IMPACTS OF SHORT SELLING RESTRICTIONS ON STOCKS TRADED AT BORSA İSTANBUL

A Master Thesis

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Graduate School of Economics and Social Sciences
of
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I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science in Management.

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ABSTRACT

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This study investigates impacts of short sale restrictions, particularly uptick rule which was repealed at 02.01.2014, on returns of stocks traded at Borsa Istanbul between January 2012 and March 2014. Firstly, time-series regressions are conducted to test the performance of the Fama - French (1993) three-factor model with four different portfolios, sorted according to their short sale volume ratio before and after repeal of uptick rule. The results show that in the after period portfolio consisting of heavily shorted stocks has the only significant and negative Jensen's alpha. This indicates that after repeal of uptick rule heavily shorted stocks underperform probably because of reflection of the pessimists' beliefs as short positions which drive asset prices down unnecessarily. Secondly, an additional short sale factor (SS), is calculated and regressed as an fourth explanatory variable in Fama-French model in an attempt to determine the common risk factors that capture the variation in stock returns before and after repeal of uptick rule. This study explores that while short sale factor (SS) substitutes size factor before repeal of uptick rule it doesn't replace size factor after repeal of uptick rule and gains independent explanatory power from size.

Keywords: Asset pricing, Fama-French Model, Short sale

ÖZET

AÇIĞA SATIŞ DÜZENLEMELERİNİN İSTANBUL BORSASINDA İŞLEM GÖREN PAYLAR ÜZERİNDEKİ ETKİSİ

Çakın, Tuğba

Yüksek Lisans, İşletme Bölümü

Tez Yöneticisi: Doç. Dr. Aslıhan Altay-Salih

Ağustos 2014

Bu çalışma, açığa satış düzenlemelerinin özellikle 02.01.2014 tarihinden uygulamadan kaldırılan yukarı adım kuralının Ocak 2012 ve Mart 2014 tarihleri arasında İstanbul Borsası'nda işlem gören paylar üzerindeki etkisini araştırmaktadır. Öncelikle, yukarı adım kuralının kaldırılmasından önce ve sonra olmak üzere açığa satış işlem hacimlerine göre oluşturulan portföylerin Fama – French (1993) üç faktör modeli kullanılarak performanslarını ölçmek için zaman serisi testi yapılmıştır. Sonuç olarak yukarı adım kuralının kaldırılmasından sonra yoğun olarak açığa satış yapılan paylardan oluşan portföyün Jensen alfasının negatif ve anlamlı olduğu anlaşılmıştır. Bu durumda yukarı adım kuralının kaldırılmasının ardından pay hakkında olumsuz fikirlerin açığa satış olarak yansımasından dolayı fiyatların gereğinden aşağı çekildiği ve yoğun olarak açığa satış yapılan payların beklenenden daha düşük performans gösterdiği sonucu çıkarılabilir. İkinci olarak, ilave açığa satış faktörü (SS) hesaplanmış ve dördüncü faktör olarak Fama French faktör modeline eklenmiştir. Sonuçta, açığa satış faktörü yukarı adım kuralı kaldırılmadan önce büyüklük faktörünün yerini alırken yukarı adım kuralının uygulamadan kaldırılmasından sonra modelde büyüklük faktöründen bağımsız olarak açıklayıcı güce kavuşmuştur.

Keywords: Varlık fiyatlandırması, Fama-French modeli

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CHAPTER I

INTRODUCTION

There has been a long debate about short selling from the very beginning of financial markets. Short sales date back to the early seventeenth century, when first uncovered on stocks of the Dutch East India Company in 1609 (Bris et al., 2007). The practice was banned in the following year. Since then, different practices and regulations have been in effect in many different jurisdictions and have alternated throughout time along with debates about the efficiency of the constraints on short sales.

Short sale is basically defined as a sale of a security that the seller does not own. It can be executed by using two different methods, covered or naked. In covered short sale, the investor borrows the related stock or has an agreement to borrow before selling short. On the other hand, in naked short selling the investors

neither borrows nor has an agreement to borrow before selling. In this sense, regulators approach may differ according to the type of short selling and their risk.

Short sellers primary motive is speculation which involves selling 'high' and buying back 'low' in the future in a way that negative views about stocks are reflected to overvalued stocks. Another purpose of short sale can be hedging by means of which investors offset their positions at derivative or other structured products by selling short in spot stock markets. Short sale may be used by arbitrageurs to make use of valuation differences between same securities on different markets. Another common motive of short sale is market making activities where main orientation is to complete the transactions instead of making use of overvalued stocks or other arbitrage opportunities.

Following the bankruptcy of Lehman Brothers in September 2008, regulators responded global financial crisis by announcing rescue plans for distressed financial institutions and later tight new restrictions on the short selling of financial stocks. These interventions rekindle discussions on impacts of short sale restrictions in markets and academic environment. On one hand, regulators argue that short sale restrictions are necessary in order to reduce risk of manipulation, prevent disorder in settlement and curb short selling's capacity to drive prices rapidly down during distressed times. On the other hand, it is argued that short sale restrictions disrupt efficient price formation in markets. Primary concern of opponents of short sale restrictions is that short sale restrictions retain

pessimist's view to reflect to market and in this way prevent informational efficiency.

There are many tools used by regulators to capture the potential benefits of short selling while simultaneously reduce the negative impacts of short selling to markets. International Organization of Securities Commission's 2003 Report on short sale, "Report on Transparency of Short Selling", classifies restrictions imposed by regulators as follows, i) the types of securities that may, and may not, be sold short; ii) the processes by which short sales are executed and iii) settlement requirements of specific relevance to short selling.

In Turkey, short sale can be executed from the very first day of the stock markets. The first restrictions on short sale with Serial:V Number:18 "Communiqué on Margin Trading, Short Sales and Lending and Borrowing of Securities" came into effect in 1994 and was updated in 2003. This Communiqué has provisions relating to initial and maintenance margin for short selling and requires flagging while sending short sale orders to Exchange. In addition, there had been a provision on price limitation at short sales, known as up-tick rule which was repealed as of 02.01.2013. This rule required that short sale should be executed at a price higher than the last execution price.

In parallel with developments in Turkish stock market, short sale practice has become widespread in time. The annual average of daily share of short sale in

total volume was 2.05 % in 2005 while it increased to 6.40 % in 2010 and jumped to 15.95 % in first quarter of 2014 in Borsa İstanbul. This thesis basically aims to discover impacts of short sale and short sale restrictions on prices of stocks traded at Borsa İstanbul in period between January 2012 – March 2014 by using Fama-French Three Factor Model.

Firstly, the research question of whether portfolios of highly shorted stocks generally underperform the market is explored. After regressing Fama-French three factor model with four different short sale portfolios before and after repeal of uptick rule, the results reveal that all jensen's alpha but the most highly shorted stock portfolio in after period is insignificant indicating that there is no under or overvaluation in these portfolios before and after repeal of uptick rule.

Secondly, in order to check if short sale has any role at explaining the causes of common variation in average returns, short sale is used as an additional explanatory variable in Fama French factor model. SS, defined as the difference between returns of most highly shorted portfolio (stocks in 4^{th} portfolio) and the least shorted portfolio (stocks in 1^{st} portfolio) is weekly calculated and regressed as an fourth explanatory variable in Fama-French model. When short sale is added to model as an explanatory factor before repeal of short sale, short sale factor replaces the size factor while after repeal of uptick rule market factor and size factor keep their significance and short sale is significant also. It means that short sale factor doesn't replace the size factor anymore and has its independent explanatory power

from size. It is probably because in absence of uptick rule it gets easier to sell short comparatively illiquid stocks and highly shorted stocks don't consist of only large stocks anymore.

This finding has valuable insights for impacts of short sale restrictions, particularly uptick rule on markets. First of all, repeal of uptick rule results in increase at short sale volume. On the other hand, the presence of uptick rule doesn't tend to cause stock overvaluation, however after repeal of uptick rule heavily shorted stocks underperform. In addition, it appears that before repeal of uptick rule short sale has an explanatory power replacing size factor. However, after repeal of uptick rule it doesn't replace size factor anymore and becomes an additional explanatory factor in asset pricing models.

The remaining of the thesis is organized as follows: Chapter 2 presents general information about short sale including definition, practice, regulation and recent developments. Chapter 3 overviews short sale practices and regulations as well as lending in Turkey. Chapter 4 reviews the literature on impacts of short selling restrictions on markets. Chapter 5 introduces the data, methodology, the descriptive statistics of the returns of short sale portfolios and empirical results before and after repeal of uptick rule. Chapter 6 presents conclusions.

CHAPTER II

SHORT SALE IN GENERAL

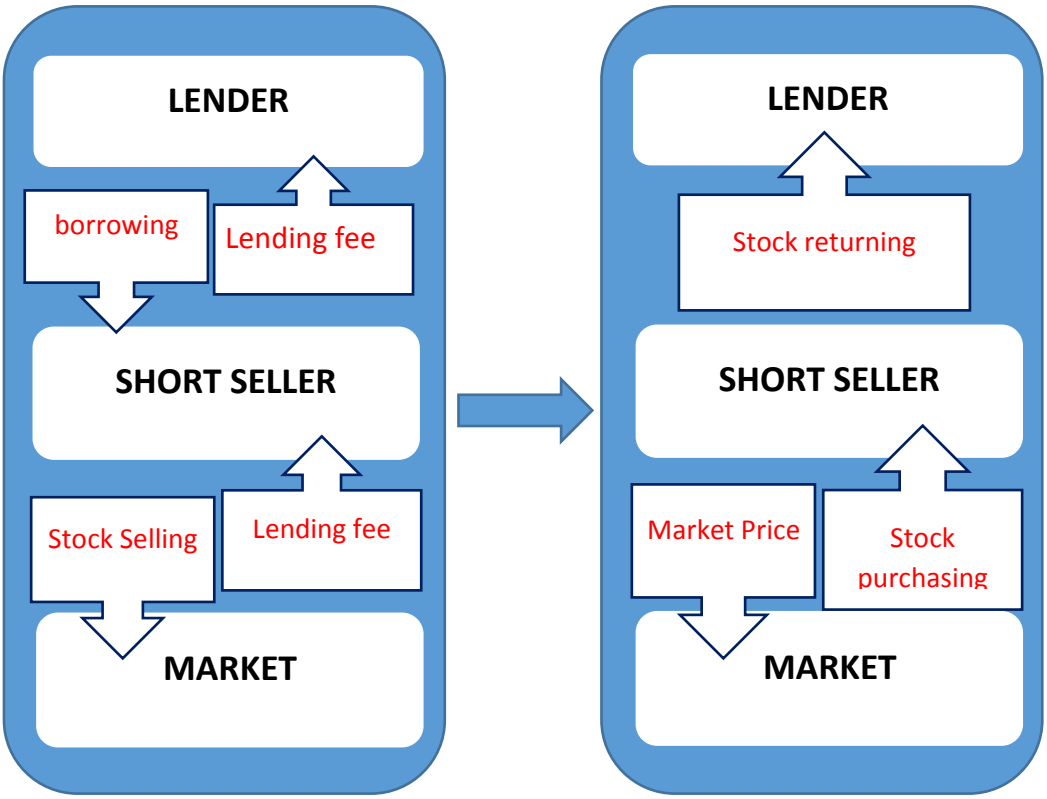
2.1. Definition of Short Sale

Short sale, defined as a sale of a security that the seller does not own, is one of the basic trading strategies which allows traders to make profits even in bear markets. Short sellers mainly hope to profit from a declining price movement or mean to hedge a long position in the same or related securities.

Short sale can mainly be executed in two different ways, explicitly and implicitly. In explicit method, investors sell the security in traditional ways in markets. On the other hand, investors can prefer derivatives in order to take short position and make profit from declines in prices by using derivatives, such as futures, forwards, options, credit default swaps etc.

In traditional way, short sale can be executed by using two different methods, covered or naked. The covered short sale consists of two steps. As a first step short seller borrows the shares he is going to sell short. Investor can find these shares from his broker-dealer or institutional investors. The brokerage house can lend the share either from his inventory or its customers' accounts that allow lending of their shares. Another supplier for lending is institutional investors that generally invest in long horizon and want to benefit lending fee in short term. In some countries, including Turkey, there are also organized markets for lending shares. The investors may borrow from this market as well. In borrowing mechanism, just as in money lending markets, the borrower, namely short seller pay a lending fee to the lender. The fee may differ depending on availability and demand of the stock. In addition, the borrower should give collateral to the lender as a guarantee for returning the share. The collateral is generally in the form of cash or liquid government bonds. In practice, the lending fee and yield of collateral are netted and the difference is called "rebate rate". Depending on the difference, the borrower or lender pays the rebate rate. Right after borrowing, the short seller sells previously borrowed stock in the market place at current price. (The buyer doesn't know that the stock is sold short) Later on, as a second step, the short seller closes his position by repurchasing the share from the market and returns it to lender and gets its collateral from lender. The mechanism is as following.

Figure 1 Short Selling Mechanism



Step 1 **Step 2**

In naked short selling, the short selling type which the market and regulators are most anxious about, the short sellers sell the stocks without borrowing the related stock. In this case, short sellers either borrow the stock till settlement date or fail to deliver the stock on settlement date. The regulators may differ their regulations according to these two types of short selling.

International Organization of Securities Commission (IOSCO) 2003 Report on short sale, "Report on Transparency of Short Selling" emphasizes the importance of definition for establishing effective trading controls and reporting as well as disclosure requirements for short selling and provides broader classification of short sale in order to provide clear understanding from regulators point of view which is as follows.

Table 1 Short Sale Classification

Deliverability at point of sale	Classification
Seller has purchased but not yet received securities.	Not normally considered to be a short sale (though it might be considered a technical short if delivery is deferred beyond the intended settlement date).
Seller has exercised an option, warrant, conversion or other contractual right that would lead to delivery.	Not normally considered to be a short sale.
Seller has borrowed securities.	Normally considered a short sale

Seller has agreement to borrow securities.	Normally considered a short sale.
Seller has made no arrangements to borrow securities at the point of sale, or otherwise prior to settlement date.	Normally considered a (naked) short sale.

2.2. The Rationale behind Short Sales

2.2.1. Speculation

The most controversial rationale behind short selling is speculation purpose. Short sellers primary purpose is selling ‘high’ and buying back ‘low’ in which they reflect their negative opinions about stocks which they consider overvalued. The speculative short sellers regularly search for overvalued stocks in order to make profit from future price declines. This rationale raises ethical and political concerns as some argue that this kind of short selling endangers economic stability. On the other hand, this enables negative information to be reflected in prices in an efficient way.

2.2.2. Hedging

Another important rationale behind short sale is hedging by means of which investors offset their positions at derivative products by selling short in spot stock markets. It is a way of managing or mitigating risk for investors in their portfolios.

For instance, a financial institution who writes put option on a specific stock can sell short underlying stock in order to hedge its risk. Similarly, if someone has convertible bonds he/she can hedge its risk by selling short the underlying stock. There are plenty of ways of using short sale in hedge strategies.

2.2.3. Market Making Activities

Market makers have commitment to guarantee two-way prices in order to provide smooth functioning of markets. They often use short selling to provide liquidity to the market. Their main orientation is to complete the transactions instead of making use of overvalued stocks or other arbitrage opportunities. Since they serve smooth functioning of the markets, they generally exempt from short selling restrictions in many jurisdictions.

2.2.4. Arbitrage Opportunities

Short selling can be used by arbitragers to make use of valuation differences between same securities on different markets. In this way they serve the market by correcting the price anomalies between equivalent securities. For instance, an exchange-traded fund mimicking an index and the stocks composing the index having different valuations. If the price of ETF is higher than underlying stocks, an arbitrager can benefit from this inequality by selling short ETF and take long position on stocks composing the index.

Diether et al. (2009) shows different approach at stating the rationale behind short selling and summarizes facts behind short selling behaviour of investors under four main pillars. First is that short sellers have inside information about future fundamental values, which suggests that short sellers are corporate insiders or can get material nonpublic information from the Corporation earlier than other investors. Second explanation states that short sellers exploit market frictions or behavioral biases that may cause price to deviate from fundamental values in the short run. This alternative suggests that short sellers are likely to be more sophisticated than the average investors. Boehmer et al. (2008) states that institutional investors execute about 75 % of all short sales, confirming this alternative. A third alternative suppose that short sellers act as voluntary liquidity providers, and take step and trade when there is a significant and temporary buy-order imbalance in the market. As buying orders decreases, prices converge to their fundamental values and short sellers can close their positions at profit. This explanation states that high level of short sales is contemporaneous to buy-order imbalances. A fourth explanation is that short sellers bear additional risk in period of elevated uncertainty.

2.3. Regulation of Short Sale

IOSCO 2003 Report on short sale, "Report on Transparency of Short Selling", starts with an emphasis on potential benefits of short sale. The report states that;

> Even where regulators consider that some aspects of short selling require regulation, they normally recognize that short selling can contribute to market efficiency. The potential benefits include:
>
> • helping to maintain efficient pricing by reversing, or containing, excessive valuations placed on security prices;
>
> • facilitating dealer liquidity provision, particularly where that service guarantees liquidity on a continuous basis;
>
> • providing a risk management tool for those needing to offset 'long' exposures;
>
> • keeping related prices properly aligned (through arbitrage);
>
> • assisting, within approved dealing and stabilization rules, with facilitating new issues;
>
> • facilitating the development of more complex and more sophisticated trading strategies (e.g. statistical arbitrage, pairs trading);
>
> • adding to overall liquidity and trading capacity.

In addition, it is strongly stressed that short selling is frequently demonized on the basis of misconceptions. For instance, the inaccurateness of perception of short selling as costless speculation is emphasized. There are definitely significant costs and risks born by short sellers. Moreover, a person who shorts a stock is exposed to potentially substantial additional costs – theoretically, an unlimited loss - if the price of the shorted security rises rather than falls. Following these lines, the report draws attention to three main concerns of regulators on short selling,

i) bring about disorderly markets

ii) facilitate market abuse and

iii) Settlement disruptions.

Regulators while appreciating the short selling role in effective price formation, concern about that speed and extent of corrections may themselves create disorders. The weight of short selling can intimidate other investors, cause them stand back and hold fresh buying orders away from markets.

Either the process of decline or outcome of decline can create disorder. The disorder in process of decline can create volatility in the simplest term and thus mispricing in derivatives markets and eventually may lead to panic and market crashes. The outcome of decline may overshoot the efficient price level and this lead to mispricing of the stock itself. Second concern of regulators is that short selling may be used to assist market abuse. It doesn't mean that short selling is abusive behavior but its ability to exacerbate price declines or to support insider dealers having negative information about an issuer, makes it useful tool for the people who intends to abuse market. Definition of manipulative activity varies between different jurisdictions. Clearly, behaviors intended to position prices, distort markets or mislead investors are accepted as market abuse irrespective of whether the selling is long or short. On the other hand, there are concerns that short selling may enhance the scope to carry out the abuse. Third concern of regulators is possible problems that short selling may create in the area of settlement. The principal issue here is buyer can get his/her stock in timely manner. Any delay in delivery may cause difficulties for instance, being able to exercise voting rights or to meet obligations on onward chain of transactions. If there is generally inadequate

enforcement to ensure the timely settlement of short sales, there may occur wider systemic risk. In addition, developments in supply and demand in the securities lending markets may remain short seller vulnerable to sudden shortages or the unexpected recall of stock.

2.4. Regulatory Approaches and Tools

Regulation over short sales aims at capturing the potential benefits of short selling (e.g. correcting an overvalued market, facilitating hedging and other risk management), while simultaneously reducing the scope for short selling to destabilize markets. IOSCO 2003 Report classifies regulations under three main areas and summarizes tools, objectives and observations as in following table.

i) the types of securities that may, and may not, be sold short;

ii) the processes by which short sales are executed;

iii) settlement requirements of specific relevance to short selling.

Table 2 Regulatory Tools

Tools	Objective	Observations
Restrict class of security eligible for short selling.	Normally to reduce risk of disorder or manipulation in less	Ban may further reduce liquidity and increase the risk of stock prices being inflated.

	liquid securities, which are more volatile + easier to manipulate.	Incentive to manipulate may not be high because rewards relatively low and stock to borrow generally scarce.
Restrict short sales in individual securities when trading appears disorderly.	To prevent disorder, including settlement disorder, but only where market monitoring shows this to be likely.	Allows freedom to short sell in most circumstances. Imposition of ban may increase risk for those with open positions (and disrupt derivatives market).
Restrict short sales in individual issues at sensitive times, e.g., takeovers, new issues.	To protect issuers against manipulation that might adversely affect funding operations, etc.	May reduce scope for manipulation, but may make price arbitrage less effective or could increase risk of offers being overpriced.
Cap percentage of issue that may be sold short.	A ceiling control designed to control excessive short selling.	Ceiling level may restrict some 'legitimate' short sales and potentially facilitate an artificially high stock price. More difficult to enforce

		when security trades in several locations.
Rules to prevent short sales at sequentially lower prices.	An aim to curb short selling's capacity to drive prices rapidly lower.	Blanket restrictions may interfere with hedging activity, but exemptions may change trading methods and their relative costs.
Ban naked short sales.	Aims to prevent settlement disruption and deter 'free-ride' speculation.	Requires effective intermediary controls. No comparable controls on speculative longs.
Require (customer) margin.	Aims to protect broker and others involved in transaction against credit risk.	Up-front margin may reduce short selling by increasing cost. May divert business via derivatives if margin costs in each market are out of line.

In view of the financial crisis IOSCO formed a mandate of the Task Force to develop high-level principles for the effective regulation of short selling in 2009. This task force prepared another Report on short selling, in order to eliminate gaps

in various regulatory approaches to naked short selling, including delivery requirements and disclosure of short positions. It is emphasized that the new Report aimed at helping restore and maintain investor confidence under ongoing financial crisis, as the principles are formulated with a view to addressing the objectives of investor protection, helping to ensure that markets are fair, efficient and transparent, and reducing systemic risk. The IOSCO 2009 Report recommends **four principles** in order to ensure effective regulation of short selling. These are;

i) Short selling should be subject to appropriate controls to reduce or minimize the potential risks that could affect the orderly and efficient functioning and stability of financial markets.

ii) Short selling should be subject to a reporting regime that provides timely information to the market or to market authorities.

iii) Short selling should be subject to an effective compliance and enforcement system.

iv) Short selling regulation should allow appropriate exceptions for certain types of transactions for efficient market functioning and development.

2.5 Countries' Responses to Recent Financial Crisis

IOSCO 2009 Report remarked that the countries with few controls are in Europe, while those with more controls are primarily in North America and Asia till recent financial crisis.

Following the bankruptcy of Lehman Brothers in September 2008, regulators respond global financial crisis by announcing robust rescue plans for distressed

financial institutions. However, the markets didn't get calm and stock prices continued to fall. After all, regulators reacted drastically by imposing tight new restrictions on the short selling of financial stocks. Frino et al. (2011) summarizes all regulatory responses in a way that firstly, on September 18, 2008, the FSA banned short-selling (both naked and covered) in financial stocks. The temporary ban, effective from September 19, 2008 to January 16, 2009, was for net short positions in 29 financial stocks on the London Stock Exchange. On the same day, the SEC imposed a similar ban on more than 800 financial stocks in the U.S. market which was later amended on 21 September and was set to expire on 2 October, 2008. This was followed in Canada by the Ontario Securities Commission (OSC) for stocks listed on the Toronto Stock Exchange (TSX) that are also inter-listed in the U.S. In Switzerland, the Swiss Federal Banking Commission (SFBC), SWX and SWX Europe placed prohibitions on short-selling, coming into effect on 19 September, 2008. On 22 September 2008 Australian Securities and Investments Commission (ASIC) banned all forms of short-selling in all stocks; and Belgium, France, Luxembourg, The Netherlands, Portugal and Germany prohibiting naked short-selling for specified financial institutions. The next day, 23 September, 2008, the Italian regulator, Commossione Nazionale per le Società e la Borsa (CONSOB), placed a similar ban on naked short-selling of shares issued by banks and insurance companies. Following these, Russia and Korea were the next regulators, placing a prohibition on the short-selling of all securities. After a while, as markets worldwide began to stabilize regulators started to lift or release the restrictions. All

these reactions can be interpreted in a way that short selling behavior is seen as scapegoat during hard times and restrictions on short selling is primary tools used by regulators to stabilize markets.

When we look at the regulation from broader perspective, in USA, there had been NYSE's Uptick rule, and Nasdaq's bid price test till 2005 SHO regulation. In 2005, SEC (Securities and Exchange Commission) established uniform locate and delivery requirements, and establish a procedure to temporarily suspend price tests for certain time periods in order to evaluate the overall effectiveness and necessity of short sale price restrictions. Later on, SEC removed all existing exchange-mandated short-sale price test effective July 6, 2007. After crisis, SEC didn't mandate price tests however adopted alternative up-tick rule. According to this new rule (Rule 201) restrictions on short selling would function only when a stock has triggered a circuit breaker by experiencing a price decline of at least 10 percent in one day. At that point, short selling would be permitted if the price of the security is above the current national best bid.[1]

On the other hand, in Europe consisting of many jurisdictions, it took time to become a union wide regulation in view of recent financial crisis. The European Commission adopted on 15 September 2010 a proposal targeting short selling and credit default swaps. Besides other things relating to short selling, this proposal

[1] SEC press release at *http://www.sec.gov/news/press/2010/2010-26.htm*

brings: (1) a two-tiered disclosure regime and a flagging system, (2) the regulator's empowerment to prohibit short sales of financial stocks temporarily and to introduce a circuit breaker, (3) a locate rule[2], and (4) the obligation for trading venues to have buy-in procedures and fines for late settlement. However market making activities are exempted from these rules. In the final text[3] published on 24 March 2012, the initial locate rule has been relaxed to allow intraday naked short-selling. Similarly, a flagging system has been abandoned. This new regulation became directly effective in all Member States as of 1 November 2012.

2 In press release of European Commission with number MEMO/12/508 and date 29/06/2012, locate rule defined as *"the arrangement whereby a broker confirms to a short seller that they have located the shares which the short seller needs to borrow to cover their short sale, taking into account the amount required and market conditions."*

[3] Regulation (EU) No 236/2012 of the European Parliament and the Council of 14 March 2012 on short selling and certain aspects of Credit Default Swaps

CHAPTER III

SHORT SALE IN TURKEY

3.1 Regulations in TURKEY

Istanbul Exchange started its operation in 1986. The average daily trade volume was 8.9 million TL in 1988 and reached to 25 billion TL in 1994. In parallel to developments in market volumes, new regulations were required to prevent market abuse and ensure efficiency in markets. As a consequence, Capital Markets Board of Turkey (CMB) prepared new regulations relating to margin trading and short sale in late 1994. Communiqué on Margin Trading, Short Sales and Lending and Borrowing of Securities" (Serial V Number 18) came into effect 12.27.1994 and defined short sale as "… sales of capital market instruments borrowed previously."

Very first regulations of short sale required to borrow related stock before selling short, which is generally called covered short sale. In addition, it is required from investor to have % 50 initial margin. On the other hand there was no provision relating to maintenance margin. Another important provision on short sale was flagging requirement. It means that if you are selling short you have to inform your broker and he/she has to press short sale button while sending order to Exchange. This regulation provides information about volume of short sale for each stock and therefore serves both investors to capture signals of the market and regulators to monitor markets efficiently at the end of sessions. Last not but not least is price limitation, known as up-tick rule. This rule required that short sale should be executed at a price higher than the last execution price. However, short sale may be executed at a price equal to last execution price if this price is above the preceding price.

In time, the practices in market had changed and CMB looked for more efficient monitoring and supervising mechanism over markets. As a result, aforementioned regulation was revised. Serial:V No:65 "Communiqué On Margin Trading, Short Sales and Lending And Borrowing of Securities" came into effect in July 2003. The fundamental change was about the definition of short sale. This time short sale was defined as, *"...*sales or placement of sale orders for capital market instruments that are not actually owned." It is not necessary to borrow related stock before selling short anymore according to new definition. Thereafter,

along with covered short selling naked short selling is allowed in Turkish capital markets.

The new Communique stipulates maintenance margin in addition to initial margin relating to short selling activities. According to new regulation, this has been in effect since 2003;

> "The customer has to deposit at least 50% margin at the beginning for the transaction of short sales. The initial margin means that the securities being subject to the short sale shall be deposited in cash in the amount of its current market value or the security shall be invested in cash. The minimum margin rate of 35% is obligatory in the course of short sale actions. The following formula shall be used in the calculation of the rate of equity capital:
>
> [(current market value of the securities subject to the transactions – market value of capital market instrument subject to short sale)/ current market values of the securities subject to the transactions]"

In addition to margin requirements, the regulation requires brokerage houses to flag each short selling while sending orders to Exchange. The provision titled "Notification of short sale order" states that;

> "The brokerage house shall clearly state to the Stock Exchange that the order is a short sale order in case of receipt of a short sale order in writing or in case a brokerage house discovers that a transaction is a short sale."

Another fundamental rule regarding to short selling is price limit in transactions, with its worldwide known name, up-tick rule. In first version of the regulation, the provision which had been in effect till 02.01.2013 required that;

> "In cases where a brokerage house executes a short sale on behalf of its customer or on its own account, the short sale shall be executed at a price higher than the price at which the last trade of a security subject to short sale is executed. However, short sale may be affected at the price at which the last trade was executed, if such price is above the next preceding price."

Another restriction on short selling is put on related parties. The provision restricts the related parties of company engaged in short selling activity of the underlying stock. The rule states that;

> The members of the board of directors of the company issuing capital market instrument and their executives and the shareholders of the company owning 10% or higher rate of shares of the company as well as those discovered to act jointly with them and their spouses and those under their guardianship are banned from effecting short sales of capital market instrument of the said company.

Till 2009, there hadn't been any changes in regulation of short sales of CMB or Borsa İstanbul. At 08.01.2009 Borsa İstanbul published a circular and announced that sending short selling orders during opening sessions are banned in order to provide efficient price formation. Following this, at 23.07.2010 CMB published Board decisions stating that the stocks traded on Borsa İstanbul are classified into three groups basing on their liquidity and market capitalization.

Besides other things, according this decision the stocks in B and C group can't be subject to margin trading or short sale. Previously, all stocks except traded in watch list companies market could be sold short. The purpose of this regulation was announced as providing market stability and preventing manipulative attempts.

In August 2011, USA credit note was decreased under AAA for the first time in the history, and the concerns about EU debt crisis jumped to Spain and Italy. All exchanges experienced significant losses in that period as BIST-100 index decreased % 19 in first ten days of August. Following these developments, CMB announced that inspections would start towards transactions violating short selling regulations and the initial margin at short selling transactions was increased to from 50 % 70 %. In this case CMB preferred to intervene to market indirectly and discouraged short selling by increasing initial margin ratios and inspections. Although the increase seems simply 20 %, it costs investors 2333 TL collateral for 1000 TL short selling instead of 1000 TL due to the calculations of margin requirements. As it is explained previously, most of the short selling positions are covered in a day, which means this regulatory change might not effect short sellers severely. After pessimistic view about markets disappeared, in 31.07.2012 CMB announced that it removed its previous decision about an increase on initial margin at short selling and decided to continue with 50 % initial margin ratio.

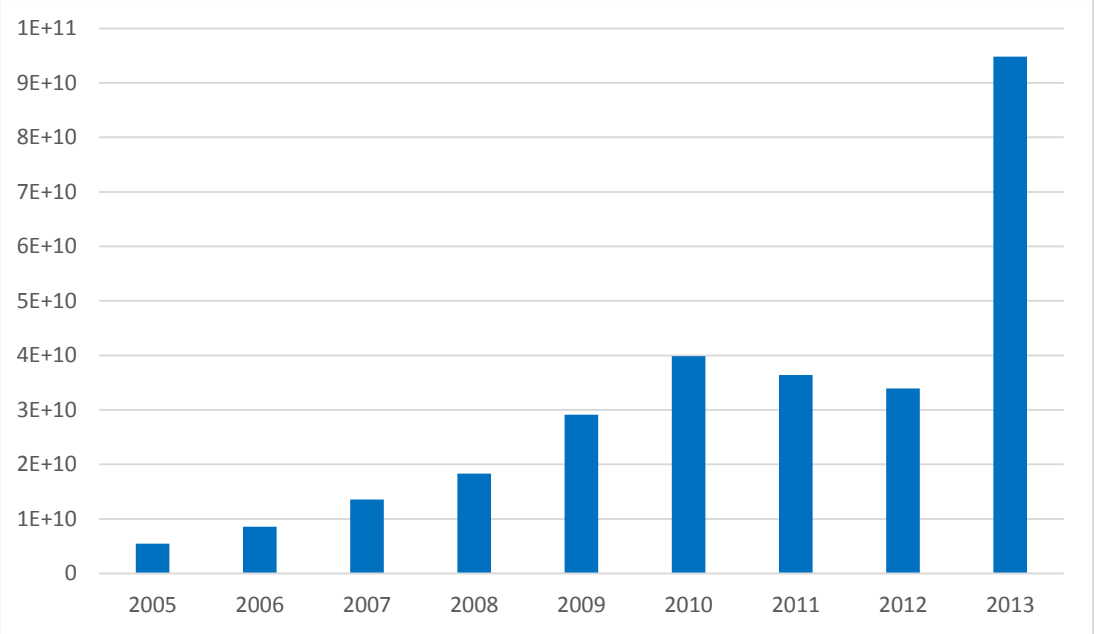
Just after 5 months after latest decision of CMB, there was a change in Communique Serial:V No:65. With this change CMB transfer its authority on implementing up-tick rule to Board of Borsa İstanbul. Following this change, Borsa İstanbul published a circular and announced that implementation of uptick rule was repealed as of 01.02.2013.

3.2. Short Sale in TURKEY

Short sale transactions are as old as stock markets. It is the most fundamental strategy in bear markets for investors. On the other hand, regulators make provisions against potential impacts of short sale in order to prevent market abuses and disorderly market functioning. The market trends as well as regulatory constraints on short sale have affected the nature of short sale. In Turkey short sale can be executed from the very first day of the stock markets and the first restrictions on short sale came into effect in 1994. The volume of the short sale is in line with both trends of the market and regulatory changes in Turkey. The figure 3 shows the progress of daily total volume and short sale volume from January 2005 to March 2014. In general total volume and short sale volume show similar trends. On the other hand, figure 4 shows ratio of daily short sale volume to total volume in percentage from January 2005 to March 2014. The ratio of daily short sale volume to total volume is around 2 % in 2005 while the average ratio increases to 11.8 % in 2013 and around 16 % in the first quarter of 2014. The highest ratio, 21, 4 % realized on Jan 2, 2014. It is obvious that there is a break point at the beginning

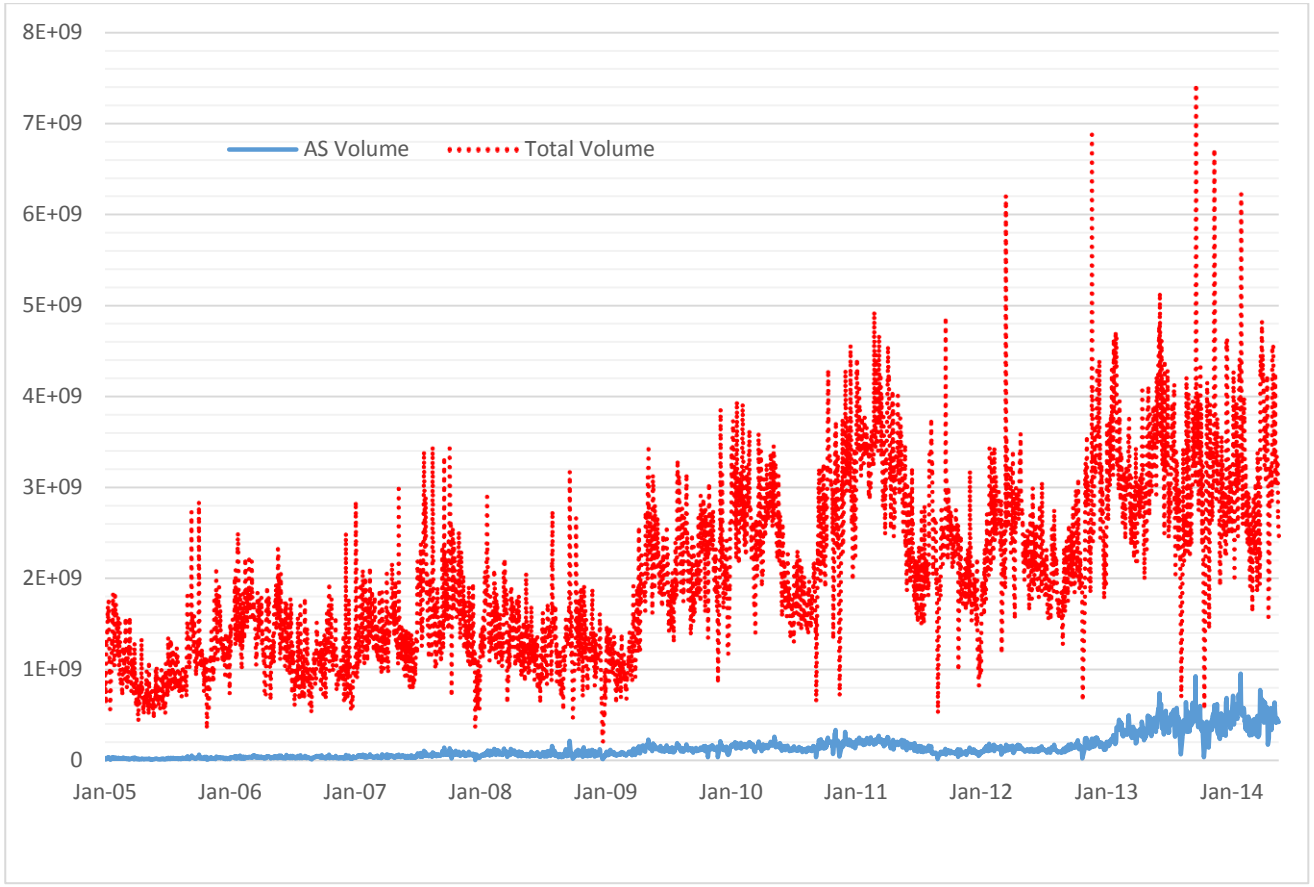
of 2013 when the main constraint on short sale, uptick rule was repealed. The shift in 2013 can be seen more clearly in the figure 2 which depicts the progress of annual short sale volume in years.

Figure 2 Annual Short Sale Volume



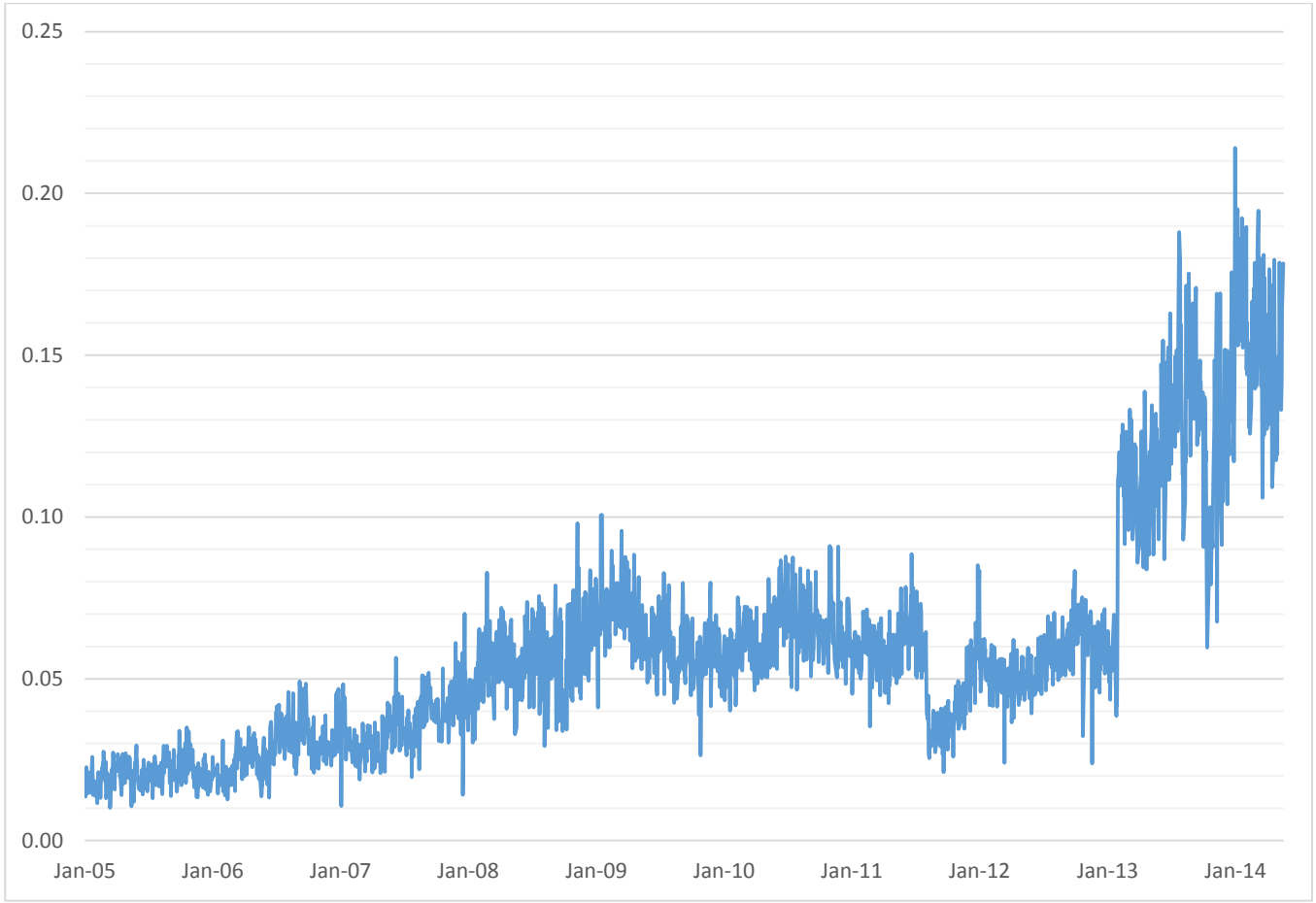
Note: Graph shows total annual short sale volume from 2005 to 2013

Figure 3 Daily Total Volume and Short Sale Volume



Note: Graph shows daily total volume and short sale volume from January 2005 to March 2014.

Figure 4 Share of Short Sale in Total Volume (%)



Note: Graph shows ratio of daily short sale volume to total volume in percentage from January 2005 to March 2014.

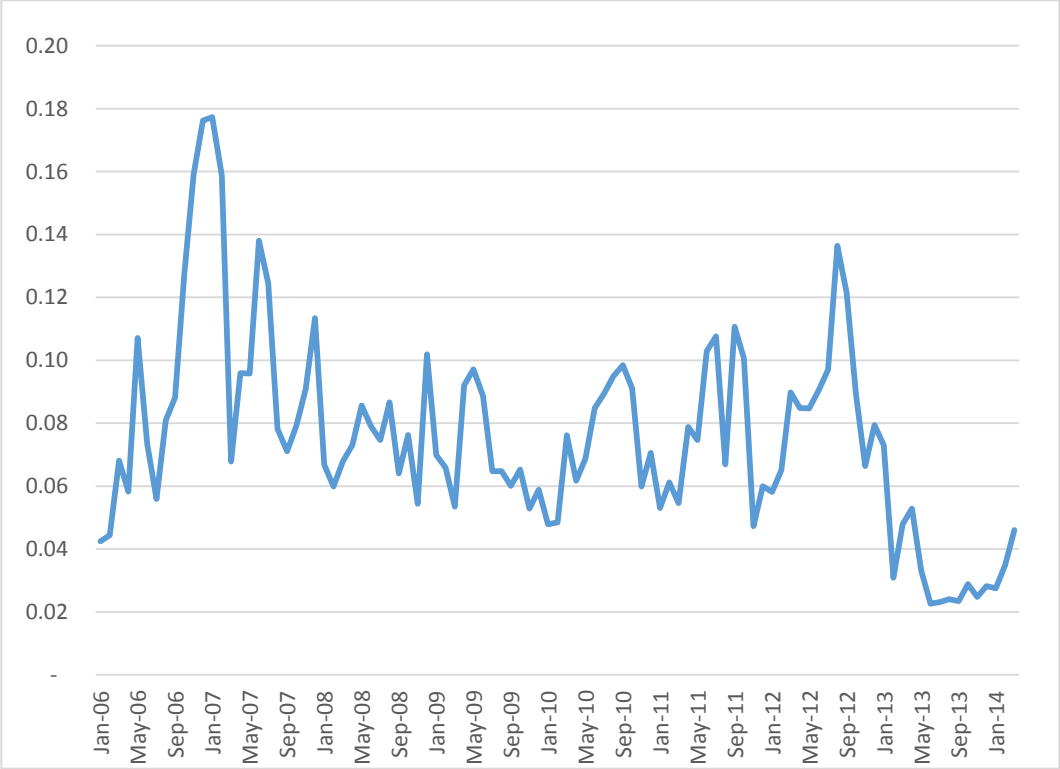
3.3. Lending Market in TURKEY

As discussed in first chapter, lending stocks is indispensable part of the short selling process. If investors don't close their position intraday, they have to borrow the related stocks to accomplish settlement requirement in day t+2. In general the lending transactions are executed on over the counter markets. The brokerage house either borrows the related stock from its other customers' accounts, generally institutional investors, or asks to borrow from other brokerage houses. In Turkey, in addition to over the counter markets, İstanbul Takas ve Saklama Bankası has operated an organized lending market since 2005.

The data of organized lending market is regularly issued by Takasbank since 2006. The market has made significant progress since its establishment. The annual lending volume was 768 million TL in 2006 while it was 3,022 million TL in 2013. On the other hand when we compare this lending data with short sale, it is seen that lending market can't keep pace with short sale. In average 9 % of daily short sale volume is met by lending market in 2006 while this ratio falls to 3,61 % in the first quarter of 2014. It may be due to two reasons. Firstly, the organized lending market doesn't work efficiently and the demand for this market is low and as a result investors prefer to borrow from over the counter markets. Secondly, the short sale positions are closed intraday and the need for borrowing the related stock to accomplish settlement requirement disappears. The figure 5 depicts the ratio of monthly lending volume to short sale volume since the beginning of January 2006. There are up and downs throughout

the period, however surprisingly the ratio falls significantly under average after January 2013. It is probably because although keeping its nominal level, lending volume can't keep up with short sale volume jump after repeal of uptick rule.

Figure 5 Ratio of Lending to Short Sale



Source: İstanbul Takas ve Saklama Bankası A.Ş.

Note: Graph shows ratio of monthly lending volume to short sale volume from January 2006 to March 2014.

CHAPTER IV

IMPACTS OF SHORT SELLING RESTRICTIONS ON MARKETS

There are abundant studies on effects of short selling restrictions on financial markets. The studies and debates on short selling can be categorized under three main pillar; overpricing, market quality and market governance.

4.1. Role of Short Selling on Overpricing

The best known role of short selling on efficient financial markets is that short selling provides investors to reflect their negative opinions to financial markets without having the stock. Overpricing effect of short selling bans was firstly theorized by Miller (1977). He argues that in case of low, restricted or banned short selling, the price of a security is higher if there is greater divergence of opinion about the return of the security. According to Miller (1977), theory with heterogeneous expectations, risk neutral and equally informed investors assumptions, overpricing occurs in existence of (1) Short selling constraints (in

the form of direct prohibition or increased costs) (2) heterogeneous opinions about stock's performance.

An efficient market is defined as by Fama (1970) "…in which prices always fully reflect available information". On the other hand, Miller states that the riskier assets (namely the ones with higher divergence of opinion) with short selling restrictions will be overpriced. In this regard, releasing short selling restrictions provides additional supply to the market and leads price down to the point where market is efficient. Miller (1977) states that

> "Because the number of people with extremely pessimistic evaluations of a stock are likely to increase with the divergence of opinion about a stock, short sales tend to moderate the tendency for riskier stocks to be bid up to higher prices"

There are many empirical studies testing Miller's theory. The most used mean to test the argument is to identify a cross-section of stocks and to verify if short sales constrained stocks are overpriced and if overpricing rises with diverging opinions.

In empirical studies, there are many proxies used to measure whether short sale is constrained. Most available and commonly used proxy is short interest which is a ratio defined as [shares sold short / shares outstanding]. IOSCO 2003 Report remarks three different perspectives on the expected relationship between short interest and stock returns. The first perspective is that short interest should bear a negative relation with stock returns. It assumes that informed traders are

more likely to engage in short selling, so high short interest conveys adverse information, implying a negative relationship between short interest and stock returns. An alternative perspective, popular in Wall Street, focuses on bullish signal of high level of short interest. It argues that short interest represents latent demand, which will transform eventually into actual purchase of the shares to cover the short position. The third perspective is that short selling may be much more related to hedging strategies, arbitrage transactions, and tax-related reasons instead of stock returns. The report states that

> "for example, traders may take short positions to implement techniques such as shorting against the box. To remove any price related uncertainty, a trader may sell short securities (usually for tax reasons) on which the trader already has a long position. Such short positions may not trigger any future demand for the shares nor are they motivated by short sellers' negative information."

Other proxies used in empirical studies are lending fee, institutional ownership and accessibility to options market. The divergence of opinion is assessed by either analysts' forecasts (Diether et al, 2002) or standard deviation of returns (Boehme et al, 2006)

Most of the studies support Miller's overpricing hypothesis with small differences. Boehme et al. (2006) examine the valuation effects of the interaction between differences of opinion and short sale constraint. They find robust evidence of significant overvaluation for stocks that are subject to both conditions simultaneously and stocks are not systematically overvalued if one of these conditions isn't met. Desai et al. (2002) uses the population of monthly short

interest data over the period of June 1988 through December 1994 for NASDAQ market. They find statistically significant subsequent underperformance for heavily shorted firms.

Study of Asquith et al. (2005) uses short interest ratios (a proxy for demand) and institutional ownership ratios (as a proxy for supply) to investigate whether short sale constraints affect stock returns. They define short-sale constrained when there is a strong demand to sell short and a limited supply of shares to borrow. They find that the higher the short interest ratio, the lower is the subsequent performance and constrained stocks underperform during the period 1988-2002 by a significant 215 basis point per month as measured by the intercepts from four-factor time-series regression models. Autore et al. (2006) examines the cross-sectional impact of the 2008 short sale ban on the returns of US financial stocks. They claim that in line with bans, stocks with larger liquidity declines are associated with poorer contemporaneous stock returns and report that valuation reversals whereby stocks with higher abnormal returns at the onset of the ban have lower abnormal returns at its removal.

Hu et al. (2009) examines the informational role played by short interest in stock price formation by using short sale data of the Taiwan Stock Exchange. They find that heavily shorted stocks generate significant and negative risk-adjusted abnormal returns. Chang et al. (2007) examines the short sale constraints on Hong Kong market. They find that short-sales constraints tend to cause stock

overvaluation and the overvaluation effect is more dramatic for individual stocks for which wider dispersion of investor opinions exists.

As mentioned previously, short sale can be mimicked through option markets. By buying puts and writing calls we can take synthetic short sale positions. Boehme et al (2006) uses the presence of exchange-traded options to distinguish between short-sale constrained and unconstrained firms. Firms with traded options are presumed to be less short-sale constrained. The intuition behind options relaxing short-sale constraints is that options allow investors to take short positions in securities without short selling directly. In other words, investors who might short-sell at a relatively high cost can use options to synthetically short a security.

Miller's theory assumes that investors are irrational, implying that some of the investors are willing to buy stocks at a price higher than efficient price. On the other hand, Diamond and Verechia (1987) put the debate into rational expectations framework and argue that if investors are aware of the market failure and systematically included it into the price, in other words, when short selling is banned, investors value stocks by keeping in mind that negative information isn't reflected into prices, then there wouldn't be any overpricing but constraint would affect speed of price adjustments to private information. Bris et al. (2007) studies effects of short sale restrictions on speed of price discovery, using data from 46 countries and find that prices incorporate negative information faster in countries where short sale is allowed and practiced.

4.2. Role of Short Selling on Market Quality

Diamond and Verechia (1987) argue that short sale bans would increase bid-ask spread and hence affect market quality. Charoenrook and Daouk (2009) investigate the effects of market wide short sale restrictions on several variables for 111 countries and find that when investors engage in short selling activities, liquidity is increased. Boehmer et al. (2009) studies the effect of the short sale ban for financials in the US and finds that a decrease in trading volume. Similarly, Marsh and Payne (2011) show a decrease in liquidity in UK.

The most debatable issue of short sale is its effects on volatility. Regulators generally justify prohibitions by claiming that short sale has negative effect on volatility. On the other hand, the empirical studies tell different story. Bris et al. (2007) studies short sale restrictions in 59 countries and gets results that shortable index has 8 % lower standard deviation from non-shortable index. Furthermore Charoenrook and Daouk (2009) show that short sale have 0.05 lower standard deviation of monthly returns. Chang et al. (2007) documents higher volatility and less positive skewness of individual stock returns when short sales are allowed for Hong Kong Market.

Diether et al. (2009) studies the effect of short-sale price tests on market quality in US stock markets and finds no evidence for increase neither in returns nor in downside volatility for Pilot stocks after regulation SHO[4] but finds that

[4] Reg SHO dictates that short-sale price tests (up-tick rule for NYSE and bid price rule for Nasdaq) be suspended for a set of Pilot stocks starting May 2, 2005.

suspension of NYSE Uptick Rule is associated with a large and significant reduction in asymmetries of depth and order flow for Pilot stocks.

4.3. Role of Short Selling on Market Governance

Short selling has been blamed during financial crisis or after financial crisis for pulling down prices further, leading to market crashes and exacerbating systemic risk. Studies analyze the skewness of stock return distributions and frequency of extremely negative returns in order to investigate short selling impact on market crashes. Bris et al (2007) examines the skewness of market returns and frequency of extreme negative returns in order to test whether short sale restrictions can reduce the severity of price declines. They find strong evidence that lifting of short sale restrictions is associated with increased negative skewness in the market returns. However, short sales have no significant impact on the frequency of crashes. Suffi and Sigurdson (2011) use stock lending data as a proxy for short selling constraints in 30 countries and find that relaxing short-sales constraints is not associated with an increase in either price instability or the occurrence of extreme negative returns.

CHAPTER V

IMPACTS OF SHORT SELLING RESTRICTIONS ON BORSA ISTANBUL

5.1. Fama-French Three Factor Model

This study uses Fama-French Three Factor Model to investigate the impacts of short selling restrictions on Borsa İstanbul. Fama and French (1993) three factor asset pricing model was developed as a result of evidences that the Capital Asset Pricing Model (CAPM) performed poorly in explaining realized returns. Fama and French (1993) extended the Fama and French (1992) study by using a time-series regression approach. The analysis included both stocks and bonds. Monthly returns on stocks and bonds were regressed on five factors: returns on a market portfolio, a portfolio for size and a portfolio for the book-to-market equity effect, a term premium and a default premium. While for stocks, the first three factors were significant, for bonds the last two factors had explanatory power. As a result, Fama and French form a three factor asset pricing model for stocks that includes well-known market factor and two additional risk

factors related to size and book to market equity. They find that this expanded model captures much of the cross section of average returns amongst US stocks. The model says that the expected return on a portfolio in excess of the risk free rate is explained by the sensitivity of its return to three factors:

(i) the excess return on a broad market portfolio,

(ii) the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks (SMB) and

(iii) the difference between the return on a portfolio of high-book-to-market stocks and the return on a portfolio of low-book-to- market stocks (HML).

The model is as follows:

$$R_{pt} - R_{ft} = \alpha + \beta_p\,(R_{mt} - R_{ft}) + s_p\,(SmB_t) + h_p\,(HmL_t) + \epsilon_{pt}$$

where:

(R_{pt}) is the weighted return on portfolio p in period t.

R_{ft} is the risk-free rate;

ß$_p$ is the coefficient loading for the excess return of the market portfolio over the risk-free rate;

s_p is the coefficient loading for the excess average return of portfolios with small equity class over portfolios of big equity class.

$\mathbf{h_p}$ is the coefficient loading for the excess average returns of portfolios with high book-to-market equity class over those with low book-to-market equity class.

$\boldsymbol{\varepsilon_{pt}}$ is the error term for portfolio p at time t.

While Fama & French (1992) uses Fama & Macbeth (1973) procedure, Fama & French (1993) employs the time-series regression method of Black et al. (1972). They interpret the slopes of these regressions as sensitivities to the factors. Using this approach provides to reveal the causes of common variation in average returns as well as interpreting the slopes and R^2 values. In addition, they examine the cross-sectional implications of different factor combinations in their study and analyze the intercepts (Jensen's alpha) of the regressions which measure the abnormal return on a stock or portfolio. It is expected that the intercepts are statistically indifferent from zero which prove that the factors are able to explain the cross-section of average returns.

Akdeniz et al. (2000) is the first paper studying the cross-sectional variation in stock returns for the Turkish market. They use Fama & French (1992) approach and make some changes in the estimation method due to small number of stocks and the short period of investigation. Their findings indicate that book-to-market ratio and firm size explain stock returns however market beta has no explanatory power even in the models where it is the only variable in the model. The working research paper by Aksu & Onder (2003) employs the Fama & French (1993) methodology and finds a relatively strong size effect and a weak

BE/ME effect for the Turkish market for the 1993-1997 period. A more recent and extended study by Yuksel et al. (2010) uses both Fama & French (1992) and Fama & French (1993) procedures for analyzing the period between 2000 and 2007 and include the liquidity as an additional risk factor in the model. Their findings show that three-factor model has more explanatory power compared to the CAPM and adding the liquidity factor to the model increases its explanatory power even more. The master thesis prepared by Akdağ (2011) extends the period between 1997 and 2010 and tries to determine the common risk factors that capture the variation in stock returns. In this study, an additional factor (FIP) is introduced and used to measure the effect of foreign investor participation on the common variation in stock returns in the Turkish market. The results of the study indicates that three-factor model is superior to the Capital Asset Pricing Model although the effects of size and book-to-market factors are weak while the inclusion of the foreign investor participation factor improves the explanatory power of the Fama & French model only slightly.

There are limited studies investigating short sale in Turkish markets. Aksoy and Dastan (2011) study short selling activities in relation to the day of the week effect and the weekend effect for the period 2005-2009 in Istanbul Stock Exchange. They cannot find direct evidence that speculative short sellers close out their position on Friday and reopen their position on the following Monday, hence, adding to the weekend effect however find positive correlation between the short selling and the returns for all days of the week. Another study is Çankaya et al. (2011) focusing on the interrelation between short selling and

volatility for Borsa İstanbul. They demonstrate that the effects of short selling activity change during the two sessions of the day and the rest of trading hours. The only study investigating impacts of short sale restrictions on Borsa İstanbul is unpublished proficiency thesis (Eken, 2013) submitted to Capital Markets Board of Turkey. This study finds that amendment in margin requirement for short sale led to decrease in trade volume and find no evidence for volatility decrease after amendment.

5.2. Data and Methodology

This study focuses on the period between January 2012 and March 2014 for investigating the impacts of short selling restrictions on prices of stocks traded at Borsa Istanbul. In particular, uptick rule was repealed as of February 2013 for Borsa Istanbul and this study aims to explore the possible pricing impacts of this amendment.

Unlike many previous studies, financial firms such as banks, holding companies, investment trusts and insurance companies are included into the sample. Some studies employing Fama French three factor models exclude financial firms from the sample since it is assumed that the highly levered capital structure of these firms would distort the results. In Fama and French (1992), they argue that "We exclude financial firms because the high leverage that is normal for these firms probably does not have the same meaning as for nonfinancial firms, where high leverage more likely indicates distress." On the other hand,

there is no leverage factor in the 1993 paper. Financials were included in their factor calculation then and all portfolios on French's website currently include financials. Moreover, Barber and Lyon (1997) show that the relationship between security returns, firm size, and the book-to-market ratio is similar for financial and nonfinancial firms and Baek and Bilson (2014) argue that size and value risk premium commonly exists in both nonfinancial and financial firms, even if two factors are less explicable in financial firms. So, this study employs data of all stocks traded at Borsa Istanbul except the ones with negative book value in order to measure the book-to-market effect accurately. The number of companies in the sample ranges from a minimum of 346 to a maximum of 381 after modifications in the period.

The daily stock prices, daily volume, daily short sale volume, market value, book-to-market ratio and BIST 100 index are obtained from Borsa İstanbul. Book-to- market ratio is calculated monthly by Borsa İstanbul using market value (=Paid-in Capital * Latest Closing Price) and book value (Capital issued at most recent financial statement). The daily stock prices are the closing prices adjusted for stock splits, cash dividends and stock dividends. The BIST-100 index values are used as a proxy for the market portfolio. The weekly returns for these variables are calculated using percentage method instead of the logarithmic difference. The weekly returns are calculated from Monday to next Monday. If Monday is holiday, the data of closest upcoming business day is used in place of Monday. For risk free rate, overnight interbank rates from the Central Bank of Turkey website or datasets derived from the returns of the irregularly issued

treasury bills are generally used. However, overnight interbank rates misestimate risk free rate during distressed time and irregularity of issuance of treasury bills cause a problem for accurate proxy. This study uses daily data of annual interest rates calculated by using government bonds traded at Borsa İstanbul. Annual rates are transformed into weekly rates.

Pricing ability of four explanatory variables is investigated in this study. Among these, excess market return is formed independently from the portfolio context. The market factor is simply the difference between the return on the BIST-100 index and the risk-free T-bill rate.

The Fama French factors, SMB and HML are constructed using the 6 portfolios formed on size and book-to-market. SMB (small minus big) proxies the size effect whereas HML (high minus low) proxies the book-to-market effect. In order to construct these variables six portfolios are formed in a way that the stocks are first sorted on size in the end of each quarter, from 2011/4 to 2013/4, and divided into two groups called small and big (S and L). Then these groups are sub-divided into three BE/ME groups where the stocks within the lowest BE/ME fraction (30%) are called low (L); the stocks in the middle (40%) are named medium (M); and the stocks with highest book-to-market ratio (30%) are defined as high (H). Hence six portfolios are created (S/L, S/M, S/H, B/L, B/M, B/H); which contain stocks in different size and BE/ME groups. The SMB factor is calculated for each week by calculating the difference between the average returns on small portfolios (S/L, S/M, S/H) and the average returns on big

portfolios (B/L, B/M, B/H). The HML is similarly the difference between the average weekly returns on the high (S/H, B/H) and low (S/L, B/L) portfolios.

In this study the impacts of short sale restrictions are investigated by two different ways. Firstly daily shorts sale volume / total volume ratios (SSV/TV) are calculated in order to explore whether portfolios of stocks highly shorted generally underperform the market. (As measured by Jensen's alpha, the intercepts from three -factor time-series regression models) In this regard, all stocks are sorted according to their short sale ratio, SSV/TV and then grouped into 4 portfolios. The portfolios are formed with benchmarks, (i) less than 1% (ii) between 1 % and 2.5 % (iii) between 2.5 % and 5 % and iv) more than 5 % in the period between 01.02.2012 and 02.04.2013. As it is seen in figure 4 that after uptick rule was repealed the average ratio of SSV/TV jumped significantly. Because of that, the portfolios are reset with new benchmarks, (i) less than 3 % (ii) between 3 % and 7 % (iii) between 7 % and 11 % and iv) more than 11 % in the period after repeal of uptick rule. In parallel with forming SMB and HML portfolios, short sale portfolios are updated quarterly by taking the quarter average SSV/TV ratios into consideration. After forming portfolios the weekly returns of each portfolio is calculated by taking an average of returns of individual stocks. The time-series tests are performed with the portfolios. The dependent variables for all model specifications are the excess returns ($R_{it} - R_{ft}$) of these four portfolios.

In order to investigate the impacts of short sale on prices, in addition to SMB and HML factors, this study investigates if short sale is an additional explanatory variable in Fama French factor model. In order to check this hypothesis, the difference between returns of most shorted portfolio (stocks in 4th portfolio) and the least shorted portfolio (stocks in 1st portfolio) is calculated weekly and called SS. The alternative models with different factors, including SS, are regressed before and after repeal of uptick rule.

5.3. Descriptive Statistics

The data set used in this study reveals the following descriptive statistics at a first glance. The data period covers from January 2012 to March 2014. Table 4 presents descriptive statistics of short sale portfolios before and after period. In first period covering January 2012- January 2013, there are 55 weeks while there are 60 weeks in second period covering February 2013- March 2014.

Mean returns of short sale portfolios are all positive before repeal of short sale while mean return of all but third portfolio are negative in the second period. Table 4 shows that the range of mean returns of short sale portfolios is from -6.59 % to 7.87 % before repeal of short sale while it is from -16.99 % to 9.42 % in the second period. Correspondingly the standard deviations of short sale portfolios in first period are lower compared to second period and in each interval standard deviation of returns increases with short sale ratios.

It is apparent from Table 4 that skewness values of short sale portfolios are negative and skewed to the left after repeal of short sale. This indicates that

return distributions of these portfolios consist of mainly small positive returns and rarely big negative returns. On the other hand, all but third short sale portfolios in first period have positive skewness values.

In table 3, there is descriptive statistics for SS and SmB before and after repeal of uptick rule. The average of SS and SMB are positive in before period while getting negative in after period.

Table 3 Descriptive Statistics of SS

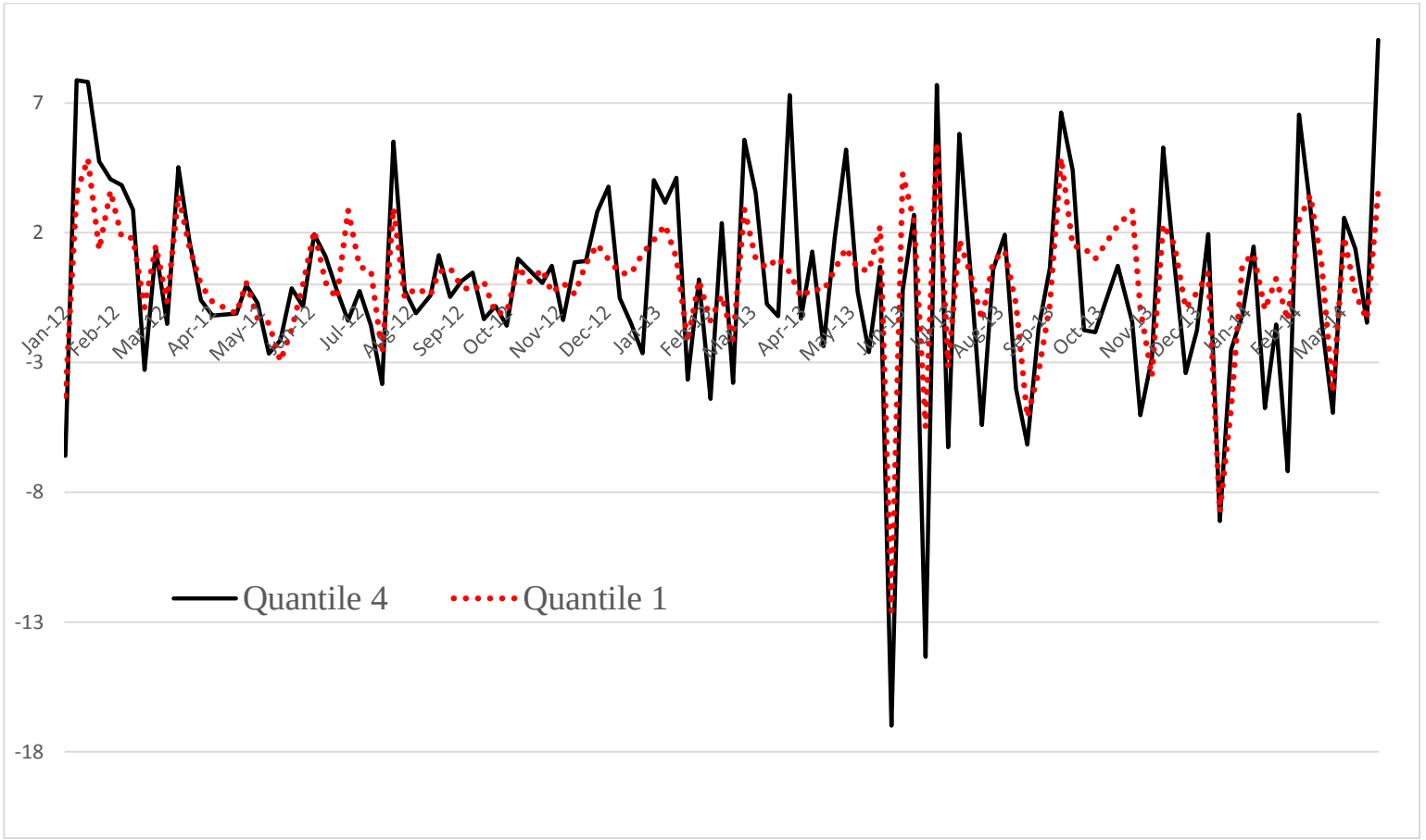
	SS		**SmB**	
	Before	**After**	**Before**	**After**
Mean	0.114	-0.110	0.357	-0.021
Median	0.208	-0.017	0.354	0.034
Standard Dev.	1.683	1.915	1.439	1.119
Kurtosis	0.627	1.130	5.353	-0.002
Skewness	0.011	-0.708	1.278	0.166
Range	8.604	9.558	9.261	5.619
Minimum	-4.262	-5.745	-2.701	-2.521
Maximum	4.341	3.812	6.560	3.098
Count	55	60	55	60

Note: Before period covers January 2012 to January 2013 when after period covers February 2013 to March 2014.

Table 4 Descriptive Statistics of Returns of Short Sale Portfolios before and after period. (%)

		Before 02/01/2013				After 02/01/2013			
	ISE 100	**Portfolio1**	**Portfolio2**	**Portfolio3**	**Portfolio4**	**Portfolio1**	**Portfolio2**	**Portfolio3**	**Portfolio4**
Mean	0.311	0.382	0.507	0.465	0.496	-0.071	-0.063	0.156	-0.534
Median	0.509	0.116	0.670	0.272	-0.149	0.498	0.318	0.500	-0.513
Std Dev.	3.650	1.701	1.962	2.181	2.805	3.045	3.623	3.997	4.858
Kurtosis	2.592	0.797	0.334	-0.285	0.723	4.554	4.388	4.651	1.944
Skewness	-0.741	0.074	-0.052	0.213	0.520	-1.595	-1.595	-1.536	-0.755
Range	24.426	9.143	9.611	9.831	14.470	18.033	21.332	23.478	26.417
Minimum	-15.018	-4.291	-4.528	-3.903	-6.595	-12.571	-14.989	-14.708	-16.993
Maximum	9.408	4.852	5.084	5.927	7.875	5.462	6.342	8.770	9.423
Count	115	55	55	55	55	60	60	60	60
Av. Size (in bil.)	-	593	1,039	1,735	6,079	602	1,770	2,831	9,963
Av. BE/ME	-	0.98	0.94	1.02	0.80	0.95	0.85	1.01	0.71

Figure 6 Return of Portfolio 1 and Portfolio 4



Note: Graph shows weekly returns of least shorted stocks (portfolio 1) and most shorted stocks (portfolio 4) throughout all period.

Figure 6 presents weekly returns of 1st portfolio (least shorted stock) and 4th portfolio (most shorted stocks) before and after repeal of uptick rule. It is seen that after repeal of uptick rule both portfolios become more volatile and up and downs for both of them get sharpened. On the other hand, the return of 4th portfolio, consisting of stocks heavily shorted has higher volatility throughout both periods.

5.4. Regression Results

5.4.1 Three Factor Model with Different Short Sale Portfolios

As it is stated previously, this study firstly investigates whether highly shorted portfolios of stocks underperform the market. In this regard, all stocks are sorted according to their SSV/TV ratios and then grouped into 4 portfolios. The portfolios are formed with benchmarks, (i) less than 1% (ii) between 1 % and 2.5 % (iii) between 2.5 % and 5 % and iv) more than 5 % before repeal of uptick rule. By considering significant increase of short sale volume after repeal of uptick rule the portfolios are reset with new benchmarks, (i) less than 3 % (ii) between 3 % and 7 % (iii) between 7 % and 11 % and iv) more than 11. The time-series tests are performed with these portfolios before and after period.

This study employs following time-series regression method of Fama & French (1993) by using excess return of four different short sale portfolios as dependent variable.

$$R_{it} - R_{ft} = \alpha + \beta_i (R_{mt} - R_{ft}) + s_i (SmB_t) + h_i (HmL_t) + \epsilon_{it}$$

Table 5 and 6 summarize the results of regressions for short sale portfolios before and after period. The coefficients on the market factor (betas) for all portfolios are highly significant where all p values are very close to zero. Furthermore, the betas are always below 1 for all portfolios in before period while in after period the beta exceeds 1 in 4th portfolio. In addition it is seen that in both period the beta coefficient increases with the level of short sale. In before period the beta of 1st portfolio, consisting of stocks slightly shorted is 0.561 while it converges to 1 for 4th portfolio consisting of highly shorted stocks. Similarly, in the after period the market factor, beta increases from 0.716 to 1.078 while short sale ratio of portfolio increases. It shows that comparatively highly shorted stocks have more tendencies to respond to swings in the market. For 4th portfolio in both period betas is very close to 1, indicating that these stocks are very vulnerable to market movements. Size factor (SmB) is significant for 2nd and 4th portfolios in before period at 5 % significant level while it is significant for all but 4th portfolio in after period. The negative coefficient of SmB indicates that in a given period the large caps outperformed small ones. HmL factor is significant only for 4th portfolio in

before period and it is significant for 3rd portfolio in the after period. The negative coefficient of HmL indicates that in a given period growth stocks outperformed value stocks.

The adjusted-R^2 values indicate the percentage of common variation in stock returns that is explained by each model for each portfolio. Thus, it is a variable used as a direct evidence for comparing the performance of different models. The R^2 is around 0.65 in before period while it jumps to 0.70's for first three portfolios and to 0.91 to 4th portfolio in second period.

Another remarkable point is significance of Jensen's alphas. Boehme et al. (2006) and Asquith et al. (2005) consider Jensen's alpha to test if there is under or overvaluation for different short sale portfolios. If Jensen's alpha is significant and positive it indicates overvaluation and if it is significant and negative it indicates undervaluation. In this study all Jensen's alpha but the 4th portfolio in after period is insignificant indicating that there is no under or overvaluation in these portfolios. On the other hand, in the after period the 4th portfolio, consisting heavily shorted stocks has the only significant and negative Jensen's alpha. These results indicate that the presence of uptick rule doesn't tend to cause stock overvaluation, however after repeal of uptick rule heavily shorted stocks underperform probably because of reflection of the pessimists' beliefs as short positions which drive asset prices down unnecessarily.

Table 5 Regression results before repeal of uptick rule

	α	Rm	SmB	HmL	R^2
1st portfolio	-0.013 (0.92)	0.561 (0.00)	-0.142 (0.19)	-0.159 (0.28)	.67
2nd portfolio	0.097 (0.58)	0.620 (0.00)	-0.250 (0.06)	-0.146 (0.41)	.64
3rd portfolio	0.019 (0.92)	0.673 (0.00)	-0.186 (0.22)	-0.129 (0.53)	.62
4th portfolio	0.040 (0.87)	0.947 (0.00)	-0.435 (0.02)	-0.494 (0.05)	.66

This table summarizes the results of the following regressions for the period from December 2012 to February 2013

$$R_{it} - R_{ft} = \alpha + \beta_i (R_{mt} - R_{ft}) + s_i (SmB_t) + h_i (HmL_t) + \epsilon_{it}$$

where $\mathbf{R_{it}}$ is the weighted return on portfolio p in period t; $\mathbf{R_{ft}}$ is the risk-free rate; $\mathbf{ß_i}$ is the coefficient loading for the excess return of the market portfolio over the risk-free rate; $\mathbf{s_i}$ is the coefficient loading for the excess average return of portfolios with small equity class over portfolios of big equity class; **h** is the coefficient loading for the excess average returns of portfolios with high book-to-market equity class over those with low book-to-market equity class and $\boldsymbol{\varepsilon_{it}}$ is the error term for portfolio i at time t. The values in paranthesis are p-values and R^2 is the adjusted r-squared value.

Table 6 Regression Results after repeal of uptick rule

	α	Rm	SmB	HmL	R^2
1st portfolio	0.056 (0.75)	0.716 (0.00)	-1.014 (0.00)	-0.056 (0.75)	.80
2nd portfolio	0.088 (0.69)	0.837 (0.00)	-1.004 (0.00)	-0.045 (0.83)	.79
3rd portfolio	0.261 (0.34)	0.837 (0.00)	-0.832 (0.01)	0.560 (0.04)	.74
4th portfolio	-0.322 (0.09)	1.078 (0.00)	-0.084 (0.67)	0.040 (0.83)	.91

This table summarizes the results of the following regressions for the period from February 2013 to March 2014.

$$R_{it} - R_{ft} = \alpha + \beta_i (R_{mt} - R_{ft}) + s_i (SmB_t) + h_i (HmL_t) + \epsilon_{it}$$

where $\mathbf{R_{it}}$ is the weighted return on portfolio p in period t; $\mathbf{R_{ft}}$ is the risk-free rate; $\mathbf{ß_i}$ is the coefficient loading for the excess return of the market portfolio over the risk-free rate; $\mathbf{s_i}$ is the coefficient loading for the excess average return of portfolios with small equity class over portfolios of big equity class; $\mathbf{h_i}$ is the coefficient loading for the excess average returns of portfolios with high book-to-market equity class over those with low book-to-market equity class and $\boldsymbol{\varepsilon_{it}}$ is the error term for portfolio i at time t. The values in paranthesis are p-values and R^2 is the adjusted r-squared value.

5.4.2. Four Factor Model with Short Sale Ratio

SmB and HmL factors are seen as proxies for risks not captured by CAPM beta. By introducing an additional proxy variable, SS, to the three-factor model, this section intends to test whether short sale is additional common risk factor at Borsa İstanbul before and after repeal of uptick rule. The effect of the short sale on the average returns is tested because if some stocks are more shorted than others it means that some investors have negative views about these stocks, indicating that there is some additional risk factor relating to short sale.

SS is the difference between returns of most heavily shorted portfolio (stocks in 4th portfolio) and the least shorted portfolio (stocks in 1st portfolio). Table 7 presents the regression results where the story about short sale impacts gains different perspective.

The following models are regressed for both before and after the repeal of uptick rule.

$$(R_{it} - R_{ft}) = \alpha + \beta_i (R_{mt} - R_{ft}) + \epsilon_{it} \quad (1)$$

$$(R_{it} - R_{ft}) = \alpha + \beta_i (R_{mt} - R_{ft}) + s_i (SmB_t) + h_i (HmL_t) + \epsilon_{it} \quad (2)$$

$$(R_{it} - R_{ft}) = \alpha + \beta_i (R_{mt} - R_{ft}) + s_i (SmB_t) + d_i (SS_t) + \epsilon_{it} \quad (3)$$

$$(R_{it} - R_{ft}) = \alpha + \beta_i (R_{mt} - R_{ft}) + h_i (HmL_t) + d_i (SS_t) + \epsilon_{it} \quad (4)$$

$$(R_{it} - R_{ft}) = \alpha + \beta_i (R_{mt} - R_{ft}) + d_i (SS_t) + \epsilon_{it} \quad (5)$$

$$(R_{it} - R_{ft}) = \alpha + \beta_i (R_{mt} - R_{ft}) + s_i (SmB_t) + h_i (HmL_t) + d_i (SS_t) + \epsilon_{it} \quad (6)$$

Table 7 presents the results of different regression models for both after and before period of repeal of uptick rule. In the before period, $(1)^{st}$ regression states that market factor and size factor have explanatory power while book-to-market factor doesn't. When we add short sale as a fourth explanatory factor to this model, short sale factor replace the size factor. In the $(5)^{th}$ regression, coefficients of market factor and short sale factor are significant while size factor loses its explanatory power and still coefficient of HmL is insignificant. Since uptick rule requires that the short sale shall be executed at a price higher than the latest execution price, it gets difficult to sell short illiquid small size stocks. Probably because of this reason in the before period, stocks in highly shorted portfolio and size portfolios are more or less same stocks and short sale factor replaces size factor in the regression. In the after period, presented in table 8, likewise first period $(1)^{st}$ regression, market factor and size factor have explanatory power while book-to-market factor doesn't. However different from before period when short sale is added to model as an explanatory factor, market factor and size factor still keep their significance and short sale is significant also. It means that this time short sale factor doesn't replace

the size factor and has its independent explanatory power from size. It indicates that when uptick rule is repealed the short sale factor doesn't mimic size factor anymore, in other words highly shorted stocks aren't just big size stocks anymore. And in the second period when the ratio of daily short sale volume to total volume is around 11 %, SS factor which is the difference between returns of highly and slightly shorted stocks gains explanatory power in explaining common variation in stock returns.

Table 7 Regression results before repeal of uptick rule

Rp-Rf	α	Rm	SmB	HmL	SS	R^2
1	-0.100 (0.54)	0.646 (0.00)				**.68**
2	0.005 (0.97)	0.700 (0.00)	-0.253 (0.04)	(-0.232) (0.17)		**.71**
3	-0.015 (0.92)	0.566 (0.00)	0.124 (0.23)		0.269 (0.01)	**.74**
4	-0.053 (0.73)	0.562 (0.00)		-0.024 (0.86)	0.288 (0.01)	**.73**
5	-0.055 (0.72)	0.556 (0.00)			0.290 (0.01)	**.73**
6	0.012 (0.93)	0.604 (0.00)	0.180 (0.14)	-0.148 (0.36)	0.249 (0.02)	**.74**

This table summarizes the results of regressions for the period from January 2013 to March 2014. The values in parenthesis are p-values and R^2 is the adjusted r-squared value.

Table 8 Regression results after repeal of uptick rule

Rp-Rf	α	Rm	SmB	HmL	SS	R^2
1	0.047 (0.82)	0.684 (0.00)				**.76**
2	0.049 (0.78)	0.801 (0.00)	-0.937 (0.00)	-0.025 (0.88)		**.84**
3	-0.094 (0.53)	0.947 (0.00)	-0.564 (0.01)		-0.396 (0.00)	**.88**
4	-0.142 (0.39)	0.935 (0.00)			-0.519 (0.00)	**.86**
5	-0,147 (0.16)	0.934 (0.05)		0.049 (0.16)	-0,521 (0.08)	**.86**
6	-0.101 (0.51)	0.945 (0.00)	-0.566 (0.01)	0.064 (0.66)	-0.398 (0.00)	**.89**

This table summarizes the results of regressions for the period from January 2013 to March 2014. The values in parenthesis are p-values and R^2 is the adjusted r-squared value.

5.4.3 Robust Checks

Dummy variables can be used in time series regressions to test the structural stability of parameters. In previous sections, it reveals that there is breakdown at the causes of common variation in average returns before and after repeal of uptick rule. This time, dummy variable is used to compare parameter estimates before versus after the repeal of uptick rule. To this end, following model is specified;

$$(R_{it} - R_{ft}) = \alpha_1 + \beta_{i1}\,(R_{mt} - R_{ft}) + s_{i1}(SmB_t) + h_{i1}\,(HmL_t) + \alpha_2 * \mathrm{d} + \beta_{i2}\,(R_{mt} - R_{ft}) * \mathrm{d} + s_{i2}\,(SmB_t) * \mathrm{d} + h_{i2}\,(HmL_t) * \mathrm{d} + \epsilon_{it}$$

In this case, we define a dummy variable, d=0 for observations before repeal of uptick rule and set d=1 for observations after period for each of four short sale

portfolios. $\alpha_2, \beta_{i2}\ s_{i2},\ h_{i2}$ are the coefficients which estimate the difference between two periods. Table 9 presents the results of regression models with dummy variables for both after and before repeal of uptick rule with four short sale portfolios. According to regression results, α_2 and β_{i2} are insignificant parameters which indicate there is no structural change for Jensen's alpha and market coefficient. However, for the first three short sale portfolios, size factor coefficient, s_{i1} is insignificant, while s_{i2} which is coefficient of size factor with dummy variable becomes significant for the first three short sale portfolios. On the other hand, for fourth short sale portfolio consisting heavily shorted stocks, size factor coefficient, s_{i1} is significant, whiles_{i2}, coefficient of size factor with dummy variable is insignificant. First of all, results indicate that there is a structural change before versus after repeal of uptick rule at size coefficient. Additionally, the results are substantially compatible with the arguments presented in section "5.4.1 Three Factor Model with Different Short Sale Portfolios" where size factor (SmB) is significant for 2nd and 4th portfolios in before period at 5 % significant level while it is significant for all but 4th portfolio in after period.

Additionally, regression of four factor models with short sale ratio with dummy variables is run in order to explore possible structural change after repeal of uptick rule. A dummy variable, d=0 is defined for observations before repeal of uptick rule and set d=1 for observations after period. The following model is regressed;

$(R_{it} - R_{ft}) = \alpha_1 + \beta_{i1}(R_{mt} - R_{ft}) + s_{i1}(SmB_t) + h_{i1}(HmL_t) + d_{i1}(SS_t) + \alpha_2 * d + \beta_{i2}(R_{mt} - R_{ft}) * d + s_{i2}(SmB_t) * d + h_{i2}(HmL_t) * d + d_{i2}(SS_t) * d + \epsilon_{it}$

Table 10 presents the results of regression of four factor model with short sale ratio with dummy variables. It reveals that α_2, β_{i2}, h_{i2} and d_{i2} are all insignificant, indicating there is no structural change at Jensen's alpha, market coefficient, growth factor and short sale factor. However while size factor s_{i1} is insignificant, s_{i2}, coefficient factor with dummy variable becomes significant showing that there is a breakdown at size factor before and after repeal of uptick rule. The results are significantly in parallel with the regression results presented under the title of "5.4.2. Four Factor Model with Short Sale Ratio".

Table 9 Regression results with dummy variable with four short sale portfolio.

	α	Rm	SmB	HmL	α*d	Rm*d	SmB*d	HmL*d	R^2
1st portfolio	-0.013 (0.93)	0.561 (0.00)	-0.142 (0.24)	-0.159 (0.37)	0.117 (0.59)	0.089 (0.26)	-0.855 (0.00)	0.086 (0.69)	.77
2nd portfolio	0.097 (0.65)	0.620 (0.00)	-0.250 (0.11)	-0.146 (0.50)	-0.115 (0.69)	0.166 (0.10)	-0.853 (0.00)	0.109 (0.70)	.74
3rd portfolio	-0.019 (0.93)	0.673 (0.00)	-0.186 (0.26)	-0.129 (0.57)	0.097 (0.75)	0.160 (0.14)	-0.795 (0.00)	0.121 (0.68)	.75
4th portfolio	- 0.040 (0.86)	0.947 (0.00)	-0.435 (0.01)	-0.494 (0.03)	0.073 (0.81)	-0.012 (0.90)	-0.231 (0.39)	0.715 (0.02)	.81

This table summarizes the results of the following regression for the period from December 2012 to March 2014 with dummy variable where d=0 for observations before repeal of uptick rule and set d=1 for observations after period for 4 short sale portfolios.

$(R_{it} - R_{ft}) = \alpha + \beta_{i1}\,(R_{mt} - R_{ft}) + s_{i1}(SmB_t) + h_{i1}\,(HmL_t) + \alpha*d + \beta_{i2}\,(R_{mt} - R_{ft})*d + s_{i2}\,(SmB_t)*d + h_{i2}\,(HmL_t)*d + \epsilon_{it}$

The values in parenthesis are p-values and R^2 is the adjusted r-squared value.

Table 10 Four factor model regression results with dummy variable.

	α	Rm	SmB	HmL	SS	α*d	Rm*d	SmB*d	HmL*d	SS*d	R^2
1	0.012	0.604	-0.180	-0.148	0.249	0.041	0.177	-0.780	0.154	-0.180	.82
	(0.94)	(0.00)	(0.19)	(0.43)	(0.04)	(0.86)	(0.10)	(0.00)	(0.54)	(0.33)	
2	0.006	0.700	-0.253	-0.232		0.043	0.100	-0.683	0.258		.81
	(0.97)	(0.00)	(0.06)	(0.21)		(0.86)	(0.25)	(0.00)	(0.29)		
3	-0.015	0.566	-0.124		0.269	0.070	0.214	-0.835		-0.199	.82
	(0.93)	(0.00)	(0.29)		(0.02)	(0.77)	(0.02)	(0.00)		(0.27)	

This table summarizes the results of the following regression for the period from December 2012 to March 2014 with dummy variable where d=0 for observations before repeal of uptick rule and set d=1 for observations after period for four factor model.

$$(R_{it} - R_{ft}) = \alpha + \beta_{i1}(R_{mt} - R_{ft}) + s_{i1}(SmB_t) + h_{i1}(HmL_t) + d_{i1}(SS_t) + \alpha * d + \beta_{i2}(R_{mt} - R_{ft}) * d + s_{i2}(SmB_t) * d + h_{i2}(HmL_t) * d + d_{i2}(SS_t) * d + \epsilon_{it}$$

The values in parenthesis are p-values and R^2 is the adjusted r-squared value.

CHAPTER VI

CONCLUSION

Short sale can be executed from the very first day of Borsa İstanbul while the first restrictions on short sale came into effect in 1994 and were updated in 2003. Besides other provisions, uptick rule, requiring execution of short sale at a price higher than the last execution price, was the most discussed rule and significant factor at determining short sale incentives. Uptick rule was repealed as of 02.01.2013 for all markets in Borsa İstanbul. After this date, it is observed that share of short sale volume in total volume jumped significantly. This study basically aims to discover impacts of short sale restrictions, particularly repeal of uptick rule, on returns of stocks and explore the possible role of short sale at explaining the causes of common variation in average returns.

Firstly, Fama-French three factor model is regressed with four short sale portfolios before and after period. The coefficients on the market factor, namely betas for all portfolios are significant and increase with the level of short sale in both period. In before period the beta of 1st portfolio, consisting of stocks slightly shorted, is 0.561 while it converges to 1 for 4th portfolio, consisting of highly shorted stocks. Similarly, in the after period the market factor, beta increases from 0.716 to 1.078 for short sale portfolios. It shows that comparatively highly shorted stocks have more tendencies to respond to swings in the market. In addition, the adjusted-R^2 values are around 0.65 in before period while it jumps to 0.70's for first three portfolios and to 0.91 to 4th portfolio in second period. This indicates that Fama-French three factor model's explanatory power on common variation in stock returns increases after repeal of uptick rule. In addition, Boehme et al (2006) and Asquith et al (2005) consider Jensen's alpha to test if there is under or overvaluation for different short sale portfolios. This study explores that all jensen's alpha in before period and all jensen's alpha but the 4th portfolio in after period are insignificant indicating that there is no under or overvaluation in these portfolios. Regression results show that the presence of uptick rule doesn't tend to cause stock overvaluation, however after repeal of uptick rule heavily shorted stocks underperform probably because of reflection of the pessimists' beliefs as short positions which drive asset prices down unnecessarily. The results are consistent with another study working on short sale in another emerging market. Hu et al. (2009) also find that that heavily shorted stocks generate significant and negative

risk-adjusted abnormal returns in Taiwan stock market. These results partially confirm regulators concern that short sale may exacerbate price declines and hence lead mispricing of the stock itself.

Secondly, this study investigates the possible role of short sale at explaining the causes of common variation in average returns before and after repeal of uptick rule. SS, formed as the difference between returns of most heavily shorted portfolio and the least shorted portfolio, is added as an explanatory variable to Fama French factor model for both before and after period. The regression results indicate that in before period when short sale factor is added to model, it is significant however size factor becomes insignificant which means short sale factor replaces size factor. The short sale factor substitutes size factor since uptick rule requires execution of short sale at a price higher than the latest execution price, which indicates it gets difficult to sell short illiquid small size stocks while large, liquid stocks are more convenient to sell short. However, after repeal of uptick rule when short sale is added to as an additional explanatory variable to model, market factor and size factor keep their significance and short sale is significant also. It means that short sale factor doesn't replace the size factor anymore and has its independent explanatory power from size. It is probably because in absence of uptick rule it gets easier to sell short comparatively illiquid stocks and highly shorted stocks don't consist of only large stocks anymore.

The findings in this thesis have direct implications for market practitioners as well as regulators. One of the most outstanding implication is that short sale restrictions, particularly uptick rule have negative impact on volume. In addition when we sort stocks according to their short sale volume, it reveals that comparatively heavily shorted stocks are more vulnerable to market swings, which makes them riskier. Furthermore, when we look at the explanatory power of short sale at common variation of stock returns, it appears that before repeal of uptick rule short sale is just replaces size factor. However, after repeal of uptick rule it becomes an additional explanatory factor in asset pricing models which are essential for the fund managers using models for portfolio selection strategies and investors who evaluate the performance of the portfolios composed of different stocks.

On the other hand, the results should be interpreted carefully by taking the particular characteristics of study period into consideration. After repeal of uptick rule, street demonstrations against Taksim Gezi Park started in June 2013 and meanwhile the index of Borsa Istanbul started to drop, and interest rates went up. Likewise, corruption investigations in December 2013 caused decrease and volatility in index. In addition, the further studies can be strengthened by employing a four factor model including momentum factor for short sale portfolios before and after repeal of uptick rule.

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