

Is Merger Arbitrage Profitable in Sweden?

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ABSTRACT

Merger arbitrage has been the focus of extensive research in recent years. It is an investment strategy that is used to exploit the price discrepancies between the stocks of the merging companies at the announcement of a merger or acquisition. Much of the empirical research performed within the U.S. found evidence that it generates abnormal profits. We investigate whether these results are applicable for Sweden, a country with a different institutional setting than U.S. We find that it is possible to make abnormal profits with this strategy however this profitability depends on specific conditions such as the method of payment and the ownership structure of the merging companies. The profits are maximized by investing in deals in which the method of payment is cash and both of the companies are characterized by family ownership.

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1. Introduction

1.1. Background and Purpose

On January 09, 2003, Swedish security brokerage and fund management firm Danir AB announced that it had decided to buy the Swedish engineering consultancy firm Epsilon. The offer was priced at SEK 22 in cash per share making the size of the deal valued at SEK 112 million. Based on Epsilon's closing price of SEK 17.20 on January 07, 2003, the last trading day before the offer was first announced; the offer represented a premium of 27.9%. After this announcement, Epsilon's share price jumped an astonishing 23.8% to SEK 21.3 by the end of the day. Since the stock remained below the SEK 22 offered, buying Epsilon at SEK 21.3 would allow an investor to capture the spread once the merger was completed. Given that completion occurred three months after the announcement, the spread that was realized of 3.28% would generate an annualized return of 13.8%.

What was just described is a classic example of merger arbitrage, also known as risk arbitrage, within a cash offer. This example is a good representative of what happens to the share price of the company being acquired following the announcement of an acquisition. As can be seen, the general trend is that the share price of the target company starts to increase right after the announcement. Depending on the structure of the deal, i.e. the method of payment, there is room for a merger arbitrage strategy in a merger or acquisition, which has been verified to be profitable. Baker and Savasoglu (2002) find that a diversified portfolio of merger arbitrage positions generate a monthly abnormal profit of 0.6% to 0.9%. A similar study by Mitchell and Pulvino (2001) finds evidence that merger arbitrage generates excess returns of 4% per year. Such studies have focused predominately on the U.S., which has a large and liquid financial market.

The purpose of our thesis is to study whether merger arbitrage is a profitable investment strategy in a different institutional setting other than the U.S. We choose Sweden as the country of our analysis because it is a civil law country with a unique institutional setting different from Anglo-Saxon countries while sharing the characteristics with that of continental Europe. We examine the returns from merger arbitrage positions taken on Swedish companies that are engaged in mergers and acquisitions between 1985 and 2005 in order to answer our first research question:

1. Is it possible to earn abnormal profits from a merger arbitrage strategy in Sweden?

The method of payment in a merger or acquisition can be pure cash, where a fixed amount of cash payment is made for each share of the target firm; it can be pure stock where a number of acquirer stocks are exchanged for a specified number of target stocks at a fixed or a variable rate; it can also be a mixed payment of both cash and stock. Different financing methods for acquisitions have different announcement effects on stock prices of the merging companies. Amihud, Lev and Travlos (1990) and Martin (1996) all report negative announcement effect for the stock price of the acquirer companies when the method of payment is stock. These findings indicate that the stock prices of acquirer compa-

nies that use stock as a method of payment under perform in the long run when compared to those of companies that use cash. This is the reason why each method of payment requires a specific investment strategy that will be explained in detail in the following sections. We want to see the implications of the method of payment on merger arbitrage returns and therefore develop a second research question as follows:

2. *Is there a significant difference among merger arbitrage returns when the method of payment is either cash or stock?*

Ownership structure of a company is a critical factor affecting the likelihood of a merger or acquisition to take place. Sweden is a country that is characterised by a concentrated ownership structure where most controlling owners are families. What is also frequent is the use of dual class shares by family owners that separate voting rights from cash flow rights. Holmén and Nivorozkhin (2005) study the effect of dual class shares on the likelihood of a takeover taking place and found that an increasing wedge between voting rights and cash flow rights has a negative impact on the likelihood of a takeover taking place. Based on this unique feature of Sweden and research findings at hand, we want to analyze if there are significant differences between returns from portfolios solely investing in specific types of acquirer and target companies that are defined by family and non family ownerships. In other words, we want to control for family ownership in our returns. Therefore, our third research question is structured as follows:

3. *Does family ownership have a significant impact on merger arbitrage returns?*

1.2. Our Contribution

Merger arbitrage has been the focus of empirical research however studies have been carried out mainly in the U.S. Baker and Savasoglu (2002) and Mitchell and Pulvino (2001) find evidence for abnormal profits of approximately 0.9% per month generated by merger arbitrage in the U.S. Dukes, Frohlich and Ma (1992) and Jindra and Walking (1999) find that investing in cash tender offers generate abnormal profits of more than 100% on an annual basis. Nonetheless the same type and level of attention has not been directed to Europe and therefore the implications of the results are limited to the institutional setting and the financial market that the U.S. is characterized with. There is need for further research that reveals country specific factors in the context of merger arbitrage. We believe it is very interesting to perform this study in a country with a different institutional setting and that has never been studied to this extent before; and we hence choose Sweden as the country of our analysis. We provide an alternative perspective on merger arbitrage by focusing our attention on factors that differentiate Sweden from Anglo-Saxon countries. Our study is unique because: 1) we calculate the abso-

lute returns that can be earned by a merger arbitrage strategy in Sweden; 2) we carry out a comparative analysis to reveal the effects of method of payment and ownership structures of the merging companies on these returns. In other words, we specify the conditions to maximize profits from merger arbitrage in Sweden. By providing evidence for these specific conditions to maximize merger arbitrage returns, we believe that this study can be of guidance for hedge funds who consider specializing in merger arbitrage within Sweden. They can focus on deals that generate the best risk adjusted returns according to our findings.

1.3. Outline

The rest of the paper is organized as follows. Section 2 describes the theoretical background of merger arbitrage within Sweden and past empirical research. Section 3 introduces our hypotheses. Section 4 describes the methodology and the definitions we use for this study. Sections 5 and 6 describe the dataset and provide a descriptive analysis. Section 7 and 8 cover the regression analyses and examine the results. We conclude the study in Section 9.

2. Theoretical Framework

2.1. Merger Arbitrage

Once the announcement of a merger or acquisition takes place, the share price of the company which is being acquired jumps, regardless of the method of payment. From then on, the level of the share price increases more or stays almost the same until the day of completion when the share price converges to the amount that is paid for the target company. This difference between what the stock price jumps to after the announcement and what the acquirer is paying is called the arbitrage spread. Although the type of the investment strategy differs with the method of payment as will be discussed below, the observed price discrepancies create the platform for a specific type of arbitrage strategy named merger arbitrage.

There are two main methods of payments that are used as financing in a merger or acquisition; pure cash or pure stock and they both require different models for structuring the merger arbitrage strategies. The returns to merging companies following the announcement have a direct effect on the arbitrage spread, which in return defines the merger arbitrage returns. Therefore, before we analyze the proper investment strategies, it is important to understand the implications of method of payment for both the acquirer and the target companies. The announcement effect for target companies is positive regardless of the method of payment under the condition that the deal will be consummated (Roll (1986)). Travlos (1987) and Martin (1996) report evidence that the use of stock as the method of payment has a negative impact on the returns to acquirer companies, whereas cash has a nonnegative impact. These findings suggest that the method of payment has signalling implications in a world of asymmetric information (Travlos (1987)). For instance, the market interprets a stock offer in a way

which suggests that the acquirer company has information on the value of the firm indicating that its stock is overvalued. In the case of a cash offer, the acquirer may signal that the stock is undervalued.

The profitability of a merger arbitrage strategy depends on the valuation of the companies following the announcement. Since method of payment has a direct effect on the values of the companies, the investment strategy should be such that it takes into consideration the above mentioned implications. It is quite straightforward in the case of a cash offer, where a merger arbitrageur solely goes long in the target firm; i.e. buys the stock of the target company and holds it until the merger is consummated. Thereby the arbitrageur captures the spread defined by the difference between the price paid for by the acquirer company and the price he pays for the target stock. Whereas in the case of a stock offer, the target company is paid by the stock of the acquirer company, which means that the value of the offer changes with the share price of the acquirer company. In this case, an arbitrageur would lose, if he solely goes long in the target company since the share price of the acquirer company is very likely to go down after the announcement. Therefore, the arbitrageur needs to hedge his position by going short in the acquirer stock in addition to buying the target stock. This way, he can capture the spread from the increase in the share price of the target and at the same time covers the short position with the acquirer shares that the target shares are converted to at the day of the completion. This is a protection for the investor against the risk that the value of his shares will be lower than the purchase price due to a decrease in the share price of the acquirer. Below is an example of the trading strategy associated with a stock offer.

Table 1. Trading strategy for a stock offer

This table shows the trading strategy when the method of payment is stock. The share price of the acquirer company, Matteus AB on the announcement and the deal completion date is seen in the second column. Based on these price levels the gain (loss) from the long and short positions in 1 share of JP bank and 0.9 shares of Matteus AB, respectively are calculated.

Merger Arbitrage Strategy				
Date	Matteus AB (SEK)	GAIN (LOSS)		
		Long Position	Short Position	Total
January 18, 1999	52	(37)	46,8	9,8
June 04, 1999	34,5	31,05	(31,05)	0
Total Gain (Loss)		(5,95)	15,75	9,8

A real world example from our data set happened on January 18, 1999. Matteus AB, a Swedish security broker announced that that it would acquire JP Bank, a Swedish bank. The terms of the merger were such that for 10 JP Bank shares, 9 shares of Matteus AB would be exchanged. After the announcement, the price of JP Bank jumped. On January 15th, last closing day before the announcement, JP Bank was trading at SEK 37 and on January 19th, it was at SEK 41.8. Meanwhile, Matteus AB was trading at SEK 52 on January 15th which dropped to SEK 50 on January 19th. On the completion date of June 4th, Matteus AB traded at SEK 34.5. In order to profit from this, an investor would need to buy 1 share of JP Bank and short sell 0.9 shares of Matteus AB. Once the merger was consummated, JP Bank shares were converted to Matteus AB shares and each shareholder in JP Bank received 0.9 shares

of Matteus AB for 1 share of JP Bank. Table 1 shows how this strategy works and results in a profit of SEK 9.8 or 26.48% (75.75% at an annualized rate, given that the deal was consummated in around 5 months).

As we see, the share price of Matteus AB is SEK 34.5 on the day of the completion, which is a drop of 34% from the initial price level thereby valuing each share of JP Bank at SEK 31.05. Clearly, an investor would have lost SEK 5.95 per share or 16%, if the strategy had been limited to a long position in JP Bank. However, by hedging the long position with a short position in 0.9 shares of Matteus AB, the arbitrageur would lock himself in at a profit of SEK 9.8.

2.2. Short Selling

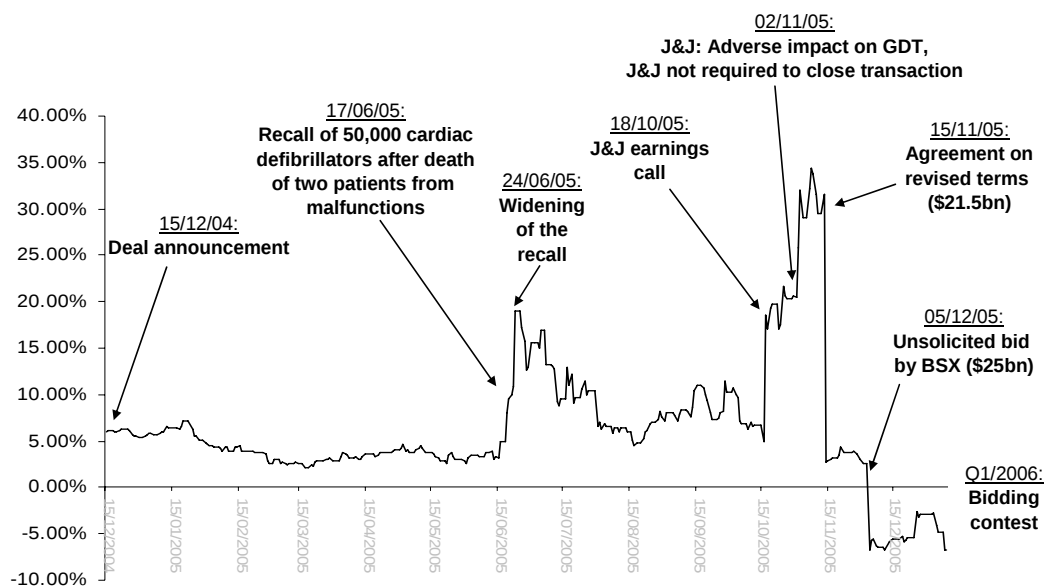
In stock offers, one of the major constraints in being able to profit successfully has to do with short selling. The investor who goes short takes a bearish view and anticipates that the price of the instrument shorted will fall. Therefore, he will be allowed to buy back the instrument at a lower price, thereby leading to a profit. When dealing with stock offers in merger arbitrage, the investor takes a short position in the acquirer stock since following a merger announcement, the value of the target stock changes with that of the acquirer stock.

It is rather hard to get data on exact trading patterns of arbitrage, however it is estimated that arbitrageurs' average ownership of the stock of target firms immediately following acquisition announcements range from 15% (Hsieh and Walkling, 2005) to 35% (Officer, 2006). However, Wall Street insiders estimate that as much as 50% of the stock in acquisition targets is acquired by arbitrageurs in an average deal (Officer, 2006). Due to this, it is quite simple to see that merger arbitrageurs play a very influential role on the stock prices of both the target and acquirer companies following the announcements. In order to keep equilibrium, many firms place limits on the process of short selling. Some investors have to own the shares that could be shorted, and may decide not to lend them out; therefore this creates a non homogeneous investment environment which ultimately promotes equilibrium.

In many countries, it is not as simple to short shares of stocks. This is due to a variety of reasons from government imposed rules, high amounts of collateral used to short, or simply, there is no market that short selling occurs in and thus the short seller must find a stock lender. Britz, N. Goetzmann and Zhu (2005) analyze short selling restrictions in a market efficiency context by studying forty six countries. They state that in Sweden, short selling restrictions had existed until 1991 which is when short selling and stock lending were allowed for the first time. Since then, short selling has been practiced on a common basis. Based on our own market research, mainly through our contacts with hedge funds, we see that short selling has been much easier and cheaper to carry out throughout the last five years. This can be explained by the substantial increase in hedge fund activities and their high turnover rates throughout the same period (Harcourt Investment Consulting, 2006).

2.3. Risks

On December 15, 2004, Johnson & Johnson announced the acquisition of Guidant Corporation, a leading company in the treatment of cardiac and vascular disease. The deal was valued at \$25.4 billion where \$76 was paid both in cash and stock for each share of the target. The premium was close to 6% on the day of the announcement. Everything was fine until June 17, 2005 when two of the patients died due to the malfunctioning of defibrillators. The premium or spread rose significantly to almost 20% on June 24, 2005. Under normal conditions, when everything goes smoothly and the deal is completed successfully, the spread should decline while the share prices of the two companies converge. However, as can be seen in this case, a negative announcement about the target company, Guidant reversed the direction of the declining spread. Figure 1 is a good representation of how easy it is to lose a lot from a merger arbitrage strategy. From Figure 1, one can see the fluctuations in the premium with the reasons attached. In the end, Boston Scientific produced a more attractive bid to Guidant and ultimately they merged together, leaving Johnson & Johnson unsuccessful in their bid.



Source: Bloomberg/Harcourt
(based on closings)

Figure 1. Merger of Johnson & Johnson and Guidant Corporation: The movements in the spread i.e. merger arbitrage premium.

This example illustrates an extreme case and indicates that returns from merger arbitrage depend on the successful completion of the deal. Baker and Savasoglu (2002) report that returns increase with the deal completion risk. Mitchell and Pulvino (2001) also state that deal completion risk gives rise to high abnormal profits. In Sweden however deals are consummated in majority of the cases and therefore the risk associated with completion is not as prominent as it is in the U.S. The institutional setting in Sweden is such that a takeover can already be blocked by shareholders who own 10% of the shares outstanding. In other words, the market for mergers and acquisitions is characterized with

friendly deals where the deal completion is not priced in the calculation of returns (Koch and Sjöström (2003)). Even so, we believe it is necessary to grasp a good understanding of what sorts of risks exist and provide a description for each factor that might play a role in the completion of a merger. We categorize them as deal completion risk, regulatory agencies restraints and funding risks.

2.3.1. Deal Completion Risk

Deal completion risk is the major risk associated with merger arbitrage and it occurs when the merger fails to be consummated. It is a substantial risk because in case of such a failure, the share price of the target company goes back to the preannouncement level or in some cases, even lower than that. Therefore, an investor may incur substantial amounts of losses depending on the amount invested. According to many authors, there are many components into whether a deal will be successful. The smaller the deal size, the more likely the deal will come to fruition (Wilkens (2003)). Likewise, mergers that progress more quickly and are more proactive are more likely to be consummated (Wilkens (2003)). Branch and Yang, (2000) note that 88% of stock offers are successful, while only 83% of cash tender offers are successful. In Sweden, the likelihood of a deal going through is higher than it is in the U.S. Since shareholders who own at least 10% can block a takeover and concentrated family ownership is seen in majority of the Swedish companies, the deals are negotiated even before the announcement is made. In other words, a deal is very likely to go through successfully (Holmén and Nivorozhkin (2005)). Koch and Sjöström (2003) provide evidence for that by showing that this risk is not priced in Sweden.

2.3.2. Regulatory Agencies Restraints

In some instances, there may be certain agencies that have to approve a merger before it can take place. In recent years, The European Commission attempted to block a number of mergers in order to prevent any potential negative effect on competition in the markets where these companies operate. Such examples include the merger between Volvo and Scania in 1999 and the one between the Swedish packing firm Tetra Laval and the French company Sidel. The former case resulted in unsuccessful completion however in the case of the latter; the European Court of First Instance overturned the Commission's decision to prohibit the proposed merger. The reason behind this was because the Commission failed to prove that the merged entity would not harm competition (Hibner (2005)).

2.3.3. Funding Risks

Funding risk is the risk that the necessary funding will not be available. The acquirer company must secure enough financing to pay target shareholders. Overall market conditions can change, making what originally would have been a profitable combination no longer viable. This often happens with swings in interest rates.

2.4. Swedish Framework

2.4.1. Swedish Institutional Setting

This section provides an overview on Swedish institutional setting by focusing on features that distinguish Sweden from the U.S. and the U.K. As mentioned above, it is different in structure from that of the U.S. or the UK which are characterised by companies with dispersed ownership structures (Holmén and Högfeldt (2000)). With a concentrated ownership structure, Sweden more resembles continental European countries; however it still has a unique corporate governance model which places Sweden in the middle of this continuum (Swedish Code of Corporate Governance (2004)). Although Sweden is dominated by owners with high voting rights, which can be a hurdle in takeover attempts, the Swedish market has seen a substantial amount of takeover activity over the past 20 years with the nature of these takeovers being seldom hostile. Takeovers are friendly in a majority of the cases because a takeover can be blocked by a shareholder or a group of shareholders who own at least 10% of the shares. This suggests that there is an acceptance level of 90% and a hostile takeover can easily be blocked. Therefore takeovers in Sweden are often negotiated between the acquirer and target firms before a public announcement is made creating the platform for friendly takeovers (Holmén and Nivorozhkin (2005)).

One of the distinguishing features of the Swedish institutional setting is the use of mechanisms for separation of ownership from control. Sweden is the country with the highest percentage of companies that issue dual class shares, amounting to 66.07% (Doukas, Holmén, Travlon, 2002). With this mechanism owners can have voting rights of up to 10 times of their cash flow rights. Moreover, the owners are families for a majority of the companies listed on the Stockholm Stock Exchange. Cronqvist and Nilsson (2003) define the type of owners holding less cash flow rights than their voting rights as controlling minority shareholders which are characterised by family owners in the Swedish setting. Their results show that family owners are more inclined to use controlling minority shareholder structures through dual class shares, stock pyramids and cross shareholdings.

The above mentioned overview has important implications for the nature of mergers and acquisitions. Given that Swedish companies have concentrated ownership structures with families having the majority of the voting rights and in most cases, employing dual class shares; it is likely that they do not want to give up their controlling rights. Therefore, for a takeover to occur, the terms of the deal should be of a nature where the shareholders either do not lose their control or get compensated for the loss of private benefits sourcing from having this control. Huggare and Keskitalo (2003) find evidence that cash financing is preferred by family owned acquirer firms when acquiring a target company in order to avoid control dilution. In the case of stock offers, family owned firms use dual class shares and prefer paying by the share class which has the lowest voting rights.

A final remark is about two-tier offers, which are prohibited in Sweden. In a two-tier offer, a tender offer is made for a certain amount of shares of stock that will allow for the acquirer to gain a

controlling stake. Following this, the board, under the majority stakeholder, will approve the pending merger. The Swedish Equal Treatment Principle limits the possibilities to offer different terms to owners of the same type of stock. Therefore, it is likely that the bid premium in Sweden is of greater importance than in a country where two-tier offers are allowed, such as the United States (Högfeldt and Högholm (2000)).

2.4.2. Overview of Nordic Hedge Fund Industry

Research on merger arbitrage cannot be examined in isolation without referring to hedge fund activities in the country of study. Regarding that we want to devote this section to our research on the hedge fund industry; the developments and trends that have been taking place mainly in Sweden. The main focus is on merger arbitrage activities. This section is an outcome of our interactions with hedge funds in Sweden by which we have tried to grasp a good understanding of this industry.

We have done market based research and have conducted an interview with a hedge fund, and based on our observations, there are no hedge funds in Sweden which merely specialize in merger arbitrage, therefore obtaining information regarding hedge funds specializing in merger arbitrage was virtually impossible. This can be explained because the Swedish mergers and acquisitions market is much smaller than the U.S., where hedge funds specializing in this strategy can be found to a large extent. Since the deal volume is the main driver behind merger arbitrage, the lack of supply can be of a reasonable explanation for this observable fact. Nonetheless, it is still a strategy that is used by portfolio managers as part of their investment strategies as can be seen in the general map of this industry.

If we start by looking at the historical development of the hedge fund industry, one date draws special attention. In 1996, the Swedish Financial Authority facilitated the onshore registration of hedge funds in Sweden. Since Sweden stands out as the biggest market with around 76% of the assets under management in the Nordic region, it is easy to see that there has been a steady growth in the number of hedge funds operating in the Nordic market and also the value of assets under management since 1996¹. Merger arbitrage is an event driven equity strategy that hedge funds categorize under the heading of relative value equity strategies. The breakdown of the industry into investment strategies shows that relative value equity makes up almost 7% of the entire set of strategies in the Nordic market. When we compare this number to the share of relative value in a global context, we see that it is about 25%. Therefore, we can conclude that Nordic market which is mainly represented by Sweden is relatively limited in investing in this type of strategy when compared to global hedge fund industry.

The SIX Harcourt Hedge Fund index shows that Swedish hedge funds have constantly outperformed the market both on an equal and a value weighted basis throughout the period of 2001-2006. It is worth observing the performance of hedge funds in comparison to the performance of the Stockholm Stock Exchange before we go into much deeper. Appendix 1 depicts the returns on both equal and value

¹ Harcourt Investment Consulting AB, provided us with this data which also shows an increase in the assets under management of hedge funds in the Nordic market from €0.7 billion in 1996 to €13 billion in the third quarter of 2006.

weighted SIX Harcourt Hedge Fund indices (HFXS) against the market returns throughout 2001 to 2006. Here we see that following the high tech stock bubble, there is a significant decline in the market overall. However, the hedge funds went on outperforming the market. Although we will touch upon in following sections, this has an implication for the volume of mergers and acquisitions that took place during this period. The data on hedge fund index covers a period of 2001 to 2006 but it is likely that hedge funds using merger arbitrage as part of their investment strategies have made significant returns until the high tech bubble. Throughout 2000-2003 the bubble burst and a dramatic market downturn took place, our intuition is that the hedge funds were left with a lack of deals taking place throughout this period although they had already had the enough money to invest in possible deals. This probably gave rise to a shift from merger arbitrage to other strategies.

2.5. Past Empirical Research

There is a significant amount of empirical research on the market pricing of mergers and acquisitions and merger arbitrage. In this section we aim to cover as much of these findings as possible in order to be able to solidify this study. Table 2a demonstrates a summary for the main findings that we cover.

Table 2a. Summary of Past Research on Merger Arbitrage

<i>Source</i>	<i>Country</i>	<i>Findings</i>
Baker and Savasoglu (2002)	U.S.	Merger arbitrage generates abnormal profits that amount to 0.6-0.9%, which are traced to limits of arbitrage; deal completion risk, target size and merger arbitrage capital.
Mitchell and Pulvino (2001)	U.S.	Merger arbitrage generates excess returns of 4% per year. There is a positive correlation between merger arbitrage returns and market returns in severely depreciating markets but no correlation as such when markets are flat or appreciating.
Karolyi and Shannon (1998)	Canada	Merger arbitrage returns yield an average of 33.9% annually in excess of the TSE index. The magnitudes of excess returns are insensitive to the number of days to close, payment method, size of the deal and the pre-announcement share price run-up.
Mitchell, Pulvino, Stafford (2004)	U.S.	There is a price pressure around mergers caused by uninformed shifts in excess demands. Nearly half of the negative stock price reaction for acquirers in stock offers reflects downward price pressure caused by short selling activities of merger arbitrageurs.

Our study follows the same methodology and proceeds in a parallel manner to some extent with the study covered in the U.S. by Baker and Savasoglu (2002). The purpose of their research is to calculate the abnormal profits from daily merger arbitrage portfolios created on U.S. data covering a period from 1981 to 1996 and trace these profits to limitations on merger arbitrage. They cover 1,901 merger and acquisition offers and their findings suggest that it is possible to earn an abnormal profit of 0.6-0.9% per month over this time period. They further find evidence for the existence of a relationship between deal completion risk, target size, general supply of arbitrage capital and merger arbitrage returns. They show that merger arbitrage returns increase with an *ex ante* measure of deal completion risk

and target size. Moreover, when arbitrage capital, which is measured by a proxy, falls, merger arbitrage returns increase. The main success of this paper comes from the fact that there had not been such extensive research done on merger arbitrage returns before and that it also showed a relationship between general supply of arbitrage capital and merger arbitrage profits. These are strong results and are strengthened even more with other studies from the U.S. One such study is conducted by Mitchell and Pulvino (2001). In their paper, they analyze the characteristics of risk and return in merger arbitrage. Analyzing 4,750 mergers throughout the period from 1963 to 1998, they find that merger arbitrage portfolios create excess returns of 4% per year (0.3% per month). Although it is less than what Baker and Savasoglu (2002) find, it indicates that merger arbitrage generates abnormal profits. One distinctive finding of their study is the relationship between merger arbitrage returns and market returns. They show that there is a positive correlation between merger arbitrage returns and market returns in severely depreciating markets but no such correlation when markets are flat or appreciating. This suggests that it is possible to lose a lot from merger arbitrage, if the markets turn down. In other words there is a systematic risk inherent in merger arbitrage. Karolyi and Shannon (1998) also calculate the returns of investing in 37 Canadian acquisition targets during 1997 and find that merger arbitrage returns yield an average of 4.78% in excess of the TSE index over an average duration of 57 days per deal, or 33.9% on an annualized basis.

Mitchell, Pulvino and Stafford (2004) study 2,130 mergers between 1994 and 2000 in the U.S. to examine the announcement effects on merging companies. They do not focus on merger arbitrage returns as the above mentioned studies do; instead they find evidence for the existence of short-lived price pressures around mergers. They show that the negative price reaction for acquirers in stock offers reflect downward price pressure caused by merger arbitrageurs' short selling activities. As mentioned in the section on theoretical framework, in stock offers the merger arbitrage strategy is to buy the target stock and short sell the acquirer stock according to the number of shares exchanged. Mitchell, Pulvino and Stafford (2004) prove that the arbitrageurs' short selling activities of this type create a downward pressure on the acquirer's stock. This is further evidence on the downward stock price movement of acquirer companies following the announcement of a deal with stock as the method of payment.

Table 2b. Summary of Past Research on Institutional Setting and Corporate Governance Model in Sweden

<i>Source</i>	<i>Country</i>	<i>Findings</i>
Holmén and Nivorozhkin (2005)	Sweden	Dual class shares reduce the likelihood that family owners will accept the terms of the value enhancing takeover offers. Firm value is negatively affected.
Cronqvist and Nilsson (2003)	Sweden	When the controlling minority structure is family, use of dual class shares, stock pyramids and cross shareholdings is 1.5-2 times more than it is for other categories of owners. Firms with family controlling minority structures are 50% less likely to be taken over compared to other firms.
Huggare and Keskitalo (2003)	Sweden	Family owned acquirer companies prefer acquiring companies that are family owned as well and they are likely to pay high premiums for family owned target companies.

There is limited research on merger arbitrage within Sweden and thus our research on Sweden predominately speaks on the institutional setting of Sweden. Table 2b reports the summary for the research findings in Sweden.

Holmén and Nivorozhkin (2005) study the effect that ownership structure has on firm value through its impact on takeover decisions. They study the relationship between the use of dual class shares and the likelihood of takeovers taking place. From their study, dual class shares reduce the likelihood that an offer will be accepted by family owners since they do not want to lose the non-transferable private benefits of control. Directly related to our third research question, it introduces the relationship between ownership structure and characteristics of mergers and acquisitions and suggests that family owned companies are rarely taken over unless there is a sufficient premium being paid that compensates the owners for the loss of private benefits. Cronqvist and Nilsson (2003) also study the relationship between the likelihood of being taken over and the ownership structure. They find evidence on the likeliness of companies with family owners as controlling minority shareholders being taken over to be less than other companies.

Amihud, Lev and Travlos (1990) investigate how ownership structure motivates the method of payment when it comes to acquisitions, by means of deal structure. Firms that value control would prefer the acquisition to occur through a cash offer since a stock offer would lead to the dilution of control. They prove that when firm control is central, cash offers are implemented; and stock financing is used primarily in acquisitions made by firms who have a more dispersed ownership structure.

Huggare and Keskitalo (2003) focus on bid premiums and ownership structures of the firms. They find family owned companies prefer target companies characterized by family ownership in order to get access to private benefits of control and therefore are willing to pay a premium for these companies. Bid premium relative to the announcement date is the difference between the price offered by the acquirer company and the stock price of the target company at the day of the announcement. Since a merger arbitrage strategy involves buying the target stock, bid premium is positively related with the merger arbitrage returns. Therefore the findings by Huggare and Keskitalo (2003) have strong implications, on which we will build our study.

An overview of these empirical findings indicates two important points. First of all, past studies examine merger arbitrage returns and find strong evidence that it is a profitable strategy in the U.S. Secondly, we see that a substantial amount of research studies the effects that the institutional setting has on firm value and takeover activities in Sweden. We observe that there is a need for a further empirical study describing merger arbitrage returns in relation to factors associated with institutional setting. As mentioned in the introduction, our contribution is to focus on merger arbitrage returns in Sweden, and to provide a comparative analysis that makes it possible to reveal the effects of method of payment and firm specific characteristics, namely deal and ownership structures on these returns.

3. Hypothesis Formulation

Having established the theoretical grounds from past empirical research, we formulate our hypotheses that define our study. We focus on merger arbitrage returns and the effects that family ownership and deal structure have on these returns.

Merger arbitrage generates up to 0.9% monthly abnormal profits in the U.S. (Baker and Savasoglu (2002)). However, no such research has focused on whether it is a profitable strategy in Sweden and if so what the magnitudes of these returns are. It is also interesting to observe that hedge funds, who are the main investors of merger arbitrage, do not specialize in this strategy in Sweden. Therefore we want to test the profitability of merger arbitrage in Sweden and believe that investors, namely hedge funds can use our findings as a guide. Our first hypothesis is formulated as follows:

Hypothesis 1: A diversified portfolio of merger arbitrage returns generates abnormal profits in Sweden.

Travlos (1987) studies the effect of method of payment on the returns to acquirer companies following the announcement of acquisitions. He reports that cash financing has a nonnegative impact however stock financing has a negative impact on the returns to an acquirer company. Jensen (1986) discusses that a company with large free cash flows prefers cash to finance an acquisition rather than stock. We build on these findings which indicate a direct relationship between the way deals are financed and the valuation of acquirer companies, and believe that merger arbitrage returns should be affected by the method of payment as well. Given that cash is a more preferable financing method with positive signalling effects and that the valuation of companies affects the arbitrage spread, we would expect to observe higher merger arbitrage returns in cash offers than in stock offers.

Hypothesis 2: Merger arbitrage returns are higher in cash offers than in stock offers.

We believe the ownership type of the merging companies to have significant impact on the returns that can be generated with merger arbitrage. Family owned companies have access to private benefits of control, which are either pecuniary or non pecuniary. An acquirer company would be more inclined to acquire a family owned company in order to access these benefits and would be willing to pay a higher premium as compensation to the target company for the loss of these private benefits (Huggare and Keskitalo (2003)). The merger arbitrage returns from investing in such a target company would increase with this bid premium which is the driver behind the arbitrage spread. We therefore expect the returns from a merger arbitrage strategy of investing in a family owned target company to be higher than investing in a non-family owned target company *ceteris paribus*.

Hypothesis 3: If a target company is characterized by family ownership, then the returns from a merger arbitrage strategy investing in this given family owned company will yield higher returns than investing in a non-family owned company, ceteris paribus.

An acquirer company with a family ownership prefers cash as the method of payment, in order to avoid control dilution. Amihud, Lev, Travlos (1990) argue that companies with concentrated ownership prefer cash financing in order to avoid the dilution of control and are ready to pay higher premiums for the compensation for maintaining this control. Huggare and Keskitalo (2003) further find evidence that in Sweden, a family owned company prefers a family owned company as the target in order to get access to private benefits of control. Therefore a family owned acquirer is willing to pay a high premium for the target company. We combine these two lines of argument and expect to observe higher return levels for the configuration of the following type within a cash offer; family acquirer – family target.

Hypothesis 4: The returns from merger arbitrage portfolios are affected by the presence of family ownership in the merging companies. The returns are positively affected in the case of a cash offer, when both the acquirer and the target companies are characterised by family ownership.

4. Implementation of Hypothesis

As mentioned in the past empirical research, this paper follows the same methodology as Baker and Savasoglu (2002). In this section we go through this methodology and explain how we proceed with our analysis. At this point, we have to note that we construct our analysis on two major grounds for which we follow two different methodologies. This is due to the different structures of our research questions and the fact that they require a different type of approach. Our first regression analyses test whether any abnormal profits can be generated with merger arbitrage in Sweden and then we identify the conditions to maximize the returns from merger arbitrage. We carry out our analysis in such a way that we observe a funneling effect on the results; we start by all offers, then focus on cash and stock offers separately and finally introduce the effect of ownership structures of the merging companies on merger arbitrage returns.

4.1. Ownership Structure

When we sort the companies according to their ownership structures, we take the distinction between family and non-family ownership as the main criterion. We define family ownership as the case when a family is the largest owner of a company and measure it by the percentage of its voting rights, which represents the controlling power. We take 10% as the cut-off level as Andersson and Nyberg (2005) did for verifying block holders in a company. We want to demonstrate it with an example from our dataset

in the context of our study. In 1991, Prosperitas was acquired by Midway Holding. Olle Olsson Bolagen was the controlling family with 48.3% of the voting rights in Prosperitas. And Midway Holding was owned by Sten Johnson K. Bolag with 40.7% of the voting rights. In this case, it is defined as a merger between a family owned acquirer and a family owned target company.

4.2. Determining portfolio returns

In this section, we explain the methodology that we use for our analysis. A test on the profitability of merger arbitrage returns requires portfolio construction of merger arbitrage positions on a daily basis. With regards to the section on data description, we include a deal in our portfolio one day before the announcement since we want to capture the possible returns sourcing from rumors. This is reasonable since in real world merger arbitrageurs are mainly hedge funds who are well informed investors following market news carefully and are likely to invest in deals at the time when rumors arise. We exclude a deal five days after the share price of the target company converges to the share price offered by the acquirer, unless we know the exact date of completion or withdrawal. The portfolios are rebalanced as soon as a new deal is added. In the subsections that follow, we show the calculation of portfolio returns for three different methods of payments.

4.2.1. Cash Portfolios

In order to create the portfolios of cash offers, the process is straight forward. Each day, we calculate the returns for all active deals in this category. The daily return from each arbitrage position is simply the daily return on the target stock. As can be seen in Equation 1, we calculate the daily return on target firm T for the cash deal i on day t , as the increase in the share price of the target company from day $t-1$.

$$r_{Tit} = \frac{P_{Tit}}{P_{Tit-1}} - 1 \quad (1)$$

4.2.2. Stock Portfolios

As previously mentioned, the investment strategy in stock offers requires the investor to short sell the acquirer stock in addition to buying the target stock. We construct it by taking a short position of Δ shares in the acquirer company, where we hold Δ to be the ratio of acquirer shares exchanged for each target share (i.e. if company A acquires company B by paying with seven shares of company A for ten shares of company B, then Δ would be 0.7).

The daily return for the stock deals has three pieces: the return on the target stock as before, the profit from the short position in the acquirer stock and the risk free return on the short sale proceeds (Baker and Savasoglu (2002)). With this, there are two critical points to mention: 1) we assume that the arbitrageurs do not have access to the short sale proceeds; 2) since there are no short sale proceeds, arbitrageurs need to make an up front investment in the target that is equal to the target price of P_{Tt-1} . The

arbitrageurs will thus receive the return on the target stock, as in the case of cash offers but then will pay out the return on the acquirer stock in excess of the risk free rate for Δ shares. Equation 2, represents the calculation of the daily return from a stock deal i as the difference between the daily return on target stock T on day t and the daily return on acquirer stock A in excess of the daily return from the risk free rate on short sale proceeds for Δ shares, given that an initial investment of $P_{T,t-1}$ is made.

$$r_{it} = r_{Tit} - (r_{Ait} - r_{ft}) \Delta \frac{P_{Ait-1}}{P_{Tit-1}} \quad (2)$$

We show the mechanics behind this calculation with an example from our dataset. NCC announced the acquisition of SIAB on February 18, 1997. The offer was 0.6 shares of NCC for each SIAB share. The share price of SIAB was SEK 39 and that of NCC was SEK 73.1 one day before the announcement. The share prices were SEK 50.5 and SEK 76.1, respectively on the day of the announcement. Given that an up front investment of SEK 39 is made for the target company and the risk free rate is 0.06% on February 17, a merger arbitrageur's SEK return on February 18 from investing in this deal is made up of three pieces:

- Return of SEK 11.5 (SEK 50-SEK 39) from buying one share of SIAB;
- The risk free rate of return on short sale proceeds of SEK 43.89 ($\Delta * P_{Ait-1} * (1+r_f)$);
- Closing the short position of 0.6 shares of NCC at SEK 76.1 for SEK 45.66.

The daily return on the position is then 25% after dividing the sum by the share price of SIAB on February 17 (SEK 39).

4.2.3. Mixed Portfolios

Among the mixed payments of cash and stock, we take the general trend to be approximately a 50/50 split between cash paid for each target share and the number of acquirer shares that are exchanged for each target share. In order to create these portfolios we treat them separately as cash offers and stock offers. With an observed 50/50 split, taking the average of the two would allow us to obtain the return of mixed offers.

$$r_{it} = 1/2 \left[r_{Tit} + \left(r_{Tit} - (r_{Ait} - r_{ft}) \Delta \frac{P_{Ait-1}}{P_{Tit-1}} \right) \right] \quad (3)$$

4.3. Size Effect

In order to test for size effect, we construct the daily portfolios of all offers as well as cash, stock and mixed offers separately both on an equal and value weighted basis. The calculation of equal and value weighted returns is as follows: For equal weighted portfolios, we weight each deal each day equally. It requires rebalancing when we move on to different years since some of the deals were consummated in

the year that follows thereby creating an overlap with the announced ones in that coming year. By this way we find the average of the daily returns in order to come up with our portfolios which we test for.

Value weighted portfolios are more complex in nature. In order to create them, we take the market capitalization of each target company as the basis and create a total portfolio depending on the firms that have activity during the given time. We then weight the portfolio based on the market capitalization of the target company in comparison to the total market capitalization of the target companies in a given daily portfolio. As in the previous case, we need to rebalance our portfolios for some cases when an overlap takes place.

While we test for both equal weighted and value weighted portfolios, we report our results based on the value weighted portfolios because there are no significant differences between the two methods and moreover it is comparable to the market index since the OMXS is a value weighted market index.

Equation 4 represents the calculation of daily portfolio returns, where w_{it} is the weight of deal i on day t either on an equal or a value weighted basis; r_{it} is the daily return from deal, i on day t , whether it is a cash, stock or mixed deal.

$$r_{pt} = \sum w_{it} r_{it} \quad (4)$$

4.4. Compounding the returns

Having calculated the returns from each deal on each day and created daily portfolios on an equal and value weighted basis, we then compound these portfolio returns monthly and describe them according to a benchmark model, namely the Capital Asset Pricing Model. Equation 5 represents our compounding process, where n is the number of days in a month and where deal i is included in the portfolio².

$$R = \prod_t^{t+n} [1 + r_{pt}] - 1 \quad (5)$$

As can be seen above, we use geometric mean return calculation for averaging the daily returns per month which assumes reinvestment of returns in each month.

As already stated, our purpose is to examine whether it is possible to beat the market and to measure the level of abnormal profits that can be made. We further go into more detail, by analyzing the characteristics of returns with respect to firm-specific characteristics, namely the ownership structures as well as methods of payment in the deals. We sort the dataset according to ownership structures of the target and acquirer companies as well as three methods of payment; cash, stock and a mix of both and perform the same type of analysis we do on the overall basis.

² On average, the number of days in a month is 22 however a complication arises for some of the cases when a portfolio is included starting from the second half of a month leaving us with different number of days. Therefore we needed to control for these cases and compounded the returns based on the actual number of days that a portfolio is included in a month in each case.

5. Data

The data set collected includes 324 recorded mergers and acquisitions within Sweden in various stages of the process. Of these, we exclude 146 deals due to missing information such as market capitalization, stock price information, and for regressions regarding ownership structure, no ownership structure information. This therefore decreases the number of deals in ownership structure regressions. The criterion for the data set is that we restrict our attention to those companies that were listed on the OMX Stockholm Stock Exchange. In the case of cash offers, our portfolio strategy makes it possible to analyze the cases where the acquirer was a private firm but the target firm was public. We focused on those that we could reach complete information coverage related to the event that is defined by the announcement date, the method of payment and the deal size. Further, both the target and the acquirer are Swedish companies and any cross border mergers are excluded. We also restrict our data to those deals where the method of payment was pure cash, pure stock or mix of both cash and stock. The data was recorded by the Thomson Financial DataStream, SixTrust and Bureau Van Dijk between 1985 and 2005.

A general overview of the dataset reveals some important figures. The breakdown of the deals into cash and stock shows that the number of stock offers has increased as the period does. We observe a cluster of stock offers in the second half of the dataset. This is inline with the trend to the Swedish economy during this time frame and it is also in line with the general stock market movement over the time period under consideration. The economic slowdown in the beginning of 1990s had clearly an effect on the mergers and acquisitions as can be seen from the substantial increase in the total number of deals especially after 1999.

Table 3. Details for the excluded data

Reason for Exclusion	Number of Deals
no target stock price data	25
no target stock price data or market capitalization	15
no target stock price data or announcement date	2
no target stock price data or announcement date or maket capitalization	6
no acquirer stock price data	43
no acquirer stock price data or market capitalization	50
no acquirer stock price data or announcement date	5
<i>Total</i>	<i>146</i>

5.1. Coding the data

For each deal, we use a variety of sources to obtain the information needed. The Zephyr data base by Bureau Van Dijk provides a brief summary of each offer, including the announcement date, market capitalization, and deal structure for deals starting in 2000. As stated above, we restrict our data to those which provide pure cash, pure stock offers or a combination of both. For deals from 1985

through 1999, we received our data set from Martin Holmén, which includes information such as announcement date, market capitalization, and deal structure.

In order to get ownership structure for the mergers, we cross referenced our data with the data sets of Magnus Andersson, who had compiled a very comprehensive data set that included ownership structure for 1985 through 2002, which was updated to 2005³.

5.2. Sample selection

Our final sample for total merger and acquisition offers contains 178 offers. We have 126 pure cash offers and 29 pure stock offers and 23 combinations of cash and stock offers.

Table 4. Total Deals broken out by Year and Deal Type

	All Deals		
	Cash	Stock	Mixed
1985	5	0	2
1986	7	3	3
1987	3	0	2
1988	17	0	0
1989	6	0	1
1990	16	0	2
1991	10	1	1
1992	0	1	0
1993	2	2	0
1994	5	3	0
1995	10	1	3
1996	3	1	2
1997	2	4	2
1998	4	1	0
1999	13	1	0
2000	5	1	1
2001	3	1	2
2002	3	1	1
2003	6	1	1
2004	4	4	0
2005	2	3	0
Total	126	29	23

Table 4 shows the breakdown of the each of the offers per year and Appendix 2 shows all the deal names. As one can see, there are three different high periods of merger and acquisition activity. During the early 1990s, there is a spike in merger activity, which is again seen in the mid 1990s predominately from cash offers. Finally from the late 1990s until today, there has been a relatively high rate of mergers and acquisitions, which once again are predominately cash offers, with stock offers becoming stronger than they had been a decade earlier.

³ Frederik Upåker updated

From Appendix 3, one can see the breakdown of our merger activity by ownership structure and deal structure. Predominately, we see that cash deals still make up the majority of the merger activity during our time period, with an increase in stock merger activity as the period progresses.

5.3. Independent Variable Data

We need a measure for risk free rate and the market index in Sweden in order to perform the regression analysis of excess merger arbitrage portfolio returns on the CAPM. We use the 90-day Treasury bill rate recorded from Sveriges Riksbank for the risk free rate. The 90-day Treasury bill is a standard measure in the United States and therefore would be a good choice for the risk free rate in Sweden as well. Interesting to note, as the rate has drastically dropped from when our study was first started. In 1985, it was around 12%. Currently the risk free rate is set at slightly below 2%.

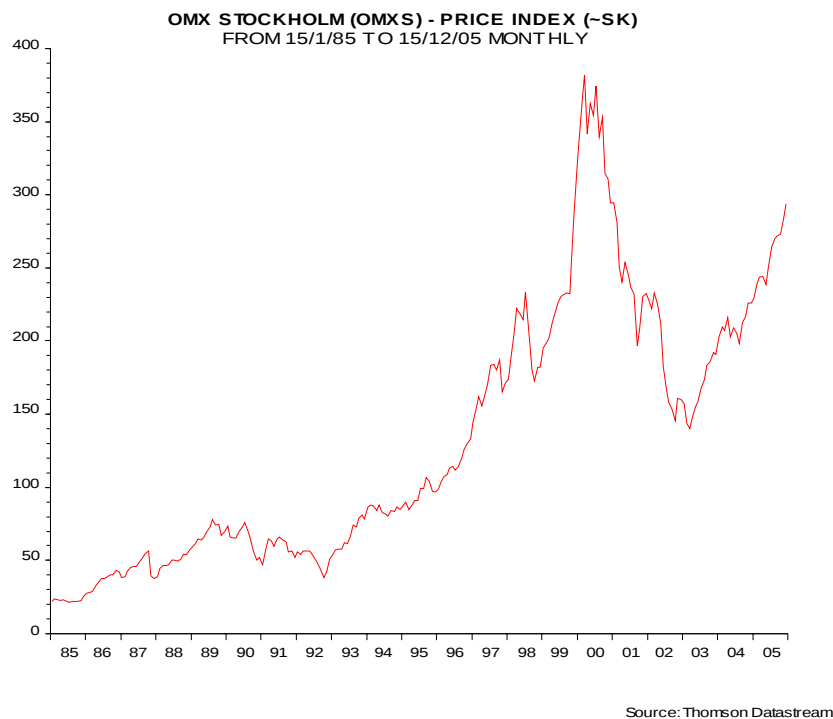


Figure 2. OMXS Price Index

For the market return, we use the OMX All Share Price Index (OMXS), which in the Nordic region is thought of as the most utilized and known market index. The OMXS is a value weighted index which includes around 300 stocks on the exchange. Figure 2 shows the development of the price index for the period of our study.

Based on this data, we calculate the excess portfolio returns and carry out the regression analyses.

6. Descriptive Analysis

Table 5. Descriptive Statistics of Portfolio Returns and Results of Mean and Median Difference Tests

Presented here are the mean, median and standard deviation measures for cash and stock portfolios. The last column shows the significance tests on the mean and median differences between the two types of portfolios.

Total Portfolio	Mean	Median	St Dev	CASH -STOCK	
				Mean Difference t-test (p value)	Median difference Sign test (p value)
Cash	0,33%	0,07%	0,72%	0,046**	0,576
Stock	-0,11%	0,14%	2,50%		

*10% significance level, **5% significance level. Mean and median tests are for two independent samples; p values indicate the significance of the differences from one-sided tests:

H_0 : CASH-STOCK=0

H_A : CASH-STOCK>0

Table 5 reports the descriptive statistics of the monthly portfolio returns for cash and stock offers. It also shows two significance tests for the mean and median differences between cash and stock offers. We see that portfolios of cash offers generate an average monthly return of 0.33%, whereas those of stock offers generate a negative 0.11%. The standard deviations indicate a higher volatility for stock offers. Interesting to note, we observe that the median for stock offers is a positive value of 0.14% quite different from the mean measure of -0.11%. Therefore we make a further analysis of the data set and find that in December 1999, the monthly return has been -18.90%. We believe it to be an outlier that causes this divergence from mean value for stock offers and make the same analysis by excluding this outlier. The mean, median and standard deviation values after exclusion are 0.05%, 0.14% and 1.77%, respectively, pointing out to a positive average return and a lower standard deviation than before.

We use t-test in order to test whether there is a statistically significant difference between mean values of cash and stock offers. The t-test for mean difference shows that monthly portfolios of cash offers generate significantly higher average returns than those of stock offers. When we exclude the outlier, the result is the same but at a significance level of 10% (p value is 0.087). The median difference test does not indicate the same results both with and without the outlier (p value, without the outlier is 0.319). Although we will perform a regression analysis on the significance of abnormal profits from portfolios of different offers, this result is in line with our second hypothesis: *Merger arbitrage returns are higher in cash offers than in stock offers.*

Table 6. Descriptive Statistics of Portfolio Returns based on the Family-Non Family Distinction in Target Companies

This table presents the descriptive statistics of the portfolios constructed according to four main distinctions. The mean, median and standard deviation are seen when the method of payment is cash and stock and the target ownership is family and non-family. Last column shows the significance tests on the mean and median differences between cash and stock offers. Last row shows the same test performed between family and non-family ownerships

DESCRIPTIVES-TARGET								
	CASH			STOCK			CASH-STOCK ¹	
	Mean	Median	St Dev	Mean	Median	St Dev	Mean Diff t-test	Median Diff Sign test
FAMILY	0,44%	0,02%	1,11%	-0,25%	0,10%	1,73%	0,012**	0,183
NON-FAM	0,22%	0,02%	0,64%	-0,11%	0,09%	2,82%	0,769	0,656
FAM-NONFAM ²	Mean Diff (t-test)							
	0,019**			0,635				
	Median Diff (Sign test)							
	0,641			0,344				

*10% significance level, **5% significance level. Mean and median tests are for two independent samples. p values indicate the significance of the differences from one-sided tests:

¹H₀: CASH-STOCK=0

H_A: CASH-STOCK>0

²H₀: FAM-NONFAM=0

H_A: FAM-NONFAM>0

Table 6 reports the descriptive statistics of monthly returns from portfolios created based on the distinction in ownership structure of the target companies within cash and stock offers. It further provides the significance tests for mean and median differences according to two criterions; between cash and stock offers by controlling for ownership structure and between family and non-family owned companies, by controlling for the method of payment.

As can be seen, the average monthly returns to merger arbitrage in cash offers (0.44% and 0.22%) are significantly higher than in stock offers (-0.25% and -0.11%) whether the target company is family or non-family owned. For family owned target companies, this difference is significant at 5% for which we use t-test whereas for non-family owned target companies it is not significant. The medians are 0.02% in cash offers for both family and non-family owned target companies. However they are 0.10% and 0.09% for family and non-family owned targets, respectively in stock offers. We again suspect that this huge difference between negative average monthly returns and positive medians is due to the existence of outliers and find that there exists one extreme negative return (-15.26% in December 1999) in case of non-family targets. By excluding it, we find that mean, median and standard deviations in stock offers for non-family owned targets are 0.10%, 0.16% and 1.94%, respectively. The results for significance tests are not affected when we make the exclusion and the difference in means is not significant in the case of non-family owned targets.

To make a comparative analysis between family and non-family owned target companies, we first look at the cash offers. It can be seen that the average return to monthly portfolios for family owned target companies (0.44%) is higher than to those for non-family owned target companies (0.22%). Moreover, this difference is significant at 5% as proved by the t-test. When we turn our attention to stock offers, we see that on average investing in deals where targets are family owned generates lower returns than when they are non-family owned. This result is strengthened when we exclude the

outlier (-15.26%) in non-family target companies. However, there is not a statistically significant difference between family and non-family owned target companies in stock offers.

Although a regression analysis will follow, we can see that these results are consistent with our third and fourth hypotheses. *Investing in target companies who are family owned generates significantly higher returns than investing in non-family owned target companies when the method of payment is cash.*

Table 7. Descriptive Statistics of Portfolio Returns based on the Family-Non Family Distinction in Acquirer Companies

The descriptive statistics for portfolios constructed for cash and stock offers as well as according to the ownership criteria in acquirer companies.

DESCRIPTIVES-ACQUIRER								
CASH			STOCK			CASH-STOCK ¹		
	Mean	Median	St Dev	Mean	Median	St Dev	Mean Diff t-test	Median Diff Sign test
FAMILY	0,59%	0,04%	1,25%	0,22%	0,15%	0,72%	0,011**	0,054*
NON-FAM	0,28%	0,03%	0,76%	-0,16%	0,13%	2,23%	0,165	0,165
FAM-NONFAM ²	Mean Diff (t-test)		0,070*			0,096*		
	Median Diff (Sign test)		0,092*			0,360		

*10% significance level, **5% significance level. Mean and median tests are for two independent samples. p values indicate the significance of the differences from one-sided tests:

¹H₀: CASH-STOCK=0

H_A: CASH-STOCK>0

²H₀: FAM-NONFAM=0

H_A: FAM-NONFAM>0

Table 7 follows the same line of analysis but this time the consideration is the acquirer companies. As can be seen, the average monthly returns to portfolios of cash offers (0.59% and 0.28%) are higher than those to stock offers (0.22% and -0.16%) whether the acquirer company is owned by a family or not. The difference is significant at 5% for in the case of family owned acquirer companies. The comparison between medians points out to higher values for stock offers however when we perform the significance tests, we see that the median for cash offers is statistically higher than stock offers in the case of family owned acquirer companies at 10%.

Finally we look at the distinction between ownership structures. When the offer is cash, we see that investing in deals where the acquirer is a family owned company generates higher returns on average than when it is non-family owned. This difference is significant at 10%. The same follows for stock offers where the difference is also significant at 10%. Median for the family owned acquirer companies is significantly higher than the median for non-family owned acquirer companies.

Overall, we observe significantly higher returns for cash offers than stock offers. Moreover family ownership in target companies is positively related with merger arbitrage returns. We find evidence for having significantly higher returns from deals where the acquirer company is family owned although the results being not as strong as in the case of target companies.

7. Regression Analysis

Our purpose is to test whether it is possible to earn abnormal profits with merger arbitrage and if so, to specify the conditions that maximize the returns. In our approach we take an investor perspective and create merger arbitrage portfolios to perform our analysis. Thus far, we have described the monthly returns from these portfolios and made a comparative analysis on these return levels based on different methods of payments as well as different ownership structure types of the merging companies. In this section we perform a regression analysis in order to benchmark our returns to the market index and test whether merger arbitrage generates abnormal profits. We choose to use the Capital Asset Pricing Model (CAPM) since it describes the relationship between risk and expected return and that is used in the pricing of risky securities. We describe the CAPM with explanations of the variables in equation 6.

$$r_p - r_f = \alpha + \beta(r_m - r_f) + \varepsilon \quad (6)$$

Where, r_p is the monthly return from the portfolio p , r_f is the 90-day Treasury Bill rate in Sweden and r_m is the monthly compounded returns from OMXS (OMX All Share Price Index).

8. Results

Since we are testing for abnormal profits from merger arbitrage portfolios and specifying the conditions to maximize profits from merger arbitrage in Sweden, we report our results in a funneling effect, where we first analyze all offers combined, then follow the same analysis to test for the effect of different methods of payment and finally go one more step to test for the effect of family ownership. As a final analysis, we examine the cross section of event returns in order to be able to test for any interaction effects but we explain it in detail in the section on the final regression model.

8.1. The returns to Merger Arbitrage Portfolios

8.1.1. All Deals

Table 8. Regression Results for All Offers

	N	R ²	Intercept		R _m -R _f	
			Alpha	p-value	Beta	p-value
Total Portfolio	219	0,0020	0,0000	0,862	-0,1980	0,473

The combined effect of merger arbitrage does not lead to encouraging returns. From the 219 observations, our R² levels are at slightly above zero at 0.2%, indicating that the CAPM is hardly explaining the variability in the return levels. We do not observe any abnormal profit. These results indicate that merger arbitrage does not generate abnormal profits when applied on a diversified basis by investing in cash, stock and mixed offers. This is quite an interesting finding for our analysis and leads us reject our first hypothesis.

Hypothesis 1 A diversified portfolio of merger arbitrage returns generates abnormal profits in Sweden.

8.1.2. Deal Structure

Prior to focusing our analysis on the relationship between ownership structure and merger arbitrage returns, we perform a regression analysis of the returns from merger arbitrage portfolios with a specific consideration on deal structure. This is our data set which has not been filtered according to the information we have on ownership structure of companies. Table 9 shows the results for cash and stock offers.⁴

Table 9. Regression Results Controlling for Method of Payment

	N	R ²	Intercept		R _m -R _f	
			Alpha	p-value	Beta	p-value
Method of payment						
Cash	172	0,0004	0,0021	0,000***	0,0490	0,807
Stock	115	0,0623	-0,0033	0.142	-2,2913	0,007***

*10% significance level, **5% significance level, ***1% significance level

As can be seen above, R² is zero in case of cash offers, indicating that the CAPM is not explaining the variability in the monthly excess returns. However, we observe a strongly significant monthly abnormal profit of 0.21%.

The results for stock portfolios have an R² of 6.23% and stock portfolios do not generate any abnormal profit (p value is 0.142). Further, we observe an extreme result for the coefficients of excess market returns; level of -2.29, significant at 1%. We believe the negative correlation of the returns on these portfolios with the market index to be a combination of several factors. First of all, we have already shown in the section on descriptive analysis that the merger arbitrage strategy investing in stock offers is not profitable in Sweden. Now we provide a statistical proof on the risk and return characteristics of these portfolios. The return levels are lower than risk free rate on average and have a high level of market risk. Having a negative beta with a high absolute value specific to stock offers may indicate that short selling as an investment strategy is the driving factor behind this result. The basic intuition is that short selling is based on selling a security which is currently high in price with the anticipation that it will go down in the future, and therefore an investor makes money if the stock price goes down.

We can also attribute this outcome to the specific characteristics of the time period we study. First of all, the past research of this type focusing on profit levels has covered a period up to 2000. This means that two major world-wide stock market events have not been taken into consideration; the high tech stock bubble which burst following the year 2000 and the attacks that occurred on September 11th 2001. The effect of world-wide market downturn was seen in Sweden as well; with a significant drop in return levels of the Stockholm Stock Exchange. However, one interesting point to note is that during the same time period, as already mentioned in the section on hedge fund industry, the Six Harcourt

⁴ The regression results for mixed offers are highly insignificant therefore we focus on the results for cash and stock offers.

Hedge Fund Index maintained the upward trend and constantly outperformed the market index throughout this period (Appendix 1). Since merger arbitrage is a strategy employed by hedge funds and returns for hedge funds are negatively correlated with the market during this time period, we believe the negative correlation that we observe between merger arbitrage portfolios in stock offers and market returns to be reasonable to an extent.

As a result, our analysis indicate that we can not reject our second hypothesis

Hypothesis 2: Merger arbitrage returns are higher in cash offers than in stock offers.

8.1.3. Family Ownership

In this section, we introduce the results from our regression analysis performed on the distinction between family and non-family ownership in merging companies. We perform eight regression analyses through which we control for family ownership in target and acquirer companies separately for two cases when the method of payment is cash or stock. As before we run our regressions for both equal and value weighted excess monthly portfolio returns; however, report only the ones on value weighted basis since we do not observe any significant differences.

8.1.3.1. Target: Family vs. Non-Family

Table 10 presents the regression results in cash and stock offers when the target company is characterized with family and non-family ownership.

Table 10. Regression Results Controlling for Method of Payment and Family Ownership

The table shows the regression results for the portfolio returns constructed on the basis of the distinction between ownership structure of the target company and the method of payment. The column is the family/non-family distinction, the two rows show the results for cash and stock offers, respectively.

CASH						
OWNERSHIP TYPE	N	R ²	Intercept		R _m -R _f	
			Alpha	p-value	Beta	p-value
FAMILY	132	0,0000	0,0030	0,000***	0,0064	0,984
NON-FAM	149	0,0056	0,0009	0,088*	-0,1867	0,366
STOCK						
FAMILY	60	0,0120	-0,0041	0,078*	-0,6566	0,405
NON-FAM	56	0,2738	-0,0041	0,213	-5,4013	0,000***

*10% significance level, **5% significance level, ***1% significance level

We see that merger arbitrage portfolios investing in cash offers generate monthly abnormal profits of 0.3% and 0.09% measured by the intercept term, α in the CAPM when the target company has family and non-family ownership, respectively. The abnormal profit in case of family owned target companies is the highest and statistically significant at 1%, in line with our expectations.

When we look at the second panel of Table 10, we observe that for stock offers, portfolios investing in family owned target companies generate negative excess return of 0.4% significant at 10%. The descriptive analysis has also indicated the non-profitability of stock offers and therefore it is not surprising to observe that when a company acquires a family owned company and pays with stock; investing in this deal generates significant losses. What is interesting to observe though is the negative coefficient for the excess market return for the non-family owned target company. The coefficient for excess market return is a negative 5.401 and significant even at 1% level with an R^2 of 27%. It can be explained by the bias in our dataset towards the number of deals that took place when the target firm had non-family ownership and the method of payment was stock. There are only 13 deals of this type covering a time period of 1994 to 2005. Secondly, as already shown in the descriptive analysis merger arbitrage has generated negative returns for stock offers on average with a high standard deviation. We can easily infer that it is not a profitable strategy in addition to the higher level of risk associated with it.

Overall, we still observe the cash portfolios doing better than others and stock portfolios generating losses for the investors. We can conclude that investing in a target company which has a family ownership structure, regardless of the ownership structure of the acquirer company, can generate a monthly abnormal profit of 0.3% when the method of payment is cash in the corresponding deal. Therefore, we can not reject our third hypothesis.

Hypothesis 3: If a target company is characterized by family ownership, then the returns from a merger arbitrage strategy investing in this given family owned company will yield the highest returns.

8.1.3.2. Acquirer: Family vs. Non-Family

We present the results from the regression analyses when the consideration is the acquirer company in Table 11.

Table 11. Regression Results Controlling for Family Ownership and Method of Payment

The table shows the regression results when the acquirer is owned by a family and non-family for the cases when the method of payment is cash and stock.

CASH						
OWNERSHIP TYPE	N	R^2	Intercept		$R_m - R_f$	
			Alpha	p-value	Beta	p-value
FAMILY	66	0,0021	0,0042	0,016**	-0,2105	0,716
NON-FAM	58	0,0226	0,0013	0,199	-0,3547	0,260
STOCK						
FAMILY	67	0,0023	0,0009	0,311	0,1390	0,700
NON-FAM	31	0,1824	-0,0057	0,149	-3,3730	0,017**

*10% significance level, **5% significance level

As can be seen, the abnormal profit from cash portfolios is 0.4%, significant at 5% level. R^2 comes in at 0.2%. Results for stock portfolios do not indicate any significant abnormal profits. Building

on the results from the cases when the consideration was the target company, we observe a tendency for better results when having the acquirer with a family owner in the portfolio rather than having a non-family owned acquirer.

The coefficient of excess market return is negative and statistically significant at 5% in case of non-family owned acquirer companies within stock offers. The resemblance of this result with the case of target being a non-family owned company is worth noting. First, there are once again a low number of observations for this category creating a bias for the results. Moreover, the average returns generated by this strategy are negative pointing out to the unprofitable nature of this strategy in stock offers.

The R^2 for non-family owned acquirer firms in cash offers is 2.3% and in stock offers, 18.2%, which is higher than what Baker and Savasoglu (2002) found, who report R^2 of 9% for all offers on an aggregate level.

Once again, we observe the cash portfolios doing better than others and stock portfolios generating losses for the investors. We can conclude that investing in an acquirer company which has a family ownership structure, regardless of the ownership structure of the target company, can generate a monthly abnormal profit of 0.4% when the method of payment is cash in the corresponding deal.

8.1.4. Final Analysis

Based on our analysis thus far, we have answered the first three hypotheses defining our study. To summarize, merger arbitrage does not generate abnormal profits when applied as an overall strategy investing in all deals with any kind of method of payment; cash, stock and mixed. However investing merely in cash deals does generate abnormal profits of around 0.2-0.4% per month. Moreover we find that when the target company is characterized with family ownership, the monthly abnormal profit is a significant 0.3% (1% significance level).

The implications of this study are that in order maximize profits one should invest in a cash offer with a family ownership structure in the target firm. A portfolio of merger arbitrage positions in all offers would not necessarily generate abnormal profits, and this is mainly due to the stock offer component, which is negative in almost every scenario except when the acquirer is a family firm.

We want to go further with our analysis and define the best deal that an investor can pick in order to maximize his merger arbitrage returns. This requires a final regression model where we can also test for the interaction of factors that explain the returns. To be explicit, we describe the methodology as well as our model in the following sections.

8.2. Cross Section of Event Returns

Since we want to analyze the returns to merger arbitrage on a deal-by-deal basis, we need a cross section of event returns which makes it possible for us to focus on each deal. To do that, we calculate the daily returns from investing in each deal as before however in this case, we do not need a portfolio

construction. After calculating the event returns, we compound them monthly with the same method we used for our merger arbitrage portfolios. Equations 7, 8 and 9 represent how we calculate the event returns in cash, stock and mixed offers respectively.

$$r_c = \prod_{t=1}^T [1 + r_{Tt}] - 1 \quad (7)$$

$$r_s = \prod_{t=1}^T \left[1 + r_{Tt} - (r_{At} - r_f) \Delta \frac{P_{At-1}}{P_{Tt-1}} \right] - 1 \quad (8)$$

$$r_m = \prod_{t=1}^T \left[1/2 \left[r_{Tt} + \left(r_{Tt} - (r_{At} - r_f) \Delta \frac{P_{At-1}}{P_{Tt-1}} \right) \right] \right] \quad (9)$$

As a result, we have a cross section of 129 monthly event returns. For this analysis we further filter our data set we have been using thus far but this time focus on deals for which we have ownership structure information of both target and acquirer companies simultaneously. The breakdown of the filtered dataset into different configurations of ownership types as well as the different methods of payments can be seen in Appendix 4. The figure shows that the majority of the deals are realized between companies who are either both owned by families or non-families. Moreover, cash is preferred as a method of payment in majority of the cases.

8.2.1. Descriptive Study on Event Returns

Before we carry out the regression analyses, we make a further analysis of the final cross sectional data; we categorize 10 best and 10 worst deals in terms of generating the highest and lowest monthly returns. Furthermore, we find out the time periods where there took place the least and the highest number of deals. This is a backwards study showing a guide for hedge funds on how the best deal is characterized and when it took place. In other words, we want to provide a description of the deals that hedge funds should pick in order to maximize their returns by grasping a better understanding of the characteristics of deals that affect the return levels. We believe this is necessary in order to create a sound platform for our regression models that will follow.

Table 12. Categorization of 10 Best and 10 Worst Deals

	10 BEST	10 WORST		
<u>Method of Payment</u>				
Stock	1	4		
Cash	8	2		
Mix	1	4		
<u>Ownership</u>				
Family-Family	3	4		
Family-NonFamily	2	1		
NonFamily-NonFamily	3	3		
NonFamily-Family	2	2		
<u>Deal Information</u>				
	Mean	Median	Mean	Median
Bid premium ¹	47%	49%	25%	23%
Days to completion	52	44	154	138
Market Capitalization ²	512	194	3672	288

¹ Bid premium is the difference between the offer price and the stock price of the target company at the day of the announcement.

² Market capitalization is x1 million.

Table 12 shows the deals which generate the highest and lowest returns with respect to the method of payment, ownership structure and three pieces of information defining a typical deal. When we look at the method of payment, we see that 8 out of 10 best deals are associated with cash offers. From another dimension, only two cash offers are categorized as worst offers. The category of ownership structure does not reveal any significant inclination however it can be seen that the best deals are those which have merging companies of the same ownership type. However when we look at the worst deals, we see that 4 of them are characterized by family owned merging companies. We move on to the last panel and see that the average and median bid premiums are much higher in 10 best deals than in 10 worst. The days to completion and the market capitalizations of the target companies are lower in 10 best deals than in 10 worst.

Keeping in mind that these results are not based on any significance tests, we still believe that they indicate important characteristics that make merger arbitrage profitable. Apparently, best deals are the ones with higher bid premiums, a result which is in line with our expectations. It also takes a shorter time period on average for those deals to be completed. Finally the target companies are smaller in size which is measured by market capitalization. While we avoid any strong inferences from the findings of this categorization, it is interesting to note that the result for the size effect is consistent with Fama and French (1993), who report a negative relationship between average returns and size based on the Fama-French Three Factor Model.

A final question still remains regarding the best deals the hedge funds should pick. Performing a backwards study, we want to see if there exist any time specific effects in order to define the deal that generated the highest return and find when it took place. Below is the representation of the number of deals from 1985 to 2005 and the corresponding event returns in each year.

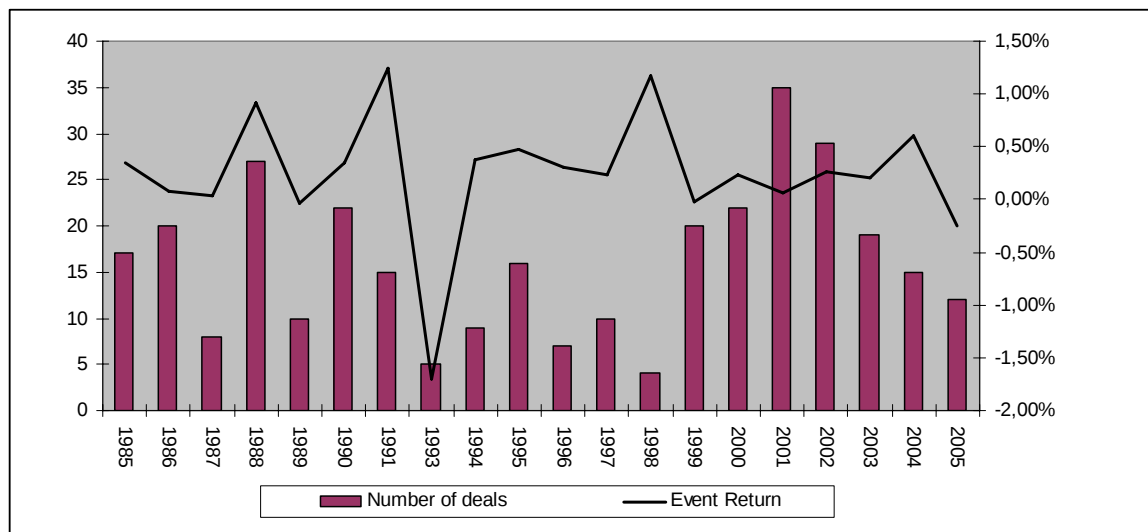


Figure 3. The comparison of the number of deals over 1985-2005 and the event returns

In figure 3, the columns represent the total number of completed deals that took place each year; these numbers also include the deals that we had to exclude from our sample data set due to a lack of information represented above in the data section. We rely on the core number of deals since we want to show the trend in the mergers and acquisitions market. The line shows the average event return in each year. These returns are based on our cross section data of 129 deals⁵.

When we look at the graph, we observe that from 1988 to 1997 and from 1999 to 2000 there is a positive relationship between the number of deals and the return levels. Other than that, we see a negative relationship. Moreover the figure also shows that the highest returns correspond to 1988, 1991, 1998 and 2004 and the lowest return to 1993. In our regression analyses that follow, we want to test whether the trends we observe throughout time in our technical analysis possess any statistical significance.

8.2.2. Regression Analysis

Based on these findings, a final regression model in principle may take into consideration the qualitative variables: ownership structure, method of payment, time period as well as other explanatory variables such as bid premium, days to completion, and the size of the target company. However, we limit our analysis to the qualitative explanatory variables; namely the ownership structures of the merging companies, method of payment in the deal and the year that the deal took place in order to keep consistency in our analysis thus far. We also test for the interaction effects.

In our model, the excess event return on a particular deal is the dependant variable. We consider returns in excess of the 90-day Treasury bill rate in order to capture the holding costs within the

⁵ We do not have any return in 1992 since we had to exclude the two deals due to missing ownership structure information for at least one of the companies.

holding period. Our regression model is such that it further explains how the returns from merger arbitrage can be maximized.

What we want to see is a comparison of returns that can be generated by different combinations of ownership structures and deal structures for which we use method of payment as a proxy. Having performed regression analyses of various configurations of ownership type and method of payment, we decide upon a final model of dummy variables, where there are four main categories of dummy variables created according to combinations of ownership structures of the target and the acquirer companies. We then introduce two more models including the interaction dummies with method of payment. Below are the three main regression models.

$$r_i - r_f = D_{FF} + D_{FN} + D_{NN} + D_{NF} + e_i \quad (I)$$

$$r_i - r_f = D_{FFC} + D_{FNC} + D_{NNC} + D_{NFC} + e_i \quad (II)$$

$$r_i - r_f = D_{FFS} + D_{FNS} + D_{NNS} + D_{NFS} + e_i \quad (III)$$

Here, r_i is the event return from deal i and r_f is the 90-day Treasury bill rate. In model I we see four dummy variables created on the basis of family ownership of target and acquirer companies. For instance D_{FF} takes a value of 1 if the target and the acquirer companies are both owned by *families* and 0 otherwise. D_{NF} takes a value of 1, if the target company is owned by a *non-family* but the acquirer is owned by a *family* and 0 otherwise. In models II and III we examine the interaction effects. For instance, D_{FFC} takes a value of 1, if both of the companies are *family* owned and the method of payment is *cash* and 0 otherwise. D_{FFS} takes a value of 1, if both of the companies are *family* owned and the method of payment is *stock* and 0 otherwise. We do not include any intercept in our models in order to avoid multicollinearity that can result in dummy variable trap.

8.2.3. Regression results

Table 13

This table shows the results from 3 OLS regression models, denoted by (I), (II) and (III). Excess event return defined above is the dependant variable in each case. (I) is the regression model where the dummy variables are based on the configuration of target/acquirer being family/family; family/non-family; non-family/non-family; non-family/family. In (II) dummy variables are the interactions of the ownership structure with method of payment being cash. In (III) the interaction effect is between ownership structure as before and stock payments. p values can be seen in parentheses.

	D_FF	D_FN	D_NN	D_NF	D_FFC	D_FNC	D_NNC	D_NFC	D_FFS	D_FNS	D_NNS	D_NFS	R ²	N
(I)	0,325% (0,023)**	0,272% (0,312)	0,243% (0,098)*	0,029% (0,883)									0,48%	129
(II)					0,559% (0,001)***	0,229% (0,362)	0,314% (0,079)*	0,294% (0,214)					8,23%	129
(III)									-0,260% (0,430)	-0,025% (0,980)	0,067% (0,849)	-0,871% (0,050)**	3,53%	129

*Significant at 10%, **Significant at 5%, ***Significant at 1%

Table 13 presents the regression results of monthly excess event returns on dummy variables created according to ownership structures of the merging companies and the methods of payment. We perform regression analyses based on three OLS regression models as can be seen in (I), (II) and (III).

When we look at the results from the first model, we see that the dummy variables are positive and statistically significant when both the target and the acquirer companies are characterized by the same type of ownership structures. The coefficient for the dummy variable for both companies being acquired by families is statistically significant at the 5% level and implies that if family owned companies acquire companies which are also owned by families, the returns from a merger arbitrage strategy investing in this type of deals, independent of the method of payment, would yield on average 0.325% per month. With the same token, if non-family owned companies acquire companies which are also characterized by non-family ownership, a merger arbitrage strategy investing in this type of deals would yield on average 0.243% per month, again independent of the method of payment.

The second regression model takes into consideration the interaction effects of when the method of payment is cash in addition to the configuration in (I). We can see that the coefficient for the interaction dummy variable, which controls for the case when both of the companies are family owned and when the deal is characterized by a cash offer, is statistically significant at 1%. It implies that when a family owned company acquires a company that is also family owned and pays with cash, the returns from a merger arbitrage strategy would yield on average 0.56% per month. The result would be 0.31% for the case when both companies are characterized by non family ownership and the method of payment is cash. However it is significant at only 10%.

In the third regression model, the consideration is the stock offers. We can see that it is possible to lose money from a merger arbitrage strategy for all of the cases except non-family/non-family configuration. However, our results are not statistically significant except for one case which is the non-family/family configuration which is a result interesting to note. This dummy represents the group where a family owned company acquires a non-family owned company and finances the deal with a stock offer. We examine this group in order to explain the mechanism behind this result and see that there are only 5 deals of this type, one of which corresponds with the outlier we excluded in our descriptive analysis. It is the merger between Guide Konsult AB and Framtidsfabriken announced in December 1999 and investing in that deal yields -3.40% compounded monthly. When we run (III) by excluding this deal, we see that the coefficient for the dummy variable D_NFS is -0.23% with a p value of 0.635, which points out to the insignificance of it.

Based on the significance of the dummy variable for the category, we construct the last regression model which includes the time effect that we mentioned in the descriptive study section. For our analysis we create seven time dummy variables for the years with the highest number of deals based on a cut off level of 20 deals. The lowest number of deals is based on a cut off level of 5, in other words we consider a year with less than or equal to 5 deals as the year with the lowest number of deals. (IV)

shows the final regression model we construct based on the established significance of the two dummy variables.

$$r_i - r_f = D_{FFC} + D_{88} + D_{93} + e \quad (IV)$$

D_{88} and D_{93} take value 1, if the years of the deals are 1988 and 1993, respectively. 1988 has 27 deals and 1993 has 5. The results of the regression are shown below.

Table 14. Regression results from the model (IV)

	D FFC	D 88	D 93	R ²	N
(IV)	0,572% (0,001)***	0,574% (0,063)*	-2,149% (0,001)***	17,94%	129

*Significant at 10%, **Significant at 5%, ***Significant at 1%

Interesting to note, we do observe statistically significant dummy variables for 1988 and 1993. We see that the deals that took place in 1988 generated 0.57% monthly excess returns on average, significant at 10%. Whereas deals in 1993 generated negative 2.15% on average, significant at 1%. All the deals that we have in our cross section have cash as the method of payment in 1988. In 1993, among the two deals one has cash and the other has stock. Here we again observe the strong effect of cash as the method of payment on the returns. Therefore we believe these findings strengthen the effect of method of payment.

The final regression analysis has strong implications for our fourth and final hypothesis. The regression results indicate that the way to maximize the returns from a merger arbitrage portfolio is to invest in mergers and acquisitions, where the method of payment is cash and both companies are owned by families. Therefore we do not reject the final hypothesis and conclude that: *The returns from merger arbitrage portfolios are affected by the presence of family ownership in the merging companies. The returns are positively affected in the case of a cash offer, when both the acquirer and the target companies are characterised by family ownership.*

As mentioned above, the implication of this study to maximize your profits is to invest in a family/family structure with cash payment. This way you will obtain a .56% profit per month, which is almost twice as much as you can earn from the second highest strategy of non-family/non-family. Therefore we recommend hedge funds to seek these types of investments.

9. Discussion and Conclusion

The purpose of our study was to examine the returns from merger arbitrage in Sweden with respect to their risk and returns characteristics and reveal the factors that can help maximize the returns from this strategy. We focused mainly on deal structure for which we took method of payment as a proxy and firm-specific characteristics for which we took ownership structure as a proxy. We believe

that this study achieved its purpose by providing a well established picture of mergers and acquisitions market in Sweden and having strong implications for the characteristics of merger arbitrage returns. We further believe that this study can be of guidance for hedge funds in Sweden who consider specializing in merger arbitrage or having it as a part of their investment strategies.

We find that merger arbitrage is a profitable strategy in Sweden when the method of payment is cash. A merger arbitrageur can further maximize his profits by further investing in deals where both companies have family owners. When the method of payment is stock, the same does not hold true and it is possible to lose from merger arbitrage in that case. The profitability of merger arbitrage is in line with Baker and Savasoglu (2002) although the amounts of abnormal profits that we have clarified as 0.2% to 0.4% per month are less than what has been found in the U.S. which ranges from 0.6% to 0.9% per month. We conclude that this is due to the institutional setting that is unique to Sweden.

9.1. Suggestions for Further Research

New questions always arise when one goes further with the analysis and it is very difficult to cover all the issues in a specific research. Likewise, we have performed an extensive analysis on merger arbitrage in order to answer our research questions however there is still more that can be done. As merger arbitrage is becoming a hotter topic, further research should be taken to further understand the implications of it. For instance, the negative returns to stock offers need further analysis. A case study on special cases of stock offers might highlight interesting results. Moreover, a study using the FAMA French Three Factor Model as a benchmark in addition to the CAPM would have interesting results since this model takes into account the factors such as the firm size and market to book ratios. A final regression model could also be constructed in order to explain the variability in the event returns to a greater extent by including explanatory variables such as bid premium and target size.

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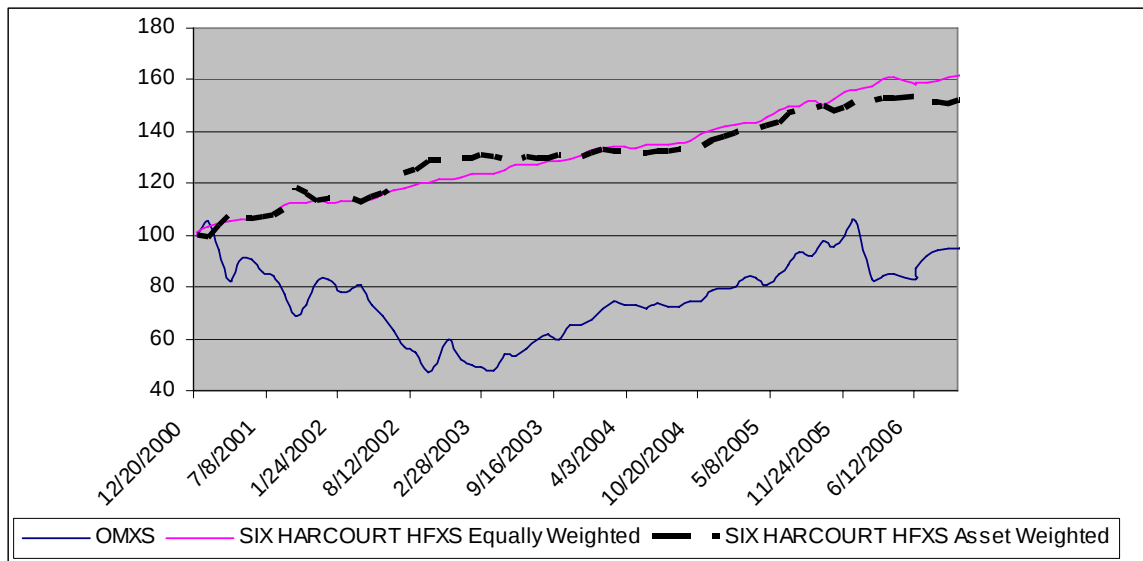
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11. Appendix

Appendix 1 OMX vs. hedge fund indices



Appendix 2 List of all 178 mergers and acquisitions

Target	Bidder	Date	Offering
Abu Garcia	Berkely	1999-05-31	cash
Adamas Industrier	Proton Invest	1994-06-29	cash
AGA	Linde	2003-08-17	cash
Ainax	Scania AB	2004-11-19	stock
Alfa-Laval	Tetra Pak	1995-01-30	cash
Allgon	LGP Telecom Holding AB	2003-01-21	stock
Allhus	Familjen Nordqvist	1994-01-23	cash
Althin Medical	Baxter Sweden	2003-12-23	cash
Anesco	Sporrong	1990-01-03	stock
Anticimex	Skandia + Länsförsäkringar+Wasa	1995-12-22	cash
Anza	Jordan	1993-06-17	cash
Aranäs	Luxonen	1996-06-12	stock
Arete	Turnit	2004-09-14	stock
Aritmos	Proventus	1998-12-16	cash
Arjo	Getinge Industrier	1999-07-14	mixed
ASG	Danzas AG	2003-04-27	cash
ASTICUS	IVG Holding AG	2003-03-09	cash
Atlantica	Invik & Co	2001-02-22	cash
AU-System	Teleca	2001-12-10	stock
Avesta Energi	Gräninge	2002-01-17	cash
AxTrade	Axel Johnson AB	1997-03-18	cash
Bahco	Industrivärden	1995-10-18	cash
Bastionen Syd	Klövern	1998-01-04	stock
Benima Ferator Engineering	Sigma	2002-09-22	cash
Betong Industri	BTG-Invest	1993-11-07	cash
Beväringen	SPP	1994-03-17	cash
Bohus	Catena	1992-03-04	cash
BPA	Procuritas Capital Partners II	2003-04-28	cash
Brio	Proventus Industrier AB	2004-07-28	cash
Broströms	ASEA	1992-03-17	cash
Brukens Nordic	EQT Industrier	1999-06-03	cash
BTL	Stinnes AG	2003-02-02	cash
Bulten	Finnveden	2004-09-22	cash
Caran	WM-Data	2002-12-15	cash
Cardo	Incentive	1998-04-26	cash
Celsius	Saab	2003-11-17	cash
Celsius	Saab AB	2003-11-17	cash
Componenta	Svedala Industri	1995-10-11	mixed
Constructa	Olsson släkten	1994-04-10	cash
Convexa	BGB	1994-03-21	cash
Cranab	Walmet-Scantrac	1992-06-23	cash
CynCrona	OEM International	2001-01-03	stock
Dacke Invest	Industrivärden	1993-12-19	cash
Dahl	EQT + Ratos	2003-02-12	cash
Depenova	Skrinet, Felländer & Möllefors	1994-10-06	cash
Diligentia	Skandia Liv	2004-03-21	cash
Dimension	ProAct IT Group AB	2003-11-24	mixed
E ON Scandinavia	Sydskraft AB	2001-02-21	cash
Edebe	WM-Data	1993-06-21	mixed
Edstrand	Familjen Edstrand	1991-09-15	cash
Ellos	ICA	1992-03-30	cash
Enator	Pronator	1991-02-04	mixed
Enator	Celsius	1998-11-08	cash
Eniro	Scandinavia Online AB	2001-11-20	cash
Enström	Esselte	1992-09-15	cash
Epsilon	Danir AB	2003-01-10	cash
ESAB	Charter Plc	1998-06-29	cash
Essve Produkter	Engros AB Ferro	1995-05-07	mixed

Target	Bidder	Date	Offering
Export-Invest	Investor	1998-03-15	stock
Fastighets	LjungbergGruppen AB	2003-06-13	cash
FB Industri	Bergman & Beving AB	2000-06-10	cash
Finansrutin Data	Förenade Liv	1997-03-04	cash
Finnveden	Cidron Invest AB	2004-11-15	cash
Finnveden	Cidron Invest AB	2004-11-17	cash
Fjällräven	Naturkompaniet AB	2001-05-31	mixed
Focal	Telelogic AB	2005-04-13	stock
Fortet	Plinius	1994-03-07	cash
Frantextil	New Wave	2002-01-14	cash
Frigoscandia	ASG	1999-08-08	mixed
Fristads	Kansas E.O.	1999-06-29	cash
Fundia	Fundiaintressenter	1995-05-16	cash
Gambro	Incentive	2000-01-03	cash
Gibeck	Hudson RCI	2003-05-13	cash
Gorthon Lines	Cardo	1997-03-05	stock
Gorthon Lines	B&N Nordsjöfrakt AB	2004-10-07	stock
Gorthon Lines	B&N Nordsjöfrakt AB	2004-12-23	stock
Graninge	Sydskraft AB	2003-11-04	cash
Guide	Framtidsfabriken	2003-12-03	stock
Guldfynd	Lagonda	1989-06-25	cash
Haki	Österlen	1990-05-22	cash
Hasselfors	AssiDomän	1999-09-05	cash
Hemglass	Hexagon	1992-02-06	cash
Hemstaden	Diös	2000-09-17	stock
Hexagon	Munksjö	1994-06-06	cash
Hilleshög	Volvo	1989-11-22	cash
HNB	HNB Intressenter	1994-02-27	cash
Horda	Trelleborg	2000-09-03	cash
HP-Färg	BPA	1994-05-04	cash
Hufvudstaden	Diligentia	2001-08-07	stock
Höganäs	Kanthal	1990-07-01	mixed
Hötorget	BGB	1993-03-24	cash
IAR Systems	Nocom AB	2004-12-22	stock
IAR Systems	Nocom AB	2004-12-23	stock
IDK Data	Frontec	1994-05-15	cash
Incentive	ASEA	1994-04-03	mixed
Intelligent Micro Systems Data	Martinsson	2002-02-18	cash
Inter Innovation	De La Rue Plc	1995-10-23	cash
Ivars bil	Philipson Bil	1990-08-23	cash
Johnson Pump	Skrinet	1992-04-27	cash
KapN	Atle	1999-04-02	cash
Karolin Invest	Atle	1999-11-21	cash
Kebo	Beijer Invest	1991-02-10	cash
Kipling	Dimension	2001-12-17	mixed
Klövern	Wihlborgs	2001-09-12	mixed
Kontorsutveckling	Esselte	1992-04-14	cash
Kramo	Securum	1998-03-16	cash
Kuben	Aritmos	1990-04-18	mixed
Kylmaterial (Kylma)	Sekretären	1989-09-21	cash
Leo	Pharmacia	1990-07-05	stock
LIC Care	Getinge Industrier	1999-06-07	cash
LKB	Pharmacia	1990-10-09	cash
Martinsson	Atle	2003-09-17	cash
Memory Data	Memory International	1994-10-02	cash
Monark Stiga	Grimaldi Industrikoncern	2003-11-20	cash
Monitor	Argonaut	1990-03-01	stock
Movexa	J & W	1994-02-13	mixed
Måldata	Sigma	2003-12-17	stock

Target	Bidder	Date	Offering
N&T Argonaut	Simbel	2003-11-16	cash
Nederman	Active	1989-06-30	cash
Nessim	Home Hotel	1990-06-11	cash
Nisses	AP-fond	1993-03-07	cash
NK	NCC	1997-04-02	stock
Norden Export	Norden International	1994-12-21	cash
Nordström & Thulin	Argonaut	2001-11-25	stock
Näckebo	Drott	2002-09-09	cash
Opus	Custos	1992-12-02	cash
Pandox	APES Holding AB	2003-11-22	cash
Partnerinvest	Atle	1999-04-02	cash
Pendax	PX Intressenter	1992-07-30	cash
Perbio Science	FSII Sweden Holdings AB	2003-06-27	cash
PriFast	Balder	2003-03-02	cash
Printcom	Östlund	1992-04-16	cash
Produra Capital	Atle	1999-04-02	cash
Prosparitas	Midway Holding	1995-03-21	cash
Provobis	Scandic Hotels	2004-04-13	mixed
Pulsen	Familjen Bartholdson	1995-10-30	cash
Radiosystem	Ericsson	1992-06-22	cash
Rang Invest	Öhmans	1990-11-04	cash
Realia	Welkins Intressenter AB	2003-03-13	cash
RKS	Sigma AB	2004-05-06	stock
Rörvik Timber	Ittur Industrier AB	2005-06-30	cash
Scandiafelt	Scapa Group	1995-11-20	cash
Scandinavia Online	Eniro	2001-12-18	cash
Scandinavian PC Systems	PC-Systemer ASA	2003-03-23	mixed
Scansped	Bilspedition	1989-12-04	cash
Scapa	Apax	1992-12-13	cash
SIAB	NCC	2001-02-19	stock
Sifab	Tornet	2000-10-05	mixed
Skoog	Trelleborg	2001-08-26	cash
Skåne-Gripen	Skanska	2000-06-11	cash
Song Networks Holding	Tele2 Sverige AB	2004-09-22	cash
Spectra-Physics	Thermo Instrument Inc.	2003-01-08	cash
Sporrong	Prosparitas	1992-06-24	cash
Stancia	Prifast	1999-06-13	stock
Stena Line	Stena AB	2004-10-31	cash
Stena line	Stena	2004-10-31	cash
Stockholms Badhus	Skandia	1991-02-10	cash
Storheden	Wihlborgs	2002-04-15	stock
Svedbergs	Svedbergs Intressenter	1993-11-25	cash
Swedish Match	Stora	1992-03-11	cash
Swegon	Latour	1999-04-04	cash
Svenska Fläkt	ABB	1992-02-25	cash
Swepart	Hexagon	2000-08-27	mixed
Sydsvenska Dagbladet	Marieberg	1998-01-25	stock
Tax Free	Invent Management	1994-05-11	cash
Teleca	AU-System AB	2001-12-10	stock
Thomé-Hörle	Thomé-Hörle Intressenter	1995-02-21	cash
Thorsman	Bahco	1994-08-21	cash
Tornet	LRT Acquisition AB	2003-10-21	cash
Transatlantic	Bilspedition	1992-08-19	cash
Tre konsulter	3K Holding	1990-12-12	cash
Tresor	AGA	1990-04-18	mixed
Trio	Netwise AB	2001-10-25	mixed
Trio	Netwise AB	2001-04-21	stock
TurnIT	Nocom AB	2004-12-22	stock
Wermia	Ahlmark & Co.	1995-03-01	cash
VIAK	VBB	1994-02-07	cash
VLT	Mediaintressenter PLMS AB	2004-08-31	cash

Appendix 3 Number of Deals broken out by target/acquirer and ownership

	Target					
	Family			NonFamily		
	Cash	Stock	Mixed	Cash	Stock	Mixed
1985	0	0	1	1	0	1
1986	2	0	0	1	0	2
1987	2	0	1	1	0	0
1988	6	0	0	7	0	0
1989	1	0	1	2	0	0
1990	11	0	2	5	0	0
1991	8	0	0	2	0	1
1992	0	1	0	0	0	0
1993	1	1	0	0	0	0
1994	1	1	0	4	1	0
1995	1	1	0	3	0	2
1996	1	0	1	2	1	1
1997	1	3	0	0	0	2
1998	0	0	0	3	2	0
1999	6	0	0	7	1	0
2000	1	0	1	4	1	0
2001	1	0	1	2	1	1
2002	2	0	0	1	1	1
2003	2	1	0	4	0	1
2004	2	1	0	2	3	0
2005	0	1	0	2	2	0
Total	49	10	8	53	13	12

	Acquire					
	Family			NonFamily		
	Cash	Stock	Mixed	Cash	Stock	Mixed
1985	0	0	1	1	0	1
1986	1	1	0	0	0	1
1987	0	0	1	3	0	0
1988	3	0	0	6	0	0
1989	1	0	1	1	0	0
1990	7	0	1	5	0	1
1991	7	2	2	0	0	0
1992	0	0	0	0	0	0
1993	1	0	0	0	1	0
1994	2	2	0	1	1	0
1995	2	1	2	5	0	1
1996	2	0	0	1	1	2
1997	2	3	0	0	1	2
1998	3	0	0	1	1	0
1999	9	1	0	3	0	0
2000	3	0	0	2	1	1
2001	1	0	1	2	1	1
2002	1	0	0	2	1	1
2003	3	0	0	3	0	1
2004	1	3	0	2	1	0
2005	0	1	0	2	2	0
Total	49	14	9	40	11	12

Appendix 4 Matrices of target/acquirer and ownership

ALL OFFERS				
Target		Acquirer		TOTAL
		Family	Non-Family	
	Family	47	13	
	Non-Family	25	44	
				129
CASH				
Target		Acquirer		
		Family	Non-Family	
	Family	33	9	
	Non-Family	16	28	
				86
STOCK				
Target		Acquirer		
		Family	Non-Family	
	Family	9	1	
	Non-Family	5	8	
				23
MIX				
Target		Acquirer		
		Family	Non-Family	
	Family	5	3	
	Non-Family	4	8	
				20

