Short selling in the Netherlands

Master thesis

Name: Daniël Sybe Klamer

Supervisors: Dr. X. Huang
Prof.dr. M.R. Kabir

University of Twente

Table of contents

1 Introduction

Since the outburst of the financial crisis short selling has gained attention in the Dutch news. The Dutch financial network station, RTL Z covers short selling activities from time to time and public opinion often blames the short sellers for negative returns. In the Dutch stock market there are examples of short selling that attracted a lot of attention. For example Imtech, ASMI, and the SNS Reaal case (RTL Z, 2013). The SNS Reaal eventually was nationalized by the Dutch government to prevent a bankruptcy. The increase of attention to short selling activities in the Netherlands has been triggered by new European regulation and publication of the short selling interest by national authorities. From November 2012 onward, European regulation obligates parties (natural and legal persons) to report any significant short position in Dutch stock market (Regulation (EU) Nr. 236/2012, article 6). The Dutch Authority Financial Market (AFM) publishes short position if the position reaches 0.5% or more of the issued shares. This information is published on a daily basis to the market in the Short Selling Register (SSR). Besides the short positions, the SSR also reveals the identity of the short seller. The EU regulation aims to increase and guarantee the functioning of the internal financial market of the European Union. Besides the disclosure of positions, the regulation also bans naked short selling. Before continuing this research, the concept of short selling needs a concise introduction.

Investors often have a different view on the stocks in the stock market. There is a divergence of opinion in the market as Miller (1977) calls it. Therefore not all investors will make the same estimate of the risk, return and consequently the price of a stock that they are willing to pay for. If a stock in the view of the investor is undervalued, he would expect an increase in the price. He should buy the stock for the lower price and wait for his expected price increase. Overvalued stocks, from the perspective of the investor, should not be bought because he expects a price decrease. An investor that expects a decline in the stock price, will sell the stock if he has any. If he does not own the stock and still wants to trade according to his view that the stock is overvalued, he can short sell the stock. He sells a stock that he does not own for the high price and buys the stock back after his expected price decline to return the stock back to the lender. He will profit from the difference in price between his moment of sale and him rebuying the stock. So, investors that take a short position in a certain stock expect a decline in the stock price and profit from that decline, in contrast with *normal* investors with a long position in the stock. Trading in order to profit from an expected price decline can be achieved in different ways and with multiple instruments.

The short seller sells a stock that he does not own in the expectation of buying it back when the price has decreased, making the difference his profit. Before he can sell a stock, he has to borrow it from another investor or a third party like a broker (and pay a lending fee).

After a certain amount of time, the short seller closes his position, by buying the shares on the market and returning them to the lender. This will deliver him a profit, if the stock price has indeed declined like he expected. If the stock price has moved into the opposite direction of his expectation, he will lose money on his short position. The table below shows a (simplified) example of a short sell at time t.

Time	Number of stock owned	stock price	bank account
t	-100	€20	€2000
t+1	0	€15	€500
t+1 alternative	0	€25	- €500

Table 1: Simplified example of short selling and the possible profit resulting from the investment

In the example above, the short seller sells 100 shares at time t for €20. That gives him €2000 in cash. If his view is correct and he closes his short position at t+1 when the price is down to €15, he has to pay €1500. The result is a profit of €500, but he also has to pay a fee for borrowing the shares from another investor. If his view is incorrect and the stock price rises to €25 in the alternative he has to pay €2500 to cover his short position of 100 shares. This results in a loss of €500, plus the cost for borrowing the shares.

With other investment instruments the same result can be accomplished. An investor can sell a call option without owning the stocks. If an investor would sell (write) a call option, it has to deliver the stocks if the buyer would exercise the option, although he did not own the stock when he sold the call option. Therefore, if the option is exercised, he has to buy the stocks on the market and deliver them to the buyer of the option. This will lead to a loss of the writer of the call option, because the buyer will only exercise the option if the price of the stock is above that of the option's strike price. But, the short seller (writer of the option) makes a profit if the stock price declines, the options he sold are now (almost) worthless.

The use of short selling as presented above is speculative. According to the view of the investor, he goes either long or short in a particular stock. Short sellers are sometimes perceived to be unethical, because they profit from the losses of others and a decline of the stock price. There are other reasons, instead of speculation, of how short selling can be used as an investment instrument. It can be used for hedging purposes or arbitrage trading. For hedging purposes short selling can be used to lower the risk of the total investment of an investor. In arbitrage trading, short selling in combination with buying the same security in a different product or through derivatives, the investor can profit from mispricing.

Like in any form of investing there are risks when investors use short selling. The risks involved with short selling is different from a long position. The maximum risk with a long position is the initial price the buyer pays for the stock, because in the worst case scenario share will be worthless, a loss of 100%. The potential return on a long investment has no limit, the price can continue to increase. The contrary is true for a short position. A stock's price downside is limited to zero, while it has no upper limit. So if an investor has a short position in a stock, there is an unlimited risk if the price increases (in the opposite of what he expected). Investing with a long position can create a maximum loss of 100% of the initial investment, while the maximum loss of a short position can become more than 100%.

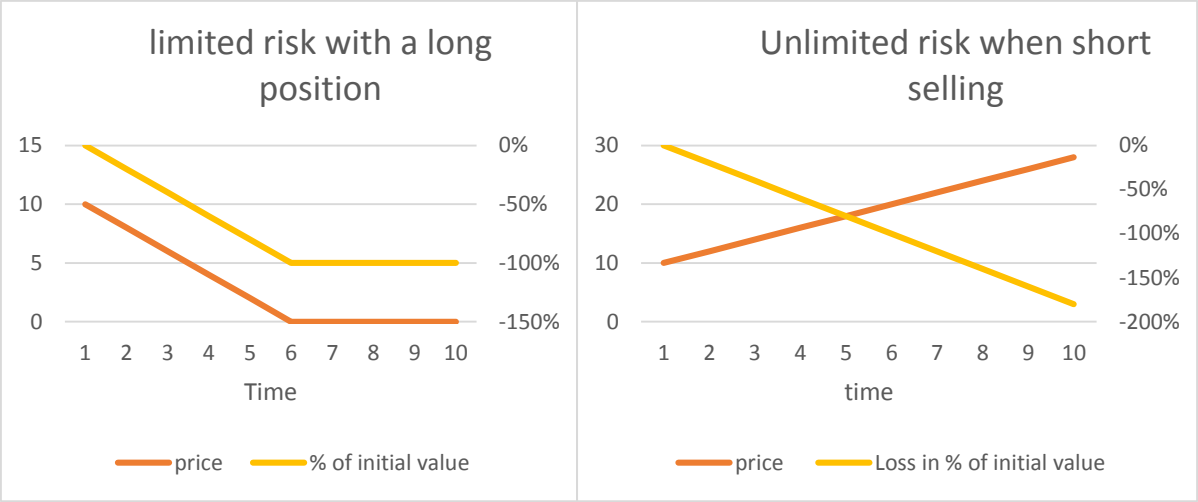

Figure 1: Visual presentation of the potential loss of a long position and a short position when the stock price moves in the opposite direction of the expectation of the investor. The Y-axis's represent the price of the stock in euro (left) and the loss of the investment as a percentage of its original value (right). The loss of a long position is limited to 100% of its initial value.

Short selling has also attracted attention of researchers. The effects of short selling has on the market and especially the stock price has been studied. Often these studies focus on the USA, UK markets, with some exceptions that focus on Australia, Hong Kong and South Korea. On the European markets there is not a lot of research available, not counting the UK. This is related to the lack of data on short selling activity that is available. Since 2012 there is data available on the European stock markets and the short selling activity. This this study focuses on the Dutch stock market. It will contribute to the gap in the literature on the Dutch stock market. In the specific case of the Netherlands there is no research on the effects of short selling on the market and stock returns. In this research the short selling data used differs from other academic research. The data is constructed based on the short selling register of the AFM which contains daily *net* short positions of investors. The net short positions are expressed as percentage of the total issued share capital of a particular company. Besides the availability of data, the interest of the public and the media in short selling has increased over the last years. With the financial crisis and a negative conjecture of the economic people are looking for someone or something to blame. Short selling and short sellers became one of the prime suspects to blame. Furthermore, the practice of short selling is often perceived as unethical. This is strengthened by a limited understanding of short selling in general. Offering an objective view and research specific on the Dutch stock market could contribute to better understanding and informed public opinion on short selling.

1.1 Research objective, motivation and structure

An investor is always interested in the return of his investment. Combined with the different risk involved in short selling, it is an interesting subject. Academic literature has often tried to explain changes in return and find relations between the risk, characteristics of the stock and companies and other possible related subjects to the return of the investment.

In this research the concept of short selling, the different reasons or motives for short selling will be described. A literature review will describe different aspect of short selling in relation to the market, informed trading and stock return. The objective is to find a relation between short selling and abnormal stock return in the Dutch stock market.

In order to reach the objective of this research it is structured as following, first the concept of short selling will be described. Including the motives for this investment strategy and other instruments that investors can use. Following the relative literature on the subject of short selling is described. This will be addressed from a theoretical and empirical perspective and literature on short selling. Additionally literature on informed investors and short selling will be presented as well as herding behavior in the stock market. Next the relation between short selling and stock return will be reviewed with relevant literature. This section presents three perspectives on that relation of short selling and return based on different findings.

The fourth chapter will describe short selling specifically in the Netherlands, present the European regulation and the introduction of the short selling register.

In the fifth chapter the hypothesis and methodology of this research are described. After this chapter the data is presented in the sixth chapter with the results following in the seventh chapter. The last chapter contains the conclusion and discussion section.

2 Stocks, markets and short selling

In the Netherlands the only legal entity allowed to an initial public offering and listing at a stock exchange is a Naamloze Vennootschap (NV). This legal ownership structure allows multiple owners with shares. Every share represents a small piece of the company, which in total represent the entire company. The shares are tradable to anyone willing to buy the share. In order to sell shares to the stock market, share will be issued through an initial public offering (IPO). This creates the first supply of shares to the market. An IPO of a company is led by an investment bank or a syndicate of banks known as the underwriters. In the time before the IPO the public offering price is determined and the amount of share the company issues. The proceeds of the IPO will flow to the company issuing the share. The shares are the total issued share capital and can be traded by their new owners. In order to facilitate trading of shares the stock exchange bring buyers and suppliers together and lists the latest trade prices of public traded stocks. In the Netherlands the stock exchange is located in Amsterdam. Stock market supply and demand set the price in a stock exchange. Every trade sets a new share price equilibrium, because at that time a buyer and a seller agree for a certain price. In general the rules of supply and demand determine the price at any moment in time. The latest price is a reference point for other investors that are considering to buy or sell a certain stock. Demand is created by investors that want to buy a stock. Supply on the stock market is created by owners of a stock that want to sell a stock. If supply is created from already issued shares the total issued share capital available on the market will remain the same. In contrast, if the supply is a result from new, formerly non-issued shares the total supply increases. The latter will create shares that were previously unavailable to the market.

2.1 What is short selling?

Short selling is selling a stock that an investors does not own. The stock can be borrowed from a third party like a broker, bank or institutional investor. By short selling the stock the investor will have a negative position in the stock, or a short position. He can close this position by buying the same stock at a later time, returning it to the lender. The short seller can profit from the trade if there are lower prices at the moment of closing his short position. Borrowing the stock creating a short position requires the investor to meet additional requirements, such as maintaining a margin account. Therefore short selling is only for professional investors who are able to meet those conditions.

While expecting a decrease in the share price, resulting in lower rebuy price for the short seller when closes his negative position, he risks an increase of stock price. The short sellers is eventually obligated to buy the share back at a higher price than he originally received for it, resulting in a loss on the trade. The additional costs of the lending fee that needs to be paid for the share during the time of the short position, leads to less possible return of the investment. The table below presents actors involved in short selling and the cash flow involved (simplified) with short selling.

Time	t	t+1	t+2	t+3
Actors				
Short seller:				
Cash	+ P_t	-fee	-fee	- P_{t+3}
Stock position	-1	-1	-1	0
Lender (stock owner)				
Cash		+fee	+fee	
Stock position	1	1	1	1
Buyer / Market				
Cash	-P_t			
Stock available	1	1	1	0

Table 2: simplified overview of the actors involved in a short sell with the cash flow and stock position. With P_t is the stock price at time t.

The table shows that all actors in the short selling process can profit from short selling. The short seller has an instrument to invest and act according to his negative view. The owner of the share has an opportunity to increase his return on his investment with a fee for lending his share. The buyer of a stock on the market will have more supply on the stock market to buy from, that could offer him a better price. In this example the short seller would first borrow the share, before selling the share. When selling shares there is a time difference between the transaction of selling the share and the delivery of the share, the settlement date. In theory this offers short sellers a limited time window to even short sell a share without borrowing it. As long as they will rebuy a before the settlement to close their position. This is called naked or uncovered short selling. In the current regulations this is banned in the European Union. (Regulation (EU) No 236/2012 article 1:19). The costs of the lending fee depend on several factors. For example if there are large institutional investors with long term investment horizon, willing to gain some extra return by lending the stocks it will be lower than a small illiquid stock with a few shares on the market. The access to borrowing facilities is something that is important for professional investors who want to short sell.

There are different reasons why investors use short selling as an investment instrument. It can be used to reduce risk in a portfolio, for hedging, arbitrage or speculative purposes. In order to reduce the overall risk of a certain portfolio a negative position in certain stocks or other instruments (i.e. short selling) can contribute to a more efficient portfolio. In general an efficient portfolio is that combination of financial instruments and positions that delivers the highest return in respect to the risk that suits the investor. For hedging purposes a short position in a financial instrument that is negatively related to another financial instrument to reduce risks. An investor that has a long position in the index could short individual stocks as a hedging strategy. Other investors that use arbitrage strategies are also involved in short selling. With arbitrage, focusing on mispricing and small valuating differences between similar assets, investors combine long and short positions. Short selling from arbitrage purposes does not involve investors trading on an expected price movement in any direction. Speculation with short selling allows investors expecting a price decline. Short selling for a speculative motive is the contrary to normal long investors that buy a stock. The investor has a negative view on a certain stock and expects a decline in the price of the stock. In order to make a profitable trade, the return of the short selling must exceed the costs of the short sell trade.

2.2 Alternatives for short selling

Investors with a negative view on stocks and expecting a price decline can use other instruments than short selling. An alternative is using derivatives to construct a short position. Derivatives are financial instruments that derive value from an underlying asset. There are several derivatives that can be used like options, futures or forwards. Options are one of the most known derivatives in the stock market and can be used for the purpose of betting against a stock. There are two type of option contracts, call and put options, that both can be used for trading on an expected lower price. A brief explanation of options and the possible ways to use them as a substitute of short selling will be described.

Option contracts are based on a specified underlying asset, a strike price and an expiration date. An option contract with a specific stock as underlying asset generally involves the trade of 100 shares. Options can be bought or sold, the seller of an option is also known as the writer of the option. The first type of an option is a call option. A call option is the right, not obligation, to buy an underlying asset at a specific price (strike price). The second type is a put option, it does not give the buyer the right to buy a stock for a specified prize, but provides an option to sell a share for a set price. An option is only valid for limited time period, until the expiration date. After the expiration date, the option expires and is no longer valid and has no value. The value of an option contract depends on the underlying assets price and a premium. That premium depends primarily on the expiration date and volatility of the underlying asset. If an investors uses his right to buy or sell the underlying asset for the strike price of his option, he exercises the option. An option will only be exercised by the owner if the difference between the strike price and market price offers an economical benefit. Otherwise he could buy or sell the stock for a better price on the market. The writer or seller of a call option has the obligation to deliver the shares (call option) or buy the shares (put option) if the option is exercised. If he option expires, he will profit from the premium he received from selling the option.

Without getting into complex combinations possible using both call and put options, an investor with a positive view on a stock can use call and put options in two ways. He buys a call option with a strike and exercises the option when the market price increases above the strike price. He will profit from the option because he can buy the stock cheaper than the current market price. Or he can sell a put option and receive the premium, assuming the put options strike price will be lower than the increased stock price on time of expiration. In both cases the investor will profit from an increase in stock price. When expecting a price decline in the underlying asset of the option, an investor can do the opposite. He can buy a put option, this gives him the right to sell share for a higher price than he expects in the market. Or he can sell a call option and receive the premium paid by the buyer. It will obligate him to delivers shares to the buyer of the option, but expecting a lower price, the option will not be exercised before expiration date.

3 Literature review

The section is structured to begin with literature on short selling and the effect on the stock markets as a whole. It presents literature on the effect of short selling and price discovery in the stock market. Following are the restrictions on short selling and the possible effects and implications of those restrictions. The next subject of the literature is informed investors with a focus on short sellers. This will contribute to the understanding of possible relations between short selling and stock returns. Also some literature about herding behavior in investments will be described. Finally the literature on the relation between short selling and stock return is presented. This literature is divided by three perspectives with different findings on that relation.

3.1 Short selling and market quality

Market quality is something that is desirable. Marsh and Payne (2012) measure the quality of the market with the following variables, trading activity, liquidity, efficiency and price discovery. Where a higher trading activity, higher liquidity, higher efficiency and a quicker price discovery indicate a higher quality market. Timely and transparent dissemination of information contributes to an efficient market. Research suggests that short selling increases price efficiency and incorporates bad news into the stock price, improving the price discovery process. When short selling is prohibited or restricted, efficiency of the market decreases.

Theoretical evidence from Miller (1977) argues that in a world of uncertainty there will be investors with a divergence of opinions and expectations on stocks. Restricting one side of those investors from the market will create a bias in the stock prices. Restricting short selling, the investors with a negative expectation, will lead to an overvaluation of securities. Only the opinions of investors with positive expectations of the market are reflected in the prices. In his model short selling contributes to the efficient pricing of stocks, improving the quality of the market. Additionally, the work of Diamond and Verrechia (1987) use rational expectation in their model. They suggest that the market will change according to the knowledge that short sales are constraint. Constraining short selling leaves only informed short sellers in the market, who expect a return from their trade higher than the costs related to the restrictions. The finding based on their theoretical model also finds that short selling increases speed of information processing in stock prices.

Other recent literature of Boehmer and Wu (2013) shows that short selling leads to more accurate stock prices using data from 2005 through 2007 published by the NYSE. These results show that short selling should not be restricted or prohibited because of its positive effect on efficient stock pricing. Other studies look at the costs and volume of markets as an estimate for its efficiency. Marsh and Payne (2012) find evidence that short selling contributes to a more efficient market on all the measurements they use, trading activity, liquidity, efficiency and price discovery. They find that during the temporarily ban on short selling in the UK between 2008 and 2009, liquidity fell, trading costs increased and trading volume fell. More extensive research comes from Bris, Goetzmann and Zhu (2007), they use worldwide data of 47 countries and find a negative relation of short sales restrictions and the diffusion of value-relevant information into prices. This is consistent with the view that short selling increases market efficiency. Also Beber and Pagano (2013) investigate the effects of the temporary bans in 2008 and 2009 within 30 countries (including the Netherlands) and find that short selling bans were detrimental for liquidity and slowed down the price discovery process.

In the empirical research of Aitken et al. (1998) it is the transparency of short selling that should be desired. Absence of transparent short sale may potentially inhibit the market's ability to impound relevant information according to the authors. In the setting of their research, short sale information is instantly available to the public and contributes to the efficiency of the market. Another argument for short selling comes from Massa, Zhang and Zhang (2012). They find that short-selling reduces the incentive for managers to earnings manipulation, thus suggesting that short-selling contributes to a better market.

3.2 Restriction of short selling

Reasons that short selling is restricted and regulated comes from governments´ belief that short selling could destabilize the market. Additionally the unlimited risks involved with a short selling requires regulation. The motivation for the EU Commission to monitor net short positions is explained in article 1:7 of the EU regulation, the regulation enables regulators concerned: "to monitor and investigate short selling that could create systemic risks, be abusive or create disorderly markets". Also in the USA the Security Exchange Commission (SEC) has a history of restriction and prohibiting short selling from the market. The SEC motivates restriction of short selling because unrestricted short selling could exacerbate a declining market in a security by increasing pressure from the sell-side, eliminating bids, and causing a further reduction in the price of a security by creating an appearance that the security price is falling for fundamental reasons, when the decline, or the speed of the decline, is being driven by other factors. (Securities Exchange Act Release No. 54891, 2006). The AFM does believe that short selling could have beneficial effects for the stock market and often includes such statements in official communication documents related to restrictions, for example the publication of the Temporary restriction (AFM, 2008)

Short selling is restricted by different legal constructions in the markets. Extreme market conditions allows the competent authorities of an EU member to act, according to article 1:26 of the regulation. Banning all short selling is one of those instruments. The ban on short selling can imposed on an entire market or selected sectors and stocks. In the Netherlands short selling was banned for financial institutions at the beginning of the financial crisis until June 2009 (AFM, 2009), just as the UK did in 2012. Also other EU members enacted temporarily bans on short selling during the extreme market conditions of the financial crisis. Another well-known restriction on short selling in the USA is the uptick rule. This rule was in effect since 1938 until 2007, with a modified uptick rule is introduced in 2010. The original uptick rule is described by the SEC as: "a listed security may be sold short (A) at a price above the price at which the immediately preceding sale was effected (plus tick), or (B) at the last sale price if it is higher than the last different price (zero-plus tick)." The new uptick rule is only triggered when a price decreases by 10% or more. An uptick rule in general restricts short selling if the conditions set by the rule are not met. In some special events short selling is also prohibited. For example in the Taiwan stock exchange of the research of Cheng, Yan, Zhao, and Chang (2012) short selling is prohibited for six month after an IPO.

But without legal restrictions and bans on short selling, the practice it is constraint relative to buying or selling stock. It takes an effort to borrow or locate a share to sell, or at least establish some trust to sell a share on a promise to deliver it. An investor with a negative view on the market is relatively restricted to act on his view using short selling. There are also other practical restrictions, costs of borrowing and the availability of shares to borrow restrict short selling. Also the lender of the stock often demands a margin account during the period of the agreement, adding costs.

3.3 Informed trading and short selling

Informed traders trade information that is not reflected in the prices of stocks. Informed traders are often categorized in two categories. The first category are investors that are informed through private information (not available to the public, or not yet). They have access to private information through tipping by analysts, faster communication networks or sensitive information from other (lending) activities. The second category of informed traders are that of traders that are informed because of their superior processing of public information. They do not possess any kind of private information but simply make better use of the public information available. Events create an opportunity to profit from the information. In the following section a number of events that are relevant to short selling and stock returns will be presented and discussed.

The model of Diamond and Verrecchia (1987) suggests informed short selling because of the costs that constrain short selling (locate rule, borrow premium). In their theoretical model the portion of short sellers that is informed increases if the costs of short selling increases. Because of the costs to short sell, the number of uninformed short sellers will decrease (less probability of profit), increasing the informational content of the short sales that remain. Empirical evidence from Christophe and Hsieh (2010) show in their study that short selling activity is abnormal high prior to analyst downgrades. This supports the informed front-running hypothesis through tipping. Investors are tipped by analysts prior to downgrades, and they can trade on that private information.

Barber, Lehavey, McNichols and Trueman (2001) examine stock returns of portfolios based on analyst recommendations in the period between 1985 and 1996 (NYSE, AMEX, Nasdaq). Although this could yield an abnormal return of more than 4%, trading costs nullify the possibility to really profit from them. Still, the recommendations of analysts should be taken into account when making investments. Superior analyses of public information could create a group of informed short sellers.

Evidence of Massoud, Nandy, Saunders and Song (2011) is consistent with hedge funds using private information resulting from the lending activities in their short selling activities. Massoud et al stress the conflict of interest of hedge funds participating in the syndicate lending market, using information of the US market (NYSE, Amex, and Nasdaq) from 2005 to 2007. Also Blau, Van Ness and Van Ness (2012) find evidence suggesting that some short sellers are better informed than others. They find that short sell activity is high prior to the monthly announcement of short sell interest disclosure. They suggest that release of short selling levels more regular would be contributing to a fairer market.

Also Irvine, Lipson and Puckett (2007) find evidence of informed trading by tipping of institutional investors before stock recommendations are published. Although they only use buy and strong buy recommendations for their research, if tipping is taken place, the assumption can be made that sell recommendations are also part of the tipping practice. Similar evidence comes from Chakravarty (2001). He finds that institutions are likely to be informed traders. Medium-size trades, initiated by institutions, are associated with a disproportionately large cumulative stock price change.

Looking into the reason why short sellers are informed, Engelberg, Reed and Ringgenberg (2012) assume that short sellers are informed and examine how they are informed. Their results suggest that short sellers gain their advantage by superior processing of public information, for the period between 2005 and 2007 on the NYSE.

Boehmer, Jones and Zhang (2013) find that in their research short sellers are informed traders. Where nonprogram institutional shorts are found to be the most informed trades. This suggests that the characteristics of the short sellers (an institutional short seller) are related to a greater negative impact. This would support the findings of Engelberg, Reed and Ringgenberg (2012) that institutional short sellers possess superior processing of public information. Chakravarty (2001) finds that medium-size trades are associated with disproportional amount of the negative stock price change. This is consistent with the stealth-trading hypothesis of Barclay and Warner's (1993). The stealth-trading hypothesis suggest that informed investors do not want to stand out and use medium-size trades to profit from their private information instead of large trades. Using smaller short trades keeps the informed investors under the radar of other investors and authorities.

In contrast to the research presented supporting the idea of informed short sellers, there are also several researchers finding no evidence of informed traders. Based on their research Blau, Fuller and Wade (2010) conclude that short sellers are not informed. They use short selling data prior to merger announcements of 354 announcements between 2005 and 2006 in the USA. Another study from Blau and Wade (2012) find that short sellers are more speculative of nature rather than informed. They examine short activity prior to analyst announcements and find that activity of short selling is abnormally high prior downgrades *and* to upgrades in 2005 and 2006. Using short sales around news events, Daske, Richardson and Tuna (2005) find no evidence of informed short sellers. They use daily short sale data of the NYSE from 2004 to 2005. The research of Busse, Green and Jegadeesh (2012) finds no evidence of the ability of institutional investors being able to superior processing of public information and recommendations. Their evidence suggest no informed trading.

3.4 Herding behavior in short selling

In the report of Oliver Wyman Inc., the authors Hsu and Ziff (2011) fear that the public disclosure of individual net short positions will lead to negative effects resulting from herding on the market. They expect decreased market efficiency and a higher risk of disorderly markets if individual positions are published, as is the case with the new regulation. In other literature evidence is found of herding behavior in stock markets during good and bad times. Hwagn and Salmon (2004) demonstrate evidence of herding in the USA and South Korean stock market during both bull and bear markets and Choi and Sias (2009) collected evidence for herding among institutional investors on industry level. Herding by these institutional investors impacts the price of the stocks, in the way that on industry level the most heavily purchased industries outperform those that are most heavily sold during those quarters that herding is present. This is consistent with other studies such as Wermer (1995). He finds an outperformance in returns of buy herds over sell herds during the following months. Similar, Sias (2004) shows a positive correlation between institutional herding and future stock returns. The public disclosure of net short positions gives investors information about the investments of others and could possibly enable herding behavior. Veneziia, Nashikkar and Shapira (2011) find herding behavior with both amateur and professional investors, where professional investors herd to a greater extent. They suggest that amateur herding is information driven. Amateur herding, driven by lack of information, increases the volatility of the market and possibly creates instability. Amateur herding based on the information in SSR can create more downward pressure on the stock returns (either by (short) selling or not buying the stock).

Measurement of herding behavior differs between the studies. This partly depends on the different definition of herding used. The usual definition of herding is the behavior of a subgroup of investors follow each other by buying and selling the same assets at the same time. (Hwang and Salmon, 2004). As made clear by Sias (2004) herding is sequential in time, so he defines herding as a group of traders following each other into (or out of) the same securities over *some* time. However, not excluding that multiple investors enter into their positions during the same time period. To measure the herding, Lakonishok, Shleifer, and Vishny (1992) use a proxy based on the proportion of buy transactions to a long time average proportion. Following Lakonishok et al., the method of Venezia, Nashikkar and Shapira (2010) for measuring herding is based on a significant deviations in the proportion of buy transactions during a given time period. While Hwang and Salmon state the above definition as the usual one, they use another concept of herding in their own research, similar to that of Christie and Huang (1995). That concept is in were individuals follow the market views about either the market index itself or particular sectors or styles. This results into a difference measuring method, as used by Hwang and Salmon (2004). Their measurement is based on dispersion of the factor sensitivity of assets within a given market (assuming that herding biases expected returns and betas of individual stocks and the market). If herding behavior is part of the stock market in the Netherlands, the publication of the SSR with the net short positions will negatively influence the relation between short selling and stock returns.

3.5 Short selling and stock returns

There is no consensus in the literature on the relation of short selling and stock returns. There are several perspectives on the relation. The first perspective is that short selling leads to negative future returns. The theoretical evidence from Diamond and Verrecchia (1987) suggests a negative relation between short selling and future stock return. Constraints and cost of short selling will prevent investors from taking short positions if they do not possess valuable (private) information about the expected stock price. This leads to a larger subpart of informed short sellers in the total population of short sellers. These informed short sellers have negative information that is not yet processed into the stock prices. If short selling increases, this is bad news to the market and future negative stock returns can be expected. Empirical evidence supports the theoretical negative relation between short selling and future stock return. According to Aitken, Frino, McCorry and Swan (1998) there is a negative price reaction (up to -0.20%) immediately after a short sale. Their results indicate that short sales are bad news to the market, based on reactions to short sales on an intraday basis on the Australian stock exchange (ASX) from 1994 to 1996. Senchack and Starks (1993) find that stocks with unexpected increase in short interest generate negative abnormal returns after the announcement date of the short interest, using the monthly short data of the NYSE and ASE. Additionally the results show that this relation is stronger for non-optioned stocks than for optioned stocks. This is in line with expectations following from the model of Diamond and Verrecchia (1987) that if it is harder to short a stock (non-optioned) the return will be lower. Christophe, Ferri and Hsieh (2010) show that firms with high abnormal short selling underperform other firms around analyst downgrades. The research of Desai, Ramesh, Thiagarajan, Balachandran (2002) shows that heavily shorted firms experience negative abnormal return between 1988 and 1994 on the Nasdaq market using monthly data. Higher levels of short interest cause an increase in the negative abnormal returns. In addition to this, Asquith, Pathak and Ritter (2005) that if shorting demand is high, stocks underperform (1988-2002) and suggest that investors should avoid long positions in stocks that are short-sale constrained by having high short demand and low supply. These stocks are likely over valuated and are likely toeir market underperformance. Also Cohen, Diehter and Malloy (2007) conclude that shorting demand is an important predictor of future stock returns. An increase in short demand predicts negative future

returns. They also find that the relation increases in an environment with less public information flow.

The second perspective is that short selling is latent demand. If a stock is sold by an investor without owning the stock, he has to buy it back at some point in time to close his position. Often referred to as conventional Wallstreet wisdom, it puts upward pressure on the stock price, (Epstein, 1995). Supporting this view, the study from Boulton and Braga-Alves (2012) find results that naked short selling is a bullish signal for investors and correlates with positive future returns, potentially as a result from buying pressure of short sellers covering their positions. In some conditions, short sellers covering their positions can lead to a short squeeze. This is an abnormal stock price increase, because there is limited liquidity while short sellers need to cover their positions. For example, VolksWagens (VW) share prices rose 82% in one day, after Porsche announced it had 74.1% of VW shares (Reuters, October 28, 2008). The Lower Saxony (Niedersachsen) controlled another 20.2% stake of VW, leaving only 5.7% of the shares available for the short sellers to cover their positions, creating upward buying pressure on the stock price. According these findings, stock returns can be expected to increase if there is high short selling interest and even extremely positive in times with limited liquidity.

The third perspective on the relation of short selling and stock returns is that there is no clear relation. The argument for this view is that short selling is used for hedging purposes or arbitrage transactions (Brent, Morse and Stice 1990, Senchak and Starks, 1993). In this case the investor does not expect a negative return based on information and the short selling. The latent demand argument of the second perspective does not hold because it is not used for speculative purposes, so no upward pressure on the future stock price is expected. Supportive of this perspective is the research of Daske, Richardson and Tuna (2005), they do not find evidence that short sales precede bad news and find no relation to negative future returns for the period of 2004 to 2005, using aggregated daily data on the NYSE. They suspect that an increase in short selling caused by uninformed investors and hedging short sales lead to a decrease in the predictive power of short selling interest.

4 Short selling in the Netherlands

The Dutch stock market is considered to be one of the oldest stock trading places, starting in 1607. It was also the first exchange where short selling was introduced in 1609 (Petram, 2011). It was Isaac le Maire, who sold more shares than he owned of the Dutch East India Company when he was dissatisfied with the results. His short selling activities combined with spreading negative rumors even led to a ban on short selling in 1610 (Petram, 2011). In the present modern times, the Dutch exchange is one of the exchanges owned by Euronext and located in Amsterdam. In 2013 the Amsterdam exchange has a total of 143 listed companies of which 105 are domestic and 38 are foreign (Website NYSE Euronext).The exchange is regulated by national and international laws and regulations. National regulation consists primary of the Wet financieel toezicht (Wft, Financial control law). For investors that are are short selling, another regulation is more important, the European Short Selling Regulation (Regulation (EU) No 236/2012). The regulation is in full effect since 1st November 2012, with implications for short selling and registration of short positions. One of those implications is that the European regulation bans naked short selling. Naked short selling implies short selling without borrowing the share. It is obligated to cover any short sale by borrowing the instrument, have an arrangement to borrow them or have an arrangement with a third party to locate the share. The regulation also introduces mandatory reporting of *net* short positions to the authorities when the positions equal 0.2% of company issued share capital, and the positions are published when they reach the threshold of 0.5%. The national authority of the financial markets, AFM in the Netherlands, is responsible for the publication of the net short positions through the short selling register. In the next section the regulation, definition and the calculation of the net short positions will be explained in more detail.

4.1 Introduction of the Short Selling Regulation

During the financial crisis of 2008 there were several serious problems on the financial markets. One of the problems was settlement of uncovered short selling and credit default swaps (CDS). Another problem was large short positions that created downward pressure on the markets and created downward pricing spirals according to several members of the European Union, the USA and Japan (Regulation (Regulation (EU) No 236/2012). Members of the European Union put in place restrictions and emergency measures to short selling and in particular *naked* or *uncovered* short selling (and CDS). The different reactions of authorities involved caused uncertainty and confusion. The European Union (EU) aims at harmonizing these different regulations throughout the union and implemented the Short Selling Regulation (Regulation (EU) No 236/2012). The delegated regulation (DR) covers short selling and certain aspects of credit default swaps and it came into effect on November the 1st of 2012 (article 48). With the DR *net* short positions in public trading companies need be registered if the position reaches a minimum threshold. If the net short position increases to the publication threshold, the information of these positions is made public through a daily aftermarket Short Selling Register (SSR). In addition to the net short positions of the investor, the short seller (labeled as the Position holder) is also named in the SSR.. The threshold for reporting is a net short position is equal to 0.2% of company issued share capital and every 0.1% above (Article 5). These reports will not be published to the public but will be monitored by the competent authority. If the net short positions reach 0.5% of company issued share capital, the positions will be made public.

The scope of the regulation encompasses all shares traded at EU trade platforms or EU shares (and/or derivatives) traded at other non EU trading platforms. The short selling regulation concerns both shares and sovereign debt. The regulation has effect on *all* instruments that have an economic interest relation to the issued share capital of a company or to the issued sovereign debt. (Article 1, sections 9 to 12). Therefore, calculation of net short positions should include derivatives (including, but not exclusive, options, futures, index related instruments, Contracts for Differences and spread bets, section 10). ETFs are also within the scope of the regulation. (Q and A ESMA, questions 1g, p.7). Even if the related instruments are traded in another country or outside the EU, they still need to be included in the calculation of the positions. There are some exceptions, as described in Article 16. For example the regulation does not apply to shares that are noted at an EU listing but have their major listing in a non EU country (for example Microsoft). The ESMA defines which shares are exempted. A list of exempted shares is published by the ESMA and reviewed every 2 years (can be found on the ESMA website). Another important exemption is made for market making activities and primary market operations (liquidity providers), specified in article 17. In the Netherlands the AFM is responsible as the competent authority. As mentions, in the Netherlands the regulation applies to all public companies that have their main listing at the Amsterdam Exchange. The DR states that significant net short positions must be reported to the competent authority if they reach the thresholds. The AFM has to publish a register with all net short positions that reach the publication threshold.

4.2 Definition and calculation of net short positions

As mentioned before, the reported positions in the SSR are net short positions. Short positions are netted with long positions in the security. Not all long positions can be used to net short positions. In this section the definitions used by the EU will be presented and the calculation of net positions as specified by legislation. The calculation of the net short positions is specified in the delegated regulation, the supplement and the Q&A document of the ESMA (Regulation (EU) No 236/2012, ESMA, 2013/159). Starting with the DR itself, article 3 presents the definitions of the short and long positions. The citations are taken from the DR. The first paragraph specifies a short position:

> "1. For the purposes of this Regulation, a position resulting from either of the following shall be considered to be a short position relating to issued share capital or issued sovereign debt:
>
> (a) a short sale of a share issued by a company or of a debt instrument issued by a sovereign issuer;
>
> (b) entering into a transaction which creates or relates to a financial instrument other than an instrument referred to in point (a) where the effect or one of the effects of the transaction is to confer a financial advantage on the natural or legal person entering into that transaction in the event of a decrease in the price or value of the share or debt instrument."

The definition used by the regulation of the EU is very broad and encompasses all financial instruments. Point (b) emphasized that all transactions that lead to an advantage for the investor by a decrease of the share price is considered a short position. With a definition for a short position, paragraph 2 of Article 3 specifies the long position.

> "2. For the purposes of this Regulation, a position resulting from either of the following shall be considered to be a long position relating to issued share capital or issued sovereign debt:
>
> (a) holding a share issued by a company or a debt instrument issued by a sovereign issuer;
>
> (b) entering into a transaction which creates or relates to a financial instrument other than an instrument referred to in point (a) where the effect or one of the effects of the transaction is to confer a financial advantage on the natural or legal person entering into that transaction in the event of an increase in the price or value of the share or debt instrument. "

The definition of a long positions is similar to the definition of a short position. The clear difference is the investors holds a share instead of short sale of the share and has an advantage if the price increases. The next paragraph 3 specifies the broad nature of the definition used by the EU. It states that investments in indexes need to be taken into account when calculating short or long positions.

> "3. For the purposes of paragraphs 1 and 2, the calculation of a short or a long position, in respect of any position held by the relevant person indirectly, including through or by way of any index, basket of securities or any interest in any exchange traded fund or similar entity, shall be determined by the natural or legal person in question acting reasonably having regard to publicly available information as to the composition of the relevant index or basket of securities, or of the interests held by the relevant exchange traded fund or similar entity. In calculating such a short or long position, no person shall be required to obtain any real-time information as to such composition from any person. "

The fourth paragraph of Article 3 specifies the definition of net short position in shares.

> "4. For the purposes of this Regulation, the position remaining after deducting any long position that a natural or legal person holds in relation to the issued share capital from any short position that that natural or legal person holds in relation to that capital shall be considered a net short position in relation to the issued share capital of the company concerned."

The general idea is that long positions are deducted from the short positions, resulting in a net short or net long position expressed in relation to the issued share capital of the company. The exact calculation of the net positions needed more specifying of and by the EU. Therefore paragraph 7 is included in the DR.

> "7. The Commission shall be empowered to adopt delegated acts in accordance with Article 42 specifying:
>
> (a) cases in which a natural or legal person is considered to hold a share or debt instrument for the purposes of paragraph 2;
>
> (b) cases in which a natural or legal person has a net short position for the purposes of paragraphs 4 and 5 and the method of calculation of such position;
>
> (c) the method of calculating positions for the purposes of paragraphs 3, 4 and 5 when different entities in a group have long or short positions or for fund management activities relating to separate funds.
>
> For the purposes of point (c) of the first subparagraph, the method of calculation shall take into account, in particular, whether different investment strategies are pursued in relation to a particular issuer through more than one separate fund managed by the same fund manager, whether the same investment strategy is pursued in relation to a particular issuer through more than one fund, and whether more than one portfolio within the same entity is managed on a discretionary basis pursuing the same investment strategy in relation to a particular issuer."

The last remark in Article 3 specifies the definition of investment strategy in the view of the DR. If a fund manager manages two separate funds with two different investment strategies, one long and one short, it results in a net long positions and a net short positions. The long fund profits form an increase in the price/value where the short fund profits from a decrease in price/value. Those two positions may not be netted because of the different strategies the funds pursue.

For the calculations of a short and long position all instruments need to be taken into account that can lead to an advantage as specified in article 3, paragraphs 1 and 2. The investment can be related to a certain issued share capital or sovereign debt (including CDSs, options, futures, positions in an index (which includes the relevant instrument) and more). An investor needs to do the calculations

for every issuer of share capital or sovereign debt. The short positions can then be netted with long positions in the same particular issuer of the share, which results in a net short position (or a net long position). The result is a net short position expressed in a percentage based on the total issued share capital. Issued share capital is defined as the total of ordinary and preference shares issued by the company (Regulation (EU) No236/2012, Article 2, (h), p.8).

The ESMA aims to include all market parties that are following a short strategy. If a fund or portfolio is net short in a particular issuer, the ESMA defines that fund or portfolio as a short strategy (ESMA 2013/159 p.16), and it should be included in the calculation of the net short positions. This is a further specification of the definition short strategy,

Figure 1 below illustrates an example of a calculation, taken from the Question and Answer documentation of the ESMA (2013/159).

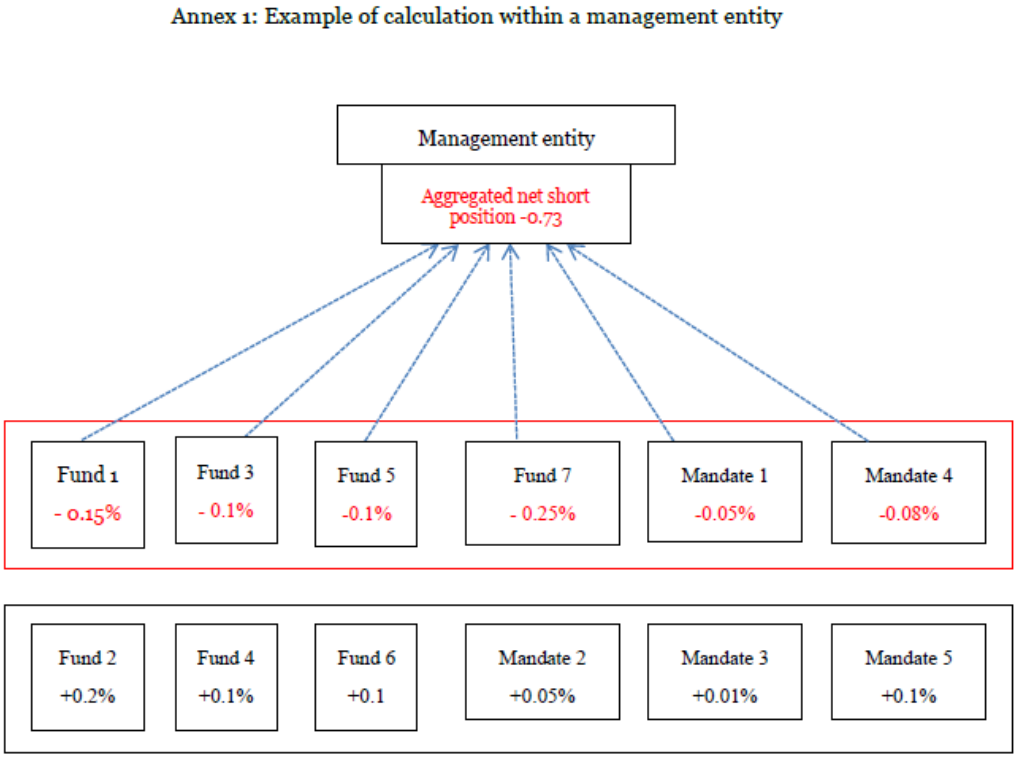

Figure 2: Calculation of net short position of a management entity with multiple funds. The net short positions are shown in percentage of the total issued share capital of the company involved. Fund is an investment fund the management entity has control over and a mandate is an investment fund that the entity has control over but does not owns. Figure is taken from the ESMA Q and A documentation 2cnd update.

As illustrated in figure 2, only the funds that follow a short strategy (top row), are aggregated and form the aggregated net short position of the Management entity. The long positions at fund level may not be aggregated because they do not follow a short strategy. In this example the net short position of the management entity is –0.73% (-0.15 + -0.1 + -0.1 + -0.25 + -0.05 + -0.08). Because the net short position reaches the 0.20% threshold, the management entity needs to report its net short position. The reported position is also made public because it reaches the 0.50% threshold. Publication will be handled by the AFM, including it in the SSR. The calculation of the net short position needs to be done for every individual share issuer (company) the investor has a short position in. The net short position is rounded on two decimal places by truncating the other decimal

places. In this example, if the net short position increases to -0.73893%, the notification will remain -0.73%. But if the initial position was -0.74523% it needs to be reported as -0.74%. If the position increases to -0.798% there is no new obligation to report, but if it passes 0.800% the new position needs to be reported again (because an increase > 0.1% , from 0.7% to 0.8)). A net short position of 0.1975% has no reporting obligation, because it is truncated to 0.19% falling below the 0.2% threshold. The fund in the example can have all sorts of instruments that relate to the individual share. It can contain an index EFT long position, which needs to be calculated to the actual weight of the individual share in that index. The weighted long position will be used to calculate the net short position. So, if the investor wants to hedge the risk of this individual share and short sells the shares of the company (exactly up to the weight it has in the index EFT) his net short position will be 0.

4.3 Short Selling Register

The SSR contains information of the net short positions that have reached the threshold for publication. This threshold is set at 0.5% of the issued share capital. Short sellers need to report any change in their net short positions of 0.1% or more. If the net short position falls below the publication threshold, the net short position of the short sellers will be reported for the last time in the SSR until it reaches the threshold again. All reports that reach the threshold for publication will be reported into the SSR. The SSR is published on a daily basis, after-market as an Excel sheet. It can be requested online at the website of the AFM. The register provides the positions holder, name of the issuer (stock), the ISI number, the net short position in percentages (in two decimals) and the position date. The table below is taken from the SSR to illustrate how the data is presented.

Position holder	Name of the issuer	Net short position in %	Position date
Lansdowne Partners Limited	Royal Imtech N.V.	0.37	2013-02-27
Lansdowne Partners Limited	Royal Imtech N.V.	0.60	2013-02-18
Lansdowne Partners Limited	Royal Imtech N.V.	0.70	2012-12-31
Lansdowne Partners Limited	Royal Imtech N.V.	0.60	2012-12-12
Lansdowne Partners Limited	Royal Imtech N.V.	0.56	2012-12-11

Table 2: Landsdowne Partners Limited short position in Royal Imtech N.V., to illustrate the data provided in the SSR. 'Position holder' is the short seller, 'Name of the issuer' it the listed company shorted, 'Net short positions in %' is the net short position of the short seller in percentage of issued share capital of the company and 'Position date' is the date which the position is reached.

The net short positions in table 1 of Landsdowne Partners Limited in Royal Imtech N.V. can be calculated with the total outstanding shares of Royal Imtech N.V., if this net short position would be constructed only with short selling shares. At that moment the outstanding shares of the company were around 90 million shares. The position 0.70% net short, as registered on December 31, 2012 represents a theoretical short position of 0.70% x 9 million = 630,000 shares. Valued at €6.93 per share this is net short position of €4,365,900. Later in time, on February 18, 2012 the position of Landsdowne Parteners Limitied was 0.60% net short. This positions represents a net short position of 0.60 x 90 million = 540,000 shares. Now the share are valued at just 3.63 and represent a value of €1,960,200. Other instruments that have an economic interest relation to the issued share capital of a company have to be included in the net short positions calculations. The positions registered can be a combination of share, options, index options and others, instead of only a short position of shares. In the Netherlands the AFM publicizes the SSR after-market on the same trading day (i.e. often between 17:45 and 19:00). This implicates that some parties have not yet been able to deliver all report of short positions to the AFM (deadline for reporting of short position is the next trading day 15:30).

In the report of Oliver Wyman Inc., the authors Hsu and Ziff (2011) examined similar short selling regulation that was in effect for a brief period in the UK. That regulation is similar to the regulation that is now in full effect in the EU. Their data is based on interviews with 35 market participants and quantitative data of the UK. They believe that the disclosure policy will increase costs (operationally), alter trades to values around thresholds and a shift of capital out of the European Union (to less restricted markets). Especially, the expectation of Hsu and Ziff that trading will alter around the publication threshold can imply that the reported positions in the SSR are just the tip of the iceberg. If there is already a short seller that has a net short position of 0.5% or more, it can be expected that there are other short sellers with a similar view but with a net short position below 0.5%. This implies that the real aggregated net short position in the register is probably higher. Market participants interviewed by Hsu and Ziff (2011) are against public disclosure of individual positions, because of fear of copycats, distorting effects of herding and less corporate access when the positions are made public.

4.4 Short sale data used by other studies

A lot of research is based on the monthly short interest data from the USA. The short selling interest in the USA that is made public is the aggregated level of short selling per individual stock. The individual positions of the short sellers are kept private. It is also possible that investors who have shorted a stock are doing this for hedging or purposes other than speculation.

Daily data has a clear advantage over monthly data according to Daske, Richardson and Tuna (2005). The disadvantage of the daily data used in their study is that it contains no information on net positions. Ideally, as stated by Daske et al. 'one would like to disaggregate hedging related trades and focus on information based positions.' The new dataset used in this paper includes daily *net* positions, thus excluding most positions for hedging. Market making activity is also not included in the SSR because of exemption rules for market makers and liquidity providers. Defining abnormal short return or identifying heavily shorted companies, Desai et al. (2002) and others (Asquith and Meulbroek 1995) use 2.5% monthly short interest in a particular stock as arbitrary cut off point to consider a stock heavily shorted and added other categories. In this research *net* short positions are used and all positions reported in the SSR will be included as they are labeled as significant positions by the EU regulation. Following Desai et al (2002) data on abnormal return will also be presented by net short positions categories.

Another concern of Daske et al. (2005) related to aggregated short sale data is that the 'informativeness' of aggregate short sale transactions decreases because of the increase of the number of short sales. Short sales are not only performed by informed investors but also by uninformed parties and hedgers. Again, using net short positions reported in the SSR in this study, the effect of hedging positions is almost eliminated from the sample, leaving more speculative short sellers. These speculative investors can be informed or uninformed, but considering the costs related with taking a significant net short position (≥ 0.5%) it is expected that these investors are relatively informed. Moreover, the regulation also offers exemption for market makers and liquidity providers. The research of Christophe et. all (2004) use customer short sale transactions from the NYSE. They believe and state that almost all of the short sales included in their sample are sellers anticipating a relative underperformance (Christophe et. all 2004), so it only includes short selling for speculative motives. The first limitation of their data as mentioned by the authors, is it does not indicate any net shorting activity. Other researchers use proxies of the real short sales. For example, Blau, Fuller and Wade (2010) use two measures of shorting activity, short turnover and short ratio. Cohen Diehter and Malloy (2007) use the direct costs of shorting from the stock loan market and proxies for demand and supply. The new SSR data used is information on real net short positions that are taken

by investors. Included in the data of this study are cheap shares, excluded by other researchers (for example Christophe, Ferri and Angel (2004) and Daske et. al (2005) if below $10) because these shares may be hard to borrow. In this study these shares are included because only shares that are possible to sell short will appear in the SSR. If they are hard to borrow and short selling is possibly costly, it would only be more interesting to include them into the sample, because the short sellers is apparently convinced his speculative trade will be profitable despite the high cost.

5 Hypothesis and methodology

In this research the objective is to examine the relation of short selling activity and return. There is empirical evidence on other markets on the relationship between short selling and returns, but there is no evidence on the Dutch market. Literature offers different perspectives on the relation between short selling and stock return. The first perspective explains a negative relation between short selling and future stock return, based on the idea that investors use short selling with speculative motives based on their (private) information. In this research net short positions are used from the SSR. Net short positions excludes short selling motivated by hedging and arbitrage trading, also the SSR excludes market makers and liquidity providers from the data. Moreover, naked short selling is banned in the EU and therefore also excluded from the data. This makes the second perspective (positive returns) and third perspective (no relation) less likely. The first perspective is therefore most likely. The hypothesis will be based on the expected relation of the first perspective.

The hypothesis is therefore:

(1) Increase in net short positions leads to a negative abnormal return in the stock

Abnormal daily return will be defined as, following the same method as other research (Christophe et. all 2004, 2009 and Daske et. all 2005), the difference between the daily return and the return on the AEX equally-weighted index on the same day.

The daily stock prices for are collected from Yahoo Finance. The daily return per stock is calculated as the adjusted close price (adjusted for dividends and stock splits) of the current day minus the previous day, divided by the current day as represented in the formula.

$$r_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

Where $r_{i,t}$ is the daily return for stock i, $P_{i,t}$ is the adjusted close price of stock i at time t.

The abnormal return used in this study follows Christophe et all. 2009 using the equally weighted market index for the AEX. The daily market return is calculated in the same way as the daily return of the stock. The abnormal return will be calculated by subtracting the daily market return from the daily return per stock.

$$abret_{i,t} = r_{i,t} - r_{m,t}$$

Where $abret_{i,t}$ is the daily abnormal return of stock i, at time t, $r_{i,t}$ is the daily return for stock i and $r_{m,t}$ the daily market return of the AEX equally-weighted index at time t.

Using daily short data of the AFM as published in the SSR a dataset of net short positions per stock is created. The data will be included from December 5 until February 4. There are 60 short sellers identified with at least once a net short positions of 0.5% in one listed company. The SSR during the sample period includes 241 trading days, resulting in 6240 ($(241-1)\times 26$) observations of daily return over that period. Of those total observations, 3914 occur on days where a company has a net short positions reported in the SSR and are included in the sample.

Following Aitken et al. (1998) and Conrad (1994) $MONTH$ variable is used to control for potential tax motivated short selling. Although the data used in this research consist of net short positions and the tax regulation in the Netherlands is different from USA regulation, a small negative beta is expected to account for end of the year, tax-motivated short selling. The $OPTIONED$ variable is similar to Senchack and Starks (1993) to control for the effect of the existence of options for the stock. Options make it easier to short sell a stock and suggesting lower cost. Nonoptioned stock are harder to short sell and it is expected to have a stronger relations because there are less uninformed short sellers. . Optioned stock are less restricted for short selling, allowing more uninformed short sellers will also short the stock. This will lead to a weaker negative relation between the abnormal return and net short positions.

A regression will be used for testing the relation between net short positions and daily stock return. The regression will be:

$$aret_{i,t} = \alpha + \beta_1 short_{i,t} + +\beta_2 MONTH_t + \beta_3 OPTIONED_i + \varepsilon$$

Where $aret_{i,t}$ is the abnormal daily return, α the intercept, $short_{i,t}$ is the net short position in relation to the issued share capital of the company net short (as reported in the SSR. Calculated by the definition and rules of the EU regulation), $MONTH_t$ is a control variable to control for short selling due to tax motivated trades, with $MONTH_t$ set to 1 if trading day is one of the last 3 trading day of the fiscal year (December) and 0 if otherwise. $OPTION_i$ is a control variable to control for the difference between optioned versus non optioned stocks (1 if a stock has options listed, and 0 if otherwise).

Variable	Description	References:
Abnormal daily return	Daily return minus the equally weighted market return	Christophe et. all 2004, 2009 and Daske et. all 2005
Net short positions	Net short positions in stocks as a percentage of issued share capital	Previously unavailable data. Others state net daily short data is better than proxies or monthly aggregated short data used in other studies.
Month	Control variable for tax related short selling	Following Aitken et al. (1998) and Conrad (1994)
Optioned	Control variable for optioned versus non-optioned stocks	Senchack and Starks (1993)

6 Data

The primary source of the data is the Short Selling Register (SSR) published by the AFM (the *competent authority* in the Netherlands as referred to in the Regulation). The SSR contains all net short positions above the 0.5% threshold for stocks at the Amsterdam stock exchange. In the period used for this study, from November 1, 2012 to October 10, 2013, the SSR reported 27 companies whose outstanding shares have had at least once a net short position of more than 0.5% of its issued share capital by a short seller. The only company that is excluded in this study is SNS Reaal because it was nationalized during the research period. Almost 25% of all domestic stocks listed and under the supervision of the AFM appear in the SSR at least once.

The time period in the sample in this study is 241 days. Within this period, all included stocks have experienced an individual net short interest of at least 0.5% for 1 day or longer. The period that the stock has a net short position of 0.5% (or more), the data will be included in the sample. The stock will remain in the sample as long as the net short position remains above the threshold. The data of the latest report of a closing position (or at least below 0.5%, resulting in a final report in the SSR) will be the last day the stock is included in the sample, until the net short position increases and reaches the threshold again (the return of the day following the latest day will be included). For example if stock XYZ is reported with a net short position of 1.4% on December 4, the data from 4 December will be included in the sample as long as the net short position remains above the 0.5%. If on February 3 it decreases below the obligated reporting level of 0.5%, the position is reported for the last time in the SSR and included in the sample.

The descriptive of the data is presented in the table 3 below.

Table 3: Descriptive statistics of the data. Abnormal return is the daily return of a stock minus the market return, market return is the daily return of the equally weighted AEX index, and net short positions are the net short positions included in the sample and as they appear in the SSR. Total number of stocks included in the sample is 26, the total time period is 241 trading days. The returns are only included in the sample when the shorted company occurs an abnormal short interest, i.e. is included in the SSR leading to 3914 observations.

	Mean	Median	Minimum	Maximum	Std. deviation	N
Return	0.02409	0.00000	-48.09160	20.61567	2.28946	3914
Market return	0.06092	0.11502	-3.14591	2.26439	0.88621	240
Abnormal return	-0.03704	-0.05589	-46.17911	19.51618	2.11905	3914
Net short positions	1.996666	1.0300	0.36	12.29	2.0481185	3914
Number of short sellers	1.9254	1	1	10	1.36093	3914

The mean (median) of the daily abnormal return in the sample is -0.037% (-0.057%). Suggesting a lower abnormal return for stocks within the sample (with reported net short positions) compared to the average market return during the same time period. The net short position in the sample has a mean (median) of 1.997% (1.030%) expressed as the percentage of total issued shares of the stock. The number of short sellers that make up those net short positions has a mean (median) of 1.925 (1). This shows the number of short sellers that trade above the threshold for publication in a stock is not very high.

Dividing the data into 5 categories based on the net short position in the stock, delivers an overview of the abnormal return0s. The data is presented in table 4 below.

Table 4: Descriptive of daily abnormal returns categorized by net short position. Abnormal return is the abnormal daily return in %. Net short positions is the net short position in % of all issued share capital of the company. N is the number of daily observations per category

	Abnormal return in %							
Net short position	**Mean**	**Median**	**Minimum**	**Maximum**	**Std. deviation**	**N**	**Mean # SS**	**# companies**
> 0 < 2.5	-0.015	-0.060	-32.770	19.516	1.871	2967	1.32	24
> 2.5 < 5	0.059	0.019	-10.798	7.945	1.818	525	3.37	9
> 5.0 < 7.5	-0.048	-0.086	-46.179	10.149	3.341	307	3.57	4
> 7.5 < 10	-0.615	-0.340	-28.716	9.904	4.184	95	6.32	2
>10	-2.960	-2.153	-13.506	4.892	5.152	20	7.80	1

The categories are divided on the net short positions. Daily abnormal returns can only be assigned to 1 category. If a stock has a net short position of 5.5%, it is assigned to *> 5 < 7.5* category.
The values in table 4 give an overview of the abnormal daily return per category of net short positions. Interesting is that the category *"> 2.5 < 5"* has an positive daily abnormal mean (median) return of 0.0589% (0.0195%), which is much higher than that of the categories with a lower net short positions and significant different from the mean abnormal return at 0.05%. The categories above 5.0% show an increasing negative mean return. Furthermore, table 4 shows that the mean of the heaviest shorted categories (>7.5% and >10%) is very negative with an abnormal return much larger than the less shorted categories. These categories are a result of only 115 (95 +20) daily net short positions in these categories resulting from only two stocks (112 Imtech and 3 ASM). There are 9 companies experiencing a net short selling positions above 2.5% during the sample period. Only 4 companies are included with a net short positions above 5%.

In table 5, the mean returns are categorized as portfolios that include a stock if it has a certain level of net short. The difference with the previous table is that the abnormal return of a stock on a day with a net short position of 5.5% is included three times, in multiple categories (>0, ≥ 2.5, ≥ 5.0) instead of only 1 category.

Table 5: Descriptive of daily abnormal returns categorized by net short position. Abnormal return is the abnormal daily return in %. Net short positions is the net short position in % of all issued share capital of the company. N is the number of daily observations per category. Daily abnormal return observations can be included in multiple categories.

	Abnormal return							
Net short position	**Mean**	**Median**	**Minimum**	**Maximum**	**Std. deviation**	**N**	**Mean # SS**	**# shorted companies**
> 0	-0.037	-0.057	-46.179	19.51 6	2.138	3914	1.93	26
≥ 2.5	-0.109	-0.038	-46.179	10.149	2.814	948	3.82	10
≥ 5.0	-0.314	-0.137	-46.179	10.149	3.691	422	4.39	4
≥ 7.5	-0.974	-0.569	-28.716	9.904	4.445	116	6.58	2
≥ 10	-2.960	-2.153	-13.506	4.892	5.152	20	7.80	1

This table shows a more expected development of the abnormal return when the net short position increases. The abnormal return is lower if the net short positions increases. This is what is expected following the first perspective and according to the hypothesis. The abnormal returns of the last two categories (≥ 10) have a big impact on the results, because those observations are included in every category.

In the literature the difference between optioned and non-optioned stocks in relation to short selling is mentioned. In the regression analyses there will be a control variable for that relation. In table 6 the descriptive data of the difference between optioned and non-optioned stocks is presented. The table shows that the mean (median) of the daily abnormal return of non-optioned stocks included in the sample was lower than that of the optioned stocks, -0.050 (-0.081) and -0.033 (-0.042). The difference is not significant. This gives short sellers opportunities to profit from their net short positions if they invest in non-optioned stocks.

Table 6: Abnormal daily return of the optioned, non-optioned stocks and the difference between those two groups. In the difference row descriptive statistics of the difference is presented between the groups. Only the difference in net short position is significant

		ABNORMAL RETURN	NET SHORT POSITION	NUMBER OF SHORT SELLERS
NON-OPTIONED	Mean Std. dev.	-0.050 2.37	0.832	1.14
	Median	-0.081	0.770	1.00
	Maximum	9.219	1.530	2.00
	N	1092	1096	1096
OPTIONED	Mean Std. dev.	-0.033 1.36	2.447	2.23
	Median	-0.042	1.460	2.00
	Maximum	19.516	12.290	10.00
	N	2822	2833	2833
DIFFERENCE	Mean	-0,017 (not significant)	-1,615 (significant)	
	Median	-0,039	0,69	
	Maximum	-10,30	-3,010	

These results of the differences in the abnormal returns between optioned and non-optioned stocks are in line with the findings of Senchack and Starks (1993). They find that non optioned stocks have a stronger negative return in relation to short selling. Although the abnormal return in non-optioned stocks more negative than that of optioned stock, the net short positions are significantly lower.

The mean net short position is much lower with 0.832% in non-optioned compared to 2.447% in optioned stock. That is in line with the expectation that short sellers will prefer larger and liquid stocks, which optioned stocks are. The non-optioned stocks are more expensive to have a net short position in because there are no options available and the stock is probably less liquid and harder to borrow. A possible reason for this lower short selling activity in these underperforming stocks is that it is more difficult, involves more risk and is costly to obtain a net short position in a non-optioned stocks. This is in line with the literature that suggest that short sellers will prefer liquid stocks, with options.

7 Results

In this section the results of the regressions are presented. The results following from the regression as described in the methodology section. The hypothesis expects a negative relation between short selling and abnormal stock return. The regression model uses the net short positions on day t-1 as the independent variable in the regression.

The results of the regression model is presented in table 7.

Table 7: Coefficients of the regression of daily abnormal return. Where $short_{i,t}$ is the net short interest stock i, at time t. MONTH the control variable for tax related short selling. OPTIONED the control variable for optioned stocks versus non optioned stocks. The standardized beta coefficient is presented followed by the t-statistic between brackets. * is significant at 1% level. Number of stocks included is 26 (3914 observations of daily return).**

MODEL	**(1)**
$\boldsymbol{short_{i,t}}$	-0.065 (-3.781)***
$\boldsymbol{MONTH}$	0.017 (1.064)
$\boldsymbol{OPTIONED}$	0.026 (1.542)
ADJUSTED R^2	0.003

The results of regression model finds a negative relation between the net short position and daily abnormal return (-0.065 significant at the 1% level). This suggests that an increase of the net short position in a particular stock leads to negative abnormal return, supporting the hypothesis. An increase of the net short position leads to a decrease of 0.065% of the daily abnormal return on the same day (t). The control variables do not provide a significant result in this model.

8 Conclusion and discussion

There are different perspectives on the relation between short selling and stock return in the literature. In this research the relation in the Netherlands is found to be negative. Results in this research find a lower abnormal daily return when the net short position increases (-0.065% daily). This is in correspondence with the perspective of Diamond and Verrecchia (1987), Aitken et al (1998) Senchack and Starks (1993) Christophe et al (2010) Desai et al (2002) Asquith et al (2005) Cohen et al (2007).

Although the negative relation between short selling and return in this research is not examined in depth, it is still valuable information for investors and regulators. They have to monitor the net short positions in Dutch stocks. A net short position in a stock is bearish signal to the market. Investors should be aware that constraints in short selling can lead to overvaluation of stock prices. Short constraint stocks like non-optioned stocks had lower abnormal return than optioned stocks. The average short positions is higher in optioned stocks, probably because the lower cost involved for short selling.

The findings in this thesis are based only on data from the Netherlands. Although the data used are actual net short position taken by real short sellers, it is limited to the threshold set by the legislation and different from other data used in literature. The timely release of the information (daily after-market) is better than that of some other literature using (US) monthly data, but less than the data used by Aitken et al. that used data of every short trade made on the exchange in Australia.

Compared to other short data used in the literature, the unique dataset with only net short positions filters motives other than that of speculation in anticipation of a price reaction. This increases the value of the relation between the net short positions and abnormal return.

Short selling is often researched in relation with bad news event and relevant returns. This study does not use news events but only tries to identify if there is a relation between the net short positions and the return. Further research could examine news events combined with the new available net short data in different European markets.

Assuming that costs of short selling companies with certain characteristics (for example stocks with low liquidity or low institutional ownership) is high, short sellers that still have net short positions in those stocks are confident that they have valuable private information. With the data presented in the SSR researchers can identify short sellers that are willing to pay higher cost for their short positions in those companies.

References

Aitken, M., Frino, A., McCorry, M., Swan, P., 1998, Short sales are almost instantaneously bad news: evidence from the Australian stock exchange. *Journal of Finance 53, 2205–2223*

Autoriteit Financiële Markt, news article, 2009, Verbod short selling vervalt, meldingsregeling aangepast, obtained online through: http://www.afm.nl/nl/nieuws/2009/mei/verbod_short_selling_vervalt.aspx

Autoriteit Financiële Markt, 2008, Tijdelijke Regeling Inzake Melding van Short Posities, obtained online through: http://www.afm.nl/~/media/files/wetten-regels/triss/regeling-shortselling.ashx

Asquith, P., Pathak, P., Ritter, J., 2005, Short interest, institutional ownership, and stock returns. *Journal of Financial Economics 78, 243-276*

Barber, B., Lehavy, R., McNichols, M., Trueman, B., 2001. Can investors profit from the prophets? Security analyst recommendations and stock returns*. Journal of Finance 56, 531–563*

Beber, A. and Pagano, M., 2013, Short-Selling Bans Around the World: Evidence from the 2007-09 Crisis, The Journal of Finance 68, issue 1, 343-381

Blau, B.M., Wade, C., 2012, Informed or speculative: Short selling analyst recommendations, *Journal of Banking & Finance 36, 14–25*

Blau, B.M., Fuller, K.P. and Wade, C., 2010, Short Sales, Informed Trading, and Merger *Announcements Working paper series*

Boehmer, E., Jones, C., Zhang, X., 2008. Which shorts are informed? *Journal of Finance 63, 491–527*

Boehmer, E., Wu, J., 2013, Short selling and the price discovery process, *The Review of Financial Studies, V. 26 no. 2*

Bris, A, Goetzmann, W., and Zhu N., 2007, Efficiency and the Bear: Short Sales and Markets Around the World, *Journal of Finance*, 62, pp. 1029-1079

Busse, J.A., Green, T.C., Jegadeesh, N., 2012, Buy-side trades and sell-side recommendations: Interactions and information content, Journal of Financial Markets 15, 207–232

Chang, C., Cheng, J.W. and Yu, Y., 2007, Short-Sales Constraints and Price Discovery: Evidence from the Hong Kong Market *The Journal of Finance Vol. LXII, No. 5*

Chakravarty, S., 2001, Stealth-trading: Which traders' trades move stock prices?, *Journal of Financial Economics 61, 289–307*

Cheng, L, Yan, Z., Zhao, Y, Chang, W., 2011 Short selling activity, Price Efficiency and Fundamental Value of IPO Stocks, Pacific-Basin Finance Journal, Forthcoming; Midwest Finance Association 2012 Annual Meeting

Christophe, S., Ferri, M., Angel, J., 2004, Short selling prior to earnings announcements. *Journal of Finance 59, 1845–1875*

Christophe, S., Ferri, M., Hsieh, J., 2010. Informed trading before analyst downgrades: evidence from short sellers*. Journal of Financial Economics 95, 85–106*

Choi, N., Sias, R.W., 2009 Institutional industry herding *Journal of Financial Economics 94 (2009) 469–491*

Cohen, L., Diether, K.B., Christopher, J.M., 2007, Supply and Demand Shifts in the Shorting Market, *The Journal of Finance Vol. 12, no. 5*

Conrad, J., 1994, The price effect of short interest announcements, *Working paper, University of North Carolina.*

Cornetta, M.M., Tehranian, H., Yalçin, A., 2007, Regulation fair disclosure and the market's reaction to analyst investment recommendation changes, *Journal of Banking & Finance 31, 567–588*.

D'Avolio, G., 2002, The market for borrowing stock, *Journal of Financial Economics 66, 271–306*

Daske, H., Richardson, S.A., Tuna, I., (2005) Do short sale transactions precede bad news events? *The Wharton School, University of Pennsylvania*

Degryse, H., De Jong, F., Lefebvre, J., 2009, An empirical analysis of legal insider trading in the Netherlands*, TILEC Discussion paper, Tilburg University*

Desai, H., Ramesh, K., Thiagarajan, S.R., Balachandran, B.V., 2002. An investigation of the information role of short interest in the Nasdaq market. *Journal of Finance 52, 2263–2287*

Diamond D., Verrecchia, R., 1987. Constraints on short-selling and asset price adjustment to private information. *Journal of Financial Economics 18, 277-311*

Engelberg, J., Reed, A., Ringgenberg, M., 2012. How are Shorts Informed: Short Sellers, News, and Information Processing? *Journal of financial Economics, forthcoming*

Geczy, C.C., Musto, D.K. and Reed, A.V. 2002 Stocks are special too: an analysis of the equity lending martet *Journal of Financial Economics 66, 241–269*

Gruenewald, S., Wagner, A.F., Weber, R.H., 2010, Short Selling Regulation after the Financial Crisis – First principles revisited, *International Journal of Disclosure & Governance*

Guardian, The, News article, obtained online through: http://www.theguardian.com/business/2008/oct/29/vw-volkswagen-porsche-takeover

Hsu, C. and Bradley, Z., 2011, The effects of short selling public disclosure of individual positions on equity markets*, Research report published by Oliver Wyman financial services requested by Alternative Investment Management Association*

Hwagn, S., Salmon, M., (2004) Market stress and herding *Journal of Empirical Finance 11 (2004) 585–616*

Irvine, P.J., Lipson, M.L., Puckett, A., 2007. Tipping. *The Review of Financial Studies 20, 741–768*.

Marsh, I.W., Payne, R., 2012, Banning short sales and market quality: The UK's experience, *Journal of Banking & Finance 36, 1975–1986*

Massa, M., Zhang, B. and Zhang, H. (2012) The invisible hand of short-selling: Does short-selling discipline earnings manipulation? *INSEAD Working paper*

Massoud, N., Nandy, D., Sounders, A., and Song, K., 2011, Do hedge funds trade on private information? Evidence from syndicated lending and short-selling, *Journal of Financial Economics 99 477–499*

Miller, E., 1977, Risk, Uncertainty, and Divergence of Opinion, *32 Journal of Finance 1151-1168*

Petram, L.O., 2011, How the Amsterdam market for Dutch East India Company shares became a modern securities market, 1602-1700, *Dissertation Faculty of Humanities, University of Amsterdam*

Securities Exchange Act Release No. 54891, 2006, Price Test Elimination Proposing Release

Senchack Jr., A.J., Starks, L.T., 1993, Short-Sale Restrictions and Market Reaction to Short-Interest Announcements*, Jounal of Financial and quantitative analysis vol. 28 no. 2*

Venezia, I., Nashikkar, A., Shapira, Z., 2011, Firm specific and macro herding by professional and amateur investors and their effects on market volatility *Journal of Banking & Finance 35 1599–1609*

Appendix

List of all short sellers and shorted companies that appeared in the short selling register of the AFM as used in this study.

Short sellers 60

Adage Capital Management L.P.

Ako Capital LLP

AQR Capital Management, LLC

Archipel Asset Management AB

Arrowgrass Capital Partners LLP

Arrowstreet Capital, Limited Partnership

Balyasny Asset Management LP

BlackRock Advisors (UK) Limited

BlackRock Institutional Trust Company, National Association

BlackRock Investment Management (UK) Limited

BNP Paribas S.A.

Bocage Capital, LLC

Canada Pension Plan Investment Board

CapeView Capital LLP

Capital Fund Management S.A.

Carlson Capital UK LLP

CQS (UK) LLP

D.E. Shaw & Co., L.P.

Daiwa Capital Markets Europe Limited

Davidson Kempner Capital Management LLC

Denjoy Integral Fund Limited

Discovery Capital Management, LLC

Lansdowne Partners Limited

Linden Advisors LP

Lucerne Capital Management, LLC

Magnetar Financial LLC

Marble Arch Investments, LP

Marshall Wace LLP

Meritage Group LP

Millennium International Management L.P.

Morton Holdings, Inc.

Naya Management LLP

Numeric Investors LLC

Occitan Master Fund LP

Oceanwood Capital Management LLP

Odey Asset Management LLP

OVS Capital Management LLP

Oxford Asset Management

Passport Capital, LLC

Polygon Global Partners LLP

S.A.C. Global Investors LLP

Scopia Capital Management LLC

Susquehanna International Group Ltd.

Susquehanna International Holdings LLC

DSAM Partners LLP

Egerton Capital Limited

Elliott Management Corporation

Encompass Capital Advisors LLC

GLG Partners LP

GMT Capital Corp

Highbridge Capital Management LLC

JPMorgan Asset Management (UK) Ltd.

Thames River Capital LLP

The Children's Investment Fund Management (UK) LLP

Third Point LLC

TT International

Tyrus Capital S.A.M.

UBS O'Connor Limited

Wellington Management Company, LLP

WorldQuant, LLC

Shorted companies 26 (excluding SNS Reaal)

Accell Group N.V.

AkzoNobel N.V.

AMG Advanced Metallurgical Group N.V.

Aperam S.A.

ASM International N.V.

BinckBank N.V.

Core Laboratories N.V.

Corio N.V.

CSM N.V.

Eurocommercial Properties N.V.

Fugro N.V.

Heijmans N.V.

Koninklijke BAM Groep N.V.

Koninklijke KPN N.V.

Koninklijke Vopak N.V.

NSI N.V.

PostNL N.V.

Royal Imtech N.V.

SBM Offshore N.V.

TNT Express N.V.

TomTom N.V.

Unibail-Rodamco SE

USG People N.V.

Wereldhave N.V.

Wolters Kluwer N.V.

Ziggo N.V.