DANMARKS NATIONALBANK

16 DECEMBER 2019

SURVEY OF THE FOREIGN EXCHANGE AND DERIVATIVES MARKETS – 2019

Increased global turnover in kroner, but a smaller Danish foreign exchange market

Global turnover in kroner has increased

kr. 288 billion

is the total volume of daily trading in Danish kroner at the global level. A larger share of turnover takes place outside Denmark, i.e. offshore.

The euro plays a large role in Denmark

47 per cent

of all foreign exchange trades in Denmark have one leg in euro. The euro is often used as a substitute for the krone.

Aggregate foreign exchange turnover in Denmark has fallen

kr. 469 billion

is the total volume of daily trading in all currencies in Denmark. Lower volatility has contributed to the fall.

Global data from the foreign exchange and derivatives markets

1,300

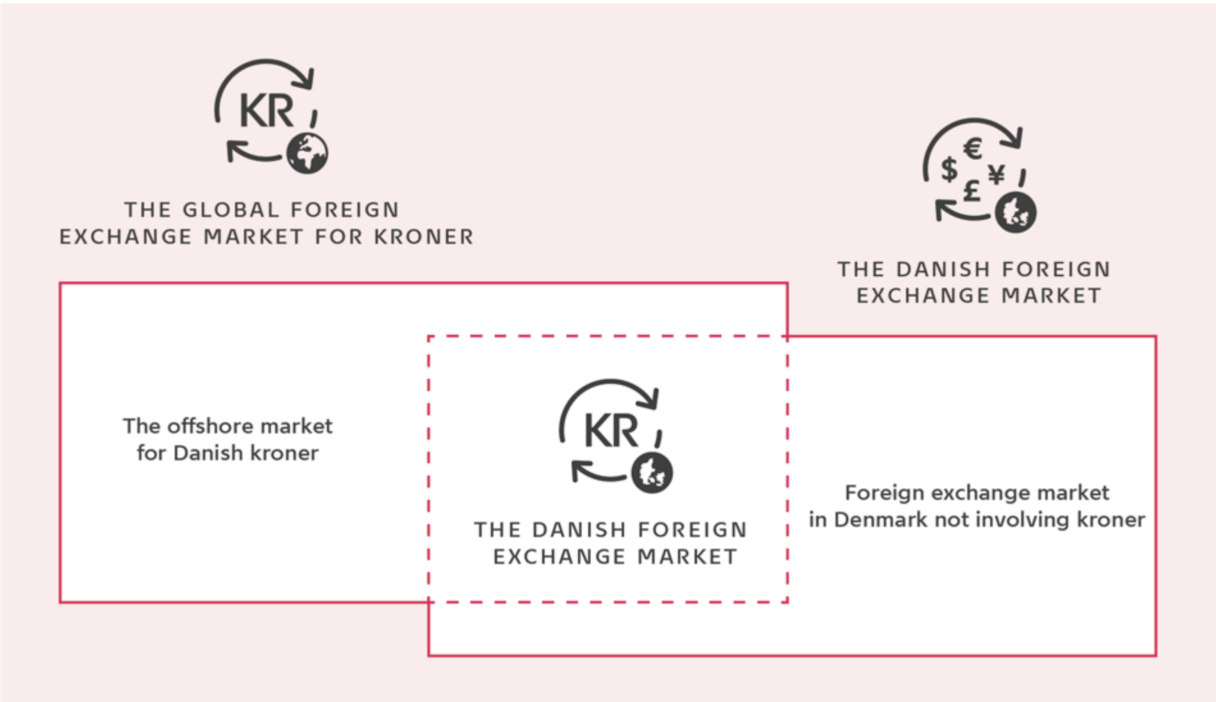
banks participate in the global survey conducted by BIS, including 8 from Denmark.

In terms of turnover, the foreign exchange market is one of the world's largest financial markets. Daily turnover in the global foreign exchange market amounts to around kr. 44 trillion. An efficient foreign exchange market supports cross-border trade in goods, services and financial assets, which makes it essential for the economy, especially for an open economy such as the Danish. Therefore it is important to know how the foreign exchange market functions.

When a firm or private individual trades foreign exchange, this is done via a bank. Banks can also trade foreign exchange among themselves. To gain knowledge about the foreign exchange market, Danmarks Nationalbank collects data for foreign exchange turnover from banks located in Denmark. Every third year, Danmarks Nationalbank provides data about trade in foreign exchange in Denmark for international statistics of turnover in the global foreign exchange market. These statistics are coordinated by the Bank for International Settlements, BIS, see Appendix 1. The global statistics e.g. provide insight into foreign exchange trading in kroner outside Denmark.

In a Danish context, the market for purchase and sale of kroner against other currencies, the *foreign exchange market for kroner*, is key, also in relation to Denmark's fixed exchange rate policy vis-à-vis the euro.[1] Consequently, the foreign exchange market for kroner is at the centre of this analysis. First we consider the *global foreign exchange market for kroner*, which can be broken down into the *Danish foreign exchange market for kroner* and the *offshore market for Danish kroner*, see Chart 1. The Danish foreign exchange market for kroner is the part of the global foreign exchange market for kroner in which banks located in Denmark participate, while the offshore market for kroner is the market for kroner outside Denmark, without participation of banks located in Denmark. Besides transactions involving kroner, substantial trading in other currencies than the krone

Illustration of foreign exchange markets Chart 1



Note: The sizes of the areas do not reflect the sizes of the respective foreign exchange markets.

1 See Kim Abildgren, The foreign-exchange market for Danish kroner, *Danmarks Nationalbank (Monetary Review 1st quarter)*, 2006, for an in-depth review of the foreign exchange market for kroner.

takes place in Denmark. For example, trading in euro against other currencies than the krone plays a large role in Denmark. So finally we look at the *aggregate Danish foreign exchange market*.

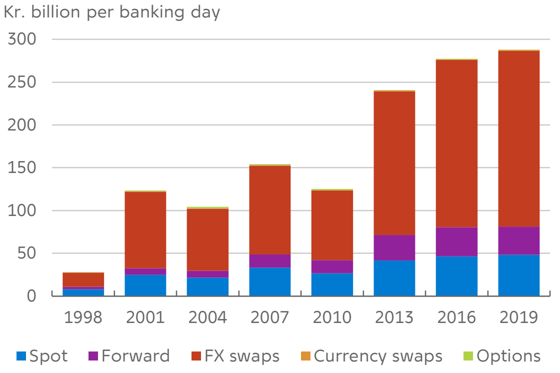
The global foreign exchange market for kroner

The global foreign exchange market for kroner comprises all purchase and sale of foreign exchange against Danish kroner, both in Denmark and abroad. Hence, the foreign exchange market for kroner is not geographically or physically limited to Denmark. Purchase and sale of foreign exchange against Danish kroner that takes place offshore, i.e. outside Denmark, is part of the global foreign exchange market for kroner.

Increased global turnover in kroner
Aggregate global turnover in kroner is kr. 288 billion per day. Turnover has increased by kr. 11 billion per day compared with the 2016 foreign exchange market survey, cf. Chart 2. 0.7 per cent of global foreign exchange turnover involves Danish kroner, making the krone the 22nd most traded currency globally.

Although the foreign exchange market survey provides a unique insight into the foreign exchange market, it is conducted every third year only. Furthermore, the survey covers April of the year in question only, and hence the turnover compiled may to some extent by affected by special circumstances and statistical uncertainty. So it might be useful to include data with a higher frequency when assessing developments. For this purpose, current information about transactions executed in kroner is available from the international settlement system for foreign exchange trades, CLS.[2] CLS data confirms the level of turnover and the overall trend.

Increased global turnover in kroner Chart 2



Note: Average daily turnover in Danish kroner for April of the years in question. Local and global double counting has been eliminated (net-net basis). See Appendix 1 for an elaboration.
Source: BIS and Danmarks Nationalbank.

The Danish foreign exchange market for kroner

The Danish foreign exchange market for kroner is geographically defined as transactions in which at least one party is a bank with a trading desk in Denmark.

It is in the Danish foreign exchange market for kroner that Danmarks Nationalbank intervenes by purchasing and selling foreign exchange in order to stabilise the krone vis-à-vis the euro.

Large turnover in kroner against euro and dollars
Turnover in the Danish foreign exchange market for kroner is kr. 82 billion per day, see Chart 3. The majority of transactions in kroner are against euro or dollars, see Chart 4. 50 per cent of all transactions in the foreign exchange market for kroner have one leg

2 A foreign exchange trade consists of two opposite payments in two different currencies. If the two payments are not effected simultaneously, the parties to the transaction incur settlement risk. Continuous Linked Settlement, CLS, reduces settlement risk by settling the two sides of the transaction simultaneously (payment versus payment).

in dollars. They are followed by euro at 41 per cent. The share for euro is even higher for spot transactions, i.e. exchange of kroner for euro or vice versa, for which it is around 63 per cent. These figures reflect the strong economic integration with the euro area, but also that the banks' internal spot transactions often go via the euro. When a bank e.g. trades kroner for dollars with a customer, the bank often hedges the exchange rate risk on the transaction via euro-dollar and krone-euro trades in the interbank market.

Turnover has fallen

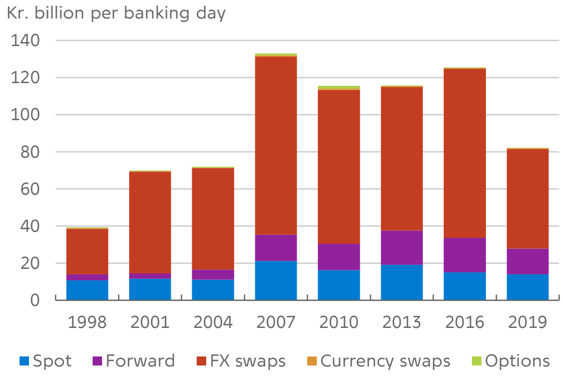
Turnover in the Danish foreign exchange market for kroner has fallen and has followed the general trend in the Danish foreign exchange market, see the section "The aggregate Danish foreign exchange market". According to market participants, part of the fall in turnover is attributable to lower volatility in the foreign exchange market. At the time of the last foreign exchange market survey in 2016, the volatility of the krone had increased in the wake of the pressure against the krone in early 2015. Furthermore, 2019 has been characterised by very low volatility. That reduces the incentive to hedge foreign exchange exposures and to take speculative foreign exchange positions.

Fall in turnover has been driven by FX swaps

FX swaps constitute a large share of the Danish foreign exchange market for kroner. An FX swap is a foreign exchange trade combining a spot transaction with a forward transaction in the opposite direction. In the spot transaction, foreign exchange is bought or sold against Danish kroner, and the transaction is settled two days after its conclusion at the latest. The forward contract is settled later, but, as in the spot transaction, the exchange rate is agreed when the FX swap is concluded. Unlike a spot transaction and an outright forward, an FX swap does not affect demand for kroner and hence not the exchange rate of the krone either. The reason is that the effect of the spot transaction is offset by the effect of the forward transaction in the opposite direction.[3]

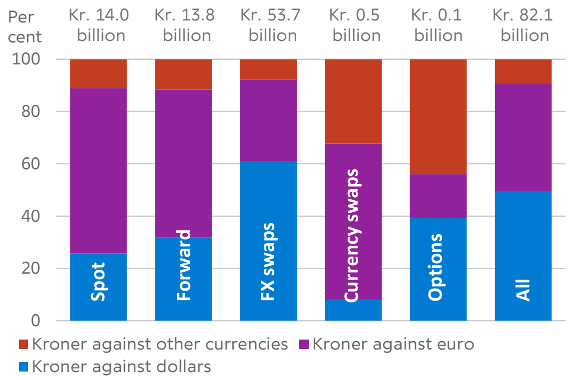
Most of the turnover in FX swaps takes place between Danish kroner and US dollars, while turnover

Fall in turnover in the Danish foreign exchange market for kroner Chart 3



Note: Average daily turnover in Danish kroner for April of the years in question. Local double counting has been eliminated (net-gross basis). See Appendix 1 for an elaboration.
Source: BIS and Danmarks Nationalbank.

The dollar and the euro are significant in the Danish foreign exchange market for kroner Chart 4



Note: Average daily turnover in Danish kroner for April 2019. Local double counting has been eliminated (net-gross basis). See Appendix 1 for an elaboration.
Source: BIS and Danmarks Nationalbank.

3 For an in-depth explanation, see Chapter 3 of Danmarks Nationalbank, *Monetary Policy in Denmark*, 2009, 3rd edition.

in FX swaps between kroner and euro is considerably lower. The lower turnover in euro is a consequence of Denmark's fixed exchange rate policy, which reduces the need for hedging in euro compared with dollars.

FX swaps can be used to finance and hedge purchases of foreign exchange assets, e.g. a Danish pension fund's purchase of dollar-denominated bonds. In the spot transaction, kroner are exchanged for dollars, which are used to purchase the bonds. In the forward transaction, the company sells dollars forward, whereby the dollar exposure from the bond is hedged. In April 2019 the insurance and pension sector had dollar exposures amounting to almost kr. 1,000 billion, of which around 65 per cent were hedged. Hedging to some extent takes place via FX swaps between euro and dollars, the euro acting as a substitute for the krone given Denmark's fixed exchange rate policy. See also the section "The aggregate Danish foreign exchange market" for the significance of the euro in the Danish foreign exchange market.

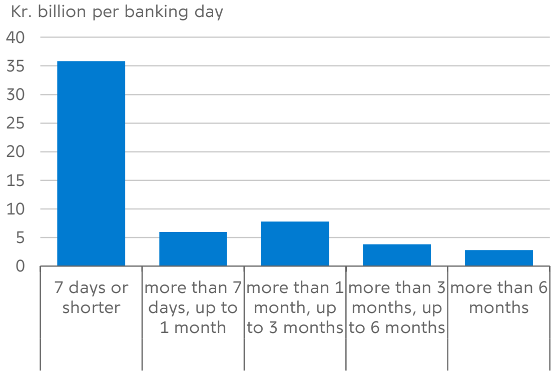
Conversely, many foreign investors make opposite transactions in FX swaps, i.e. buy kroner and sell foreign exchange in the spot transaction and vice versa in the forward transaction, in connection with the purchase of Danish securities. For example, foreign investors own government and mortgage bonds in kroner for more than kr. 800 billion.

Danish short-term government securities, T-bills, are virtually all purchased by foreign investors. Foreign interest comes from, inter alia, dollar-based investors who can achieve higher returns in dollars by investing in Danish T-bills via FX swaps between kroner and dollars rather than investing directly in US T-bills.[4]

FX swaps are often used for liquidity management
FX swaps with one leg in kroner and the other in euro or dollars are often used for liquidity management purposes, i.e. a liquidity surplus in one currency can be lent in exchange for liquidity in another currency. In this way, an FX swap can be seen as a loan in one currency against a loan in another currency at exchange rates known beforehand so that the (loan) transaction does not involve any exchange rate risk.

A large share of turnover is in FX swaps with short maturities

Chart 5



Note: Average daily turnover in FX swaps in the Danish foreign exchange market for kroner for April 2019. Local double counting has not been eliminated (gross-gross basis) as it is not possible directly to eliminate double counting from the maturity data. However, the excess compared to FX swaps in chart 3 only amounts to kr. 2.4 billion. See Appendix 1 for an elaboration.
Source: BIS and Danmarks Nationalbank.

When banks use FX swaps for liquidity management, short-term swaps are often used, and 64 per cent of transactions in the Danish foreign exchange market for kroner have a maturity of less than one week, see Chart 5.

The offshore market for Danish kroner

More than 70 per cent of global turnover in kroner takes place offshore without the participation of

4 See Danmarks Nationalbank, Danish Government Borrowing and Debt 2018, *Danmarks Nationalbank Report*, no. 1, January 2019. The hedged investment in T-bills is attractive because it is relatively expensive to obtain funding in dollars via FX swaps, see Danmarks Nationalbank, Stable krone and calm money market, *Danmarks Nationalbank Report (Monetary and financial trends)*, no. 2, March 2017.

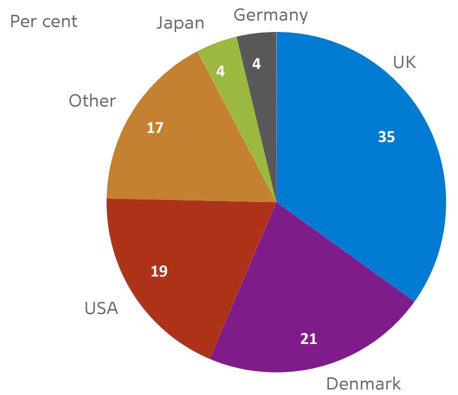
banks located in Denmark. The volume of offshore trading in kroner has increased considerably. In 2010, offshore trading accounted for less than 10 per cent of global turnover in kroner.

Part of the offshore turnover is based on trading in Danish kroner, e.g. in the USA and Japan, outside the opening hours of the Danish foreign exchange market for kroner. However, most offshore turnover takes place within European opening hours, and there is no sharp divide between the Danish foreign exchange market for kroner and the offshore market for kroner. Part of the turnover outside Denmark takes place between the foreign entities of Danish banks and Danish firms, respectively. But it is also customary for large Danish firms and institutional investors to trade foreign exchange against kroner with large international banks with which they already conduct other financial transactions.

The growing importance of offshore trading in foreign exchange, i.e. trading outside the local market, is an international phenomenon. Global foreign exchange trading has increasingly become concentrated on a handful of financial centres, including the UK, where 43 per cent of global foreign exchange turnover takes place. 75 per cent of global foreign exchange turnover takes place in the UK, the USA, Singapore and Hong Kong. The concentration of global foreign exchange trade is attributable to, inter alia, the possibilities of achieving economies of scale by offering a number of banking services in the same place, thereby reducing the costs for branches that have to operate under the financial legislation of different countries.[5]

As regards kroner, the banks in the UK are counterparty in more than one third of global turnover, and for the first time turnover in the UK exceeds turnover in Denmark, see Chart 6. Part of the turnover in other countries, including the UK, takes place with banks located in Denmark, and hence it is part of the Danish foreign exchange market for kroner. Around 54 per cent of turnover in the Danish foreign exchange market for kroner involves foreign counterparties.

A large share of turnover in kroner takes place in the UK Chart 6



Note: Average daily turnover in Danish kroner for April 2019. Local double counting has been eliminated (net-gross basis). See Appendix 1 for an elaboration.
Source: BIS and Danmarks Nationalbank.

The aggregate Danish foreign exchange market

The Danish foreign exchange market is the market for foreign exchange trading in Denmark. This market is geographically defined as transactions in which at least one party is a bank with a trading desk in Denmark. Besides the Danish foreign exchange market for kroner, the Danish foreign exchange market includes all foreign exchange trades not involving Danish kroner, e.g. trades between euro and dollars.

Trading in foreign exchange is linked to both real economic activity and financial conditions. For example, foreign exchange trades take place in connection with trade in goods and services and cross-border capital flows. Furthermore, many foreign exchange trades are connected to firms' need to manage their exchange rate exposures. In addition, market participants take foreign exchange positions in the expectation of making gains on the

5 See Andreas Schrimpf and Vladyslav Sushko, Sizing up global foreign exchange markets, *BIS Quarterly Review*, December 2019.

future development in exchange rates. Part of the turnover, e.g. in FX swaps, is also an element of firms' and banks' liquidity management.

A large Danish foreign exchange market

Aggregate daily turnover in all currencies in the Danish foreign exchange market amounts to kr. 469 billion, see Chart 7. This is around 30 times more than the total inward and outward flows of goods, services and capital from the current and financial account of the balance of payments.[6] This illustrates that most of the turnover in the foreign exchange market is linked to financial conditions, not to real economic activity. Financial customers are counterparties to over 80 per cent of the local banks' transactions in the Danish foreign exchange market. At the same time, part of the banks' trading with non-financial customers is driven by financial conditions, e.g. expectations of future exchange rate developments.

Obviously, foreign exchange trades often transcend national borders and currency areas, and 86 per cent of turnover in the Danish foreign exchange market is with non-resident customers. Historically, non-resident customers have also been counterparties to the lion's share of turnover with banks located in Denmark.

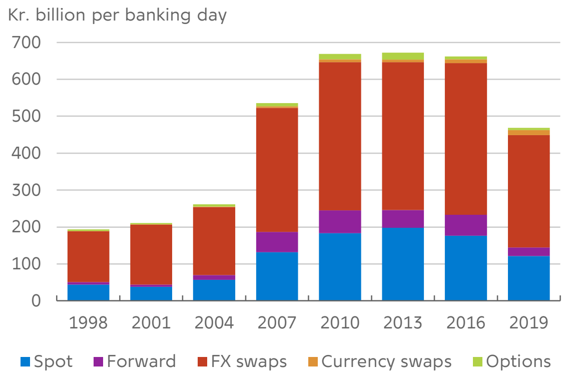
With a share of almost 1 per cent of total global turnover, the aggregate Danish foreign exchange market ranks 12th in the world, making it larger than both the Swedish and Norwegian markets. This is because there are banks with trading desks in Denmark that are major players in the Scandinavian foreign exchange market.

The euro plays a large role

Most foreign exchange trades in Denmark do not involve kroner. 47 per cent of transactions in the Danish foreign exchange market have one leg in euro, and in most cases the euro is traded against other currencies than the krone, see Chart 8. The fixed exchange rate policy means that the euro is to a large extent seen as a substitute for the krone and used instead of the krone in many foreign exchange trades. So in many cases trading between kroner

Turnover in the Danish foreign exchange market has fallen

Chart 7

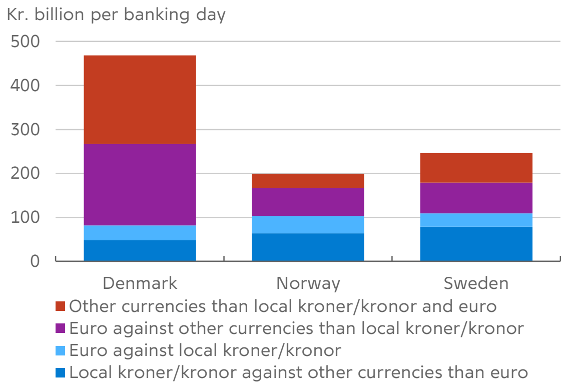


Note: Average daily turnover in Danish kroner for April of the years in question. Local double counting has been eliminated (net-gross basis). See Appendix 1 for an elaboration.

Source: BIS and Danmarks Nationalbank.

Turnover in local kroner is lower in Denmark than in Sweden and Norway, but turnover in euro is higher

Chart 8



Note: Average daily turnover in Danish kroner for April of the years in question. Local double counting has been eliminated (net-gross basis). See Appendix 1 for an elaboration.

Source: BIS and Danmarks Nationalbank.

6 However, it should be noted that income and expenses from the current account of the balance of payments and assets and liabilities in the financial account are net figures and hence underestimate the aggregate gross transaction volume from these accounts.

and, say, dollars, is replaced by trading between dollars and euro.

Turnover in euro is much higher in Denmark than in Sweden and Norway. Conversely, turnover in kroner in the Danish foreign exchange market is lower than turnover in Swedish kronor and Norwegian kroner in their respective local markets.

Denmark's fixed exchange rate policy and the stable exchange rate of the krone vis-à-vis the euro is part of the explanation to both the lower turnover in kroner and the higher turnover in euro in Denmark. Higher overall turnover in foreign exchange in the Danish market may also contribute to the higher turnover in euro in Denmark. Several other factors also have an impact, e.g. the size of the economies, trading with other countries and capital flows.

The dollar is still dominant

However, the dollar is the dominant currency in the Danish foreign exchange market; 75 per cent of all transactions have one leg in dollars. Transactions between euro and dollars account for 28 per cent. And in 50 per cent of all transactions involving kroner, the dollar is the other currency. The dollar is also the largest currency globally. 88 per cent of all foreign exchange trades worldwide have one leg in dollars, while 32 per cent have one leg in euro.

Falling turnover in the Danish foreign exchange market

Aggregate daily turnover in the Danish foreign exchange market for all currencies and instruments has fallen by kr. 193 billion since 2016, see Chart 7.

Turnover has also declined in e.g. Sweden and Norway, see Chart 9. The same applies in Finland, the Netherlands and Japan, but at the global level turnover has risen, including in the USA and the UK.

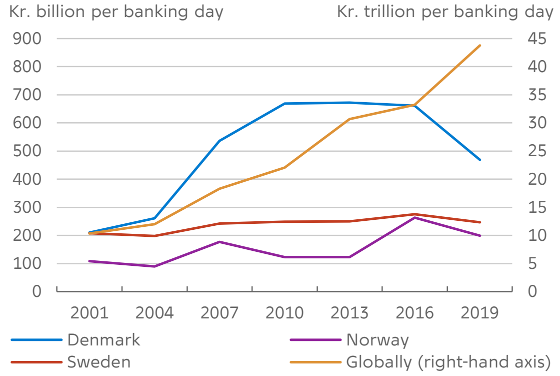
The fall in the Danish foreign exchange market has been driven by transactions not involving kroner, which have declined by kr. 149 billion. The fall is broadly distributed across instruments and particularly strong for non-financial customers, see Chart 10. For this segment, turnover has fallen by kr. 106 billion, of which kr. 94 billion relates to transactions not involving kroner.

Turnover and volatility have declined

Non-financial customers include non-financial corporations, households and non-financial public

Falling turnover in the Danish, Swedish and Norwegian foreign exchange markets, but rising global turnover

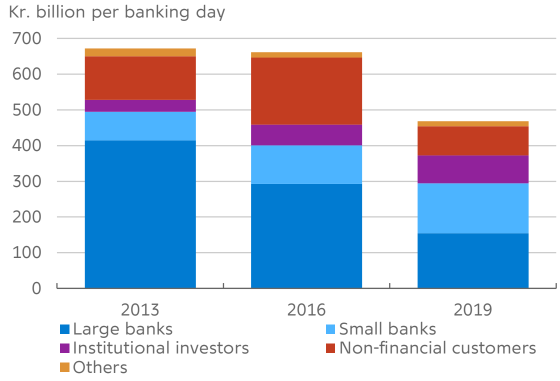
Chart 9



Note: Average daily turnover in Danish kroner for April of the years in question. The data for Denmark, Norway and Sweden is net-gross, i.e. double counting reporting has been eliminated. Global data is net-net, i.e. both local and global double counting has been eliminated. See Appendix 1 for an elaboration.
Source: BIS and Danmarks Nationalbank.

Non-financial customers account for a large share of the fall in turnover

Chart 10



Note.: Average daily turnover in Danish kroner for April of the years in question. Local double counting has been eliminated (net-gross basis). See Appendix 1 for an elaboration. Large banks are banks that trade extensively in the foreign exchange market and consequently report for the foreign exchange survey, while small banks are those that do not report.
Source: BIS and Danmarks Nationalbank.

sector customers. Part of the fall is attributable to the foreign exchange trading of private customers on digital platforms having fallen. Such transactions are often concluded with a view to profiting from exchange rate fluctuations. Volatility in the foreign exchange markets has generally fallen to a low level in 2019, which has reduced interest in such transactions substantially. The lower volatility has also reduced demand from non-financial corporations for foreign exchange trades to hedge foreign exchange risk.

Small banks play a larger role

Turnover between banks located in Denmark and other banks has decreased by kr. 106 billion compared to 2016, primarily as a result of lower turnover in FX swaps with foreign banks. Foreign banks participating in the foreign exchange survey account for this fall. However, turnover with small banks that do not participate in the survey has risen.

This is in line with the international tendency. One of the reasons why smaller banks conclude more FX swaps with the larger banks is that small banks may find it more difficult to raise loans in dollars and euro directly in those two markets, so instead they use the FX swap market in their liquidity management and borrow dollars and euro there.[7]

Turnover with financial institutional investors, such as pension funds, has also risen, by a total of kr. 20 billion.

7 See Andreas Schrimpf and Vladyslav Sushko, Sizing up global foreign exchange markets, BIS Quarterly Review, December 2019.

Appendix 1. Survey of the foreign exchange and derivatives markets

Every third year, the Bank for International Settlements, BIS, working with a number of central banks worldwide, conducts a survey of the global foreign exchange and interest rate derivatives markets. The survey comprises two elements: turnover and outstanding positions. In this analysis, focus is on turnover in the foreign exchange market.

The banks reporting for the survey are all large banks and other foreign exchange dealers with trading desks in the country in question, i.e. branches of foreign banks are also included in the local data collection. Danmarks Nationalbank is responsible for collecting data for the Danish foreign exchange and derivatives markets and has participated in the survey since 1989.

In 2019, nearly 1,300 banks in 53 countries participated in the global survey. Of these, 8 banks are located in Denmark.

The survey deals only with derivatives, i.e. trading not taking place via the official exchanges, also known as "over-the-counter" (OTC) trading. All intra-group trades concluded on market terms are included in the survey.

The reporting institutions report their aggregate gross turnover for the month of April, and the average daily turnover is calculated by dividing the aggregate turnover by the number of banking days that month. When concluding a contract, the reporting institution registers the trade and converts it into dollars. In this analysis, conversion into kroner has taken place using the average dollar/krone exchange rate for April.

Turnover data includes all foreign exchange trades at the nominal value of the contracts or of the underlying assets, also known as the notional value. Furthermore, no distinction is made between purchase and sale. All transactions are registered on the trade date.

Elimination of duplicated reporting
A foreign exchange trade between two banks reporting for the survey will initially be included twice as it is reported by both parties to the transaction. But it is possible to eliminate such double counting as the survey shows how much the reporting institutions have traded with each other, both locally and globally. Hence, three terms are used in the survey – gross-gross, net-gross and net-net – depending on the type of elimination. These three expressions are elaborated on below.

- Gross-gross means that double counting has not been eliminated. Maturity data is gross-gross as it is not directly possible to eliminate local or global double counting from this data.
- Net-gross means that local double counting has been eliminated, but double counting in cross-border trading between reporting banks has not. Such data is used for e.g. turnover by geographical area, aggregate turnover in kroner in Denmark and turnover in kroner broken down by country.
- Net-net means that both local and cross-border double counting has been eliminated. Such data is used for e.g. aggregate global turnover in kroner or aggregate global turnover in foreign exchange.

Instruments in the foreign exchange market
The survey of the foreign exchange market comprises trading in the following products:

- Spot transactions, i.e. foreign exchange trades involving exchange of two currencies at a rate agreed on the trade date. The currencies are exchanged, for cash settlement, within two banking days.
- Outright forwards, i.e. foreign exchange trades involving exchange of two currencies at a rate agreed on the trade date. The currencies are exchanged, for cash settlement, at a specified future date, but not less than two banking days after conclusion of the contract.
- FX swaps, i.e. foreign exchange trades combining a spot transaction with a forward transaction in the opposite direction.
- Currency swaps, i.e. trades in which interest rate payments, in two different currencies, are exchanged on a current basis, and in which the principal amounts are exchanged at the start and expiry dates of the contract.
- Currency options, i.e. options that grant one party the right, but not the obligation, to buy or sell a given currency against another currency at an agreed rate over a period specified beforehand.

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