Hft Transaction – Risk and Regulations

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ABSTRACT *The high frequency transactions contribute to both a quick attainment of great wealth for investors and also to many bankruptcies. Due to significant HFT firms' market share there is a threat of an excessive concentration of wrong decisions and of losses. The purpose of the article is an analysis of this transactions according to the risk criterion and an assessment of the new regulations in this field – especially in the European Union. This area of capital market has the best regulations in Germany. The problem of risk and field of HFT regulations need further research.*

INTRODUCTION

High-frequency trading is now becoming more common on the financial markets. This process is contributing to both a quick attainment of great wealth for investors and to many bankruptcies.

As the U.S. Securities and Exchange Commission (SEC) defined, high frequency transaction is a professional action on one's own account with the use of strategies based on a large number of orders during a day [*Concept Release on Equity Market Structure*, 2012]. However, HFT is primarily a technology which provides new opportunities. Technology itself is not a strategy. It becomes a strategy only when the technology is used to reach an intended target. A goal of making profits can be accomplished with a numerous of ways. A certain way of accomplishing a goal is called a strategy which is realized by an algorithm. That is the reason why the term of algorithmic trading (AT) seems to be more accurate. If an algorithm is based on very small time intervals (such as milliseconds), then this kind of action is called HFT. To sum up, HFT is a subset in a set of AT strategies. HFT's attributes are:

- the use of superfast computers and programmes that generate, send and realize orders,
- the use of, so called, collocations and a special package of data offered by stock exchange in order to minimize trade execution time delays,
- the use of very short time periods for opening and closing positions,
- submission of orders that are cancelled immediately (a price poll),
- closing position at the end of a day.

The purpose of this article is an analysis of this kind of transactions according to the risk for the market criterion and also an assessment of the new regulations in this area, especially the ones in the European Union.

Following research methods have been used in the article: literature analysis, case studies and statistical analysis.

1. RISK FOR THE MARKET AND FOR THE INVESTORS

HFT transactions are perceived by many members of the market as a useful instrument that has a positive influence on development of the market. After a slump during the last subprime crisis, a volume of transactions grows constantly in both Europe and in the USA (Table 1) [Płókarz,

2013, p. 164-166, *Xetra: Leading International Trading Platform*, 2013]. The AT programmes make it possible to realize over a dozen of transactions per a millisecond.

Due to significant market share of firms using HFT, there is a risk of an excessive concentration of wrong decisions and losses. The main types of risk in this area are:

- risk of information asymmetry,
- speculative risk,
- investment risk,
- IT risk.

**TABLE – 1**
SHARE OF HFT TRANSACTIONS IN GLOBAL MARKETS IN 2013

No.	Capital markets with the greatest share of HFT transactions	Share, %
1	Equity trading in the USA	70,0
2	Equity trading in Europe	40,0
x	- including: FTSE 100 Index, Great Britain	32,0

Source: Płókarz R. *Globalne rynki finansowe*, Wydawnictwo Naukowe PWN, Warszawa, 2013, p. 165

The potential cases of manipulation on the market which should be treated as a warning in an automated circumstances of trading are (Graph 1):

- orders that are for poll purposes ('ping orders'),
- marking orders ('quote stuffing'),
- initiating tendencies ('momentum ignition'),
- making fake orders ('layering and spoofing').

GRAPH – 1
MARKING ORDERS ('QUOTE STUFFING')
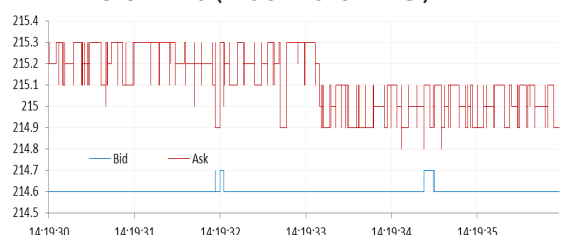
Source: *High Frequency Trading – The Good, The Bad,*

and The Regulation. Credit Suisse 05.12.2012, http://www.forex-tsd.com/adownload. php?attachmentid=149535 (access 30.04.2014).

Very high capital expenditure on introducing HFT is the reason why there are relatively little companies of this kind. Relation of their number and the number of the rest of the market members shows a huge disproportion – tens to tens of thousands. Is means that if there occurs a negative and unexpected factor on the market, it may cause an un-controlled reaction of systems based on HFT. Can potential and appreciable losses contribute to eliminating from the market subjects that generate 50% of its trade? Unfortu-nately, it is possible. An example can be a company Knight Capital Group, that was a 'king' of HFT until 2012. It was generating 17% of trading at the NYSE. In 2012 Knight en-tered the market with a new software and started to buy shares of 140 companies listed at NYSE aggressively. It bought and sold shares worth 7 billion dollars in 45 min-utes what is 2,6 million dollars per second. After each pur-chase an algorithm raised price what gave pleasure to the investors on the other side of the market as they were sell-ing lucratively – at increasingly higher prices. Until the end of the session Knight lost 440 million dollars. This sum rep-resented 40% of the company's capital [*How the Robots Lost: High-Frequency Trading's Rise and Fall,*2013].

During the international subprime crisis HFT transactions were pointed as an essential factor of the crisis prolifera-tion. In the European Union, the FTT tax was suggested as an instrument limiting a role of HFT transactions in creat-ing crisis [Schafer, 2012].

Between 2008 and 2010 transactions of HFT firms rep-resented over 50% of all the transactions at the stock ex-change in the USA. It may be assumed that thanks to liquid-ity guaranteed by companies using HFT, a total collapse was avoided during a record instability on the market. Inves-tors could keep on trading however, many of them had to accept quite big losses. Few spectacular events with HFT should not determine their negative influence on the market [*High Frequency Trading: Is It A Dark Force Against Ordi-nary Human Traders And Investors*, 2013].

1.1. INDIAN INDEX COLLAPSE. CASE STUDY

HFT is becoming more popular on Indian capital market. This process creates possibilities and threats for the mar-ket's development. Graph 2 shows Indian index NIFTY col-lapse. At first, HFT was blamed for that event. Later, an investigation conducted by the National Stock Exchange showed that companies which use HFT were not responsi-ble for the collapse [*How the Robots Lost: High-Frequency Trading's Rise and Fall*, 2013].

GRAPH – 2
NIFTY INDEX COLLAPSE IN INDIA, 2012
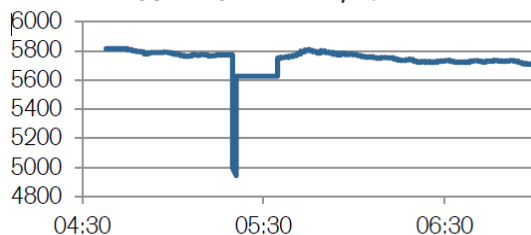
Source: *High Frequency Trading – The Good, The Bad, and The Regulation.* Credit Suisse 05.12.2012, http://www.forex-tsd.com/adownload.

php?attachmentid=149535 (access 30.04.2014).

Broader research into HFT market including adequacy of regulations is this area is needed [*HFT and the question of regulation,* 2013].

1.2. FLASH CRASH. CASE STUDY

On 6 May 2010 the market opened with a fall and this trend continued by the most of the day due to situation in Greece. Dow Jones Industrial Average index noted a fall of 300 points in relation to its opening. In the next 5 minutes DJIA fell over 600 points and later it rebounded to its val-ue from before the sudden collapse [Lauricella, 2010]. This day is called 'flash crash'. Initially the companies using HFT were blamed for the drastic slump. It began a discussion about HFT risk and elasticity. American supervisory authori-ties – the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC) took up this case. According to the report that was published, a direct reason of the slump was a huge sell order of E-Mini S&P500 contracts at the request of investment funds (75000 contracts worth 4,1 billion dollars) [*Findings regard-ing the market events of May 6*, 2010]. This order was de-scribed as atypically big and it was found that a computer programme that executed the order made an order's vol-ume exceeded the limit of the total trade in the previous minute (the programme did not take into consideration a current price of the contract and duration of executing or-der). The following transactions were made by the compa-nies using HFT and they generated losses of further 3 %. An overall maximum loss noted during the day was over (% (Graph 3).

GRAPH – 3
DJIA COLLAPSE IN THE USA, 6 MAY 2010

Source: *Trading program sparked May 'flash crash',* http://money.cnn.com/2010/10/01/markets/SEC_CFTC_ flash_crash/ (access 23.04.2014).

HFT firms made money on this transactions and probably that is the reason why they were widely criticized in the media. They were accused of not taking action when the market needed liquidity. That day some of the HFT algo-rithms shut off transaction programs as a result of atypical proceedings on the market.

In the report by the SEC and by the CFTC it was written that in the extreme market conditions, an automatic execu-tion of a big sell order may result in extreme price changes [Jones, 2013]. It is possible when an algorithm of an auto-mated order execution does not take price on board. An interaction between automatic programs for the transac-tions (like the one used by institutional investors and HFT companies in this case) can quickly upset liquidity and ef-fect in disturbance on the markets [*Findings regarding the market events of May 6*, 2010].

However, in order to point guilty unambiguously, all the market members who buy and sell in the key moment should be identified. This analysis would allow to describe who had what kind of influence on the sudden fall and on return to 'normal' value. Ascribing investors' losses in the context of their technical and analytical potential cannot be the only argument.

It is obvious that an individual investor who buys stocks of some companies, is not a competition for companies that use an algorithmic trade including HFT. He is also not a subject to negative effects of this companies' action directly. This kind of investments last years and it is hard to say that cases talked-about above were the reason for individual investors' losses. There is a competition between big investment companies, but rather the speculating ones than investing. It seems to be obvious that there is a category of investors who take part is this game knowingly.

2. THE AREA OF REGULATIONS
In Credit Suisse's report a big media's interest in HFT and its rather negative tenor are pointed [*High Frequency Trading,* 2012]. It entails politicians' voices about a need of regulating trade using HFT technology, especially due to experiences of the last subprime crisis. Credit Suisse analysts do not judge HFT unambiguously. They try to show a new process in a wider spectrum by showing the positive aspects of HFT like providing the market with liquidity and arbitration on one side and on the other side, they note that there are some negative strategies like trend initiating, marking orders or making fake orders.

Law has to suit market reality and it has to be efficient [*Masiukiewicz, Morawska,* 2015]. Currently, in some countries there are initiatives taken to imply legal regulations in the area of trade using HFT technology [*Biais, Declerck, Moinas* 2013, *Brogaard, Riordan, Hendershott,* 2012]. After the subprime crisis there were suggestions to register HFT companies as official market makers in order to avoid lack of liquidity in crisis situations [*HFT and the question of regulation,* 2013].

2.1. EU REGULATIONS
In February 2014, the European Commission, the European Parliament and the Council of Europe endorsed a MiFID II directive. The directive aims at normalizing legislation on financial markets in the context of their globalization and wider access to the market.

The goal of MiFID was improvement of integration and effectiveness of financial markets in the EU by creating harmonized regulation frames due to investment services in the whole EU. As a result of the last global financial crisis, the European Commission decided to review the directives. In consequence, in 2011 suggestions of new legal acts were published – Markets in Financial Instruments Directive II (MiFID II) and Markets in Financial Instruments Regulation II (MiFIR). In 2014 a process of MiFID II / MiFIR trialogue between the European Parliament, Commission and Council ended with an agreement of the final content of the directives [*MiFID / MiFIR,* 2014]. The new legal act contains requirements of before- and after-transaction transparency (now this requirements will concern not only stock market instruments, but also OTC market including some derivatives) and new rules of product interventions (law of the European Securities and Markets Authority to introduce periodic ban on sale and distribution of a particular financial instrument). Also the subject of regulations

changes, for example exclusion for entities investing only on their own account will not work for these subjects that use HFT strategies or make transactions on their own account as a result of the customers' orders. There are many other changes in the package like, for example, relevant changes of the rules of investors protection or new guidelines on algorithmic trading and on high frequency trading [*MiFID II / MiFIR,* 2014].

The guidelines of the European Securities and Markets Authority (the ESMA) are entitled *Systems and controls in an automated trading environment for trading platforms, investment firms and competent authorities.* The goal of the guidelines is providing a universal homogenous and coherent implementation of MiFID and a directive on market abuse in the field of their application in the systems and in the control mechanisms required to: trade platforms and investment companies in an automated trade environment and trade platforms and investment companies due to providing a direct access or a sponsored access to the market [*Systemy i mechanizmy kontroli…,* 2012].

Trade platforms should introduce solutions that make it possible to identify a transaction. This solutions should also involve orders that prompt to file the proper authorities the notice about a doubtful transaction due to a market abuse (especially manipulation on the market) and also enabling to file the notice immediately (if a preliminary inquiry is commenced, a notice has to be filed as quickly as possible, if the investigation does not result in a satisfying clarification of an observed action). Trade platforms should run periodic inspections and an internal audit of procedures and solutions preventing from behaviours that may involve market abuse and helping to identify them. HFT platforms should keep records of questions mentioned in the ESMA guidelines.

A project of the European Council (2011) about a common financial transactions tax system (FTT) is aimed to implement a common tax directed at financial services safety advancement by prevention of especially risky actions in some sectors of financial markets. The field of the tax is broad, because it is supposed to include transactions concerning financial instruments of all kinds. As a result, the field of the tax includes capital market negotiable instruments, money market instruments (excluding payment instruments), units or shares in corporate investment funds or in alternative investment funds and also derivatives contracts. The FTT project consultations are lengthening [*Masiukiewicz, Dec,* 2012].

2.2. REGULATIONS IN THE FEDERAL REPUBLIC OF GERMANY
In Germany a High Frequency Trading Act obtains since 2013 [*Xetra: Leading International Trading Platform*, 2013, *Amendments to Exchange Rules for the Frankfurt Stock Exchange regarding flagging of algorithms and order-to-trade ratios,*2013]. The key issues that are subject to this regulations are:

- additional eligibilities for the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) inter alia: the supervisory authority is allowed to ask for detailed information about the system that is used, investment strategy including an algorithm and parameters, in order to check whether the system works rightfully, and it can ban on using the particular algorithmic trade strategy,
- duty to hold a licence the BaFin grants all companies

using HFT,
- organizational requirements – firms that use algorithmic trading have to secure a proper configuration and a service of their transaction systems to avoid actions that are not accord with domestic and foreign law,
- introducing a special ratio – an Order to Trade Ratio (OTR) and payments associated with it,
- obligatory marking all orders generated by the HFT programmes that are used on the market and marking the applied algorithms.

A value of OTR is calculated at the end of each month. If OTR for a particular product is more than 1, it is taken as a violation [*Amendments to Exchange Rules for…*, 2013]. This kind of violation can result in imposing sanctions on a particular member. The value of OTR is calculated with the following formula:

$$OTR = \frac{Lzt}{(WZxZWS) + MP}$$

Where: Lzt – number of orders, WZ – orders volume, ZWS – executed constant coefficient, MP – month basis.

The number of orders is determined in relation to a month and to a particular financial instrument (e.g. to a share) that accrue to a particular market member. Each modification or cancellation of an order is totalled up in a way that a modification is a cancellation and placing a new order. The executed orders are not totalled up.

The rate of volume is a result of multiplying two parameters: (volume of executed orders) and (constant rate). A typical value of a constant rate is 500. The volume of executed orders is counted the whole month long.

A month basis depends on the stock exchange member's status. It is constant and typical for a particular financial instrument for a member who is not a market maker. For market makers it is counted due to meeting specific terms and it relates only to instruments that are an object of trade as a market maker. In case of not meeting the terms, a month basis is constant, alike for a trade participant who is not a market maker [*Order to Trade Ratio. Concept*, 2014].

2.3. OTHER COUNTRIES
Solutions based on OTR are introduced also in countries like: Denmark, Finland, France, Swiss, Norway and Italy [Bi-

ais, 2011]. The method of calculating the rates values are selected due to conditions characteristic for the particular market. In France though the name is different, a model is similar to OTR. In Italy orders generated using HFT are taxed. Moreover, a stock exchange in Milan introduced a payment linked to OTR. In the USA the SEC and the CFTC prepare legal regulations on HFT. A special unit in the SEC (Quantitative Analytics Unit) in cooperation with FBI do research to identify possible crimes committed using the latest computer technologies. The CFTC set up the Technology Advisory Committee to study the risk of HFT transactions [*HFT and the question of regulation*, 2013].

In Poland MiFID / MiFIR are in force, but there are no other special regulations on HFT. However, the volume of this transactions is still little [Masiukiewicz, 2013].

CONCLUSION
An analysis of the suggested legal solutions MiFID II / MiFIR and the ESMA guidelines about algorithmic trade allows to state that the theoretical aspects of HFT influence on the market and the cases that are recognized and defined in legal suggestions. The solutions in this area mainly focus on an obligation to identify transactions and subjects unambiguously.

The German act on HFT that covers the whole field of algorithmic trade can be a model legal solution. It allows to avoid the identified threats with the minimal interference. Unambiguous identification of members and of strategies provides the most important data due to which it is possible to do detailed research. Introducing a common transactions analysis based on OTR is of significant importance. The ratio's construction enables to considerably limit the use of negative strategies like: quote shifting or layering and spoofing with keeping a possibility to provide the market with liquidity. It seems to be the most rational solution, because it does not burden the market members, but at the same time it allows to control it.

The HFT transactions regulations still need improvement in the East-Central Europe. That is why it is crucial to do research in this area. What is more, international cooperation should contribute to limiting speculation and to protecting investors on financial market.

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