



Staff memo

The Swedish derivative market

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Staff Memo

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Summary¹

The derivative market is extensive, both globally and in Sweden. The size of the derivative market in Sweden equals 16 times GDP, or five times the total assets of the Swedish banking sector. At the same time, the Swedish market only constitutes just over 1 per cent of the EU derivative market.

The fact that Sweden is a small, open economy is reflected in the derivative market because the Swedish derivative market is closely interconnected with international derivative markets. This is clear in that numerous derivative contracts are denominated in foreign currencies and the counterparties are often located abroad.

The Swedish derivative market also shares many characteristics with the larger derivative market for the EU. For example, both are dominated by interest rate derivatives, the vast majority of derivative contracts are traded bilaterally rather than on an exchange, and a small number of participants represent the majority of outstanding derivative contracts.

Understanding how derivative contracts are used is therefore important to better understanding the risks they can present in the financial system. From a financial stability angle, it is thus important to study the Swedish derivative market.

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1 Introduction

A derivative contract can be described as a financial instrument, of which the value depends on one or more underlying assets. Participants in the financial system use derivatives partly for hedging, and partly for speculation. Examples of such participants are banks, insurance companies and other financial companies, public authorities and non-financial corporations. Companies can use derivatives, such as futures and forwards, to hedge against fluctuations in an exchange rate or interest rate. Participants can also use derivatives to take speculative positions based on how they expect equities, interest rates, currencies, etc. to perform in the future.

Derivatives can thus be used to reduce risk, but also to build up risk, such as liquidity risk, market risk and counterparty risk. Derivatives redistribute risk exposure in assets and liabilities for participants in the financial system. Derivative contracts also directly link together various participants, which enter derivative contracts with each other.

Events during the financial crisis of 2008–2009 demonstrated that there are risks in using derivatives. Two examples are when the bank Lehman Brothers went bankrupt in September 2008 and when the Federal Reserve bailed out the insurance company AIG. In both of these cases, the very risks built up with derivatives played a central role in what turned out to be a global financial crisis.

A more recent example of what can happen when major risks are assumed through derivatives occurred in September 2018 when one of the participants at the Swedish central counterparty (CCP), Nasdaq Clearing, defaulted. Using derivatives, the participant had speculated in a narrowing of the price difference between Nordic and German electricity. However, on 10 September, this difference instead increased over 17 times more than on a normal trading day. Because of this, the participant was unable to pledge collateral to cover its heightened exposures, and thus could not fulfil its obligations towards Nasdaq Clearing. The default was managed without any impact on the main operations, although it caused substantial losses for both other participants and Nasdaq Clearing.

Understanding how derivative contracts are used is therefore important to better understanding the risks they can present in the financial system, not least because participants often report derivatives as off-balance-sheet items, in notes.² From a financial stability angle, it is thus important to study the Swedish derivative market.

This study is based on comprehensive data on Swedish derivative contracts. To improve transparency in the derivative markets, starting a few years ago, all derivative contracts in the EU are reported to trade repositories.³ The Riksbank has access to

² See e.g. Borio et al. (2017).

³ Derivatives are regulated in the EU according to Regulation ([EU] No 648/2012) on OTC derivatives, central counterparties and trade repositories (EMIR). EMIR contains requirements to report all derivative contracts to trade repositories, compulsory clearing through central counterparties of certain OTC derivatives, and techniques for managing risk. The requirement to report derivative transactions applies to both financial and non-financial counterparties, and both counterparties in a contract must report the transaction. Only individuals are exempted from reporting derivative contracts.

these.⁴ That way, information can be obtained on the entire Swedish derivative market in a way that was not possible before. In this report, we use data from the repositories to illustrate various aspects of the Swedish derivative market. We do this by means of various data breakdowns to highlight different types of characteristics, such as the derivative contracts that are common and the countries where counterparties are located.

⁴ As a Swedish authority, the Riksbank only has access to Swedish derivative contracts (that is, derivative contracts issued in Sweden, by a Swedish counterparty or with a Swedish underlying asset). Therefore, we only include contracts that have at least one Swedish counterparty.

2 The Swedish derivative market in figures

2.1 Comprehensive data on the Swedish derivative market

In this report, we describe the Swedish derivative market using data on all outstanding derivative contracts that include Swedish participants. These participants include banks and other financial institutions, authorities and non-financial corporations, and as a rule they report at company level (i.e. not at group level). When referring to “the Swedish derivative market”, we mean all derivative contracts that include at least one Swedish counterparty.

As mentioned above, the value of a derivative contract depends on the underlying assets. These underlying assets commonly consist of different types of financial instruments, currencies or commodities. To illustrate the differences that exist between various types of derivative contracts at the general level, we break down the Swedish derivative market into different submarkets. The breakdown is based on type of underlying asset and gives us the following five submarkets: the equity market, the credit market, the commodities market, the interest rate market and the foreign exchange (FX) market. We will throughout present statistics for the different submarkets and for the Swedish derivative market as a whole.

The type of underlying asset affects how a derivative contract is designed, which is also true for a number of other various parameters. It is a matter of what will actually be done according to the derivative contract, for instance whether one type of underlying asset will be exchanged for another during a certain period or whether the contract holder will be able to buy an underlying asset at a certain time and at a certain price. It is also a matter of the duration of the derivative contract, the currency in which any payments will be made, and how the price of the derivative contract is determined. To provide a comprehensive description of the Swedish derivative market, we go through a number of such various parameters individually throughout the report.

In an initial step, we look at the size of the derivatives. A common way of measuring the size of a derivative is to use the notional amount. Notional amount is the amount of the underlying asset that is used to calculate cash flows in the derivative contract. This means that if, according to a derivative contract, a floating interest rate will for instance be exchanged for a fixed interest rate during a certain period of time (i.e. an interest rate swap), the notional amount is used to calculate the size of the cash flows; in simplified terms, the interest rate multiplied by the notional amount. The actual payment flows linked to the derivative contract can consequently be a fraction of the notional amount. Thus, derivative contracts are linked to very large amounts while at the same time cash flows are relatively small. In this report, we always refer to notional amounts when discussing the size of the derivative market, unless otherwise specified.

A similar study on the derivative market of the EU has been published previously by ESMA.⁵ In that report, various characteristics of the derivative market are illustrated, which is defined in terms of at least one counterparty being from the EU. It is thus possible, at an overarching level, to compare the Swedish derivative market with the larger EU derivative market. ESMA's report only concerns outstanding derivative contracts for 2019, however. Because of this, throughout this report we present the results for the Swedish derivative market for both 2019 and 2020.⁶ The reason for this is to show that no major structural changes take place on the derivative market between two years.

2.2 The derivative market is extensive

The derivative market is extensive, both globally and in Sweden. The size of the Swedish derivative market has been relatively stable at around SEK 80,000 billion in the last few years, measured as outstanding notional amounts (see Chart 1). This represents approximately 16 times Swedish GDP, or five times the total assets of the Swedish banking sector.⁷ If instead the size is measured in terms of the number of outstanding derivative contracts, it has been at just over 400,000 derivative contracts during the same period.

The EU derivative market amounted to around SEK 7,000,000 billion at the end of 2019, which makes the Swedish market around 1 per cent of that of the EU.⁸ The size of the derivative market in the EU equals around 49 times EU GDP.⁹ In this estimate for 2019, the United Kingdom is included in the EU and is also the country that dominates the derivative market. Considering the major financial centres that are found in other countries in the EU, such as the United Kingdom, it is not surprising that the Swedish market is smaller in relation to its GDP than the derivative market of the EU is in relation to EU GDP.

⁵ ESMA (2020).

⁶ Note that ESMA's report concerns the average of the outstanding derivative contracts on four different days in 2019. In this report, we use instead the average of the final trading day of each month for both 2019 and 2020.

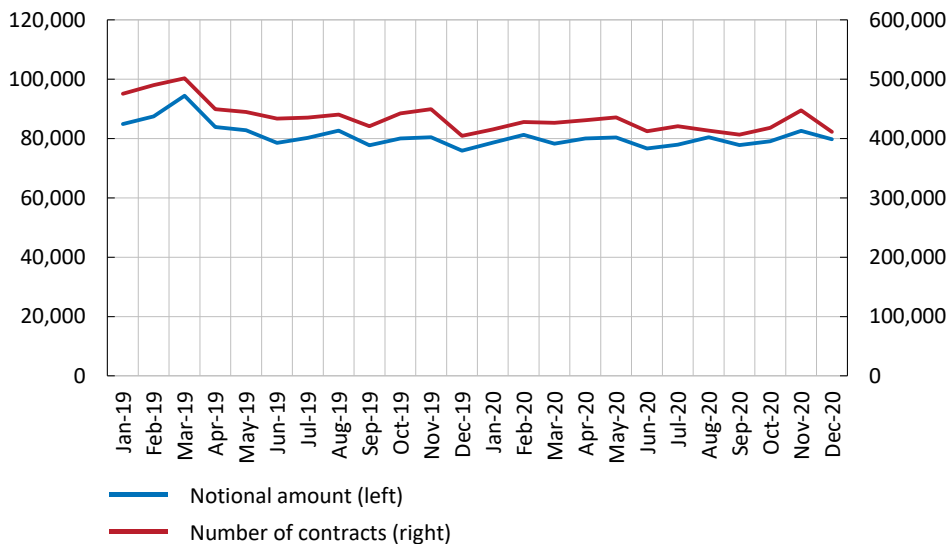
⁷ The total assets of the Swedish banking sector refers to the total assets of monetary financial institutions in December 2020 according to Statistics Sweden's financial markets statistics.

⁸ ESMA (2020).

⁹ Eurostat.

Chart 1. The size of the Swedish derivative market

SEK billion, number of derivative contracts



Note. Size is measured as total outstanding notional amount and number of outstanding derivative contracts.

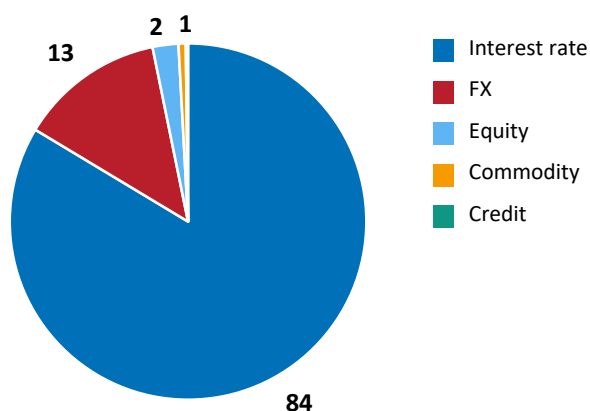
Source: Trade repositories, the Riksbank

In terms of size, the interest rate derivative market dominates the Swedish derivative market, representing around 80 per cent of it (see Chart 2). This is driven by interest rate derivatives having a broad area of use. Participants can primarily use them for strategic hedging of interest rate risk, but also to hedge risks in smaller operational flows. Strategic hedging of interest rate risk is predominately a matter of participants wishing to change the characteristics of interest rates in assets and liabilities, which are sizeable in themselves. For example, using an interest rate derivative, they can convert a liability in the form of a loan with a floating interest rate to fixed-rate loan.

The second largest is the foreign exchange market, representing just over 10 per cent. Then comes the equity market, at 2 per cent. This pattern for the Swedish derivative market is also relatively well-reflected in the EU as a whole.

Chart 2. The size of the Swedish derivative market by submarket

Per cent, 2020



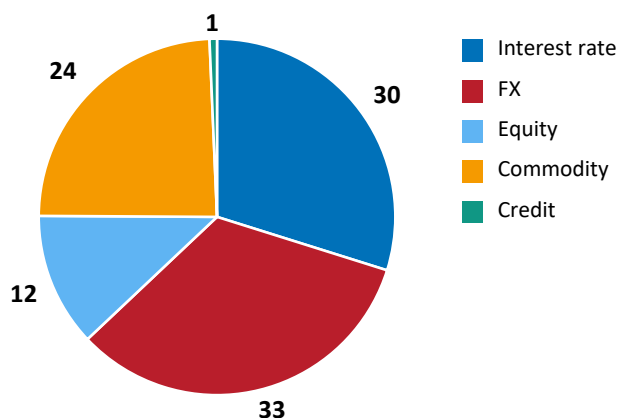
Note. Average percentages for the last trading day of each month in 2020 based on outstanding notional amounts. The share of the credit market is 0.002% and is thus not visible in the chart.

Source: Trade repositories, the Riksbank.

If the percentages of the submarkets are measured in number of outstanding derivative contracts instead of in notional amounts, a different picture emerges, with the foreign exchange market representing the largest share, at just over one third (see Chart 3). The foreign exchange market is followed by the interest rate market and the commodities market, which make up one third and one quarter, respectively, while the equity market represents around 10 per cent. Here, the Swedish derivative market clearly differs from the EU derivative market, where it is instead the equity market that is largest with 40 per cent of the number of outstanding derivative contracts. After that come the foreign exchange market, interest rate market and commodities market in declining order.

Chart 3. Number of outstanding derivative contracts by Swedish submarket

Per cent, 2020



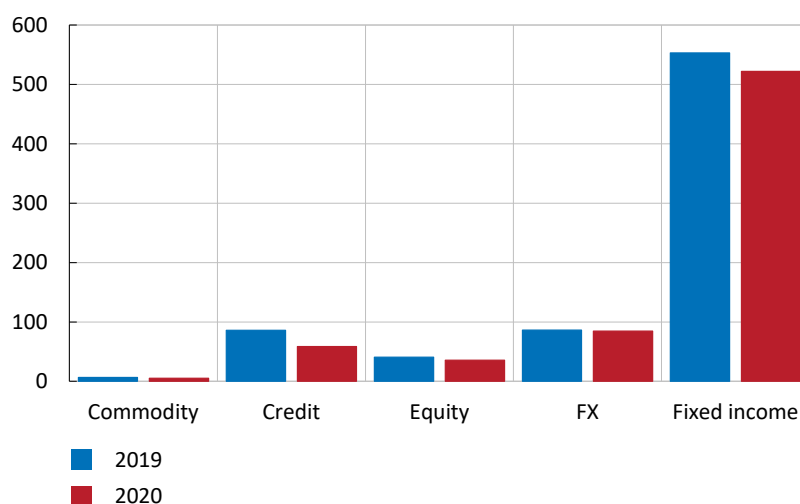
Note. Average percentages for the last trading day of each month in 2020 based on number of outstanding derivative contracts.

Source: Trade repositories, the Riksbank.

The fact that the interest rate market is the largest but does not have the most contracts is explained by the average derivative contract on the interest rate market being much larger than on other submarkets. This can be explained by frequent use of interest rate derivatives when assets or liabilities are acquired, and altering their characteristics is desired. These are often of a strategic nature, which means that they occur more seldom and are of high amounts. In contrast, foreign exchange derivatives are commonly entered at fairly short maturities – three months, for instance. These derivative contracts are of smaller amounts and the contracts are typically renewed when they have matured, generating numerous outstanding derivative contracts.¹⁰ Chart 4 shows that derivative contracts on the interest rate market are on average five to ten times greater than derivative contracts on the foreign exchange, equity and credit markets.

Chart 4. Average size per derivative contract on the Swedish submarkets

SEK million



Note. Average notional amount per derivative contract for the last trading day of each month.

Source: Trade repositories, the Riksbank.

¹⁰ For more information see Sveriges Riksbank (2020).

FACTS – Different type of derivative contracts

Forward and futures contracts are types of derivative contracts in which it is agreed to buy or sell an asset at a specific time at a determined price. A distinction is made between **futures** and **forwards**. Futures are standardised contracts while forwards are traded bilaterally (see the fact box on trading and clearing of derivatives). Futures have the same terms irrespective of the counterparty, while forwards are specifically adapted according to the two parties to the contract.

Options are also derivatives in which it is agreed to buy or sell an underlying asset at a specific time at a determined price. Unlike forward and futures contracts, options however give the buyer the right, but not the obligation, to buy or sell the underlying asset.

A **swap agreement** is a derivative contract in which it is agreed to swap a currency or interest rate during a set period of time. There are many different types of swaps that are traded on various submarkets. On the interest rate market, there are many different types of interest rate swaps. One of these is the **plain vanilla interest rate swap**, in which one party pays a predetermined, fixed interest rate on a notional amount and the other pays a floating rate during a determined period of time. The notional amount is often not paid – just the interest.

On the foreign exchange market a common type of derivative is the **foreign exchange swap**. A foreign exchange swap is an agreement regarding a spot transaction of two currencies between two parties, and a forward transaction in which the parties swap back the two currencies at a later date.

On the credit market, **credit default swaps** (CDS) are a common type of derivative. Credit default swaps have the purpose of transferring credit risk in an asset between two parties. The buyer of a credit default swap buys credit protection from the seller. If a credit event occurs, the buyer conveys the insured asset to the seller, which pays the notional value of the asset.

A **swaption** is a derivative that entitles the holder to enter an interest rate swap at a future date.

A contract for difference (**CFD**) is a derivative in which two parties agree to swap the difference between the current price of an underlying asset and the price attained by the asset when the contract expires. This means for instance that, if the value of the underlying asset rises from when the derivative contract was entered, the buyer can sell the CFD and, in that case, receive payment equalling the difference in value.

Spreadbets resemble CFDs. They entail speculating in the difference between the purchase and sale price of an underlying asset over time.

A **forward rate agreement** (FRA) is a derivative entailing the payment of set interest at a set time. The notional amount in an FRA is only used as a basis for calculating the interest payment. Cash flow in FRAs thus only consists of interest payments.

2.3 Swaps are most common

As mentioned previously, derivative contracts are financial instruments, of which the value is linked to the value of their underlying assets. Another common factor for derivatives is that they are linked to events or conditions at a set time or period of time. The design of derivative contracts can however differ in numerous ways, and there are thus many different types of derivatives. In data, derivative contracts are divided into nine broad categories:

- forwards
- futures
- options
- contracts for difference (CFDs)
- swaps
- swaptions
- spreadbets
- forward rate agreements (FRA)
- other

The fact box above provides a more detailed description of the different types of derivative contracts.

Chart 5 shows the types of derivative contracts that are common on the Swedish derivative market, broken down into the various submarkets. There, it can for instance be seen that swaps are the most common type of derivative overall, which is also consistent with the picture in the EU.

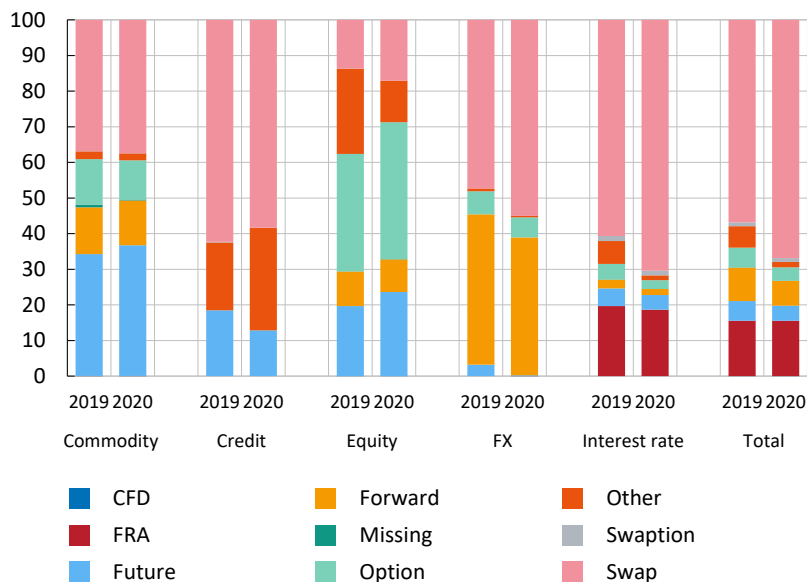
On the interest rate market, swaps represent more than half of derivative contracts. FRAs, forwards and futures are next in terms of total market share. This is also relatively consistent with figures at the EU level.

Swaps are also common on the foreign exchange and credit market. On the foreign exchange market, forward contracts are also common.¹¹ On the equity market, equity options are the most common type of derivative contract. On the commodities markets, it is instead futures that have the greatest market share.

¹¹ It is noteworthy that, in the foreign exchange market, forwards can, in some cases, be registered as swaps in the transaction reporting and, conversely, swaps can be registered as forwards. Hence, there is uncertainty regarding the exact figures for these two types of contract in the foreign exchange market.

Chart 5. Breakdown of types of derivative contract on the Swedish derivative market

Per cent



Note. Share of total outstanding notional amounts calculated as an average of the last trading day of each month. Missing means that, in the data, information regarding the type of derivative contract is missing for a small number of derivative contracts. Spreadbets do not occur in the Swedish derivative market according to data.

Source: Trade repositories, the Riksbank.

Chart 6 shows the most common types of derivative contracts on the entire derivative market, measured in outstanding notional amounts. In the chart, types of derivative contract are also broken down by their type of underlying asset. Hence, interest rate swaps are for example distinguished from foreign exchange swaps and credit default swaps, unlike in the Total bar on the right in Chart 5, where all swaps are presented as one and the same category.

The type of derivative that is predominant on the Swedish market is interest rate swaps, which represents over 60 per cent of all outstanding notional amounts. Interest rate swaps have a broad area of use for companies, both operationally (managing individual transactions) and strategically (for instance, the overall view of the company’s interest rate risk and future direction of interest rates). This is because interest rate swaps can change the characteristics of participants’ assets and liabilities, even after the assets or liabilities have been acquired. For example, liabilities such as floating-rate loans or bonds can be converted so that they have a fixed rate, and vice versa.¹² Another example is insurance companies that can alter the interest rate sensitivity of their assets with interest rate swaps to better match the high interest rate

¹² For example, Swedish banks that finance floating-rate mortgages through covered bonds use interest rate swaps to this end. The reason is that covered bonds often have a fixed rate of interest that the bank has to pay, while mortgages often have a floating interest rate. This means that the bank receives a variable interest rate from its mortgage customers, but pays a fixed interest rate to its financiers. To better match

sensitivity in their long-term liabilities.¹³ Given the broad area of use of interest rate swaps and the size of the underlying assets and liabilities they can have, it is not surprising that they dominate the derivative market.

The second most common type of derivative is the FRA, which represents around 15 per cent of all derivative contracts. Interest rate futures are also common types of derivative contract. On the Swedish market, they chiefly consist of futures contracts on government and covered bonds.

Other common derivative contracts in Sweden are foreign exchange swaps and foreign exchange forwards. Banks, insurance companies, the Swedish National Pension Funds (the AP funds) and non-financial corporations are examples of major participants that use the foreign exchange market. In general, the participants can use foreign exchange derivatives to hedge risks linked to exchange rate fluctuations and speculation. Insurance companies and the Swedish National Pension Funds can for instance use foreign exchange derivatives to manage foreign exchange risk linked to their foreign investments.¹⁴

The most common types of derivatives on the Swedish market are also the most common types in the EU.

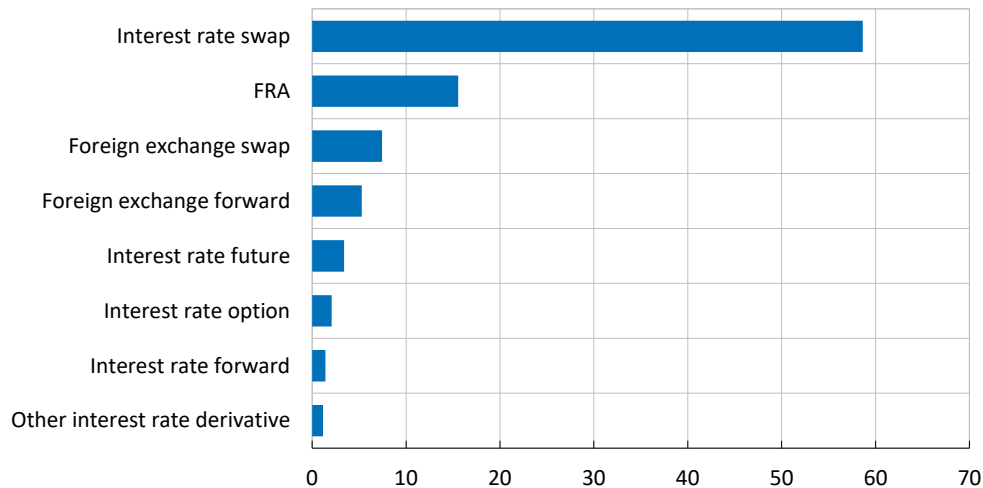
these interest payments, the bank can enter an interest rate swap, whereby the bank pays a floating interest rate and obtains a fixed interest rate in return. That way, the bank reduces its interest rate risk. For more information see Eidestedt et al. (2020).

¹³ In order to increase interest rate sensitivity on the asset side, insurance companies can enter interest rate swaps in which they pay a floating rate and obtain a fixed interest rate on various maturities. The interest rate swap will therefore develop in line with pension commitments when interest rates change. If interest rates go down, the value of the future pension commitments increases. At the same time, the value of the interest rate swap increases in that they now have a higher fixed interest rate compared with the new prevailing interest rate level.

¹⁴ The currency difference between the assets and liabilities of the insurance company or National Pension Fund gives rise to a currency risk. To reduce or avoid such currency risks, insurance companies or National Pension Funds can currency-hedge their assets using foreign exchange swaps. In that case, the insurance company first of all buys foreign currency from a bank in exchange for Swedish kronor through a spot transaction. At the same time as entering this spot transaction, the insurance company also enters a forward contract in which it undertakes, in future, to sell back the foreign currency to the bank in exchange for Swedish kronor after, for instance, three months. When the forward contract matures, the insurance company must thus return the foreign currency and the bank must return the Swedish kronor. For more information see Sveriges Riksbank (2020).

Chart 6. The most common types of derivative contract on the Swedish derivative market

Per cent, 2020



Note. Percentages of the total notional amount on the derivative market. Based on an average for the last trading day of each month, 2020.

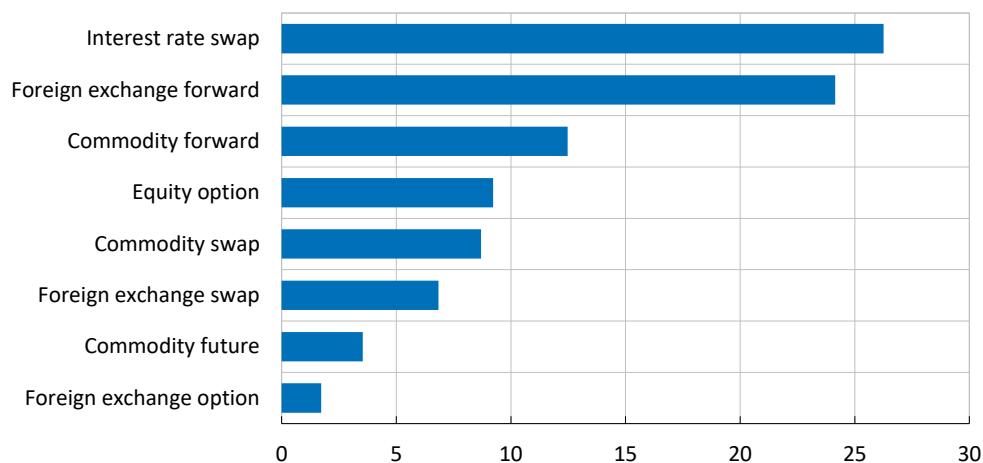
Source: Trade repositories, the Riksbank.

When the most common derivative contracts are instead defined according to the number of outstanding derivative contracts, the picture is somewhat different (see Chart 7). Interest rate swaps are still the most common. They, and foreign exchange forwards, together make up more than half of all derivative contracts. Commodity forwards are now the third most common type, despite the commodities markets being the second smallest submarket in terms of notional amount (see Chart 2). Commodity swaps, equity options and foreign exchange swaps are also common.

In the EU, equity CFDs and foreign exchange CFDs were the most common types of derivatives measured in terms of the number of outstanding derivative contracts for 2019. Use of CFDs is thus much more widespread in the EU than in Sweden. In Sweden, CFDs are one of the most uncommon types of derivative contract.¹⁵ In the EU, foreign exchange forwards only come in third place and interest rate swaps in fourth place.

¹⁵ CFDs on the equity, foreign exchange and commodity markets are all among the 11 least traded contracts measured in terms of number of outstanding contracts in 2019. In 2020 they were among the 15 least traded contracts.

Chart 7. Largest number of derivative contracts on the Swedish derivative market
Per cent, 2020



Note. Percentages of the total number of outstanding derivative contracts on the derivative market. Based on an average for last trading day of each month, 2020.

Source: Trade repositories, the Riksbank.

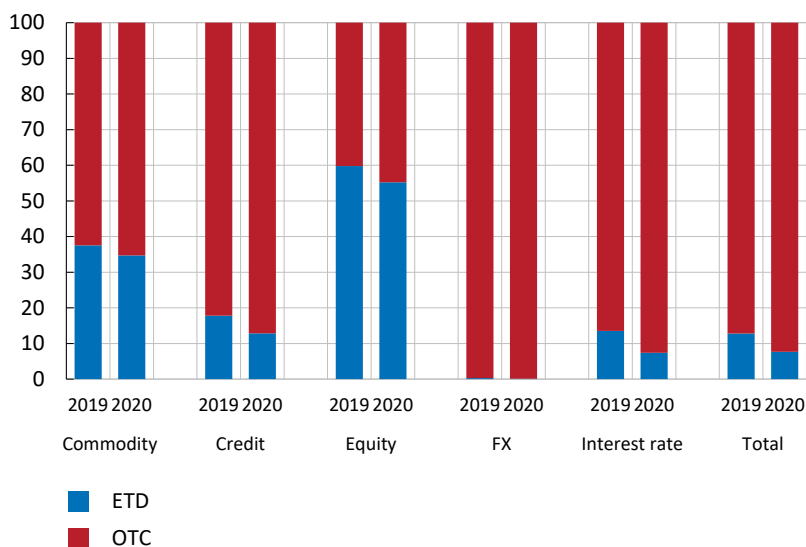
2.4 The majority of derivative contracts are traded over-the-counter

Derivative contracts can either be exchange-traded (ETDs), or be traded bilaterally (over-the-counter) outside of regulated trading venues (OTC derivatives). Exchange-traded derivative contracts are standardised and generally feature low transaction costs and high liquidity; that is, they are easy to buy and sell. It is also a transparent way of trading in derivative contracts, because all exchange participants can trade in them and see their pricing. OTC contracts can instead be tailored to the needs of the two counterparties. Typically, trading in them is thus more expensive and they are less liquid than exchange-traded derivative contracts. A market in which a large proportion of derivative contracts are exchange-traded can therefore be interpreted as being more transparent and liquid than a market with a small proportion of exchange-traded derivative contracts.

Just over 90 per cent of outstanding derivative contracts in Sweden are traded OTC (see Chart 8). However, there are differences between the submarkets in how the derivative contracts are traded. OTC contracts dominate foreign exchange, interest rate and credit derivatives, while exchange-traded derivative contracts are more common on the equity market and to some extent on the commodities market. Overall, the proportion of exchange-traded derivative contracts in Sweden closely resembles the distribution in the EU.

Chart 8. Percentages of derivatives that are exchange-traded and OTC in Sweden

Per cent



Note. Based on the average total outstanding notional amount for the last trading day of each month. The data only includes trading venues approved in the EU or trading venues in third countries that are considered to be equivalent to those in the EU. Trade on other trading venues falls into the OTC category.

Source: Trade repositories, the Riksbank.

FACTS – Trading and clearing of derivatives

Derivative contracts can either be traded on an exchange – **exchange-traded derivatives (ETD)** – or bilaterally. When two parties themselves enter a derivative contract bilaterally (that is, not through an exchange), it is instead said that the derivative contract is traded over-the-counter (**OTC**).

When trading in derivatives (and other financial services), clearing must be performed. Clearing entails compiling instructions and information regarding transactions ahead of the settlement itself, which is the final stage in a transaction. Clearing can either be done bilaterally by the parties included in a transaction, or it can be done centrally. In the latter case, clearing is performed by a central counterparty, **CCP**. This means that instructions and information are not only compiled, but that the central counterparty also serves as a counterparty in the transaction, which means that the central counterparty will be the buyer for every seller and the seller for every buyer. Clearing through a central counterparty can be done irrespective of whether the derivative contract is traded bilaterally or on an exchange. For some OTC derivatives, there are legal requirements for clearing through central counterparties. This type of clearing is known as CCP clearing.

2.5 Clearing through a central counterparty is common

Derivative contracts can, as mentioned above, give rise to risks. Irrespective of whether a participant is using derivatives for speculative purposes or to hedge against risks, the usage of derivatives gives rise to counterparty risk; that is, the risk of loss in the event of the counterparty's default on its obligations. One way of managing counterparty risk is to use a central counterparty (CCP). A CCP steps in between the two participants included in a derivative contract and becomes the buyer for the seller and the seller for the buyer. This means that the CCP assumes the counterparty risk for the derivative contract. A condition for a CCP to reduce counterparty risk is however that it adequately manages risk.¹⁶

To reduce counterparty risks on the derivative market, requirements have been introduced for certain OTC transactions to be cleared through a CCP.¹⁷ The market with the most comprehensive requirements concerning CCP clearing is the interest rate market. This is reflected clearly in Chart 9, which shows that over 80 per cent of OTC-traded derivative contracts on the interest rate market derive from CCP-cleared derivative contracts. This is also consistent with the picture for the interest rate market at the EU level. In general, the proportion of OTC-traded derivatives in the submarkets cleared through a CCP is higher in Sweden than in the EU, with the greatest differences emerging in the commodities, equity and foreign exchange markets. This could roughly be interpreted as counterparty risk being somewhat lower on these submarkets than in the EU.¹⁸ In both Sweden and the EU it seems that the proportion of CCP-cleared derivatives increases over time.

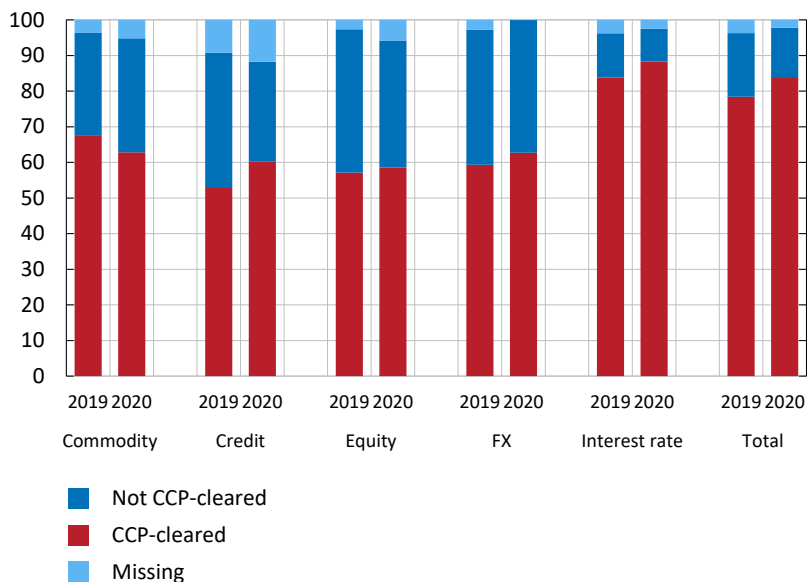
¹⁶ For more information, see Eklund et al. (2012).

¹⁷ According to Regulation (EU) 2019/834 of the European Parliament and of the Council of 20 May 2019 amending Regulation (EU) No 648/2012 as regards the clearing obligation, the suspension of the clearing obligation, the reporting requirements, the risk-mitigation techniques for OTC derivative contracts not cleared by a central counterparty, the registration and supervision of trade repositories and the requirements for trade repositories.

¹⁸ Note that there are more ways of reducing counterparty risk than clearing contracts via CCPs, such as netting agreements and pledging collateral.

Chart 9. Percentage of CCP-cleared OTC derivatives on the Swedish derivative market

Per cent



Note. Based on the average total outstanding notional amount for the last trading day of each month. Missing means that the contract could not be classified.

Source: Trade repositories, the Riksbank.

CCP clearing requirements only apply to OTC-traded derivatives. However, exchange-traded derivatives can also be cleared through a central counterparty. Essentially, all exchange-traded derivatives are CCP-cleared.

A consequence of there being CCPs on the derivative market is that they can mechanically increase concentration on the market. This is because requirements regarding CCP clearing can lead to redirecting large volumes of derivative contracts, which would otherwise have been traded by a number of different participants, to one and the same entity. Concentration on the derivative market is analysed in more detail in section 2.9.

2.6 Short maturities in equity and foreign exchange derivatives

The maturities of different types of derivative contract reflect counterparty preferences. In some cases, for instance, it is desirable for the derivative contract to have the same maturity as the asset or liability for which a change in characteristics is desired. In other cases it can instead be desirable to let the derivative contract have a shorter maturity and renew it as soon as the old one matures. The duration of the maturity of a derivative contract also affects the risk. Longer maturities for instance involve greater counterparty risk because the probability of the counterparty defaulting increases over a longer time horizon. If an entity instead relies on continuing with

shorter derivative contracts, there is on the other hand a risk of the counterparty not being willing or able to renew the derivative contract when it matures.

On the Swedish derivative market, around half of all derivatives have an outstanding maturity of less than one year (see Chart 10). Around one third have long maturities of three years or more. This distribution of maturities is highly consistent with that in the EU.

The foreign exchange market, in which foreign exchange swaps and foreign exchange forwards are predominant, is the submarket with the very shortest maturities. Over 90 per cent have a maturity of less than a year. Foreign exchange derivatives are often entered on shorter maturities because this provides flexibility in adjusting the size of these positions. However, it can cause problems in extending derivative contracts in situations of market turbulence. Another reason for entering short-term derivative contracts is that it can be more expensive to enter foreign exchange swaps with longer maturities.¹⁹ The equity market is also dominated by derivative contracts with short maturities. Over 70 per cent have a maturity of less than a year.

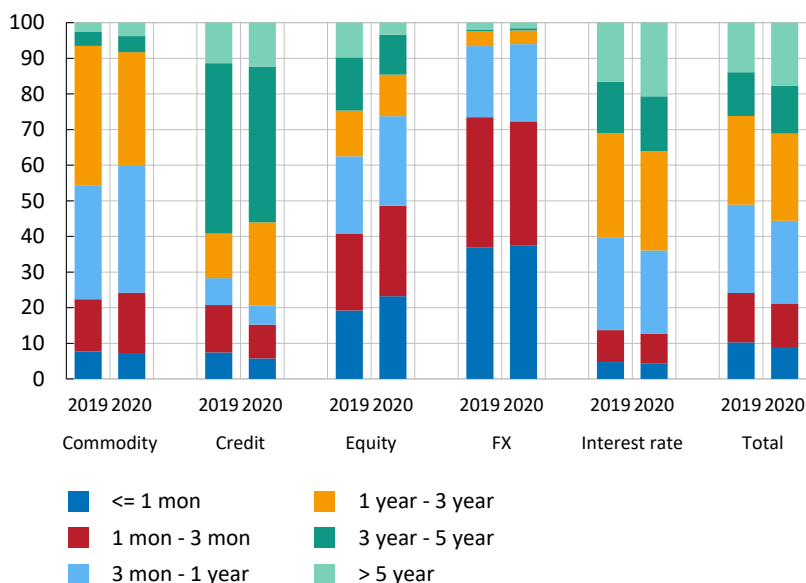
The credit market is the submarket with the longest maturities. Here, 80 per cent of derivatives have a maturity of more than one year. This can partly be explained by credit derivatives having the purpose of protecting against credit risk in an underlying asset, such as a bond. Because bonds often have longer maturities of one to ten years, so too do credit derivatives.

The interest rate market also has long maturities. Over 60 per cent have a maturity of more than a year. This can be explained by the fact that interest rate derivatives often reflect the maturities of the assets or liabilities for which a change in characteristics is desired, for instance when converting a floating interest rate to a fixed one for a loan.

¹⁹ Read more about foreign exchange swaps and the use of foreign exchange swaps by insurance companies and the Swedish National Pension Funds in Sveriges Riksbank (2020).

Chart 10. Maturities by submarket and in total in Sweden

Per cent



Note. Share of the total outstanding notional amount by time to maturity calculated as an average of the last trading day of each month.

Source: Trade repositories, the Riksbank.

2.7 Swedish kronor, euro and dollars are the most common currencies in derivative contracts

Sweden is a small open economy with substantial international trade. Also, the Swedish financial system is dependent on the international financial markets. This interconnectedness with other countries is also reflected on the Swedish derivative market, which can be clearly seen when inspecting the currencies in which the derivative contracts are denominated.

Chart 11 shows the distribution of various currencies in derivative contracts broken down by submarket.²⁰ Overall, Swedish kronor is the most common currency with over 50 per cent of the market, followed by euro with around 20 per cent. US dollars and Norwegian kroner each make up around one tenth of the market.

Compared with the EU as a whole, the presence of different currencies differs quite substantially. In the EU, the euro and dollar are predominant, followed by the pound sterling. This divided picture is not particularly surprising, as the Swedish krona is a small currency internationally, while the euro and dollar are very large ones.

In Sweden, the interest rate and equity markets derivative contracts in Swedish kronor are the most common. Because Swedish participants on derivative markets

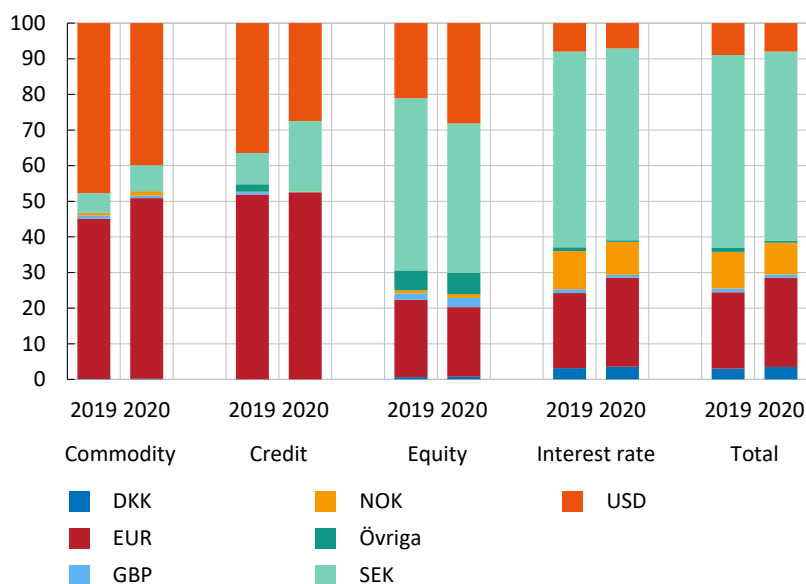
²⁰ This is based on "Notional Currency 1" in the data. The exception is derivatives based on multiple currencies and we therefore choose to exclude the foreign exchange market and cross currency basis swaps that are reported on the interest rate market.

largely have their operations in Swedish kronor, it is also reasonable for interest rate derivatives to have Swedish rates as the underlying asset. It is thus expected that a large proportion of interest rate contracts are in Swedish kronor. It is not surprising either that a considerable proportion of equity derivatives are in Swedish kronor because Swedish participants also tend to invest in Swedish equities.

On the commodities and credit markets, it is instead the euro and dollar that are the most common currencies. Swedish kronor only represent a small proportion of derivative contracts.

Chart 11. Breakdown of currencies by submarket in total in Sweden

Per cent



Note. Share of the total outstanding notional amount calculated as an average of the last trading day of each month. Based on the currency specified as “Notional Currency 1” in the reporting. The foreign exchange market is excluded. Cross-currency basis swaps are also excluded from the interest rate market.

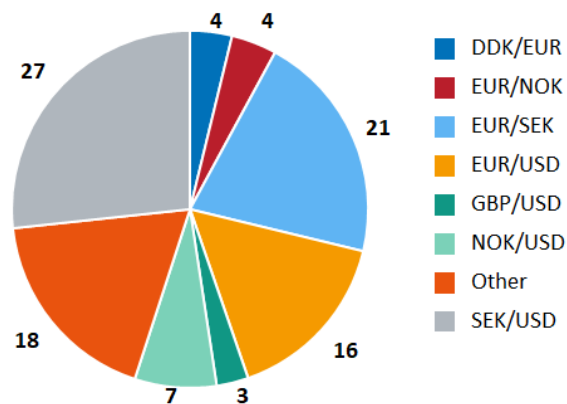
Source: Trade repositories, the Riksbank.

Derivative contracts on the foreign exchange market contain, by definition, foreign currency because they involve exchanging one currency for another. The foreign exchange market is thus presented separately in Chart 12.²¹ The absolute most common currency pair involves exchanging Swedish kronor for US dollars. However, the currency pairs Swedish kronor for euro, and euro for US dollars are also common on the Swedish foreign exchange market. This is to be expected, as both US dollars and euro are major currencies.

²¹ Also, cross-currency basis swaps, from the interest rate market, are reported in Chart 12.

Chart 12. Currency pairs in foreign exchange derivatives on the Swedish market

Per cent



Note. Share of the total outstanding notional amount calculated as an average of the last trading day of each month. The chart only concerns the foreign exchange market and cross-currency basis swaps. The currency pairs concern derivative contracts in which the two currencies are stated as one leg each of the contract. This means for example that DDK/EUR refers to all derivative contracts with one leg in DDK and the other in EUR, irrespective of whether it is EUR that is exchanged for DDK, or DDK that is exchanged for EUR. The breakdown is based on information from “Notional Currency 1” and “Notional Currency 2”.

Source: Trade repositories, the Riksbank.

2.8 The Swedish derivative market is interconnected with markets of other countries

The Swedish derivative market is, as described, closely interconnected with the international derivative market. This is clear not only when looking at the currencies in which derivative contracts are denominated, but also when studying the countries where the counterparties of Swedish participants are located. These countries are shown in Chart 13.²² If both parties are Swedish, the counterparty country is categorised as Sweden in the diagram. Otherwise, it is categorised as the country where the counterparty of the Swedish participant operates.

In general, the majority of derivative contracts are entered between a Swedish participant and an international counterparty. In the interest rate market, counterparties from the United Kingdom are predominant, which is expected in light of London’s role as a financial centre which implies counterparties such as major international banks and central counterparties. Derivative contracts between two Swedish parties and against the rest of the Nordics make up around one fifth each.

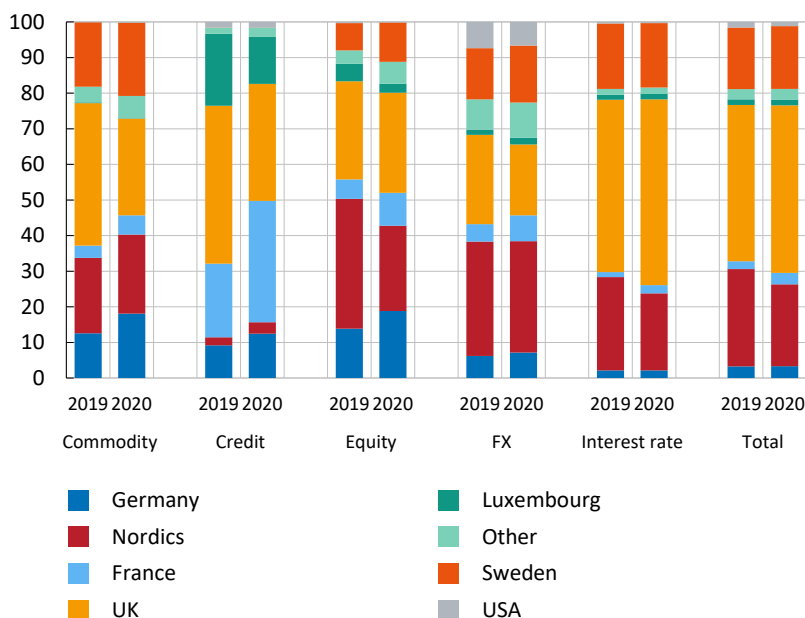
On the submarkets for credit derivatives, foreign exchange derivatives, commodity derivatives and equity derivatives, counterparty countries vary to a greater extent, suggesting that numerous submarkets are interconnected internationally. The counterparties are often located in the United Kingdom, Sweden, the Nordics, France and Germany. This is to be expected considering that countries, such as the United Kingdom in particular, but also Germany and France, have considerable financial sectors

²² Categorisation of different countries is done using information from GLEIF.

with large international banks and central counterparties. On the credit market, there are only a handful of derivative contracts with only Swedish counterparties.

Chart 13. Counterparty countries for Swedish participants

Per cent



Note. Based on an average of percentages of the total outstanding notional amount for the last trading day of each month.

Source: Trade repositories, the Riksbank.

2.9 The derivative market is dominated by a small number of participants

As noted previously, the Swedish derivative market is large. To obtain a deeper understanding of the market and its structure, its distribution between different participants – that is, market concentration – can be studied. High concentration implies that a handful of counterparties make up a large proportion of the market, while low concentration implies a more even distribution between counterparties in the market.

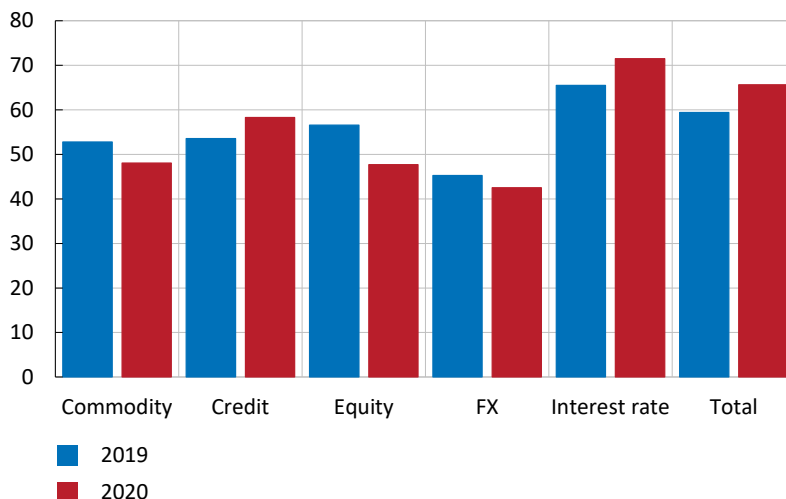
Chart 14 shows concentration in the form of the market share of the five largest participants. It is clear that the Swedish derivative market has a relatively high concentration of participants. Overall, the five largest represent over 60 per cent of market share. This means that only a small number of participants represent over half of the activity on the Swedish derivative market. Bearing in mind that the Swedish financial system is relatively small and dominated by a handful of large participants, this is not surprising.

On the interest rate market, the five largest participants hold 70 per cent of the market. This is also the submarket with the most far-reaching requirements in terms of CCP clearing. Because CCP clearing requirements can cause the redirection of a large

number of derivative contracts, which would otherwise have been entered by numerous different participants, to one and the same counterparty, this can intensify concentration. The five largest participants in the remaining submarkets have instead around half of the market share. This is largely consistent with the situation on the EU derivative market.

Chart 14. Market concentration on the Swedish derivative market

Per cent



Note. Market share for the five largest counterparties in terms of outstanding notional amount per submarket and in total, calculated as an average of the last trading day of each month.

Source: Trade repositories, the Riksbank.

Another way of measuring concentration is to study how many different unique counterparties a participant on the derivative market has (see Chart 15). On the Swedish interest rate and foreign exchange submarkets, 0.1 per cent of the participants have around 1,000 unique connections with counterparties.²³ On the equity and commodities markets, 0.1 per cent of the participants have between 200 and 500 unique connections. At the same time, 90 per cent of the participants only have roughly one individual connection. The fact that a handful of participants have numerous unique connections, while at the same time most participants only have a few, is also a characteristic that the Swedish market shares with the EU derivative market. The EU derivative market is however much larger and thus consists of far more participants.

The Swedish credit market stands out somewhat in Chart 15. This is because it is a very small submarket (see Chart 2) and hence the number of unique participants is also much smaller than on other submarkets.

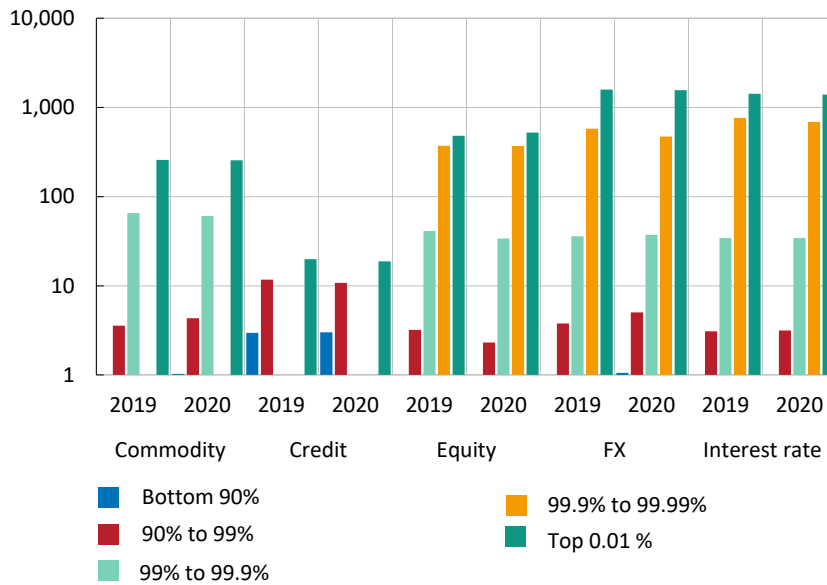
The fact that the derivative market is dominated by only a few participants implies that the Swedish derivative market has a core-periphery structure. This means that a small number of participants have outstanding derivative contracts with numerous other participants that do not have outstanding derivative contracts between each

²³ As a comparison, there were 6,612 unique participants on the Swedish derivative market at 31/12/2020.

other. There is thus an intricately interconnected core in the middle of the network of participants that make up the Swedish derivative market. This is largely explained by the fact that some financial participants have the role of market maker on the derivative markets, and CCPs. Being a market maker involves the participants providing both buy and sell prices, thus maintaining an active market even when there are no participants with the exact matching needs in derivative positions in their operations. Hence, market makers enter derivative contracts with many different participants. CCPs can also add to concentration on the market because they serve as counterparties for both the buyers and sellers in derivative contracts.

Chart 15. Number of connections for participants on the Swedish derivative market

Number of unique connections, logarithmic scale



Note. Based on outstanding derivative contracts and unique counterparty relations. Calculated as an average for the last trading day of each month. Each bar indicates the number of unique connections held by participants belonging to a certain percentile. The dark green bar thus equals the 0.01 per cent of participants with the greatest number of unique connections. On the interest rate market for 2020, these 0.01 per cent of the participants with the greatest number of unique connections have on average approximately 1,300 unique connections.

Source: Trade repositories, the Riksbank.

3 Conclusions

The Swedish derivative market is large because the value of the outstanding notional amounts in derivative contracts is 16 times Swedish GDP, or five times the total assets of the Swedish banking sector. In an international perspective, the Swedish derivative market is not that large, however. Compared with the derivative market for the EU as a whole, the size of which equals 49 times EU GDP, the Swedish market only represents just over 1 per cent. Since Sweden is a small economy, this is perhaps not particularly surprising.

Sweden is also an open economy with extensive trade with other countries, which is also reflected in the Swedish derivative market. Just over half of the counterparties in derivative contracts are foreign. It is primarily a matter of countries that have large financial centres with major international banks and central counterparties. The Swedish derivative market is thus closely interconnected with international derivative markets. The international aspect is also reflected by the fact that more than half of derivative contracts are denominated in foreign currency.

The Swedish derivative market also shares many characteristics with that of the EU. In both cases, the interest rate derivative market for example is clearly the largest sub-market, which is natural in light of its broad area of use. In Sweden it represents over 80 per cent of the entire derivative market, and is so large mainly because interest rate derivatives can be used to change the interest rate characteristics of assets and liabilities, which are sizeable in themselves. Another characteristic shared by both markets is that a large proportion – over 90 per cent – of the derivatives are traded bilaterally. In addition, both the derivative markets are dominated by a handful of participants. On the Swedish derivative market, the five largest participants represent over half of the outstanding notional amount of the entire market. One reason for the derivative market having a clear core of participants that represent a large proportion of outstanding derivative contracts is that a handful of major participants serve as market makers and a large proportion of the derivative contracts are cleared through central counterparties.

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APPENDIX 1 – Data

Data from trade repositories

The report is based on data from trade repositories (TR) in the EU, to which the Riksbank has limited access. Large counterparties in the EU are obliged to report their derivative positions to trade repositories according to the EU's regulation on OTC derivatives, central counterparties and trade repositories (EMIR).²⁴

The Riksbank's access to these trade repositories is limited to Swedish transactions. This means that the Riksbank only has access to transactions *in which one* of the following conditions are fulfilled:

1. One of the parties in the transaction is Swedish.
2. The transaction is cleared or reported by a Swedish CCP.
3. The underlying asset for the transaction is Swedish (for instance a Swedish equity or STIBOR).
4. The transaction is based on the Swedish currency.

In the analysis we only study trade state reports, which contain information on all open derivative positions at the end of each day of trade for five derivative markets: the interest rate, foreign exchange, equity, credit and commodities markets. Each such trade state report contains around 100 different variables. We focus on a selection of these, for instance counterparty identification, notional amount, type of underlying asset, currencies and whether the derivative contract has been CCP-cleared.

Data processing

First of all, the information from the different trade repositories is combined. Then, the data is supplemented with counterparty information from Global Legal Identifier Foundation (www.gleif.org) based on the variable legal entity identifier (LEI), in order to include information on legal name, corporate identity number and legal domicile for counterparties. We only keep the observations that have LEI information for both parties in a transaction and in which at least one of the parties is Swedish.

Notional amounts are then converted to Swedish kronor using prevailing exchange rates for the trade date concerned. Because both parties in a transaction might be obliged to report the transaction, there is dual reporting in the data from the trade repositories. These duplicates are deleted so that we only have unique transactions remaining, and we choose to keep the report that contains the least number of absent variables; that is, the reporting that contains the most information about the transaction.

²⁴ Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories.



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