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1. Introduction

The purpose of this chapter is to introduce the reader to the research topic of this dissertation. The background provides a general discussion about the subject and leads to the problem discussion, which in turn constitutes the foundation of the study's purpose. Thereafter the limitations are communicated. Finally, the outline is presented in order to provide an overview of the dissertation's structure.

1.1 Background

In today's global environment it is difficult for countries the isolate themselves from the rest of the world. This is especially true regarding economic aspects, since companies are increasingly exposed to global competition and hence strive to enhance the markets in which they operate. Furthermore, most governments are dependent on financial support from companies which pay substantial amount of funds in taxes, and also indirectly, save money for governments by providing jobs for the countries' citizens. Companies might therefore use this influence to pressure governments to reduce regulations that prevent market integration.

The great importance for companies to be able to access foreign markets, have made the issue of *International finance* extensively debated in the research world. In particular, much focus has been concentrated to investigate the degree of market integration. Several studies have examined this by analyzing changes in market value following companies' internationalization (see for example Alexander, Eun and Janakiramanan, 1988; Foerster and Karolyi, 1999; Miller, 1999).

The global financial integration has varied substantially during the 20th century, which usually is illustrated as a "U-shaped" curve. In the beginning of the century economies displayed a level of market integration similar to what can be perceived today, since regulations on cross-border capital flows did not exist to a greater extent. However, the deregulative features of the international capital markets would eventually vanish as a consequence of the notorious stock market crash in October 1929, which began in New York and spread worldwide. (Goetzmann, Li and Rouwenhorst, 2002)

Furthermore, in the time period that followed the Second World War, governments in general believed that the best way of healing the economic wounds was to impose a variety of restrictions on international capital flows. In addition to high taxation and transaction costs, there existed explicit restrictions on foreign ownership, capital mobility, and foreign exchange transactions. Besides this, equity markets were often small and characterized by low liquidity and lack of disclosure requirements. As a result of these barriers, many companies became dependent on their domestic capital markets and therefore faced a high cost of capital. (Oxelheim, 1996)

Capital markets throughout the world did not become increasingly integrated until the last few decades. The underlying forces that have driven the enhancing integration between capital markets are the liberalization of stock markets and the boost in international activities of multinational companies. However, even though capital markets today are considered to be less regulated than they were during the past century, there is a consensus in the academic world that barriers to financial integration still exist.

1.2 Problem discussion

Capital market segmentation creates incentives for companies to adopt operating and financial policies that reduce the negative effects of this type of financial segmentation. According to Stapleton and Subrahmanyam (1977), a company can choose between the following financial policies in order to circumvent the barriers that investors face: (1) portfolio investment or direct investment; (2) mergers with foreign companies; (3) cross-listing of the company's stock on foreign equity markets.

This study focuses on the third alternative since cross-listings represent an interesting feature in International finance and has gained importance as a strategic management tool. Moreover, no single capital market attracts as many foreign cross-listings as the US stock markets. The most common method used by non-US companies when cross-listing its stocks, is to establish *American Depositary Receipts* (ADRs)[1]. (Miller, 1999)

Through studying the reaction on domestic stock prices following cross-listings, important conclusions can be made regarding financial integration. Theory suggests that if markets are completely integrated there should not be any unusual effects on domestic stock prices following a cross-list from one market to another, since investors are presumed to have access to both markets in the first place (Sundaram and Logue, 1996).

However, since several studies have shown that there are substantial effects on domestic stock prices when companies cross-lists their stocks, there must be a form of market segmentation between countries (see for example Alexander, Eun and Janakiramanan, 1988; Foerster and Karolyi, 1999; Howe and Kelm, 1987; Miller, 1999; Sundaram and Logue, 1996). Nevertheless, these studies have concluded rather ambiguous results, where some indicate positive impacts on domestic stock returns, while others suggest negative impacts. The lack of consensus regarding the effect of cross-listings further motivates this study, which leads to the purpose of the dissertation.

1.3 Purpose

The purpose of this study is to investigate whether different geographical regions are financially integrated with the US capital markets and if the level of integration has changed over time.

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[1] An American Depositary Receipt can be described as a certificate that represents a foreign company's domestically traded equity. By initiating an ADR program a company can circumvent certain barriers and have its stocks traded on US exchanges (Foerster and Karolyi, 1999).

1.4 Limitations

To be able to conduct this empirical study some limitations and criteria need to be outlined. Companies of which the stocks do not fulfill the requirements are excluded from the research. The limitations that are applied in this dissertation are as follows:

- Only ADR programs that are registered in the Bloomberg database are included in the data sample.
- Only ADRs, where the underlying stocks' domestic prices and relevant index data were obtainable from the Bloomberg database for at least 241 consecutive trading days before and 60 days after listing date are considered.
- To be included the cross-listing dates must be represented on the Bank of New York's database regarding ADR programs.
- The cross listings must have occurred between January 1988 and December 2002 to be included.

1.5 Outline

After this introductory chapter, which has focused on providing the reader with some insight regarding the research, the remainder of the dissertation proceeds as follows:

Chapter 2. This chapter describes the working procedure used in this study. First the choice of research method is argued for, and thereafter the data collection issues are presented. Next in the chapter, a discussion is held concerning the studies' reliability and validity. Finally, the empirical method is presented briefly.

Chapter 3. The purpose of this chapter is to introduce the relevant theories regarding the research topic. Theories that are covered are for example the efficient markets hypothesis and the international asset pricing model. The third chapter ends by reviewing previous research of interest.

Chapter 4. The empirical event study methodology is here presented in a more detailed way compared to in chapter two. All the steps undertaken in order to calculate the numerical data are presented. This chapter describes how the data has been handled in order to establish the results that constitute the foundation of the analysis.

Chapter 5. In this chapter the results obtained are presented and analyzed separately for each geographic region. It is here that the signs regarding financial market integration can be stated. Furthermore, a test is also conducted with purpose of examining whether other variables can explain the results obtained.

Chapter 6. In the final chapter of the dissertation, concluding remarks regarding the level of integration and how it has changed over time are presented. This chapter and thus the entire dissertation end with suggestions for further research.

2. Methodology

In this chapter the working procedure of this study is presented. First a description of the method is outlined, which is followed by a presentation of the data collection, method of selection, and the reliability and validity of the study. In the last section an overall presentation of the event study technique is outlined.

2.1 Choice of Method

This study investigates whether non-US financial markets are integrated with the American stock markets, by measuring the reactions on domestic stock returns following the event of cross-listings through ADR programs. In order to undertake this analysis a quantitative approach is used. This choice is made partly because the study investigates variables that are measurable and partly because a great number of research units are included in the data sample.

Quantitative approaches presuppose that the researcher can quantify the information needed and is characterized by a focus on the collection of numerical data and the use of statistical tools to analyze the data. The method is much more formalized and structured compared to the qualitative method, which is the other main research approach. The qualitative methods are however more suitable for in-depth studies where fewer units are investigated. (Holme and Solvang, 1996)

A positive feature when using quantitative research methods is that statistical generalizations can be made from the data sample. Furthermore there is a distance between the researcher and the object being studied which removes possible biases such as misinterpretations and subjectivity that can arise from for example interviews, which are of a qualitative nature. However, a weakness in using a quantitative method is that the results may not be applicable to all units in the sample even though it is valid for the units in general. Another important factor when conducting quantitative research is to revise the sources where the data has been collected. If the data is not reliable the results obtained from the analysis will not have any scientific value. (Holme and Solvang, 1996)

In addition, the method applied in this study is of a deductive character as a theoretical framework is employed in order to formulate hypotheses used to answer the research question (Bryman, 1989).

2.2 Data Collection

An extensive data collection has been undertaken in order to obtain relevant literature and reliable numerical data needed to conduct the investigation. The published articles and literature have been collected via economic libraries, electronic databases and authors' homepages. The databases that primarily have been used are J-Stor, Nber and Ingentia. Whenever references are made to scientific research the original articles have been

acquired. This has been done in order to minimize the risk for misinterpretations by other authors.

Regarding the collection of numerical data a careful choice has been made in order to find the most reliable source that is accessible. Hence, all stock price- and index data have been collected from the Bloomberg database, which is an independent and professional organization that provides information and news to its customers worldwide. Thus, the numerical data employed is of a secondary nature, in other words, the information has been gathered by other researchers, persons or institutions.

Finally, listing dates for the ADR programs are acquired from the Bank of New York. The bank provides extensive information regarding foreign companies that has cross-listed their stocks on US exchanges.

2.3 Method of selection

The initial data sample included all ADRs that were registered in the Bloomberg database during January 1988 and December 2002. This sample amounted to 1607 programs from 62 countries.

The first prerequisite to be included in the final sample is that listing dates for ADR programs during the test period are available from the Bank of New York. Furthermore, to be included in the study price data must be obtainable from the Bloomberg database for at least 241 consecutive trading days prior to the listing date and 60 trading days afterwards. The next prerequisite is that a relevant country specific index for each company is obtainable in the Bloomberg database for the same period as the stock prices.

The final sample consists of 556 companies from 38 countries. In order to investigate the research question, ADRs from different countries have been clustered together to represent various geographic regions. For example, the "Scandinavian" region consists of ADRs that have been made by companies incorporated in Denmark, Finland, Norway and Sweden. (See appendix A for an overview of the countries and regions included in the study).

2.4 Reliability and Validity

Reliability refers to the consistency of a measure and is determined by how the tests have been conducted and how careful the researcher has been when processing the information. A high degree of reliability is achieved when several independent measurements regarding the same phenomenon give similar result. (Holme and Solvang, 1996)

In this study the reliability is determined by the method used to collect the numerical data and how accurate the data processing has been. Regarding the data collection of asset prices and listing dates, the only sources used are major organizations why the reliability of the numerical data is considered to be high. Even though the data is of a secondary

nature, there is no reason to suspect the data sources of systemically manipulating the prices or supplying inaccurate listing dates. When processing such a large amount of numerical data as this study has, the possibility of random mistakes cannot be totally eliminated. However, by carefully processing the data and conducting a double check of prices for 50 stocks and 20 indexes, the probability of errors in the data sample has been limited.

In order to estimate the expected returns needed to calculate abnormal returns, appropriate market portfolios are needed. The most optimal market portfolio would be one that accounts for country-, industry-, size- and other company-specific variables. However, considering the large sample of ADR programs from 38 different countries, this selection method of market portfolios was not a realistic option. Instead, the market portfolios in this study constitutes of primarily *all-share* indexes for each country where the ADR program was initiated from. When these indexes were not obtainable, other appropriate indexes were used. (These are presented in appendix B).

The validity of a measure takes into account whether it really relates to the concept that it is claimed to measure. In other words, validity is dependent on if the method applied in the study really measures the phenomenon that it intends to measure. (Holme and Solvang, 1996)

The obvious question that is entitled to be discussed regarding the validity of the research conducted in this dissertation is the connection between ADRs and integration. One might question if the impact on the domestic stock price following an ADR cover the whole concept of financial market integration. This form of validity is often mentioned as *construct validity* and refers to if there are any theoretical connections between the method and the area of interest (Bryman, 1989). Since a deductive approach is employed in this study, hypotheses are established on a theoretical base implying that there is construct validity in this research.

2.5 Event study

By using financial market data, an event study is used to measure the effects of an economic event on the value of a company. This methodology has a long history and was pioneered by Dolley (1933) through the publication of a research paper that examined the price effects of stock splits. However, since then the methodology has been developed and modified. The event study methodology that is mainly employed today was developed by Fama, Fisher, Jensen and Roll (1969).

An event can be defined as for example mergers, earnings announcements, equity issues etc. In this dissertation the events that are studied are ADR programs made by companies between January 1988 and December 2002. To investigate how these affect domestic stock returns, the returns are analyzed during different event windows. It is through these analyses that conclusions can be drawn regarding financial integration which exists if different markets can be seen as one common market.

To be able to appraise the events' impact on domestic stock returns a measure of abnormal returns needs to be outlined. Abnormal returns are defined as the actual ex post stock returns subtracted by the expected returns during the event window. The expected returns are defined as the returns that can be expected if no event was to take place.

According to MacKinlay (1997) there are two common choices for modeling and estimating expected returns for stocks; (i) *the constant mean return model* [2] and (ii) *the market model*. The latter is the one that is implemented in this study. The market model is more sophisticated and represents a potential improvement compared to the constant mean return model. By using the market model, the variance of abnormal returns is reduced as the fraction of the return related to variation in the market's return is removed (MacKinlay, 1997). The market model assumes a stable linear relationship between a stock's return and the return on a relevant market portfolio. Historical data, previous to the event window, are therefore used with the purpose of estimating expected returns for stocks during the event windows that are studied.
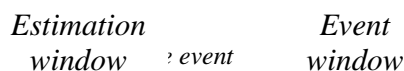
In the above figure, the estimation window is used to estimate each stock's α- and β-coefficients[3]. These parameters are, thereafter, used in combination with country-specific index data in order to calculate relevant expected returns, which in turn are used to calculate abnormal returns.

Afterwards the abnormal returns are summed for each stock during the event windows. Thereafter all the cumulative abnormal returns (CARs) are averaged across stocks and event days. Finally, these values (CAARs) are statistically tested for significance so that an analysis can be performed and conclusions made about the research question regarding financial market integration. (See chapter 4. *Empirical methodology* for a more detailed illustration of these processes).

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[2]The constant mean return model assumes that a certain stock's mean return is constant through time. That is, the expected return is equivalent to the mean return for a particular time period.

[3]This is done by an Ordinary Least Squared (OLS) regression, which estimates its parameters by minimizing the deviation from a "best-fit" line.

2.5.1 Arguments for choosing listing dates

In previous research, it has been wildly discussed which event date, announcement- or listing date, that is the most accurate to chose in order to measure the effect of international cross-listings. There are advantages and disadvantages with both dates and the purpose of this part is to consider the pros and cons of each one and present our choice of event date.

There exists a consensus in financial research that the announcement date is more appropriate to use as event date, if it is assumed that markets are efficient (see for example Miller, 1999). If markets are efficient in the sense that stock prices reflect all publicly available information, then the price reaction of the cross-listing will be incorporated immediately at the announcement date. However, Foerster and Karolyi (1999) mention three important disadvantages when using the announcement date. The first is that markets might have expected a company to cross-list its stocks in the US for years, implying that the information have already been incorporated into the price at announcement date. The second is that a company's spokesperson might indicate that the company intends to cross-list its stocks, but has not received necessary approval from the company's board of directors, the relevant stock exchange or the SEC approval. Thirdly, there is also the possibility that companies announce their intent to cross-list, without actually doing it.

Thus, it is difficult to obtain reliable announcement dates, since the information might have gone out in different press releases on different dates. Furthermore, when analyzing a great extent of different regions as is done in this study, the possibility to obtain correct announcement date for all ADR programs is unrealistic. Therefore, the chosen date used in this dissertation is the listing date.

By using the listing date it is possible to incorporate effects such as increased company visibility, investor recognition and liquidity aspects, which are hard to evaluate at the announcement date. Furthermore, if markets are not efficient, then the price reaction to the event in question might not affect the stock price completely at the time of announcement. Instead, by using actual listing dates and examining a longer time horizon the reactions might, on the other hand, more appropriately capture these effects.

3. Theoretical framework

This chapter accounts for relevant theories regarding the subject in question. The chapter starts with a presentation of the efficient market hypothesis. Thereafter, the structure of the ADR market is presented and is followed by an exposition of the International Asset Pricing Model, the investor recognition and the liquidity hypotheses. Subsequently, barriers to stock market integration and motives for cross-listing are outlined. Finally, a chronological review of previous research regarding the impact of cross-listings on domestic stock price is provided.

3.1 The Efficient Markets Hypothesis

"The efficient markets hypothesis is the proposition that an asset's current price fully reflects all publicly available information about future economic fundamentals affecting the asset's value" (Bodie and Merton 2000, p. 206).

The above quote, more or less, concludes the general view that all publicly information about a certain stock is incorporated into the stock's market price. Consider a case when some good news is released implying that the stock price should rise in the near future. These expectations will motivate investors to acquire the stock the day of the news release. As long as potential investors expect the stock price to increase, they will purchase the stock and this will consequently drive up the price. Finally the price has risen so much that it has reached the equilibrium level and the market does not expect the price to increase any more. The thought of the stock price reflecting new information immediately is of main focus in the theory of efficient markets.

The foundation to the theory behind the Efficient Markets Hypothesis was laid by Roberts (1959) who first made the distinction between weak and strong form tests. However, according to Fama, the term efficient market hypothesis was developed by Fama, Fisher, Jensen and Roll (1969) and considers three different degrees of efficiencies, depending on how much of the existing information that is incorporated in the stock price[4].

3.1.1 Weak form of efficiency

The weak form degree of efficiency is fulfilled if all historical information regarding a stock is reflected in its stock price. When this criterion is met, it is implied that past stock prices cannot be used in order to predict future stock returns. Spokesmen of technical analysis are, however, convinced of the possibility of finding patterns in historical stock price data that can help them in the task of forecasting future stock returns. Therefore,

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[4] Mail correspondence with Eugene F. Fama, 14th May 2003.

they do not believe in the weak form of efficiency which implies that stock prices follow a so-called Random walk, which means that price changes do not follow any patterns. That is, today's stock price is uncorrelated with historical prices (Fama, 1970).

In the world of economics there exists a consensus that stock prices follow a random walk and that financial markets are at least efficient according to the weak form. This is quite intuitive due to the fact that historical stock price data are very easily obtained and if there were profit opportunities to be extracted from these, everyone would seek to identify these price patterns and thereby exhausting the profits. This would then increase the stock price instantaneously until a new equilibrium price is reached. (Fama, 1970)

3.1.2 Semi-strong form of efficiency

The semi-strong level of efficiency exists when all historical information and all publicly available information is incorporated in stock prices. If this is the case, neither technical analysis nor fundamental analysis will generate abnormal returns. Consequently, investors are incapable of predicting stock price movements through studying newspapers, press releases, company specific information such as financial statements etc. (Fama, 1970)

Keown and Pinkerton (1981) carried out a study where they investigated how stock prices changed when companies were targeted for takeovers. Usually the company that intends to take over another one is willing to pay high premiums to acquire the shares of the targeted company. Considering basic economic theory concerning demand and supply, one would easily expect the stock price of the target company to rise. Assuming that capital markets are semi-strong efficient the price increase would take place immediately. The results which Keown and Pinkerton arrived at supported the view of the markets being semi-strong efficient. The study showed that the targeted companies' stock prices increased at the announcement day of the takeovers, and that these increases were not temporary fluctuations. This implies that the new stock price levels reflected the acquisition premiums that could be expected to be paid for the target companies' stocks. The analysis also gave evidence for insider trading profits, which were observed as stock prices increased a few days before the takeover announcement. (Keown and Pinkerton, 1981)

Several other studies have been undertaken with the purpose of investigating how stock prices react to other news releases besides those concerning takeovers. These studies imply that most of the information gets incorporated into the prices relatively quickly. This means that a potential investor cannot obtain abnormal returns by trading on the news in question, after the time when the announcement occurred. These findings support the propositions stating that markets are at least semi-strong efficient.

3.1.3 Strong form of efficiency

If stock prices reflect all relevant information that exists, markets are assumed to be efficient according to the strong form criteria. In this market condition, people with inside

information will not be able to generate abnormal profits based on their special information. This degree of efficiency assumes that stock prices react instantaneously when somebody gets new information about a stock. (Fama, 1970)

However, the study of Keown and Pinkerton (1981) implies that markets do not fulfil the criteria of being strongly efficient as they found that insider trading actually generated certain abnormal returns. The strong degree of efficient markets implies that an investor might as well throw darts on a stock list when deciding which stocks to include in the portfolio. This is because one cannot use the knowledge of a stock to achieve abnormal returns[5]. This, however, seems to be unrealistic to the vast majority of the academic world of economics (Fama, 1970).

3.2 The structure of the American Depositary Receipt market

The most common method for foreign companies to cross-list their stocks on US exchanges are by creating ADRs (Foerster and Karolyi, 1999). In order to give the reader a basic understanding of this financial strategy, a description of the structure of the ADR market is presented below.

In 1927 JP Morgan developed the ADR market as an alternative method for US investors to purchase and earn dividends on foreign stocks without actually having direct access to the foreign market itself. ADRs can be described as certificates representing a certain number of underlying foreign stocks, and are issued by US depository banks. ADRs can be divided into two broad categories; unsponsored and sponsored programs. In the early days, the most common ADRs were unsponsored programs. The initiative to introduce an unsponsored ADR was made by a US bank and did not require an authorization from the foreign company. However, since 1983 the Security and Exchange Commission (SEC) requires all new ADRs to be authorized by the company before the program can be established. (Sundaram and Logue, 1996)

Sponsored ADRs are, on the other hand initiated by foreign companies. Companies choosing to sponsor ADR programs permit a depository bank to act as transfer agent and no other banks are allowed to duplicate the program. When issuing an ADR program the company must finance all initial costs and following expenses that are associated with ADR management. (Sundaram and Logue, 1996)

There are no rules regarding the number of underlying stocks an ADR represents, which therefore can be either a fraction or a multiple of each stock. Depending on the foreign stock price, the number included in an ADR is made to fit the appropriate trading range for US stocks. Like other securities traded on the US stock exchanges, the certificates must be registered with the SEC. All dividends and other payments to US investors are converted into USD, which means that the foreign company does not bear any exchange risk nor pay the fees to the depository bank (Foerster and Karolyi, 1999).

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[5]A potential investor can however use knowledge about the stock market to diversify the portfolio in order to spread the risks, which throwing darts not necessarily would do.

There exist several advantages with ADR programs for both issuers and investors. According to Foerster and Karolyi (1999) the main advantages for issuers include: (i) the access to a liquid secondary market in the US; (ii) an increased opportunity to raise capital due to the enlarged investor base associated with ADRs and (iii) enhances of the domestic market for the issuers stocks.

In addition, Miller (1999) points out a number of potential advantages for investors that want to diversify their portfolios. As stated above, ADR programs give investors opportunities to invest in foreign restricted equity markets. Further advantages are that (i) ADRs are denominated and dividends are paid in USD; (ii) the depository bank is responsible for distributing financial information to investors; (iii) trading costs are lower and (iv) as settlement occurs in the US the transaction can be completed faster compared to a direct purchase on the foreign company's home market. An additional advantage with ADRs is the increased company disclosure requirements due to the US accounting standards, which makes it harder for companies to conceal information from investors.

There are four different levels of ADR programs that companies can choose between to balance the advantages and the costs of increased information requirements. Table 3.1 describes the different characteristics of each level regarding exchange, accounting standards, SEC registration, share issuance and costs. (Miller, 1999)

Table 3.1
Different types of American Depositary Receipt Programs

	Level I	Level II	Level III	144a
Primary Exchange	OTC market	NYSE, AMEX or NASDAQ	NYSE, AMEX or NASDAQ	PORTAL
Accounting standards	Domestic standards	U.S GAAP	U.S GAAP	Domestic standards
S.E.C registration	Exempt[6]	Full registration	Full registration	Exempt
Share issuance	Existing shares only (Public offering)	Existing shares only (Public offering)	Equity capital raised (Public offering)	Equity capital raised (Private offering)
Costs	< $25,000	$200,000-700,000	$500,000-2,000,000	$250,000-500,000

Source Miller (1999) p. 107

For a company wanting to cross-list its stocks on the US market, the cheapest and most commonly strategy is to establish a so-called Level I ADR program. These ADRs that are traded on the OTC market require a minimal SEC disclosure and the company does not have to reconcile to the General Accepted Accounting Principles (GAAP) rules, thus the

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[6] Level I ADR programs only require a minimal registration procedure.

company is allowed to use its domestic accounting standards with adequate translation. (Miller, 1999)

Level II ADR programs are initiated by companies that want more liquidity in their stocks and higher visibility. These ADRs are traded on the NYSE, AMEX and NASDAQ and therefore requires the company to comply with US accounting standards under GAAP. The costs associated with Level II ADRs can be substantial and according to Miller (1999) the initial cost alone can exceed 1 Million USD. Moreover, both Level I and Level II ADRs are made without any capital raising elements and thus created only by the company's existing shares.

Level III ADRs are the most prestigious and expensive cross-listings that companies can carry out. This type of listings involves capital raising by new equity issues and requires full SEC disclosure, reconciliation with the exchange's existing listing rules and compliance with GAAP reporting standards. Similar to Level II programs these ADRs are traded on NYSE, AMEX and NASDAQ.

Finally companies can choose to list its stock in the US markets by raising equity capital via private placements towards so-called qualified institutional buyers. This is done under rule 144A and is known as RADRs. By using this form of programs companies do not have to comply with GAAP or SEC disclosure rules. RADR programs are traded on PORTAL[7] which has a limited liquidity. (Miller, 1999)

3.3 The International Asset Pricing Model (IAPM)

The traditional form of the Sharpe-Lintner Capital Asset Pricing Model (CAPM) has important limitations since it only considers national investments. An investor that has not diversified the portfolio internationally will according to theory be bearing more risk than if the investor was able to diversify the portfolio with stocks from other countries. This is true since an international diversification facilitates a reduction of the portfolio variance for any given expected return. The outcome is that the risk-premium is significantly lower in an internationally diversified portfolio compared to a domestic portfolio. This implies that a stock's domestic β cannot be taken as the true measure of its risk. The "true" systematic risk of a stock is much smaller than the domestic – non-diversifiable – risk. (Solnik, 1974a)

In an integrated market, investors with internationally diversified portfolios will measure the risk of an individual stock in terms of a world market portfolio and a global β. Therefore, the cost of capital for an individual company will be in terms of a global CAPM as shown below. (Solnik, 1974a)

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[7]PORTAL stands for Private Offering, Resales and Trading through Automated Linkages. PORTAL was developed to support the distribution of private placements and to facilitate liquidity in the secondary of Rule 144a securities.

$$E[R_i] = r_f + \beta_G \big[E[R_G] - r_f \big]$$

Where $E[R_i]$ is the required return on a stock when markets are global, r_f is the risk free interest rate, B_G is the global beta, and R_G is the return on the world market portfolio. A company that has internationally diversified shareholders will have a cost of capital with a lower market risk premium as compared to companies with shareholders that are not internationally diversified, because the latter investors demand higher expected returns. (Solnik, 1974b)

3.4 Investor Recognition Hypothesis

Merton's (1987) capital equilibrium model is an extension of the standard Sharpe-Lintner CAPM, which relaxes the assumption that investors have equal information. By assuming that investors only use stocks that they are aware of to construct an optimal portfolio, the model takes the factor of incomplete information into account and shows that expected returns not only depend on market risk. According to the author the motivation behind the assumption is the fact that any investor's portfolio only contains a small fraction of all securities available in the market place.

The information cost structure underlying the model is partly based on analyses of information cost structures and models of differential information made by Klein and Bawa (1977). The information cost structure is divided into two parts; one refers to the cost of gathering information and processing the data and the other of transmitting the information from one party to another.

The model by Merton does not consider different quality of information, it is assumed that information of all securities are the same, but that the price is affected by the different distribution of information to investors. Thus, the emphasis lies on the differences in the breath of investor cognisance.

Merton argues that the most important cost structure for the model is the cost involved in making investors aware of the company. In a theoretical example, Merton shows that an increase in the size of a company's investor base will lead to a reduction of the cost of capital since expected returns decrease in relation to the size of the company's investor base. By doing this he shows that expected returns depend on other factors than market risk as in the traditional CAPM. Merton also shows that the impact will be more evident for companies that are relatively unknown.

Even though regulation constraints are not an incomplete information issue specifically, Merton argues that these constraints are accounted for in the model since investors act as if they did not know about the company and would therefore not include the security in their portfolio. Merton suggests that by spending resources, for example to have the

company listed on another exchange, the company can expand its investor base by making the company an eligible investment for these overseas investors.

3.5 Liquidity Hypothesis

In an equilibrium asset pricing model developed by Amihud and Mendelson (1986), the returns are shown to be an increasing and concave function of liquidity. Since the illiquidity can be measured by the cost of immediate execution, the proxy for liquidity in the model is the bid-ask spread. The ask price includes a premium for an instant purchase, and the bid price reflects a concession for an instant selling. Thus a natural measure of liquidity is the bid-ask spread since it reflects the sum of the buying premium and the selling concession.

According to the model, the return required by an investor on an asset is described as the required spread-adjusted return plus the expected liquidation cost, which consists of the investor's liquidation probability multiplied by the asset's relative spread. The hypothesis is that if a listing results in smaller spreads, the investors should require lower expected returns and thus give rise in stock prices. Nevertheless, the result could also be the other way around as outlined by Domowitz, Glen and Madhavan (1998) who conclude that where intermarket information linkages are poor, cross-listings reduce liquidity.

3.6 Barriers to stock market integration

This part of the chapter focuses on barriers to stock market integration. The literature in international finance identifies a number of market imperfections, which hinder integration. However, the relative importance of these obstacles has changed over time and across markets (Oxelheim, Randöy and Stonehill, 2001). The barriers described below are considered to be important.

3.6.1 Asymmetric information

This concept takes into account that there is information asymmetry depending on in which countries investors are resident. The basic assumption is that domestic investors are assumed to be better informed regarding payoffs on the domestic market than foreign investors (Kang and Stulz, 1994). This implies that investors in different countries do not have access to the same information. For example, language difficulties could impose a barrier for potential investors' information gathering concerning foreign stocks. This could be due to information distortion arising from difficulties in interpreting foreign financial data, medias etc.

Asymmetric information also concerns differences in analytic methods used to evaluate the strength of a stock. This clarification is in accordance with Coval and Moskowitz's (1999) finding, which states that portfolios of US domestic mutual funds are geographically biased toward the home of the fund. The problems of distance are explained by language and communication difficulties, since information about the

domestic economy can be acquired easily, whereas information regarding foreign economies requires considerably more efforts.

Furthermore, Kang and Stulz (1994) present empirical evidence stating that foreign investments in Japanese equities are concentrated to the largest companies' stocks, which indicates that foreign investors have less information concerning small companies than local investors. Evidence that further supports the asymmetric information hypothesis can be drawn from Shukla and Inwegen (1995). They conclude that foreign managed mutual funds in the US are outperformed by domestic funds and that at least a part of this performance shortfall is due to inferior market timing by the foreign funds.

3.6.2 Different tax regulations

Differences in governments' tax regulations could also impose a barrier to stock market integration. This is true especially regarding taxes on capital gains and double taxation of dividends. Differences in tax systems have been acknowledged to be an imperfection affecting the relative value of stocks sold in different markets (Kim and Stulz, 1988).

Personal and corporate taxation highly influence the shape of national financial markets. The tax system can for example lower the propensity for investing in production facilities and instead create incentives for other investments. However, the most acknowledged problem with different tax systems is that in some countries it is more favorable to raise funds by debt instead of equity. (Oxelheim, 1996)

Stonehill and Dullum (1982) discuss the problem of different taxes on similar kinds of investments in Denmark. Until a tax law change in July 1981, capital gains on stocks held for over two years were taxed at a 50 percent rate. However, stocks held for less than two years were taxed at personal income tax rates, which varied up to a rate of 75 percent. In contrast, capital gains on bonds were tax free. This tax policy resulted in the fact that most individual investors held bonds rather than stocks, which reduced the liquidity of the stock market and increased the required return on stocks.

3.6.3 Stock market regulations

There are different types of regulations that a government can impose on cross-border equity activities, which constitute important sources for market segmentation. Regulations that impose a direct barrier to integration are restrictions on foreign ownership of stocks. During the past century governments also employed restrictions on acquisitions of foreign stocks by domestic investors. Moreover, legislators have also restricted the ability for domestic companies to cross-list abroad and for foreign companies to list on the domestic market. Other forms of restrictions that have been used by national legislators are restrictions of cross-listings abroad and restrictions on listings of foreign companies on the domestic equity market. (Oxelheim, 2001)

In countries where regulative restrictions exist, companies have to find ways to "escape" their home markets in order to entice foreign investors (Oxelheim, Randöy and Stonehill,

2001). However, these kinds of restrictions are not generally applicable to global equity offers in the world today, since most markets have been deregulated since the mid-1980s (Chaplinsky and Ramchand, 2000).

3.6.4 Agency costs

Agency costs arise from the principal-agent problem, meaning that "insider's" and "outsider's" interests are in conflict (Jensen and Meckling, 1976).

Jensen and Meckling (1976) recognize two types of interest conflicts. The first is between stockholders and managers, and the second is between stockholders and debt holders. The first type arises since management's portfolios are generally less diversified, and consequently they will try to reduce the operational risk more than the shareholders who have limited shares in the company. The second type of conflict arises since the debt contract gives shareholders incentive to invest suboptimally and increase the risk and the expected return of the company.

There are differences in agency costs between countries. The most obvious difference in agency costs can be found between firms located in bank-dominated markets such as Japan and Germany compared to firms situated in Anglo-American markets (Oxelheim, Randöy and Stonehill, 2001).

3.6.5 Risk tolerance

Investors from different countries can have different levels of financial risk tolerance, implying that companies have to think over their debt ratios. Investors in some countries can accept financial risks whereas investors in other countries would neglect a company if it was considered as being too risky.

Moreover, the degree of financial leverage usually differs depending on which country the company is incorporated in. Scandinavian, German and Japanese companies tend to have relatively high debt/equity ratios compared to US and UK standards (Stonehill and Dullum, 1982). As a result, investors in the UK and the US might perceive these kinds of stocks as more risky and demand higher expected returns.

3.6.6 Foreign exchange rate risk

When deviations in Purchasing Power Parity (PPP) exist, investors in different countries will measure their real returns in different ways. Consequently, investors will prefer to hold different portfolios (Adler and Dumas, 1983). Exchange rate risk is a product of a floating exchange rate system and imperfect foresight ability (Choi and Rajan, 1997). When it comes to the valuation of an individual company, or the demand for an asset, there are both theoretical (Choi, 1986) and empirical evidence (Karolyi and Stulz, 1996) that stock returns are sensitive to exchange rate changes.

The existence of this risk factor depends on the nature of exchange rate uncertainty. If exchange rates are purely nominal, exchange risk can be fully diversified away. If, on the other hand, they contain real components such as relative price uncertainty, consumption differences, or government controls, the exchange rate risk may be partially non-diversifiable (Adler and Dumas, 1983). Thus, investors facing non-diversifiable exchange rate risks might demand higher expected return.

3.6.7 Take-over defenses

Differences in systems regarding the number of votes per share could impose severe barriers between stock markets. For example, the Anglo-American market is characterized by one-share-one-vote norms. On the other hand, some countries have systems with different categories of stocks, where some categories provide influence in the company while others only pay dividends. The latter system is developed to function as a takeover defense, but has a depressing price effect on the stocks in question. From an entirely capital market point of view the concentration of a voting majority in non-voting stocks is less than ideal. It eliminates one of the capital market's main functions, namely, facilitation of a change in control. (Stonehill and Dullum, 1982)

3.6.8 Transaction costs

Transaction costs, such as bid-ask spreads, brokerage commissions and transaction taxes, are important features in financial markets (Vayanos, 1998). Since the level of transaction costs involved in trading stocks differs across markets, stocks are also valued differently. Consequently, the level of differences in transaction costs has an impact on the integration between markets as well.

The existence of transaction costs have an impact on investor's portfolios, since these costs have the implication that investors do not trade in all assets (Mayshar, 1981). This implies that transaction costs have a limiting effect on the number of assets an investor can hold in the portfolio. To relate this statement to this research one can imagine a US investor that wants to purchase stocks in a Danish company listed on the Copenhagen Stock Exchange (CSE). Imagine that the transaction costs are larger when purchasing directly on the CSE, then the investor would value the opportunity to purchase the stock at lower transaction costs as an ADR on an US exchange (Chaplinsky and Ramchand, 2000).

3.6.9 Political risk

Another barrier imposing capital market segmentation is political risk. This kind of risk can be defined as "risk attaching to changes in the market rules" (Oxelheim, 1996, p.225). This kind of risk takes into account the government's propensity to intervene in the capital markets as well as the country's relative indebtedness. The latter measure is mentioned since the need for intervention is signalled by the country's financial situation. A high net foreign debt makes it more likely that a government will intervene in the market by launching new taxes or legislations affecting corporate returns on investments. (Oxelheim, 1996)

When managers or investors undertake investments exposed to political risks, they demand higher risk premiums, implying higher expected returns. Every government is associated with a certain level of political risk and uncertainty, which affects the pricing of stocks in the country. (Oxelheim, 1996)

3.7 Why do companies want to list abroad?

Since this dissertation investigates the impact of cross-listings on domestic stocks prices it is appropriate to discuss why companies reach abroad and cross-list on foreign stock exchanges. In this part, the most important reasons why companies list their stocks on foreign markets are outlined.

A foreign cross-listing has generally its roots in two main reasons (Pagano, Röell and Zechner, 2002). First, financial motives such as cheaper funding and a larger supply of capital could motivate a company to list itself on a foreign stock exchange. Second, a listing abroad may be done for marketing reasons since a cross-listing enhances a company's visibility on foreign markets.

3.7.1 Raising capital for investments

One important reason why companies may need equity funding is to be able to finance new investment programs. Equity funding is most important to companies that are large and fast growing and for those that have limited their debt capacity. Thus, it can be concluded that companies with high investment, growth rate and leverage are more likely to cross-list than companies that have the opposite characteristics. (Pagano, Röell and Zechner, 2002)

Another reason for cross-listing stocks on foreign stock exchanges could be when companies are considering mergers or acquisitions involving foreign companies. It is common that acquisitions are financed with the bidder's stocks. However, this is only acceptable if the stocks are listed on the same stock exchange. (Pagano, Röell and Zechner, 2002)

3.7.2 Broadening shareholder base

Numerous researches have shown that an expansion of the marketplace for a company's stocks lowers the cost of capital since risk sharing improves (see for example: Martin and Rey, 2000; Stulz 1999). However, as described in table 3.2 there exist mixed evidence regarding the effects on stock prices following cross-listings. Nonetheless, most studies point at positive cumulative abnormal returns around the listing date (Foerster and Karolyi, 1999). There is also evidence pointing at a reduction of the home market β for companies that cross-list, which results in a lower cost of capital (Karolyi, 1998).

Cross-listings make it possible for companies to circumvent market segmentation by reducing the barriers to foreign investors discussed in chapter 3.6. Lack of information

can range from total unawareness of foreign investment opportunities as in Merton's (1987) "investor recognition hypothesis," to an informational disadvantage of trading foreign stocks as described in Kang and Stulz (1994). It is clear that companies initiating ADR programs might reduce this kind of barrier to attract foreign investment by supplying investors with more information (Pagano, Röell and Zechner, 2002).

Research has shown that the larger the expansion of the shareholder base, the greater is the positive reaction on the domestic stock price (Forester and Karolyi, 1999, Miller, 1999). A research presenting related evidence showed that stocks moving from the OTC to the NYSE experienced abnormal returns of five percent (Kadlec and McConnell, 1994). Another interesting finding is that cross-listing companies experienced an increase of analyst coverage resulting in an increased visibility, which was followed by a boost in investors' awareness of the company (Bancel and Mittoo, 2001).

3.7.3 Liquidity

Enhancing trading liquidity of the stocks is a common reason why companies cross-list their stocks. When listing on a foreign exchange, the increase in turnover associated with a wider shareholder base can also have positive effects on domestic bid-and-ask spreads and trading volumes. (Foerster and Karolyi, 1999)

However, studies have shown mixed conclusions in this research area as well. For example, as explained in chapter 3.5, it has been outlined that when intermarket information linkages are poor, cross-listings could negatively impact the liquidity on the domestic markets (Domowitz, Glen and Madhavan, 1998).

3.7.4 Capitalizing on Product Market Reputation

Companies that already have penetrated a product market would be more motivated to cross-list their stocks on that capital market compared to similar companies that are not established on the same market (Pagano, Röell and Zechner, 2002). The argument is that investors are already familiar with the company and a large marketing effort to attract investors might not be necessary. In a research conducted by Saudagaran (1988) it was outlined that companies cross-listed on foreign exchanges had a larger portion of foreign sales than companies only listed on the home market.

3.7.5 Strengthening the company's output market

As explained in the previous section, the presence on a foreign product market can improve a company's ability to reach that foreign capital market. However, the relationship could also be the other way around. A cross-listing can be used as a very strong marketing tool for the company's products, thereby increasing the company's foreign sales (Pagano, Röell and Zechner, 2002). According to Stoughton, Wong and Zechner (2001) a company lists itself on an equity market in order to signal its high product quality to consumers, and consequently, try to capture a larger market share and increase its profits. This motive has also been proved by Bancel and Mittoo (2001),

concluding that 16 percent of European cross-listed companies consider this motive as important.

3.7.6 Other motives for cross-listing

There are at least five further motives for companies to cross-list their stocks. One increasingly important motive is regarding management compensation. This motive arises if a multinational company wishes to use stock options and stock purchase compensation plans for the management and employees in a subsidiary located in a foreign country. In this case a listing on the local stock market would increase the perceived value of such plans. In addition, a cross-listing would reduce the transaction- and foreign exchange costs for the local recipients. (Eiteman, Stonehill and Moffet, 2000)

According to Eiteman, Stonehill and Moffet (2000), gaining political acceptance is the most important motive for Japanese companies when cross-listing. This conclusion is based upon the argument that the Japanese market has both low cost of capital and high availability of capital. Therefore, Japanese companies are not driven by trying to increase stock prices, liquidity or the availability of capital by cross-listings. Instead Japanese companies that cross-list on foreign stock markets seek local ownership in the host country in order to increase the political acceptance of the company.

Another reason to cross-list is to take advantage of a temporarily high valuation of the company's stocks abroad (Pagano, Röell and Zechner, 2002). This situation can arise either by an overvaluation in the foreign market or by an undervaluation in the domestic market.

A cross-list could also have its roots in analyst coverage. For example, a company is likely to cross-list on an exchange where analysts with superior knowledge of a specific industry are situated. In some industries, the access to such knowledge may have an impact on the availability of capital. Since analysts reduce the informational asymmetry in the market, investors are more willing to invest in companies covered by well reputed investment banks compared to uncovered companies. (Pagano, Röell and Zechner, 2002).

Another motive for companies to cross-list is the existence of differences in regulations between countries. By listing the stocks on a highly regulated exchange, companies signal that they will use high standards of corporate governance and disclosure. Consequently, companies signal quality by listing on highly regulated exchanges (Pagano, Röell and Zechner, 2002). However, evidence in this area is mixed. For example, Biddle and Saudagaran (1989) state that rigorous disclosure requirements have a negative impact on foreign companies listing decisions.

3.8 Previous Research

The objective of this part is to provide the reader with a comprehensive picture concerning the research made on the subject of financial market integration and cross-

listings. By reviewing the most important literature focusing on foreign cross-listings and stock market integration, the empirical findings are here presented in chronological order.

3.8.1 Stonehill and Dullum (1982)

In 1982 Stonehill and Dullum conducted an in-depth study of the Danish pharmaceutical company Novo. This is one of the first empirical studies directed to this area of finance. The authors aim was to investigate the impact market segmentation had on cost of capital. Furthermore, they wanted to outline how companies could overcome the limitations of being listed on a segmented market.

One basic argument concerning market segmentation is that investors can benefit from internationally diversifying their portfolios if stock markets are uncorrelated with each other. Thus, the authors suggested that stocks traded on foreign markets should be priced to reflect their attractiveness for inclusion in internationally diversified portfolios. Another argument regarding the effect of illiquidity and market segmentation is that companies located on markets characterized by these impediments are likely to be undervalued. The authors suggested that when and if, these companies cross-list on foreign exchanges it is possible to analyze the reaction on stock prices to evaluate whether the country is segmented or not. If it is possible to observe significant changes in stock prices uncorrelated with movements on both underlying stock market indexes during the transition, one could infer that the domestic market was segmented.

At the time of the study, the Danish financial market was highly regulated and illiquid, which had the implication that Novo was heavily undervalued in the home market compared to its US competitors. However, when Novo cross-listed its stocks on the US capital market the company experienced a strong increase in the US stock price, resulting in an increase in the domestic stock price as well. A consequence of going international financially was that the company could enjoy a significant decrease in their cost of capital. This conclusion implied that other companies on segmented markets could also benefit by internationalizing their cost of capital.

3.8.2 Howe and Kelm (1987)

Howe and Kelm (1987) examined the impact on domestic stock returns of US companies that listed their stocks on European and Japanese stock markets during the time period 1962 to 1985. Their study was the first to use an event study methodology to investigate the market response following foreign cross-listings. The purpose of the research was not to outline whether the included markets were more or less integrated with the US, instead the authors focused on what consequences a foreign cross-listing had on shareholders' wealth.

The research examined the issue of overseas listings from two perspectives. First, they measured the impact of companies' first, second and third overseas listing. Second, they sorted the sample by listing location in order to discover if listings on different stock exchanges had different price effects. The stock exchanges that were included in the

second sample were Basel, Frankfurt and Paris. The method used to examine these issues was the standard event methodology, with the listing date as the event of interest. The event window that was exercised in this study was 90 days prior to the listing date and 40 days after the event. The authors state that by looking at 90 days prior to the event they were able to incorporate the effects of the application and the approval dates. To estimate the abnormal returns the market model was used, and the parameters of the market model were estimated from the 100-day period ending just prior to the event period. The data sample consisted of 112 US companies.

The results of the first, second and third listing indicated that a foreign listing was harmful to shareholders' wealth since the CARs was negative prior to the actual listing and remained negative even after the event. The next area of the research concentrated on the listing location. Basel listings showed to be associated with negative abnormal returns. The cumulative effect was about -5.55% over the event window. The result drawn from listings on the Frankfurt Stock Exchange showed a similar result whereas the Paris listings concluded no significant CARs.

3.8.3 Alexander, Eun and Janakiramanan (1988)

The first study to empirically test the behavior of a larger number of stock returns following international cross-listings on major US exchanges was conducted by Alexander, Eun and Janakiramanan (1988). Previous research had mainly focused on the stock return impact when domestic companies had changed their domestic trading place (Fabozzi, 1981; Van Horne 1970) or purely theoretical studies of equilibrium pricing asset models (Stapleton and Subrahmanyan 1977, Errunza and Losq 1985). The authors found it most interesting to study the phenomenon due to the lack of empirical evidence within this field of international finance, the increased frequency of cross-listings at the time and the fact that conclusions can be drawn regarding the integration of capital markets. The purpose of the study was threefold; the first objective was to investigate the effects cross-listings had on stock returns, the second to study whether the effects varied between issuers from different countries, and on the basis of these results draw conclusions regarding capital market integration.

The authors' hypothesis was that an international listing should lead to a decrease in the expected return if capital markets are completely or mildly segmented before the listing. The study was based on a sample of 34 companies from six countries that cross-listed their shares on the NYSE, AMEX or NASDAQ between 1969 and 1982. Due to the difficulty of determining a reliable announcement date the authors found it more accurate to investigate the changes in expected returns around the listing date. The analysis was made with monthly data starting 36 months before the first month of trading and ending 36 months after listing.

Their empirical results indicated that non-Canadian companies experienced a significant decline of expected returns after a cross-listing. Although the Canadian companies also experienced a decline of expected returns in the post-listing period, the decline was less compared to the others and not of significance. The authors conclude that these results

can be interpreted as if non-Canadian stock markets are more segmented from the US stock markets than the Canadian stock markets. However, they also suggest that the results could be interpreted as Canadian stock markets being just as segmented as the others but have a relatively higher covariance with US stock markets.

3.8.4 Jayaraman, Shastri and Tandon (1993)

Another often cited research within the field of international cross-listings is the study conducted by Jayaraman, Shastri and Tandon (1993). The study focuses on the impact on risk and return when companies cross-list through ADRs. The international financial integration and financial deregulation in the eighties had given rise to an increased interest of the impact of international listings which is mentioned as a motive for the research. The purpose was to investigate the effect on underlying stock prices and volatilities following cross-listings.

The data sample consisted of 95 companies from seven countries that listed as ADRs in the period 1983 to 1988[8]. The first day of trading for the ADR was used as the event date. Daily underlying stock prices were observed 150 days prior and 150 days after the listing date.

The authors found empirical evidence of significant positive abnormal returns on the underlying stocks associated with the listing of ADRs. However, the authors suggest that this positive effect was primarily driven by the Japanese sub-sample as neither the British nor the other samples showed any significant abnormal returns. No negative effects regarding the post-listing performance of the stock returns are shown in the study. The authors interpret these findings as a result of a greater liquidity in the stock associated with ADRs. They also suggest that there is a value incorporated in the cross-listing itself since it provides companies with an additional capital market where the possibility of raising funds at a lower cost exists.

3.8.5 Sundaram and Logue (1996)

An alternative method of studying the impact of international cross-listings on stock prices was made by Sundaram and Logue (1996). Previous research had mainly investigated changes in returns, and the motive behind the study was to adopt an alternative method to examine the price impact directly. Instead of using a traditional event study methodology they focused on three valuation measures; price-to-book, price-to-cash-earnings, and price-to-earnings. These price ratios were then evaluated on a country-benchmarked, world industry-benchmarked as well as on a non-benchmarked basis. The purpose of the study was to re-examine the previous mixed empirical evidence on international cross-listings using their alternative method.

The data sample consisted of 57 companies that listed on the NYSE and AMEX during the period 1982 to 1992. By using monthly equity prices, they analyzed the post-listing

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[8] 78 percent of the sample consists of Japanese and British companies.

equity price performance for each company with three sets of pre- and post-listing periods. These periods were evaluated in relation to the benchmarks described above. Their hypothesis was that if the benchmarked ratios were less than 1, the cross-listing destroyed value. Benchmark ratios greater than 1 indicated value creation associated with the listing.

The non-benchmarked results did not indicate any significant change in value for the domestic shareholders. However, when the tests were conducted in relation to country- and world industry specific ratios, the listing companies experienced an increase in stock prices by 4 and 10 percent respectively for at least six months after the listing. The authors interpreted these results as cross-listings being associated with a value creating effect and thereby reducing the expected returns. Furthermore, the results showed no differences in valuation effects between companies from underdeveloped financial markets, compared to those from well-developed markets. The conclusion is that a cross-listing in the US increases the valuation of a company by reducing the effects of segmentation between financial markets, regardless of the origin of the company.

3.8.6 Miller (1999)

Miller (1999) conducted one of the most thorough researches on stock price reaction to international cross-listings on US exchanges. The author found the research of interest for two main reasons. First of all, Miller found an interest in the dramatic increase of ADR programs during the past decade. Secondly, the author's attention was captured by the ambiguous empirical evidence of cross-listings, which in many cases have contradicted the theoretical models of asset pricing under barriers to international capital flows. The purpose of the study was to investigate the impact on company value following cross-listings and also to measure the effect created by indirect- and direct barriers.

In the study an extensive analysis was made on the stock price reaction to different types of ADR programs. The analysis intended to investigate the indirect barriers in segmented markets and was made by linking the different levels of disclosure requirements of the ADR programs to the liquidity- and investor recognition hypotheses. In order to investigate the direct legal barriers, Miller used the economic development in different countries as proxies and clustered the companies into groups according to three classifications of economic development[9].

The data sample consisted of 181 companies that announced ADR program on US exchanges over the period 1985 through 1995. An event study methodology was used to measure stock reactions around announcement dates. To be included in the sample, daily domestic returns were required for 150 days prior to the announcement date and 125 after the listing date. Miller found that the mean time between listing date and announcement date was 77 days.

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[9]The three classifications are based on the Investment Regulation Summary developed by the International Finance Corporation and are labeled as developed markets, free emerging markets and restricted emerging markets.

The results showed positive abnormal returns around the announcement date and also that companies earned a normal rate of return following the listing on US exchanges. Altogether these findings are consistent with the equilibrium models of asset pricing under barriers to capital flows.

Regarding the test for indirect barriers the findings are consistent with the liquidity- and investor recognition hypothesis. The study concludes that companies that list their stocks on the major US exchanges experience the largest positive returns, while the listings that occur on PORTAL have much less price response. Miller argues that PORTAL has low liquidity and investor awareness which could explain the difference.

The study does not support the international market segmentation hypothesis which states that companies in segmented markets should have larger abnormal returns than companies from developed markets. The findings are that these listings result in lower returns than for those in developed markets. The author argues that this could be explained by the fact that a majority in the sample of companies that were classified as restricted emerging markets had listed their stocks on PORTAL. Therefore the indirect barriers such as liquidity and investor recognition could have outweighed the legal barriers for these stocks in the study. Furthermore, he explained that the positive pre-listing returns could be caused by insider trading, which Miller suggests could be most critical in emerging markets. Furthermore, he argues that difficulties in finding the accurate announcement dates could further explain the positive pre-listing returns.

3.8.7 Foerster and Karolyi (1999)

Another important study of cross-listings on US exchanges was conducted by Foerster and Karolyi (1999). The purpose of this research was to study stock price performance and how companies' risk exposure changes following a cross-listing. The authors state that their motivation to conduct this study arose from the fact that important conclusion pertaining to the issue of capital market integration and segmentation can be drawn from analyzing the reaction of stock prices due to international cross-listings.

To investigate the stock price reaction due to cross-listings, Foerster and Karolyi uses a data sample consisting of US cross-listings by 153 companies from 11 countries in four regions of the world, including Europe, Canada, Asia and Australia. The study was limited to include companies that issued ADR programs during the time period 1976 to 1992. Both announcement- and listing dates were used as event dates.

In order to analyze the impact on domestic stock prices following cross-listings, the study uses the market model to obtain the parameters needed to calculate the expected returns for different stocks. Thereafter the actual returns for the event window are compared to the expected returns in order to calculate the abnormal returns. The abnormal returns are sorted according to if they occur before, during or following the US listing.

They motivate their choice of examining a longer window around the event to obtain an overall picture of what happens to domestic stock prices following cross-listings. Their findings imply that stocks earned a significantly average abnormal return of 19 percent during the pre-listing year, an additional 1.20 percent during the listing week, but experienced a significant average decline of 14 percent during the year following the cross-listing. They conclude that these results are generally consistent with the market segmentation hypothesis, but can also stem from larger shareholder bases and greater liquidity that companies achieve upon listing in the United States.

The authors mention that their results do not capture time variation effects, because their study was only based on event time. For example, they did not test if different markets had become more integrated over the test period since they did not divide their data into sub-samples.

Table 3.2
A Chronology of studies regarding cross-listings

Study	Methodology	Sample	Findings
Stonehill and Dullum, 1982	In depth case study on a single Danish company, Novo	The Danish firm, Novo internationalizing its cost of capital	• A firm can achieve a lower cost of capital when circumventing barriers
Howe and Kelm, (1987)	Event study – announcement date. daily data, 1962-85	165 U.S. listings in Canada and Europe.	• Negative abnormal returns in the period surrounding the announcement of the listing,.
Alexander, Eun and Janakiramanan (1988)	Event study – listing date, monthly data, 1969-82	34 ADR listing on NYSE, AMEX and NASDAQ by companies from 6 countries	• CARs peak three months before listing and then decline, indicating segmentation. • Declines significant only for non-Canadian stocks.
Jayaraman, Shastri and Tandon (1993)	Event study – listing date, daily data, 1983-88	95 ADRs by companies from 7 countries.	• Positive cumulative returns during listing months
Sundaram and Logue (1996)	Examining valuation metrics (price-to-book, price-to-cash-earnings, price-to-earnings) – listing date, quarterly data, 1982-92	76 US ADR listings on NYSE and AMEX by firms from 14 countries	• Using country benchmarked ratios – the value of cross-listed stocks had a positive rise of 4-10% compared to the stock prices in the home markets.
Miller (1999)	Event study – announcement date, daily data, 1985-95	181 ADR listings by companies from 35 countries	• Positive effect at announcement • Small listing effect • Results sensitive to geographical location and disclosure choices
Foerster and Karolyi (1999)	Event study – listing date, weekly data, 1976-92	153 US ADRs listings by firms from 11 countries in Europe, Asia, Canada and Australia	• Positive CARs before and during listing • Negative CARs after listing • Results differed by region, and returns also vary by industry.

3.9 Summary

This chapter has provided the reader with a description of the theories related to this dissertation's research subject. Since this research analyses stock market reactions the effective markets hypothesis was first discussed in this chapter.

Afterwards, this chapter provided a description of ADRs and the markets they are traded upon. It was outlined that there are four different levels of ADRs whereas the first two levels are made upon existing stocks and the two others incur an element of raising new capital. The levels that will be taken into account in this dissertation are the first three levels.

The International Asset Pricing Model was therafter discussed in order to exhibit why a cross-listing in theory should decrease the expected return and lower companies' cost of capital. Furthermore, the investor recognition- and liquidity hypotheses were outlined to explain why companies could benefit from cross-listings accompanied with an enlargement of the shareholder base and more liquidity in the trade of the stock.

The most essential argument in this research is that if markets were perfect financially integrated there should be no impact on the domestic stock price when cross-listing on a foreign stock exchange. Therefore, a part in this chapter was devoted to describe barriers that create segmentation of capital markets. If barriers did not exist this research would be redundant.

Furthermore, a presentation of the motives for cross listing was provided. The most common motive for a company to list on a foreign stock exchange is to lower its cost of capital. However, there are other motives such as marketing, management compensation, shareholder value etc. that are important to have in mind when scrutinizing this area.

The presentation of previous research demonstrated that most research made on this topic shows that financial markets are at least partially segmented. However, there are mixed results regarding the impact foreign cross-listings have on domestic stock prices.

4. Empirical methodology

In this chapter the empirical methodology used to perform the analysis is outlined. The purpose of the chapter is to thoroughly describe how the data has been handled in order to establish the results that constitute the foundation of the analysis. This will make it easier for the reader to understand the procedure used to answer the research question.

4.1 Computations

In order to investigate whether different financial markets are integrated with the US stock markets, abnormal returns for each stock have to be calculated. Therefore the first step, after gathering all relevant stock price- and index data, is to calculate the returns. This is done by the following procedure:

$$r_t = \frac{P_t}{P_{t-1}} - 1 \qquad\qquad [t = \text{day } -241, +60]$$

where r_t is the asset's return at day t and P_t and P_{t-1} are the market values at day t respectively $t-1$.

The second step is to estimate the different stocks' "normal" returns; that is the return that would have been expected if no event had occurred. This study uses *the market model* in order to estimate these returns. An essential part of the market model is to evaluate how a security's return varies relative to the return of a relevant market portfolio. This is done by running an OLS-regression on each stock's return data for the estimation window, which in this study is -240 to -121 days relative to the actual cross-listing date. In the regression model the explanatory variable is the return on a market portfolio, that is the percentage change in value of a relevant country-specific index. This is demonstrated below:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \qquad\qquad [t = -240, -121]$$

where $R_{i,t}$ and $R_{m,t}$ are the day-t returns on stock i and the market portfolio, respectively, and $\varepsilon_{i,t}$ is the zero mean disturbance term. Furthermore, the α- and β-coefficients are the parameters used to estimate expected returns for the stocks in the event windows. Thereafter, these returns are subtracted from the actual stock returns in order to attain the abnormal returns. Algebraically this process can be illustrated as below

$$AR_{i,t} = R_{i,t} - \left(\alpha_i + \beta_i R_{m,t} \right) \qquad [t = -120, +60]$$

where $AR_{i,t}$ is the abnormal return for company i in time period t, and $R_{i,t}$ is the actual ex post stock return for the event windows and $(\alpha_i + \beta_i R_{m,t})$ is the expected return. Afterwards, as discussed in chapter 2.5, the abnormal returns for each stock are

accumulated in order to be able to observe total stock return movements during certain event windows. The calculation of the cumulative abnormal return (CAR) for any given stock and event window is undertaken in the following way:

$$CAR_{i,(t_1,t_2)} = \sum_{t_1}^{t_2} AR_{i,t} \qquad [t = \text{day in event window}]$$

Finally, all cumulative abnormal returns are averaged across stocks for each day in the different event windows. It is these cumulative average abnormal returns (CAARs) that are analyzed and used as indicators to determine whether or not financial markets are integrated with the American stock markets.

4.2 Determination of the event windows

The analysis conducted in this study is based upon four event windows, (i) [-100, -2], (ii) [-20, +20], (iii) [+1, +60] and (iv) [-120, +60], reflecting the days relative to the actual listing date. The reason to separate the analysis into several event windows is to capture different aspects associated with cross-listings, thus providing a more thorough analysis.

The first event window focuses on the pre-listing effects on domestic stock returns. The purpose of choosing a relatively long pre-listing event window is to capture the effects of cross-listing announcements. Miller (1999) and Foerster and Karolyi (1999) has shown that, on average, announcement dates occur between 77 and 70 days before the actual listing dates, why the pre-listing window should be able to capture the announcement effect.

The second event window attempts to, exclusively, capture the effect from the actual listing. According to Alexander, Eun and Janakiramanan (1988) and Foerster and Karolyi (1999) the market segmentation hypothesis, accurately, explains the return patterns around the actual listing dates. The overall thought is that the effect during the time of listing should be greater for companies where the home market is more likely to be segmented from the US financial market compared to companies domiciling from integrated markets.

The third event window is employed in the study to capture the post-listing effects on domestic stock returns. A relatively long post-listing window is used in order to analyze whether the effects of cross-listings are sustainable or if they only are temporary.

The longer event window capturing 120 days prior and 60 days after the listing attempts to describe the overall effects of cross-listings. The purpose of including this event window is to provide the reader with a comprehensive picture about the changes in stock returns over a longer period.

4.3 Test for financial market integration

In order to determine whether regions are financially integrated, certain statistical tests have to be performed. As mentioned in chapter 2.5 this study defines financial market integration as if different markets could be seen as one market. Consequently, assets in these markets should be priced equally. Hence, if test statistics indicate that the values of CAARs are significantly different from zero, then this implies that those markets are financially segmented from the American markets, since the event is assumed to generate significant abnormal returns.

In order to test for financial integration, t-values are calculated and compared to critical t-values in order to establish the statistical significance of the observations[10]. The calculation of the observed t-values is undertaken by using the following formula:

$$t = \frac{\overline{X} - \mu}{s / \sqrt{n}}$$

t : *observed t-value*
$\overline{X}$: *the average of the studied variable, i.e. CAARs$_{i,t}$*
μ : *the value for which the studied variable is tested to be different from, which in this study is zero.*
s : *the studied variable's standard deviation*
n : *number of observations*

The hypotheses testings concern examining whether the different regions' CAARs are significantly different from zero. This implies the following hypotheses for the different regions and event windows:

H_0: *CAARs = 0*
H_1: *CAARs ≠ 0*

If the null hypothesis is rejected it implies that the region in question is financially segmented from the American stock markets. However, if the null hypothesis cannot be rejected, it indicates that financial market integration exists. This implies that no significant domestic abnormal returns can be expected following cross-listings by companies from that region.

4.4 Cause analysis

In order to examine if the results obtained can be explained by the choice of stock exchange, a test have been undertaken to investigate the investor recognition and liquidity hypothesis described in chapter 3.5 and 3.6 respectively. This is done by

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[10]Some tests are performed for regions with relatively small samples, which motivate the use of t-tests. Furthermore, the critical t-values increase when the number of observations decrease, which makes it harder to achieve statistically significant results.

conducting a multiple regression analysis with dummy variables, on the overall event window concerning [-120, +60] days[11]. The regression examines indirectly both the investor recognition- and liquidity hypothesis by using the NYSE, NASDAQ and the OTC markets as proxies to test the hypotheses.

According to Miller (1999), liquidity is recognized to be larger on the NYSE and NASDAQ compared to on the OTC. Thus, if the liquidity hypothesis applies on ADR programs, a cross-listing directed to the NYSE or NASDAQ should generate larger abnormal returns than a listing on the OTC market. Therefore, an indirect test of this hypothesis is proposed by examining how CARs differ if the listing is made on the NYSE or NASDAQ relative to the OTC.

Similarly, the potential investor base attained from a cross-listing is assumed to be greater if a company chooses to initiate the ADR program on either the NYSE or NASDAQ relative to the OTC market. Therefore, it is possible to indirectly test the investor recognition hypothesis by examining how abnormal returns differ between listings on these exchanges (Foerster and Karolyi, 1999).

The regression model is constructed as follows:

$$CAR_{i,t} = \alpha_i + \beta_1 NewYork + \beta_2 Nasdaq + \varepsilon_{i,t}$$

where *NewYork* is a dummy variable that takes the value *1* for all the stocks that were listed on NYSE and zero otherwise. The second explanatory variable is *Nasdaq*, which also is a dummy variable. It takes the value 1 for the stocks that were cross-listed on NASDAQ.[12] In the above regression model the observations for the stocks that cross-listed on the OTC market were indirectly excluded. They are excluded in order to be able to analyze how the effects of listing on the NYSE and NASDAQ differ compared to the OTC. By excluding the OTC observations, the coefficients and test statistics for the dummy variables are directly compared to the OTC observations.

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[11] Dummy variables are used to capture qualitative properties of data.
[12] Only one stock in the data sample cross-listed on AMEX, why this stock was excluded from the regression analysis.

5. Results and analysis

In this chapter the results obtained from the data sample is presented and analyzed. The findings for each region is presented and analyzed separately on the basis of Cumulative Average Abnormal Returns (CAARs) in four different event windows. Finally, a test is conducted, in order to examine if alternative variables could explain the results.

5.1 Regional analysis

In order to investigate whether different regions are financially integrated with US stock markets and how the levels of integration have changed over time, CAARs associated with cross-listings are calculated and analyzed for different event windows and for each region. As explained in chapter 4.2 the analysis is based upon four event windows, (i) [-100, -2], (ii) [-20, +20], (iii) [+1, +60] and (iv) [-120, +60], reflecting the days relative to the listing date. The reason to separate the analysis into several event windows is to capture different aspects associated with cross-listings.

5.1.1 Scandinavia

The Scandinavian sample consists of 23 ADR programs from Denmark, Finland, Norway and Sweden, which were initiated from 1988 to 2002. In the sample, 8 programs were initiated between 1988 and 1995, and the remaining 15 cross-listings were made in the second time period, which is between 1996 and 2002. As the number of ADR programs initiated by companies from the Scandinavian region is quite limited, it is difficult to establish statistically significant results. This implies that the results should be interpreted with certain caution.

Table 5.1
**Cumulative Average Abnormal Returns (CAARs), for 23 Scandinavian
cross-listings on US exchanges during 1988-2002**

The table presents cumulative average abnormal returns experienced by the Scandinavian companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

Event window	1988-1995	1996-2002	All
[-100, -2]	-34.24	11.53	-4.39
	(-2.14)*	*(0.98)*	*(-0.42)*
[-20, +20]	-4.52	-4.24	-4.33
	(-0.54)	*(-0.99)*	*(-1.10)*
[+1, +60]	0.05	-8.41	-5.47
	(0.01)	*(-1.66)*	*(-1.22)*
[-120, +60]	-29.12	1.17	-9.36
	(-1.44)	*(0.08)*	*(-0.80)*

**,* indicate significance at the 5 and 10 percent levels, respectively.

As shown in table 5.1, the pre-listing period is associated with a decline in CAARs of approximately 4 percent for Scandinavian companies when both time periods are considered. However, the results differ prominently when comparing the development in the two time periods. The market reaction for those ADR programs that were initiated in the first time period are associated with significant negative CAARs of more than 34 percent (*t*-statistic of -2.14), while the market reaction to listings made in the second time period indicates positive CAARs of less than 12 percent.

Theory suggests that if the Scandinavian stock markets were segmented from the US capital markets, expected returns should decrease at the announcement, as prices are supposed to increase if investors believe that barriers to foreign investment are to be removed (Miller, 1999). If the markets instead were perfectly integrated, there would not be any significant stock price reaction to the announcement of a cross-listing since foreign investors are already supposed to have access to the domestic market.

Even though it is not possible to pinpoint the exact date of announcement, figure 5.1 illustrates obvious differences in return patterns 80 days prior to the listings in the first time period and 50 days prior to the listings in the second time period, which could very well be the actual announcement dates' stock return reactions. As the negative impact of the supposed ADR announcements prior to 1996 are significant and much stronger than the positive reaction of the supposed announcements that occurred thereafter, this would indicate that the Scandinavian region has become more integrated with US stock markets. One possible explanation to the depressing stock price development in the first time period could be that foreign investors considered the Scandinavian companies as overvalued, which accordingly led to the price adjustment. This argument is based on the suggestion that international financial markets are more efficient than domestic segmented markets (Faff, Hodgson and Saudagaran, 2002).
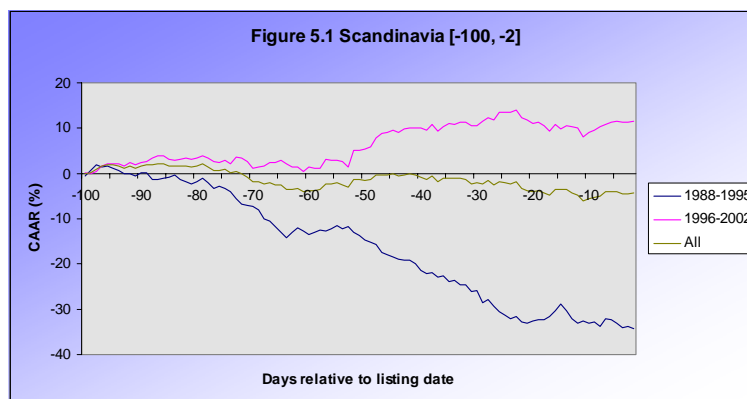

During the listing period the Scandinavian companies experienced a general decline in CAARs of 4 percent, although the result is not significantly different from zero (*t*-statistic of -1.10). Furthermore, as outlined in figure 5.2, the return patterns for each time period fluctuates around zero and the *t*-values indicates that neither of the CAARs are statistically significant. Since the effects were marginally greater in the early 1990s it can

be presumed that the Scandinavian markets were more segmented from the US capital markets at that time than in the later period.

**Figure 5.2 Scandinavia [-20, +20]**
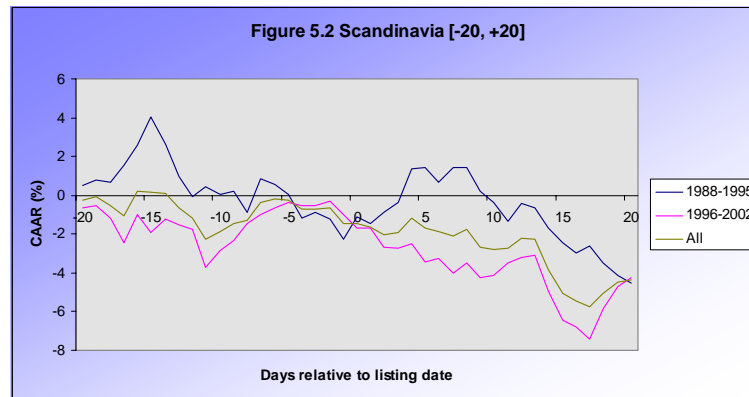
As illustrated in table 5.1 and figure 5.3 the post-listing period for the total sample is associated with a decline in CAARs of more than 5 percent. However, the post-listing CAARs fluctuated around zero for the ADR programs initiated between 1988 and 1995, while the post-listing effects were almost significantly negative after 1996[13]. The negative CAARs during the post-listing period is in accordance with findings by Alexander, Eun and Janakiramanan (1988) and Foerster and Karolyi (1999) where post-listing declines were pointed out. The latter study offers a possible explanation to the negative post-listing impact on abnormal returns. According to the authors, managers have an incentive to time the cross-listing just before poor fundamental performance regarding the company will follow.

Figure 5.3 Scandinavia [+1, +60]
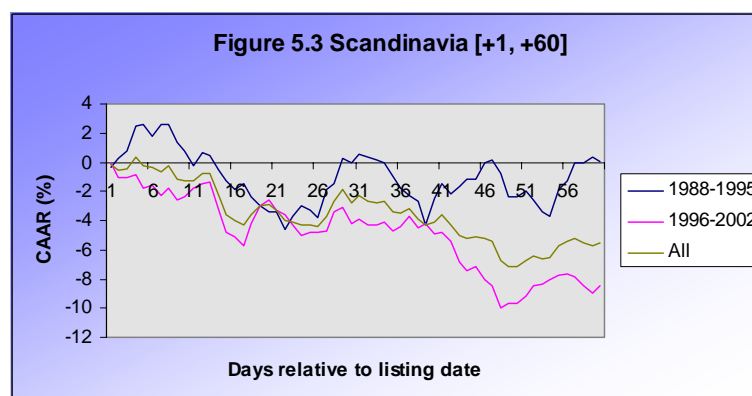
While examining the return patterns for the whole 181-day period in table 5.1 and figure 5.4, interesting differences between the two time periods can be observed. The results demonstrate that Scandinavian companies that cross-listed on US exchanges from 1988 to 1995 incurred a decline in stock returns of approximately 30 percent (*t*-statistics of -

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[13] Even though the CAARs are not significantly negative after 60 days (relative to the listing date) they are, however, significantly negative between t= -46 to -48 days.

1.44). In contrast the ADR programs that were initiated in the second time period were associated with an increase in CAARs of just 1 percent (*t*-statistics of 0.08). It is obvious that the market reaction during the first time period was greater than it was during the second time period, implying that the region has become more integrated with the US over time.
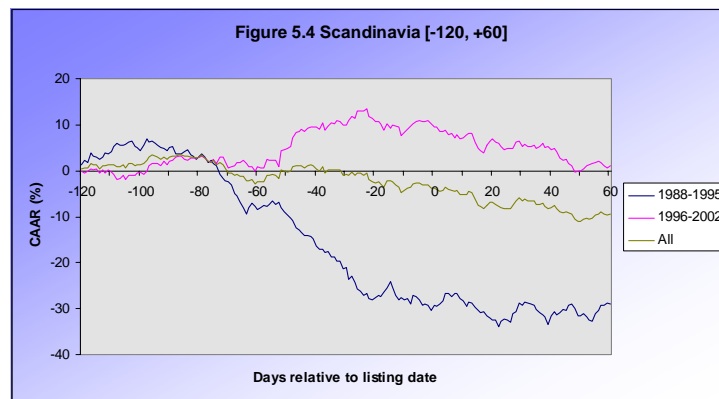
As described above most indications imply that the Scandinavian region has become more integrated over time even though there are still signs of segmentation. These findings are in accordance with Oxelheim (2001), who states that most barriers to cross-listing activities were relaxed in the late 1990s even though the tax structure in the Scandinavian countries still constitutes a barrier to integration. This barrier could explain some part of the remaining segmentation that has been observed in the Scandinavian region.

5.1.2 West Europe

The Western European sample consists of 204 ADR programs from Austria, Belgium, Britain, France, Germany, Ireland, Netherlands, Portugal, Spain and Switzerland, which were initiated from 1988 to 2002. In the sample, 41 programs were initiated between 1988 and 1995, and the remaining 163 cross-listings were made in the second time period, which is between 1996 and 2002.

Table 5.2

Cumulative Average Abnormal Returns (CAARs), for 204 Western European cross-listings on US exchanges during 1988-2002

The table presents cumulative average abnormal returns experienced by the Western European companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

| Event window	1988-1995	1996-2002	All
[-100, -2]	-2.39	-2.00	-2.08
	(-0.53)	*(-0.69)*	*(-0.84)*
[-20, +20]	3.12	-1.21	-0.34
	(1.33)	*(-0.79)*	*(-0.26)*
[+1, +60]	1.35	-3.84	-2.80
	(0.56)	*(-2.01)***	*(-1.74)**
[-120, +60]	-1.43	-5.58	-4.74
	(-0.20)	*(-1.22)*	*(-1.21)*

**,* indicate significance at the 5 and 10 percent levels, respectively.

The pre-listing period implies a reduction in CAARs by close to 2 percent for the stocks in the total sample. The companies within the two different time periods suffer similar declines over the full event window. However, the charts in figure 5.5 illustrating the CAARs for the first time period display a severe significant reaction from day -76 to -65. This drop could represent the announcement dates, implying that the Western European markets were to some extent segmented from US capital markets during the first time period. There are no significant reactions during the second time period, which implies that the Western European stock markets have become more integrated with the US.

Figure 5.5 West Europe [-100, -2]
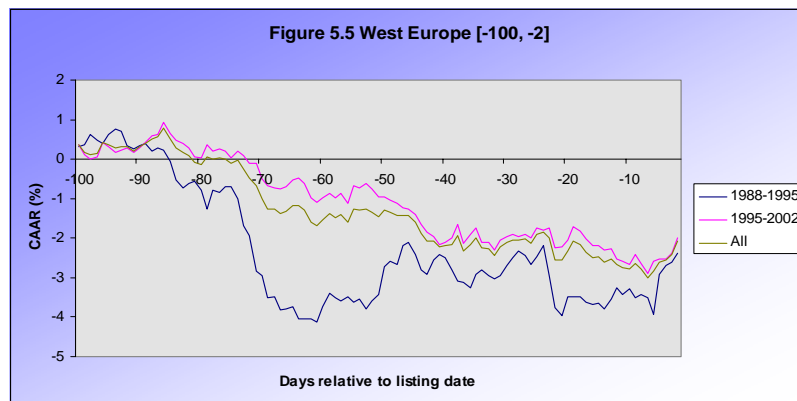
Regarding the actual listing period, it can be seen in figure 5.6 that the returns hover around zero for the total sample. However, when comparing the two time periods it can be observed that the CAARs of the companies within the first time period experienced some obvious increases compared to the second time period. Furthermore, the data used to calculate the CAARs show that there exist some significant "inter-period" return

increases in the first time period[14]. Since there is an evident market reaction in the first time period, but not in the second, the results further indicate that the region has become more integrated.


Figure 5.6 West Europe [-20, +20]
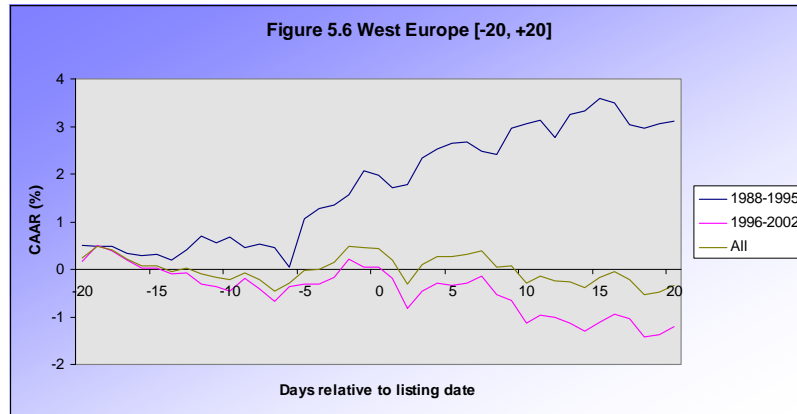
The results from the total sample show that Western European companies suffer an significant decline in CAARs of almost 3 percent (*t*-statistics of -1.74) during the post-listing event window. Nevertheless, as shown in table 5.2 and figure 5.7 the decline is mainly driven by the negative impact on returns from the second time period since this latter sample constitute the vast majority of total observations. When comparing the two time periods the differences are apparent. Companies that cross-listed from 1988 to 1995 experienced an increase in returns, whereas the ADRs that were initiated during the second time period were accompanied by a significant (*t*-statistics of 2.01) decline in CAARs of nearly 4 percent.

Previous research has also observed post-listing declines and the driving forces to these negative market reactions have been widely discussed (Alexander, Eun and Janakiramanan, 1988; Foerster and Karolyi, 1999). However, no consensus has been reached regarding this phenomenon. Alexander, Eun and Janikaramanan (1988) found in their sample that companies originating from more integrated markets suffered a less dramatic decline than those from segmented markets. Although the Western European post-listing sample is significantly negative, the value of CAAR is quite small, suggesting that many other factors such as negative news or poor company performance could be addressed rather than the market segmentation hypothesis.

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[14] The reaction is significant positive on the 10 percent significance level from day 4 to 15.

Figure 5.7 West Europe [+1, +60]
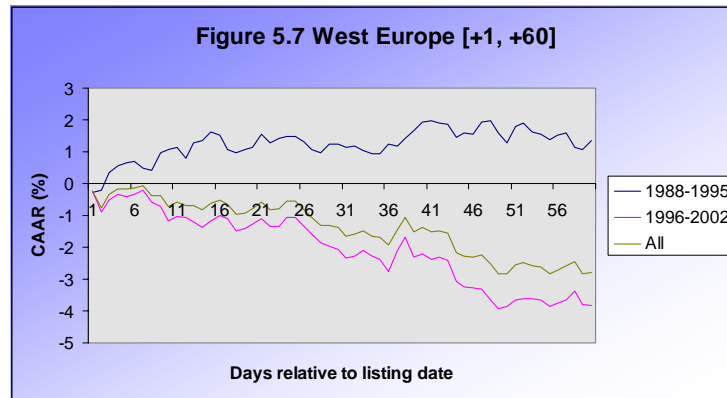
As illustrated in figure 5.8, the Western European companies in general faced a drop of almost 5 percent in CAARs during the 181-day event window. Companies that cross-listed between 1988 and 1995 suffered a serious drop in CAARs in the supposed "announcement period" [t= -76 to -65 days], but started to recover at the time surrounding the actual listing. On the other hand, companies in the second time period experienced more constant declines over the 181 day event window.

Figure 5.8 West Europe [-120, +60]
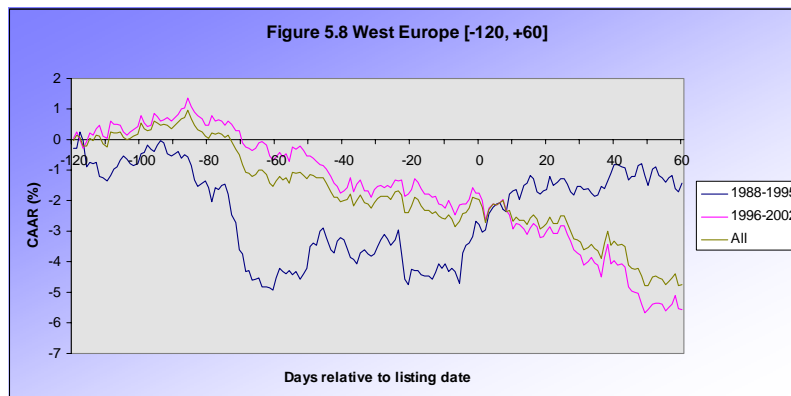
As indicated from the analysis above, indistinctive results are obtained regarding whether the Western European markets have become more or less integrated with the US markets. If the analyzed region is expected to be somewhat efficient according to the semi-strong degree of efficiency, it would imply that the cross-listing information should be incorporated into stock prices simultaneously with the announcement of the event. However, no such reaction can be observed here since the significant negative reaction is not apparent until 44 days after the actual listing. This would imply that the Western European markets would either be integrated with the US stock markets or segmented and very inefficient. Nonetheless, the latter assumption seems rather weak why the post-listing effect most likely can be explained by other factors apart from integration barriers. For example, the significant post-listing decline could be explained by certain negative effects from cross-listing, such as unexpected cost increases or by overestimation of the

expected gains from the cross-listing. Thus, these results would indicate that the region has become more integrated with the American stock markets over time.

5.1.3 East Europe

The Eastern European sample consists of 17 ADR programs from Hungary, Poland, Russia and Turkey, which were initiated from 1995 to 2002. In the sample, 9 programs were initiated between 1995 and 1997, and the remaining 8 listings were made in the second time period, which is between 1998 and 2002. As the number of ADR programs initiated by companies from the Eastern European region is limited, it is difficult to statistically establish the results implying that these results should be interpreted with some caution.

Table 5.3
Cumulative Average Abnormal Returns (CAARs), for 17 Eastern European cross-listings on US exchanges during 1995-2002

The table presents cumulative average abnormal returns experienced by the Eastern European companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

Event window	Early period	Late period	All
[-100, -2]	-21.90	*2.76*	-10.29
	(-1.37)	*(0.10)*	*(-0.69)*
[-20, +20]	7.22	3.38	5.42
	(0.71)	*(0.30)*	*(0.74)*
[+1, +60]	-26.89	-19.74	-23.52
	(-1.32)	*(-1.15)*	*(1.80)**
[-120, +60]	-49.68	-20.92	-36.14
	(-1.60)	*(-0.59)*	*(-1.58)*

**,* indicate significance at the 5 and 10 percent levels, respectively

As pointed out in table 5.3 and shown in figure 5.9, the sample including all ADR programs by Eastern European companies indicate a reduction in CAARs during the pre-listing event window. However, the companies that cross-listed in the second time period enjoyed a minor increase in abnormal returns prior to listings, whereas companies that cross-listed during the first time period suffered a major decline in abnormal returns during the same event window. It is supposed that domestic stock prices should react to the announcement of foreign cross-listings if markets are segmented and semi-strong efficient according to the efficient market hypothesis. A rather severe reaction can be observed by looking at the chart illustrating the first time period in figure 5.9[15]. This finding implies that the Eastern European markets were quite segmented during this period.

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[15] CAARs are significantly negative between -73 to -11 days relative to the actual listing date.

Regarding the barriers to financial integration discussed in chapter 3.6 at least one, political risk, corresponds very well with Eastern European countries, and especially Russia which represents a large part of the observations in the region. According to Hodgetts and Luthans (2003) there has been, and are still to some extent considerable problems in Russia associated with growing crime, corruption as well as political uncertainty. Since these factors could lead potential risk averse investors to perceive Russian companies negatively, a substantial risk premium would be expected when investing in these companies where the business environment is uncertain. This could be a possible explanation to the strong drop in CAARs for the companies that cross-listed in the first time period. Even though the results from the first time period strongly indicates that Eastern European markets were segmented from US capital markets, the scarce number of observations suggests that the results should be interpreted with some caution.

**Figure 5.9 East Europe [-100, -2]**
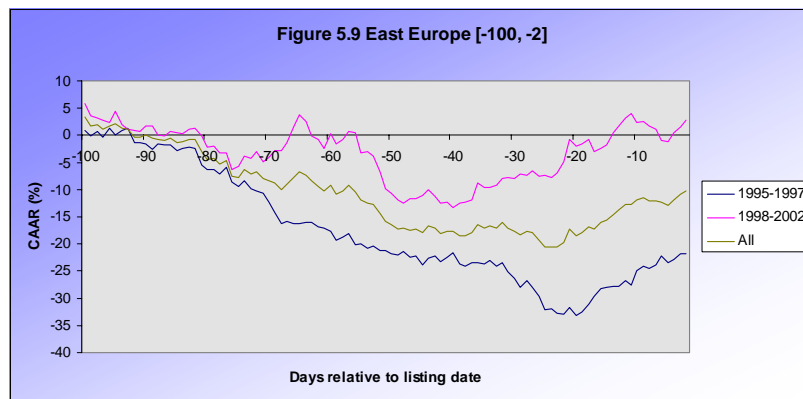
As mentioned previously, Foerster and Karolyi (1999) states that the reaction during the listing period should be greater for companies domiciling from segmented markets and less for companies originating from more integrated markets. Table 5.3 and figure 5.10 show that the companies included in the Eastern European region experienced an increase in CAARs of approximately 5 percent (*t*-statistics of 0.74) during the listing period. Even though the increases in CAARs are not statistically significant, the positive market reaction is relatively large which could be a sign of financial market segmentation[16]. In addition, when comparing the two different time periods in figure 5.10, it is noticeable that the cross-listings in the first time period was accompanied by greater reactions on the domestic stock markets. Therefore, these results provide an indication that the Eastern European markets have become less segmented over time.

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[16]Since the number of observations is relatively low, it is difficult to attain significant t-values as indicated by the formula for calculating t-values in chapter 4.1. Hence, the rather large values of CAARs might be signs of market segmentation even though the calculated t-values do not support that interpretation.

Figure 5.10 East Europe [-20, +20]
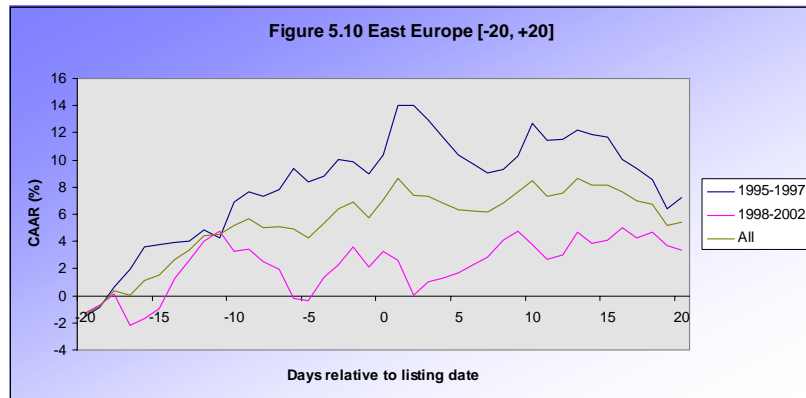
The post-listing period is in contrast associated with a rigorous reduction in CAARs of nearly 24 percent (*t*-statistics of 1.80) for the sample including all observations. This result is significantly different from zero despite the low number of observations[17]. Moreover, the decrease is of an extensive magnitude in both time periods which is in accordance with previous research regarding post-listing effects on segmented markets.

Figure 5.11 East Europe [+1, +60]
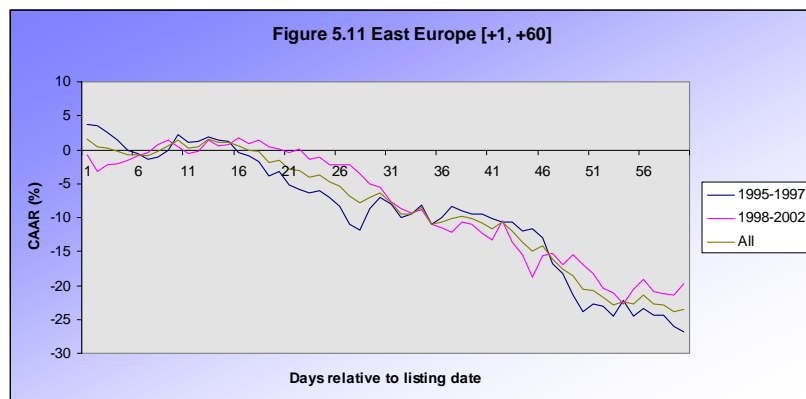
Finally, during the whole 181-day window, the Eastern European companies experienced an overall drop in CAARs of approximately 36 percent. This large drop is, however, not significantly different from zero (*t*-statistics of -1.58). One interesting inference that can be observed from figure 5.12 is that the curves illustrating the different time periods move relatively correlated, implying that the market participants in the Eastern European region reacted to dual listings in a similar way, but not in the same magnitude between the two time periods.

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[17]The fact that the data sample used is so limited but still provides a significant t-value indicates that the drop in CAARs is very severe.

Figure 5.12 East Europe [-120, +60]
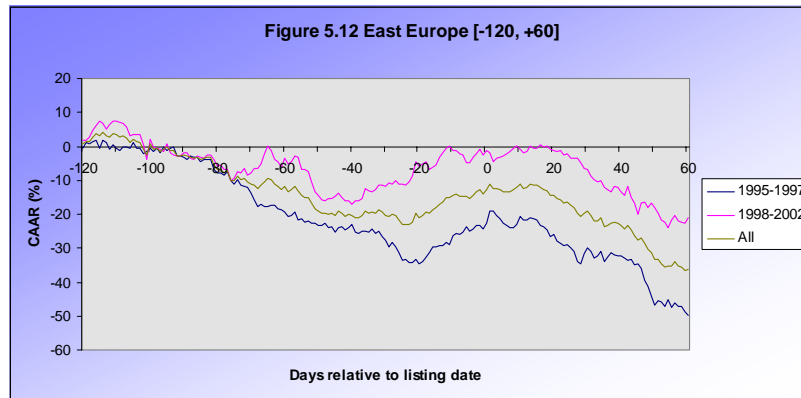
Summarizing the results from the different event windows, it is noticeable that the diminishing market reaction in the second time period indicates that the region has become more integrated over time. However, despite a lower degree of segmentation, there are still strong indications that the region is rather segmented from the US capital markets.

5.1.4 East Asia

The East Asian sample consists of 134 ADR programs from China, Hong Kong, Japan, South Korea and Taiwan, which were initiated from 1988 to 2002. In the sample, 64 programs were initiated between 1988 and 1995, and the remaining 70 cross-listings were made in the second time period, which is between 1996 and 2002.

Table 5.4
Cumulative Average Abnormal Returns (CAARs), for 134 Eastern Asian cross-listings on US exchanges, during 1988-2002

The table presents cumulative average abnormal returns experienced by the East Asian companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

Event window	1988-1995	1996-2002	All
[-100, -2]	2.27	-8.18	-3.19
	(0.61)	(-1.37)	(-0.88)
[-20, +20]	0.19	-1.49	-0.69
	(0.08)	(-0.45)	(-0.33)
[+1, +60]	-4.88	-8.24	-6.64
	(-1.59)	(-1.79)*	(-2.36)**
[-120, +60]	0.06	*-16.07*	-8.36
	(0.01)	(-1.69)*	(-1.44)

**,* indicate significance at the 5 and 10 percent levels, respectively.

The result for the pre-listing period shows that Eastern Asian companies cross-listing in the US incurred a loss in CAARs of approximately 3 percent for the time period 1988 to 2002. However, the results differ significantly between the two time periods. While the market reaction in the first time period was slightly positive with CAARs of 2 percent, the result for the second time period shows negative CAARs of over 8 percent (t-statistic -1.37). For the latter, declines measured in the "inter-period" prove to be significantly negative[18], implying that the region was segmented from the US financial markets.

As shown in figure 5.13, there seem to be a regime shift in the second time period around 70 to 50 days prior to actual listing. This suggests that this "inter-period" include potential announcement dates and that investors disapprove with the decision of cross-listing. The result indicates a form of market segmentation, but in contrast to the other regions analyzed above, the integration process seems to be reversed with CAARs in the first period being marginal and insignificant until 1996.

There are most likely many explanations to this phenomenon, but one that must be considered is the effect of the Asian crisis in 1997. Until then the economies in the region had experienced a steady growth which came to an abrupt end following the crisis (Furman and Stiglitz, 1998). The economic and political situation and the general pessimistic outlook for companies operating in Asia after the crisis could be a possible explanation to the negative stock price reactions in the second time period. This argument is based on the presumption that, due to the uncertain business environment, investors demanded a higher risk premium for holding these stocks. This would imply an increase in expected returns and thus have a negative impact on stock prices.

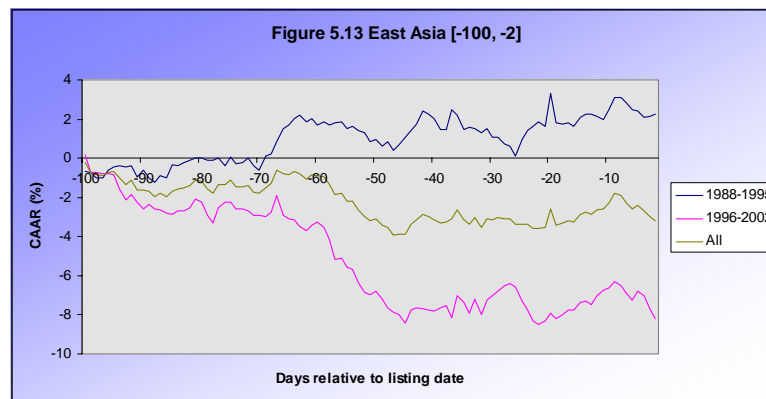Figure 5.13 East Asia [-100, -2]

Table 5.4 shows that the listing period does not indicate any direct impact on domestic stock returns in general. The companies included in the first time period experienced marginal CAARs during the actual listing period of 0.19 percent (*t*-statistic of 0.08), suggesting almost perfect market integration. The abnormal returns experienced by companies in the second time period fluctuates around zero and end up with negative CAARs of approximately 1.50 percent. Since the latter result is not significantly

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[18] CAARs during the period from -90 to -40 days relative to the listing were significantly negative.

separated from zero, no indications of segmentation can be found by analyzing this event window.

**Figure 5.14 East Asia [-20, +20]**
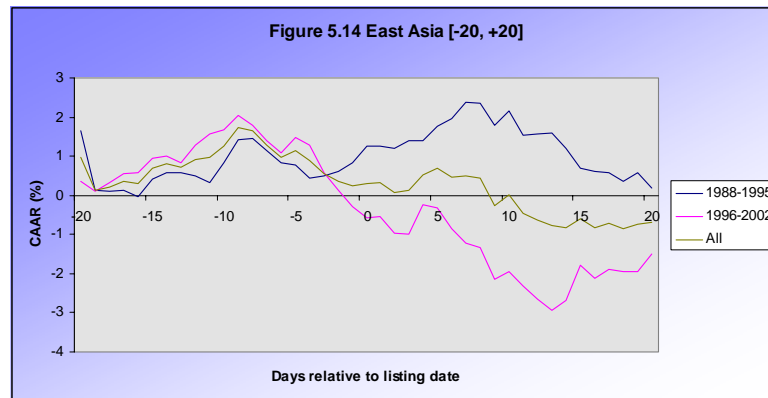
In general, the post-listing period show clear evidence of negative impact on cross-listings by Eastern Asian companies. During the 60 days following a listing, significant negative CAARs of nearly 6 percent (*t*-statistics -2.36) are experienced by the total sample. The negative impact on returns is primarily driven by the results from the second time period where a significant decline of over 8 percent (*t*-statistics -1.79) is proven, whereas the results for the first time period is more modest and insignificant. These results, put together, should be interpreted as the region has become less integrated over time.

Figure 5.15 East Asia [+1, +60]
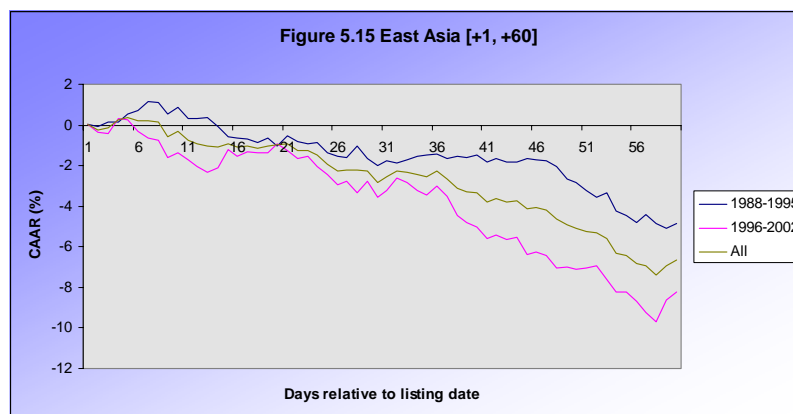
When observing the 181-day event window it is interesting to see that the ADR programs in the first time period were associated with positive abnormal returns, while the programs initiated in the second time period had a negative impact on stock returns. The segmentation hypothesis suggests that the domestic stock return reaction is positively related to the level of market segmentation (Miller, 1999). The results in table 5.4 and figure 5.16 therefore indicate that the region was rather integrated during the first time period, as CAARs never were significantly separated from zero. In contrast, since the

results obtained from the second time period are significantly negative, they suggest that the Eastern Asian markets have become more segmented over time.

Figure 5.16 East Asia [-120, +60]
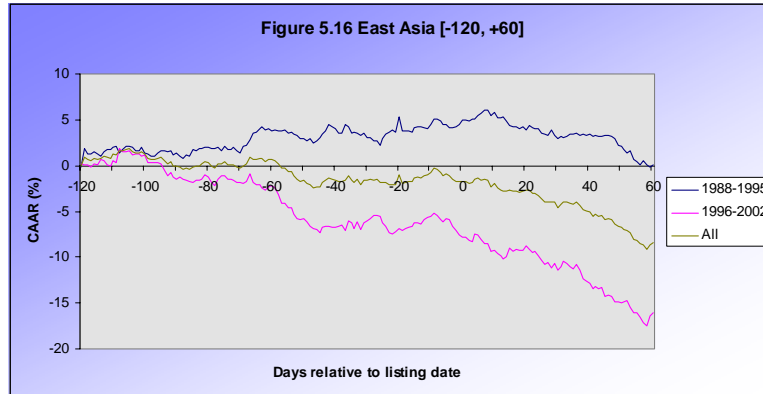
In summary, the results obtained for the Eastern Asian markets are quite convincing. Regarding the results for the first time period, most indicators imply that the region was relatively well integrated with the US markets since no dramatic reactions can be observed. Interestingly, the return patterns for ADR programs initiated after 1996, instead, suggests market segmentation just as clearly.

5.1.5 South Asia

The South Asian sample consists of 36 ADR programs from India, Indonesia, Malaysia, Philippines and Singapore, which were initiated from 1988 to 2002. In the sample, 15 programs were initiated between 1988 and 1995, and the remaining 21 cross-listings were made in the second time period, which is between 1996 and 2002. As the number of ADR programs initiated by companies from the South Asian region is quite limited, it is difficult to establish statistically significant results. This implies that the results should be interpreted with certain caution.

Table 5.5
Cumulative Average Abnormal Returns (CAARs), for 36 Southern Asian cross-listings on US exchanges, during 1988-2002

The table presents cumulative average abnormal returns experienced by the South Asian companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

| Event window	1988-1995	1996-2002	All
[-100, -2]	4.42	*-22.80*	-11.46
	(0.64)	*(-1.96)**	*(-1.50)*
[-20, +20]	-0.91	-8.30	-5.22
	(-0.42)	*(-1.26)*	*(-1.32)*
[+1, +60]	1.45	-6.96	-3.46
	(0.30)	*(-0.79)*	*(-0.62)*
[-120, +60]	5.33	*-32.24*	*-16.59*
	(0.52)	*(-1.79)**	*(-1.42)*

**,* indicate significance at the 5 and 10 percent levels, respectively.

As can be observed in table 5.5 and figure 5.17 the pre-listing period implies a reduction in CAARs for the total South Asian sample by roughly 11 percent. When comparing the two time periods it is possible to observe that the reactions differs substantially. The companies included in the first time period experienced an increase in CAARs of approximately 4 percent, whereas the cross-listings undertaken in the second time period faced a significant major decline in CAARs of almost 23 percent (*t*-statistics -1.96). The results from the pre-listing event window clearly suggest that the region has become more segmented over the test period.
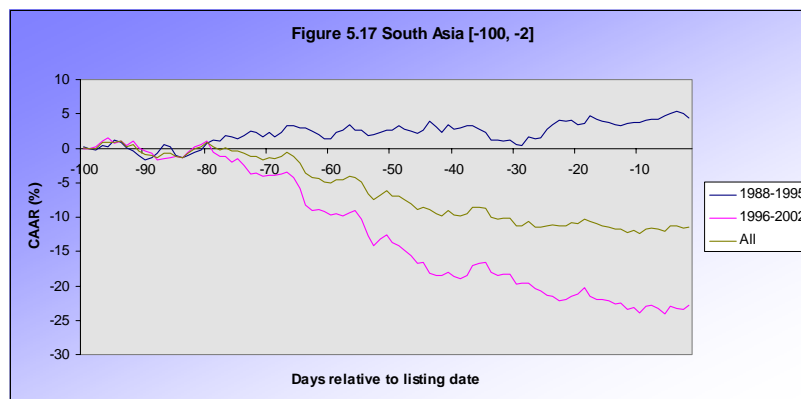

Similar patterns as those found in the pre-listing window, are also observable in the actual listing period. The abnormal returns experienced by the companies in the first time period provide a picture of the region being almost perfectly integrated with the US capital markets. The CAARs stay close to zero during this window and end up at -0.91 percent. On the other hand, the decline in CAARs suffered by the companies in the

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second time period is relatively constant, finishing at -8.30 percent These findings support the conclusion made in the pre-listing period suggesting that the region has become more segmented over time.

Figure 5.18 South Asia [-20, +20]
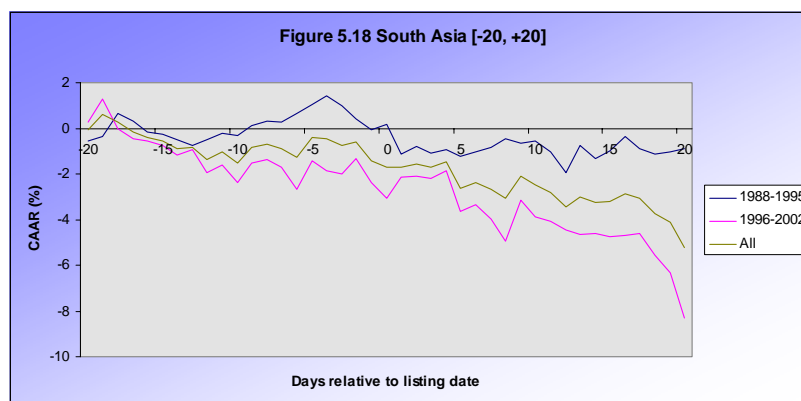
The post-listing period is associated with a continuing marginal effect for the companies within the first time period, with CAARs fluctuating close to zero. However, for the companies included in the second time period, the post-listing window is associated with negative CAARs of almost 7 percent. The findings made in the post-listing period further nourish the suggestions made in the previous event windows.

Figure 5.19 South Asia [+1, +60]
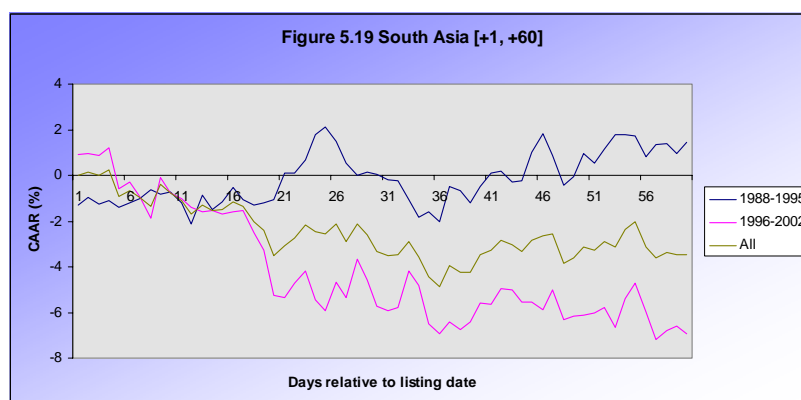
As presented in table 5.5 and illustrated in figure 5.20, the results regarding the 181-day period differ prominently between the two time periods. ADR programs that were initiated prior to 1996 did not result in any significant reactions, implying that the region was fairly integrated. On the other hand, listings that occurred after 1996 were associated with significant severe reductions in CAARs of over 32 percent (*t*-statistics of -1.79). These results further provide evidence that the markets were relatively well integrated between 1988 and 1995, but have become segmented to a great extent over time.

Figure 5.20 South Asia [-120, +60]
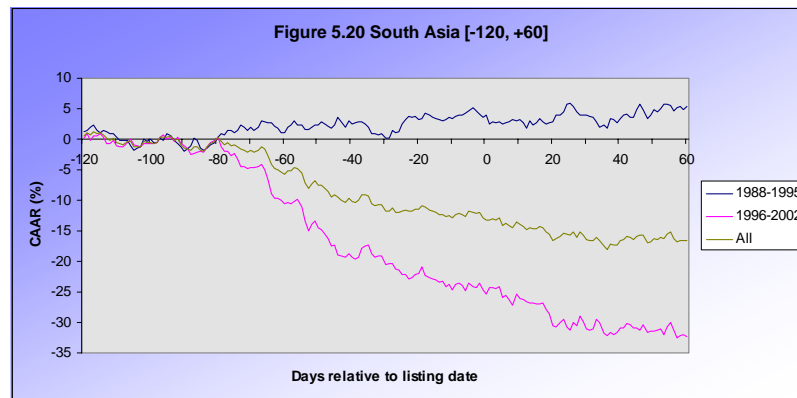
Similar to the analysis regarding the East Asian region, the results indicate that the South Asian markets were relatively well integrated during the first time period, while there is evidence pointing at the region being segmented during the second time period. As described in the East Asian analysis, the severe negative market reactions during the second time period are likely to be a result of the Asian Crisis in 1997. It is interesting to discover that the results are consistent with the findings outlined in the East Asian region despite the fact that the data sample here is much more limited.

5.1.6 Australia & New Zealand

The sample consists of 45 ADR programs from Australia and New Zealand, which were initiated from 1988 to 2002. In the sample, 14 programs were initiated between 1988 and 1995, and the remaining 31 cross-listings were made in the second time period, which is between 1996 and 2002. As the number of ADR programs initiated by companies in the first time period is rather limited, these results should be interpreted with certain caution.

Table 5.6
Cumulative Average Abnormal Returns (CAARs), for 45 Australian and New Zealand cross-listings on US exchanges, during 1988-2002

The table presents cumulative average abnormal returns experienced by the Australian and New Zealand companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

Event window	1988-1995	1996-2002	All
[-100, -2]	-7.32	*-4.86*	-5.63
	(-0.47)	*(-0.65)*	*(-0.81)*
[-20, +20]	-2.84	-6.49	-5.36
	(-0.45)	*(-1.87)**	*(1.74)**
[+1, +60]	-11.17	-7.62	-8.73
	(-1.99)*	*(-1.47)*	*(2.24)***
[-120, +60]	*-20.65*	-13.43	-15.67
	(-1.32)	*(-1.26)*	*(-1.79)**

**,* indicate significance at the 5 and 10 percent levels, respectively.

As presented in table 5.6, the companies experienced a drop in CAARs during the pre-listing period of almost 6 percent. Furthermore, the results for the two time periods are rather similar even though the reactions during the first time period are more evident. As communicated in figure 5.21, there was a positive impact on stock returns around day 90 to 80 prior to the listing dates for those ADR programs that were initiated during the first time period. If this positive reaction could be related to the announcement effect, it indicates that the region was more segmented during the first time period since no such effect is observable in the second time period. However, as the increase enjoyed by the companies in the first time period during the "announcement period" are not significantly separated from zero, the indication of segmentation can not be statistically established.
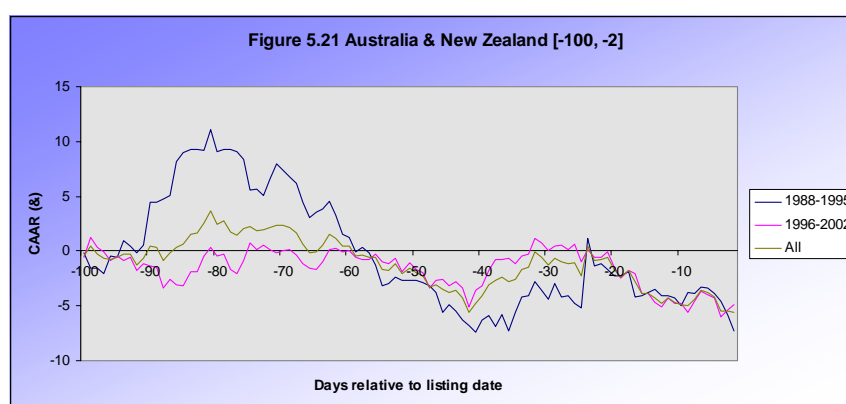

The decline in CAARs by over 5 percent for the total sample of Australian and New Zealand companies around the listing period is significantly negative (*t*-statistic of -1.74). As communicated in figure 5.22, similar return patterns indicating certain market segmentation can be observed in the two time periods. Nevertheless, only the second time period is significantly negative with a reduction in CAARs of 6 percent (*t*-statistics of -1.87). These results are in accordance with the findings by Foerster and Karolyi (1999), who argue that the Australian market was the most segmented market included in their sample.
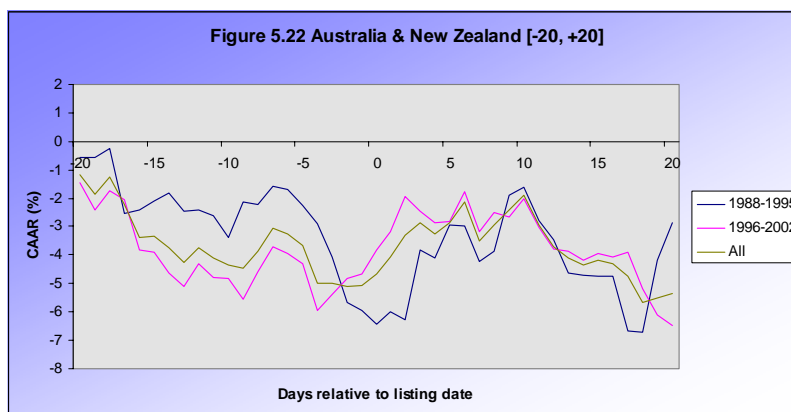
The negative CAARs during the post-listing period are significant for the total sample and approximate 9 percent (*t*-statistic of -2.24). The post-listing decline observed is in accordance with Faff, Hodgson and Saudagaran (2002), who also found a similar post-listing decline of roughly 8 percent for Australian companies. A severe post-listing decline can be observed in both time periods. The companies that initiated ADR programs prior to 1996 suffered a significant reduction in CAARs of more than 11 percent (*t*-statistics of -1.99), whereas companies that cross-listed during the second time period experienced a decline in CAARs of approximately 7 percent. In accordance with theory, which suggests that the impact on returns should be greater the more segmented the region is, the results indicate that the region's stock markets are to some extent segmented from the US financial markets.

Figure 5.23 Australia & New Zealand [+1, +60]
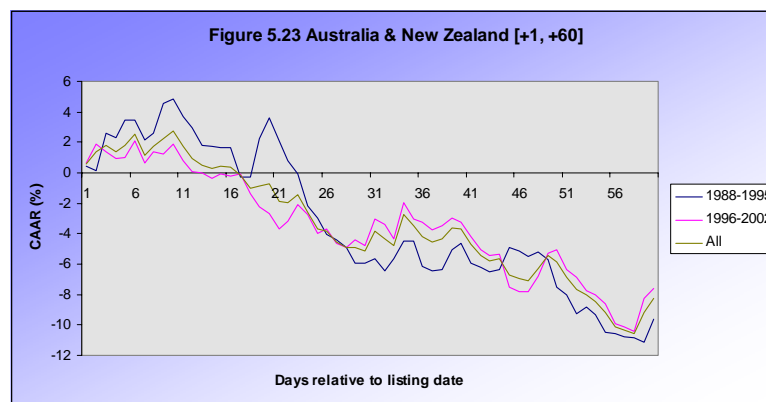
When analyzing the whole 181-day period, it is possible to outline that the Australian and New Zealand companies experienced a significant drop in CAARs by almost 16 percent (*t*-statistics of -1.79). An interesting point that can be observed in figure 5.24 is that the curves illustrating the two time periods move relatively correlated, suggesting an unchanged level of market segmentation. The only major difference in the return patterns is that the companies in the first time period experienced a noticeable increase in returns around the "announcement period", whereas the second time period reacts very modest in the same "inter-period". A possible explanation to this difference could be that investors today already have "learned" to consider a cross-listing in a more negative manner. This might imply that the market is more conservative when evaluating the cross-listing news, thus not driving the price upwards at the announcement. Similar conclusions have been stated by Faff, Hodgson and Saudagaran (2002) regarding the Australian market.

Figure 5.24 Australia & New Zealand [-120, +60]
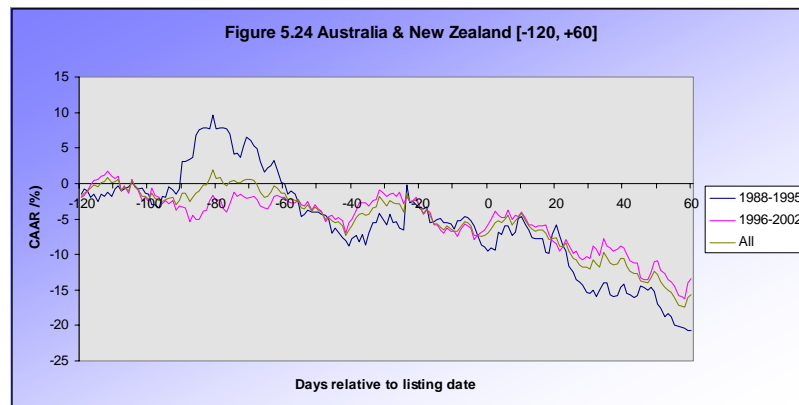
In summary, the results attained from the Australian and New Zealand data sample does not provide a clear sign of how the level of segmentation has changed over time. However, there are statistically significant indicators to market segmentation in three of the four event windows, implying that the region is quite segmented. This conclusion is supported with the findings from both Foerster and Karolyi (1999) and Hodgson and Saudagaran (2002), who also stated the region as segmented.

5.1.7 South America and Mexico

The South American and Mexican sample consists of 71 ADR programs from Argentina, Brazil, Chile, Mexico, Peru and Venezuela, which were initiated from 1995 to 2002. In the sample, 30 programs were initiated between 1995 and 1999, and the remaining 41 cross-listings were made in the second time period, which is between 2000 and 2002.

Table 5.7
Cumulative Average Abnormal Returns (CAARs), for 71 South American and Mexican cross-listings on US exchanges, during 1995-2002

The table presents cumulative average abnormal returns experienced by the South American and Mexican companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

Event window	1995-1999	2000-2002	All
[-100, -2]	*6.23*	1.56	3.54
	(0.84)	(0.30)	(0.81)
[-20, +20]	5.28	5.83	5.60
	(1.07)	(2.27)**	(2.21)**
[+1, +60]	0.53	3.43	2.21
	(0.10)	(1.21)	(0.79)
[-120, +60]	*5.39*	*6.55*	6.06
	(0.50)	*(1.00)*	(1.03)

**,* indicate significance at the 5 and 10 percent levels, respectively.

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As communicated in table 5.7 and figure 5.25, the total sample of South American and Mexican companies experienced an increase in CAARs by less than 4 percent in the pre-listing window. However, as the charts indicate, the abnormal returns enjoyed by companies cross-listing have diminished over time. During the first time period the companies experienced an increase in CAARs of approximately 6 percent during the pre-listing period, whereas companies that cross-listed during the second time period only faced an increase of less than 2 percent. However, as indicated in the chart representing the listings occurred after 2000, there exists a rather dramatic decline in returns beginning approximately 85 days prior to the actual listing, implying certain market segmentation[19].
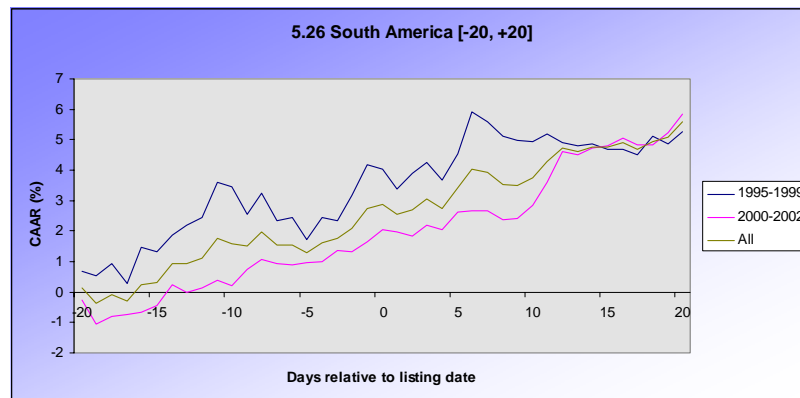

Figure 5.25 South America [-100, -2]
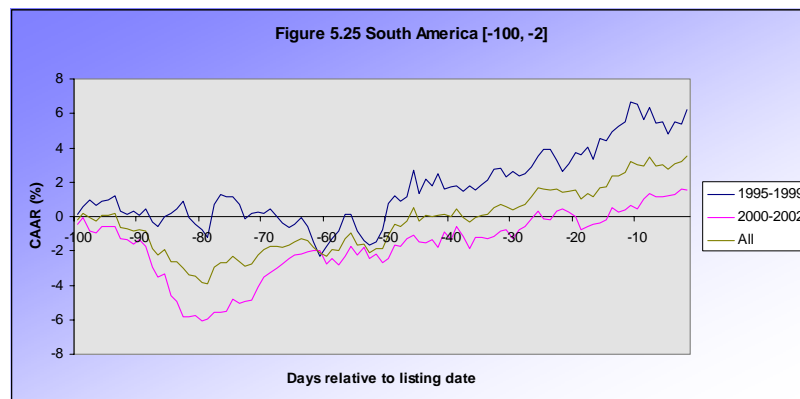
As mentioned previously, the segmentation hypothesis states that the market response during listing periods should be greater for companies domiciling from segmented markets compared to those originating from integrated markets (Foerster and Karolyi, 1999). For this reason, the significant increase in returns of nearly 6 percent (*t*-statistics of 2.21) in the second time period provides an indication that the region is quite segmented from the US. The evident market reaction could imply that US investors might value the opportunity to diversify their portfolios with South American and Mexican stocks. Another possible explanation is that companies might have been undervalued on their domestic stock markets, as a result of illiquidity or low availability of capital, and that the market prices therefore adjust towards their equilibrium prices following the cross-listing.

When comparing the charts in figure 5.26 no particular distinctions can be observed, implying that investors reacted similar to the event in both time periods. However, as presented in table 5.7 the increase in abnormal returns experienced by companies in the second time period is significantly positive, while the comparable increase in the first time period is insignificant[20].

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[19]Even though, the CAARs at the end of the event window are not significant, the values in the "inter-period" (-88 to -71 days relative to actual listing) are significantly negative.
[20]This difference is due to the fact that the observations in the first time period encompass larger standard deviations, which have an adverse effect on the calculations of t-values (see chapter 4.3).

5.26 South America [-20, +20]

In the post-listing period the increase in abnormal returns continues for the South American and Mexican companies. When observing figure 5.27, it is possible to notice that the companies included in the first time period experienced a post-listing increase, but faced a relapse ending up slightly above zero. These fluctuations could be interpreted as the region being somewhat segmented during the first time period. However, since the CAARs are not significant anywhere in the "inter-period", there also exist signs suggesting that the region was integrated. Rather clear indications of market segmentation can nonetheless be observed in the second time period, as companies enjoyed a relatively larger and a more stable increase in CAARs constituting of over 3 percent (*t*-statistics of 1.21)[21].

5.27 South America [+1, +60]
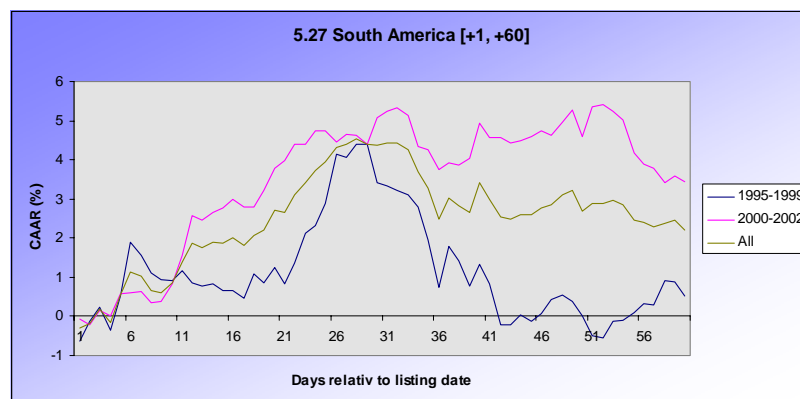
When observing figure 5.28 it is noticeable that the reactions in the different time periods are on the same level and correlated with each other. This would imply that the region has not become more integrated during the test period. The increase in returns could be a result of investors' perception that the dual listing should reduce barriers to integration. One barrier that might constitute a hinder on foreign investments in South America and Mexico is political risk. As explained in chapter 3.6.9, political risk can be measured by a

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[21]Even though, the CAARs at the end of the event window are not significant, the values in the "inter-period" (12 to 54 days relative to actual listing) are significantly positive.

country's relative indebtness since it has an effect on the government's propensity to intervene in the market rules (Oxelheim, 1996). It is widely known that economies in South America have been under some pressure the past decade, accumulating heavy foreign debt obligations and severe increases in inflation. The break down of the financial system in Argentina in 2002 and the collapse of the Mexican peso in 1994 constitutes two known examples of the financial distress in the region (Hodgetts and Luthans, 2003).

Figure 5.28 South America [-120, +60]
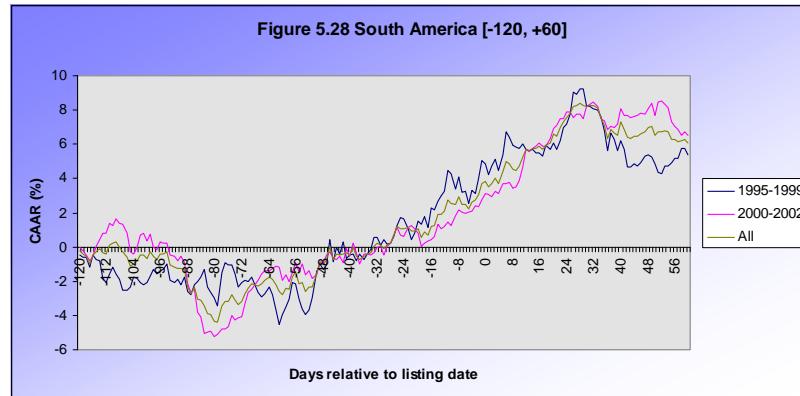
In general, there are indications implying that the region was segmented during both time periods. However, the significant CAARs experienced during the different event windows by companies included in the second time period, imply market segmentation, whereas no significant reaction could be observed in the first time period. If the interpretation of the results should be consequent, the region should be considered as integrated in the first time period and segmented in the second time period. This result is on the other hand questionable, since the magnitude and direction of market reactions are remarkably similar between the two time periods.

5.1.8 South Africa

The South African sample consists of 26 ADR programs, which were initiated from 1995 to 2002. In the sample, 11 programs were initiated between 1994 and 1996, and the remaining 15 cross-listings were made in the second time period, which is between 1997 and 2002. Since the number of ADR programs is limited, it is difficult to statistically establish the results implying that these results should be interpreted with caution.

Table 5.8

Cumulative Average Abnormal Returns (CAARs), for 26 South African cross-listings on US exchanges, during 1994-2002

The table presents cumulative average abnormal returns experienced by the South African companies during the different event windows used in the analysis. CAARs for the last observation in each event window are given for the two time periods. In the last column CAARs representing all observations are presented. Calculated *t*-values are displayed in parentheses.

| Event window	1994-1996	1997-2002	All
[-100, -2]	-9.58	6.14	-2.93
	(-1.53)	*(0.52)*	*(-0.47)*
[-20, +20]	-4.15	-8.44	-5.97
	(-1.45)	*(-1.05)*	*(-1.61)*
[+1, +60]	-8.08	-0.87	-5.03
	(-1.58)	*(-0.08)*	*(-0.90)*
[-120, +60]	-21.45	2.81	-11.19
	(-1.94)*	*(0.12)*	*(-0.95)*

**,* indicate significance at the 5 and 10 percent levels, respectively.

During the pre-listing period, the total sample of South African companies endured an approximately 3 percent reduction in CAARs. When comparing the charts illustrating the two time periods in figure 5.29 it is possible to observe that the reactions are inversed and that the strongest reactions occur around 45 days prior to listing. As shown in table 5.8, companies included in the first time period experienced a heavy decline in CAARs by almost 10 percent during the pre-listing window, while the cross-listings made in the second time period faced a large increase in CAARs by over 6 percent. The reactions that can be observed in this event window are evident, indicating that the South African market to some extent is segmented from the US. However, neither of these reactions are significant, whereby the above mentioned statement cannot be statistically established.

Figure 5.29 South Africa [-100, -2]
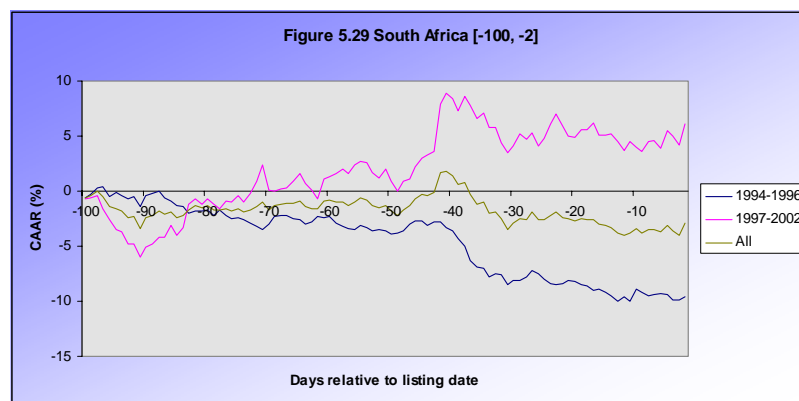
As mentioned above, the greater the stock market reaction is during the listing period the more segmented the market is assumed to be. When considering all South African companies in the sample it can be seen that they experienced a reduction in CAARs by

nearly 6 percent during the 40 day listing window. This would further indicate that the South African market to some extent is segmented from the US markets. A decline of this magnitude indicates that the stocks had been miss-priced on the domestic market and thereafter priced correctly first after being transferred to a more efficient market. As illustrated in figure 5.30 there is an obvious reduction at the actual listing date. Nevertheless, there is a large difference between the two time periods in the sample. It is apparent that the cross-listings made in the second time period are accompanied by a strong negative reaction at the listing date, whereas cross-listings made earlier only suffered a relatively small constant decline over the event window. Rather surprisingly, the results obtained are not statistically significant, though, this could be explained by the scarce number of cross-listings in the region.
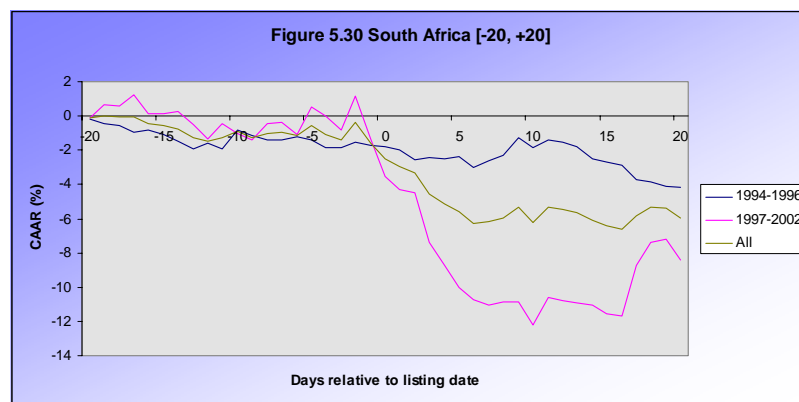

The post-listing period contains an average reduction in CAARs by approximately 5 percent for the total sample. When comparing the two time periods large differences can be outlined here as well. The companies within the first time period suffered a constant decline in CAARs over the event window finishing on a decline of more than 8 percent (*t*-statistics of -1.58), which indicates some form of market segmentation[22]. In contrast, the companies that cross-listed from 1997 and onwards experienced a severe significant drop in CAARs just after the listing but recovered during the event window and ended up close below zero[23].

An explanation to the post-listing decline for segmented markets has been proposed by Domowitz, Glen and Madhavan (1998). According to these authors the negative market reaction after listing could be due to the so-called "order flow migration". This means that when a company from a partially segmented market cross-list on a stock exchange which demands increased company disclosure relative to the domestic market, investors move their capital investments from the segmented market to the more sophisticated market. This would then increase the bid-and-ask spreads, and in accordance with Amihud and Mendelsons' (1987) liquidity hypothesis, lead to an increase in expected returns and thus have a negative impact in stock prices.

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[22] CAARs are significant for the "inter-listing" period from 32 to 46 days after listing date.
[23] Although, the CAARs at the end of the window are not statistically significant there exist significant negative "inter-period" declines at days 5 to 16 after listing date.

Figure 5.31 South Afica [+1, +60]
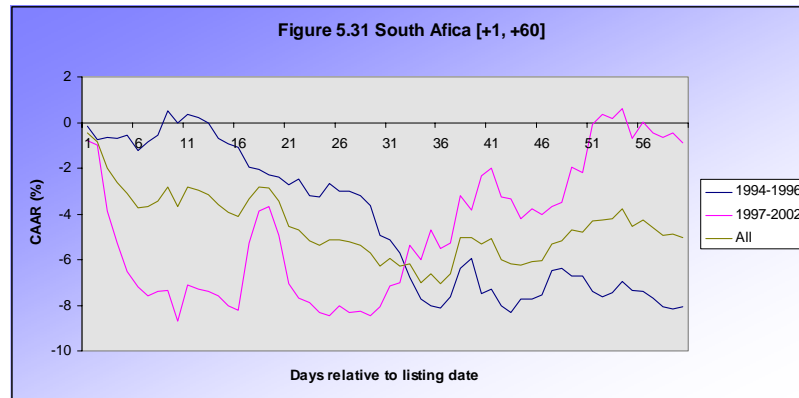
When considering the 181-day event window South African companies, in general, suffered a decrease in CAARs of approximately 11 percent. Companies that initiated ADR programs in the first time period experienced a significant decrease in CAARs of more than 21 percent (*t*-statistics of -1.94), whereas companies in the second time period obtained an increase in CAARs of slightly less than 3 percent (*t*-statistics of 0.12). These results suggest that the South African market was segmented during the first time period and has become more integrated over time. Furthermore, the results indicate that the South African stock market is not fully integrated yet since the market reactions accompanying cross-listings still are large.

Figure 5.32 South Africa [-120, +60]
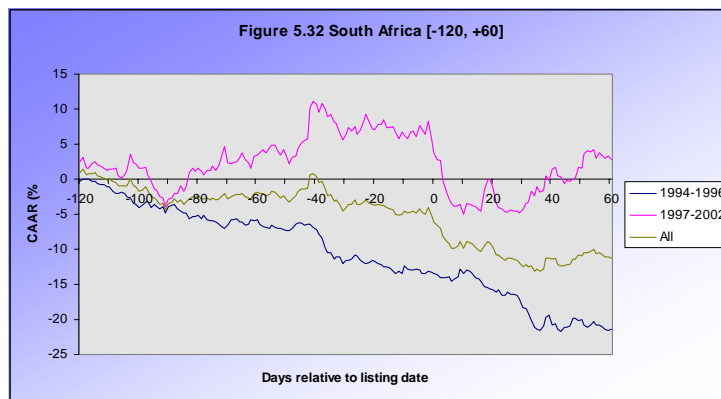
In summary it can be stated that the South African market is characterized by an increased level of integration over time. The analysis has shown that the market was segmented during the first time period, which certainly had its roots in the fact that the South African economy was segmented due to the trade embargos created against the apartheid system which was not revoked until 1993. Even though the integration process has been going on for some time the South African market is still segmented to some extent.

5.2 Alternative explanations

In order to examine whether there exist any differences in return patterns that are related to the location of listing a regression model has been employed. Stock exchanges are used as proxies to test the investor recognition hypothesis (Merton, 1987) and the liquidity hypothesis (Amihud and Mendelson, 1986). The sample constitutes of 555 ADR programs[24] from all eight regions in the study. The reason to cluster all regions into one sample is to exclusively examine if the listing location have any direct impact on the cumulative abnormal returns (CARs), in accordance with the two above mentioned hypotheses.

The number of cross-listings that were initiated on the NYSE amounted to 113, whereas 38 were made on the NASDAQ, and the remaining 354 cross-listings were directed to the OTC market.

Table 5.9

The table presents the results from the regression model described in chapter 4.4.

	Coefficients	*t-statistic*
New York	-0.01	-0.18
Nasdaq	0.01	0.06

Table 5.9 shows the regression coefficients for the NYSE and NASDAQ. The coefficients are expressed in percent, and explain the difference in CARs associated with listings on the NYSE and NASDAQ, in relation to listings made on the OTC. Thus, the results indicate that a listing on NYSE is accompanied with a 0.01 percent lower CARs than a listing on the OTC market. The result for listings on the NASDAQ should be interpreted the other way around. For both tests, the *t*-values are low and far from significant, indicating that the listing location has no impact at all in the total sample. However, the insignificant result could be explained by the fact that other relevant variables were neglected in the model.

The results are rather surprisingly, both insignificant and very marginal, which imply that the hypotheses tested have no impact at all when cross-listing. These results are however, in contrast to previous research and might be due to lack of explanatory power in the model. Another reason to the results could be that the effects from the liquidity- and investor recognition hypotheses might not influence stock returns in the event window investigated in this study. They might instead affect stock returns in a longer time perspective.

5.3 Summary

To summarize the findings made in the analysis, three different patterns concerning the eight regions' globalization process have been acknowledged. While some regions have become more integrated over time, others show indications of experiencing the reverse

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[24]One ADR program was excluded from the sample since the listing occured on the AMEX.

development. In addition, there are regions where the integration process seems to be less intensive as no direct development could be found.

The first pattern observed, pointing towards an increased level of integration was found in West Europe, Scandinavian, and South African regions. However, the two latter regions are not integrated yet, since indications implying segmentation could be observed in the results. Even though it was evident that Western European ADRs were associated with a significant negative market reaction during the post-listing period, it was concluded that the relatively marginal reaction most likely have its roots in other factors than market segmentation. Therefore, the results obtained regarding the Western European markets imply that the region is rather integrated with the US capital markets.

The Eastern European region experienced a similar development as the Scandinavian and the South African regions did, that is an increased level of integration. However, despite the increased level of integration, the region still seems to be fairly segmented. Indications from the sample, even though not significant, show that severe market reactions accompany cross-listings made by Eastern European companies.

In contrast to the general thought of a world going towards an increased globalization, Asian markets seem to face an opposite development. Interestingly the Asian markets, although divided into two regions, show astonishing similar results. While the markets appeared to be well integrated with the US between 1988 and 1995, strong evidence implies that the Asian markets have become segmented thereafter.

The South American and Mexican region together with the Australian and New Zealand markets show no general patterns of a changing level of integration. Both regions have in this research been concluded as segmented, nonetheless, the effects associated with cross-listings in the two regions are inversed. ADR programs from the former region are accompanied with positive market reactions in both time periods, (the only region in the sample where this reaction is found). On the other hand, the companies from the latter region faced rather severe declines.

Finally, a regression model was employed in order to examine if the listing location could explain a part of the market reaction. Since the results show no significance, it either implies that the choice of exchange have no impact at all when cross-listing, alternatively that the model is insufficient in capturing the listing location effects. Thereby, this study can neither support nor neglect the liquidity- or investor recognition hypothesis.

6. Conclusions

In the final chapter of the dissertation, concluding remarks regarding the level of integration and how it has changed over time are presented. Furthermore, the managerial and theoretical implications of the results are given. Finally, suggestions for further research are provided.

6.1 Conclusions of the dissertation

This dissertation has investigated how different regions are financially integrated with the US capital markets and how the level of integration has changed over time. The research has been conducted by using an event study methodology to examine the impact on domestic stock prices following foreign cross-listings on US stock exchanges. The theoretical connection between cross-listings and integration was explained by Sundaram and Logue (1996). They stated that if markets are completely integrated there should not be any abnormal effect on domestic stock prices when companies from one market cross-lists on another.

The study was partly motivated by the ambiguous results found in previous research regarding the effects of international cross-listings, and partly because important conclusions regarding capital market integration can be drawn by studying the phenomenon. This is of particular interest since companies can use this knowledge to adapt their financial activities in order to circumvent the negative effects due to segmentation.

In order to examine the effects from foreign cross-listings on US stock exchanges in the time period between 1988 and 2002, a sample of 556 ADR programs from 38 countries was analyzed. During the test period all regions in the sample, at least to some extent seemed to be segmented from the US markets. However, while some regions have become more integrated over time, others show indications of experiencing a reverse development. A third category of regions seem to experience a minor or no development over time.

Interestingly, and in contrast to several other studies regarding international cross-listings on US stock exchanges, is that the vast majority of initiated ADR programs in this study are associated with negative market reactions during the examined event windows. The only exception to these results are ADR programs initiated from the South American- and Mexican region, where the reactions were positive.

Despite the fact that an increasing number of companies choose to cross-list on US stock exchanges, the benefits are not evident by exclusively considering the market values of these companies, at least not in a short term perspective. These results are in contradiction to theory, suggesting that stock prices should increase when companies make efforts to internationalize their cost of capital.

The negative market reactions in general, could be explained by the relatively substantial costs that are associated with international cross-listings. However, the declines in stock prices could also be explained by the fact that some domestic markets are too optimistic regarding the effects of cross-listings and therefore, expect that the US market will accept their stocks in a positive manner. If, however, this is not the case, then the domestic stock price will fall as a consequence of the overvaluation of the event.

By using the methodology and time span in this study, certain aspects of international cross-listings are neglected. In particular, the supposed long-term perspective of managers initiating ADR programs has not been considered. Since the motives for cross-listing most probably exceed the short-term aspects, important issues such as marketing effects have been overseen. As these motives could prove to be beneficial in the long-term the results might have been positive if a longer time horizon had been investigated. Another drawback regarding this event study is that it does not filter out other news that could distort the affects of cross-listings. However, with aim at minimizing the possibility of distortion, 556 ADR programs have been taken into account. Hence, the probability of "contaminated" news altering the results is considered to be limited due to the large data sample.

As stated above, in contrast to the negative market reactions concluded in this dissertation, the long-term effects of international cross-listings could prove to be beneficial for companies. Consequently, the topic of international listings deserves further investigation where these longer perspectives are taken into account. Despite the fact that this study has provided possible explanations to the post-listing declines, the question regarding the underlying forces to these declines remains unsolved. Therefore, it would be very interesting to conduct an in-depth study of a more limited data sample in order to investigate whether company-specific factors, rather than macro economic factors could explain the effects regarding foreign cross-listings on US stock exchanges.

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