Algorithmic trading in the foreign exchange market

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The foreign exchange market is an important part of the financial system and performs important functions for the real economy. Recently, trading in this market has become increasingly automated as the use of electronic foreign exchange trading and algorithms has increased. In this article, we analyse how and why algorithmic trading is used on the market for Swedish krona. We also analyse how this trading affects the functioning of the market. From interviews with market participants, we reach the conclusion that algorithmic trading is a component of competition-driven technological development. On the whole, it should therefore contribute towards a more efficient foreign exchange market with lower transaction costs. At the same time, it may entail certain risks for both individual market participants and the financial system as a whole. Finally, we observe that the market itself has worked out a practice for the functioning of algorithmic trading in the foreign exchange market.

1. A WELL-FUNCTIONING FOREIGN EXCHANGE MARKET IS IMPORTANT FOR THE ECONOMY IN GENERAL

The foreign exchange market plays an important role for the basic functions of the financial system: mediating payments, converting savings into funding and managing risks (Sveriges Riksbank, 2013). For foreign exchange trading to function smoothly, it is important that the various risks in the transaction chain are managed as securely and efficiently as possible, from the moment of trade until the transaction is settled. In addition, there must be many buyers and sellers, so that currencies can be sold and bought rapidly, which is to say that market liquidity is good.

A further condition for an efficient market is that those trading on it have confidence in its way of working. However, it does happen on the financial markets that information on both market participants and financial instruments is deficient and unevenly allocated, which can have a negative effect on confidence. If the participants' confidence in the functionality of the markets declines, their willingness to trade with each other may also decline, making it more difficult to rapidly buy and sell financial instruments. Among other

consequences, this may affect the ability of banks and companies to manage their risks and obtain funding on the capital market.

Algorithmic trading is presently a normal way of trading on the financial markets and involves automated trading in which orders and executions are handled by computers. It is a sub-category of electronic trading, which is trading via an electronic trading platform. Algorithmic trading includes what is usually referred to as high frequency trading. High frequency trading is thus a sub-category of algorithmic trading and involves placing or executing orders at a very high frequency. The aim is to generate profit through the speed of trading and the informational advantage created by the technology over other participants on the market.

The media and academic studies have primarily focused on algorithmic trading on the stock market. These discussions were given particular impetus by the temporary fall in stock prices of 6 May 2010. On this day, the US equity index Dow Jones fell by 9 per cent within the space of about five minutes before returning to largely the same level as prior to the fall a few minutes later. According to investigations by the US authorities, this short-term crash (also called the 'flash crash') was caused by a hedge fund that had sold a very large block of index futures[1] through a computer programmed with algorithms, which also created pressure to sell on other markets and for other instruments (U.S. Commodity Futures Trading Commission and the U.S. Securities and Exchange Commission, 2010). According, among others, to Kirilenko et al. (2011) high frequency traders also contributed to the fall in stock prices.

In the subsequent discussions of algorithmic trading – and high frequency trading in particular – the focus has been on the possible effects on and risks for the stock market's functioning, among other areas. Haldane (2011) considered that the new computerised trading may entail 'fatter tails' on the financial markets, which is to say greater probabilities of major fluctuations in market prices. IOSCO (2011) described algorithmic trading and high frequency trading on the stock market and pointed out the risks with these forms of trading.

However, relatively little attention has been focused on the foreign exchange market, where algorithmic trading also occurs. The foreign exchange market is much larger than the stock market (see Chart 1). During the time period in Chart 1, the Riksbank's monetary policy counterparties and counterparties in foreign exchange transactions had a daily turnover of about SEK 72 billion on the foreign exchange market for Swedish krona.[2] This can be compared with about SEK 14 billion, which was the daily turnover for the Stockholm Stock Exchange's 30 largest stocks.

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1   A future is a binding agreement between two parties to buy or sell an underlying asset at a certain price at a given point in time.
2   Sveriges Riksbank's SELMA statistics, www.riksbank.se.

Chart 1. Daily turnover on the foreign exchange and stock markets, spot
SEK billion
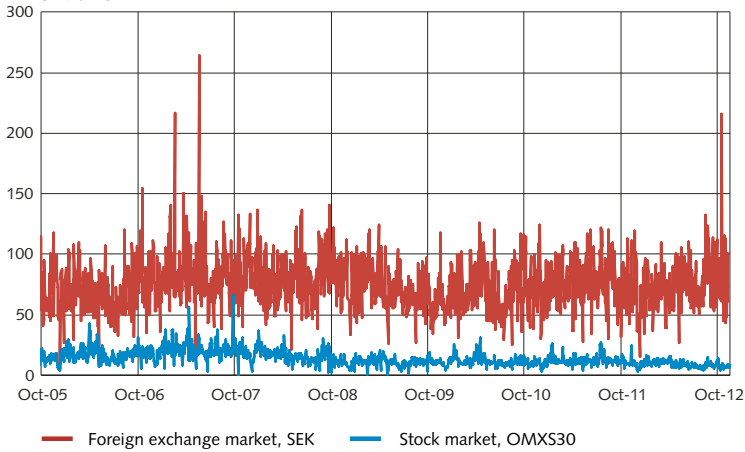
Sources: Reuters, EcoWin and the Riksbank.

The foreign exchange market and its functioning are significant for the safe and efficient functioning of the payments system, which is one of the Riksbank's objectives. Consequently, it is interesting to study how algorithmic trading affects the foreign exchange market's functioning. In this article, we analyse how and why algorithmic trading is used on the foreign exchange market for Swedish krona and how it affects the functioning of the market. Unless stated otherwise, in this article, 'foreign exchange market' refers exclusively to the spot market for currencies.

From the Riksbank's point of view, it is particularly interesting to know whether algorithmic trading takes place in trading with Swedish krona. Consequently, we have interviewed seven market participants who are active, in various ways, on the foreign exchange market and in trading with Swedish krona. The interviewed participants include Swedish and foreign banks, pension fund managers, hedge funds and non-financial companies. The banks included are responsible for about 50 per cent of turnover on the foreign exchange market for Swedish krona.[3]

We open the article by describing a few characteristics of the foreign exchange market. In addition, we present the different functions of algorithms, which we divide into four categories. We then go on to analyse both conceivable reasons for the use of algorithmic trading and the risks we have identified in our analysis. Finally, we observe that the market itself has worked out a practice for the functioning of the algorithmic trading in the foreign exchange market.

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3   Sveriges Riksbank's SELMA statistics, www.riksbank.se.

2. THE STRUCTURE OF THE FOREIGN EXCHANGE MARKET

The foreign exchange market is worldwide and is open around the clock. Its characteristics include trading with large amounts, a large number of participants and the rapid dissemination of price information. The global turnover in this market every day involves amounts corresponding to tens of thousands of billions of Swedish krona.[4] The foreign exchange trading can be divided into two segments, trading between banks (interbank) and trading between banks and their customers.

Market makers have a central function on the foreign exchange market

Currencies are traded over the counter (OTC), meaning that trading does not take place on a regulated market. Trading on the foreign exchange market usually takes place through what are known as market makers. A market maker is a bank that undertakes to quote bid and ask prices and to guarantee that it is possible to buy and sell a minimum volume in one or several currency pairs. In this article, 'market maker' refers to banks with formal and informal commitments to quote prices in various currency pairs.

Foreign exchange trading entails risks for the market maker, for which the market maker compensates itself by quoting the bid and ask prices so that the difference in these is to the market maker's advantage. The market maker is vulnerable to liquidity risk, as it is forced to match orders and interest on the market. Liquidity risk is the risk of being affected by a loss as a result of there not being enough liquidity on the market. Poor liquidity means that it is difficult to find buyers when one wishes to sell and vice-versa.

The market maker may also be vulnerable to market risk, as the value of the position a transaction gives rise to may vary over time if the market maker does not enter an opposite position. Market risk is the risk that fluctuations in market prices will change the market value of assets and liabilities negatively.

In addition, the market maker is vulnerable to credit risk with regard to the counterparty until the transaction has been settled. Credit risk is the risk that a counterparty in a transaction will lose the ability to repay its debts. This risk can be mitigated by establishing limits to restrict exposure to a particular counterparty. In foreign exchange trading – and all trading in financial instruments – credit risks arise but, in this context, these are known as counterparty risks and settlement risks.

The counterparty risk in foreign exchange (spot) trading is limited

The counterparty risk in a foreign exchange transaction (sometimes known as replacement cost risk) is the risk that the counterparty will fail on its debts and that the currency will consequently have to be bought or sold anew for another price. Counterparty risk is limited for spot transactions, as the time between date of trade and settlement is so short, only 2-3 days. Under normal market conditions, price fluctuations and counterparty risk are minimal,

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4   See also King et al. (2011) for a comprehensive survey of trading on the foreign exchange market.

but during crises the risk can be greater as exchange rates can fluctuate more. While counterparty risk is often deemed to be small, settlement risk is higher.

On certain financial markets, counterparty risk is restricted by a central counterparty (CCP).[5] A CCP acts as an intermediary between the buyer and seller in the management of a securities transaction. The original contract between the buyer and the seller is then replaced by two contracts with the CCP. This means that the original counterparties in the transaction are no longer exposed to risk in relation to each other but instead in relation to the CCP. On the foreign exchange market at present, there is no CCP that clears foreign exchange transactions in Swedish krona. Consequently, neither is there any possibility of restricting counterparty risk by trading via such a counterparty.

The settlement risk in foreign exchange trading can be eliminated through CLS

Settlement risk can be eliminated by settling foreign exchange transactions through the system Continuous Linked Settlement (CLS). All payments in CLS are settled according to the principle of payment versus payment. This is achieved by the members making payments to and receiving payments from CLS accounts – one for each currency – with both stages of the foreign exchange transaction being settled through these accounts simultaneously. On January 2013, CLS settles trades in 17 currencies, including the Swedish krona. Statistics from the first six months of 2012 show that about 90 per cent of all foreign exchange transactions made by the four major Swedish banks were settled via CLS. However, the proportion of transactions settled via CLS varies between the banks.

There are different types of trading platforms on the foreign exchange market

Foreign exchange trading takes place either by telephone and chat or electronically via trading platforms. All of the trading platforms mediate contact between the buyer and the seller, and provide information on current prices for various currency pairs. Access to information on details in each currency order – for example the order depth – is much more limited on the foreign exchange market than on marketplaces on the stock market. Even if each price set by a market maker only applies to a specified order volume at a certain point in time, a buyer or a seller cannot know exactly the size of the order volume behind the price. This means, on one hand, that it is more difficult to carry out speculative foreign exchange trading on the basis of the available information on order volumes on each side of the market price than it is in stock exchange trading.[6] On the other hand, it means lower transparency (compared with the stock market). A high level of transparency is fundamentally important for the maintenance of long-term confidence in financial markets.

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5   CCPs are regulated by the EU regulation EMIR (the European Market Infrastructure Regulation) on OTC derivatives, central counterparties and trade repositories, which came into force on 16 August 2012.
6   It should be noted that hidden liquidity also occurs in stock market trading, in what are known as 'dark pools'.

Trading platforms can be divided into three different types:

- *Inter-dealer electronic broking platforms.* These platforms were developed in the 1990s and are regarded, according to the Bank for International Settlements (BIS, 2010), as the dominant source of interbank liquidity on the foreign exchange market. They mediate information on various market makers' indicative prices. EBS and Reuters, based in London, are the two dominant platforms within this category.

- *Multi-bank platforms.* These platforms are also known as multi-bank ECNs (electronic communication networks). They were created in the first decade of this century and resemble the previous category in that they mediate several market makers' prices. One difference is that they have freer access regulations for market makers, which makes it easier for market makers to join these platforms. Another difference is that they are largely used outside the interbank market, which is to say by market participants that are not banks. The US platforms FX All, Currenex, Hotspot FX, State Street and Fx Connect are examples of this type of trading platform. There are also platforms that provide standardised algorithmic trading functions as a service. Currenex is one such platform.

- *Single-bank platforms.* This type of platform is run by an individual bank. The platform mediates only the individual bank's own prices for various currency pairs, unlike the trading platforms discussed above, which mediate several market makers' prices. In Sweden, SEB has a platform of this type, SEB Trading Station. Other examples of banks with such platforms are JP Morgan, Deutsche Bank and Citibank.

A participant on the foreign exchange market can either be directly connected to a platform or indirectly connected via what is known as a prime broker. A bank that is a prime broker allows customers to trade on the foreign exchange market in that bank's name. This means that the bank also takes credit risk exposures to the customers trading in this manner.

3. DIFFERENT PURPOSES FOR ALGORITHMS ON THE FOREIGN EXCHANGE MARKET

Several earlier studies have observed that algorithmic trading exists on the foreign exchange market. The BIS (2011) claims that high frequency trading is most widespread in trading in the largest and most liquid currency pairs such as EUR/USD, GBP/USD and USD/JPY, but that it could spread to trading in less liquid currency pairs. King et al. (2011) also draw the conclusion that high frequency trading is responsible for a large share of turnover in the largest and most liquid currency pairs.

The market participants we interviewed in our study estimate that algorithmic trading constitutes 0-40 per cent of trading in currency pairs in which the Swedish krona is one of the currencies, and 0-75 per cent of trading in other currency pairs. These proportions are assessed to be the highest among market makers (20 and 39 per cent respectively), while they are assessed to be significantly lower by other participants (4 and 2 per cent respectively).

On the foreign exchange market for Swedish krona, our interviews have shown that the algorithms are mainly applied in spot trading, and to a lesser extent in forward[7] trade. Above all, this is said to be because spot trading is the most standardised form of foreign exchange trading, while forward trade may involve specific characteristics and conditions in the traded contracts. Automating forward trade is thus more difficult than automating spot trading.

From our interviews, we draw the conclusion that algorithms on the foreign exchange market for Swedish krona fulfil four different main functions: executing orders; quoting prices; managing risks; and speculating and exploiting price differences when arbitrage opportunities arise.

Order execution

Algorithms are used to automatically execute orders on the basis of one or more predetermined criteria. A few common types of algorithms are those that spread out execution over a predetermined time period, execute an order in batches of a smaller amount, or execute an order for a certain price. Some allow a random generator to determine the amount concerned on each occasion and when the transaction is to be executed.

Banks and trading platforms are developing algorithms as a part of their range of competitive services to attract customers and ultimately generate revenue. For the customers, the algorithms have entailed standardised and automated methods for minimising market manipulation, when they carry out foreign exchange transactions and enter orders anonymously.

Algorithms also make it easier for the user to report exactly how an order has been executed, as all information is automatically stored. However, the asset managers and non-financial companies' treasury departments interviewed say that their usage of algorithms only amounts to at most 10 per cent of the total foreign exchange transactions in Swedish krona.

Price quotation

Certain algorithms have been developed to automatically quote prices in different currency pairs, sometimes with very high frequencies. With the assistance of such algorithms, banks can continually update their prices for different currency pairs on the trading platforms. The algorithms are set to quote market prices and act on the basis of the conditions and variables for which they are programmed. Consequently, under the right conditions, they make it possible for the banks to rapidly quote market prices, at the same time as manual involvement is minimised and the number of working hours per quoted price is reduced.

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7 A forward is a binding agreement between two parties to but or sell an underlying asset at a certain price at a given point in time.

Risk management

Some banks use algorithms to manage the market risks arising in foreign exchange transactions. One example would be if a transaction generated by a customer led to a bank buying USD/SEK, following which an algorithm sold the equivalent amount in USD/SEK to eliminate the market risk. Such algorithms can thus be said to automatically make transactions to achieve the desired risk exposure. Furthermore, these algorithms free up resources for the banks, as risk management no longer needs to be conducted manually.

Speculation and exploitation of arbitrage opportunities

There are also algorithms that can be used to automatically take positions to yield return. The decision criteria that the algorithms are programmed for are defined by the algorithm's owners. These criteria may, for example, be based on correlations between asset type and different currency pairs or other historical relationships. For example, a speculative algorithm may be programmed to sell dollars when the price of gold rises, as the historical relationship has demonstrated a negative correlation between these prices. The positions generated by speculative algorithms are thus associated with market risk.

There are also algorithms that do not take any market risk but take positions when arbitrage opportunities arise through inconsistencies on pricing. Such algorithms can, for example, be programmed to rapidly identify and act on differences in price between a derivative and its underlying assets, or between different marketplaces. This often means that inconsistencies in pricing are rapidly eliminated.

Certain algorithms are high frequency traders, which is to say that they trade at a very high frequency and benefit from temporary possibilities to make risk-free or almost risk-free profits that they can exploit due to their rapidity. By exploiting available information earlier and more rapidly than other market participants, they can act faster on new information and thus generate yield. However, none of the market participants we have interviewed works with such algorithms.

4. ALGORITHMIC FOREIGN EXCHANGE TRADING LEADS TO INCREASED EFFICIENCY

There are several conceivable reasons for the use of algorithmic trading on the financial markets. One of these is structural changes such as changed regulations for marketplaces, which Haldane (2011), among others, have indicated for the stock market. For example, the conditions for algorithmic trading are influenced by whether trading is conducted on one or several marketplaces, and by access to different types of market information. These factors can, in turn, depend on the regulations surrounding trading.

Another reason for algorithmic trading is technological development on the financial markets. Algorithmic trading means that the banks can streamline their foreign exchange trading and provide competitive services to their customers. According to the BIS (2011), high frequency trading on the foreign exchange market (for example) is an increasingly common form of trading and part of a development of technology that is increasing the

use of electronic trading. Algorithmic trading is also replacing often older technology by fulfilling the same functions more efficiently. For example, Menkveld (2013) says that high frequency traders on the stock market to a great extent resemble traditional human market makers. However, it is likely that trading by telephone will continue to be needed to make transactions with large amounts. The interviewed market participants deem that the personal relationships built up by foreign exchange traders by telephone will continue to be valuable, as these are considered to lead to favourable business conditions and thus better prices in major transactions.

Technological development is thus a strong contributory factor in the growth of various types of algorithmic trading. Technological development often leads to a reduction in the number of hours needed to supply a service, which should mean that the market is functioning more efficiently. Among other characteristics, an efficient market is signified by low transaction costs and the presence of assets with high liquidity so that the flow of trade can function smoothly (Fama, 1970).

5. ALGORITHMIC FOREIGN EXCHANGE TRADING MAY ENTAIL RISKS

However, there are a number of conceivable risks with algorithmic trading: operational risks, risks with regard to the liquidity of the market, risks of increased volatility and temporary crashes such as the 'flash crash' in 2010, risks to the access to information and the confidence in the market, and risks of barriers of entry for market makers. These risks exist both for the individual market participant and for the market as a whole. They can also vary depending on how liquid the currencies are. This is because the liquidity in the trade of a currency influences the choice of appropriate trading strategy and the degree to which trading can be automated. It is therefore important to make a distinction between trading in less liquid currencies and trading in the most liquid currencies.

According to the BIS (2010), the Swedish krona was the currency with the ninth highest turnover in April 2010, with 1.1 per cent of the foreign exchange market's total daily turnover of USD 4 000 billion. Under normal conditions, the liquidity of the Swedish krona is high, meaning that market participants can make foreign exchange transactions without influencing exchange rates against other currencies to any great extent. However, during certain, often turbulent periods, there may arise a shortage of liquidity on the market for the Swedish krona. This may make it difficult to make transactions at a reasonable price, as there is suddenly very little interest to trade among market participants. One example of this is following the outbreak of the financial crisis in 2008, when the market participants experienced insufficient liquidity on the market (Sveriges Riksbank, 2009).

Operational risks

The algorithmic trading may contribute to a declining manual handling of transactions and interaction between individuals trading on the financial markets. This may have both benefits and drawbacks. One advantage is that trading is less frequently affected by

temporary, irrational and occasionally impulsive behaviour. Instead of acting on the basis of emotions, the algorithms always make assessments on the same basis, based on their pre-programmed criteria.

On the other hand, one disadvantage of the decrease of manual trading may be that algorithms are unable to quickly assess scenarios for which they are not programmed. For example, if a market should suddenly lose liquidity or be subjected to a major fall in prices, there is a risk that the algorithm will not change its behaviour but will continue to trade or quote prices. Such behaviour may lead to losses for the market participant using the algorithm. One example dates from August 2012, when the US finance company Knight Capital lost USD 440 million after the company's incorrectly programmed algorithm conducted loss-making transactions in 148 different stocks (Financial Times 2, 2012).

Market liquidity risks

To manage operational risks, banks and other market participants often use different types of circuit breakers and other mechanisms to disable the algorithms in turbulent situations. This helps the market participants to avoid losses, but also leads to the sudden disappearance from the marketplace of the liquidity otherwise provided by the algorithms' trading. King et al. (2011) point out that there is unease that high frequency trading market makers on the foreign exchange market may choose to stop trading when turbulence arises in market pricing. There are several studies of this phenomenon on the stock market. For example, Johansson (2012) points out the risk that algorithmic traders on the stock market may stop trading under stressed market conditions. Such behaviour can both create and worsen unease in trading, which can have a negative effect on market liquidity.

Several studies show that algorithmic traders usually make a positive contribution to liquidity on the market. Chaboud et al. (2011) indicate that algorithmic trading entails increased liquidity on the foreign exchange market, in terms of greater order depth. As regards the stock market, Hendershott et al. (2010) show that algorithmic trading on the stock market has generally contributed positively to the market's liquidity, but that another relationship cannot be ruled out under stressed market conditions. The behaviour of algorithmic traders can also be expected to differ, depending on which strategy they choose to apply. Hagströmer and Nordén (2012) divide high frequency traders into market makers and opportunistic traders. They show that the market makers are the dominant high frequency traders on the Swedish stock market and that they contribute positively to liquidity on the market. Gomber et al. (2011) also point out that the traders' strategies form a reasonable starting point for the assessment of high frequency trading.

Risks of increased volatility and temporary crashes

Algorithmic trading that takes place for speculative purposes or to exploit arbitrage opportunities can affect the pricing of currencies and other asset classes. Bicchetti and Maystre (2012) show that inconsistencies in pricing between different asset classes and

currencies, and between derivatives and their underlying assets, are expected to become fewer. Such a development can be seen as positive, as it will lead to a more arbitrage-free market. Chaboud et al. (2011) also show that algorithmic trading has led to fewer arbitrage opportunities, as the market reacts more quickly to new information. This development could also be imagined to lead to increased co-variance between different financial instruments and between different asset markets, as new information is more rapidly reflected in prices.

Authorities and researchers have asked whether algorithmic trading may lead to increased volatility in asset prices, which could impair the functioning of the financial markets. Several studies have been made of this relationship on the stock market. Boehmer et al. (2012) indicate a positive relation between algorithmic trading and volatility on the stock market, that is that algorithmic trading contributes to increased volatility. At the same time, there are studies that indicate the opposite, for example Hagströmer and Nordén (2012). Broogaard et al. (2012) cannot draw any conclusions indicating any clear relation between high frequency trading and volatility. As regards the foreign exchange market, Chaboud et al. (2011) show no clear signs that algorithmic trading influences volatility. In general, there is thus a lack of support for a clear relation between algorithmic trading and volatility.

However, the Government Office for Science (2012) demonstrates that algorithms on the stock market can act in a kind of technological herd behaviour, so called feedback loops, which can create rapid price fluctuations. On these occasions, algorithms act by selling or buying simultaneously, which affects the price of the asset in question either upwards or downwards. As regards the foreign exchange market, Chaboud et al. (2011) show that the algorithmic traders' strategies show more of a correlation than do those of the human traders. As different financial instruments and markets co-vary more, a temporary and exaggerated market fluctuation on one asset market can spread to the foreign exchange market, which can create uncertainty on several financial markets. Such a scenario would be particularly serious for a currency like the Swedish krona, which does not belong to the most liquid currencies, as it may lead to a sudden reduction of liquidity on the market.

However, according to the BIS (2011), the risk of temporary crashes is smaller on the foreign exchange market than it is on the stock market. This is because the foreign exchange market differs from the stock market in several respects. One fundamental difference, according to the report, is that a currency is priced in relation to another currency, while a stock price is an absolute price. When the price of a currency falls, one party loses, while the other party gains. This means a redistribution of wealth rather than a reduction, which is the effect when stock prices fall. A further difference is that there is rather stable demand for foreign exchange related to cross-border trade and financial flows. There is no equivalent flow on the stock market.

Risk related to the access to information and the confidence in the market

An uneven distribution of information may lead slower investors to make less advantageous investment decisions than high frequency traders, as they do not receive information as rapidly. Biais et al. (2011), Jarrow et al. (2011) and McInish and Upson (2012) discuss this and note that high frequency traders have various means of profiting from and acting on information more rapidly than other market participants. Finansinspektionen (2012) and Johansson (2012) discuss the risk of improper behaviour and reach the conclusion that high frequency trading gives rise to new behaviour among market participants that may entail a risk of market abuse. In that trading takes place at a higher speed, thus the possibility of improperly influencing the market price to a trader's own advantage.

However, there are also studies that show that high frequency traders quote the most favourable prices on the market and thus contribute towards efficient price formation. These studies include Hasbrouck and Saar (2011). As regards the foreign exchange market, Chaboud et al. (2011) simultaneously show that the people who are trading still have good access to information and that their trading influences price formation more than that of the algorithmic traders.

Risks of barriers of entry for market makers

Developing algorithms requires more or less comprehensive investments in technology. Those banks investing in electronic systems and algorithms do so partly to streamline their operations to gain economies of scale over other banks. According to King et al. (2011), this is an example of a reason for the banks to choose to develop their own trading platforms for customer trading to a greater extent. This makes it possible for the banks to internally match cash flows in different currencies. At the same time, as this may have advantages for the individual banks, King et al. (2011) observe that an increased fragmentation of the market may, over the long term, occasionally create liquidity shortages on the interbank market.

There is also a risk that the need for comprehensive investments will create barriers of entry on the foreign exchange market. This is because small banks can lack both competence and resources to invest in the technology needed to compete for trade. King et al. (2011) state that such barriers of entry have led fewer banks to choose not to be active in the largest, most liquid currency pairs. At the same time, King et al. (2011) say that the smaller banks are still trading in the smaller local currencies, and that they are thereby becoming experts and earning money on trade with these currencies.

6. SCOPE FOR SELF-REGULATION IN THE FUTURE

In general, the foreign exchange market differs from other financial markets, as foreign exchange trading and the clearing and settlement of foreign exchange transactions are not regulated by authorities. At present, there is no Swedish legislation to regulate trading on the foreign exchange market. However, it is in the market's own interest to counteract trading that may damage the functioning of the market. It is therefore self-regulating in

that the market itself has formulated a practice for how trade functions. Neither is there any global legislation for the trading platforms existing for foreign exchange trading, which is a difference to how the stock market functions (BIS, 2011).

Since the financial crisis, work has started on the formulation of several new regulatory frameworks. However, under their current formulations, none of these regulatory frameworks specifically affect the foreign exchange market. In the EU, MiFID II/MiFIR[8] will entail expanded regulations for the equity and fixed-income markets (both spot and derivative markets), among other areas regarding increased transparency and requirements covering which instruments may be traded on a regulated marketplace. There are at present no equivalent rules for the foreign exchange market. MiFID II will probably also include rules placing requirements on securities companies using algorithmic trading (articles 17 and 51 of the European Commission, 2011). In a similar way, the so-called Dodd-Frank Act in the United States will probably include new rules on algorithmic trading. It is not completely clear whether and how securities companies using algorithmic trading in currency will be affected by these regulations. The legislation is primarily intended to address any negative effects of high frequency trading on the stock market.

Recently, certain trading platforms have tried to counteract elements of algorithmic trading, as it has been seen as disruptive to the functioning of the foreign exchange market. One example of such a platform is EBS. The measures adopted include an increased tick size[9], as well as a reduction of the number of bids a trader may enter without actually trading. Trading behaviour is deemed to have become healthier due to these measures, without trading volumes having been affected negatively (Financial Times 1, 2012). There will continue to be scope for this kind of self-regulation to counteract elements of disruptive trading on the foreign exchange market.

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8 MiFID stands for the Markets in Financial Instruments Directive. MiFIR stands for Markets in Financial instruments Regulation. These regulations will probably be implemented in 2015.
9 Tick size is the smallest possible price change.

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