**THE EFFECTS OF CROSS-LISTING OF NON-U.S. FIRMS
ON THE NEW YORK STOCK EXCHANGE**

by

ADIL ORAN, B.S., M.S.

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ABSTRACT

The level of integration or segmentation of markets is the subject of many debates in finance. This dissertation uses cross-listing of non-U.S. firms on the New York Stock Exchange (NYSE) to achieve a better understanding of the functioning of international capital markets.

Cross-listings are examined to try to answer three main questions:

1. Are there changes in the risk/return characteristics of cross-listing firms?
2. Are there abnormal returns around the time when cross-listing of firms is announced or occurs?
3. Are there differences between the effects of cross-listing that may be due to the differences in accounting policy in the U.S. and in the countries of origin?

Strong evidence is found that there are significant effects of cross-listing of non-U.S. firms on the NYSE. The effects are especially significant when looking at changes in the risk/return characteristics of stocks, and are quite significant for the finding of abnormal returns around the cross-listing events. The results for tests of significant differences in abnormal returns due to varying accounting policies in countries of origin are not clear cut. There is some evidence of firms from certain areas having greater abnormal returns than firms in samples that do not have to provide additional U.S. Generally Accepted Accounting Policies (GAAP) reconciliations. However, the results do not seem to lend much support to the argument that all GAAP standards other than the U.S. and Canadian are inferior and provide less valuable information to investors.

This dissertation contains empirical tests of some arguments commonly found in theoretical and empirical literature about the effects of cross-listing. The perceived value of U.S. GAAP reconciliations of non-U.S. firms is also tested. These tests are carried out using basic event study methodologies.

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CHAPTER I

INTRODUCTION

The functioning of international capital markets is one of the numerous areas in finance that remain unresolved. The primary area of disagreement focuses on the level of segmentation or integration of markets across physical distances and especially national boundaries. This theoretical divergence leads to difficulty in determining the appropriate models to understand and/or predict events and their effects in international capital markets. The empirical work in this area has not been able to settle the disagreement conclusively, probably because the real world capital market lies somewhere between the extremes of perfect segmentation and perfect integration.

The field of finance deals with the efficient use of money and other assets. In order to accomplish this task, it is necessary to know, or at least predict the effects that certain actions are likely to have. Forming estimates or predictions requires the use of either explicit or implicit models that attempt to help assess the real world. Disagreements between parties pertaining to the appropriateness of certain actions will usually be due to their use of divergent models, as even models that differ in minute ways may lead to drastically different predictions. It is due to this importance of models that a significant portion of the efforts of finance academicians goes to formulating and evaluating competing models of financial markets.

In the early periods of the development of the field of finance, the economic environment seemed to justify considering most capital markets as being somewhat

separated from each other. This became increasingly warranted as the level of aggregation rose and national boundaries were reached. Many models in the field of finance that are not theoretically limited to operate within national boundaries are empirically implemented as if they were valid only within certain areas, usually countries (e.g., Friend and Blume, 1970; Black, Jensen and Scholes, 1972; Fama and MacBeth, 1973). By so doing they imply that capital markets are perfectly segmented beyond the borders of that specific country or that the relation with the rest of the world is such that it can be modeled in this way. It should be pointed out that there have been some studies which have taken an international view and have used specific assumptions about the interrelations of national markets (Solnik, 1974a; Stehle, 1977). However, most studies with an international aspect have simply examined the rest of the world as a secondary component (Levy and Sarnat, 1970; Solnik, 1974b; Officer and Hoffmeister, 1987) and focused on correlations between markets and the international diversification opportunities they provide.

Cross-listing of firms provides an opportunity to examine the interrelationships of the respective markets. In this dissertation, an attempt is made to contribute to the understanding of the functioning of international capital markets by examining the cross-listing of non-US firms on the New York Stock Exchange (NYSE). Cross-listings are examined to try to answer three main questions.

1. Are there changes in the risk/return characteristics of cross-listing firms?
2. Are there abnormal returns around the time when cross-listing of firms is announced or occurs?

3. Are there differences between the effects of cross-listing that may be due to the differences in accounting policy in the US and in the countries of origin?

Chapter II of this dissertation contains a survey of the literature related to the topics examined. The literature is reviewed in three groups. The first group of articles examines the effects of US firms transferring between US exchanges, and finds evidence suggesting that there might be a positive effect on stocks before the listing and a negative effect once the stock is actually listed on the stock exchange. The second group contains articles that investigate the effects of international investments and of international cross-listing of firms. These articles generally find that investing in foreign securities is beneficial from a risk diversification perspective, yet there always seems to be a bias towards holding excessive home securities in investment portfolios. Results in articles examining international cross-listing yield limited evidence of parameter changes before and after cross-listing, but provide some evidence of possible abnormal returns pre listing and post listing.

The final group of articles reviewed deal with the ongoing accounting disclosure debate. Debates about the appropriate level of accounting requirements take place in many countries between accounting standard setters and their constituencies. However, the most widely publicized one seems to be taking place between the US Securities Exchange Commission (SEC) and members of the NYSE. The SEC argues that in order to protect investors it must ensure that the rigorous level of accounting disclosure is maintained by everyone that desires to trade on US organized exchanges. On the other side, the NYSE argues that the SEC is actually harming investors by keeping foreign

firms from listing on US organized exchanges. This harms investors in two ways, they are forced to trade in less efficient markets and incur more risk due to less information and underdiversification. The empirical evidence provided in the literature about the additional value of US Generally Accepted Accounting Policies (GAAP) is quite limited and provides little, if any, evidence in support of it. The results obtained about the relevance of US GAAP reconciliations required from non-US firms listed in various countries should contribute valuable evidence to the accounting disclosure debate.

The development of the hypotheses is presented in Chapter III. The hypotheses are developed along the lines of the three main questions mentioned earlier. The first set of hypotheses are about potential changes in the risk/return structure of the cross-listing firms. In most event studies this would not be one of the main tests, as there are usually no a priori reasons to expect changes in the return generating processes. However, in this case there is a strong possibility of a change in the return generating process after cross-listing occurs.

The second set of hypotheses are more in line with the usual tests of basic event studies. Stock returns around the cross-listing event are examined for the presence of significant abnormal returns.

Prior to the derivation of the last set of hypotheses, a summary of the ways that non-US firms can participate in US organized capital markets are reviewed. The final set of hypotheses are concerned with the effects of varying GAAPs. The abnormal returns of Canadian firms and firms that were in the US prior to NYSE listing are compared to

abnormal returns from other groups. The reason for utilizing these comparisons is to isolate the effect of providing US GAAP reconciliations.

Chapter IV of this dissertation contains a description of the data selection, collection, and final resulting data. A review of the methodology utilized to test the hypotheses developed in the previous chapter is also provided.

Chapter V presents the empirical results of the examination of cross-listing on the NYSE. Section 2 evaluates the explanatory power of various models used in the literature. The model selected in this section is used as the basic model for tests in the remainder of the dissertation. Section 3 presents the results of testing for changes in the risk/return characteristics of the cross-listing firms. This analysis initially replicates some earlier work, then it presents other tests that raise the power of previous tests. The evidence provided in this section seems to lend strong support to the view that cross-listing of non-US firms on the NYSE is an important event that affects their risk/return characteristics.

In the fourth section an analysis of the abnormal returns around the cross-listing event is provided. The tests seem to indicate that a company's announcement of its application to list on the NYSE (hereafter announcement) is positive news for its stock. Interestingly, the market seems to adjust to the information shortly before it is announced publicly. The evidence also suggests that the actual listing (hereafter listing) of a firm basically has no significant effects.

Section 5 provides the results of comparisons of abnormal returns between various areas. This is done in order to test whether there may be differences in returns that

are caused by originating from countries with different accounting policy regimes. The control group used is composed of Canadian firms and non-US firms that were in US stock markets prior to NYSE listing (hereafter PreUS). Some differences between areas are found, however, these differences do not seem to be caused by accounting regime differences.

Chapter VI provides the summary and conclusions of the dissertation. In brief, strong evidence is found that there are significant effects of cross-listing of non-US firms on the NYSE. The effects are especially significant when looking at changes in the risk/return characteristics, and quite significant for the presence of abnormal returns around the announcement of cross-listing. The results for tests of significant differences in abnormal returns due to varying accounting policies in countries of origin are not clear cut. There is some evidence of firms from certain areas having greater abnormal returns than firms in samples that do not have to provide additional US GAAP reconciliations. However, the results do not seem to lend much support to the argument that all GAAPs other than the US and Canadian are inferior and provide less valuable information to investors.

This dissertation contains empirical tests of some arguments commonly found in theoretical literature as well as in the actual markets about the effects of cross-listing. The perceived value of US GAAP reconciliations of non-US firms is also empirically tested. These tests are carried out using basic event study methodologies.

CHAPTER II

REVIEW OF LITERATURE

2.1 Introduction

This chapter contains an overview of the extant literature about the listing of stocks on the NYSE and some other exchanges. The following section contains a review of the literature related to transfers of stocks to the NYSE from other US exchanges. These articles find some interesting return patterns around the listing event. In particular, they tend to find that there are positive abnormal returns before the listing and negative abnormal returns following the actual listing of the stocks. The overall effect is still found to be positive.

The third section reviews the literature related to the international cross-listing of stocks. These articles generally find that investing in foreign securities is beneficial from a risk diversification perspective. However, they still find that there is a consistent bias towards holding, what seems to be, an excessive proportion of home securities. Results from examining international cross-listing yield limited evidence of parameter changes, but some evidence of possible abnormal returns in the pre listing and post listing periods.

The fourth section of this chapter includes a review of the literature about accounting practices in the US and the world and the debate about the optimal level of accounting information disclosure. This debate is a very active one in the accounting arena in the US as well as around the world. It should significantly influence the volume of non-US firms coming to the US exchanges and to exchanges around the world.

2.2 Transfers of US Stocks to the NYSE

The following factors have been cited in the literature as possible benefits of listing on the NYSE for US firms:

- Increased liquidity,
- Increased marketability,
- Increased recognition/information,
- Decreased bid-ask spreads,
- Wider investor base,
- Prestige of being on big board,
- Endorsement by the exchange.

These benefits might have some effects on the stock price of the listing companies and, in addition, some interesting effects have been found in the literature. Ule (1937) was one of the first to examine the effects of listing on stock prices. He compares stock returns of new listings to industry averages over 1934 to 1937, and finds some evidence suggesting positive abnormal pre listing returns followed by negative abnormal post listing returns. Merjos (1962, 1963, 1967) examines stock transfers to organized exchanges over three non-overlapping periods. She finds that stock prices of new listings rise pre listing and fall post listing, but the overall price ends up higher. Merjos interprets this as consistent with exchange listing being valuable and there being profit taking by investors. Van Horne (1970) also compares stock returns of listing companies to industry returns for NYSE listings between 1960-67. He finds the same pattern of positive excess

pre listing returns and negative excess post listing returns, which he interprets as consistent with profit taking. Ignoring transaction costs there seems to be increased value, however, taking transaction costs into account, no significant effect remains.

Ying, Lewellen, Schlarbaum and Lease (YLSL 1977) examine 248 companies listing their stock on the American Stock Exchange (AMEX) or NYSE between 1966-68. YLSL use the market model with monthly data of up to 84 months for beta estimates. They find no evidence of changes in betas, but find positive abnormal pre listing returns and negative abnormal post listing returns for the NYSE and the AMEX stocks. YLSL also point out that almost all applications to the exchanges are accepted and therefore repeat the analysis around the public announcement of the application for listing. They find positive abnormal pre-application returns and positive abnormal returns right after the application (interpretable as effect of listing), then negative abnormal returns 2-3 months after application (which is usually also post listing). According to YLSL the negative abnormal post listing returns may be due to a correction of an overreaction prior to listing.

Baker and Edelman (1992) take a slightly different approach and examine stock transfers from the AMEX to NYSE. They use a market model with daily data to examine the period 1982-89. Interestingly they find that the pattern of positive abnormal pre listing and negative abnormal post listing returns is even present in stock transfers from the AMEX to NYSE.

Sanger and McConnell (1986) examine over-the-counter (OTC) to NYSE transfers between 1966-77. They utilize a market model with weekly data and find little

or no change in the parameters. Similar to previous literature they also find the positive abnormal post-announcement returns and negative abnormal post listing returns.

However, they find that the introduction of National Association of Securities Dealers Automatic Quotation (NASDAQ) communications system to the OTC market in 1971 reduced the post-announcement abnormal returns and made them insignificant.

McConnell and Sanger (1987) scrutinize the negative abnormal post listing returns for possible explanations. They use market adjusted returns with monthly data for the NYSE between 1926-82 and daily data for the NYSE and AMEX between 1962-82 and are able to conclude that the following possibilities are not causing the anomaly:

- Insider dumping,
- Correction of overreaction,
- Time period,
- Outliers,
- Original locale of trading,
- AMEX or NYSE peculiarities,
- Issuance of additional stock after listing.

The authors conclude that the negative abnormal post listing returns are not due to insider dumping/profit taking as stocks with insider selling actually did better. They also eliminate correction of overreaction as they fail to find significant correlation between the magnitudes of pre listing run-ups and magnitudes of post listing falls of stock prices.

Dharan and Ikenberry (1995) are able to find some empirical support for one possible explanation of the negative abnormal post listing returns. They use returns

adjusted for size and book-to-market equity between 1962-90 and find that smaller firms or firms with fewer institutional investors tend to have more negative abnormal post listing returns. The managers of these firms are those that had greater autonomy and it was argued that under the opportunism hypothesis they time their applications to the exchanges. If the managers expect bad performance in the future they apply for listing before the bad news comes out. Once the firm is listed the bad news can not do as much harm, because the hurdles for remaining listed on the exchanges are much lower than those for initial listing.

2.3 International Investments and International Cross-Listing of Stocks

The literature cited in the preceding section about the effects of NYSE listing for US firms is relevant to this dissertation as it will be informative to compare these findings with those for non-US firms. However, special accommodations may be required to examine the effects of cross-listing on non-US firms. There is quite a bit of controversy about the level of segmentation of world capital markets, which makes the determination of appropriate models even more problematic.

Assuming that the assumptions of the CAPM are met in the world capital market, then all investors should hold well diversified portfolios consisting of the universal risk-free asset and the world market portfolio.

Levy and Sarnat (1970) use annual returns on common stock indices from 28 countries for the period 1951-67 that are adjusted for exchange rates, in order to derive the mean-standard deviation efficient frontier. They find that US investors would benefit

from undertaking a certain amount of foreign investment, especially in developing countries with which they have low correlations.

Solnik (1974b) uses weekly returns of stocks from the US and seven leading European exchanges, in order to form random portfolios. He shows that there are significant advantages to international diversification.

Officer and Hoffmeister (1987) show that the use of ADRs also improves risk-return characteristics of home US portfolios. They employ a sample of 45 ADRs that were listed on the NYSE, AMEX or OTC between 1973-1983.

Solnik, Boucelle and Le Fur (1996) find that there seems to be contagious volatility effects between international markets. By examining monthly data from the US, Germany, UK, Switzerland, France and Japan between 1958-95, the authors conclude that international correlations rise in periods of high market volatility. However, Solnik, Boucelle and Le Fur argue that national factors are still important in driving stock returns and the international correlations are still low enough to provide significant diversification benefits.

Stulz (1981) points out that investors' portfolios tend to have a heavy bias towards home securities when compared to the optimal portfolios. He tries to model this bias by imposing costs to holding foreign securities on the absolute amount of foreign securities held.

Several explanations for this home bias can be found in the literature, which usually imply some sort of market segmentation. Differences in the level of information about securities may lead to higher required returns on the lower information groups. Not

knowing the CAPM parameters with certainty does not alter predictions based on the model, as long as the uncertainty is constant across all securities. Barry and Brown (1985) show that when estimation risk and differential information is combined, higher returns will be required from the securities with less information.

Kadlec and McConnell (1994) use a model of CAPM with incomplete information that was originally developed by Merton (1987), where investors only invest in stocks that they are aware of. When information about the stock, or more accurately investor awareness of the stock, increases the required return decreases due to higher demand. Kadlec and McConnell argue that the listing of US firms on a major exchange, like the NYSE, could increase investor recognition. Their model is formulated for a national market, however, it can easily be extended to international cross-listing. Kadlec and McConnell use weekly data for 308 companies listing on the NYSE between 1980-89. They find positive abnormal returns following the listing announcement and negative but insignificant post listing returns. They conclude that the positive listing announcement effect supports their hypothesis of increased investor recognition. A variation of the differential information is the use of varying accounting practices in different countries, which may cause problems in comparing home firms to foreign firms.

In a survey article, Adler and Dumas (1983) point out that Purchasing Power Parity (PPP) deviations exist between countries that may cause differences in the real returns of investors, leading to varying optimal portfolios. Solnik (1974a) states that if investors use the home currency for making their decisions, then foreign securities will contain additional risk due to exchange rate risks. Investors from different countries

would be expected to have different optimal portfolios. Solnik examines a sample of 299 stocks from 8 major European countries and the US between 1966-71. He argues that international stock prices are best described by a model taking into account both national and international factors. The model he uses has the national factor in residual form, free of the effects of the international factor.

NYSE listing for non-US firms usually entails all of the benefits that were listed for US firms, and in addition the following benefits have also been found in the literature:

- Diversified ownership/Reduction of herd behavior,
- Exposure to enlarged investor base,
- Facilitation of local transactions,
- Improved relations with politicians and customer base,
- Simplified employee compensation with equity,
- Provision of US GAAP financial information,
- Increased visibility of the firm,
- Decrease of political risk.

In addition to these possible benefits, there are also some costs involved with cross-listing of non-US firms on the NYSE:

- Initial Listing and annual registration fees to the exchange,
- Costs to meet additional accounting and disclosure requirements,
- Potential for the US regulatory agency to have worldwide jurisdiction over the company.

The largest of the costs involved with cross-listing are usually those involved with meeting the additional requirements.

There is a considerable amount of controversy about what the most appropriate model of the world capital market is and whether there are changes in return generating processes of cross-listing stocks. Stapleton and Subrahmanyam (1977) propose international cross-listing of stocks as one possible way of reducing the effects of segmented markets.

Alexander, Eun and Janakiramanan (1988) argue that cross-listing of a stock on a foreign capital market should lower expected returns of the stock if the markets are completely or even mildly segmented. They believe that the cross-listing may be beneficial by allowing trading in the foreign currency, provision of additional information, easier access to information or increased information production by analysts. The authors use mean adjusted and CAPM based returns for 34 firms with monthly data between 1969-1982 to test for abnormal returns post listing. Alexander, Eun and Janakiramanan find persistent post listing negative abnormal returns for non-Canadian firms, while no significant abnormal returns for Canadian firms. They interpret this as indicating that the Canadian capital market is closely integrated with the US market while the non-Canadian markets are segmented, leading to lower post listing expected returns for non-Canadian firms.

Cheung and Shum (1995) examine 24 Hong Kong stocks that cross-listed on the London Stock Exchange between 1986-91. They use a market model with daily data and

the Hong Kong index and find that the risk of the cross-listing stocks may decrease due to lower exposure to political risk.

Lee (1992) examines 18 UK firms cross-listing on the Tokyo Stock Exchange and 14 Japanese firms cross-listing on the London Stock Exchange between 1962-89. He uses a market model with weekly returns and finds positive but insignificant abnormal returns both pre and post listing. Lee concludes that there are no wealth effects of cross-listing between Japan and the UK, and therefore no evidence of segmentation.

Lessard (1974) uses 16 national market indices for the period 1959-1973. He converts all returns into a common currency and then conducts analyses. He concludes that there seems to be a common world factor, but purely national factors are also important in explaining stock returns. Therefore, international diversification should be an important part of portfolio diversification. Lessard also points out that one should be cautious about the construction of the world market factor, as it may influence the explanatory power of the factor on particular groups of stock returns.

Errunza and Losq (1985) develop a model of international market segmentation by using an “unequal access” assumption where a subset of the investing population can only invest in “eligible” securities. As a result, the required return on “ineligible” securities should be higher because they should include a “super risk premium” proportional to the differential risk aversion and the conditional market risk. They test this by using a sample of US stocks and Least Developed Countries (LDC) stocks from 9 countries, with monthly data and find evidence consistent with mild segmentation of the markets. A simple extension of their model would be a shift of a security from the

“ineligible” to “eligible” category, resulting in the elimination of the “super risk premium.”

Howe and Kelm (1987) attempt to measure the net effect of overseas listing. They use a market model with daily data and a US index for 165 US firms going abroad to list between 1962-85. Howe and Kelm find that the first overseas listing is associated with significant negative abnormal returns while the second and third listings have no significant effects. When separated by exchange, the Basel and Frankfurt exchanges seem to have significant negative effects, while Paris has no significant effect. Overall, they conclude that overseas listings do not seem to be beneficial.

Howe and Madura (1990) define a segmented market as one that capital does not flow into or out of, therefore assets in segmented markets are priced in that context and risks are measured relative to systematic factors in the market. They examine 68 US firms cross-listing to Germany, France, Japan or Switzerland between 1969-1984. They utilize quarterly data with two models, one with only the home country factor and one with both home and foreign country factors, and find no evidence suggesting that international cross-listing changes the risk characteristics of the firms. Howe and Madura test for changes in the parameters of the equations by comparing averages for all firms pre and post listing.

Jayaraman, Shastri and Tandon (1993) examine 95 non-US firms listing their ADRs on US exchanges between 1983-88. They find that variances for the foreign firms increase an average of 56% after cross-listing. Using a mean adjusted returns model with daily data, they find positive abnormal returns on the listing date, followed by negative

but insignificant post listing returns. Jayaraman, Shastri and Tandon also use a two factor model with a home market factor and a foreign markets factor to examine a sample of 95 non-US firms cross-listing to US exchanges between 1983-88. Similar to Howe and Madura (1990), they also conduct tests on the overall averages of the parameters and fail to find any significant changes in the parameters post listing. They find evidence of positive abnormal returns on the listing date, but no evidence of negative abnormal returns post listing.

2.4 The Accounting Disclosure Debate

There are two opposing views about what level of accounting disclosure should be required from non-US companies that wish to have their stock traded in the US. A similar debate is continuing about whether the Financial Accounting Standards Board (FASB) and SEC have gone too far in their quest for better financial reporting. Some are arguing that the cost of adhering to many requirements is not justified by the benefits they yield. In this section we will focus on the accounting disclosure debate for non-US participants in US exchanges.

Some arguments and evidence about the advantages of international diversification have been provided in the previous sections. Many US investors seem to have accepted the benefits of international diversification and are investing significantly more in non-US stocks. Cochrane (Bayless, Cochrane, Harris, Venuti, Leisenring, McLaughlin and Wirtz, 1996) argues that US investors have realized that in the past they had been ignoring the advantages of international diversification, and he believes that US

investors are raising the international portion of their equity portfolio from about 5% to 10%. The increase of international investing is also evident in the actions of fund managers that are increasing their international holdings.

The SEC adheres to the idea that in order to protect US investors, reconciliation or adherence to US GAAP is very important. Chen (1992) points out that the SEC's insistence on reconciliation to US GAAP has kept the organized US exchanges from meeting US investors increased demand for non-US stocks, and it may even be harming US investors by forcing them to go to non-organized exchanges where very little information is available. Cochrane, Shapiro and Tobin (1996) argue that investors forced to non-organized exchanges are harmed due to less investor protection and higher costs.

Cochrane (Bayless et al., 1996) states that most new non-US issuers coming to US markets view the reconciliation to US GAAP as the most significant problem they face, with these costs being estimated as at least US\$ 1 million per year (Biddle and Saudagaran 1991).

The effect of requiring reconciliation can be seen in the numbers of firms circumventing the requirements. Berton (1995) points out that 55 million shares of non-registered non-US stocks are being traded on US OTC markets, for example 14% of Swiss giant Nestle S.A. is owned by Americans and it is not traded on any organized US exchange. Chen (1992) highlights the fact that markets that have not been hampered by US GAAP reconciliation requirements have experienced great international growth. Prior to 1983 non-US companies could be listed on NASDAQ without reconciliation thanks to rule 12g3-2(b), and the number of non-US firms on NASDAQ increased from 85 to 294

from 1977 to 1983. After 1983, the number of non-US firms on NASDAQ stalled and was only 271 in 1991. On the other hand, as of 1999 rule 12g3-2(b) still applied to non-NASDAQ OTC and from 1983 to 1991 the number of non-US listings had gone from 152 to 1056 (Chen, 1992).

Berton (1995) states that the NYSE is worried that if it does not come up with ways of allowing non-US firms to be traded without having to totally reconcile their statements to US GAAP, they will lose great market share to other markets. On the other hand the SEC claims it has been taking some measures to make it easier for non-US issuers to come to US markets, they have reduced historical reconciliation requirements from 5 to 2 years and interim financial information does not have to be reconciled (Bayless et al., 1996). However, the SEC stresses that they will not allow the use of standards that are of low quality and may harm investors. Bayless et al. (1996) state that US firms might be disadvantaged in their own markets if they have to abide by US GAAP while non-US firms can use other GAAPs that are less rigorous.

Even though US GAAP is generally accepted as being the most detailed and stringent in the world, there does not seem to be much proof that this additional detail and stringency is valuable to investors, especially when the additional costs are considered. In order to have stock traded on organized US exchanges the SEC requires that the companies use US GAAP or at least reconcile to it with form 20-F. There are some exceptions to this, the major ones being allowing Canadian companies to use Canadian GAAP and allowing non-US issuers to use a few International Accounting Standards (IASs). If we assume that the SEC is rational and pursues the goal of helping the US

capital market function as efficiently as possible, then we can extract some assumptions it makes from its actions. A line is drawn between American and Canadian GAAP and the GAAPs of other countries, and it is assumed that any GAAP beyond the line is deficient and must be reconciled to US GAAP to protect investors and improve the efficiency of the market.

Meek (1983) examines the effects of annual earnings announcements in the US and annual 20-K (20-F) filings where earnings are reconciled to US GAAP. He used a sample of 26 non-US firms from 5 countries that were traded on the NYSE or AMEX between 1968 and 1979, with a market model using daily data, the CRSP equally weighted index and Scholes-Williams betas. Meek concluded that reactions to home GAAP annual earnings announcements of the non-US firms were similar to those of US firms, and there were no significant effects of filing of reconciliations. He argues that the lack of response to reconciliations might be due to the reconciliation data not being timely, because they only need to be filed 6 months after the end of the fiscal year. This still causes one to question the value of US GAAP reconciliations.

Pope and Rees (1991) try to compare the information content of accounting earnings under US GAAP and UK GAAP by regressing the market adjusted stock returns on alternative earnings and their components. They use London Stock Exchange data for 27 UK firms also listed on a US organized exchange between 1986-90. The results are not very conclusive, but seem to indicate that UK GAAP accounting information may contain more information for these firms. Pope and Rees also find that unlike Meek, many firms are announcing their US GAAP reconciliations on their financial statements.

In summary, it is far from obvious that US GAAP reconciliations are worth the cost of producing such information. Any study that contributes evidence to this debate should be very valuable.

2.5 Summary

The review of literature dealing with the transfer of stocks to the NYSE has documented that there seem to be certain return patterns for firms transferring their stock to the NYSE. In particular, they find that there are positive abnormal returns pre listing, positive abnormal returns at the announcement of application to list, and negative abnormal returns post listing. Many have argued that this return pattern may be due to selling off by insiders or correction of a pre listing over-reaction. These and other possible reasons are examined and refuted (McConnell and Sanger, 1987). The only possible reason that seems to be supported by the empirical evidence is the presence of opportunism by managers who time their applications to take place before some bad news reaches the market (Dharan and Ikenberry, 1995). The total overall effect of listing seems to be significantly positive despite the negative post listing abnormal returns.

Many articles have documented the benefits that diversifying internationally provides over only diversifying within a country. Despite this apparent benefit, investors are found to have a heavy bias towards home securities. Some possible explanations for this event like PPP deviations, exchange rate risk, information availability differences, ease of accessibility are found in the literature. All of these explanations imply some sort of segmentation between markets. International cross-listing is proposed by Stapleton and

Subrahmanyam (1977) as one possible way of reducing the effects of segmented markets. It is not theoretically obvious what market a cross-listing stock should be priced according to. The empirical results yield limited evidence of parameter changes, but some evidence of possible positive abnormal returns pre listing and negative abnormal returns post listing.

The accounting disclosure debate usually takes place between the accounting standard setters and their constituents. The two main sides in the US are the SEC and representatives of the exchanges. The SEC argues that the rigorous US GAAP standards must be maintained in order to protect the investors, while the NYSE argues that such standards are excessive and harm investors by keeping many non-US firms out of organized US exchanges. The empirical evidence found in the literature provides little, if any, evidence in support of the market finding US GAAP significantly superior to other GAAPs. The accounting disclosure debate may be the area to which the analyses in this dissertation have the greatest likelihood of making significant contributions to.

CHAPTER III

HYPOTHESES DEVELOPMENT

3.1 Introduction

Capital markets around the world have been in existence for centuries. However, we are still not certain about the underlying forces and interactions that affect and control them. In the early periods of the development of the field of finance, the economic environment seemed to justify considering most capital markets as being somewhat separated from each other. The presence of national barriers in many markets was made quite obvious by differences in currency, language, culture, time zone, sovereign power, level of information, regulations and many other factors. In addition to the individual effects of each of the factors listed above, a number of the intercountry barriers combine to form a psychological barrier between countries that cause participants to view otherwise equivalent commodities as being different.

An example of the treatment of national boundaries in models can be observed in capital market models. Most models of asset pricing tend to limit themselves empirically to operate within national boundaries, even if the theory itself does not require it. The Capital Asset Pricing Model (CAPM) (Sharpe, 1964; Lintner, 1965; Mossin, 1966) and some of its variations are still the most often used in the field of Finance, despite several important problems having been identified with them (Basu, 1977; Banz, 1981; Reinganum, 1981; Keim, 1983; Roll, 1977). Even though Solnik (1974a) points out that there are some problems in adopting the CAPM within an international context, like the

absence of a universal risk-free asset and the presence of exchange risk, the CAPM could still basically be appropriate for an integrated world market. Yet, empirical applications of the CAPM have usually tended to interpret it within national boundaries (e.g., Friend and Blume, 1970; Black, Jensen and Scholes, 1972; Fama and MacBeth, 1973). It should be noted that there have been some studies which have tried to take an international view of the CAPM with some adjustments and have come up with some International CAPMs (ICAPM) (Solnik, 1974a; Stehle, 1977). However, most studies with an international aspect have focused on the correlations between national markets and the international diversification opportunities they provide (Levy and Sarnat, 1970; Solnik, 1974b; Officer and Hoffmeister, 1987). There have also been some studies that have utilized variations or deviations of the CAPM to approximate the functioning of capital markets in attempting to examine certain of its aspects. Examples of the last type of studies include some that have used multi-factor market models that have factors for separate national factors (Howe and Madura, 1990; Jayaraman, Shastri and Tandon, 1993) as well as some for international factors (Agmon and Lessard, 1981; Solnik, 1974; Lessard, 1974) or even a US market factor as an approximation of the international factor (Agmon, 1973).

Like many other topics in social sciences, it has not been possible to determine for certain whether capital markets are segmented or integrated, as there have been some studies that can be interpreted as supporting segmentation (Alexander, Eun and Janakiraman, 1988) while others seem to support integration (Agmon, 1972; Lee, 1992). The main reason for many of the inconclusive results of tests in social sciences is that the truth often lies between the extremes that are tested. The world capital market is

probably not perfectly segmented, nor is it perfectly integrated. Precise conclusions about the exact level of segmentation/integration of the world capital market are not attempted in this dissertation. Rather, the objective is to obtain a better understanding of the functioning of world capital markets by analyzing the effects of international cross-listing of stocks on the NYSE by non-US firms. However, it should be pointed out that any changes or effects that are observed around the international cross-listing could be interpreted as evidence of some segmentation between the respective markets, even if they might be due purely to psychological factors.

The first area examined in this dissertation is whether the introduction of a stock onto the stock market of a foreign country alters its risk/return generating process. That topic is covered in section 3.2. In particular, non-US firms that originally had their stock traded in their home country prior to cross-listing on the NYSE are examined. In section 3.3 the behavior of stock returns around the date of their cross-listing on the NYSE is examined. In the final section of this chapter, comparisons of stock returns from different groups of countries are examined for possible evidence of significant investor preferences for certain GAAPs over others. In examining the above-mentioned subjects, the models that are utilized are based on the market model. In particular, the models used are multi-factor market models that contain separate factors for the national factors of the countries in which the stocks are traded, an approach that is similar to that of Howe and Madura (1990) and, Jayaraman, Shastri and Tandon (1993). In this dissertation, the factors are the US factor, which represents the foreign market to which the stocks are being cross-listed, and the home country factor of the country of origin of the stocks.

Some improvements to the models used by Howe and Madura (1990) and, Jayaraman, Shastri and Tandon (1993) are also introduced.

3.2 Changes in the Risk/Return Structures

In many event studies there is no a priori reason to expect changes in the return generating processes, therefore, the authors are able to choose from several estimation periods available to them. The most common estimation periods are pre event periods that go back in time a reasonable length and have a certain portion excluded just before the event in order to try to eliminate the effects of possible information leakage. However, many of these studies still carry out the analyses with the other estimation periods and provide the information in the footnotes as it usually does not alter the results significantly. In this dissertation the examination of “whether the risk/return structure of a stock changes” merits special attention due to the fact that there are a priori reasons to expect possible changes. There have been numerous studies that have argued that international cross-listing of stocks may cause changes in risk/return structures due to many factors like decreased segmentation (Stapleton and Subrahmanyam, 1977; Howe and Madura, 1990), reduction of political risk (Cheung and Shum, 1995), and reduction of information costs (Alexander, Eun, and Janakiraman, 1988). An attempt in this dissertation is made to extend the analysis of changes in risk structure around international cross-listing undertaken by Howe and Madura (1990) by examining for changes in the return generating processes of international cross-listing firms. The same

model was also used in a part of a study by Jayaraman, Shastri and Tandon (1993). The hypotheses tested for risk/return structure changes are:

H₁₀: Cross-listing of a non-US firm on the NYSE will not affect the foreign beta.

H₁₁: Cross-listing of a non-US firm on the NYSE will increase the foreign beta.

Howe and Madura (1990) use the following rationale for supporting H₁₁ “If markets are sufficiently segmented, international listing will increase the sensitivity of the firm’s stock to market movements in the country of listing; i.e., the stock’s foreign beta would rise” (p. 1136).

H_{20a}: Cross-listing of a non-US firm on the NYSE will not affect the home beta.

H_{21a}: Cross-listing of a non-US firm on the NYSE will decrease the home beta.

and

H_{20b}: Cross-listing of a non-US firm on the NYSE will not affect the home beta, even after taking into account the effect of the foreign market.

H_{21b}: Cross-listing of a non-US firm on the NYSE will decrease the home beta, even after taking into account the effect of the foreign market.

Howe and Madura (1990) use the following rationale for supporting hypotheses H_{21a} and H_{21b} “An international listing which decreases segmentation will increase the influence of the foreign market on the listing firm’s stock returns. The influence of the

home market will be correspondingly less pronounced” (p. 1136). The directions of the beta changes seem to be sensible, however, not necessarily always correct. Therefore, the hypotheses are also tested for changes in any direction.

It is necessary to point out some weaknesses of the Howe and Madura study.

First, they did not specifically state how they derived the returns that they used. It seems that ordinary returns were used, which is problematic. Ordinary returns are truncated at the lower end at minus 100% and would result in a truncated and skewed distribution. The use of log-returns corrects the distribution and allows for the simple addition of log returns over adjacent periods in order to obtain the total return over the entire period. This dissertation uses log-returns in the models.

Second, they did not appear to make any adjustments for exchange rates. The various market returns that they used are dependent on the underlying currency and its exchange rates. If no adjustments are made, the analysis becomes analogous to comparing apples and oranges. An example would be deriving a market model beta for IBM by using the return on the NYSE equally weighted index, converted into Turkish Liras. Even if there is a strong relationship between the return on IBM stock and the index, unrelated changes in the Turkish Lira to US\$ exchange rate may hide the relation. This dissertation replicates the original Howe and Madura models and then uses other models that adjust for the varying currencies.

Third, Howe and Madura test for changes in risk by comparing the **averages** of parameters from pre listing periods to those from post listing periods. In this dissertation an attempt is made to improve on their tests by examining the individual firms’

parameters as opposed to the overall averages. This is achieved by using dummy variables in the individual equations for the post listing periods.

Finally, Howe and Madura did not present a combined test of whether any of their hypothesized changes took place. They also neglected the possibility that changes in the risk return structure could materialize through changes in the constant parameter of the models used. These shortcomings are remedied together by providing an overall test for changes in the risk/return structures.

H₃₀: Cross-listing of a non-US firm on the NYSE will not affect the risk/return structure.

H₃₁: Cross-listing of a non-US firm on the NYSE will alter the risk/return structure.

3.3 Stock Returns Around International Cross-Listing on the NYSE

Stock returns surrounding cross-listing on the NYSE are examined using basic event study methodology (Brown and Warner, 1980, 1985). Normal returns are derived by using the appropriate model as determined in the evaluation of competing models. There are several different effects that have been reported in the literature on cross-listing of stocks. One pattern of stock returns commonly found in US stock transfers to the NYSE or other large organized exchanges in the US has been positive abnormal pre listing returns, followed by negative abnormal post listing returns (Ule, 1937; Merjos, 1962, 1963, 1967; Van Horne, 1970; YLSL, 1977; Sanger and McConnell, 1986; Baker and Edelman, 1992; Dharan and Ikenberry, 1995). Another fairly common pattern found

together with the preceding patterns has been positive abnormal returns in response to the announcement of a listing application. There appear to be two possible candidates for the event date, the application announcement date and the actual listing date. Even though most studies agree that if the market is efficient the appropriate event date should be the announcement date, the possibility of interesting effects around the listing date warrants that the analysis be carried out separately for each date.

The hypothesis tested to check for abnormal returns follows.

H₄₀: Cross-listings of non-US firms on the NYSE have no abnormal effects on their stock prices.

H₄₁: Cross-listings of non-US firms on the NYSE have abnormal effects on their stock prices.

3.4 The Effects of Varying GAAPs

Non-US shares can be traded in the US in a number of ways:

- First, Canadian firms must basically act like a US firm, with the exception that they are permitted to use Canadian GAAP.
- According to rule 12g3-2(b), if the stock is not traded on any organized exchange (NYSE, AMEX, NASDAQ) then, the firm only has to provide home country documents. The stocks can be traded on the OTC-BB and with pink sheet listings. Prior to 1983 this rule also applied to NASDAQ and allowed many non-US firms to use the NASDAQ, after 1983 this number has slowed greatly.

- Stocks can be traded indirectly by having banks purchase them and then issue American Depositary Receipts (ADRs) to individual investors. ADRs do not require any special accounting formats or disclosures. The issuing banks quote them in US dollars and also convert any dividend payments. However, if the ADR is listed on an organized exchange the firm must fill out form 20-F just like a non-US company with its stock listed.

- Stocks can be traded on organized stock exchanges or the NASDAQ after filling out form 20-F. Filling out form 20-F basically requires reconciliation of their financial statements to US GAAP. In order to make a public security offering they would also have to provide disclosures on geographic location and lines of business.

- Stocks can be traded in the US via Rule 144A as long as the securities are only sold to qualified institutional buyers, which usually require significantly less disclosure than the Securities Exchange Commission (SEC).

Determining the optimal level of accounting disclosure is a difficult endeavor as it requires assumptions about the level of market efficiency with respect to varying levels of accounting information. The SEC, which has the duty of determining the level of accounting disclosure for publicly traded companies in the US, has chosen to delegate the job to the private sector under the control of the Financial Accounting Standards Board (FASB). The SEC has gone along with the vast majority of FASB results, but it still has the authority to overrule in case of disagreements.

The SEC has usually taken a strong stance against allowing non-US firms to enter the US organized stock exchanges with what they believe to be “inferior” financial

information (Bayless et al., 1996). However, the SEC also seems to have realized that some concessions must be made in order to bring some structure to the chaos of the world capital market. The SEC appears to support the development of International Accounting Standards (IAS) by the International Accounting Standards Committee (IASC), and already allows some IASs to be used by non-US applicants to US markets (Bayless et al., 1996; Cairns, 1997). Berton (1995) points out that 55 million shares of non-registered non-US stocks are being traded on US OTC markets where the US investors are faced with financial information of questionable quality.

The US GAAP is usually accepted as being the most detailed and stringent in the world (Biddle and Saudagaran, 1991), perhaps to a fault. The NYSE feels that, requiring non-US firms to conform to US GAAP is causing them to lose significant market share to other exchanges, as many large non-US firms are choosing to stay out of the US stock markets (Berton, 1995). The cost of converting to US GAAP has been estimated and been found to be quite significant (Biddle and Saudagaran, 1991). Due to these and other reasons, evidence concerning the value of different GAAPs would be quite useful.

An interesting fact is that Canadian firms that list on organized US exchanges are allowed to use Canadian GAAP, whereas all other non-US firms have to reconcile to US GAAP via form 20-F, at a minimum. This dissertation takes advantage of the Canadian firms' ability to use Canadian GAAP, by using the Canadian sample as part of a control group for the other possible effects that are entwined in the effect of cross-listing on the NYSE by non-US firms.

A problem encountered in the collection of the data turned out to actually be an important opportunity to test the value of US GAAP reconciliations. A number of the firms in the sample had returns listed for periods prior to NYSE listing. The original impulse was to remove these firms from the sample as they would not have the embedded additional US GAAP effect. However, then it was realized that these firms were excellent candidates for addition to the control group to test for the value of US GAAP reconciliations. These firms were already providing US GAAP reconciliations, therefore, cross-listing to the NYSE should not have the additional US GAAP effect.

Hypothesis H_{50} is tested to determine whether the market finds reconciliations to US GAAP to be significantly valuable. The Control group consists of Canadian firms and non-US firms in the US market prior to listing on the NYSE.

H_{50} : There are no differences between the abnormal returns around cross-listing on the NYSE by firms in the Control group and non-Canadian non-US firms.

H_{51} : The abnormal returns around cross-listing on the NYSE of firms in the Control group are lower than the abnormal returns of non-Canadian non-US firms.

CHAPTER IV

DATA AND METHODOLOGY

4.1 Introduction

This chapter describes the data and the methodologies that are used in this dissertation to test the hypotheses that were developed in chapter III. Section 4.2 describes all of the data collected and used in this dissertation; it also details the specifications that the data had to meet to be included in the sample. Section 4.3 contains an explanation of the methodologies that are used to test the first set of hypotheses regarding changes in the risk/return structure of non-US firms around cross-listing on the NYSE. Section 4.4 includes the methodology that is used to examine abnormal returns around the cross-listing on the NYSE, in order to test the hypotheses concerning the presence of abnormal returns. The final section gives an explanation of the reasons and methodology used to compare abnormal returns of different groups of countries in order to test the hypotheses regarding the values of different GAAPs.

Throughout the dissertation 10% is assumed as the relevant level of significance for the tests and is denoted by a single asterisk in all the tables.

4.2 Data

One of the main endeavors of this dissertation was assembling all of the necessary data. The data required spans the four corners of the world, as the pre listing stock price data has to come from the foreign exchanges on which the stocks were originally listed.

The population of stocks that were originally available for this dissertation were all non-US stocks traded in the US. In order to obtain data more easily the analysis was first limited to organized exchanges and then even further to the NYSE, as it provided sufficient observations and is commonly accepted as the premier stock exchange of the world. At that point, the number of possible firms that could be included in the sample was 319, as of 1997. The next condition for inclusion was that the non-US firm be listed on an organized exchange outside of the US, in order to ensure that reliable stock prices are available for the pre listing period. At that point the total number of firms that could be included in the dissertation was 221. Further limiting the sample to the 1980 through 1996 listing period reduced the number of available firms to about 200. From this population of 200 firms an attempt was made to obtain daily pre listing stock prices from Datastream International, non-US stock market indices from Datastream International, post listing stock prices from the Center for Research in Stock Prices database (CRSP), US stock market indices from CRSP, exchange rates from the Federal Reserve's FRED database, listing dates from the NYSE's annual reports, and dates for announcement of listing applications and acceptances of listing applications from the NYSE's Weekly Bulletin.

The main reasons for elimination from the sample were as follows. Not being on another organized exchange, or not being able to determine the exchange. Not being able to obtain pre listing stock prices. Not having announcements of listing application and listing acceptance in the NYSE Weekly Bulletin. As a result of these further reductions, the final sample consists of the 85 firms listed in Tables 4.1 and 4.2. Of these firms, it

was found that 14 were traded in US markets prior to the NYSE listing. This group was included as a control group.

The daily stock prices used either already had been adjusted for splits and dividends or stock returns that included dividends and splits were used. Exchange rates were obtained from the FRED database when available and supplemented from Datastream International when necessary. The announcements of NYSE listing applications and the announcements of NYSE listing acceptances were manually collected from the NYSE Weekly Bulletins in the Archives of the NYSE in New York.

Daily stock prices for the firms were obtained for at least 1 year prior to and following the cross-listing on the NYSE. All of the pre listing data, other than US market indices, had to be from the original home country exchange as no prices were present from the NYSE prior to listing. There were some exceptions to this encountered, these were firms that had been in the US markets prior to listing on the NYSE. The post listing stock prices were obtained from the CRSP data tapes. There were a few instances when post listing data was not available from CRSP but was on Datastream, in those instances the post listing data was also obtained from Datastream. The daily stock returns were also used to derive weekly returns, as all of the analyses were carried out using both daily and weekly data. All returns in this dissertation were calculated as log-returns.

Daily stock market indices were also obtained from the non-US markets that have cross-listed stocks included in the sample. An attempt was made to obtain each exchange's main value weighted index, the resulting indices are listed in Table 4.3. For the US market the value weighted CRSP index from the CRSP data tapes was used.

Due to the peculiarities of the data used, adjustments were necessary for any analysis. The stock price data for the non-US cross-listing stocks originated from two different sources. The pre listing data had to come from the home (non-US) exchange and were therefore denominated in the non-US currency. The post listing data were from the CRSP database that uses NYSE prices denominated in US dollars. The post listing data could also have been obtained from the non-US exchanges; however, the non-US data were more difficult and costly to obtain as well as seeming to be more prone to errors. Therefore, CRSP data were utilized whenever it possible. Maldonado and Saunders (1983), and Amir, Harris and Venuti (1993) find that stocks that are simultaneously traded on more than one exchange internationally have prices that are aligned internationally and do not provide arbitrage opportunities. Therefore, the stock prices from the separate exchanges were merged after the appropriate adjustments were made. For comparison to Howe and Madura (1990) and Jayaraman, Shastri and Tandon (1993), the returns were derived after the post listing prices had been converted to home (non-US) prices and combined with the pre listing returns, which were already denominated in the home (non-US) prices. Later, all returns, including non-US market indices were converted to US dollar returns and the analyses were carried out on a common currency base.

There were three possible candidates for the event date. These were the listing application announcement date on the NYSE Weekly Bulletin, the listing application acceptance date on the NYSE Weekly Bulletin, and the date of the actual listing on the NYSE. Previous literature has found that the initial public announcement of listing

application occurs in the NYSE Weekly Bulletin, and these applications are almost never refused as there is a prior confidential review (Baker and Edelman, 1992; Kadlec and McConnell, 1994; Sanger and McConnell, 1986; Ying, Lewellen, Schlarbaum and Lease, 1977). Therefore, the application announcement in the NYSE Weekly Bulletin should be the event date if it is assumed that the market is efficient. The announcement of the acceptance and the start of listing should have no effect as they basically contain no new information. However, as interesting return patterns have been documented around the actual listing date in the literature, the analyses are carried out for this date as well. There are some instances where an announcement of listing application could not be located in the NYSE Weekly Bulletin, in those cases the announcement of acceptance is used, if available. The announcement is published in the NYSE Weekly Bulletin which is sent out Fridays after trading hours and should be received by the following Monday. Therefore, the announcement event date is the Monday following the publication of the Bulletin. The listing event date was the date of actual listing on the NYSE. The event dates can also be found in Table 4.1.

4.3 Methodology for Testing Changes in Risk/Return Structure

The analyses throughout the dissertation are carried out by using the estimation and event windows listed below. Tests for abnormal returns are carried out on subsets of the event windows.

	<u>Estimation Window</u>	<u>Event Window</u>
Weekly	(-51, -16) and (30, 49)	(-15, 29)
Daily	(-251, -52) and (50, 249)	(-51, 49)

The reason that the windows may seem a little awkward is that in the data preparation stage of this dissertation, the event date was erroneously set to 1 instead of the usual 0. Fortunately, this did not cause any major inaccuracies. The effects were actual data collection windows of (-251, +249) days and (-51, +49) weeks.

The examination of changes in risk structure of non-US firms cross-listing on the NYSE are initially based on the methodology used by Howe and Madura (1990) to test for a change in the risk structure of US firms cross-listing onto non-US exchanges. Howe and Madura use the following two equations in their study:

$$R_{i,t} = a_i + b_i R_{H,t} + e_{i,t} \quad (4.1)$$

$$R_{i,t} = a_{2,i} + c_i R_{H,t} + d_i R_{F,t} + u_{i,t} \quad (4.2)$$

Where $R_{i,t}$ is the rate of logarithmic return for security i over period t ; $R_{H,t}$ is the rate of logarithmic return on the home country index; $R_{F,t}$ is the rate of logarithmic return on the foreign country index; $e_{i,t}$ and $u_{i,t}$ are error terms. Also, a_i , b_i , c_i , d_i are the ordinary least squares (OLS) estimates of firm i 's regular and two-factor market model parameters.

In Howe and Madura's study, the home country (H) is the US while the foreign country (F) is Germany, France, Japan or Switzerland. They use 16 quarters of data pre listing and 16 quarters post listing to obtain parameter estimates. They then average across firms and test for a change in the parameters after the cross-listing. They fail to find significant changes in the risk measures, but this may be due to the lack of power of

their technique. In addition to their methodology, in this dissertation several other methodologies are used to try to improve on Howe and Madura's design.

$$R_{i,t} = a_{1,i} + d_{a1,i}D + b_{1,i}R_{H,t} + d_{1,i}DR_{H,t} + e_{i,t} \quad (4.3)$$

$$R_{i,t} = a_{2,i} + d_{a2,i}D + b_{2,i}R_{H,t} + c_{1,i}R_{US,t} + d_{2,i}DR_{H,t} + d_{3,i}DR_{US,t} + u_{i,t} \quad (4.4)$$

Where D is 0 for $t < 0$, otherwise 1; $R_{H,t}$ is the return on the home country market portfolio of the stock for period t; $R_{US,t}$ is the return on the US market portfolio of the stock for period t; $R_{i,t}$ is the return of stock i for period t; e_i and u_i are random errors.

The methodology in equations (4.3) and (4.4) has several improvements over Howe and Madura. The use of dummy variables allows for changes in the risk structure to be evaluated on an individual firm level. Adjustments are also made to the home country index returns and pre listing stock returns for changes in the exchange rates, in order to bring all variables onto a common currency base. Once all of the individual regressions have been run, a binomial test will be used to test whether partial F-tests for significance of the dummies come up significant more times than would be expected under the null hypothesis of no change in the risk-return structure.

$$R_{i,t} = a_{3,i} + d_{a3,i}D + b_{3,i}\gamma_{H,t} + c_{2,i}R_{US,t} + d_{4,i}D\gamma_{H,t} + d_{5,i}DR_{US,t} + u_{i,t} \quad (4.5)$$

$$R_{H,t} = a_{4,h} + b_{4,h}R_{US,t} + \gamma_{H,t} \quad (4.6)$$

Equations (4.5) and (4.6) were also used to obtain estimates for a model with the home country factor in residual format. This was done in an attempt to eliminate the potentially serious problem of multi-collinearity while maintaining the equations' explanatory power. This type of model has also been found in the literature (Agmon,

1972, 1973; Agmon and Lessard, 1977; Lessard, 1974). However, it was observed that the use of this model would lead to problematic interpretations of the calculated parameters of the equations and of their significances. Therefore, the results are presented for these equations as well, but they are not focused on in the body of the dissertation. It should also be noted that the residual returns calculated from equation (4.5) are equivalent to those calculated from equation (4.4).

The equations listed above are estimated for a significant number of variations involving currencies, factors included, dummy variables, lags and residual format. Among these many variations it is necessary to choose the variation that best modeled returns. The “best” model is selected via a process that considers both explanatory power and theoretical appeal. An example of theoretical appeal would be models using returns denominated in different currencies versus all returns being denominated on a common basis. The common basis model is chosen over the other unless the evidence showed that the other model has much better explanatory power. In order to choose between models without changes in the risk/return structure and those with changes (dummies), binomial tests with null hypotheses of no change are used.

Weekly data is also utilized to estimate the equations to check for potential problems and provide a longer event horizon. While the daily data might have little or no overlap for exchanges around the world, the weekly data should have sufficient overlap to correct for time zone differences. The analyses using daily data are also run by lagging the data from exchanges outside of the Americas, as they start trading the following day after the NYSE closes.

H₁₀: Cross-listing of a non-US firm on the NYSE will not affect the foreign beta.

H₁₁: Cross-listing of a non-US firm on the NYSE will increase the foreign beta.

Hypothesis H₁₀ is initially tested by testing if the mean of d_i from equation (4.2) is significantly greater in the post period than in the pre period. This is done to replicate Howe and Madura (1990) as well as Jayaraman, Shastri and Tandon (1993). Then the tests are repeated with two-sided tests.

As an extension of their methodology, hypothesis H₁₀ is tested by using equation (4.4) and testing if the mean of d_{3,i} is significantly different from zero. This test is performed on each individual firm, and then the results are combined into a single overall test by using a binomial test. The binomial test has the hypothesis of no effect as the null and therefore a α % chance of significant d_{3,i}'s. The null hypothesis of no effect on the beta can be rejected when the number of significant d_{3,i}'s exceeds a critical value that can be calculated or found in statistical tables, and for samples larger than 20

$y_r = n \times p + w_r \sqrt{n \times p \times (1 - p)}$ can be used (Conover, 1980). Where w_r is the r^{th} quantile of the standard normal distribution; n is the number of attempts; p is the probability of success (α).

H_{20a}: Cross-listing of a non-US firm on the NYSE will not affect the home beta.

H_{21a}: Cross-listing of a non-US firm on the NYSE will decrease the home beta.

Hypothesis H_{20a} is tested by using equation (4.1) and testing if the mean of b_i is significantly smaller in the post period than in the pre period. The extension is tested by testing if the mean of $d_{1,i}$ in equation (4.3) is significantly different from zero.

H_{20b} : Cross-listing of a non-US firm on the NYSE will not affect the home beta, even after taking into account the effect of the foreign market.

H_{21b} : Cross-listing of a non-US firm on the NYSE will decrease the home beta, even after taking into account the effect of the foreign market.

Hypothesis H_{20b} is tested by using equation (4.2) and testing if the mean of c_i is significantly smaller in the post period than in the pre period. The extension is tested by testing if the mean of $d_{2,i}$ in equation (4.4) is significantly different from zero.

H_{30} : Cross-listing of a non-US firm on the NYSE will not affect the risk/return structure.

H_{31} : Cross-listing of a non-US firm on the NYSE will alter the risk/return structure.

Hypothesis H_{30} is tested by using an F-test for the overall significance of the dummies in equation (4.4) ($d_{a2,i}=d_{2,i}=d_{3,i}=0$).

4.4 Methodology for Examining Returns Around Cross-Listing

The methodology used to test for abnormal returns around the cross-listing of non-US firms is the basic event study methodology that is often used in the fields of finance and accounting in line with Brown and Warner (1980, 1985). The normal returns

are obtained from the model that is found to model returns best in the risk/return structure analysis part of the dissertation.

The dissertation contains analyses based on both daily and weekly data. This is done in order to take advantage of the higher power of tests using daily data over studies using less frequent intervals, as shown by Brown and Warner (1985). At the same time a weekly approach tries to remedy problems that may arise due to time differences between various exchanges around the world. Also, there was very little event date concentration, as can be seen in Table 4.1, which should keep the amount of cross-correlation of returns to a minimum. This should prevent the underestimation of the standard deviation of returns which Collins and Dent (1984) show may be caused by serious cross-correlation of returns.

H₄₀: Cross-listings of non-US firms on the NYSE have no abnormal effects on their stock prices.

H₄₁: Cross-listings of non-US firms on the NYSE have abnormal effects on their stock prices.

The abnormal returns are obtained around two event dates, listing application announcement and actual listing dates. Hypothesis 40 is tested by examining abnormal returns (ARs) and cumulative abnormal returns (CARs) to check for abnormal returns via standard t-tests and non-parametric sign tests. The windows over which CARs are examined consist of (-16, -6), (-5, +5), (+6, +49) for daily data and (-15, -2), (-1, +1), (+2, +29) for weekly data. The emphasis is on the windows right around the event dates, while the other windows are for checking for interesting pre listing and post listing effects

similar to or perhaps different from those for US stocks listing on the organized US exchanges.

4.5 Methodology for Testing for Differences in Abnormal Returns Due to Differences in GAAP

Tests for significant differences in the means of the CARs of different groups are performed with standard t-tests and non-parametric Mann-Whitney rank order tests. A control group is used to attempt to isolate the effects other than GAAP differences. The control group consists of Canadian firms and non-US firms that were in the US markets prior to their NYSE listing. Tests are run for differences between the control group and the overall group, as well as, two subgroups of firms. The firms are separated into subgroups according to their degree of divergence from US GAAP. The subgroup with relatively less divergence is labeled “Close” and includes 42 firms from Australia, Denmark, Finland, France, Germany, Ireland, Israel, Italy, the Netherlands, Sweden, and the UK. The other group is labeled “Far” and includes 24 firms from Argentina, Brazil, Chile, Colombia, Mexico, and Peru. The results of additional tests for smaller subgroups are also provided.

It is expected that if the market believes there to be value in the additional US GAAP reconciliations, then the stocks that will be providing them in the future should have greater abnormal returns. Furthermore, the effect should be greater for firms falling into the Far group relative those of the Close group.

The non-parametric Mann-Whitney test consists of assigning ranks to the observations across both samples, and summing the ranks of the chosen samples. The null

hypothesis of no differences in the means or (medians) of the populations can be rejected for 1-sided tests if the sum of the ranks exceeds the critical value or, for 2-sided tests, exceeds the upper critical value or is below the lower critical value. The critical values can be found in statistical tables. For samples larger than 20 the critical value can be calculated by $w_p = n(N + 1)/2 + x_p \sqrt{n \times m(N + 1)/12}$ (Conover, 1980); where x_p is the p^{th} quantile of the standard normal distribution; n is the number of observations in the first sample; m is the number of observations in the second sample; N is equal to $n+m$. See Appendix D for an example.

Table 4.1
List of firms in the overall sample

#	Country	Stock/ADR	Application	Authorization	Listing date
1	Argentina	Telecom Argentina, S.A.	11/11/94	11/18/94	12/9/94
2	Argentina	Telefonica de Argentina, S.A.	11/26/93	2/25/94	3/8/94
3	Argentina	IRSA-Inversiones y Representaciones	12/2/94	12/9/94	12/20/94
4	Australia	Australia and New Zealand Banking Group Ltd.(Pfd)	1/22/93	2/26/93	3/2/93
5	Australia	Broken Hill Proprietary Company Ltd.	4/24/87	5/1/87	5/28/87
6	Australia	Coles Myer Ltd.	10/7/88	10/14/88	10/31/88
7	Australia	FAI Insurances Ltd.	9/2/88	9/16/88	9/28/88
8	Australia	News Corporation Ltd.	4/25/86	5/9/86	5/20/86
9	Australia	Orbital Engine Corporation Ltd.	10/25/91	11/29/91	12/4/91
10	Australia	Westpac Banking Corporation		2/17/89	3/17/89
11	Australia	WMC Ltd.	11/17/89	12/8/89	1/2/90
12	Brazil	Telecomunicacoes Brasileiras S.A.-Telebras	10/20/95	11/3/95	11/1/95
13	Canada	Abitibi-Consolidated Inc.	4/24/87	6/12/87	7/1/87
14	Canada	Barrick Gold Corporation	1/23/87	2/13/87	2/25/87
15	Canada	Placer Dome Inc.	6/26/87	8/7/87	8/13/87
16	Canada	Royal Bank of Canada(MONTREAL QUE)	9/15/95	9/22/95	10/16/95
17	Canada	TransCanada Pipelines Ltd.	4/26/85	5/10/85	5/30/85
18	Chile	Compania de Telecomunicaciones de Chile S.A.	6/22/90	6/29/90	7/20/90
19	Chile	Cristalerias de Chile S.A.		1/14/94	1/25/94
20	Chile	Embotelladora Andina S.A. (Series A)	6/10/94		7/6/94
21	Chile	Empresa Nacional de Electricidad S.A.	7/15/94	7/15/94	7/27/94
22	Chile	Enersis S.A.	9/24/93	10/15/93	10/20/93
23	Chile	Laboratorio Chile S.A.	6/17/94	6/24/94	6/29/94
24	Chile	Madeco S.A.	4/23/93	5/7/93	5/28/93
25	Chile	MASISA-Maderas y Sinteticos S.A.	5/14/93		6/17/93
26	Chile	Administradora de Fondos de Pensiones-Provida, S.A.	10/21/94	10/28/94	11/16/94
27	Chile	Santa Isabel S.A.	6/30/95	7/14/95	7/27/95
28	Chile	Vina Concha y Toro S.A.	9/23/94	9/30/94	10/19/94
29	Colombia	Banco Ganadero S.A.	10/14/94	10/21/94	11/15/94
30	Colombia	Banco Industrial Colombiano S.A.		6/30/95	7/26/95
31	Denmark	Tele Danmark A/S		4/15/94	4/28/94
32	Denmark	ISS-International Service System A/S	4/29/94	5/6/94	10/27/94
33	Finland	Nokia Corporation	6/24/94		7/1/94
34	Finland	Valmet Oy		5/3/96	5/31/96
35	France	Alcatel Alsthom Compagnie Generale d'Electricite	4/10/92		5/20/92
36	France	AXA	5/31/96	6/7/96	6/25/96
37	France	Elf Aquitaine	3/29/91	5/3/91	6/14/91
38	France	SCOR	9/27/96		10/10/96
39	France	TOTAL	10/4/91	10/11/91	10/25/91
40	Germany	Fresenius Medical Care AG	8/2/96	8/16/96	9/17/96
41	Germany	SGL Carbon Aktiengesellschaft	5/24/96	5/31/96	6/5/96
42	Ireland	Elan Corporation PLC	12/23/94	12/30/94	1/3/95
43	Ireland	Jefferson Smurfit Group PLC	6/30/95		7/13/95
44	Israel	Koor Industries Ltd.		10/6/95	11/13/95

Table 4.1
Continued

#	Country	Stock/ADR	Application	Authorization	Listing date
45	Italy	Benetton Group	4/14/89	4/21/89	6/8/89
46	Italy	FIAT SpA	12/2/88	12/23/88	2/14/89
47	Italy	Montedison SpA	6/12/87	6/26/87	7/16/87
48	Mexico	Altos Hornos de Mexico S.A. de C.V.(AHMSA)	6/21/96	6/28/96	12/11/96
49	Mexico	Desc S.A. de C.V.	6/17/94	6/24/94	7/14/94
50	Mexico	Empresas la Moderna S.A. de C.V.	1/14/94		2/2/94
51	Mexico	Grupo Financiero Serfin S.A.	11/12/93		12/1/93
52	Mexico	Transportacion Maritima Mexicana S.A. de C.V.	5/8/92	5/15/92	6/10/92
53	Mexico	Vitro S.A.	10/4/91	11/8/91	11/19/91
54	Netherlands	ELSEVIER NV	9/16/94	10/7/94	10/6/94
55	Netherlands	Royal PTT Nederland N.V.		9/29/95	10/23/95
56	Peru	Banco Wiese Limitado	8/19/94	9/16/94	9/21/94
57	Sweden	Astra AB		5/17/96	5/23/96
58	U.K.	Abbey National PLC (Series A PFD)		11/22/96	12/17/96
59	U.K.	Barclays Bank PLC	8/1/86	8/29/86	9/9/86
60	U.K.	Bass PLC	12/15/89	1/12/90	2/8/90
61	U.K.	BOC Group PLC		9/13/96	9/18/96
62	U.K.	Cable & Wireless PLC		9/11/89	9/27/89
63	U.K.	Enterprise Oil PLC-Series A (PFD)	6/5/92	6/12/92	7/20/92
64	U.K.	Hanson PLC		10/3/86	11/3/86
65	U.K.	LASMO PLC	4/30/93	5/21/93	6/8/93
66	U.K.	LucasVarity PLC		7/19/96	9/6/96
67	U.K.	National Westminster Bank PLC	9/26/86	10/17/86	10/22/86
68	U.K.	Premier Farnell PLC	2/9/96	3/8/96	4/12/96
69	U.K.	Reed International PLC	9/16/94	10/7/94	10/6/94
70	U.K.	SmithKline Beecham PLC	6/9/89	6/16/89	6/21/89
71	U.K.	Willis Corroon PLC	8/24/90	9/28/90	10/9/90

Table 4.2
List of firms in the PreUS sample

#	Country	Stock/ADR	Application	Authorization	Listing date
1	Canada	Domtar Inc.	8/14/87	9/4/87	9/22/87
2	Canada	Goldcorp Inc. (A)	5/26/95	6/9/95	6/16/95
3	Canada	Gulf Canada Resources Ltd.	1/19/96	2/2/96	2/2/96
4	Canada	IPSCO Inc.		12/27/96	12/31/96
5	Canada	Ranger Oil Ltd.	12/24/82	1/7/83	1/28/83
6	Denmark	NOVO-Nordisk A/S		6/12/81	7/9/81
7	Netherlands	AEGON N.V.	9/20/91	11/1/91	11/5/91
8	Netherlands	Philips Electronics N.V.	3/27/87	4/10/87	4/14/87
9	U.K.	Cadbury Schweppes PLC	4/12/96		5/2/96
10	U.K.	Carlton Communications PLC	9/24/93	10/1/93	10/19/93
11	U.K.	English China Clays PLC	4/10/92	4/24/92	4/30/92
12	U.K.	Glaxo Wellcome PLC	5/1/87	5/22/87	6/10/87
13	U.K.	Imperial Chemical Industries PLC	9/30/83	10/28/83	11/1/83
14	U.K.	Tomkins PLC	2/3/95	2/17/95	2/21/95

Table 4.3
List of National Indices

Country	Index
Australia	AUSTRALIA SE ALL ORDINARY - PRICE INDEX
Brazil	BRAZIL BOVESPA - PRICE INDEX
Canada	TORONTO SE 300 COMPOSITE - PRICE INDEX
Chile	CHILE GENERAL (IGPA) - PRICE INDEX
Colombia	BOGOTA MEDELLIN GENERAL - PRICE INDEX
Denmark	COPENHAGEN SE GENERAL - PRICE INDEX
Finland	HEX GENERAL - PRICE INDEX
France	CAC 40 - PRICE INDEX
Germany	CDAX GENERAL - PRICE INDEX
Ireland	IRELAND SE GENERAL (ISEQ) – PRICE INDEX
Israel	TEL AVIV SE GENERAL - PRICE INDEX
Italy	MILAN MIB CURRENT GENERAL - PRICE INDEX
Mexico	MEXICO IPC (BOLSA) - PRICE INDEX
Netherlands	CBS ALL SHARE GENERAL - PRICE INDEX
Peru	IGBVL
Sweden	VECKANS AFFARER WEIGHTED ALL SHARE- PRICE INDEX
UK	FTSE ALL SHARE - PRICE INDEX

CHAPTER V

EMPIRICAL ANALYSES

5.1 Introduction

This chapter contains details of the empirical analyses that are employed in this dissertation and presents their results. Daily data results are generally provided for the data sets centered around the announcement of the listing application event. Unless otherwise noted, the conclusions are not significantly different for the other data sets and can be found in the appendices. The other data sets are announcement/weekly, listing/daily, and listing weekly. Section 2 of this chapter describes the various return generating models that are used and the process used to select between them. The third section presents results obtained from testing for changes in the risk/return characteristics of non-US firms cross-listing to the NYSE. The initial tests replicate previous work in the field. Additional tests then increase the power of the analyses. Significant evidence is found to reject the null hypothesis that listing has no effect on the risk/return characteristics of the firms.

The fourth section contains an attempt to determine if cross-listing of non-US stocks on the NYSE has a significant abnormal return effect. The abnormal returns are derived by using the model that was chosen in section 2 of this chapter. It is observed that there are significant abnormal returns around the announcement of NYSE listing application.

The fifth section of this chapter contains comparisons of abnormal returns of different samples to determine the differential listing impact for stocks from various pre listing GAAP regimes.

5.2 Normal Returns Generating Models

When examining international capital markets, choices that are usually obvious in the national markets become much less clear. The literature does not seem to have reached a consensus on many of these choices. Some examples of these include the type and number of factors to be used in the models, the underlying currency of the models, and the appropriate time horizons. Even though not universally accepted, many event studies focusing within national boundaries choose to follow the path outlined by Brown and Warner (1980, 1985) and use the basic market model which they showed was generally free of major problems and relatively easy to implement. As was seen in the literature review, in the international arena there seem to be many researchers utilizing some sort of two factor market model. Even though this is probably not as widespread as the use of the basic market model in national studies, it is the path that is followed in this dissertation.

Another important choice deals with the underlying currency to use in the models. For those used to dealing with studies within national boundaries, it is not always immediately obvious that the use of varying currencies in the models may lead to significant differences. However, a relation between two variables may be hidden if there is an underlying factor, like different currencies, that introduces significant noise into the

system. The literature provides a significant number of studies that use returns denominated in separate (home) currencies, as well as, others that use returns that are adjusted for varying currencies. The adjustment for varying currencies is generally done by converting the returns to a common basis, usually the US dollar. In this dissertation, both currency adjusted and unadjusted models are initially considered. The a priori belief used in this dissertation is that it is more appropriate to put all variables on a common basis, as logical investors are probably able to understand that returns in different underlying currencies are not necessarily equivalent. As a result, models using a common currency are given preference unless the empirical evidence overwhelmingly favors the rival models.

Even though Brown and Warner (1985) showed that using daily stock returns increased the power of tests, they also cautioned that problems arose when there was event date uncertainty. The problem that was encountered in this dissertation was not so much that the exact event dates were difficult to identify, rather it was that there were significant time differences between various exchanges around the world. Two attempts are made to ensure that this does not cause significant problems. First, in addition to daily returns the analyses are repeated with weekly returns that should have plenty of overlap to correct for non-synchronicity of the markets. Second, models with lagged US market factors are examined to see if they represent reality more closely. Finally, the analyses are carried out for two separate event dates. The announcement date and the actual listing date.

The models used in the empirical estimations are:

Models 1 and 1a:

$$E(RN_{i,t}) = a_i^1 + b_i^1 RN_{H,t}$$

$$E(RN_{i,t}) = a_i^{1a} + d_{a1,i}^{1a} D + b_i^{1a} RN_{H,t} + d_{1,i}^{1a} DRN_{H,t}$$

Model 2 and 2a:

$$E(RU_{i,t}) = a_i^2 + b_i^2 RU_{H,t}$$

$$E(RU_{i,t}) = a_i^{2a} + d_{a1,i}^{2a} D + b_i^{2a} RU_{H,t} + d_{1,i}^{2a} DRU_{H,t}$$

Model 3 and 3a:

$$E(RN_{i,t}) = a_i^3 + b_i^3 RN_{H,t} + c_i^3 R_{US,t}$$

$$E(RN_{i,t}) = a_i^{3a} + d_{a2,i}^{3a} D + b_i^{3a} RN_{H,t} + c_i^{3a} R_{US,t} + d_{2,i}^{3a} DRN_{H,t} + d_{3,i}^{3a} DR_{US,t}$$

Model 4 and 4a:

$$E(RU_{i,t}) = a_i^4 + b_i^4 RU_{H,t} + c_i^4 R_{US,t}$$

$$E(RU_{i,t}) = a_i^{4a} + d_{a2,i}^{4a} D + b_i^{4a} RU_{H,t} + c_i^{4a} R_{US,t} + d_{2,i}^{4a} DRU_{H,t} + d_{3,i}^{4a} DR_{US,t}$$

Model 5 and 5a:

$$E(RN_{i,t}) = a_i^5 + b_i^5 RN_{H,t} + c_i^5 RL_{US,t}$$

$$E(RN_{i,t}) = a_i^{5a} + d_{a2,i}^{5a} D + b_i^{5a} RN_{H,t} + c_i^{5a} RL_{US,t} + d_{2,i}^{5a} DRN_{H,t} + d_{3,i}^{5a} DRL_{US,t}$$

Model 6 and 6a:

$$E(RU_{i,t}) = a_i^6 + b_i^6 RU_{H,t} + c_i^6 RL_{US,t}$$

$$E(RU_{i,t}) = a_i^{6a} + d_{a2,i}^{6a} D + b_i^{6a} RU_{H,t} + c_i^{6a} RL_{US,t} + d_{2,i}^{6a} DRU_{H,t} + d_{3,i}^{6a} DRL_{US,t}$$

Model 7, 7a and 7b:

$$E(RU_{i,t}) = a_i^7 + b_i^7 \gamma_{H,t} + c_i^7 R_{US,t}$$

$$E(RU_{i,t}) = a_i^{7a} + d_{a2,i}^{7a} D + b_i^{7a} \gamma_{H,t} + c_i^{7a} R_{US,t} + d_{2,i}^{7a} D \gamma_{H,t} + d_{3,i}^{7a} D R_{US,t}$$

$$\text{where } RU_{H,t} = a_i^{7b} + b_i^{7b} R_{US,t} + \gamma_{H,t}$$

D is a dummy variable equal to zero for $t < 0$, otherwise 1

$R_{US,t}$ is the return on the US market factor, in period t, in US dollars

$RL_{US,t}$ is the return on the US market factor, in period t-1, in US dollars

$RN_{H,t}$ is the return on the home country market factor, in period t, in the home (non-US) currency

$RN_{i,t}$ is the return on stock i, in period t, in the home (non-US) currency

$RU_{H,t}$ is the return on the home country market factor, in period t, in US dollars

$RU_{i,t}$ is the return on stock i, in period t, in US dollars

The R-squares for the models listed above are presented in Table 5.1. As can be seen from Table 5.1, when we compare model 3a with model 4a there is no evidence to suggest that using a model with different currencies is necessary. Comparisons of the R-squares of models with lagged US returns versus those with contemporaneous US returns do not seem to indicate that lagging is necessary.

The next choice that needs to be made is whether there is evidence suggesting that a second (US) factor is warranted. In order to test this, F-tests are carried out to test the significance of the US factor for each firm. The restricted model is model 2a and the unrestricted model is model 4a. It is found that the US factor makes a significant contribution to the explanatory power of the model for 35 out of the 71 firms in the

sample, at 10% significance. This is equivalent to a p-value of less than 0.0001 when a binomial test is used with the null hypothesis of no contribution of the US factor. In summary, there is no evidence to suggest that using different currencies or lagged returns may be preferable from an explanatory point of view, and furthermore there is strong evidence that the US factor significantly contributes to the explanatory power of the model. The conclusions are not significantly different when carried out with the models having different currencies or other significance levels are used in the binomial tests. The results are the same for tests using the listing date with daily or weekly data, as well as the announcement date with weekly data. However, it should be pointed out that the tests using daily data provide the stronger results.

As a result, models 4 and 4a are chosen as those that “best” explain the returns and are the basis for the majority of tests carried out in the rest of the dissertation. These models are two factor market models. The two factors are the home (non-US) factor and the foreign (US) factor, where all returns have been converted to US dollars. Further details about the results of significance tests of various factors can be found in Appendix C.

5.3 Changes in Risk/Return Characteristics

5.3.1 Replication of Previous Studies

Howe and Madura (1990) examine 68 US firms going abroad to other stock exchanges over the 1969-84 period and are not able to find evidence of significant

changes in risk and therefore conclude that either markets are not significantly segmented or cross-listing is not an effective way of resolving the segmentation.

Jayaraman, Shastri and Tandon (1993) look at 95 non-US firms cross-listing to US exchanges. In addition to other analyses, they check for changes in beta coefficients of the firms using the same model as Howe and Madura and also fail to find significant differences.

In order to replicate the tests carried out in the studies mentioned above, a sample consisting of 71 non-US firms that cross-listed to the NYSE in the 1980-96 period is used. These tests require the use of models 1 and 3. Estimates of the models are obtained in both the pre and post announcement periods, then t-tests are carried out on the averages of the beta estimates to test for possible changes. The results of these tests for the announcement with daily data can be found in Tables 5.2 and 5.3.

The home (non-US) beta estimates are obtained by using models 1 and 3. The results for model 1 provided in Table 5.2 are examined first. It is observed that even though the average beta for the sample goes from 0.8538 in the pre period to 0.7821 in the post period, the change is not significant. This result seems to be in accordance with the previous findings. However, there are some differences in the subsamples. Howe and Madura had remarked that even though they did not find any significant differences, all of their subsamples' home beta estimates moved in the hypothesized directions. In this sample, there is one sample (UK) where the decrease in the beta estimates is significant. Furthermore, there are two samples whose home beta estimates actually go up.

The results obtained from model 3 are even more interesting. A significant decrease from 0.8708 to 0.7629 in the overall average home beta estimate is found, together with significant decreases in three samples. It should be pointed out that the same two samples that had increases in their average home beta estimates using model 1 display the same pattern with this model.

The foreign (US) beta estimates are obtained by using model 3. While Howe and Madura fail to find significant changes in the foreign betas, the results presented here indicate the presence of a significant increase. The overall average foreign beta estimate displays a significant increase from -0.0137 to 0.2608, together with significant increases in five out of the seven subsamples.

The results using different event/data frequency combinations for the overall sample can be found in Table 5.4. When the other event date/data frequency samples are examined, there are some differences. For announcement/weekly and listing/weekly there is no significant evidence of decreases in the home betas. However, the foreign beta is still found to increase. The results from listing/daily are basically identical to the application/daily results that are presented in detail above.

One possible reason for the divergent results is the use of different samples. Howe and Madura's sample consists of US firms cross-listing to non-US exchanges. Jayaraman, Shastri and Tandon use a sample more similar to this one, consisting of non-US firms entering US markets. However, their sample covers only 1983-88 and includes cross-listing to any US exchange. Due to these reasons, the samples used in previous studies differ notably from the one used in this dissertation.

In addition to using models 1 and 3 to obtain the home and foreign beta estimates, models 2 and 4 were also used to put all returns on a common basis. These results are provided in Tables 5.5 and 5.6.

The evidence supporting the hypotheses that there are significant changes in the risk/return structure is even stronger with these models. Not only is there significant evidence in the 2 factor model, but there is also evidence of significant change in the single factor model used. The average home beta estimate falls from 0.8716 to 0.6757 for model 2 and from 0.8856 to 0.6693 for model 4, while the average foreign beta estimate rises from -0.0210 to 0.2719 for model 4. All of the changes in average beta estimates mentioned just above are highly significant.

The results from using different event/data frequency combinations are provided for the overall sample in Table 5.7. Once more, there are some differences when the other event/date frequency combinations are utilized. The announcement/weekly and listing/weekly samples fail to find evidence of significant changes in the home beta estimates, in both the one factor and two factor models. The significant change in the foreign beta is still present. The results from examining the listing/daily sample are basically identical to those presented here for announcement/daily.

5.3.2 Extension of Previous Studies

In this section, the tests used in previous studies are extended by using tests of individual firm beta estimates. The tests require a two step process. In the first step, an empirical model with dummy variables is estimated for each firm and the coefficients of

the dummy variables are examined for significance. In the second step, the results of the individual tests are combined with a binomial test that tests for an overall change in the beta parameters. The binomial test assumes a binomial distribution for the results of the individual tests. If the number of rejections exceeds the number of rejections that may occur randomly under the assumed distribution, then the null hypothesis of no change can be rejected.

Table 5.8 provides the results of the first step of the overall test. Under the null hypothesis of no change in the risk/return structures, one would expect there to be on a random basis no more than nine significant t-tests for a sample of 71 firms at a significance level of 10% (see Appendix E for more details).

The home beta estimates of 25 out of 71 firms in the sample were significantly lower in the post period for model 1. As a result, it can be concluded that overall, the home country beta seems to decrease after the cross-listing event. Similarly, the same conclusion can be reached when model 3 is used.

The foreign beta estimates of 33 out of 71 firms rose significantly. When the binomial test is used, it can easily be concluded that there is an overall rise in the foreign betas of the firms after cross-listing.

Examining Table 5.8 shows that the results of tests using other event/data frequency combinations are the same. However, it is observed that the daily data provide stronger evidence.

5.3.3 Hypotheses Testing

In this subsection of the dissertation, hypotheses H_1 , H_{2a} and H_{2b} are initially tested in their uni-directional forms suggested by Howe and Madura, and Jayaraman, Shastri and Tandon, using the binomial test. Afterwards, the tests are repeated for changes in either direction. Finally, hypothesis H_{30} is tested for any overall change in the risk/return structure. All of the tests are carried out using models 2 and 4, or their versions with dummy variables 2a and 4a. The reason for this is that earlier in this dissertation we concluded that model 4, which uses currency adjusted returns, best represents the returns of cross-listing firms. Model 2 is also used as it is the direct reduced form of model 4. The stated results are for the announcement/daily sample and, unless otherwise stated, are not significantly different for the other samples.

5.3.3.1 H_{10}

H_{10} : Cross-listing of a non-US firm on the NYSE will not affect the foreign beta.

H_{11} : Cross-listing of a non-US firm on the NYSE will increase the foreign beta.

This hypothesis is tested by using model 4a and examining the significance of $d_{3,i}^{4a}$. The results of individual 1-sided t-tests on $d_{3,i}^{4a}$ are provided in Table 5.9, together with results from testing the coefficients of model 2a. Hypothesis H_{10} is easily rejected as the number of significant t-tests is 35 which is greater than the maximum of 9 significant t-tests that may occur randomly under the null hypothesis of no significant change and a significance level of 10%.

5.3.3.2 H_{20a}

H_{20a}: Cross-listing of a non-US firm on the NYSE will not affect the home beta.

H_{21a}: Cross-listing of a non-US firm on the NYSE will decrease the home beta.

Hypothesis H_{20a} is tested by using model 2a and examining the significance of $d_{1,i}^{2a}$. As can be seen in Table 5.9, hypothesis H_{20a} is easily rejected as the number of significant t-tests is 37 which is greater than the maximum of 9 significant t-tests that may occur randomly under the null hypothesis of no significant change and a significance level of 10%.

5.3.3.3 H_{20b}

H_{20b}: Cross-listing of a non-US firm on the NYSE will not affect the home beta, even after taking into account the effect of the foreign market.

H_{21b}: Cross-listing of a non-US firm on the NYSE will decrease the home beta, even after taking into account the effect of the foreign market.

Hypothesis H_{20b} extends the H_{20a} by allowing for the use of a two factor model and thereby removing the effect of the foreign market. It is tested by looking at the significance of $d_{2,i}^{4a}$. There are 37 significant t-tests, which is sufficient to reject hypothesis H_{20b}.

5.3.3.4 Two-sided hypotheses tests

The testing of hypotheses H₁₀, H_{20a} and H_{20b} are now repeated with alternative hypotheses of changes in either direction. These tests are carried out as it is not clear

theoretically that changes in the beta parameters must always be in the directions hypothesized by Howe and Madura.

Table 5.10 provides the results of individual 2-sided tests carried out using models 2a and 4a. It is observed that the number of significant tests does not decrease for the home beta, while they do for the foreign beta.

When hypothesis H_{10} is tested against a 2-sided alternative, there are 27 significant tests out of 71. The 27 significant tests are more than sufficient to reject the hypothesis of no change in the foreign beta. There seems to be evidence indicating that the foreign beta changes. The one exception is the test using the announcement/weekly data where evidence of a significant change is not present.

Hypothesis H_{20a} is tested against the 2-sided alternative using model 2a. The 40 significant tests out of 71 allow the null hypothesis of no change in the home beta to be rejected with an even higher p-value than in the 1-sided case.

Hypothesis H_{20b} is tested against the 2-sided alternative by using model 4a and is strongly rejected by the data as there are 42 out of 71 significant individual tests. There seems to be a change in the home beta even when the effect of the foreign market is considered.

The conclusions from testing hypotheses H_{20a} and H_{20b} around the announcement with daily data remain unchanged when the other event/data frequency samples are utilized. Therefore, there seems to be strong and consistent evidence of a change in the foreign betas of non-US firms cross-listing to the NYSE.

5.3.3.5 H₃₀

H₃₀: Cross-listing of a non-US firm on the NYSE will not affect the risk/return structure.

H₃₁: Cross-listing of a non-US firm on the NYSE will alter the risk/return structure.

The use of 2-sided tests and the use of a binomial test to combine the individual tests makes it possible to test a united overall hypothesis. Hypothesis H₃₀ is an overall hypothesis for changes in the risk/return structure that is tested by using an F-test to test $d_{a2,i}^{4a} = d_{2,i}^{4a} = d_{3,i}^{4a} = 0$. This is done by using model 4a as the unrestricted model and model 4 as the restricted model. The results can be found in Table 5.10. It is found that 45 out of 71 of the tests came up significant. Once more this is highly significant and rejects hypothesis H₃₀.

Restating the results of the analyses of risk/return characteristics of non-US firms cross-listing to the NYSE, it can be safely concluded that there is evidence of changes in the return generating process after listing.

5.4 Abnormal Returns

The abnormal returns used in this dissertation are obtained by subtracting the expected normal returns from the realized returns. The normal returns are calculated from model 4a, which is found to model the returns best. Separate results are reported for the announcement event and the actual listing event.

As discussed earlier in the dissertation, if there is an effect of cross-listing and the market incorporates public information efficiently, then the effect should manifest itself at the time of the initial public announcement. For the NYSE, this date should be the date of the announcement of listing application as virtually all official applications are accepted. Table 5.11 provides measurements of abnormal returns for various windows around the announcement event with daily data. The abnormal return measures tested are Cumulative Abnormal Returns (CARs) that are cumulated over the given periods.

5.4.1 H₄₀

H₄₀: Cross-listings of non-US firms on the NYSE have no abnormal effects on their stock prices.

H₄₁: Cross-listings of non-US firms on the NYSE have abnormal effects on their stock prices.

Hypothesis H₄₀ is rejected as the overall sample has significantly positive abnormal returns in the (-5, +5) day announcement window. As can be seen from Table 5.11, there seems to be a positive effect of announcement as there are significant positive abnormal returns in the (-5, +5) day window.

The basic abnormal returns and their t-statistics for (-5, +5) days are provided in Table 5.12. This information should be used cautiously and only for general descriptive purposes, as claiming significance for these would be problematic and could be interpreted as data mining. The interesting thing that can be noted from this Table is that none of the significant positive effects seem to be taking place on the event day 0.

When abnormal returns around the announcement event are examined with weekly data we see some additional effects. The CARs with weekly data around the announcement event are provided in Table 5.13. It should be pointed out that the event windows now cover slightly and sometimes significantly different periods than in the daily data case. The pre announcement window reaches farther back, the event window includes one additional week (+1) and the post announcement window extends further into the future. The first thing to be noted is that the significant announcement effect is still present and is even more significant.

Table 5.14 provides the basic abnormal returns and their t-statistics for (-5, +5) weeks. The same warnings as in the daily data case apply. It is observed that in addition to the absence of a significant effect of day 0 in the daily data version, there does not seem to be a significant effect in week 0 either. The effect of the announcement seems to be experienced the week before the announcement and the week following the announcement week.

After concluding that there is a positive effect of the announcement, attention is turned to the actual cross-listing event. The listing date of a stock can be any day of the week and is used as day 0 in the event study. The results of tests on the CARs for various windows around the listing event with daily data are provided in Table 5.15. It is observed that there are no significant abnormal returns for the window directly around the listing event, which implies that the market does not consider this to be a significant event. This is consistent with the market correctly incorporating the listing information at the announcement date. There are significant positive abnormal returns in the (-15, -2)

week pre listing window which may be catching some of the effect of the announcement or high returns due to enthusiasm for the upcoming NYSE listing.

The daily abnormal returns for the period surrounding the listing can be found in Table 5.16. Once more, it is reiterated that these statistics are provided for descriptive purposes only. It is observed from Table 5.16 that the sample as a whole has significant negative abnormal returns on the day of the listing, but these returns are not large enough to stay significant in the (-5, +5) day window when they are combined into CARs.

Finally, CARs for the listing event are examined with weekly data, and the results are provided in Table 5.17. The weekly data consists of returns for the workweeks, with event date 0 being the workweek in which the stock was listed on the NYSE. For the overall sample, there is no evidence of significant CARs around the cross-listing event. The abnormal returns of the individual weeks provided in Table 5.18 do not seem to indicate any significant patterns of effects around the cross-listing event.

5.4.2 Examination of subsamples for abnormal returns

The observed significant CARs for the overall sample in the (-5, +5) day announcement window, which can be found in Table 5.11, seem to be driven primarily by the Chilean and European samples. For the rest of the daily event windows and samples around the announcement event, there do not seem to be any other significant effects.

Examining Table 5.12, it is seen that the only significant abnormal return t-statistic for day 0 is for the UK, and it is negatively significant. This is troubling as it implies that there is almost no detectable effect on the day of the announcement.

Switching to weekly data provided in Table 5.13 subject to the wider event windows that were mentioned earlier, Chile no longer has a significant announcement effect, but has significant pre announcement abnormal returns in the extended pre announcement period. Europe still has a significantly positive announcement effect, as well as, significant abnormal returns in the extended post announcement period. There are also significant abnormal returns in the pre announcement period for the PreUS sample.

Looking at the basic weekly abnormal returns for the announcement in Table 5.14, it is apparent that the lack of effect on day 0 also seems to be valid for week 0. Only the UK has a significant abnormal return in week 0. The few other significant abnormal returns seem to occur either the week before or after the announcement.

The CARs and ARs for daily data are given in Tables 5.15 and 5.16, and in Tables 5.17 and 5.18 for weekly data. Australia and Chile are the subsamples that individually display the significant positive daily pre listing CARs. However, Chile deserves additional attention as it also has significant negative daily CARs for the post listing period. The only other sample that has any significance in the daily data is the PreUS sample, which is excluded from the normal sample as these firms were in the US market prior to NYSE listing. The PreUS sample displays negative abnormal returns in the (-5, +5) day window.

The only sample to have significant daily ARs on the listing date is Australia. Canada and Mexico have significant negative abnormal returns for the day before listing, while Europe has significant positive abnormal returns. Canada's day (-1) negative t-statistic of -7.4298 is caused by the presence of one firm with huge negative returns on

that day. Other than these there do not seem to be any major patterns identifiable for the daily data.

For the weekly data, evidence is found in support of the positive pre listing CARs for Australia and Chile that was also found using daily data. In addition to those effects, significant negative CARs are found in the post listing period for Mexico. There do not seem to be any prevalent patterns of effects in the weekly ARs around the listing.

5.5 Comparisons of Abnormal Returns

In this section of the chapter, the abnormal returns of various groups are compared to the abnormal returns of the Control group composed of Canadian firms and the PreUS sample. Canadian firms are the only ones allowed to use their home country GAAP and still participate in US organized exchanges. The implicit assumption made by the SEC here is that Canadian GAAP is so close to US GAAP that investors will not be harmed by not requiring US GAAP reconciliations from Canadian firms. When this assumption is turned around a little bit, it also implies that any other GAAP is inferior to US or Canadian GAAP. The cross-listing of firms from countries with these different GAAP regimes allows for an examination of the market's reaction to the fact that the cross-listing firms will have to provide US GAAP reconciliations from now on. The Canadian sample and the PreUS sample are used as the control group to try and hold factors other than US GAAP reconciliations constant. The other firms are also separated into the Far or Close group, depending on their level of divergence from US GAAP. The tests used to test for differences between the groups are the basic parametric t-test and the non-

parametric Mann-Whitney rank test. For the Mann-Whitney test the observations are ranked according to size across the two samples, then the ranks of the chosen group are added up. If the sum of the ranks falls in the critical region then the null hypothesis is rejected. An example of the Mann-Whitney test can be found in Appendix D, or refer to Conover (1980).

The tests are one sided as the alternative hypothesis is that US GAAP reconciliations are valuable and therefore firms that will provide them after listing should have an additional positive listing effect.

5.5.1 H_{50}

H_{50} : There are no differences between the abnormal returns around cross-listing on the NYSE by firms in the Control group and non-Canadian non-US firms.

H_{51} : The abnormal returns around cross-listing on the NYSE of firms in the Control group are lower than the abnormal returns of non-Canadian non-US firms.

Tables 5.19 and 5.20 provides the results of t-tests on abnormal returns, while Tables 5.21 and 5.22 provide the results of Mann-Whitney tests. Hypothesis H_{50} can not be rejected for the (-5, +5) day announcement window with daily data. The lack of evidence suggesting differences in abnormal returns around the announcement is also consistent across the two subgroups.

Looking at the pre and post announcement windows, it is observed that the only occurrence of significance is in the pre announcement window using the Mann-Whitney test to compare the AlexCan sample to the Control. The corresponding t-test is marginally insignificant with a p-value of 10.33%. The two subgroups each have pre announcement CARs that have marginally insignificant differences from the Control group on their own, but combine to be significant in the overall comparison.

The results of tests reexamining the announcement event with weekly data is provided in Tables 5.2 through 5.26. The lack of evidence of differences in abnormal returns for the announcement window is apparent again. The overall sample provides no evidence of differences in the weekly pre or post announcement windows. However, the Mann-Whitney test suggests that the Far sample may have greater CARs than the Control group in the (-15, -2) week pre announcement window. The corresponding t-test does not provide supporting evidence.

An examination of Panel B of Table 5.26 sheds some light onto the reason there was some (limited) evidence of possible differences in the (-16, -6) day pre announcement window.

When abnormal returns around the actual listing are examined, interesting results are encountered. The results of tests for differences in abnormal returns around the listing are provided in Tables 5.27 through 5.34. The only significant effects are in the windows directly surrounding listing. The listing/daily sample using t-tests provides no evidence of significant differences in CARs. Using the Mann-Whitney tests leads to evidence suggesting that the Close group may have greater CARs than the Control group in the (-5,

+5) day announcement window. When the weekly data are used, the evidence becomes stronger. Not only are there significant differences in the t-test and Mann-Whitney test for the (-1, +1) week listing window for the Close versus Control comparison, it is strong enough to make the overall comparisons significant as well.

The presence of significant differences in CARs for the listing window raise more questions than they answer. The first question is why there should even be an effect at the time of listing. The effect, if any, should occur at the time of announcement of application to list on the NYSE. At the latest, the effect should occur at the time of announcement of the acceptance of the application by the NYSE.

The second question is what may be causing this effect. Differences in accounting regimes do not seem to be the answer, as no effect is detected in the Far group, which should actually be affected more.

The comparisons of CARs in this part of the dissertation provide some limited evidence of a few differences in abnormal returns for some groups and periods. However, the overall results do not seem to support the view that the market finds pending US GAAP reconciliations to add additional value to NYSE listings.

5.5.2 Comparisons of abnormal returns for detailed subsamples

This subsection contains a detailed analysis of the abnormal returns for subgroups that are smaller than those used to test hypothesis H_{50} in the previous section. The comparisons are also separated into comparisons with two separate control groups. The Control groups are Canadian firms, and non-US firms present in US markets prior to

NYSE listing (PreUS). This analysis is meant to provide some additional descriptive details to the analysis of section 5.5.1.

Examining the announcement with daily data, there is no evidence of greater CARs for the overall sample relative to the control samples. The only sample for which a significant effect is found is the European sample relative the Canadian sample for (-5, +5) days. The Chile versus Canada comparison may be significant if non-parametric tests are used.

The announcement event with daily data is used first to examine possible differences in abnormal returns. Tables 5.35 and 5.36 provide the p-values of t-tests carried out for various groups and Tables 5.37 and 5.38 provide the results for the Mann-Whitney tests. The t-tests indicate that Australia seems to have significantly greater CARs than both the Canadian and PreUS samples in the (-16, -6) pre announcement window. The only other comparison that comes out significant is the comparison of Europe and Canada in the (-5, +5) day announcement window.

The Mann-Whitney test also has three significant comparisons, however, they are not all the same three. The Australia versus PreUS comparison for the pre announcement window and the Europe versus Canada comparison for the announcement window also come up significant in the Mann-Whitney test. In addition, the Chile versus Canada comparison comes out significant for the announcement window. The Australia versus Canada comparison that was significant in the parametric t-test barely misses being significant in the Mann-Whitney test.

In order to get a clear indication of significant differences between groups, it would have been ideal to get a result where the differences are significant with both the Canadian and PreUS sample, as well as, across parametric and non-parametric tests. The closest that this analysis gets to the ideal is in the comparison of Australia to the control groups in the pre announcement window. The only thing that is missing is significance in the Mann-Whitney test comparing Australia to Canada, where it barely missed being significant. There is a second problem in interpreting this as it is in the pre announcement period and not in the announcement period.

Moving on to weekly data, the announcement event is reexamined. Tables 5.39 and 5.40 contain the p-values for parametric t-tests using weekly data and Tables 5.41 and 5.42 contain the test statistics for the non-parametric Mann-Whitney tests. There does not seem to be any evidence of any significant differences in the announcement window or the post announcement window. However, it is observed that in the pre announcement window there are numerous samples, including the AllexCan sample, that have significantly greater abnormal returns than the Canadian sample.

The results for tests around listing are provided in Tables 5.43 through 5.50. Examining the listing event using daily data, it is observed that Europe and the UK seem to have abnormal returns that are significantly greater than those of the PreUS for the (-5, +5) day window around listing. These conclusions are consistent across both tests used. Furthermore, there are no significant differences between returns for the pre or post listing windows. The results of these tests imply that there may be some effects of coming from different GAAP regimes, specifically for those firms coming from Europe or the

UK. However, the results are puzzling as it is the samples that are supposed to have the least variations from US GAAP that are displaying significant differences. This is contrary to the prior expectations that the positive effect of US GAAP reconciliations should be greater as the level of GAAP divergence increases.

The examination of listing with weekly data yields some additional significant tests. It is found that the returns of the overall AlexCan sample, together with a number of other samples, is significantly greater than the PreUS sample for the (-1, +1) week window around listing. Furthermore, the CARs of AlexCan, Australia and Chile exceed significantly that of the Canadian sample for the (-15, -2) week pre listing window.

In summary, the basic t-test with daily data finds that the CARs of Europe exceed those of Canada in the (-5, +5) announcement window. In addition, Australia seems to have significantly higher CARs than both control groups in the (-16, -6) day pre announcement window. These results change only slightly when non-parametric Mann-Whitney tests are used. For weekly data, the only effect that is found is that the Canadian sample seems to have significantly lower CARs, than almost all other groups in the (-15, -2) week pre announcement window. It is concluded that there are some differences between the returns of various groups around the announcement, but it seems unlikely that they are caused by variations in accounting policies.

There seems to be a little more happening around cross-listing. Examining daily data, it is observed that the CARs of Europe and the UK exceed those of the PreUS in the (-5, +5) day listing window. For weekly data, it is found that the overall AlexCan sample, together with three or four others, has significantly higher CARs than the PreUS

sample in the (-1, +1) week listing window. While in the (-15, -2) week pre listing window, the AllexCan, Australia and Chile samples have CARs that are significantly greater than the Canada sample. Once more, even though there is evidence of some differences in the CARs of various groups, the results do not seem to indicate that these differences can be explained by accounting variations.

5.6 Summary

This chapter presents the empirical analyses employed in this dissertation and presents their results. The first analyses evaluate a number of competing models on their ability to explain the returns of cross-listing firms. Models 4 and 4a are chosen to best represent the returns. These models are two country factor market models that utilize returns that have been adjusted to be on a common basis, the US dollar in this case.

In the third section, the models are examined for possible changes in risk/return structures. In the initial tests, methodologies from previous studies are used in order to replicate previous work. Later, a two-step test is used that links F-tests and t-tests on individual firms through a binomial test that allows these to be combined into an overall test. The replication finds that the risk/return structure seems to have changed. This result is supported even more strongly by the tests suggested as extensions in this dissertation.

When the abnormal returns are examined in the fourth section, a number of interesting findings appear. The announcement is found to have a positive effect as significant positive abnormal returns are found in the windows centered around the announcement. The results for the listing are quite different, there is no evidence of

abnormal returns in the event windows immediately surrounding the listing in the daily or weekly data. There are a few significant CARs in the pre and post listing windows, however, they are not widespread. As a result, it is concluded that actual cross-listing of non-US firms on the NYSE is not a significant event.

The final area of examination is possible differences in abnormal returns of samples from different areas. The results of this section are not as clear-cut as the other sections. There is no evidence of significant differences in abnormal returns for the event windows directly around the announcement event. There is some evidence of possible differences in other windows and other groups, but they do not seem attributable to listings originating from areas with different accounting regimes.

Table 5.1
Average R^2 s of models estimated¹ for various
event/data frequency combinations

Model	Announcement Daily	Announcement Weekly	Listing Daily	Listing Weekly
Model 1a	23.27%	33.12%	22.90%	33.16%
Model 2a	28.07%	37.14%	27.46%	36.58%
Model 3a	24.91%	36.34%	24.67%	36.44%
Model 4a	29.59%	40.24%	29.07%	39.84%
Model 5a	24.07%	36.16%	23.72%	36.22%
Model 6a	27.84%	40.02%	28.21%	39.55%
Model 7a	29.59%	40.24%	29.07%	39.84%
Model 1	21.48%	29.67%	21.29%	29.24%
Model 2	25.36%	33.30%	24.92%	32.45%
Model 3	22.60%	31.28%	22.50%	30.99%
Model 4	26.34%	35.04%	26.02%	34.24%
Model 5	21.97%	31.15%	21.71%	30.85%
Model 6	25.76%	34.73%	25.31%	33.98%
Model 7	26.34%	35.04%	26.02%	34.24%
Model 7b	6.15%	10.69%	6.66%	10.55%

¹ Estimation period for daily samples consists of 400 observations from (-251, -52) and (+50, +249). For weekly samples, the estimation period consists of 55 observations from (-51, -17) and (+30, +49).

Table 5.2
Beta estimates from model 1¹ for announcement/daily sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-values	2-sided p-values
All	Home beta	0.8538	0.7821	0.1411	0.2823
Australia	Home beta	1.0705	0.6952	0.2545	0.5091
Canada	Home beta	0.8282	1.1529	0.9258	0.1484
Chile	Home beta	0.8239	0.5713	0.3786	0.7572
Europe	Home beta	0.7735	0.6376	0.1336	0.2672
Mexico	Home beta	0.4874	0.9663	0.9954	0.0091*
S. America	Home beta	0.7391	0.6859	0.3995	0.7991
UK	Home beta	1.0913	0.7914	0.0069*	0.0137*
PreUS Canada	Home beta	1.0667	0.9737	0.4308	0.8615
PreUS Europe	Home beta	0.7531	0.7613	0.5068	0.9865
PreUS UK	Home beta	0.8275	0.8694	0.6130	0.7740
PreUS All	Home beta	0.8970	0.8835	0.4738	0.9476

¹Model 1 is $E(RN_{i,t}) = a_i^1 + b_i^1 RN_{H,t}$, which is a one factor market model with the securities return and home market return in the non-US currency.

Table 5.3
Beta estimates from model 3¹ for announcement/daily sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
All	Home beta	0.8708	0.7629	0.0698*	0.1396
	Foreign beta	-0.0137	0.2608	0.0000*	0.0000*
Australia	Home beta	1.0720	0.6886	0.0906*	0.1811
	Foreign beta	-0.0032	0.2747	0.0000*	0.0000*
Canada	Home beta	1.0502	1.4932	0.8494	0.3013
	Foreign beta	-0.2016	-0.3089	0.6734	0.6531
Chile	Home beta	0.8178	0.5331	0.4195	0.8391
	Foreign beta	0.0177	0.5325	0.0079*	0.0158*
Europe	Home beta	0.7644	0.5819	0.0693*	0.1387
	Foreign beta	0.0678	0.3800	0.0001*	0.0003*
Mexico	Home beta	0.5158	0.9574	0.9923	0.0154*
	Foreign beta	-0.2168	0.0555	0.0065*	0.0130*
S. America	Home beta	0.7262	0.6599	0.3719	0.7439
	Foreign beta	0.1552	0.3039	0.2054	0.4107
UK	Home beta	1.1098	0.6946	0.0003*	0.0005*
	Foreign beta	-0.0912	0.2942	0.0000*	0.0001*
PreUS Canada	Home beta	1.0410	0.9862	0.4558	0.9116
	Foreign beta	-0.0409	-0.0413	0.5006	0.9987
PreUS Europe	Home beta	0.7000	0.5858	0.3942	0.7885
	Foreign beta	0.0802	0.8188	0.0881*	0.1761
PreUS UK	Home beta	0.7306	0.6955	0.4370	0.8741
	Foreign beta	0.2248	0.3010	0.3895	0.7790
PreUS All	Home beta	0.8349	0.7758	0.3875	0.7750
	Foreign beta	0.0990	0.2897	0.1584	0.3169

¹Model 3 is $E(RN_{i,t}) = a_i^3 + b_i^3 RN_{H,t} + c_i^3 R_{US,t}$, which is a two factor market model with the securities' return and home market return in the non-US currency. The US market return is in US dollars.

Table 5.4
Beta estimates for the overall sample for models 1¹ & 3²
and event/data frequency combinations

Event/data frequency	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 1					
Ann/daily	Home beta	0.8538	0.7821	0.1411	0.2823
Ann/weekly	Home beta	0.9070	0.8945	0.4383	0.8766
Listing/daily	Home beta	0.8522	0.7878	0.1624	0.3248
Listing/weekly	Home beta	0.9087	0.9198	0.5500	0.8999
Model 3					
Ann/daily	Home beta	0.8708	0.7629	0.0698*	0.1396
	Foreign beta	-0.0137	0.2608	0.0000*	0.0000*
Ann/weekly	Home beta	0.8991	0.8509	0.3049	0.6099
	Foreign beta	0.0184	0.3297	0.0041*	0.0081*
Listing/daily	Home beta	0.8737	0.7662	0.0731*	0.1462
	Foreign beta	-0.0110	0.2551	0.0000*	0.0000*
Listing/weekly	Home beta	0.9040	0.8982	0.4762	0.9523
	Foreign beta	0.0099	0.2377	0.0184*	0.0367*

¹Model 1 is $E(RN_{i,t}) = a_i^1 + b_i^1 RN_{H,t}$, which is a one factor market model with the securities return and home market return in the non-US currency.

²Model 3 is $E(RN_{i,t}) = a_i^3 + b_i^3 RN_{H,t} + c_i^3 R_{US,t}$, which is a two factor market model with the securities' return and home market return in the non-US currency. The US market return is in US dollars.

Table 5.5
Beta estimates from model 2¹ for announcement/daily sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
All	Home beta	0.8716	0.6757	0.0003*	0.0007*
Australia	Home beta	0.9765	0.4718	0.0049*	0.0097*
Canada	Home beta	0.8743	1.1749	0.9214	0.1573
Chile	Home beta	0.8678	0.5377	0.1367	0.2734
Europe	Home beta	0.8349	0.5643	0.0037*	0.0074*
Mexico	Home beta	0.5327	0.8811	0.9777	0.0446*
S. America	Home beta	0.7811	0.6611	0.2813	0.5626
UK	Home beta	1.0564	0.6823	0.0003*	0.0006*
PreUS Canada	Home beta	0.9992	0.9948	0.4961	0.9922
PreUS Europe	Home beta	0.8842	0.6449	0.2605	0.5210
PreUS UK	Home beta	0.8127	0.7694	0.3702	0.7404
PreUS All	Home beta	0.8946	0.8232	0.3409	0.6818

¹Model 2 is $E(RU_{i,t}) = a_i^2 + b_i^2 RU_{H,t}$, which is a one factor market model with the securities' return and home market return in US dollars.

Table 5.6
Beta estimates from model 4¹ for announcement/daily sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
All	Home beta	0.8856	0.6693	0.0003*	0.0006*
	Foreign beta	-0.0210	0.2719	0.0000*	0.0000*
Australia	Home beta	0.9796	0.4664	0.0007*	0.0013*
	Foreign beta	-0.0057	0.2824	0.0000*	0.0000*
Canada	Home beta	1.0508	1.4390	0.8526	0.2947
	Foreign beta	-0.2007	-0.2707	0.6287	0.7426
Chile	Home beta	0.8646	0.5490	0.0964*	0.1929
	Foreign beta	0.0022	0.4380	0.0010*	0.0021*
Europe	Home beta	0.8328	0.5425	0.0020*	0.0040*
	Foreign beta	0.0545	0.3392	0.0003*	0.0006*
Mexico	Home beta	0.5603	0.8700	0.9645	0.0709*
	Foreign beta	-0.2532	0.1509	0.0006*	0.0011*
S. America	Home beta	0.7680	0.6360	0.2557	0.5113
	Foreign beta	0.1527	0.3032	0.2076	0.4153
UK	Home beta	1.0632	0.6319	0.0000*	0.0000*
	Foreign beta	-0.0790	0.2898	0.0001*	0.0001*
PreUS Canada	Home beta	0.9196	0.9640	0.5469	0.9061
	Foreign beta	0.0422	-0.0133	0.5804	0.8393
PreUS Europe	Home beta	0.8484	0.3458	0.0700*	0.1401
	Foreign beta	0.0919	0.8775	0.0871*	0.1741
PreUS UK	Home beta	0.7459	0.6376	0.2663	0.5325
	Foreign beta	0.2446	0.3086	0.3957	0.7914
PreUS All	Home beta	0.8299	0.6916	0.2008	0.4016
	Foreign beta	0.1396	0.3155	0.1715	0.3430

¹Model 4 is $E(RU_{i,t}) = a_i^4 + b_i^4 RU_{H,t} + c_i^4 R_{US,t}$, which is a two factor market model with all returns in US dollars.

Table 5.7
Beta estimates for the overall sample for models 2¹ & 4²
and event/data frequency combinations

Event/data frequency	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 2					
Ann/daily	Home beta	0.8716	0.6757	0.0003*	0.0007*
Ann/weekly	Home beta	0.8863	0.8283	0.2098	0.4197
Listing/daily	Home beta	0.8773	0.6741	0.0002*	0.0004*
Listing/weekly	Home beta	0.8937	0.8412	0.2481	0.4962
Model 4					
Ann/daily	Home beta	0.8856	0.6693	0.0003*	0.0006*
	Foreign beta	-0.0210	0.2719	0.0000*	0.0000*
Ann/weekly	Home beta	0.8843	0.8006	0.1549	0.3098
	Foreign beta	0.0181	0.3046	0.0070*	0.0140*
Listing/daily	Home beta	0.8963	0.6673	0.0002*	0.0003*
	Foreign beta	-0.0153	0.2638	0.0000*	0.0000*
Listing/weekly	Home beta	0.8987	0.8263	0.1973	0.3946
	Foreign beta	0.4023	0.6145	0.0332*	0.0664*

¹Model 2 is $E(RU_{i,t}) = a_i^2 + b_i^2 RU_{H,t}$, which is a one factor market model with the securities' return and home market return in US dollars.

²Model 4 is $E(RU_{i,t}) = a_i^4 + b_i^4 RU_{H,t} + c_i^4 R_{US,t}$, which is a two factor market model with all returns in US dollars.

Table 5.8
Number of significant¹ 1-sided t-tests from testing models 1a²
and 3a³ for the overall sample

Event/data frequency	Parameter tested	Model 1a	Model 3a
Announcement/daily	Home beta	25*	30*
	Foreign beta		33*
Announcement/weekly	Home beta	10*	11*
	Foreign beta		16*
Listing/daily	Home beta	26*	32*
	Foreign beta		31*
Listing/weekly	Home beta	16*	12*
	Foreign beta		12*

¹Significance level used is 10%

²Model 1a is $E(RN_{i,t}) = a_i^{1a} + d_{a1,i}^{1a}D + b_i^{1a}RN_{H,t} + d_{1,i}^{1a}DRN_{H,t}$, which is a one factor market model with dummy variables. The securities return and home market return is in the non-US currency.

³Model 3a is

$E(RN_{i,t}) = a_i^{3a} + d_{a2,i}^{3a}D + b_i^{3a}RN_{H,t} + c_i^{3a}R_{US,t} + d_{2,i}^{3a}DRN_{H,t} + d_{3,i}^{3a}DR_{US,t}$, which is a two factor market model with dummy variables. The securities' return and home market return is in the non-US currency. The US market return is in US dollars.

Table 5.9
Number of significant¹ 1-sided t-tests from testing models 2a²
and 4a³ for the overall sample

Event/data frequency	Parameter tested	Model 2a	Model 4a
Announcement/daily	Home beta	37*	37*
	Foreign beta		35*
Announcement/weekly	Home beta	13*	16*
	Foreign beta		15*
Listing/daily	Home beta	36*	38*
	Foreign beta		32*
Listing/weekly	Home beta	17*	19*
	Foreign beta		13*

¹Significance level used is 10%

²Model 2a is $E(RU_{i,t}) = a_i^{2a} + d_{a1,i}^{2a}D + b_i^{2a}RU_{H,t} + d_{1,i}^{2a}DRU_{H,t}$, which is a one factor market model with dummy variables. The securities' return and home market return in US dollars.

³Model 4a is $E(RU_{i,t}) = a_i^{4a} + d_{a2,i}^{4a}D + b_i^{4a}RU_{H,t} + c_i^{4a}R_{US,t} + d_{2,i}^{4a}DRU_{H,t} + d_{3,i}^{4a}DR_{US,t}$, which is a two factor market model with dummy variables. All returns are in US dollars.

Table 5.10
Number of significant¹ 2-sided tests from testing models 2a
and 4a for the overall sample

Event/data frequency	Parameter tested	Model 2a	Model 4a
Announcement/daily	Home beta	40*	42*
	Foreign beta		27*
	All Dummies	38*	45*
Announcement/weekly	Home beta	20*	18*
	Foreign beta		8
	All Dummies	17*	20*
Listing/daily	Home beta	40*	39*
	Foreign beta		23*
	All Dummies	37*	45*
Listing/weekly	Home beta	20*	16*
	Foreign beta		12*
	All Dummies	21*	18*

¹Significance level used is 10%

²Model 2a is $E(RU_{i,t}) = a_i^{2a} + d_{a1,i}^{2a}D + b_i^{2a}RU_{H,t} + d_{1,i}^{2a}DRU_{H,t}$, which is a one factor market model with dummy variables. The securities' return and home market return in US dollars.

³Model 4a is

$E(RU_{i,t}) = a_i^{4a} + d_{a2,i}^{4a}D + b_i^{4a}RU_{H,t} + c_i^{4a}R_{US,t} + d_{2,i}^{4a}DRU_{H,t} + d_{3,i}^{4a}DR_{US,t}$, which is a two factor market model with dummy variables. All returns are in US dollars.

Table 5.11
Tests of CARs for announcement/daily sample

Samples	CAR and t-statistic for (-16, -6)	CAR and t-statistic for (-5, +5)	CAR and t-statistic for (+6, +49)	Critical 10% t-statistic value
All	0.0005 (0.0747)	0.0116 (1.6877)*	0.0019 (0.1406)	1.6669
Australia	0.0392 (1.8154)	0.0120 (0.5538)	0.0230 (0.5327)	1.8946
Canada	-0.0191 (-0.7428)	-0.0059 (-0.2285)	0.0522 (1.0127)	2.1318
Chile	0.0072 (0.3742)	0.0439 (2.2729)*	-0.0095 (-0.2449)	1.8125
Europe	-0.0099 (-0.7935)	0.0238 (1.9008)*	0.0038 (0.1534)	1.7291
Mexico	-0.0041 (-0.1527)	0.0090 (0.3396)	-0.0272 (-0.5098)	2.0150
S. America	-0.0027 (-0.1112)	-0.0173 (-0.7227)	-0.0359 (-0.7504)	1.9432
UK	-0.0014 (-0.1144)	-0.0097 (-0.7904)	0.0095 (0.3873)	1.7709
PreUS Canada	0.0027 (0.0831)	-0.0445 (-1.3507)	-0.0921 (-1.3971)	2.1318
PreUS Europe	0.0015 (0.0421)	0.0500 (1.3733)	-0.0899 (-1.2334)	2.9200
PreUS UK	-0.0308 (-1.4345)	0.0414 (1.9319)	0.0424 (0.9881)	2.0150
PreUS	-0.0119 (-0.7007)	0.0126 (0.7418)	-0.0340 (-1.0034)	1.7709

Table 5.12
Abnormal returns and t-statistics for announcement/daily sample

Critical values	Abnormal returns and t-statistics for announcement/daily sample									
	All		Australia		Canada		Chile			
Days	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
-5	0.0003	0.1599	0.0001	0.0215	-0.0051	-0.6554	0.0010	0.1742		1.8125
-4	0.0015	0.7471	-0.0028	-0.4301	-0.0152	-1.9515	0.0116	1.9845*		
-3	0.0025	1.2059	-0.0028	-0.4282	0.0002	0.0270	0.0134	2.3073*		
-2	0.0023	1.1201	0.0031	0.4706	-0.0073	-0.9422	0.0050	0.8607		
-1	0.0047	2.2918*	-0.0027	-0.4176	0.0005	0.0653	0.0062	1.0653		
0	0.0001	0.0575	-0.0048	-0.7347	0.0067	0.8633	0.0095	1.6352		
1	-0.0024	-1.1474	-0.0032	-0.4842	0.0012	0.1534	-0.0059	-1.0108		
2	-0.0003	-0.1393	0.0074	1.1376	0.0078	1.0030	-0.0020	-0.3467		
3	-0.0013	-0.6237	-0.0059	-0.9085	0.0078	1.0069	-0.0019	-0.3232		
4	0.0035	1.6696*	0.0193	2.9559*	0.0022	0.2860	0.0060	1.0256		
5	0.0005	0.2557	0.0043	0.6545	-0.0048	-0.6136	0.0010	0.1662		

Table 5.12
Continued

Critical values	Europe			Mexico			S. America			UK		
	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Days												
-5	0.0031	0.8150	-0.0047	-0.5817	0.0016	0.2231	-0.0006	-0.1547				
-4	0.0053	1.3974	-0.0021	-0.2596	0.0011	0.1515	-0.0014	-0.3803				
-3	0.0011	0.2883	0.0047	0.5823	-0.0060	-0.8310	0.0030	0.8228				
-2	0.0053	1.3935	0.0037	0.4570	0.0001	0.0080	-0.0004	-0.1166				
-1	0.0089	2.3597*	0.0105	1.3057	-0.0003	-0.0454	0.0035	0.9459				
0	0.0010	0.2530	0.0051	0.6365	-0.0023	-0.3201	-0.0089	-2.4145*				
1	0.0000	-0.0043	-0.0075	-0.9355	0.0021	0.2864	-0.0038	-1.0330				
2	-0.0031	-0.8283	-0.0027	-0.3351	0.0017	0.2326	-0.0021	-0.5706				
3	0.0003	0.0914	0.0042	0.5290	-0.0086	-1.1893	-0.0025	-0.6769				
4	0.0001	0.0226	0.0032	0.3939	-0.0023	-0.3218	0.0007	0.1924				
5	0.0019	0.5160	-0.0053	-0.6660	-0.0043	-0.5910	0.0028	0.7639				

Table 5.12
Concluded

Critical values	PreUS Canada			PreUS Europe			PreUS UK			PreUS		
	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Days												
-5	0.0009	0.0954	-0.0097	-0.8787	-0.0026	-0.4084	-0.0029	-0.5601	-0.0029	-0.5601	-0.0029	-0.5601
-4	-0.0086	-0.8680	0.0298	2.7104	0.0091	1.4074	0.0072	1.4089	0.0072	1.4089	0.0072	1.4089
-3	-0.0050	-0.4991	0.0065	0.5947	0.0003	0.0471	-0.0002	-0.0473	-0.0002	-0.0473	-0.0002	-0.0473
-2	-0.0096	-0.9694	0.0007	0.0650	0.0147	2.2679*	0.0030	0.5862	0.0030	0.5862	0.0030	0.5862
-1	-0.0021	-0.2082	0.0087	0.7918	0.0057	0.8866	0.0036	0.7010	0.0036	0.7010	0.0036	0.7010
0	-0.0049	-0.4888	0.0120	1.0900	0.0023	0.3516	0.0018	0.3532	0.0018	0.3532	0.0018	0.3532
1	0.0291	2.9305*	0.0339	3.0906*	-0.0032	-0.4983	0.0163	3.1903*	0.0163	3.1903*	0.0163	3.1903*
2	-0.0169	-1.7044	-0.0220	-1.9995	-0.0076	-1.1814	-0.0140	-2.7464*	-0.0140	-2.7464*	-0.0140	-2.7464*
3	-0.0037	-0.3713	-0.0055	-0.5018	0.0025	0.3799	-0.0014	-0.2832	-0.0014	-0.2832	-0.0014	-0.2832
4	-0.0149	-1.5009	-0.0123	-1.1163	0.0180	2.7814*	-0.0003	-0.0490	-0.0003	-0.0490	-0.0003	-0.0490
5	-0.0089	-0.8955	0.0078	0.7087	0.0024	0.3735	-0.0005	-0.0932	-0.0005	-0.0932	-0.0005	-0.0932

Table 5.13
Tests of CARs for announcement/weekly sample

Samples	CAR and t-statistic for (-15, -2)	CAR and t-statistic for (-1, +1)	CAR and t-statistic for (+2, +29)	Critical 10% t-statistic value
All	0.0195 (1.2387)	0.0247 (3.3842)*	-0.0085 (-0.3822)	1.6669
Australia	0.0775 (1.8068)	0.0594 (2.9916)*	-0.0517 (-0.8529)	1.8946
Canada	-0.0825 (-1.4645)	0.0012 (0.0452)	0.0159 (0.1993)	2.1318
Chile	0.1143 (2.5705)*	0.0314 (1.5237)	-0.0290 (-0.4605)	1.8125
Europe	-0.0393 (-1.3888)	0.0275 (2.0947)*	0.0703 (1.7536)*	1.7291
Mexico	0.0821 (1.1898)	0.0364 (1.1392)	-0.0546 (-0.5595)	2.0150
S. America	0.0203 (0.3656)	0.0240 (0.9330)	-0.0128 (-0.1631)	1.9432
UK	0.0052 (0.1801)	-0.0007 (-0.0486)	-0.0671 (-1.6330)	1.7709
PreUS Canada	0.1287 (1.9293)	-0.0174 (-0.5648)	0.0286 (0.3029)	2.1318
PreUS Europe	0.1278 (1.3037)	0.0080 (0.1756)	-0.0403 (-0.2910)	2.9200
PreUS UK	-0.0028 (-0.0676)	0.0533 (2.7655)*	0.0073 (0.1232)	2.0150
PreUS	0.0721 (2.1142)*	0.0183 (1.1609)	0.0047 (0.0969)	1.7709

Table 5.14
Abnormal returns and t-statistics for announcement/weekly sample

Critical values	All		Australia		Canada		Chile	
	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Weeks								
-5	0.0040	0.9497	-0.0004	-0.0372	-0.0193	-1.2804	0.0150	1.2593
-4	-0.0012	-0.2748	-0.0056	-0.4907	-0.0082	-0.5417	-0.0014	-0.1193
-3	0.0018	0.4353	0.0199	1.7371	-0.0019	-0.1234	0.0122	1.0276
-2	0.0012	0.2827	0.0229	1.9966*	-0.0192	-1.2722	-0.0110	-0.9269
-1	0.0138	3.2844*	-0.0078	-0.6798	-0.0236	-1.5662	0.0358	3.0080*
0	0.0018	0.4384	0.0208	1.8182	0.0238	1.5836	-0.0026	-0.2178
1	0.0090	2.1387*	0.0464	4.0431*	0.0009	0.0610	-0.0018	-0.1510
2	0.0011	0.2619	0.0048	0.4143	0.0061	0.4079	0.0071	0.6012
3	-0.0022	-0.5213	0.0168	1.4672	0.0012	0.0779	-0.0067	-0.5644
4	0.0008	0.1955	0.0010	0.0915	0.0018	0.1226	-0.0110	-0.9292
5	-0.0100	-2.3755*	-0.0143	-1.2448	-0.0126	-0.8349	-0.0129	-1.0842

Table 5.14
Continued

Critical values	Europe		Mexico		S. America		UK	
	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Weeks								
-5	-0.0028	-0.3666	0.0353	1.9135	0.0028	0.1863	0.0031	0.4016
-4	0.0018	0.2387	0.0127	0.6915	-0.0052	-0.3494	-0.0041	-0.5252
-3	-0.0021	-0.2820	-0.0017	-0.0908	0.0007	0.0466	-0.0076	-0.9778
-2	-0.0067	-0.8903	0.0174	0.9434	0.0014	0.0951	0.0099	1.2777
-1	0.0272	3.5953*	0.0270	1.4654	0.0048	0.3249	0.0021	0.2648
0	0.0013	0.1716	0.0116	0.6320	0.0024	0.1588	-0.0171	-2.1960*
1	-0.0011	-0.1387	-0.0023	-0.1242	0.0168	1.1324	0.0143	1.8471*
2	0.0028	0.3683	-0.0129	-0.6989	0.0135	0.9070	-0.0101	-1.3026
3	0.0035	0.4648	-0.0361	-1.9578	-0.0288	-1.9387	0.0089	1.1493
4	-0.0001	-0.0081	-0.0105	-0.5684	0.0376	2.5340*	-0.0026	-0.3384
5	0.0051	0.6740	-0.0198	-1.0716	-0.0199	-1.3393	-0.0169	-2.1694*

Table 5.14
Concluded

Critical values	PreUS Canada			PreUS Europe			PreUS UK			PreUS		
	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	t-statistics
Weeks												
-5	0.0295	1.6546	0.0186	0.0186	0.7099	0.0073	0.0073	0.6594	0.0177	0.0177	1.9374*	1.7709
-4	-0.0102	-0.5716	0.0485	0.0485	1.8522	0.0080	0.0080	0.7203	0.0102	0.0102	1.1179	
-3	-0.0209	-1.1716	-0.0557	-0.0557	-2.1262	-0.0129	-0.0129	-1.1564	-0.0249	-0.0249	-2.7319*	
-2	0.0175	0.9839	0.0276	0.0276	1.0554	-0.0151	-0.0151	-1.3596	0.0057	0.0057	0.6252	
-1	-0.0288	-1.6159	0.0290	0.0290	1.1091	0.0311	0.0311	2.7968*	0.0093	0.0093	1.0180	
0	0.0000	-0.0019	0.0057	0.0057	0.2181	0.0080	0.0080	0.7163	0.0046	0.0046	0.5078	
1	0.0114	0.6395	-0.0268	-0.0268	-1.0231	0.0142	0.0142	1.2768	0.0044	0.0044	0.4850	
2	-0.0260	-1.4605	-0.0160	-0.0160	-0.6105	-0.0015	-0.0015	-0.1377	-0.0134	-0.0134	-1.4677	
3	0.0239	1.3417	-0.0183	-0.0183	-0.6975	-0.0027	-0.0027	-0.2382	0.0035	0.0035	0.3828	
4	-0.0301	-1.6881	-0.0346	-0.0346	-1.3198	0.0124	0.0124	1.1159	-0.0128	-0.0128	-1.4071	
5	-0.0268	-1.5016	-0.0033	-0.0033	-0.1266	0.0027	0.0027	0.2422	-0.0091	-0.0091	-0.9996	

Table 5.15
Tests of CARs for listing/daily sample

Samples	CAR and t-statistic for (-16, -6)	CAR and t-statistic for (-5, +5)	CAR and t-statistic for (+6, +49)	Critical 10% t-statistic value
All	0.0187 (2.7169)*	-0.0098 (-1.4225)	-0.0080 (-0.5785)	1.6669
Australia	0.0446 (2.2700)*	-0.0307 (-1.5639)	-0.0266 (-0.6768)	1.8946
Canada	0.0047 (0.1780)	-0.0092 (-0.3474)	0.0235 (0.4430)	2.1318
Chile	0.0342 (1.8430)*	-0.0016 (-0.0879)	-0.0728 (-1.9600)*	1.8125
Europe	0.0077 (0.6235)	-0.0028 (-0.2288)	0.0011 (0.0462)	1.7291
Mexico	0.0451 (1.6184)	-0.0503 (-1.8056)	0.0566 (1.0154)	2.0150
S. America	0.0100 (0.3795)	-0.0158 (-0.5978)	-0.0057 (-0.1071)	1.9432
UK	0.0054 (0.4001)	0.0060 (0.4419)	0.0005 (0.0201)	1.7709
PreUS Canada	0.0198 (0.6028)	-0.0627 (-1.9129)	-0.1109 (-1.6921)	2.1318
PreUS Europe	-0.0750 (-1.9957)	-0.0220 (-0.5843)	0.0030 (0.0399)	2.9200
PreUS UK	0.0236 (1.0727)	-0.0169 (-0.7662)	0.0479 (1.0884)	2.0150
PreUS	0.0011 (0.0639)	-0.0343 (-1.9732)*	-0.0184 (-0.5300)	1.7709

Table 5.16
Abnormal returns and t-statistics for listing/daily sample

Critical values	All		Australia		Canada		Chile	
	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Days								
-5	-0.0023	-1.1023	-0.0005	-0.0878	0.0061	0.7625	-0.0013	-0.2323
-4	-0.0003	-0.1556	0.0004	0.0717	0.0124	1.5524	0.0002	0.0389
-3	0.0006	0.2924	0.0002	0.0381	0.0103	1.2930	0.0150	2.6777*
-2	0.0007	0.3140	0.0021	0.3628	-0.0017	-0.2107	-0.0024	-0.4289
-1	-0.0008	-0.3908	0.0007	0.1121	-0.0594	-7.4298*	0.0032	0.5649
0	-0.0035	-1.7054*	-0.0151	-2.5469*	0.0032	0.4018	-0.0069	-1.2370
1	-0.0011	-0.5130	-0.0077	-1.3051	0.0058	0.7216	-0.0018	-0.3165
2	-0.0018	-0.8663	-0.0068	-1.1519	0.0150	1.8800	-0.0104	-1.8608*
3	-0.0006	-0.2989	-0.0042	-0.7097	-0.0037	-0.4690	-0.0048	-0.8647
4	-0.0002	-0.1009	0.0054	0.9180	-0.0091	-1.1358	0.0060	1.0779
5	-0.0004	-0.1909	-0.0053	-0.8883	0.0118	1.4818	0.0016	0.2892

Table 5.16
Continued

Critical values	Europe		Mexico		S. America		UK	
	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Days								
-5	0.0010	0.2578	-0.0038	-0.4518	-0.0279	-3.5049*	0.0017	0.4260
-4	0.0027	0.7267	-0.0120	-1.4230	-0.0056	-0.7096	-0.0024	-0.5868
-3	-0.0070	-1.8772*	0.0001	0.0089	0.0047	0.5908	-0.0049	-1.2061
-2	-0.0038	-1.0265	0.0195	2.3137*	0.0103	1.2978	-0.0035	-0.8516
-1	0.0095	2.5584*	-0.0172	-2.0447*	0.0152	1.9062	0.0004	0.1023
0	0.0003	0.0742	-0.0036	-0.4280	-0.0014	-0.1720	-0.0032	-0.7833
1	-0.0024	-0.6381	-0.0028	-0.3386	0.0002	0.0196	0.0029	0.7069
2	-0.0055	-1.4899	-0.0008	-0.0918	0.0030	0.3733	0.0044	1.0702
3	0.0043	1.1478	-0.0026	-0.3129	-0.0018	-0.2305	0.0003	0.0837
4	-0.0030	-0.8156	-0.0129	-1.5363	-0.0048	-0.6034	0.0066	1.6172
5	0.0012	0.3238	-0.0142	-1.6841	-0.0076	-0.9502	0.0036	0.8871

Table 5.16
Concluded

Critical values	PreUS Canada			PreUS Europe			PreUS UK			PreUS		
	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	t-statistics
Days												
-5	-0.0085	-0.8574	-0.0140	-0.0140	-1.2372	-0.0052	-0.0083	-0.7853	-0.0083	-0.0083	-1.5754	-1.5754
-4	-0.0124	-1.2516	-0.0135	-0.0135	-1.1931	0.0061	-0.0047	0.9209	-0.0047	-0.0047	-0.8949	-0.8949
-3	-0.0046	-0.4657	0.0002	0.0002	0.0152	0.0065	0.0012	0.9738	0.0012	0.0012	0.2217	0.2217
-2	0.0050	0.5026	0.0097	0.0097	0.8579	0.0019	0.0047	0.2833	0.0047	0.0047	0.8889	0.8889
-1	0.0188	1.8995	0.0055	0.0055	0.4841	-0.0109	0.0032	-1.6453	0.0032	0.0032	0.6100	0.6100
0	-0.0118	-1.1960	0.0008	0.0008	0.0691	-0.0018	-0.0048	-0.2707	-0.0048	-0.0048	-0.9197	-0.9197
1	-0.0036	-0.3614	-0.0018	-0.0018	-0.1616	-0.0001	-0.0017	-0.0196	-0.0017	-0.0017	-0.3287	-0.3287
2	-0.0170	-1.7240	0.0013	0.0013	0.1130	0.0043	-0.0040	0.6517	-0.0040	-0.0040	-0.7545	-0.7545
3	-0.0091	-0.9194	-0.0031	-0.0031	-0.2725	-0.0104	-0.0084	-1.5703	-0.0084	-0.0084	-1.5964	-1.5964
4	-0.0170	-1.7171	-0.0129	-0.0129	-1.1395	0.0005	-0.0086	0.0819	-0.0086	-0.0086	-1.6384	-1.6384
5	-0.0025	-0.2538	0.0060	0.0060	0.5265	-0.0077	-0.0029	-1.1615	-0.0029	-0.0029	-0.5571	-0.5571

Table 5.17
Tests of CARs for listing/weekly sample

Samples	CAR and t-statistic for (-15, -2)	CAR and t-statistic for (-1, +1)	CAR and t-statistic for (+2, +29)	Critical 10% t-statistic value
All	0.0212 (1.3293)	0.0010 (0.1286)	-0.0100 (-0.4449)	1.6669
Australia	0.1352 (3.1364)*	-0.0128 (-0.6402)	0.0745 (1.2216)	1.8946
Canada	-0.0882 (-1.6965)	-0.0297 (-1.2352)	0.0892 (1.2123)	2.1318
Chile	0.1334 (2.9013)*	-0.0035 (-0.1647)	-0.0474 (-0.7292)	1.8125
Europe	-0.0314 (-1.1383)	0.0188 (1.4705)	0.0015 (0.0377)	1.7291
Mexico	-0.0198 (-0.3033)	-0.0531 (-1.7595)	-0.1905 (-2.0647)*	2.0150
S. America	0.0263 (0.4500)	0.0271 (1.0002)	0.0821 (0.9937)	1.9432
UK	-0.0026 (-0.0758)	0.0079 (0.4935)	-0.0496 (-1.0181)	1.7709
PreUS Canada	0.1893 (2.6120)*	-0.0701 (-2.0896)	0.0684 (0.6676)	2.1318
PreUS Europe	0.1229 (1.4867)	-0.0235 (-0.6141)	-0.1527 (-1.3068)	2.9200
PreUS UK	0.0039 (0.0845)	-0.0231 (-1.0776)	-0.0258 (-0.3932)	2.0150
PreUS	0.0956 (2.3534)*	-0.0400 (-2.1262)*	-0.0193 (-0.3368)	1.7709

Table 5.18
Abnormal returns and t-statistics for listing/weekly sample

Critical values	All		Australia		Canada		Chile	
	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Weeks								
-5	-0.0001	-0.0261	0.0032	0.2789	-0.0126	-0.9074	-0.0107	-0.8706
-4	0.0048	1.1199	0.0122	1.0624	0.0151	1.0840	0.0182	1.4793
-3	0.0117	2.7494*	0.0223	1.9331*	-0.0016	-0.1172	0.0197	1.6032
-2	0.0055	1.2834	0.0170	1.4772	0.0179	1.2903	0.0178	1.4509
-1	0.0004	0.0998	0.0160	1.3871	-0.0043	-0.3126	0.0123	1.0047
0	0.0010	0.2405	-0.0214	-1.8538	-0.0353	-2.5410*	0.0102	0.8285
1	-0.0005	-0.1175	-0.0074	-0.6421	0.0099	0.7143	-0.0260	-2.1185*
2	-0.0035	-0.8128	-0.0058	-0.5023	0.0021	0.1528	-0.0190	-1.5450
3	-0.0072	-1.6813*	-0.0076	-0.6568	-0.0165	-1.1855	0.0081	0.6583
4	0.0012	0.2817	0.0158	1.3707	0.0189	1.3616	-0.0135	-1.1004
5	0.0018	0.4282	-0.0044	-0.3847	0.0224	1.6126	0.0033	0.2694

Table 5.18
Continued

Critical values	Europe			Mexico			S. America			UK		
	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Weeks												
-5	0.0142	1.9211*	-0.0114	-0.0114	-0.6543	0.0101	0.0101	0.6438	-0.0099	-1.0737	-0.0099	-1.0737
-4	-0.0028	-0.3731	0.0150	0.0150	0.8579	-0.0072	-0.0072	-0.4614	-0.0013	-0.1398	-0.0013	-0.1398
-3	0.0001	0.0136	0.0241	0.0241	1.3808	0.0275	0.0275	1.7590	0.0077	0.8341	0.0077	0.8341
-2	0.0038	0.5171	0.0006	0.0006	0.0344	-0.0156	-0.0156	-1.0012	-0.0003	-0.0273	-0.0003	-0.0273
-1	0.0037	0.5076	-0.0211	-0.0211	-1.2092	-0.0201	-0.0201	-1.2868	-0.0014	-0.1502	-0.0014	-0.1502
0	0.0061	0.8198	-0.0075	-0.0075	-0.4312	0.0373	0.0373	2.3880*	-0.0020	-0.2222	-0.0020	-0.2222
1	0.0090	1.2197	-0.0245	-0.0245	-1.4071	0.0099	0.0099	0.6312	0.0113	1.2271	0.0113	1.2271
2	0.0073	0.9857	-0.0412	-0.0412	-2.3633*	0.0114	0.0114	0.7279	0.0014	0.1573	0.0014	0.1573
3	-0.0067	-0.9012	-0.0211	-0.0211	-1.2080	-0.0057	-0.0057	-0.3628	-0.0112	-1.2118	-0.0112	-1.2118
4	0.0033	0.4533	-0.0040	-0.0040	-0.2307	-0.0094	-0.0094	-0.5996	0.0026	0.2778	0.0026	0.2778
5	0.0021	0.2860	0.0256	0.0256	1.4688	-0.0286	-0.0286	-1.8313	0.0015	0.1633	0.0015	0.1633

Table 5.18
Concluded

Critical values	PreUS Canada			PreUS Europe			PreUS UK			PreUS		
	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	Abnormal returns	t-statistics	Abnormal returns	t-statistics	Abnormal returns	t-statistics
Weeks												
-5	-0.0083	-0.4264	0.0310	0.0310	1.4043	0.0021	0.0021	0.1706	0.0046	0.4239	0.0046	0.4239
-4	0.0414	2.1385*	0.0213	0.0213	0.9657	0.0078	0.0078	0.6312	0.0227	2.0922*	0.0227	2.0922*
-3	0.0066	0.3389	-0.0004	-0.0004	-0.0175	0.0450	0.0450	3.6265*	0.0215	1.9828*	0.0215	1.9828*
-2	0.0005	0.0257	-0.0389	-0.0389	-1.7607	-0.0240	-0.0240	-1.9380	-0.0185	-1.6994	-0.0185	-1.6994
-1	0.0006	0.0316	-0.0257	-0.0257	-1.1646	0.0089	0.0089	0.7191	-0.0015	-0.1357	-0.0015	-0.1357
0	-0.0463	-2.3906*	0.0128	0.0128	0.5791	-0.0075	-0.0075	-0.6025	-0.0170	-1.5653	-0.0170	-1.5653
1	-0.0244	-1.2603	-0.0106	-0.0106	-0.4782	-0.0246	-0.0246	-1.9831	-0.0215	-1.9817*	-0.0215	-1.9817*
2	0.0002	0.0090	-0.0167	-0.0167	-0.7576	0.0261	0.0261	2.1089*	0.0077	0.7074	0.0077	0.7074
3	0.0030	0.1525	0.0207	0.0207	0.9365	-0.0159	-0.0159	-1.2823	-0.0013	-0.1221	-0.0013	-0.1221
4	0.0086	0.4435	0.0050	0.0050	0.2254	0.0102	0.0102	0.8212	0.0085	0.7826	0.0085	0.7826
5	-0.0261	-1.3470	-0.0104	-0.0104	-0.4712	0.0087	0.0087	0.7000	-0.0078	-0.7210	-0.0078	-0.7210

Table 5.19
P-values for t-tests on CARs from the
announcement/daily sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
(-16, -6)	0.1033	0.1204	0.1683
(-5, +5)	0.3681	0.4331	0.3202
(+6, +49)	0.3700	0.2517	0.6027

Table 5.20
P-values for t-tests on abnormal returns
from the announcement/daily sample

Days	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	0.1337	0.1059	0.2605
-4	0.4078	0.4896	0.2858
-3	0.2763	0.3851	0.1935
-2	0.2862	0.3167	0.3027
-1	0.2763	0.3124	0.2670
0	0.8041	0.9695	0.3697
1	0.9861	0.9610	0.9369
2	0.0343*	0.0379*	0.0837*
3	0.7689	0.7579	0.7225
4	0.3016	0.2974	0.3596
5	0.2785	0.1651	0.5380

Table 5.21
Critical values and test statistics for Mann-Whitney tests
on CARs from the announcement/daily sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
n,m	19,66	19,42	19,24
critical values	938.49	671.29	470.40
(-16, -6)	948*	668	470
(-5, +5)	821	588	423
(+6, +49)	824	606	408

Table 5.22
Test statistics for Mann-Whitney tests on abnormal returns
from the announcement/daily sample

Days	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	949*	677*	462
-4	841	585	446
-3	816	597	409
-2	835	596	429
-1	855	612	433
0	750	496	444
1	724	535	379
2	974*	697*	467
3	727	529	388
4	836	615	411
5	900	663	427

Table 5.23
P-values for t-tests on CARs from the
announcement/weekly sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
(-15, -2)	0.5347	0.7561	0.2350
(-1, +1)	0.2814	0.2941	0.2835
(+2, +29)	0.6004	0.5345	0.6684

Table 5.24
P-values for t-tests on abnormal returns from the
announcement/weekly sample

Weeks	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	0.5818	0.7925	0.2602
-4	0.7002	0.7104	0.6056
-3	0.0230*	0.0490*	0.0257*
-2	0.3656	0.3051	0.4851
-1	0.0796*	0.1734	0.0406*
0	0.7702	0.7979	0.6836
1	0.3207	0.2297	0.4998
2	0.1887	0.2591	0.1410
3	0.6847	0.2996	0.9409
4	0.2476	0.2848	0.2909
5	0.4923	0.3531	0.6811

Table 5.25
Critical values and test statistics for Mann-Whitney tests
on CARs from the announcement/weekly sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
n,m	19,66	19,42	19,24
critical values	938.49	671.29	470.40
(-15, -2)	860	578	472*
(-1, +1)	862	612	440
(+2, +29)	795	580	405

Table 5.26
Test statistics for Mann-Whitney tests on abnormal returns
from the announcement/weekly sample

Weeks	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	788	545	433
-4	757	553	394
-3	962*	674*	478*
-2	885	638	437
-1	974*	663	501*
0	697	506	381
1	834	618	406
2	893	637	446
3	829	654	365
4	836	605	421
5	844	638	396

Table 5.27
P-values for t-tests on CARs from the
listing/daily sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
(-16, -6)	0.1415	0.2372	0.1189
(-5, +5)	0.2049	0.1446	0.3788
(+6, +49)	0.5383	0.4517	0.6207

Table 5.28
P-values for t-tests on abnormal returns from the
listing/daily sample

Days	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	0.3771	0.0437*	0.7531
-4	0.5832	0.4263	0.7063
-3	0.7172	0.9053	0.2507
-2	0.7014	0.9497	0.2505
-1	0.1005	0.0856*	0.2413
0	0.5880	0.5770	0.5867
1	0.6841	0.7081	0.6366
2	0.7727	0.7239	0.7756
3	0.0303*	0.0024*	0.2377
4	0.0158*	0.0097*	0.0954*
5	0.6943	0.5179	0.8230

Table 5.29
Critical values and test statistics for Mann-Whitney
tests on CARs from the listing/daily sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
n,m	19,66	19,42	19,24
critical values	938.49	671.29	470.40
(-16, -6)	824	580	434
(-5, +5)	907	682*	415
(+6, +49)	802	572	420

Table 5.30
Test statistics for Mann-Whitney tests on abnormal returns
from the listing/daily sample

Days	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	923	700*	413
-4	806	605	391
-3	687	446	431
-2	706	465	431
-1	831	619	402
0	856	633	413
1	819	587	422
2	772	567	395
3	1001*	736*	455
4	999*	721*	468
5	743	558	375

Table 5.31
P-values for t-tests on CARs from
the listing/weekly sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
(-15, -2)	0.6406	0.7729	0.4024
(-1, +1)	0.0383*	0.0177*	0.1701
(+2, +29)	0.6162	0.5463	0.6901

Table 5.32
P-values for t-tests on abnormal returns from
the listing/weekly sample

Weeks	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	0.4710	0.3529	0.6546
-4	0.9264	0.9401	0.7799
-3	0.5952	0.7616	0.2676
-2	0.1017	0.1004	0.1970
-1	0.3841	0.2614	0.6083
0	0.0607*	0.1066	0.0712*
1	0.1323	0.0389*	0.5612
2	0.8490	0.6453	0.9517
3	0.5429	0.6090	0.4408
4	0.8665	0.6973	0.9510
5	0.4950	0.4809	0.5167

Table 5.33
Critical values and test statistics for Mann-Whitney
tests on CARs from the listing/weekly sample

Windows	AllexCan vs. Control	Close vs. Control	Far vs. Control
n,m	19,66	19,42	19,24
critical values	938.49	671.29	470.40
(-15, -2)	793	545	438
(-1, +1)	991*	741*	440
(+2, +29)	837	608	419

Table 5.34
Test statistics for Mann-Whitney tests on abnormal returns
from the listing/weekly sample

Weeks	AllexCan vs. Control	Close vs. Control	Far vs. Control
-5	842	619	413
-4	708	501	397
-3	796	545	441
-2	984*	705*	469
-1	826	626	390
0	938	675*	453
1	933	701*	422
2	717	558	349
3	855	604	441
4	735	562	363
5	773	574	389

Table 5.35
P-values for t-tests on CAR comparisons from the
announcement/daily sample

Sample	Control group	(-16, -6)	(-5, +5)	(+6, +49)
AllexCan	vs. PreUS	0.1489	0.4923	0.1395
	vs. Canada	0.1717	0.2383	0.8691
Australia	vs. PreUS	0.0127*	0.5073	0.1602
	vs. Canada	0.0693*	0.3356	0.6252
Chile	vs. PreUS	0.1450	0.1447	0.3084
	vs. Canada	0.1982	0.1015	0.7832
Europe	vs. PreUS	0.4521	0.2762	0.1529
	vs. Canada	0.3684	0.0849*	0.7977
Mexico	vs. PreUS	0.3816	0.5431	0.4525
	vs. Canada	0.3716	0.3295	0.8035
S. America	vs. PreUS	0.3429	0.8237	0.5118
	vs. Canada	0.3406	0.6247	0.8013
UK	vs. PreUS	0.2561	0.8274	0.1499
	vs. Canada	0.2581	0.5551	0.7425

Table 5.36

P-values for t-tests on abnormal return comparisons from the announcement/daily sample

Sample	Control group	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	vs. PreUS	0.1929	0.7271	0.2975	0.4962	0.3642	0.6819	0.9921	0.0020*	0.5477	0.2912	0.3805
	vs. Canada	0.1959	0.0571*	0.3876	0.1027	0.2614	0.8334	0.7169	0.8965	0.9152	0.4511	0.2390
Australia	vs. PreUS	0.2958	0.8190	0.6541	0.4970	0.8116	0.8402	0.8291	0.0051*	0.6999	0.1165	0.2913
	vs. Canada	0.2738	0.1679	0.7160	0.0819*	0.6045	0.9117	0.7268	0.5154	0.8497	0.2494	0.2918
Chile	vs. PreUS	0.2304	0.3256	0.0726*	0.4078	0.2682	0.1316	0.8910	0.0583*	0.5239	0.2773	0.4175
	vs. Canada	0.2299	0.0173*	0.1675	0.0760*	0.2127	0.3852	0.7617	0.8223	0.8088	0.3978	0.3314
Europe	vs. PreUS	0.1181	0.5674	0.3877	0.3954	0.1529	0.5862	0.8905	0.0211*	0.3320	0.4777	0.2792
	vs. Canada	0.1550	0.1217	0.4328	0.1373	0.1681	0.8940	0.5606	0.9362	0.9118	0.6286	0.2022
Mexico	vs. PreUS	0.5773	0.8064	0.2979	0.4762	0.1559	0.3277	0.8402	0.0497*	0.2469	0.3745	0.7885
	vs. Canada	0.4892	0.0756*	0.3492	0.1408	0.2012	0.5697	0.8245	0.9680	0.6182	0.4659	0.5176
S. America	vs. PreUS	0.2470	0.7164	0.7635	0.6160	0.7355	0.6695	0.7434	0.0166*	0.8140	0.5802	0.7011
	vs. Canada	0.2606	0.0746*	0.7517	0.1515	0.5313	0.7378	0.4523	0.7904	0.9140	0.6571	0.4858
UK	vs. PreUS	0.3253	0.8847	0.3115	0.6728	0.5067	0.9755	0.9047	0.0064*	0.5773	0.4478	0.2339
	vs. Canada	0.2862	0.0193*	0.3742	0.1748	0.3473	0.9838	0.8176	0.9879	0.9068	0.5731	0.2033

Table 5.37
Critical values and test statistics for Mann-Whitney tests on CAR
comparisons from the announcement/daily sample

Sample	n,m	Critical values	Control group	(-16, -6)	(-5, +5)	(+6, +49)
AllexCan	14,66	668.21	vs. PreUS	651	525	614
	5,66	237.03	vs. Canada	227	226	140
Australia	14,8	180	vs. PreUS	193*	161	170
	5,8	44	vs. Canada	44	38	31
Chile	14,11	206	vs. PreUS	205	190	187
	5,11	54	vs. Canada	51	58*	37
Europe	14,20	282	vs. PreUS	250	250	263
	5,20	84	vs. Canada	75	87*	51
Mexico	14,6	163	vs. PreUS	154	144	144
	5,6	37	vs. Canada	33	34	23
S. America	14,7	171	vs. PreUS	159	137	157
	5,7	41	vs. Canada	38	30	30
UK	14,14	231	vs. PreUS	215	168	218
	5,14	64	vs. Canada	61	54	43

Table 5.38

Critical values and test statistics for Mann-Whitney tests on abnormal return comparisons from the announcement/daily sample

Sample	n,m	Critical Control values	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	14,66	668.21 vs. PreUS	647	509	558	526	625	546	516	805*	531	600	616
	5,66	237.03 vs. Canada	232	262*	188	239*	160	134	138	99	126	166	214
Australia	14,8	180 vs. PreUS	167	159	154	159	164	149	156	195*	157	178	174
	5,8	44 vs. Canada	41	46*	33	46*	28	26	27	31	29	39	41
Chile	14,11	206 vs. PreUS	195	192	189	181	197	203	169	213*	177	186	188
	5,11	54 vs. Canada	52	62*	52	57*	42	43	31	27	33	39	49
Europe	14,20	282 vs. PreUS	283*	218	247	233	278	248	240	312*	237	255	262
	5,20	84 vs. Canada	85*	87*	72	81	60	51	57	42	49	60	76
Mexico	14,6	163 vs. PreUS	156	137	144	143	155	150	136	171*	155	151	141
	5,6	37 vs. Canada	33	36	24	35	30	29	27	19	31	28	30
S. America	14,7	171 vs. PreUS	158	146	142	146	149	158	154	181*	139	148	155
	5,7	41 vs. Canada	38	43*	28	37	30	31	32	26	23	29	34
UK	14,14	231 vs. PreUS	213	182	207	189	207	163	186	258*	191	207	221
	5,14	64 vs. Canada	58	63	54	58	45	29	39	29	36	46	59

Table 5.39
P-values for t-tests on CAR comparisons from the
announcement/weekly sample

Sample	Control group	(-15, -2)	(-1, +1)	(+2, +29)
AllexCan	vs. PreUS	0.7942	0.3717	0.5746
	vs. Canada	0.0803*	0.2707	0.5826
Australia	vs. PreUS	0.4802	0.1555	0.6612
	vs. Canada	0.0908*	0.2011	0.6401
Chile	vs. PreUS	0.3272	0.3558	0.6067
	vs. Canada	0.0348*	0.3065	0.5998
Europe	vs. PreUS	0.9649	0.3034	0.2453
	vs. Canada	0.1768	0.1811	0.3443
Mexico	vs. PreUS	0.4663	0.3453	0.6486
	vs. Canada	0.0761*	0.3276	0.6273
S. America	vs. PreUS	0.6839	0.4265	0.5609
	vs. Canada	0.1525	0.3284	0.5894
UK	vs. PreUS	0.8057	0.8444	0.7776
	vs. Canada	0.1170	0.5246	0.7535

Table 5.40
P-values for t-tests on abnormal return comparisons from the
announcement/weekly sample

Sample	Control group	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	vs. PreUS	0.8401	0.7931	0.0128*	0.6008	0.2841	0.6204	0.3662	0.1128	0.6779	0.1389	0.5215
	vs. Canada	0.0763*	0.3070	0.4034	0.0837*	0.0128*	0.8579	0.3385	0.6275	0.5791	0.5181	0.4388
Australia	vs. PreUS	0.9087	0.7155	0.0211*	0.2035	0.7963	0.2788	0.0768*	0.1472	0.2409	0.1907	0.5931
	vs. Canada	0.9132	0.5826	0.8237	0.9606	0.2089	0.4747	0.1099	0.4741	0.2228	0.4946	0.4737
Chile	vs. PreUS	0.5625	0.6795	0.0277*	0.7784	0.0882*	0.7124	0.5996	0.0947*	0.6831	0.4579	0.5885
	vs. Canada	0.0922*	0.3506	0.2581	0.3896	0.0069*	0.8943	0.5352	0.4800	0.6042	0.5977	0.5074
Europe	vs. PreUS	0.9222	0.6625	0.0601*	0.8348	0.1468	0.6168	0.6383	0.1481	0.4991	0.1371	0.1553
	vs. Canada	0.2191	0.2999	0.5064	0.1762	0.0154*	0.8903	0.5503	0.5583	0.4374	0.5207	0.1427
Mexico	vs. PreUS	0.1945	0.4714	0.1542	0.3129	0.2383	0.4108	0.5891	0.4881	0.9681	0.4615	0.6805
	vs. Canada	0.0383*	0.2523	0.4966	0.0927*	0.0370*	0.5891	0.5388	0.8615	0.9627	0.5654	0.6265
S. America	vs. PreUS	0.8169	0.6990	0.0904*	0.5769	0.5874	0.5590	0.3177	0.0770*	0.9253	0.0233*	0.6577
	vs. Canada	0.1431	0.3919	0.4123	0.2011	0.0340*	0.8029	0.2706	0.3768	0.8667	0.3061	0.5823
UK	vs. PreUS	0.8625	0.7472	0.1557	0.4017	0.6722	0.9551	0.2877	0.4015	0.3500	0.2323	0.6929
	vs. Canada	0.1087	0.3759	0.6119	0.0834*	0.0695*	0.9732	0.2033	0.8346	0.3018	0.5400	0.6048

Table 5.41
Critical values and test statistics for Mann-Whitney tests on
CAR comparisons from the announcement/weekly sample

Sample	n,m	Critical values	Control group	(-15, -2)	(-1, +1)	(+2, +29)
AllexCan	14,66	668.21	vs. PreUS	538	573	546
	5,66	237.03	vs. Canada	252*	219	179
Australia	14,8	180	vs. PreUS	164	162	159
	5,8	44	vs. Canada	47*	42	33
Chile	14,11	206	vs. PreUS	196	189	178
	5,11	54	vs. Canada	59*	47	44
Europe	14,20	282	vs. PreUS	204	257	260
	5,20	84	vs. Canada	79	82	69
Mexico	14,6	163	vs. PreUS	153	150	141
	5,6	37	vs. Canada	38*	32	28
S. America	14,7	171	vs. PreUS	154	157	150
	5,7	41	vs. Canada	42*	35	34
UK	14,14	231	vs. PreUS	192	183	183
	5,14	64	vs. Canada	62	56	46

Table 5.42
Critical values and test statistics for Mann-Whitney tests on abnormal return
comparisons from the announcement/weekly sample

Sample	n,m	Critical values	Control group	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	14,66	668.21	vs. PreUS	466	483	708*	592	623	497	571	668	589	641	570
	5,66	237.03	vs. Canada	252*	204	184	223	281*	130	193	155	170	125	204
Australia	14,8	180	vs. PreUS	145	147	188*	172	149	164	173	173	178	175	164
	5,8	44	vs. Canada	45*	38	40	46*	40	33	42	36	41	28	42
Chile	14,11	206	vs. PreUS	180	164	213*	176	211*	168	171	201	176	178	169
	5,11	54	vs. Canada	57*	42	44	46	66*	32	40	37	38	31	38
Europe	14,20	282	vs. PreUS	200	229	277	244	278	231	234	290*	264	265	270
	5,20	84	vs. Canada	82	75	65	68	102*	51	63	62	63	47	85*
Mexico	14,6	163	vs. PreUS	149	142	154	157	157	143	142	147	127	151	145
	5,6	37	vs. Canada	39*	33	27	36	39*	28	28	23	20	25	30
S. America	14,7	171	vs. PreUS	139	144	175*	154	155	152	159	175*	147	175*	151
	5,7	41	vs. Canada	39	39	35	38	43*	28	36	33	27	31	33
UK	14,14	231	vs. PreUS	178	182	226	214	198	164	217	207	222	222	196
	5,14	64	vs. Canada	65*	52	48	64	66*	33	59	39	56	38	51

Table 5.43
P-values for t-tests on CAR comparisons from the
listing/daily sample

Sample	Control group	(-16, -6)	(-5, +5)	(+6, +49)
AllexCan	vs. PreUS	0.1583	0.1345	0.4093
	vs. Canada	0.2871	0.5063	0.7302
Australia	vs. PreUS	0.1337	0.4549	0.5708
	vs. Canada	0.1953	0.6188	0.8778
Chile	vs. PreUS	0.1538	0.1896	0.8043
	vs. Canada	0.2127	0.4590	0.8463
Europe	vs. PreUS	0.3777	0.0881*	0.2793
	vs. Canada	0.4402	0.4460	0.7151
Mexico	vs. PreUS	0.1637	0.6806	0.1016
	vs. Canada	0.2247	0.6958	0.3020
S. America	vs. PreUS	0.4073	0.3303	0.4094
	vs. Canada	0.4470	0.5296	0.6719
UK	vs. PreUS	0.4339	0.0508*	0.3209
	vs. Canada	0.4890	0.3855	0.6800

Table 5.44
P-values for t-tests on abnormal return comparisons from the
listing/daily sample

Sample	Control group	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	vs. PreUS	0.1756	0.276	0.5687	0.7982	0.4845	0.4538	0.4871	0.4406	0.0285*	0.0286*	0.3748
	vs. Canada	0.8344	0.9277	0.8065	0.3720	0.0056*	0.7411	0.8488	0.9658	0.2955	0.1061	0.9519
Australia	vs. PreUS	0.0743*	0.2580	0.5533	0.7120	0.5976	0.8327	0.8284	0.6389	0.2381	0.0374*	0.6135
	vs. Canada	0.9106	0.8413	0.9412	0.3161	0.1353	0.8329	0.9244	0.9409	0.4494	0.1105	0.9368
Chile	vs. PreUS	0.1314	0.3435	0.0740*	0.8571	0.5006	0.5707	0.5034	0.7911	0.3123	0.0159*	0.3039
	vs. Canada	0.8091	0.7260	0.3651	0.5252	0.1437	0.6893	0.8236	0.9666	0.5455	0.0674*	0.7808
Europe	vs. PreUS	0.0089*	0.0640*	0.7801	0.9940	0.2349	0.1644	0.5636	0.5803	0.0025*	0.1102	0.2056
	vs. Canada	0.8844	0.9170	0.8482	0.6508	0.0239*	0.6293	0.9170	0.9390	0.0373*	0.1777	0.9491
Mexico	vs. PreUS	0.2716	0.8036	0.5545	0.0354*	0.9384	0.4356	0.5696	0.3805	0.2502	0.6953	0.8911
	vs. Canada	0.8529	0.9635	0.9310	0.0774*	0.2543	0.6896	0.8354	0.8092	0.4556	0.6179	0.9789
S. America	vs. PreUS	0.9216	0.5457	0.3732	0.1397	0.1900	0.3580	0.4086	0.2085	0.1997	0.2814	0.7062
	vs. Canada	0.9259	0.9175	0.6417	0.1053	0.1114	0.6067	0.6712	0.8023	0.4141	0.3182	0.9495
UK	vs. PreUS	0.0307*	0.3401	0.8683	0.9359	0.6218	0.4081	0.1274	0.1041	0.0358*	0.0133*	0.1294
	vs. Canada	0.7392	0.9617	0.9968	0.5788	0.0711*	0.7015	0.7150	0.8401	0.1573	0.0663*	0.8761

Table 5.45
Critical values and test statistics for Mann-Whitney tests
on CAR comparisons from the listing/daily sample

Sample	n,m	Critical values	Control group	(-16, -6)	(-5, +5)	(+6, +49)
AllexCan	14,66	668.21	vs. PreUS	543	652	580
	5,66	237.03	vs. Canada	211	185	152
Australia	14,8	180	vs. PreUS	172	165	153
	5,8	44	vs. Canada	41	36	26
Chile	14,11	206	vs. PreUS	189	198	174
	5,11	54	vs. Canada	50	43	36
Europe	14,20	282	vs. PreUS	225	289*	248
	5,20	84	vs. Canada	72	69	58
Mexico	14,6	163	vs. PreUS	150	138	161
	5,6	37	vs. Canada	35	26	31
S. America	14,7	171	vs. PreUS	146	148	157
	5,7	41	vs. Canada	34	32	31
UK	14,14	231	vs. PreUS	186	239*	212
	5,14	64	vs. Canada	54	54	45

Table 5.46
Critical values and test statistics for Mann-Whitney tests on abnormal return
comparisons from the listing/daily sample

Sample	n,m	Critical values	Control group	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	14,66	668.21	vs. PreUS	732*	610	515	441	564	592	631	564	708*	723*	556
	5,66	237.03	vs. Canada	121	126	102	195	197	194	118	138	223	206	117
Australia	14,8	180	vs. PreUS	188*	170	151	148	158	151	154	145	171	187*	153
	5,8	44	vs. Canada	28	31	23	38	38	32	26	29	34	44	26
Chile	14,11	206	vs. PreUS	206	188	205	159	176	186	183	168	187	220*	186
	5,11	54	vs. Canada	32	35	44	44	43	44	31	31	35	49	36
Europe	14,20	282	vs. PreUS	316*	278	218	172	263	259	264	243	310*	282	251
	5,20	84	vs. Canada	53	53	36	56	73	76	41	51	95*	69	48
Mexico	14,6	163	vs. PreUS	152	137	143	154	127	146	150	150	156	146	133
	5,6	37	vs. Canada	22	21	23	40*	26	32	23	27	32	27	19
S. America	14,7	171	vs. PreUS	150	155	156	163	163	144	174*	160	170	165	147
	5,7	41	vs. Canada	21	25	30	41	37	31	31	29	45*	31	24
UK	14,14	231	vs. PreUS	245*	207	167	170	202	231	231	223	239*	248*	211
	5,14	64	vs. Canada	40	36	21	51	55	54	41	46	57	61	39

Table 5.47
P-values for t-tests on CAR comparisons from the
listing/weekly sample

Sample	Control group	(-15, -2)	(-1, +1)	(+2, +29)
AllexCan	vs. PreUS	0.8837	0.0386*	0.4929
	vs. Canada	0.0752*	0.2168	0.7374
Australia	vs. PreUS	0.3576	0.1859	0.2400
	vs. Canada	0.0537*	0.3939	0.5260
Chile	vs. PreUS	0.3373	0.1835	0.5888
	vs. Canada	0.0239*	0.3633	0.7389
Europe	vs. PreUS	0.9816	0.0073*	0.4151
	vs. Canada	0.1578	0.1383	0.7050
Mexico	vs. PreUS	0.8304	0.6433	0.8147
	vs. Canada	0.3087	0.6216	0.7961
S. America	vs. PreUS	0.7525	0.0395*	0.1945
	vs. Canada	0.1289	0.2258	0.5141
UK	vs. PreUS	0.9157	0.0540*	0.5862
	vs. Canada	0.1011	0.2509	0.7211

Table 5.48
P-values for t-tests on abnormal return comparisons from the
listing/weekly sample

Sample	Control group	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	vs. PreUS	0.6222	0.9204	0.7535	0.0192*	0.4243	0.1022	0.0456*	0.8511	0.6703	0.7902	0.2589
	vs. Canada	0.2237	0.7398	0.2155	0.7872	0.3831	0.0833*	0.7406	0.6462	0.2867	0.8673	0.8894
Australia	vs. PreUS	0.5353	0.6424	0.4894	0.0502*	0.1089	0.5811	0.1807	0.8165	0.6331	0.3395	0.4179
	vs. Canada	0.7844	0.5327	0.7135	0.5100	0.1007	0.4050	0.1931	0.3282	0.3890	0.4643	0.0798*
Chile	vs. PreUS	0.8020	0.5844	0.5485	0.0261*	0.1644	0.1533	0.6106	0.9603	0.2481	0.9157	0.2736
	vs. Canada	0.4711	0.4402	0.0971*	0.5015	0.1847	0.2213	0.9318	0.8508	0.1502	0.8520	0.7675
Europe	vs. PreUS	0.2608	0.9333	0.9566	0.0195*	0.3478	0.0454*	0.0164*	0.5127	0.6636	0.6559	0.2403
	vs. Canada	0.1212	0.8373	0.4528	0.7837	0.3399	0.1218	0.5178	0.3894	0.3211	0.7413	0.8450
Mexico	vs. PreUS	0.8394	0.6115	0.4547	0.1625	0.8524	0.3204	0.5613	0.9877	0.8709	0.7666	0.0496*
	vs. Canada	0.4721	0.5020	0.1792	0.6920	0.7538	0.3320	0.8867	0.9253	0.5613	0.7346	0.4443
S. America	vs. PreUS	0.3728	0.8865	0.3863	0.4430	0.8538	0.0357*	0.0397*	0.4241	0.5693	0.8852	0.8971
	vs. Canada	0.1506	0.8986	0.1277	0.8266	0.7510	0.1560	0.5012	0.3674	0.4017	0.8113	0.9969
UK	vs. PreUS	0.8936	0.9019	0.8440	0.0889*	0.4976	0.2057	0.0257*	0.6926	0.7575	0.6832	0.2846
	vs. Canada	0.4224	0.8367	0.2649	0.7841	0.4450	0.2308	0.4775	0.5167	0.4112	0.7464	0.8169

Table 5.49
Critical values and test statistics for Mann-Whitney tests
on CAR comparisons from the listing/weekly sample

Sample	n,m	Critical values	Control group	(-15, -2)	(-1, +1)	(+2, +29)
AllexCan	14,66	668.21	vs. PreUS	484	723*	593
	5,66	237.03	vs. Canada	239*	198	174
Australia	14,8	180	vs. PreUS	171	183*	173
	5,8	44	vs. Canada	46*	38	35
Chile	14,11	206	vs. PreUS	195	187	182
	5,11	54	vs. Canada	61*	41	41
Europe	14,20	282	vs. PreUS	191	318*	256
	5,20	84	vs. Canada	75	76	65
Mexico	14,6	163	vs. PreUS	133	142	142
	5,6	37	vs. Canada	31	27	27
S. America	14,7	171	vs. PreUS	149	176*	163
	5,7	41	vs. Canada	39	37	34
UK	14,14	231	vs. PreUS	170	242*	202
	5,14	64	vs. Canada	62	54	47

Table 5.50

Critical values and test statistics for Mann-Whitney tests on abnormal return comparisons from the listing/weekly sample

Sample	n,m	Critical Control values	-5	-4	-3	-2	-1	0	1	2	3	4	5
AllexCan	14,66	668.21 vs. PreUS	542	502	515	749*	555	668	690*	482	607	495	588
	5,66	237.03 vs. Canada	230	136	211	165	201	200	173	165	178	170	115
Australia	14,8	180 vs. PreUS	158	152	158	183*	170	166	174	149	176	162	157
	5,8	44 vs. Canada	45*	28	38	35	44	36	34	32	36	36	24
Chile	14,11	206 vs. PreUS	170	183	180	220*	186	190	176	149	205	160	185
	5,11	54 vs. Canada	47	39	51	44	48	43	32	32	46	36	33
Europe	14,20	282 vs. PreUS	261	220	210	318*	251	286*	302*	238	251	226	260
	5,20	84 vs. Canada	89*	46	67	59	77	74	68	69	62	66	47
Mexico	14,6	163 vs. PreUS	140	146	147	159	132	150	147	124	133	137	165*
	5,6	37 vs. Canada	33	30	35	28	29	29	27	23	25	28	29
S. America	14,7	171 vs. PreUS	155	143	158	161	138	173*	176*	156	167	142	130
	5,7	41 vs. Canada	38	26	40	27	27	38	34	35	35	30	17
UK	14,14	231 vs. PreUS	183	183	187	233*	203	228	240*	191	200	193	216
	5,14	64 vs. Canada	53	42	55	47	51	55	53	49	49	49	40

CHAPTER VI

SUMMARY AND CONCLUSIONS

This dissertation began by introducing the problem of indeterminate market segmentation or integration. It pointed out how financial models are often interpreted as functioning within national markets when they are theoretically applicable on an international level. International cross-listing of firms was identified as a valuable opportunity to examine the interplay of international markets. The analyses attempt to answer three main questions.

1. Are there changes in the risk/return characteristics of cross-listing firms?
2. Are there abnormal returns around the time when cross-listing of firms is announced or occurs?
3. Are there differences between the effects of cross-listing that may be due to the differences in accounting policy in the US and in the countries of origin?

The literature review covers work done about changes in locale of trading of stocks within the US and internationally. In addition, the accounting disclosure debate is reviewed. Articles looking at transfers of firms to the NYSE find interesting return patterns. Generally, there are positive abnormal returns before the listing and negative abnormal returns after the listing. The overall effect of listing is still found to be positive.

Articles examining international aspects of stock markets find that there are significant diversification benefits of investing in foreign securities including ADRs. They also document significant biases towards investors holding excessive portions of

investment portfolios in home securities. Literature seems to provide little evidence of international cross-listing leading to changes in the parameters of return generating models. However, there seems to be some evidence of abnormal returns around the cross-listing event.

The accounting disclosure debate in the US and around the world is concerned with the optimal level of accounting information disclosure. The debate in the US seems to be principally between the SEC and the NYSE. The SEC argues for a high level of disclosure similar to the present level, while the NYSE desires a lower level. The NYSE argues for more lenience mainly because it is trying to attract large non-US firms to its market and believes that the high level of accounting disclosure is scaring them off. The extant literature provides little if any evidence in support of the benefits of additional US GAAP reconciliations.

The data used to conduct the analyses of the dissertation consist of returns around the cross-listing. Logarithmic returns for the firms, US stock market, and non-US stock markets were obtained for roughly 250 days before and after the events and 50 weeks before and after the events. There were two events, the announcement of listing application and the actual listing of stocks on the NYSE. The sample of firms consisted of 71 firms that were separated into seven groups, as well as, a separate group of 14 non-US firms believed to have been in the US capital market prior to NYSE listing.

An evaluation of various models as possible candidates to model the returns of non-US firms cross-listing to the NYSE resulted in the choice of a two factor market model with returns adjusted to a common currency. The two factors in the model are a

home country and a US market factor. The two factor market model that is chosen is used throughout the rest of the analyses of this dissertation.

A series of seven hypotheses tests are utilized in an attempt to answer various aspects of the three main questions that were posed earlier. In order to answer the question of whether there are changes in the risk/return structures of cross-listing firms, initially a replication of tests carried out by Howe and Madura (1990) and Jayaraman, Shastri and Tandon (1993) is done. The test involves obtaining pre and post estimates of the beta parameters and then testing if the average of the betas has changed significantly. The previous analyses are extended in this dissertation by using a two step test that first uses t-tests and F-tests to test for changes in the individual risk/return characteristics of the firms and then links these tests together through a binomial test to obtain a combined overall test (see Appendix E for details). Both the tests find significant evidence of changes in the risk/return structures, with the tests carried out in the extension providing even stronger evidence than the replication.

The second main question of whether there are abnormal returns around the cross-listing event is examined by using standard event study methodology. A number of interesting findings appear. The announcement is found to have a positive effect as significant positive abnormal returns are found in the windows centered around the announcement. However, the results for the listing are quite different as there is no evidence of abnormal returns in the event windows immediately surrounding the listing in the daily or weekly data. There are a few significant CARs in the pre and post listing windows, but they are not widespread. As a result, it is concluded that the announcement

of cross-listing is a significant event while the actual cross-listing itself is not a significant event. This implies that the markets appropriately incorporate this new information at the time it comes out. There does seem to be one other interesting occurrence as most of the abnormal returns take place shortly before the announcement of cross-listing.

The final main question of interest concerns the presence of possible differences between areas with varying GAAP regimes. Canadian firms and non-US firms that were in the US capital markets prior to NYSE listing are used as the control group as they either do not have to provide US GAAP reconciliations (Canada) or they were already providing the reconciliations prior to NYSE listing. The results of this section are not as clear cut as the other sections. Even though there is evidence of some differences in the abnormal returns of some groups and windows, the results do not seem to indicate that these differences can be explained by accounting variations. Overall, there does not seem to be any evidence supporting the view that the market finds additional US GAAP reconciliations valuable.

In conclusion, significant evidence is provided in this dissertation that there is at least some segmentation between international stock markets, and that international cross-listing of stocks has significant effects on the stock's return generating processes. There is no consistent significant evidence found that GAAP variations by themselves cause notable segmentation between the markets.

The market places a positive value on the cross-listing of non-US firms on the NYSE. Furthermore, it incorporates the information at the time of public announcement as opposed to the actual listing date. The market does not seem to find the prospect of

additional information arising from future US GAAP reconciliations to add extra value as hypothesized.

The absence of evidence supporting the value of additional information provided by US GAAP reconciliations leads one to question whether US GAAP reconciliation is necessary for all non-US firms other than Canadian.

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APPENDIX A
R²S FOR SAMPLES

Table A.1
R-squares for the announcement/daily sample

	ALL(71)	AUSTRALIA	CANADA	CHILE	EUROPE	MEXICO	S. AMERICA	UK	PREUS	CANADA	EUROPE	PREUS	UK
Model 1a	23.27%	24.30%	29.67%	16.65%	19.83%	29.57%	39.25%	19.83%	15.54%	14.12%	22.35%	13.30%	
Model 2a	28.07%	28.78%	33.25%	20.21%	23.54%	37.97%	42.81%	26.87%	17.35%	14.52%	24.09%	16.35%	
Model 3a	24.91%	26.47%	32.28%	17.42%	21.70%	29.84%	40.10%	22.16%	21.58%	15.18%	34.41%	20.50%	
Model 4a	29.59%	30.80%	35.44%	21.10%	25.12%	38.31%	43.65%	29.08%	23.72%	15.77%	37.73%	23.34%	
Model 5a	24.07%	25.77%	31.24%	17.26%	20.59%	30.08%	39.72%	20.47%	17.98%	15.18%	25.83%	16.39%	
Model 6a	27.84%	29.93%	34.65%	20.78%	24.32%	38.45%	33.45%	27.44%	19.73%	15.60%	27.82%	19.12%	
Model 7a	29.59%	30.80%	35.44%	21.10%	25.12%	38.31%	43.65%	29.08%	23.72%	15.77%	37.73%	23.34%	
Model 1	21.48%	21.26%	28.75%	15.46%	18.34%	26.19%	36.83%	18.54%	15.19%	13.81%	21.93%	12.98%	
Model 2	25.36%	24.06%	32.29%	16.69%	21.58%	35.68%	39.27%	24.45%	16.84%	14.32%	23.05%	15.83%	
Model 3	22.60%	23.51%	31.21%	15.74%	19.41%	26.29%	37.54%	19.94%	19.99%	14.63%	29.36%	19.77%	
Model 4	26.34%	25.70%	34.28%	16.99%	22.44%	35.78%	40.03%	25.88%	21.95%	15.43%	31.90%	22.42%	
Model 5	21.97%	22.47%	29.72%	15.74%	18.67%	26.52%	37.12%	19.02%	17.32%	14.54%	24.90%	15.84%	
Model 6	25.76%	24.64%	33.13%	16.97%	21.95%	35.98%	39.55%	24.83%	18.85%	15.07%	26.11%	18.37%	
Model 7	26.34%	25.70%	34.28%	16.99%	22.44%	35.78%	40.03%	25.88%	21.95%	15.43%	31.90%	22.42%	
Model 7b	6.15%	0.27%	43.15%	1.92%	2.76%	7.72%	4.05%	4.86%	18.48%	37.87%	10.87%	6.13%	

Table A.2
R-squares for the announcement/weekly sample

	ALL(71)	AUSTRALIA	CANADA	CHILE	EUROPE	MEXICO	S. AMERICA	UK	PREUS	CANADA	EUROPE	PREUS	UK
Model 1a	33.12%	37.61%	28.62%	29.31%	27.38%	35.37%	52.38%	32.76%	24.06%	22.83%	21.61%	26.32%	26.32%
Model 2a	37.14%	39.67%	32.22%	31.07%	31.17%	48.62%	54.72%	37.03%	29.48%	22.61%	25.65%	37.11%	37.11%
Model 3a	36.34%	40.90%	32.27%	31.85%	30.75%	37.75%	55.13%	36.71%	28.86%	28.01%	28.00%	30.00%	30.00%
Model 4a	40.24%	42.57%	35.79%	33.63%	34.34%	50.90%	57.55%	40.90%	33.69%	27.85%	30.01%	40.41%	40.41%
Model 5a	36.16%	39.67%	33.03%	31.45%	31.04%	37.57%	55.31%	36.12%	26.62%	24.66%	26.32%	28.41%	28.41%
Model 6a	40.02%	41.18%	37.27%	33.24%	34.40%	50.76%	57.68%	40.25%	31.86%	25.44%	29.09%	38.60%	38.60%
Model 7a	40.24%	42.57%	35.79%	33.63%	34.34%	50.90%	57.55%	40.90%	33.69%	27.85%	30.01%	40.41%	40.41%
Model 1	29.67%	33.08%	24.94%	26.20%	23.93%	31.08%	49.98%	29.59%	22.03%	20.77%	20.09%	24.05%	24.05%
Model 2	33.30%	35.16%	28.24%	27.63%	27.31%	43.86%	52.61%	32.87%	27.46%	20.03%	24.01%	35.39%	35.39%
Model 3	31.28%	35.71%	26.99%	27.60%	25.30%	31.19%	50.45%	32.16%	24.96%	23.49%	23.98%	26.67%	26.67%
Model 4	35.04%	37.94%	30.18%	29.04%	28.69%	44.00%	53.10%	36.06%	30.09%	23.25%	26.19%	37.73%	37.73%
Model 5	31.15%	34.97%	27.21%	27.00%	25.89%	31.48%	50.65%	31.25%	23.42%	21.37%	24.14%	24.78%	24.78%
Model 6	34.73%	36.55%	30.72%	28.42%	29.06%	44.27%	53.24%	34.85%	28.94%	21.33%	26.70%	36.41%	36.41%
Model 7	35.04%	37.94%	30.18%	29.04%	28.69%	44.00%	53.10%	36.06%	30.09%	23.25%	26.19%	37.73%	37.73%
Model 7b	10.69%	7.40%	44.30%	3.35%	10.10%	6.80%	4.42%	11.98%	25.97%	43.17%	16.72%	16.27%	16.27%

Table A.3
R-squares for the listing/daily sample

	ALL(71)	AUSTRALIA	CANADA	CHILE	EUROPE	MEXICO	S. AMERICA	UK	PREUS	PREUS CANADA	PREUS EUROPE	PREUS UK
Model 1a	22.90%	23.93%	26.63%	16.47%	19.38%	30.19%	37.72%	20.52%	14.91%	12.12%	23.18%	13.11%
Model 2a	27.46%	28.57%	30.22%	19.92%	22.91%	38.48%	40.91%	26.82%	17.04%	12.74%	26.73%	15.79%
Model 3a	24.67%	26.41%	30.22%	17.19%	21.23%	30.43%	38.62%	23.03%	20.66%	13.52%	33.59%	20.15%
Model 4a	29.07%	30.82%	33.19%	20.75%	24.45%	38.73%	41.79%	29.26%	23.21%	14.47%	38.79%	22.71%
Model 5a	23.72%	24.84%	28.57%	17.07%	20.29%	30.99%	38.15%	21.14%	17.45%	13.10%	26.80%	16.40%
Model 6a	28.21%	29.35%	31.94%	20.46%	23.77%	39.19%	41.34%	27.40%	19.44%	13.67%	30.47%	18.73%
Model 7a	29.07%	30.82%	33.19%	20.75%	24.45%	38.73%	41.79%	29.26%	23.21%	14.47%	38.79%	22.71%
Model 1	21.29%	21.39%	25.80%	15.45%	18.02%	26.96%	35.83%	19.20%	14.59%	11.88%	22.75%	12.76%
Model 2	24.92%	23.66%	29.37%	16.73%	21.03%	36.35%	38.11%	24.54%	16.46%	12.58%	25.30%	15.26%
Model 3	22.50%	23.48%	29.28%	15.75%	19.06%	27.11%	36.38%	20.82%	19.33%	12.91%	29.58%	19.55%
Model 4	26.02%	25.50%	32.18%	17.07%	21.88%	36.47%	38.73%	26.23%	21.62%	14.01%	33.68%	21.95%
Model 5	21.71%	21.82%	26.87%	15.74%	18.34%	27.38%	36.12%	19.66%	16.84%	12.57%	25.88%	15.88%
Model 6	25.31%	24.04%	30.32%	17.02%	21.39%	36.71%	38.40%	24.96%	18.53%	13.25%	28.36%	18.02%
Model 7	26.02%	25.50%	32.18%	17.07%	21.88%	36.47%	38.73%	26.23%	21.62%	14.01%	33.68%	21.95%
Model 7b	6.66%	0.40%	42.88%	1.89%	2.89%	10.85%	3.99%	5.97%	18.07%	36.88%	10.76%	6.05%

Table A.4
R-squares for the listing/weekly sample

	ALL(71)	AUSTRALIA	CANADA	CHILE	EUROPE	MEXICO	S. AMERICA	UK	PREUS	CANADA	EUROPE	PREUS	UK
Model 1a	33.16%	35.24%	30.83%	28.29%	27.15%	37.15%	51.27%	34.43%	23.03%	17.36%	26.45%	26.05%	
Model 2a	36.58%	40.25%	34.97%	29.59%	30.00%	49.92%	53.44%	35.81%	29.07%	19.48%	29.65%	36.77%	
Model 3a	36.44%	39.15%	33.87%	30.87%	30.83%	39.63%	53.06%	38.53%	28.36%	24.29%	30.84%	30.51%	
Model 4a	39.84%	43.35%	38.03%	32.15%	33.62%	52.11%	55.35%	40.39%	33.73%	25.42%	33.74%	40.65%	
Model 5a	36.22%	38.39%	35.40%	30.50%	30.99%	39.53%	53.36%	37.24%	25.85%	19.97%	29.53%	28.91%	
Model 6a	39.55%	42.92%	39.38%	31.87%	33.50%	51.99%	55.62%	39.00%	31.43%	22.35%	31.67%	38.87%	
Model 7a	39.84%	43.35%	38.03%	32.15%	33.62%	52.11%	55.35%	40.39%	33.73%	25.42%	33.74%	40.65%	
Model 1	29.24%	30.58%	27.15%	25.29%	23.10%	31.97%	48.60%	30.27%	20.53%	15.85%	22.04%	23.67%	
Model 2	32.45%	34.64%	31.50%	26.50%	26.09%	44.34%	50.97%	30.95%	26.90%	17.35%	26.81%	34.90%	
Model 3	30.99%	33.26%	28.45%	26.36%	24.90%	33.20%	48.93%	33.03%	23.41%	18.96%	23.21%	27.22%	
Model 4	34.24%	37.14%	32.63%	27.56%	27.68%	45.35%	51.32%	34.48%	29.47%	20.02%	27.73%	38.21%	
Model 5	30.85%	33.24%	29.85%	26.01%	24.93%	33.49%	49.24%	31.76%	21.75%	16.41%	24.40%	24.88%	
Model 6	33.98%	36.76%	33.97%	27.27%	27.59%	45.64%	51.60%	33.00%	28.13%	18.19%	28.52%	36.22%	
Model 7	34.24%	37.14%	32.63%	27.56%	27.68%	45.35%	51.32%	34.48%	29.47%	20.02%	27.73%	38.21%	
Model 7b	10.55%	5.36%	44.22%	3.35%	10.08%	8.52%	4.37%	11.77%	25.70%	42.08%	17.81%	16.01%	

APPENDIX B
TESTS USING PRE AND POST AVERAGES

Table B.1
Beta estimates and p-values for announcement/daily sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-values	2-sided p-values
Model 1					
All	Home beta	0.8538	0.7821	0.1411	0.2823
Australia	Home beta	1.0705	0.6952	0.2545	0.5091
Canada	Home beta	0.8282	1.1529	0.9258	0.1484
Chile	Home beta	0.8239	0.5713	0.3786	0.7572
Europe	Home beta	0.7735	0.6376	0.1336	0.2672
Mexico	Home beta	0.4874	0.9663	0.9954	0.0091*
S. America	Home beta	0.7391	0.6859	0.3995	0.7991
UK	Home beta	1.0913	0.7914	0.0069*	0.0137*
PreUS Canada	Home beta	1.0667	0.9737	0.4308	0.8615
PreUS Europe	Home beta	0.7531	0.7613	0.5068	0.9865
PreUS UK	Home beta	0.8275	0.8694	0.6130	0.7740
PreUS All	Home beta	0.8970	0.8835	0.4738	0.9476
Model 2					
All	Home beta	0.8716	0.6757	0.0003*	0.0007*
Australia	Home beta	0.9765	0.4718	0.0049*	0.0097*
Canada	Home beta	0.8743	1.1749	0.9214	0.1573
Chile	Home beta	0.8678	0.5377	0.1367	0.2734
Europe	Home beta	0.8349	0.5643	0.0037*	0.0074*
Mexico	Home beta	0.5327	0.8811	0.9777	0.0446*
S. America	Home beta	0.7811	0.6611	0.2813	0.5626
UK	Home beta	1.0564	0.6823	0.0003*	0.0006*
PreUS Canada	Home beta	0.9992	0.9948	0.4961	0.9922
PreUS Europe	Home beta	0.8842	0.6449	0.2605	0.5210
PreUS UK	Home beta	0.8127	0.7694	0.3702	0.7404
PreUS All	Home beta	0.8946	0.8232	0.3409	0.6818

Table B.1
Continued

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 3					
All	Home beta	0.8708	0.7629	0.0698*	0.1396
	Foreign beta	-0.0137	0.2608	0.0000*	0.0000*
Australia	Home beta	1.0720	0.6886	0.0906*	0.1811
	Foreign beta	-0.0032	0.2747	0.0000*	0.0000*
Canada	Home beta	1.0502	1.4932	0.8494	0.3013
	Foreign beta	-0.2016	-0.3089	0.6734	0.6531
Chile	Home beta	0.8178	0.5331	0.4195	0.8391
	Foreign beta	0.0177	0.5325	0.0079*	0.0158*
Europe	Home beta	0.7644	0.5819	0.0693*	0.1387
	Foreign beta	0.0678	0.3800	0.0001*	0.0003*
Mexico	Home beta	0.5158	0.9574	0.9923	0.0154*
	Foreign beta	-0.2168	0.0555	0.0065*	0.0130*
S. America	Home beta	0.7262	0.6599	0.3719	0.7439
	Foreign beta	0.1552	0.3039	0.2054	0.4107
UK	Home beta	1.1098	0.6946	0.0003*	0.0005*
	Foreign beta	-0.0912	0.2942	0.0000*	0.0001*
PreUS Canada	Home beta	1.0410	0.9862	0.4558	0.9116
	Foreign beta	-0.0409	-0.0413	0.5006	0.9987
PreUS Europe	Home beta	0.7000	0.5858	0.3942	0.7885
	Foreign beta	0.0802	0.8188	0.0881*	0.1761
PreUS UK	Home beta	0.7306	0.6955	0.4370	0.8741
	Foreign beta	0.2248	0.3010	0.3895	0.7790
PreUS All	Home beta	0.8349	0.7758	0.3875	0.7750
	Foreign beta	0.0990	0.2897	0.1584	0.3169

Table B.1
Concluded

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 4					
All	Home beta	0.8856	0.6693	0.0003*	0.0006*
	Foreign beta	-0.0210	0.2719	0.0000*	0.0000*
Australia	Home beta	0.9796	0.4664	0.0007*	0.0013*
	Foreign beta	-0.0057	0.2824	0.0000*	0.0000*
Canada	Home beta	1.0508	1.4390	0.8526	0.2947
	Foreign beta	-0.2007	-0.2707	0.6287	0.7426
Chile	Home beta	0.8646	0.5490	0.0964*	0.1929
	Foreign beta	0.0022	0.4380	0.0010*	0.0021*
Europe	Home beta	0.8328	0.5425	0.0020*	0.0040*
	Foreign beta	0.0545	0.3392	0.0003*	0.0006*
Mexico	Home beta	0.5603	0.8700	0.9645	0.0709*
	Foreign beta	-0.2532	0.1509	0.0006*	0.0011*
S. America	Home beta	0.7680	0.6360	0.2557	0.5113
	Foreign beta	0.1527	0.3032	0.2076	0.4153
UK	Home beta	1.0632	0.6319	0.0000*	0.0000*
	Foreign beta	-0.0790	0.2898	0.0001*	0.0001*
PreUS Canada	Home beta	0.9196	0.9640	0.5469	0.9061
	Foreign beta	0.0422	-0.0133	0.5804	0.8393
PreUS Europe	Home beta	0.8484	0.3458	0.0700*	0.1401
	Foreign beta	0.0919	0.8775	0.0871*	0.1741
PreUS UK	Home beta	0.7459	0.6376	0.2663	0.5325
	Foreign beta	0.2446	0.3086	0.3957	0.7914
PreUS All	Home beta	0.8299	0.6916	0.2008	0.4016
	Foreign beta	0.1396	0.3155	0.1715	0.3430

Table B.2
Beta estimates and p-values for announcement/weekly sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-values	2-sided p-values
Model 1					
All	Home beta	0.9070	0.8945	0.4383	0.8766
Australia	Home beta	0.9531	0.7204	0.3973	0.7946
Canada	Home beta	0.8644	1.2614	0.8576	0.2848
Chile	Home beta	1.0062	1.0082	0.6578	0.6843
Europe	Home beta	0.7378	0.7289	0.4768	0.9536
Mexico	Home beta	0.6749	1.1334	0.9790	0.0420
S. America	Home beta	0.8144	0.9027	0.6630	0.6741
UK	Home beta	1.2056	0.8412	0.0267	0.0533
PreUS Canada	Home beta	1.0964	1.0139	0.4274	0.8548
PreUS Europe	Home beta	0.8556	0.6898	0.3587	0.7173
PreUS UK	Home beta	0.8659	0.7650	0.3388	0.6775
PreUS All	Home beta	0.9460	0.8378	0.2929	0.5857
Model 2					
All	Home beta	0.8863	0.8283	0.2098	0.4197
Australia	Home beta	0.9026	0.4870	0.4259	0.8517
Canada	Home beta	0.8899	1.2514	0.8427	0.3146
Chile	Home beta	0.9636	0.9376	0.4476	0.8952
Europe	Home beta	0.8069	0.6741	0.1670	0.3339
Mexico	Home beta	0.7331	1.0678	0.9055	0.1890
S. America	Home beta	0.8377	0.9293	0.6829	0.6343
UK	Home beta	1.0182	0.8128	0.0751	0.1503
PreUS Canada	Home beta	0.9381	0.8504	0.4154	0.8308
PreUS Europe	Home beta	0.9090	0.7910	0.3297	0.6593
PreUS UK	Home beta	0.9574	1.1875	0.9247	0.1505
PreUS All	Home beta	0.9402	0.9821	0.6027	0.7946

Table B.2
Continued

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 3					
All	Home beta	0.8991	0.8509	0.3049	0.6099
	Foreign beta	0.0184	0.3297	0.0041	0.0081
Australia	Home beta	0.9410	0.6885	0.1626	0.3252
	Foreign beta	0.0022	0.3465	0.0017	0.0034
Canada	Home beta	0.8765	1.5007	0.8218	0.3564
	Foreign beta	-0.0454	-0.2546	0.6924	0.6152
Chile	Home beta	1.0169	0.9715	0.4830	0.9660
	Foreign beta	0.1110	0.4842	0.3689	0.7378
Europe	Home beta	0.7098	0.6586	0.3856	0.7713
	Foreign beta	-0.0205	0.4792	0.0077	0.0154
Mexico	Home beta	0.7112	1.1055	0.9447	0.1106
	Foreign beta	-0.3332	0.8330	0.0338	0.0675
S. America	Home beta	0.7932	0.8772	0.6487	0.7026
	Foreign beta	0.3261	0.3108	0.5155	0.9689
UK	Home beta	1.1948	0.7267	0.0117	0.0235
	Foreign beta	0.0303	0.1776	0.2308	0.4615
PreUS Canada	Home beta	1.1518	0.9095	0.2796	0.5593
	Foreign beta	-0.1131	0.0919	0.3655	0.7311
PreUS Europe	Home beta	0.8563	0.5303	0.2983	0.5966
	Foreign beta	-0.2194	0.4790	0.0908	0.1816
PreUS UK	Home beta	0.8004	0.6357	0.2430	0.4861
	Foreign beta	0.1014	0.1829	0.3838	0.7676
PreUS All	Home beta	0.9379	0.7109	0.1344	0.2688
	Foreign beta	-0.0440	0.2138	0.1459	0.2919

Table B.2
Concluded

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 4					
All	Home beta	0.8843	0.8006	0.1549	0.3098
	Foreign beta	0.0181	0.3046	0.0070	0.0140
Australia	Home beta	0.8821	0.5033	0.1861	0.3722
	Foreign beta	0.0252	0.3466	0.0054	0.0108
Canada	Home beta	0.9076	1.4122	0.7995	0.4011
	Foreign beta	-0.0653	-0.1924	0.6320	0.7361
Chile	Home beta	0.9756	0.9524	0.4175	0.8350
	Foreign beta	0.1156	0.4518	0.3816	0.7633
Europe	Home beta	0.7974	0.6209	0.1222	0.2444
	Foreign beta	-0.0323	0.4252	0.0088	0.0176
Mexico	Home beta	0.7683	1.0384	0.8345	0.3310
	Foreign beta	-0.3753	0.9176	0.0324	0.0649
S. America	Home beta	0.8139	0.8990	0.6604	0.6791
	Foreign beta	0.2964	0.3325	0.4646	0.9293
UK	Home beta	1.0146	0.7534	0.0429	0.0858
	Foreign beta	0.0687	0.0629	0.5121	0.9758
PreUS Canada	Home beta	0.8723	0.7486	0.3633	0.7266
	Foreign beta	0.0846	0.1720	0.4383	0.8766
PreUS Europe	Home beta	0.9561	0.6723	0.2024	0.4047
	Foreign beta	-0.1375	0.4833	0.0832	0.1665
PreUS UK	Home beta	0.9412	1.0679	0.7103	0.5794
	Foreign beta	0.0416	0.0426	0.4987	0.9975
PreUS All	Home beta	0.9198	0.8691	0.3788	0.7577
	Foreign beta	0.0186	0.1832	0.2411	0.4821

Table B.3
Beta estimates and p-values for listing/daily sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-values	2-sided p-values
Model 1					
All	Home beta	0.8522	0.7878	0.1624	0.3248
Australia	Home beta	1.0996	0.6484	0.3409	0.6819
Canada	Home beta	0.8451	1.1403	0.8949	0.2103
Chile	Home beta	0.8282	0.6890	0.3722	0.7443
Europe	Home beta	0.7441	0.6863	0.3183	0.6366
Mexico	Home beta	0.5145	0.8974	0.9820	0.0359
S. America	Home beta	0.7459	0.6488	0.3221	0.6443
UK	Home beta	1.0844	0.8267	0.0159	0.0319
PreUS Canada	Home beta	1.0036	0.9686	0.4731	0.9463
PreUS Europe	Home beta	0.7649	0.7295	0.4728	0.9457
PreUS UK	Home beta	0.8548	0.8584	0.5090	0.9819
PreUS All	Home beta	0.8887	0.8701	0.4638	0.9277
Model 2					
All	Home beta	0.8773	0.6741	0.0002	0.0004
Australia	Home beta	1.0186	0.4607	0.0053	0.0106
Canada	Home beta	0.8784	1.1656	0.9048	0.1904
Chile	Home beta	0.8805	0.5422	0.1182	0.2363
Europe	Home beta	0.8336	0.5727	0.0055	0.0110
Mexico	Home beta	0.5534	0.8343	0.9606	0.0788
S. America	Home beta	0.7675	0.6238	0.2406	0.4811
UK	Home beta	1.0498	0.7076	0.0007	0.0013
PreUS Canada	Home beta	0.9452	1.0067	0.5545	0.8910
PreUS Europe	Home beta	0.9191	0.6586	0.2296	0.4593
PreUS UK	Home beta	0.8272	0.7483	0.2789	0.5578
PreUS All	Home beta	0.8890	0.8214	0.3463	0.6927

Table B.3
Continued

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 3					
All	Home beta	0.8737	0.7662	0.0731	0.1462
	Foreign beta	-0.0110	0.2551	0.0000	0.0000
Australia	Home beta	1.1065	0.6439	0.1142	0.2283
	Foreign beta	0.0026	0.2924	0.0000	0.0000
Canada	Home beta	1.1536	1.5196	0.7686	0.4628
	Foreign beta	-0.2793	-0.3347	0.5743	0.8515
Chile	Home beta	0.8256	0.6455	0.4132	0.8263
	Foreign beta	0.0030	0.5193	0.0374	0.0749
Europe	Home beta	0.7339	0.6291	0.1958	0.3917
	Foreign beta	0.0618	0.3890	0.0000	0.0001
Mexico	Home beta	0.5436	0.8936	0.9713	0.0575
	Foreign beta	-0.1657	0.0228	0.0346	0.0692
S. America	Home beta	0.7333	0.6243	0.3002	0.6003
	Foreign beta	0.1210	0.4255	0.0379	0.0758
UK	Home beta	1.0902	0.6990	0.0005	0.0010
	Foreign beta	-0.0375	0.2744	0.0004	0.0008
PreUS Canada	Home beta	0.9742	0.9287	0.4591	0.9182
	Foreign beta	-0.0431	-0.0018	0.4517	0.9033
PreUS Europe	Home beta	0.7027	0.5692	0.3782	0.7563
	Foreign beta	0.0961	0.8087	0.0672	0.1343
PreUS UK	Home beta	0.7652	0.6815	0.3482	0.6964
	Foreign beta	0.2261	0.3038	0.3910	0.7820
PreUS All	Home beta	0.8265	0.7457	0.3355	0.6710
	Foreign beta	0.1021	0.3029	0.1527	0.3053

Table B.3
Concluded

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 4					
All	Home beta	0.8963	0.6673	0.0002	0.0003
	Foreign beta	-0.0153	0.2638	0.0000	0.0000
Australia	Home beta	1.0257	0.4566	0.0006	0.0012
	Foreign beta	0.0009	0.2913	0.0000	0.0000
Canada	Home beta	1.1315	1.4647	0.7864	0.4271
	Foreign beta	-0.2719	-0.2915	0.5300	0.9400
Chile	Home beta	0.8796	0.5475	0.0823	0.1647
	Foreign beta	-0.0062	0.4287	0.0094	0.0188
Europe	Home beta	0.8295	0.5524	0.0031	0.0062
	Foreign beta	0.0491	0.3409	0.0001	0.0002
Mexico	Home beta	0.5811	0.8249	0.9363	0.1274
	Foreign beta	-0.1966	0.1182	0.0019	0.0038
S. America	Home beta	0.7553	0.6009	0.2212	0.4424
	Foreign beta	0.1273	0.4207	0.0467	0.0933
UK	Home beta	1.0525	0.6345	0.0000	0.0001
	Foreign beta	-0.0254	0.2709	0.0006	0.0011
PreUS Canada	Home beta	0.8696	0.9345	0.5715	0.8569
	Foreign beta	0.0257	0.0079	0.5210	0.9580
PreUS Europe	Home beta	0.8727	0.3651	0.0515	0.1030
	Foreign beta	0.1152	0.8690	0.0755	0.1510
PreUS UK	Home beta	0.7622	0.6125	0.1894	0.3789
	Foreign beta	0.2482	0.3098	0.4044	0.8087
PreUS All	Home beta	0.8242	0.6745	0.1683	0.3367
	Foreign beta	0.1402	0.3218	0.1747	0.3495

Table B.4
Beta estimates and p-values for listing/weekly sample

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-values	2-sided p-values
Model 1					
All	Home beta	0.9087	0.9198	0.5500	0.8999
Australia	Home beta	0.9727	0.6990	0.3449	0.6898
Canada	Home beta	0.8828	1.3449	0.9627	0.0746
Chile	Home beta	0.8935	0.8768	0.1800	0.3599
Europe	Home beta	0.7208	0.8283	0.7615	0.4771
Mexico	Home beta	0.7628	1.0370	0.8372	0.3257
S. America	Home beta	0.8188	0.8604	0.5700	0.8600
UK	Home beta	1.2691	0.8590	0.0490	0.0980
PreUS Canada	Home beta	0.7712	0.8555	0.5707	0.8585
PreUS Europe	Home beta	0.8680	1.0795	0.6747	0.6505
PreUS UK	Home beta	0.8563	0.8412	0.4773	0.9545
PreUS All	Home beta	0.8284	0.8974	0.6319	0.7361
Model 2					
All	Home beta	0.8937	0.8412	0.2481	0.4962
Australia	Home beta	0.8915	0.4623	0.4704	0.9408
Canada	Home beta	0.9481	1.3296	0.9562	0.0877
Chile	Home beta	0.8872	0.7784	0.3685	0.7369
Europe	Home beta	0.8127	0.6961	0.1904	0.3808
Mexico	Home beta	0.7915	1.0804	0.8478	0.3044
S. America	Home beta	0.8367	0.8944	0.6027	0.7947
UK	Home beta	1.0686	0.8657	0.1412	0.2825
PreUS Canada	Home beta	0.7033	0.7727	0.5517	0.8966
PreUS Europe	Home beta	0.9632	0.8519	0.3124	0.6247
PreUS UK	Home beta	0.9606	1.1322	0.8682	0.2635
PreUS All	Home beta	0.8693	0.9437	0.6480	0.7041

Table B.4
Continued

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 3					
All	Home beta	0.9040	0.8982	0.4762	0.9523
	Foreign beta	0.0099	0.2377	0.0184	0.0367
Australia	Home beta	0.9734	0.7634	0.4789	0.9579
	Foreign beta	-0.0249	0.0925	0.0130	0.0260
Canada	Home beta	0.9033	1.2348	0.7384	0.5231
	Foreign beta	-0.0530	0.1307	0.3068	0.6136
Chile	Home beta	0.9109	0.7970	0.2754	0.5508
	Foreign beta	0.0029	0.5526	0.4204	0.8408
Europe	Home beta	0.6948	0.7970	0.7203	0.5593
	Foreign beta	0.0628	0.4896	0.0143	0.0285
Mexico	Home beta	0.8355	1.0722	0.8083	0.3834
	Foreign beta	-0.4091	0.3568	0.0210	0.0421
S. America	Home beta	0.8017	0.8566	0.5909	0.8181
	Foreign beta	0.1698	0.2057	0.4567	0.9133
UK	Home beta	1.2383	0.8250	0.0497	0.0995
	Foreign beta	0.0817	0.0805	0.5022	0.9957
PreUS Canada	Home beta	0.7334	1.0397	0.7013	0.5975
	Foreign beta	0.0276	-0.2943	0.6660	0.6681
PreUS Europe	Home beta	0.8445	0.8016	0.4723	0.9445
	Foreign beta	-0.2857	0.5069	0.0305	0.0610
PreUS UK	Home beta	0.7922	0.6634	0.2791	0.5582
	Foreign beta	0.0656	0.3253	0.2133	0.4266
PreUS All	Home beta	0.7824	0.8274	0.5754	0.8492
	Foreign beta	-0.0232	0.1429	0.2888	0.5775

Table B.4
Concluded

Sample	Parameter tested	Pre estimate	Post estimate	1-sided p-value	2-sided p-value
Model 4					
All	Home beta	0.8987	0.8263	0.1973	0.3946
	Foreign beta	0.4023	0.6145	0.0332	0.0664
Australia	Home beta	0.9001	0.4913	0.4123	0.8246
	Foreign beta	0.2721	0.2498	0.9822	0.0356
Canada	Home beta	0.9862	1.2583	0.7317	0.5366
	Foreign beta	0.5311	0.9259	0.0141	0.0283
Chile	Home beta	0.9061	0.7666	0.4836	0.9672
	Foreign beta	0.3438	0.7360	0.3329	0.6658
Europe	Home beta	0.8058	0.6767	0.1940	0.3880
	Foreign beta	0.3331	0.7472	0.0133	0.0267
Mexico	Home beta	0.8571	1.1071	0.8183	0.3635
	Foreign beta	0.2117	1.1701	0.0148	0.0295
S. America	Home beta	0.8147	0.8837	0.6187	0.7627
	Foreign beta	0.7240	0.8717	0.3903	0.7806
UK	Home beta	1.0533	0.8580	0.1835	0.3670
	Foreign beta	0.4964	0.2284	0.8796	0.2408
PreUS Canada	Home beta	0.5898	1.0443	0.8001	0.3998
	Foreign beta	0.5358	0.4330	0.5636	0.8727
PreUS Europe	Home beta	0.9988	0.6103	0.0907	0.1814
	Foreign beta	0.2242	0.9076	0.0573	0.1146
PreUS UK	Home beta	0.9166	1.0204	0.7541	0.4917
	Foreign beta	0.4807	0.6244	0.3428	0.6856
PreUS All	Home beta	0.8175	0.9411	0.7324	0.5353
	Foreign beta	0.4454	0.6167	0.2604	0.5207

APPENDIX C
NUMBER OF SIGNIFICANT F-TESTS AND T-TESTS
FOR INDIVIDUAL FIRM REGRESSIONS

Table C.1					
Number of significant 1-sided t-tests for the overall sample at 10%					
Event/data frequency	Parameter tested	Model 1a	Model 2a	Model 3a	Model 4a
Ann/daily	Home beta	25*	37*	30*	37*
	Foreign beta			33*	35*
Ann/weekly	Home beta	10*	13*	11*	16*
	Foreign beta			16*	15*
Listing/daily	Home beta	26*	36*	32*	38*
	Foreign beta			31*	32*
Listing/weekly	Home beta	16*	17*	12*	19*
	Foreign beta			12*	13*

Table C.2					
Number of significant 1-sided t-tests for the overall sample at 5%					
Event/data frequency	Parameter tested	Model 1a	Model 2a	Model 3a	Model 4a
Ann/daily	Home beta	23	30	24	34
	Foreign beta			27	27
Ann/weekly	Home beta	7	10	6	10
	Foreign beta			7	7
Listing/daily	Home beta	21	31	26	32
	Foreign beta			27	23
Listing/weekly	Home beta	9	15	8	10
	Foreign beta			9	10

Table C.3
Significant 2-sided F-tests for the announcement/daily sample

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
All (71)								
All dummies	38	38	45	45	25	33	34	41
Dummies for Home and US betas			44	47			39	41
US Factor			33	35			29	31
Home Factor	71	71	71	71	71	71	71	70
US beta dummy			27	27			20	20
Home beta dummy	40	40	37	42	31	34	32	35
Australia (8)								
All dummies	7	7	7	7	4	6	6	7
Dummies for Home and US betas			7	6			6	6
US Factor			3	3			2	1
Home Factor	8	8	8	8	8	8	8	8
US beta dummy			4	4			2	2
Home beta dummy	6	6	6	6	5	6	5	6
Canada (5)								
All dummies	3	3	3	3	2	3	2	3
Dummies for Home and US betas			2	2			1	2
US Factor			3	3			2	2
Home Factor	5	5	5	5	5	5	5	5
US beta dummy			0	0			0	0
Home beta dummy	2	2	1	1	1	2	1	1
Chile (11)								
All dummies	6	3	6	5	4	2	5	4
Dummies for Home and US betas			7	6			6	5
US Factor			3	3			2	3
Home Factor	11	11	11	11	11	11	11	11
US beta dummy			2	3			2	2
Home beta dummy	7	5	6	4	5	3	6	4
Europe (20)								
All dummies	6	9	12	12	5	8	8	9
Dummies for Home and US betas			12	13			11	11
US Factor			13	13			13	13
Home Factor	20	20	20	20	20	20	20	19
US beta dummy			10	10			9	8
Home beta dummy	9	11	7	10	7	8	7	8
Mexico (6)								
All dummies	6	5	6	5	4	4	5	5
Dummies for Home and US betas			5	5			4	4
US Factor			0	1			0	1
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			1	1			0	1
Home beta dummy	5	4	5	5	4	4	4	4

Table C.3
Continued

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
S. America (7)								
All dummies	4	4	3	3	2	3	2	3
Dummies for Home and US betas			3	4			3	3
US Factor			3	3			3	3
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			2	2			1	1
Home beta dummy	5	5	4	5	4	4	3	4
UK (14)								
All dummies	5	6	7	9	3	6	5	9
Dummies for Home and US betas			7	10			7	9
US Factor			7	8			7	8
Home Factor	14	14	14	14	14	14	14	14
US beta dummy			8	7			6	6
Home beta dummy	5	6	7	10	4	6	5	7
PreUS Canada (5)								
All dummies	0	0	0	0	0	0	0	0
Dummies for Home and US betas			0	0			0	0
US Factor			2	2			1	2
Home Factor	5	5	5	5	5	5	5	5
US beta dummy			0	0			0	0
Home beta dummy	0	0	1	0	0	0	0	0
PreUS Europe (3)								
All dummies	0	1	3	3	0	1	3	3
Dummies for Home and US betas			3	3			3	3
US Factor			3	3			3	3
Home Factor	2	3	2	3	2	3	2	3
US beta dummy			3	3			3	3
Home beta dummy	0	1	1	2	0	1	1	2
PreUS UK (6)								
All dummies	0	1	2	3	0	1	1	3
Dummies for Home and US betas			2	3			1	3
US Factor			3	3			3	3
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			2	1			1	1
Home beta dummy	0	1	1	2	0	1	0	2
PreUS All (14)								
All dummies	0	2	5	6	0	2	4	6
Dummies for Home and US betas			5	6			4	6
US Factor			8	8			7	8
Home Factor	13	14	13	14	13	14	13	14
US beta dummy			5	4			4	4
Home beta dummy	0	2	3	4	0	2	1	4

Table C.4
Significant 2-sided F-tests for the announcement/weekly sample

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
All (71)								
All dummies	13	17	14	20	10	12	11	15
Dummies for Home and US betas			18	19			12	16
US Factor			12	11			9	9
Home Factor	63	65	58	62	60	61	57	60
US beta dummy			8	8			7	6
Home beta dummy	14	20	14	18	8	10	11	13
Australia (8)								
All dummies	2	4	2	2	2	1	2	1
Dummies for Home and US betas			3	2			1	1
US Factor			2	1			1	1
Home Factor	6	7	6	6	6	6	6	6
US beta dummy			0	0			0	0
Home beta dummy	3	4	3	3	2	2	2	1
Canada (5)								
All dummies	1	1	1	2	1	1	1	1
Dummies for Home and US betas			1	1			1	1
US Factor			1	1			1	1
Home Factor	5	5	4	4	5	4	4	4
US beta dummy			1	1			1	1
Home beta dummy	0	2	1	2	0	0	1	2
Chile (11)								
All dummies	2	1	2	1	1	1	0	1
Dummies for Home and US betas			1	1			0	1
US Factor			1	2			0	0
Home Factor	11	11	10	11	10	11	10	10
US beta dummy			0	0			0	0
Home beta dummy	3	3	3	3	1	1	1	2
Europe (20)								
All dummies	4	6	5	8	3	5	4	5
Dummies for Home and US betas			5	7			4	6
US Factor			4	4			3	4
Home Factor	16	15	13	14	14	14	12	14
US beta dummy			3	3			3	3
Home beta dummy	4	6	2	4	1	3	2	3
Mexico (6)								
All dummies	2	2	0	2	2	2	0	2
Dummies for Home and US betas			3	3			2	2
US Factor			0	0			0	0
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			1	2			0	0
Home beta dummy	2	2	2	2	2	2	2	2

Table C.4
Continued

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
S. America (7)								
All dummies	1	1	0	1	0	0	0	1
Dummies for Home and US betas			1	1			1	1
US Factor			0	0			0	0
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			0	0			0	0
Home beta dummy	1	1	1	1	1	0	1	1
UK (14)								
All dummies	1	2	3	3	1	2	3	3
Dummies for Home and US betas			3	3			2	3
US Factor			3	2			3	2
Home Factor	12	14	12	14	12	13	12	13
US beta dummy			2	1			2	1
Home beta dummy	1	2	1	2	1	2	1	2
PreUS Canada (5)								
All dummies	0	0	2	1	0	0	2	0
Dummies for Home and US betas			1	1			1	1
US Factor			2	2			1	1
Home Factor	3	4	3	3	3	2	3	3
US beta dummy			1	1			1	1
Home beta dummy	0	0	1	2	0	0	1	1
PreUS Europe (3)								
All dummies	0	0	1	0	0	0	1	0
Dummies for Home and US betas			0	0			0	0
US Factor			1	1			1	1
Home Factor	2	2	1	2	2	2	1	2
US beta dummy			0	0			0	0
Home beta dummy	0	0	0	0	0	0	0	0
PreUS UK (6)								
All dummies	0	0	2	1	0	0	1	0
Dummies for Home and US betas			1	1			1	1
US Factor			1	1			1	1
Home Factor	5	6	4	6	5	6	4	6
US beta dummy			1	1			1	0
Home beta dummy	0	1	0	0	0	0	0	0
PreUS All (14)								
All dummies	0	0	5	2	0	0	4	0
Dummies for Home and US betas			2	2			2	2
US Factor			4	4			3	3
Home Factor	10	12	8	11	10	10	8	11
US beta dummy			2	2			2	1
Home beta dummy	0	1	1	2	0	0	1	1

Table C.5
Significant 2-sided F-tests for the listing/daily sample

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
All (71)								
All dummies	31	37	36	45	24	30	31	40
Dummies for Home and US betas			41	46			38	40
US Factor			35	34			26	26
Home Factor	71	71	71	71	71	71	71	71
US beta dummy			28	23			18	19
Home beta dummy	35	40	39	39	28	33	31	36
Australia (8)								
All dummies	5	6	2	7	4	6	2	7
Dummies for Home and US betas			7	7			6	7
US Factor			2	2			2	2
Home Factor	8	8	8	8	8	8	8	8
US beta dummy			2	2			2	2
Home beta dummy	6	6	6	6	5	6	5	6
Canada (5)								
All dummies	2	2	3	3	2	2	2	1
Dummies for Home and US betas			1	2			1	1
US Factor			2	2			2	2
Home Factor	5	5	5	5	5	5	5	5
US beta dummy			0	0			0	0
Home beta dummy	1	1	1	1	1	1	1	1
Chile (11)								
All dummies	5	3	4	4	3	2	4	4
Dummies for Home and US betas			6	6			6	4
US Factor			4	3			2	3
Home Factor	11	11	11	11	11	11	11	11
US beta dummy			3	2			2	2
Home beta dummy	6	4	7	4	5	3	5	3
Europe (20)								
All dummies	7	11	13	12	5	7	13	11
Dummies for Home and US betas			11	12			10	10
US Factor			13	13			12	11
Home Factor	20	20	20	20	20	20	20	20
US beta dummy			10	9			7	7
Home beta dummy	7	11	8	9	6	9	7	9
Mexico (6)								
All dummies	5	5	1	6	5	5	0	4
Dummies for Home and US betas			5	5			4	5
US Factor			1	1			0	0
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			1	1			0	1
Home beta dummy	5	6	6	6	5	5	5	5

Table C.5
Continued

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
S. America (7)								
All dummies	3	3	4	3	2	2	3	3
Dummies for Home and US betas			3	4			3	3
US Factor			4	4			2	2
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			2	2			1	1
Home beta dummy	4	4	3	4	3	3	2	3
UK (14)								
All dummies	3	6	8	9	2	5	7	9
Dummies for Home and US betas			7	9			7	9
US Factor			8	8			6	6
Home Factor	14	14	14	14	14	14	14	14
US beta dummy			9	7			6	6
Home beta dummy	5	7	7	8	2	5	5	8
PreUS Canada (5)								
All dummies	0	0	3	0	0	0	2	0
Dummies for Home and US betas			0	0			0	0
US Factor			3	2			2	2
Home Factor	4	4	5	5	4	4	5	5
US beta dummy			1	1			1	0
Home beta dummy	0	0	1	1	0	0	0	0
PreUS Europe (3)								
All dummies	0	1	3	3	0	1	3	3
Dummies for Home and US betas			2	3			2	3
US Factor			3	3			3	3
Home Factor	2	3	2	3	2	3	2	3
US beta dummy			3	3			2	3
Home beta dummy	0	1	1	2	0	1	1	2
PreUS UK (6)								
All dummies	0	1	5	1	0	1	4	1
Dummies for Home and US betas			1	2			1	1
US Factor			5	4			4	3
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			2	1			2	0
Home beta dummy	0	1	1	2	0	1	1	2
PreUS All (14)								
All dummies	0	2	11	4	0	2	9	4
Dummies for Home and US betas			3	5			3	4
US Factor			11	9			9	8
Home Factor	12	13	13	14	12	13	13	14
US beta dummy			6	5			5	3
Home beta dummy	0	2	3	5	0	2	2	4

Table C.6
Significant 2-sided F-tests for the listing/weekly sample

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
All (71)								
All dummies	12	21	14	18	8	12	12	12
Dummies for Home and US betas			15	18			10	14
US Factor			13	14			10	10
Home Factor	62	63	58	61	60	61	54	59
US beta dummy			11	12			8	7
Home beta dummy	14	20	15	16	8	15	9	14
Australia (8)								
All dummies	2	4	2	3	2	3	2	2
Dummies for Home and US betas			1	2			1	2
US Factor			2	2			2	2
Home Factor	7	7	7	7	6	7	6	7
US beta dummy			1	1			1	0
Home beta dummy	3	4	4	2	1	2	1	1
Canada (5)								
All dummies	0	1	1	1	0	0	1	0
Dummies for Home and US betas			1	0			0	0
US Factor			1	1			1	0
Home Factor	5	5	4	5	5	5	3	4
US beta dummy			0	1			0	0
Home beta dummy	0	0	1	1	0	0	1	1
Chile (11)								
All dummies	1	2	2	1	1	1	0	1
Dummies for Home and US betas			2	4			0	1
US Factor			1	1			0	0
Home Factor	9	9	9	9	9	9	8	9
US beta dummy			2	2			1	1
Home beta dummy	2	3	3	3	0	2	0	3
Europe (20)								
All dummies	3	7	4	4	2	4	4	4
Dummies for Home and US betas			5	5			4	4
US Factor			4	5			4	4
Home Factor	17	16	14	14	16	16	13	14
US beta dummy			4	4			4	3
Home beta dummy	3	6	3	5	3	5	3	4
Mexico (6)								
All dummies	2	3	2	3	2	2	2	2
Dummies for Home and US betas			3	3			3	3
US Factor			2	2			0	1
Home Factor	6	6	6	6	6	6	6	6
US beta dummy			1	1			1	1
Home beta dummy	3	3	2	2	2	3	2	2

Table C.6
Continued

	Significant at 10%				Significant at 5%			
	1a	2a	3a	4a	1a	2a	3a	4a
S. America (7)								
All dummies	1	1	0	1	0	0	0	0
Dummies for Home and US betas			0	0			0	0
US Factor			0	0			0	0
Home Factor	5	5	5	5	5	5	5	5
US beta dummy			0	0			0	0
Home beta dummy	0	0	0	0	0	0	0	0
UK (14)								
All dummies	2	3	3	4	1	2	3	2
Dummies for Home and US betas			2	3			1	3
US Factor			3	3			3	3
Home Factor	12	14	12	14	12	12	12	13
US beta dummy			2	2			1	1
Home beta dummy	2	3	1	2	1	2	1	2
PreUS Canada (5)								
All dummies	0	0	3	1	0	0	3	0
Dummies for Home and US betas			1	1			1	1
US Factor			3	2			2	1
Home Factor	2	4	2	2	2	3	2	2
US beta dummy			1	2			1	1
Home beta dummy	0	0	1	2	0	0	1	2
PreUS Europe (3)								
All dummies	1	1	1	1	1	0	0	0
Dummies for Home and US betas			1	0			0	0
US Factor			0	1			0	0
Home Factor	2	2	2	2	2	2	2	2
US beta dummy			1	0			1	0
Home beta dummy	0	0	1	0	0	0	1	0
PreUS UK (6)								
All dummies	0	0	1	0	0	0	1	0
Dummies for Home and US betas			1	0			0	0
US Factor			1	1			1	1
Home Factor	5	6	4	6	5	6	4	6
US beta dummy			0	0			0	0
Home beta dummy	1	1	0	0	0	0	0	0
PreUS All (14)								
All dummies	1	1	5	2	1	0	4	0
Dummies for Home and US betas			3	1			1	1
US Factor			4	4			3	2
Home Factor	9	12	8	10	9	11	8	10
US beta dummy			2	2			2	1
Home beta dummy	1	1	2	2	0	0	2	2

APPENDIX D

NON-PARAMETRIC MANN-WHITNEY RANK TEST

The Mann-Whitney Rank test tries to determine whether the null hypothesis of two populations being identical can be rejected. The two samples from the populations are combined and ranked. If there are no ties, the test statistic is simply the sum of the ranks of the chosen group. The null hypothesis is rejected if the test statistic falls into the critical region. It is important to note that this test can be carried out in two ways. The largest value in the samples can be assigned a rank of 1 and the rest appropriate ascending ranks or the highest value can be assigned the highest rank and the rest appropriate descending ranks until the lowest value gets the rank of 1. The results of the tests are not affected by this, it is simply necessary to ensure that the appropriate critical values are being used. In this dissertation, the highest value was assigned a rank of 1 followed by appropriate ascending ranks to the rest of the samples. Therefore, a test statistic that is higher than the critical value implies that the chosen population seems to have lower values than its counterpart.

Table D.1
Example of Mann-Whitney test

Sample A	Rank A	Sample B	Rank B
23	3	65	10
28	4	62	9
6	1	97	13
41	5	58	8
53	7	81	11
14	2	46	6
		86	12
Sum of ranks	22		69

Under the null hypothesis of the samples being identical and the alternative of sample B having greater values, the critical region is ($T < 33$) for an approximate level of significance of 10%. As $T = 22$, the null hypothesis can be rejected.

The critical region is obtained from tables in Conover (1980). There is also a large sample approximation when the size of either sample exceeds 20 observations. The critical value can be calculated by $w_p = n(N + 1)/2 + x_p \sqrt{n \times m(N + 1)/12}$ (Conover, 1980). Where x_p is the p^{th} quantile of the standard normal distribution; n is the number of observations in the first sample; m is the number of observations in the second sample; N is equal to $n + m$.

APPENDIX E
THE BINOMIAL TEST

The binomial test is a very versatile test that can easily be adapted to many situations. It consists of n trials where the number y of successes is counted. The null hypothesis assumes that there is a certain probability p of each trial resulting in success.

An example would be drawing marbles from a population that is assumed to consist of 90% white marbles and 10% black marbles. One hundred marbles are drawn at random and the number of black marbles are counted. Looking at Table E.1 we can see that if the number of black marbles exceeds 13 then the null hypothesis of the population having 10% black marbles can be rejected at a significance level of 10%. Under the assumption of 10% black marbles, the probability of having 14 or more black marbles from 100 is 7.26%.

For this dissertation, the null hypothesis is that there are no changes in the parameters of risk/return characteristics, therefore the tests performed should have a possibility of rejection of 10% (the assumed level of significance in the individual tests). If the number of rejections exceeds the number that should occur randomly then it can be concluded that the null hypothesis of no change in the parameters can be rejected.

Table E.1 provides the p-values for probability of success of 10%, and Table E.2 for 5%.

Table E.1
P-values for Binomial test using 10% level of probability of success

10%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.0%																			
2	1.0%	0.0%																		
3	2.8%	0.1%	0.0%																	
4	5.2%	0.4%	0.0%	0.0%																
5	8.1%	0.9%	0.0%	0.0%	0.0%															
6	11.4%	1.6%	0.1%	0.0%	0.0%	0.0%														
7	15.0%	2.6%	0.3%	0.0%	0.0%	0.0%	0.0%													
8	18.7%	3.8%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%												
9	22.5%	5.3%	0.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%											
10	26.4%	7.0%	1.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%										
11	30.3%	9.0%	1.9%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%									
12	34.1%	11.1%	2.6%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								
13	37.9%	13.4%	3.4%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
14	41.5%	15.8%	4.4%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
15	45.1%	18.4%	5.6%	1.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					
16	48.5%	21.1%	6.8%	1.7%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
17	51.8%	23.8%	8.3%	2.2%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
18	55.0%	26.6%	9.8%	2.8%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
19	58.0%	29.5%	11.5%	3.5%	0.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
20	60.8%	32.3%	13.3%	4.3%	1.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
25	72.9%	46.3%	23.6%	9.8%	3.3%	0.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
30	81.6%	58.9%	35.3%	17.5%	7.3%	2.6%	0.8%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
35	87.8%	69.4%	46.9%	26.9%	13.2%	5.5%	2.0%	0.6%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
40	92.0%	77.7%	57.7%	37.1%	20.6%	10.0%	4.2%	1.5%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
45	94.8%	84.1%	67.1%	47.3%	29.2%	15.9%	7.6%	3.2%	1.2%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50	96.6%	88.8%	75.0%	56.9%	38.4%	23.0%	12.2%	5.8%	2.5%	0.9%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
55	97.8%	92.3%	81.3%	65.5%	47.6%	31.0%	18.0%	9.4%	4.4%	1.9%	0.7%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
60	98.6%	94.7%	86.3%	72.9%	56.3%	39.4%	24.8%	14.2%	7.3%	3.4%	1.5%	0.6%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
65	99.1%	96.4%	90.0%	79.1%	64.3%	47.8%	32.3%	19.9%	11.1%	5.7%	2.6%	1.1%	0.4%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
70	99.5%	97.6%	92.9%	84.1%	71.3%	55.8%	40.1%	26.4%	15.9%	8.7%	4.4%	2.0%	0.9%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
71	99.5%	97.8%	93.3%	85.0%	72.6%	57.4%	41.7%	27.7%	16.9%	9.4%	4.8%	2.3%	1.0%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
75	99.7%	98.4%	95.0%	88.1%	77.3%	63.3%	47.9%	33.4%	21.4%	12.6%	6.9%	3.4%	1.6%	0.7%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%
80	99.8%	98.9%	96.5%	91.2%	82.3%	70.0%	55.4%	40.7%	27.7%	17.3%	10.0%	5.4%	2.7%	1.2%	0.5%	0.2%	0.1%	0.0%	0.0%	0.0%
85	99.9%	99.3%	97.5%	93.6%	86.4%	75.8%	62.5%	48.0%	34.3%	22.8%	14.0%	8.0%	4.2%	2.1%	1.0%	0.4%	0.2%	0.1%	0.0%	0.0%
86	99.9%	99.4%	97.7%	94.0%	87.1%	76.8%	63.8%	49.5%	35.7%	23.9%	14.9%	8.6%	4.6%	2.3%	1.1%	0.5%	0.2%	0.1%	0.0%	0.0%
90	99.9%	99.5%	98.3%	95.3%	89.7%	80.8%	68.9%	55.1%	41.2%	28.7%	18.6%	11.3%	6.3%	3.3%	1.6%	0.7%	0.3%	0.1%	0.0%	0.0%
95	99.9%	99.7%	98.8%	96.7%	92.2%	84.9%	74.5%	61.8%	48.2%	35.1%	23.9%	15.2%	9.0%	5.0%	2.6%	1.3%	0.6%	0.3%	0.1%	0.0%
100	100.0%	99.8%	99.2%	97.6%	94.2%	88.3%	79.4%	67.9%	54.9%	41.7%	29.7%	19.8%	12.4%	7.3%	4.0%	2.1%	1.0%	0.5%	0.2%	0.1%

Note: Horizontal axis has y equal to number of successes
Vertical axis has n equal to number of trials

Table E.2
P-values for Binomial test using 5% level of probability of success

5%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.0%																			
2	0.3%	0.0%																		
3	0.7%	0.0%	0.0%																	
4	1.4%	0.0%	0.0%	0.0%																
5	2.3%	0.1%	0.0%	0.0%	0.0%															
6	3.3%	0.2%	0.0%	0.0%	0.0%	0.0%														
7	4.4%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%													
8	5.7%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%												
9	7.1%	0.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%											
10	8.6%	1.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%										
11	10.2%	1.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%									
12	11.8%	2.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								
13	13.5%	2.5%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
14	15.3%	3.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
15	17.1%	3.6%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					
16	18.9%	4.3%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
17	20.8%	5.0%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
18	22.6%	5.8%	1.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
19	24.5%	6.7%	1.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
20	26.4%	7.5%	1.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
25	35.8%	12.7%	3.4%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
30	44.6%	18.8%	6.1%	1.6%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
35	52.8%	25.4%	9.6%	2.9%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
40	60.1%	32.3%	13.8%	4.8%	1.4%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
45	66.5%	39.2%	18.7%	7.3%	2.4%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50	72.1%	45.9%	24.0%	10.4%	3.8%	1.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
55	76.8%	52.3%	29.5%	14.0%	5.6%	1.9%	0.6%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
60	80.8%	58.3%	35.3%	18.0%	7.9%	3.0%	1.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
65	84.2%	63.7%	41.0%	22.5%	10.6%	4.3%	1.6%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70	87.1%	68.6%	46.6%	27.2%	13.7%	6.0%	2.3%	0.8%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
71	87.6%	69.5%	47.7%	28.2%	14.4%	6.4%	2.5%	0.9%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
75	89.4%	73.0%	52.0%	32.1%	17.2%	8.1%	3.4%	1.2%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
80	91.4%	76.9%	57.2%	37.1%	21.1%	10.5%	4.7%	1.8%	0.7%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
85	93.0%	80.4%	62.0%	42.1%	25.2%	13.3%	6.2%	2.6%	1.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
86	93.3%	81.0%	62.9%	43.1%	26.0%	13.9%	6.6%	2.8%	1.1%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
90	94.3%	83.4%	66.4%	47.0%	29.5%	16.4%	8.1%	3.6%	1.5%	0.5%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
95	95.4%	85.9%	70.5%	51.8%	33.9%	19.8%	10.3%	4.8%	2.1%	0.8%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
100	96.3%	88.2%	74.2%	56.4%	38.4%	23.4%	12.8%	6.3%	2.8%	1.1%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Note: Horizontal axis has y equal to number of successes

Vertical axis has n equal to number of trials