

Richard Olsen

The democratization of the foreign exchange market

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The foreign exchange market, with a daily transaction volume of 1.5 trillion USD, is 50 times larger than all the equity markets combined and is essentially controlled by only ten or so major banks. Typically, every trade is for one million USD or more, much larger than in any other market. Smaller trades are aggregated.

How is it possible that this huge market has remained the fiefdom of the large investors and traders? Will the Internet and predictive technologies change all this? We clearly expect so. It is estimated that the FX market will grow within a few years from a transaction volume of 1.5 trillion USD per day to 10 trillion and will be fully automated, transacting currencies at a minuscule spread of 0.01 percent and lower.

History of the modern foreign exchange market

The story of the development of today's FX market is remarkable. In the 1970s, after three decades of government restrictions on foreign exchange transactions subsequent to the Second World War, the FX market became highly efficient in a short period of time. With the regime of fixed exchange rates being undermined and currencies allowed to float freely, the volume of currency trading grew quickly. Initially, the market comprised a large number of market makers. As we will see, this was to change rapidly in the late 1990s.

The foreign exchange market is a huge over-the-counter market of professional market participants. It was the first market where traders traded with each other remotely, i.e. they never met in a central exchange, such as a futures exchange or stock market. The currency traders conducted their business initially via telex, then over the telephone in direct contact or through a broker, and later over electronic communication networks, such as the Reuters or EBS dealing systems.

Few people realize that the modern foreign exchange market evolved from a kind of early Internet-type communications system. It was Reuters news agency that had the idea of using its computer network to create a bulletin board for banks to post their indicative market prices. Starting in the early seventies and continuing up to the 80s and 90s, banks could subscribe to an

¹ The collected works of Olsen and Associates will be published by Academic Press in 2001 under the title *High Frequency Finance*. This comprehensive overview of predictive technology describes the characteristic statistical properties of financial markets and discusses the development of predictive models.

electronic service from Reuters, where they could publish price information and market comments in an electronic format.

It was a very simple kind of service, with pages only 10 lines long and 80 characters wide, but extremely effective. It allowed banks to broadcast their information in real time to a wide audience. In addition, Reuters utilized this platform to create a bulletin board showing the most recent update published by any one of its contributors. The bulletin board was an indication of the current price level and an important reference point in the price negotiations between banks.

Eventually, Reuters introduced a money dealing system that increased the efficiency of trading between banks. It was a kind of e-mail system that allowed banks to streamline the negotiating and processing of foreign exchange transactions. With increased efficiency, the speed of transactions increased. In this more competitive environment, large banks with strong internal customer bases had a competitive edge because they could withstand adverse price movements better than their smaller competitors. As a result, the smaller entities gradually withdrew from market making.

In the 90s, the structural changes in the foreign exchange markets had a major impact on price behavior. Early in the decade, market liquidity during extremely volatile price movements was – with few exceptions - almost continuous. Today, this has changed. Market liquidity is discontinuous, i.e. only small price shocks are required to make market liquidity disappear. When the price movements stabilize again, liquidity reappears and markets return to normal working order.

This behavior pattern is highly disturbing. It increases the risk of exceptionally large price shocks such as the collapse of the Japanese yen in 1998. In this event, market making in the yen was discontinuous whenever there was an above average price movement, with market liquidity disappearing. As soon as external circumstances led to large sell orders, the orders could not be accommodated due to the lack of liquidity. This, in turn, triggered additional sale orders, which further undermined the currency. Thus, the meltdown.

In our view, today's foreign exchange markets are extremely fragile. The reason for this is quite simple. The mergers between banks, and the closing of smaller dealing rooms within banks, have led to a reduction of overall “risk capital” allocated to market making. Simultaneously, there has been a dramatic increase in the volume of fundamentally-driven FX transactions as a result of the rapid growth of international trade and global investing. To absorb the impact of these transactions, a high level of market liquidity is required. In the absence of this, the markets are extremely sensitive to small changes of supply and demand, leading to erratic price swings with intermittent market liquidity.

Structure of the foreign exchange market

The foreign exchange market is a two-tier market. On the one hand, there is a professional over-the-counter market for transactions larger than one million USD. This market functions very efficiently and operates 24 hours a day during the business week. It has a transaction volume of 1.5 trillion USD and offers a low spread of 0.03 percent during high volume trading hours. This compares extremely favorably with other markets, such as the equity markets, where spreads of 0.7 percent and more are common. However, the professional market is exhibiting a degree of stress due to the continuing consolidation process I mentioned within the banking industry and the reduction of dealing rooms per financial institution. Confronted with these realities, and the continued rapid growth of fundamentally-driven transaction volume, the professional OTC market does not offer the same degree of liquidity as was available in the 80s and early 90s.

RICHARD OLSEN: The democratization of the foreign exchange market

The second tier of the market covers currency transactions below 500'000 USD. These transactions are not negotiated and are executed on proprietary transaction platforms. Typically, they are initiated as part of another transaction, such as the purchase of foreign stocks, the purchase of equipment or international travel. Unlike the highly efficient OTC market, this market segment is not efficient and relatively large spreads are charged. Typical spreads are 0.5 percent, increasing up to 5 percent for credit card transactions. Because these transactions are executed in the context of other transactions, there is a high degree of “stickiness,” i.e. it is difficult for the customer to negotiate the price and select his preferred counter party. He is kept hostage and has to accept the price offered. Needless to say, this second tier is highly lucrative for the banks offering the service.

Recently, a third tier has started to develop in which banks are implementing their proprietary transaction platforms for foreign exchange. With these platforms, they target transaction volumes of 100'000 USD and large. The platforms are fully automated and transactions are executed at a fixed premium over the current market price. Large transactions are negotiated and require manual intervention by the bank's trader. Banks are investing heavily to fill their platforms with contents, such as treasury applications or updated market research.

Finally, there is also a fourth tier in development in which major banks are joining forces to create a joint transaction platform, such as FXAll. The unique selling proposition here is the competitiveness of the banks' market quotes. This is an attempt to extend the reach of the first tier and make it a generalized platform for business to business foreign exchange transactions.

My assessment: The two tier nature of the foreign exchange markets is gradually being undermined. The institutions that in the past had to pay large spreads because they belonged to the second tier group are getting access to significantly better transaction prices by joining the third or fourth tier. The question arises, will the foreign exchange market become a super ECN (Electronic Communication Network) in the hands of the current incumbents, a handful of major banks?

For traders who have been participants in the foreign exchange markets over the past 20 years, these recent changes appear to be monumental. They are, however, nothing in comparison to what will happen in the future. The Internet and computing power in general will, in conjunction with predictive technologies, implode the foreign exchange market and transform it.

What are the driving forces of change?

The Internet and idiosyncrasies of financial markets

The Internet has lowered the cost of handling and processing information by several orders of magnitude. This is a major driving force for change in the financial markets, the very purpose of which is to handle and process information.

In addition, many of the conventions in financial markets are completely outdated because they developed when the physical delivery of paper was the only means of written confirmation. This has resulted in the delivery date of foreign exchange transactions, i.e. the value date, being two business days after the transaction. Another example of the impact of legacy technology is interest rate payments, which are made only once a day, at the end of the business day.

With modern technology, nothing stands in the way of executing and settling transactions in real time and increasing the frequency of interest rate payments to an hourly or even minute-by-

RICHARD OLSEN: The democratization of the foreign exchange market

minute rate. However, existing players in the market have no interest in changing the existing idiosyncrasies because they are to their advantage and generate additional revenue. In addition, the idiosyncrasies are firmly embedded in their software systems and established players in the foreign exchange markets cannot update these procedures without huge investments. This is, however, not the case for new ventures that build their systems from scratch and create an efficient platform. As soon as they become operational, they become powerful players with a strong momentum.

Oanda, an online company founded by Olsen and Associates, is in the process of launching a new foreign exchange market. Its FxExchange platform will initially be focused on small scale transactions up to a size of 500'000 USD. Its key features include:

- Average spread: 0.01 percent, or approximately a third of the spread charged at peak trading times in the professional OTC market.
- Continuous markets with 24/7 transaction capabilities: Users will be able to trade at any time in the day, including weekends, when other markets are closed.
- Incremental interest rate payments: Interest rate payments will be made at hourly increments and later at higher frequencies. In the traditional foreign exchange market, investors can only take advantage of the interest rate premium if they keep their funds invested in the respective currency overnight. With Oanda, they can take advantage of any interest rate premiums during the course of one hour. These intraday interest rate payments lower the threshold for getting investors to buy a currency that has a sales overhang, which will make Oanda attractive to countries whose currencies are under pressure. The payment frequency will also be attractive to corporate treasurers, who know that pennies add up.

Predictive technologies

Oanda is capable of launching a new foreign exchange market because the company owns a “field of use” license for the Olsen market making engine, for which a patent has been filed. This engine relies on predictive technologies for setting bid and ask prices and hedging market risk.

Olsen and Associates have pioneered predictive technologies during the course of a 15-year research and development effort in which an extensive high frequency, tick-by-tick database of market maker quotes and transaction prices has been created. The data has been analyzed and a theory of heterogeneous markets has been developed that provides provides the foundation for the new technologies.

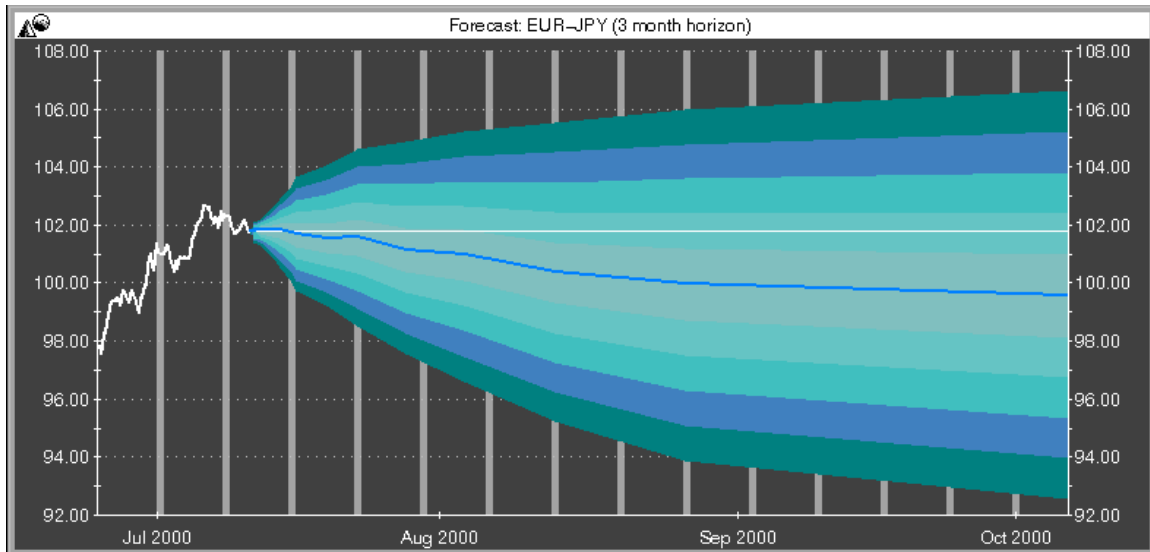
The hypothesis is simple: Unlike the approach of classical economics, where every market participant is assumed to be the same, the new theory emphasizes that market participants are different and, in particular, trade on different time scales. Using this approach it is possible to identify groups of market participants that have common trading patterns, which can be analyzed using high frequency market data. With complex non-linear indicators, the interaction patterns between these groups are mapped and probabilistic volatility and price forecasts generated. Using this information, the market making engine is able to set continuous bid and ask prices and hedge any imbalances in incoming buy and sell orders.

Using predictive technologies it is possible to generate online forecasts and distribute them in a user-friendly, web-based browser environment. These forecasts generate automatic research reports and are a substitute, or at the very least an extension of, traditional research reports. In view of the high cost of providing continuously updated research, we anticipate that for established markets, such as the FX and interest rate markets, online forecasting services will become an important source of market information. In meteorology, large quantitative weather

RICHARD OLSEN: The democratization of the foreign exchange market

forecasting models have become standard. We anticipate a similar development in financial markets.

The following is a forecast graph for EUR/USD exchange rate. The cone indicates the fifty percent probability range of the future price movement.



Predictive technologies are in their infancy. In the first quarter of 2001, Academic Press will publish Introduction to High Frequency Finance, written by the team that has pioneered this work at Olsen and Associates. This will be the first time this material is made available to a broader audience beyond the specialized readership of scientific journals. We anticipate the book will generate a large amount of interest among professionals and that applications of predictive technologies, such as in the context of a market making engine, will fuel a rapid expansion of research in this area. Additionally, there are huge economies of scale in developing and implementing these new important new tools.

Efficiency of financial markets

Financial markets are the lubricants of the fundamental economy. Without foreign exchange markets, international trading would suffer. If the foreign exchange markets are inefficient and spreads large, then this adds dramatically to the cost of products. Essentially, the efficiency of financial markets is as important to the economy as the fuel efficiency of cars or any other critical technical devices.

The advent of the Internet and the development of predictive technologies will dramatically increase the efficiency of financial markets. To this end, it is our expectation that an automatic market making engine will be significantly more effective in market making than traditional traders who rely on "gut" feeling. This is especially so because a market making engine can be designed in such a way that the experience of traders can be input at a higher level, at which they supervise the operation of the engine.

Supported by an extremely efficient computing infrastructure for the processing and handling of transactions, the new foreign exchange market will have the potential to transact huge volumes of

RICHARD OLSEN: The democratization of the foreign exchange market

currency transactions. We anticipate a dramatic growth of FX market spurred by the Internet, international e-commerce and access to the market by the small investor.

The small investor or day trader will be attracted to this market due to its efficiency and profit potential. The ratio of the spread between bid and ask and volatility determines the maximum profit potential of trading a particular market. For the new foreign exchange market to be launched by Oanda this ratio is 1:1000, whereas traditional equity markets offer a ratio of 1:50. Using this measure, this FX market is thus 20 times more attractive to trade in than traditional equity markets. The incumbents will be under hard pressure to adapt to this changing environment. Those who resist will rapidly lose market share and find it extremely expensive to jump ship at a later stage.

In closing, we expect that the foreign exchange market will become a model for what will happen in the other financial markets in the future: There will be an ongoing democratization process, with everyone gaining access to an extremely efficient market place open for trades in any size and with microscopic spreads.