Report on derivatives

Submitted to the Minister of Finance of Belgium and the High Level Expert Group on the future of the Belgian financial sector

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National Bank OF BELGIUM
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EXECUTIVE SUMMARY

In its report on the Future of the Belgian financial sector, published in 2016, the High-Level Expert Group recommended that the NBB analyse derivative products in the Belgian financial system and the systemic risks involved. In 2017 the NBB received a request from the Minister of Finance to prepare a report on these issues. This report represents the NBB's response to that request.

Although derivatives were not the main cause of the 2007-2008 financial crisis, they nevertheless contributed to its scale and magnitude. The sale and widespread distribution of complex financial products, which relied on derivatives (primarily credit default swaps) to transfer the risks of the products to other counterparties and which were even sometimes composed of derivatives, helped to transform stress in a very specific market segment (i.e., US subprime mortgage loans) into a global crisis. The risks associated with the complex products and the derivatives used to spread the risks were often poorly understood and managed.

The opacity of the exposures and of the network of interconnections between financial institutions allowed massive concentrations of risk to build up in particular institutions. It was seen that the default of a major market participant could result in significant spill over effects through OTC derivatives contracts. In addition, the lack of transparency in OTC derivatives markets meant that it was difficult to accurately gauge in a timely fashion the impacts of deterioration of the creditworthiness of derivatives counterparties. These issues prompted a number of the post-crisis modifications to the international and European financial regulatory frameworks, including the requirement of central clearing for standardised derivatives and increased capital and margin requirements for non-centrally cleared derivatives.

The report reviews the post-crisis changes to the regulatory framework that directly relate to derivatives or for which the regulatory requirements are affected by banks' or insurance companies' derivatives exposures. At the international level, changes to the Basel 3 bank regulatory framework are discussed. Relevant regulatory changes that are examined at the European level include the European Market and Infrastructure Regulation (EMIR), the proposed European legislation concerning the recovery and resolution framework for central counterparties (CCPs), the implementation of the Solvency II framework for insurance firms, and the European Bank Recovery and Resolution Directive (BRRD).

Following the discussion of regulatory changes, the report analyses developments and trends in Belgian banks' derivatives activities during the past ten years and then examines Belgian insurance companies' derivatives activities. With respect to banks, a number of observations and developments are noted. First, as in many other countries, interest rate derivatives represent the largest proportion of derivatives for Belgian banks, accounting for more than three quarters of Belgian banks' notional derivatives exposures.

Second, the amount of notional derivatives exposures by Belgian banks has fallen dramatically since the crisis, both in terms of absolute amounts and as a proportion of total assets. The drivers of this decline include: requirements of the restructuring agreements signed with the European Commission by certain banks following the crisis; reductions in the risk appetites of bank management; changes to the international and European regulatory framework relating directly or indirectly to derivatives; structural reform measures introduced in the Belgian banking law, which prohibit banks from undertaking proprietary trading activities; and transfers of some derivatives activities to other entities within groups.

Yet, while derivatives exposures of the Belgian banking sector have declined, there is considerable heterogeneity across Belgian banks. Among the eight largest bank users of derivatives (out of the eighteen Belgian banks that report derivatives exposures), the median ratio of notional amounts of derivatives over total assets has remained roughly constant since the crisis. At the same time, the dispersion in this ratio across banks has sharply declined, indicating that most of the decline at banking-sector level is due to reductions by the largest banks.

Whereas the notional amounts of Belgian banks' derivatives have declined since the crisis, the net market value of derivatives exposures for the banking sector has also grown increasingly negative. This development is linked to banks' hedging derivatives and is attributable to the fall in interest rates since the crisis, combined with the intensive use by Belgian banks of fixed-payer interest rate swaps (whereby the holder of the swap makes a fixed rate payment and receives a variable rate payment in return) in order to hedge their relatively high duration gaps.

The analysis also shows that income associated with derivatives can contribute quite significantly, either positively or negatively, to banks' profit. In the ten years following the crisis, derivatives have contributed negatively to Belgian banks' income, with the negative income from derivatives exceeding -90% of net operating income for particular banks in certain years. Clearly, when interest rates begin to increase, Belgian banks' losses associated with their fixed-payer interest rate swaps will also diminish.

In terms of derivatives counterparties, emerging data from the detailed reporting now required by the EMIR legislation suggest that for some Belgian banks a central counterparty is now the main counterparty, due to the requirement of central clearing of standardised derivatives. Other, typically smaller banks, which are not direct clearing members, have only financial institutions other than CCPs as counterparties. For some Belgian banks, intragroup transactions represent a large fraction of their derivatives transactions.

With respect to insurance firms, considerably less data are available than for banks. It is well known that insurance firms typically make significantly less use of derivatives than banks, and Belgian insurance firms are no exception. Among the eighteen Belgian insurance firms that reported derivatives exposures in 2016, the ratios of notional amounts of derivatives to total assets are quite low. Indeed, the extent of derivatives activities of the most active Belgian insurance firms appears to be rather similar to the activities of the smallest Belgian banks engaging in derivatives transactions. Like Belgian banks, interest rate derivatives represent the largest proportion of derivatives for insurance firms.

On the basis of the quantitative analysis of Belgian banks' and insurance firms' derivatives activities, together with qualitative analysis and supervisory dialogue, the report identifies some policy conclusions and key messages. First, **derivatives are important in terms of their contributions to banks' balance sheets and income statements**. Belgian banks appear to have larger duration gaps than many of their European peers, due in part to their relatively large portfolios of fixed-rate loans combined with large proportions of non-maturing deposits. In order to reduce this duration gap, Belgian banks tend to make more intensive use of derivatives than many other European banks. Indeed, our analysis indicates that Belgian banks are quite sensitive to interest rate variations, and more so than a number of other European banks. This suggests that regular transversal analysis of derivatives activities could help to identify emerging areas of concern at an early stage.

Second, while **derivatives can reduce risk, they also create new risks.** Yet, understanding derivatives activities and the risks associated with them is complex and involves many dimensions. Our analysis leads us to question whether senior bank management always has a full understanding of the uses of derivatives within their institution or of the importance of new risks created by these transactions. For at least some banks, knowledge of derivatives activities seems to be lodged in silos, and an overall, top-down view is missing. This not only makes it difficult for management to form a complete view of the potential risks but also for supervisors to make an accurate assessment. It could be useful for supervisors to conduct in-depth studies of derivatives for large banks, in order to determine the extent to which a broad view of derivatives activities exists and whether an appropriate governance framework is in place to allow senior management to fully understand the origin of the derivatives position and to assess the risks associated with derivatives.

In addition, **risks of income losses associated with derivatives, even for hedging, can be significant**. Even banks with simple, retail-oriented business models that use derivatives for hedging can sometimes find themselves exposed to large, unanticipated losses. Supervisory assessments of Belgian banks' hedging decisions have revealed some inadequacies in certain banks' hedging strategies and hedging risk

frameworks. It is, therefore, important to ensure that banks have adequately assessed the risks associated with their hedging activities and that banks have appropriate hedging risk frameworks in place.

With respect to the new regulatory framework, while the central clearing requirement introduced by the EMIR legislation should contribute to a reduction in counterparty risk between individual institutions, the **central counterparties have become, by definition, systemically important financial institutions**, which may give rise to a number of potential systemic risks. CCPs stand at the very centre of the financial system, interconnecting their clearing members on a global scale. The volume of transactions cleared by CCPs has increased dramatically in recent years and is expected to increase even further in the future. There is also a very high concentration within the CCP industry, with a very small number of CCPs clearing most derivatives transactions in the EU. Finally, CCPs apply margins and haircuts pro-cyclically.

These observations imply that appropriate licensing and supervision of CCPs are critical. The stress testing of CCPs to extreme market shocks – as undertaken annually for all EU CCPs by ESMA, in cooperation with the ESRB – is also a useful exercise.

The EMIR legislation allows intragroup derivatives transactions satisfying certain conditions to qualify for a waiver of the central clearing obligation. EMIR also allows some intragroup transactions to be exempted under certain conditions from the obligation to provide collateral for non-centrally cleared derivatives transactions. Since 2016 nine Belgian institutions have obtained a waiver of the central clearing obligation, and two institutions have obtained an exemption for collateral for non-centrally cleared intragroup transactions. Given that Belgium hosts a number of important subsidiaries of large financial groups which centrally manage their derivatives business at parent level, **the risks associated with large volumes of non-centrally cleared or non-collateralised intragroup transactions should be closely monitored**.

Although insurance firms engage in considerably less derivatives activity than banks, **derivatives can still create significant risk for insurance firms**. EMIR requires that all derivatives counterparties apply risk-mitigation techniques to all non-centrally cleared derivatives transactions; however, regular supervisory reports by insurance firms do not currently permit insurance supervisors to obtain a clear view of the impact of these risk-mitigation techniques. Supervisors must ensure that the insurance firms supply adequate data through their supervisory reports.

Because derivatives involve making decisions in light of uncertain future movements of market variables, **they can be used to take positions in the hope of improving profitability.** The Belgian structural reforms measures in the Banking Law prohibit proprietary trading by banks, and therefore the use of derivatives by banks for the purpose of improving profit. For insurance firms, the prudent person principle should serve a similar purpose. This principle states that insurance firms may use derivatives only for the purposes of reduction of risks and efficient portfolio management. Current insurance supervisory data need to be supplemented with additional information in order for supervisors to accurately assess whether insurance firms' derivatives activities conform strictly to the prudent person principle.

Data quality issues hinder the ability of authorities to analyse and assess the risks associated with derivatives. In addition to the issues mentioned above for insurance firms, data issues for banks are also significant. Supervisory reporting data at the bank balance-sheet level do not allow for a detailed assessment of the characteristics and risks of banks' derivatives activities. On the other hand, EMIR requires all derivatives counterparties to report detailed data for each derivatives transaction. Analysis of these data would be potentially invaluable. Yet, given the sheer volumes of EMIR reporting data, there are major technical obstacles to managing and analysing it. There is thus considerable scope for international cooperation by authorities in building the necessary IT platforms and sharing data and expertise in order to achieve the advances in our knowledge of interconnectedness and systemic risk intended via the EMIR derivatives reporting requirements.

Finally, our analysis suggests that the requirements of the European Bank Recovery and Resolution Directive (BRRD) for **applying bail-in to derivatives contracts to banks in resolution procedures raise a number of feasibility concerns**, given the complexity and the specificities of derivatives contracts. In practice, valuing and bailing in derivatives is likely to be a complex process, which could require significantly more time than the resolution authority has to conclude the resolution procedure. Yet, the BRRD only permits the exclusion of derivatives from bail-in on a discretionary and case-by-case basis.

The NBB is taking a number of steps to address the concerns highlighted by the report. The NBB will be undertaking regular transversal analysis of derivatives activities of Belgian banks and insurance firms, in order to attempt to identify potential risks at an early stage. The NBB is also devoting resources to developing an IT platform for the analysis of EMIR derivatives reporting data, which will permit more detailed analysis to be undertaken. A limited version of the platform should become operational in 2018. Along similar lines, the NBB will regularly monitor data relating to the characteristics of intragroup derivatives transactions, in order to identify any potential risks and, for cases in which clearing or collateral exemptions have been granted, to verify that the conditions for granting the exemptions are still satisfied. The NBB will also work with insurance firms in order to ensure that adequate and appropriate data relating to derivatives activities are provided within the existing supervisory reporting framework. Finally, the NBB is working within the European banking supervisory framework to encourage in-depth studies of the derivatives activities of large banks, together with assessments of the overall understanding by senior management of the derivatives activities within the banks.

SECTION 1 INTRODUCTION

In its report on the Future of the Belgian financial sector, published in 2016, the High-Level Expert Group recommended that the NBB analyse derivative products in the Belgian financial system and the systemic risks involved. In 2017 the NBB received a request from the Minister of Finance to prepare a report on these issues.

This report represents the NBB's response to that request. The report first discusses post-crisis changes that have been made to the regulatory framework and that directly concern derivatives or for which new regulatory requirements may be affected by banks' or insurance companies' derivatives exposures. It then analyses developments and trends in Belgian banks' derivatives activities during the past ten years, followed by an examination of Belgian insurance companies' derivatives activities. Finally, key messages relating to the potential systemic risk associated with Belgian banks' and insurance companies' derivatives activities are drawn from the analysis, and relevant policy conclusions are identified on the basis of these messages.

Because of confidentiality restrictions, we cannot provide information on individual banks or insurance companies. This limits the possibility for detailed presentations of some of the results of the analysis, including the considerable heterogeneity that exists across institutions in the volumes and uses of derivatives. We try to overcome this limitation to the extent possible by presenting statistics relating to the distributions across institutions of some of the key indicators.

With respect to the motivation for the report, a first notable observation is that assessing the potential systemic risk from financial institutions' derivatives activities requires analysing potential risks at both the microprudential and macroprudential levels. In fact, systemic risk from derivatives may derive from any one of at least four potential sources: (1) institution-level risks associated with derivatives activities by systemically important financial institutions; (2) risks arising as a result of common derivatives exposures of many financial institutions; (3) interconnectedness of financial institutions through derivatives exposures; and (4) other sources, such as risks relating to central counterparties (CCPs). Given that it is the largest Belgian banks and insurance firms that make the greatest use of derivatives, the risks identified at the microprudential level for those firms also qualify as potential systemic risks. In addition, to the extent that many Belgian financial institutions make use of interest rate swaps, any risks to these institutions relating to interest rate movements and deriving from their common derivatives exposures could also represent a potential systemic risk.

Although derivatives were not the main cause of the 2007-2008 financial crisis, they nevertheless contributed to its scale and magnitude. The sale and widespread distribution of complex financial products, which relied on derivatives (primarily credit default swaps) to transfer the risks of the products to other counterparties and which were even sometimes composed of derivatives, helped to transform stress in a very specific market segment (i.e., US subprime mortgage loans) into a global crisis. The risks associated with the complex products and the derivatives used to spread the risks was often poorly understood and managed.

The opacity of the exposures and of the network of interconnections between financial institutions allowed massive concentrations of risk to build up in particular institutions. It was seen that the default of a major market participant could result in significant spill over effects through OTC derivatives contracts. In addition, the lack of transparency in OTC derivatives markets meant that it was difficult to accurately gauge in a timely fashion the impacts of deterioration of the creditworthiness of derivatives counterparties. These issues prompted a number of the post-crisis modifications to the international and European financial regulatory frameworks, including the requirement of central clearing for standardised derivatives and increased capital and margin requirements for non-centrally cleared derivatives.

The understanding and analysis of derivatives activities and the risks associated with them is highly technical, complex and involves many dimensions. In order to facilitate the presentation of the analysis and conclusions, Section 2 of this report first provides a basic description of the characteristics and types of derivatives and the potential uses of derivatives by financial institutions. This section also identifies some potential risks associated with derivatives and faced by the counterparties to derivatives transactions.

Section 3 of the report discusses post-crisis changes to the regulatory framework that relate directly or indirectly to derivatives. At the international level, changes to the Basel 3 bank regulatory framework are discussed. Relevant regulatory changes at the European level include the implementation of the Solvency II framework for insurance firms, the European Market and Infrastructure Regulation (EMIR) including two amendments to it that are currently under discussion, the proposed European legislation concerning the recovery and resolution framework for CCPs, and the European Bank Recovery and Resolution Directive (BRRD).

Section 4 uses supervisory reporting data to analyse developments and trends in Belgian banks' derivatives activities over the past ten years. Recent reporting required by the EMIR legislation on transaction-level data for banks' derivatives is used to examine some specific issues.

Section 5 makes use of recent supervisory reporting required by the Solvency II regulation to offer a recent picture of derivatives exposures by Belgian insurance companies. Because no time series of data exist, we are not able to analyse developments in insurance firms' derivatives activities over time.

Section 6 draws a number of policy conclusions and messages based on the quantitative analysis presented in Sections 4 and 5, together with qualitative analysis and supervisory dialogue to highlight some key policy concerns and messages relating to the implications of Belgian financial institutions' derivatives activities for systemic risk.

SECTION 2 DERIVATIVES AND THEIR USES

A derivative is a financial contract whose payments are defined as a function of some underlying variable, such as an interest rate, an exchange rate, the price of a security or commodity, an equity (or other) index, or an event such as the default of a firm. Because the cash flows from derivative contracts are defined in terms of an underlying asset or financial instrument, derivatives can provide the payoffs associated with a financial instrument without requiring the holder of the derivative to actually own the instrument. This characteristic creates one advantage of derivatives, in that they can be acquired at relatively low cost, thereby allowing leveraged positions to be taken on without the need to fund the underlying instrument.

Derivatives allow counterparties to isolate and trade specific risks; hence, derivatives also permit owners of certain assets or instruments to reduce or hedge particular risks associated with those assets. For example, a bank that holds a bond denominated in a foreign currency may wish to use a derivative to reduce the risk of changes in the value of the bond due to variations in the exchange rate. A bank holding a loan to a firm may wish to use a derivative to reduce the repayment risk linked to default by the firm. By shifting certain risks from the holder of an instrument or asset to the derivatives counterparty, derivatives can serve a risk management function. As will be discussed below, derivatives contracts also give rise to some new risks, such as counterparty credit risk and liquidity risk. Finally, derivatives can be embedded in complex ways in commercial products, thereby leading to the creation of "structured" loans or deposits.

Derivatives can either be traded on an exchange or over the counter (OTC). Exchange-traded derivatives (ETD) have highly standardised terms and features. For these derivatives, regulated exchanges require that a CCP provides clearing services and regulatory safeguards to investors. Initial margin (i.e., collateral pledged at the initiation of a transaction) is typically required of both counterparties to an exchange-traded derivative contract, in order to serve as a guarantee for the future exposure. Variation margin (i.e.,

adjustments to collateral to reflect gains or losses associated with the change in the price of the derivative) allows the total amount of collateral exchanged to evolve with changes in the value of the contract; i.e., with changes in the values of the underlying variables on which the contract is based.

The terms of OTC derivatives contracts constitute bilateral agreements between the counterparties, and, as such, OTC derivatives tend to have less standardised features than exchange-traded derivatives. Historically, initial margin has not been a typical feature of OTC derivatives contracts. While the flexibility of OTC derivatives contracts gives rise to more legal risk than for exchange-traded derivatives, the International Securities Dealers Association (ISDA) is widely recognised as playing a leading role among market participants in promoting market standards and in mitigating legal risk.

2.1 Measuring derivatives activities

Two common ways of measuring derivatives exposures are in terms of notional amounts or of market (i.e., carrying) values. Each of these concepts offers a useful measure, depending upon the question of interest. The notional amount of a derivatives contract represents the underlying reference amount of the contract and serves as the basis for calculating the payment flows of the counterparties. The notional amount itself is never transferred from one counterparty to the other, except in case of foreign exchange swaps (see also Section 2.2.1 below).

While notional values can provide an idea of the volume of derivatives activity of an institution, they provide no indication of certain risks associated with derivatives contracts. Market values, which are determined by changes in the reference assets or instruments upon which the derivatives contract is based, do provide an indication of risk, in the sense of indicating the value of the derivative asset or liability of an institution vis-à-vis its counterparty if the contract were closed out today. When the market value of a derivative contract is positive for an institution, the value represents the maximum amount of the claim against the counterparty if it were to default today, and in the absence of any collateral or netting agreements. When the market value of a derivative contract is negative for an institution, the value represents the maximum amount that would be owed to the counterparty, in the absence of collateral or netting agreements, if the institution were to default today.

The market value of a derivatives contract is typically at or close to zero on the day when the transaction is signed but may then change thereafter, as the value of the reference variables change. In contrast, notional amounts of derivatives do not vary over the lifetime of the contract.[1] Hence, notional derivatives amounts are generally disconnected from the dynamics of the market values.

2.2 Types of derivatives

Derivatives may be classified according to the type of risk that they cover or according to the terms of the payment flows between the counterparties. With respect to the risks covered, the most typical types of derivatives contracts undertaken by Belgian banks and insurance companies include interest rate derivatives, foreign exchange derivatives, equity derivatives, and credit derivatives. Each of these types is described below.

2.2.1 Type of risk covered

Interest rate swap (IRS)[2]: An interest rate swap is an agreement between two counterparties to exchange interest rate cash flows at specified intervals. Interest rate swaps usually involve the exchange of a fixed interest rate payment based on a particular notional amount for a floating rate payment on that same

[1] This statement holds for all derivatives except those that have a notional value linked to inflation.

[2] While interest rates swaps are not the only form of interest rate derivative, they are the most common type of interest rate derivatives.

notional amount, or vice versa.[3] If a counterparty holds a "payer swap", it pays a fixed rate and receives a floating rate from the other counterparty. The counterparty that pays a floating rate and receives a fixed rate is said to hold a "receiver swap".

At the time of the signing of an IRS agreement, the present value of the swap's expected fixed rate flows will be equal to the present value of the expected floating rate payments. As interest rates change, so will value of the swap.

IRS are typically quoted in terms of the fixed rate, or alternatively the "swap spread", which is the difference between the fixed rate of the swap and the equivalent local government bond yield for the same maturity. The floating rate index is commonly an interbank offered rate (IBOR) of a specific tenor in the appropriate currency of the IRS.

While the difference in the expected present values of the fixed payments and the floating rate payments are equal at the point at which the swap agreement is signed, over time, as interest rates change, the swap counterparties will encounter unrealised fair value gains or losses on the contract.[4] A fall in interest rates will benefit the "receiver" of the fixed rate, to the detriment of the "payer" of that rate. An increase in interest rates works in the opposite direction.

Foreign exchange (FX) swaps: In a foreign exchange swap one counterparty simultaneously lends one currency to the other counterparty and borrows another currency from the same counterparty, after which this transaction will be reversed at a future date specified in the contract. Counterparties often engage in such contracts to reduce exposure to exchange rate risk or to reduce the cost of borrowing a foreign currency. The amounts of each currency exchanged at the start of the contract are governed by the spot exchange rate. The amounts of currency that will be exchanged on the future date are determined by the forward exchange rate prevailing at the time of signing of the contract. As the currency received by each counterparty effectively serves as collateral for the payment of the second leg of the swap, FX swaps can be considered as a form of collateralised borrowing or lending.

Credit derivatives: These derivatives are designed to transfer the credit risk of an underlying asset from one party to another. The most typical credit derivative is a credit default swap (CDS), whereby one counterparty (the credit "protection buyer") makes an upfront or regular payment to the other counterparty (the credit "protection seller"), in exchange for a payment if a "credit event", which is defined in the contract, occurs with respect to the underlying asset on which the CDS is based. Typical credit events include bankruptcy of an entity, failure to pay, debt restructuring, or changes in a credit spread or rating. A CDS can thus resemble an insurance contract, with the protection buyer paying a premium to the protection seller, who makes a payment to the protection buyer only if a credit event occurs.

If the contract foresees "physical settlement", (i.e., involving delivery of a security) the protection buyer will need to deliver the underlying security – upon occurrence of the credit event - in exchange for the protection seller's payment. CDSs are typically traded pursuant to an ISDA master agreement, which serves to standardise the terms of the contract.

Most CDSs tend to be "unfunded", meaning that the protection seller does not have to make any payment during the life of the contract unless a credit event occurs. This means that whereas the protection buyer may be transferring credit risk from an underlying asset to the protection seller, the protection buyer is now

[3] An IRS can also involve the exchange of one type of floating rate for another, which is called a basis swap. The different sides of the swap will necessarily be different interest indexes, such as 1M LIBOR or Eurobor, 3M LIBOR, 6M LIBOR, SONIA, Eonia etc.

[4] While these gains and losses reflect the net present value of changes in the cash flows over the remaining lifetime of the swap, the fair value gain or loss at any particular point in time remain unrealised unless the swap is unwound.

taking on counterparty credit risk linked to the protection seller's ability to make a payment in the case of a credit event.

The price of a CDS is determined by the credit risk of the underlying asset or entity on which the CDS is based.

Equity derivatives: An equity derivative is a contract whose payment is a function of the value of one or more equity securities. The most common forms of equity derivative are equity options and futures. (See the table below on different forms of derivatives contracts.)

2.2.2 Payment flows

The table below describes the most common forms of derivatives in terms of the payment flows between the counterparties.

Table 1 Derivative contract payment flows

Type	Definition	Cost at inception	Value change of the contract
Swaps	An agreement to exchange cash flows between two parties at specified intervals	Zero or very close to zero cost at inception An initial margin can be contractually foreseen	Changes in price or rates affects the fair value of the swap
Forward	An obligation to exchange a specified amount of a security or commodity at a specified fixed price, with delivery at a specific point in time	Zero. Does not require an initial cash outlay, although in some cases an initial margin can be contractually foreseen	Measured as the difference between the forward rate at the signing of the contract and the spot rate on the date of contract maturity
Future	Similar to a forward but traded on an organised exchange	Initial deposit of funds is required to create a margin account	Measured as the difference between the forward rate at the signing of the contract and the spot rate
Option	Represents a right rather than an obligation to buy or sell	Non-refundable option premium	Based on: intrinsic value, time value, interest rate, and volatility
Swaptions	OTC option on a swap		

2.3 Uses of derivatives

Derivatives may be used by financial institutions for three general purposes: (1) hedging; (2) market making or provision of financial services to clients; or (3) position taking, which may also include taking advantage of arbitrage opportunities. We describe each of these in turn below.

Hedging. Practice by which an institution seeks to reduce one or more risks associated with an existing (or future) asset or liability on the balance sheet. For example, an institution may wish to use a derivative to protect an asset from a decline in value due to adverse market (price) movements. Hedging is typically most effective when the changes in the value of the hedging derivative instrument and the hedged item have exhibited a stable relationship over time and when the movements in the value of the derivative and the hedged item are strongly negatively correlated.

A bank may have any number of motivations for undertaking hedging derivatives transactions, such as hedging of its banking book[5] exposures or hedging exposures acquired through the provision of financial services or market making to clients. Institutions that undertake hedging are often interested in managing their future cash flows. Clearly, declines in asset values arising from market movements can have a negative impact on future cash flows.

Market making or provision of financial services to clients. Financial institutions often serve as counterparties or intermediaries for their customers seeking to engage in derivatives transactions. A bank may, for example, agree to be the counterparty in an OTC derivatives contract with a client. The bank may then seek to eliminate all or a part of the market risk associated with this contract by engaging in an offsetting derivatives contract with another counterparty. If the bank succeeds in undertaking a perfectly, but oppositely, matched derivatives contract (i.e. "back-to-back"), it then eliminates all of the market risk associated with the original transaction with the customer.

Position taking. Because derivatives contracts allow counterparties to obtain cash flows without having to hold the underlying assets, they may be undertaken with the objective to generate profit-enhancing cash flows. This practice represents one form of proprietary trading. When an institution uses derivatives for the purpose of position taking, it engages in a derivatives contract without attempting to offset the exposure with another derivative or item on the balance sheet. As was clearly illustrated during the previous financial crisis, the potential gains and losses from this type of activity can be quite large relative to the institution's balance sheet or capital.

Derivatives can also be used for arbitrage, where the goal is to make a profit by exploiting price differentials across different markets. Depending upon the intent of the transactions, the use of derivatives for arbitrage may also fall in the category of proprietary trading.

Whereas in the past some Belgian banks made use of derivatives for the purpose of proprietary trading, the structural reforms regulation in Belgium, which has been in place since 2014, now forbids credit institutions from engaging in proprietary trading. For Belgian insurance firms, the prudent person principle embodied in the European Solvency II regulation forbids insurance companies from engaging in derivatives transactions for purposes other than reduction of risks or efficient portfolio management.

2.4 Risks associated with derivatives

It is worth stressing that once a counterparty seeking to hedge a certain risk enters into a derivative contract, this does not mean that the counterparty faces no risks whatsoever. Put differently, derivatives are not risk-free hedging instruments. Derivatives expose counterparties to a new, but different, set of risks. It is therefore fair to say that derivatives typically transform risks rather than eliminating them all together. Below we provide a brief list of risks that counterparties face when entering into a derivative contract:

Basis risk: The risk that the price of a financial instrument used in a hedging strategy may not move in a way that perfectly matches the price of the hedged item, thereby reducing the effectiveness of the hedging strategy. To provide an example, suppose that mortgage loan rates are set as a function of the OLO rates. The rate on IRS, however, is typically an IBOR or the EONIA (or a similar) rate. Because the correlation between these two interest rates is not perfect, the price of the hedged item and that of the hedging instrument will deviate, potentially significantly so, with every interest rate movement. This in turn means that the hedge will not be perfect.

[5] Banking regulation distinguishes between the "banking" book and the "trading" book of banks. The latter contains what are normally referred to as trading activities. According to the Basel framework and the European Capital requirements regulation (CRR), which applies that framework to Europe, the trading book should include "all positions in financial instruments and commodities held by an institution either with trading intent, or in order to hedge positions held with trading intent".

Counterparty risk: Represents the cost of replacing a derivative if the counterparty defaults. The credit risk of the counterparty is relevant if the default occurs when the swap has a positive market value to the nondefaulting counterparty; otherwise, the default has no financial impact on the nondefaulting counterparty. This risk can be mitigated via the exchange of an initial collateral (margin) and subsequent margin calls. Protection is further enhanced if the margins are held in a bankruptcy remote manner with a third-party custodian or on a segregated account.

Valuation risk and model risk: Occurs if the actual risk level of the derivative portfolio is underestimated or if the collateralisation level is insufficient. Such risk often occurs if insufficient market data are available or if the institution applies inaccurate assumptions or parameters in its valuation or margining model, which can lead to an inaccurate estimation of the current and potential future exposures.

Liquidity risk: Risk of not being able to quickly unwind a derivative prior to maturity without significantly affecting its price. Because OTC derivatives tend to be 'tailor-made' to suit the counterparties' needs, liquidity risk tends to be higher in OTC than in ETD derivatives. Derivatives can be classified in three risk levels: Level 1 are standardised liquid derivatives (typically those traded in exchanges); Level 2 are derivatives that can be unwound only at some (significant) cost (most OTC derivatives belong to this category); Level 3 are the most illiquid type of derivatives that are nearly impossible to unwind (e.g. complex derivatives) without bilateral negotiations which might lead to high costs of unwinding.

Another important source of liquidity risk derives from the changes in the value of the derivative or of the pledged collateral. If the collateral received/pledged is a financial instrument rather than cash, its value may change over the life of the derivative, thereby requiring the counterparties to pledge or receive additional collateral in order to maintain the degree of collateralization constant. This risk also embeds the risk that the counterparty on the asset side to a derivative contract might make sudden margin calls on very short notice. This can severely affect the liquidity of the counterparty on the liability side.

Market risk: Risk related to the changes in price of the underlying instrument upon which the derivative is based. In the case of interest rate derivatives, interest rate risk is a form of market risk, as a change in interest rates directly affects the value of interest rate derivative.

Operational - Legal risks: The validity and enforceability of netting or collateral contracts could be rejected by a local court, as a result of the interpretation of national legislation, which often corresponds to a jurisdiction different from that of the derivative counterparty. In addition, the collateral of non-centrally cleared derivatives might be placed as a deposit with one of the counterparties, typically the largest one, to the derivative contract. This type of arrangement carries a greater operational risk in the case of default than is the case for cleared contracts in which the collateral is deposited with a separate entity (e.g. in a central securities depository). Finally, the inclusion of swap termination events or break clauses in the derivatives contract may lead to losses, if the institution that wants to keep the derivative has to novate it at own cost, without compensation from the counterparty.

SECTION 3 THE REGULATORY LANDSCAPE

In 2009, in response to the important role that derivatives had played in the financial crisis, the G20 leaders announced their intention to fundamentally reform the regulatory framework for OTC derivatives markets. As described by the Financial Stability Board (FSB)[6], the reforms were ultimately aimed at five objectives: (1) standardised derivatives should be centrally cleared; (2) standardised derivatives should be traded on exchanges or electronic platforms, where appropriate; (3) higher bank capital requirements should be imposed on non-centrally cleared derivatives; (4) minimum margin requirements should be imposed on non-centrally cleared derivatives; (5) OTC derivatives should be reported to trade repositories. These

[6] See FSB “Review of OTC Derivatives market reforms”, June 2017.

regulatory reforms have now been embedded in the Basel 3 framework (whose provisions have been translated into European regulation via the CRR) and, for European institutions, in the European Market and Infrastructure Regulation (EMIR).[7]

With respect to the uses of derivatives by banks and insurance companies, the Belgian structural reform measures implemented via Articles 117-127 of the Banking Law effectively restrict the uses of derivatives by Belgian banks, as banks are now prohibited from engaging in proprietary trading activities.[8] The European Solvency II regulation for insurance firms also imposes similar restrictions on the derivatives activities of European insurance companies.

In this section we first discuss the post-crisis changes to the Basel framework of banking regulation that affect the minimum capital requirements relating to derivatives. We then turn to the Solvency II Directive and the EMIR regulation. Finally, we discuss the European Bank Recovery and Resolution Directive (BRRD).

3.1 The Basel 3 framework and increases in capital requirements relating to derivatives

A number of reforms of the Basel 3 framework were aimed directly at increasing the capital requirements for derivatives. One such measure was an increase in the capital requirements for counterparty credit risk. In addition, for non-centrally cleared derivatives transactions banks now face a capital charge for a potential deterioration of the credit worthiness of a counterparty; i.e., the credit valuation adjustment (CVA). The CVA was introduced into the Basel framework following the observation that during the crisis, this source of deterioration in market value was a more important cause of losses for banks than actual default by counterparties. Finally, the capital requirements for exposures to CCPs are also strengthened. In the past, exposures to CCPs received a 0% risk weight. The Basel 3 framework now requires exposures to non-qualifying CCPs be subject to counterparty credit risk treatment similar to that of other counterparties; however, in order to incentivise central clearing through authorised CCPs, Basel 3 allows a more favourable risk weight be applied for exposures to qualifying CCPs, ranging from 2% to 4%.

In addition to these measures, the leverage ratio introduced in Basel 3 also results indirectly in a potential increase in the capital requirements associated with derivatives.[9] The leverage ratio is a non-risk weighted capital requirement that requires banks to hold Tier-1 capital equal to at least 3% of the institution's total exposures, where total exposures include both on and off-balance sheet assets, including derivatives.

Liquidity requirements were also introduced into Basel 3, and the amounts of derivatives held by banks also influence these requirements. The box below describes the Basel 3 liquidity requirements and the role of derivatives in determining the minimum amount of liquid assets or stable funding that an institution must hold.

Box 1 Liquidity requirements and derivatives

Liquidity regulation comprises two key metrics: the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). The objective of the LCR is to ensure that a bank has an adequate stock of unencumbered high-quality liquid assets (HQLA) that can be converted into cash easily and immediately in private markets to meet its liquidity needs for a 30 calendar day liquidity stress scenario.[*] The objective of the NSFR is to promote a more stable funding profile (on a one-year horizon) by requiring banks to maintain stable funding in relation to the composition and characteristics of their assets, liabilities and

[7] 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.

[8] For a description of the Belgian structural reform measures and a comparison of similar measures in other countries, see *NBB Financial Stability Review* (2014), "Structural Banking Reforms", p. 99-111.

[9] Clearly, this will only be the case if the leverage ratio requirement is more binding than the risk-weighted capital requirement.

off-balance sheet activities.** Thus, while the LCR has a short-term character, the NSFR focuses on the long term.

Because of their different objectives, the LCR and the NSFR are designed in quite different ways: the LCR is a metric that focuses only on cash flows in the relevant time horizon, whereas the NSFR is a balance sheet metric. Nevertheless, both metrics focus on broadly the same aspects of derivatives, namely: (1) the current replacement costs (market value) of a derivative (either a derivative asset or a derivative liability) and the associated amount of collateral that is posted or received to "pre-settle" the derivative position; and (2) a notion of "potential future exposure" to account for liquidity flows due to market stress and changes in the market value of derivatives that may occur during the relevant time horizons. More specific aspects, such as the type of derivatives or the underlying instrument are not considered in liquidity regulation.

Liquidity Coverage Ratio (LCR)
The general, combined idiosyncratic and market-wide stress that underlies the LCR stress scenario provides the estimation of the stressed outflows that a bank will incur in such a situation, in addition to any contractual cash flows that fall due over a 30-day horizon. To that end, the LCR regulation encompasses both contractual and "stressed" cash flows related to the derivative activities of a bank:

- Contractual cash flows are all in- and outflows from derivative assets and liabilities that mature over the 30-day horizon. The derivative assets and liabilities are calculated at counterparty-level (master netting set level) and are considered net of collateral received and posted, as the collateral exchanged at maturity offsets the cash flow on the maturing asset or liability.
- Stressed cash flows comprise several elements: (1) cash flows due to market value fluctuations, which are approximated by a historical look-back approach that assumes that the largest absolute net 30-day collateral flows realised during the preceding 24 months will be called by the counterparties; (2) estimated increased liquidity needs due to additional collateral to be posted as a result of a 3-notch downgrade of the bank; (3) assumption that the less liquid HQLA (i.e., Level 2 HQLA) posted as collateral will lose 20% in value.

Additional regulatory requirements include: increased liquidity needs related to excess non-segregated collateral held by the bank that could contractually be called at any time by the counterparty; contractually required collateral on transactions for which the counterparty has not yet demanded the collateral to be posted; and collateral calls due to contracts that allow collateral substitution from HQLA to non-HQLA assets.

Net stable funding ration (NSFR)
In order to achieve a "stable funding profile", the NSFR imposes requirements on derivative positions that can be classified into requirements addressing current exposure and requirements addressing potential future exposure. Another element captures the funding requirement of collateral posted as initial margin or default contribution to a CCP.

With respect to current exposure, banks must calculate a net derivative position at the institution level, aggregating derivative assets and liabilities, which themselves are calculated at the master netting set level and net of collateral received or posted. If the net derivative position is an asset, the bank must assign a 100% required stable funding factor (RSF); i.e. the asset must be fully funded with long-term funding. If the net derivative position is a liability, a bank must assign a 0% available stable funding factor (ASF); i.e. the liabilities are deemed not to confer any stable funding. The amount of uncollateralised derivative assets that is netted against derivative liabilities at the institution level is implicitly assumed to be funded by these liabilities.

With respect to potential future exposure, the Basel Committee has recently announced a 5% RSF on gross derivative liabilities as a proxy for potential funding requirements.

* HQLA: eligible liquid assets meeting operational requirements, subject to haircut depending on their quality; Net Cash Outflows: expected cash outflows minus expected cash inflows (or 75% outflows) in the specified stress scenario for the subsequent 30 calendar days.

** The NSFR as a ratio of available stable funding (ASF) to required stable funding (RSF). ASF is a weighted portion of capital and liabilities expected to be stable over a one year horizon (with a 6-month maturity bucket), whereas the weights depend on the stability (either contractually or behaviourally defined) of the funding sources of an institution. RSF is a weighted portion of assets and off-balance sheet exposures that are required to be stably funded on a one-year horizon (with a 6-month maturity bucket), whereas the weights approximate the amount that would have to be funded, depending of the residual maturity of the assets but also on other characteristics, including the liquidity and franchise concerns.

The Basel 3 framework has also incorporated increases to market risk capital requirements for instruments held in the trading books of banks, including derivatives. For banks using the standardised approach for calculating their market risk capital requirements, this approach has been modified in order to make it more sensitive to risks of correlation and volatility within banks' derivatives portfolios. In addition, whereas previously banks were required to assume a stress period of ten days of illiquidity for all traded instruments, all banks must now estimate losses over varying liquidity horizons, many of which exceed the previous ten-day horizon, and which depend upon the nature of the risk affecting the instrument. These varying liquidity horizons also apply to derivatives.

3.2 The Solvency II framework and derivatives for insurance firms

The regulatory framework for European insurance firms is laid out in the Solvency II Directive. This framework requires that the balance sheet is now fully marked to market, which gives insurance companies greater incentives to use derivatives to hedge their balance sheets in order to stabilise their solvency positions. The capital requirements for market risk will decrease as a function of risk-reducing strategies, to the extent that the strategy decreases the estimated loss in basic own funds following a shock. The insurer's capital requirements must nevertheless also take into account the default risk of the counterparties of derivatives transactions, which is determined as a function of the probability of default and the loss-given-default of the counterparty.

According to Solvency II, insurance companies must undertake investments in line with a principle labelled the *prudent person principle*. In this context, insurance firms may use derivatives, but only for the purposes of reduction of risks and efficient portfolio management. Where derivatives are used for the purpose of the reduction of risks, it is up to the firm to demonstrate the hedge effectiveness and, in particular, whether the use of derivatives achieves the intended offsetting effects and does not give rise to basis risk or the creation of other risks.

Efficient portfolio management describes the use of derivatives for purposes which do not result in a substantial change in the undertaking's risk profile or in any material increase of risks, for example by considerably increasing the leverage of the portfolio. Also here, it is up to the firm to demonstrate the efficiency of the derivatives.

3.3 European Market Infrastructure Regulation and Central Counterparties

3.3.1 EMIR requirements for counterparties

In line with the commitment made by the countries of the G20 in Pittsburgh in September of 2009, the European Commission adopted the European Market Infrastructure Regulation, which took effect in August, 2012. This new regulation was introduced with the objectives of reducing systemic risk, increasing transparency in the OTC market, and preserving financial stability. EMIR contains three main pillars:

1. **Clearing**: Counterparties to a standard OTC derivative contract must clear the transaction through a recognised central counterparty (CCP).

2. **Reporting**: Counterparties that enter into derivatives contracts must report the details of every transaction to a trade repository of their choice. The reporting obligation includes not only information on the transactions themselves, such as the identity of the counterparties, the notional amount, the price of the transaction, the maturity, etc., but also information on clearing, and on on-going valuation and collateralisation.
3. **Risk mitigation**: For non-CCP-cleared derivatives contracts, counterparties must apply specific risk mitigation techniques, which include portfolio compression, portfolio reconciliation, collateral requirements, and capital adequacy requirements.

In general, the requirements defined in EMIR apply to all European counterparties who enter into a derivative contract, regardless of whether they are financial institutions (banks, insurance firms, asset management companies, etc.) or non-financial institutions (corporates, payment institutions, etc.).[10] The clearing obligation currently applies only to standardised OTC interest rate derivatives in G4 currencies and in a few smaller currencies, as well as to standardised credit default swaps.[11] In contrast, the reporting obligation affects all classes of derivatives; i.e. interest rate, foreign exchange, equity, credit and commodity. Moreover, the reporting obligation applies to both extra-group and intragroup derivatives transactions in all currencies and in all venues (ETD and OTC).

In Belgium, the NBB and the FSMA are responsible for verifying that the financial and the non-financial institutions under their respective supervision fulfil the three requirements mentioned above. In the case of the NBB, this mandate is defined in Articles 36/25bis and 36/25ter of the Organic Law of the National Bank of Belgium.[12]

Intragroup transactions may be exempted from the clearing obligation under the conditions set forth in Articles 4.2. and 11.6-11.10 of EMIR. With respect to these articles, and in accordance with its mandate, the NBB has issued the Circular NBB_2016_30, in which it defines the applicable procedure for its supervised entities to apply for a waiver of the clearing obligation for their intragroup transactions. At the time of this report, the NBB has granted a clearing waiver to nine institutions (five in 2016 and four in 2017).

EMIR also allows certain intragroup transactions to be exempted from the collateralisation obligation. The NBB has issued Circular NBB_2017_16 in order to define the conditions and documentation required for Belgian institutions to apply for the intragroup collateral exemption.[13] As of this report, two institutions have received a collateralisation waiver, and two additional requests are in the pipeline.

Although EMIR entered into force in 2012, certain provisions were only fully applied at a later date, following the entry into force of a number of Commission Delegated Regulations which enact the draft Regulatory Technical Standard and Implementing Technical Standard developed by the European Securities and Markets Authority (ESMA).

Despite the relative infancy of EMIR, the requirements defined in the regulation have had a significant impact, not only on the organisation of the derivatives market but also on the counterparties themselves. Large financial institutions have devoted vast amounts of resources to fulfilling the new set of obligations; e.g. in ICT infrastructure, compliance, middle and back-offices, and legal and collateral management.

On the other hand, non-financial and smaller financial institutions have not had to devote as many resources to fulfilling the EMIR requirements, as these institutions typically do not have direct access to clearing

[10] Non-financial institutions with less than EUR 3 bn in notional interest rate swaps or credit default swaps are exempted from clearing and collateral obligations.

[11] See https://www.esma.europa.eu/regulation/post-trading/otc-derivatives-and-clearing-obligation for an overview.

[12] See Art 36/25bis and ter of the Wet van 22 Februari 1998 tot Vaststelling van het Organiek Statuut van de Nationale Bank van België / Loi du 22 Février 1998 Fixant le Statut Organique de la Banque Nationale de Belgique.

[13] The criteria for the collateralisation exemption are more stringent than for the clearing exemption.

houses and need to obtain access to them through larger banks. Furthermore, because smaller counterparties typically have less expertise and fewer resources to develop the necessary infrastructure for the reporting of their transactions, EMIR allows them to delegate the transaction reporting to their intermediaries.

Nevertheless, in order to alleviate the burdens imposed by EMIR on some of the smaller counterparties, the European Commission published in 2017 some proposed amendments to the current regulation. The key proposed changes by are presented in Box 2.

Box 2 EMIR REFIT proposal.

In May 2017 the European Commission published a proposal to amend the EMIR text in order to eliminate disproportionate costs and burdens to small companies – especially non-financial counterparties (NFCs) – and to simplify some requirements without compromising the objectives of the legislation. The reform proposal was included in the 2016 Commission's Regulatory Fitness and Performance programme (REFIT).

The main changes proposed by the European Commission can be summarised as follows:

Reporting requirement.
The proposal streamlines the reporting requirement for all counterparties. This will considerably reduce the administrative burden, while ensuring that the quality of data needed for monitoring the derivatives market and identifying financial stability risks is not sacrificed. In particular, exchange traded derivative transactions will have to be reported by the CCPs on behalf of both counterparties. Transactions concluded between companies belonging to the same group (i.e. intragroup transactions) will no longer be subject to the reporting obligation where both counterparties are non-financial counterparties. To further reduce the burden for small non-financial counterparties, transactions between a financial counterparty and a small non-financial counterparty will be reported by the financial counterparty on behalf of both counterparties. To conclude, the reporting of historic transactions will no longer be required.

Non-financial counterparties.
Non-financial counterparties typically use OTC derivatives to hedge certain risks directly linked to their commercial or treasury financing activities. While under the current rules NFCs must clear all derivatives, if they exceed the clearing threshold for one class of derivatives, the Commission is now proposing that NFCs clear only the asset classes for which they have breached the clearing threshold, thereby reducing the burden for NFCs.

Financial counterparties.
Small financial counterparties are numerous but account only for very small volumes of OTC derivatives and of systemic risk. They currently have significant difficulties to find clearing service providers. The proposal introduces a clearing threshold for small financial counterparties, such as small banks or funds. This clearing threshold is based on the volume of OTC derivatives transactions. While the reporting and collateralisation obligation would still apply to all financial counterparties, only counterparties exceeding the specific clearing thresholds would be required to clear centrally in the new regime.*

*The EMIR Refit proposal would apply identical clearing thresholds on financial counterparties as the existing clearing thresholds to non-financial counterparties (EUR 1 billion in gross notional for credit and equity derivatives, and EUR 3 billion in gross notional for interest rate derivatives, FX derivatives, commodities and other derivatives).

3.3.2 EMIR requirements for CCPs

In addition to the three EMIR pillars of clearing, reporting, and risk mitigation described above and applying to all counterparties in the EU who enter into a derivative contract, EMIR also introduced a full set of

organisational, business conduct and prudential requirements for clearing service providers, i.e. central counterparties.

These requirements were necessary, as central counterparties (CCPs) have become essential to the global financial landscape in recent years. CCPs are financial market infrastructures (FMIs) that interpose themselves between two parties to a derivative transaction, thereby becoming a buyer to every seller and a seller to every buyer. As long as no clearing member (client) defaults, a CCP has always a "matched book"; that is, its net position, which consists of the sum of the assets and liabilities of the CCP against all its clearing members, is zero. Because CCPs clear the transactions of many counterparties simultaneously, they are able to net these transactions on a multilateral basis, which has the obvious advantage of producing smaller net exposures than in the case of bilateral netting. As a result, CCPs simplify the previously complex and opaque web of derivatives exposures. Contrary to other financial service providers, such as banks and prime brokers, CCPs are single-purpose entities; i.e., they only provide clearing services to their clients and nothing else. In addition, CCPs standardise risks, as they impose a common collateralisation framework. As a result, CCPs are widely considered to reduce counterparty risk.

CCPs' activities can nevertheless pose a number of risks to financial stability. First, they stand at the very centre of the financial system, interconnecting their clearing members on a global scale. That is, CCPs concentrate the risk of millions of transactions. As a result, CCPs are by definition systemically important. Second, the volume of transactions cleared by CCPs has increased dramatically in recent years and is expected to increase even further in the future.[14] This increase is not only explained by the introduction of central clearing obligations across different asset classes in several jurisdictions but also by an increase of voluntary clearing among market participants.[15] A third potential risk arises from the high concentration within the CCP industry of a very small number of CCPs clearing most derivatives transactions in the EU. This implies that the failure of a single CCP could have a direct and immediate severe impact on financial markets.

Finally, CCPs apply margins and haircuts pro-cyclically. That is, when volatility is low, CCPs impose lower collateral requirements. As a result, clearing members and their clients can collateralise a higher level of exposures with a given amount of collateral, thereby increasing leverage. When volatility increases, CCPs increase their collateral requirements, which could contribute to the creation or the aggravation of a systemic liquidity shortfall.

Because CCPs are key to the well-functioning of the financial system, their ability to manage ensuing risks is crucial. Consequently, EMIR sets out stringent CCP risk management requirements and requires the recognition and ongoing supervision of CCPs. Contrary to banks, insurers and other financial entities, CCPs operate mainly following the "defaulter-pays" model. That is, the CCP's counterparty risk is covered via collateralisation and, only to a much lesser extent, via capital reserves.

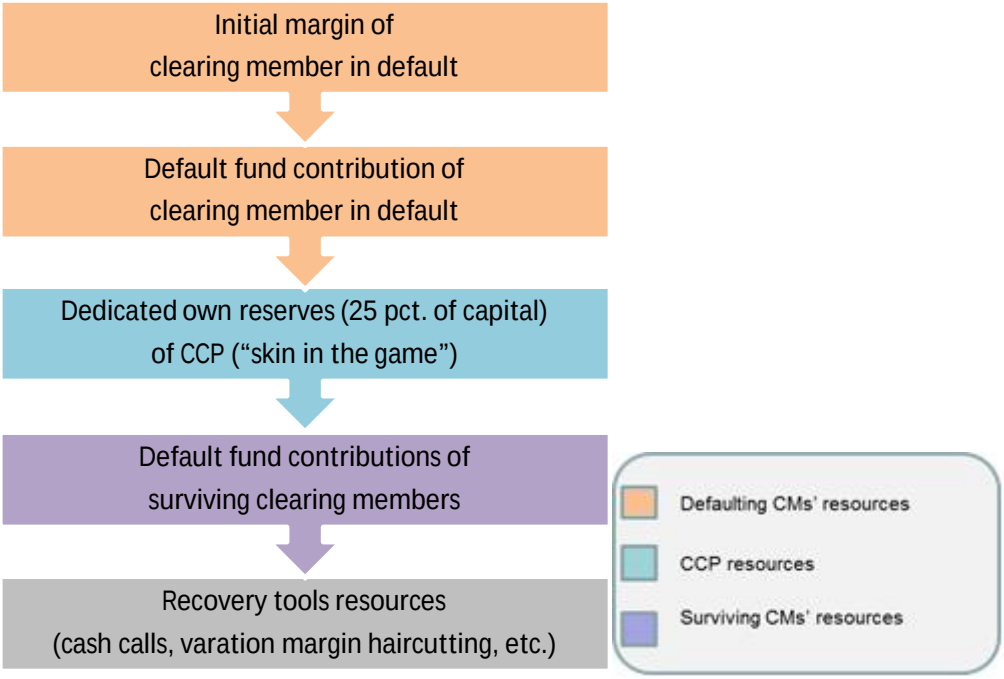
Whenever a clearing member defaults, the matched book of a CCP is lost. To cope with such an event the CCP requires ex-ante the collateralisation of its exposures vis-à-vis its clearing members. These initial margins are due by each clearing member as coverage for the trades it clears. In the event that the collateral pledged by the defaulting member is not enough to re-establish the matched-book, the CCP will make recourse to the default fund contributions of the defaulting member. Should these contributions still not be sufficient, the CCP will have to contribute with its own capital to rebalance its books. This is the CCP's so-called "skin in the game".

[14] While in 2009 about 36% of all OTC interest rate derivatives were centrally cleared, in 2015 this figure rose to approximately 60%.

[15] It should be noted that the Basel 3 framework incentivises central clearing by imposing lower capital requirements for centrally-cleared than for non-centrally-cleared derivatives.

A final loss coverage mechanism consists of the remaining resources available in the CCP default fund. All clearing members must make ex-ante contributions to the default fund to cover the obligations that another defaulting clearing member has vis-à-vis the CCP. This is the "survivor-pays" element along the default waterfall. Via this fund, the clearing members mutualise losses. Finally, the CCP has clear and pre-established clearing member default-handling procedures.

Figure 3.1 - CCP default waterfall



Prefunded resources are indicated in colour. Non-prefunded resources are in grey.

Figure 3.1 represents the resources available to the CCP to cover its obligations if a clearing member defaults, as required by EMIR. This is called the CCP default waterfall, because the layers of coverage are used successively as the preceding cover is exhausted. All waterfall resources are prefunded, as opposed to the resources available to the CCP for recovery purposes (see below).

The increasing systemic importance of CCPs for the EU, as well as the foreseen departure of the UK from the EU, has highlighted the need to enhance the existing supervisory arrangements. As a result, in June 2017 the European Commission made a proposal to amend the procedures and authorities involved in the authorisation of CCPs and the requirements for the recognition of third-country CCPs. The main elements of the Commission's proposal are presented in Box 3.

Box 3 Enhanced CCP supervision proposal

The foreseen withdrawal of the United Kingdom from the EU is expected to have a significant impact on the regulation and supervision of clearing in Europe. Currently, approximately 75% of euro-denominated interest rate derivatives are cleared in the UK. These transactions directly impact the responsibilities, including in the area of monetary policy, of the relevant EU and Member State institutions and authorities. Moreover, as indicated in the main text, CCPs play an increasing role for the EU financial system. As a

result, the European Commission has recognised the need for an enhanced supervisory arrangement for CCPs located both inside and outside the EU.

This box presents the main elements of the proposal by the European Commission. With regard to the supervision of CCPs located in the EU, the Commission has proposed to enhance the current supervisory regime by creating a CCP Executive Session. This Executive Sessions would be established in the ESMA to coordinate the supervision of CCPs located in the EU. While the supervision would still remain in the hands of national authorities, ESMA would have a final say in a large number of areas of common interest, including the validation of risk models and the stress testing framework. In addition, for a limited number of issues, including liquidity risk controls and collateral requirements, the Central Bank of Issuance (mainly the ECB) will be able to express a binding opinion.

Regarding the third-country CCPs supervision regime, the Commission has proposed to establish a supervision regime based on thresholds that depend on the systemic relevance of the different CCPs. Under this proposed supervision regime, third country CCPs deemed to be systemically important will be required to: i) comply with the EMIR obligations, including prudential requirements such as capital requirements, conduct of business rules, and margin requirements; ii) comply with additional requirements set by the relevant EU central banks; and iii) agree to provide ESMA with all relevant information and to enable on-site inspections. This will set the EU framework on a comparable level to the one applied by the US in terms of regulating third-country CCPs. Finally, the proposed third-country supervision regime allows for the possibility to request the relocation of a CCP that is considered to be "substantially systemically important"; i.e. if it is of such systemic importance that the standard requirements are deemed insufficient to mitigate the potential risks.

3.4 Other challenges for central clearing

In June 2017 the FSB cited a number of remaining challenges for CCPs, referring on the one hand to elements of CCP resilience that could be enhanced, and on the other hand to the need to better understand the macro-level interdependencies via supervisory stress testing.[16] The FSB also made reference to the need to fully implement CCP recovery and resolution plans.

In addition, the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) published a Draft Framework for the supervisory stress testing of CCPs in June 2017.[17] The draft framework states that rather than analysing the impact of a stress scenario on a particular CCP, the purpose of the supervisory stress-testing is to analyse the broad, macro-level impact of a common stress event affecting a set of CCPs jointly. The sources of stress can be credit or liquidity shortages, or both. Currently in the EU, ESMA (with the assistance of the ESRB and the ECB) performs a stress test on all EU's CCPs on a yearly basis. In February 2017 ESMA announced the details of its 2017 CCP stress test, covering credit and liquidity shocks.[18]

CPMI and IOSCO have also issued further guidance on a number of CCP risk management requirements aimed at enhancing the resilience of CCPs.[19] Among these, the guidance on CCP liquidity stress testing

[16] FSB report Review of OTC derivatives market reform: Effectiveness and broader effects of the reforms, available at http://www.fsb.org/2017/06/review-of-otc-derivatives-market-reform-effectiveness-and-broader-effects-of-the-reforms/.

[17] CPMI-IOSCO Framework for supervisory stress testing of central counterparties (CCPs) - consultative report, June 2017, available at http://www.bis.org/cpmi/publ/d161.htm

[18] See ESMA announces details of its 2017 CCP stress test, available at https://www.esma.europa.eu/press-news/esma-news/esma-announces-details-2017-ccp-stress-test.

[19] Resilience of central counterparties (CCPs): Further guidance on the PFMI - Final report, July 2017, available at http://www.bis.org/cpmi/publ/d163.htm.

practices stresses the importance of taking into account within the framework intra-day exposures (which can be larger than end-of-day exposures) and the additional risks created by a clearing member who acts as a liquidity and/or other service provider, in particular when it acts as a settlement bank or custodian. A further element refers to the CCP margin methodology, which reinforces the requirements for the CCP to avoid applying margins pro-cyclically, together with assessing the impact on market participants when collecting intra-day variation margins.

Finally**,** in November 2016 the European Commission published a proposal for a Regulation on CCP recovery and resolution**.** The main elements of the proposal are presented in Box 4.

Box 4 Proposed regulation on CCP recovery and resolution.

The aim of the Commission's proposal on CCP recovery and resolution is to create a legislative framework that should ensure the continuity of a CCP's critical functions while avoiding the use of tax payers' money to restructure and resolve a CCP. The legislative proposal is based on international work, in particular on the CPMI and IOSCO guidance on the recovery of FMIs* and the FSB key attributes of effective resolution regimes for financial institutions including FMIs.** The main elements of the EU legislative proposal on recovery and resolution of CCPs is provided below:

1. **CCP recovery planning**. CCPs should prepare for potential threats to their financial health via the elaboration of recovery plans. A CCP recovery plan should aim at preserving the continuity of the CCP's critical functions via a set of recovery tools to be implemented in case of extreme stress situations such as the default of one or more clearing members, or other business losses like investment losses and operational problems. The recovery plan should include a list of triggers that will activate the implementation of the recovery tools and a set of stress scenarios that cannot be managed by relying only on the prefunded resources of the CCP default waterfall. CCPs are responsible for drafting the recovery plans themselves. In doing so, they should choose a set of recovery tools that is comprehensive enough and effective to remedy any liquidity shortfall, as well as to allocate any uncovered losses, while ensuring that stakeholders affected by the plan do not have unlimited exposures towards the CCP.

2. **CCP resolution planning**. Should a failing CCP be not able to restore its solvency, the designated resolution authority will have the possibility intervene and resolve the CCP via the implementation of resolution tools. The EU proposal on recovery and resolution of CCPs provides the resolution authority with the power to write down instruments of ownership and debt instruments and, where appropriate, to convert debt instruments into equity. In addition, under the Commission's proposal, the resolution authority will be granted the powers to sell parts of the CCP business to a third party, which can be a bridge CCP and apply the following position and loss allocation tools:
   i. **Contract termination**: permanently closing some or all of the contracts of a clearing member in default, a clearing service or the CCP in resolution at a certain price (e.g. the price for calculating the last variation margin) before the actual settlement date. While this tool helps in stemming further losses and re-establishing a matched book at the CCP, it also alters the hedging arrangements of clearing members.
   ii. **Variation margin haircutting (VMHC)**: reduction of the variation margin pay-outs to clearing members with in-the-money positions, while continuing to receive in full the payments made by clearing members with out-of-the-money positions. VMHC allocates uncovered losses in a manner similar to insolvency. Creditors are thus not made worse of in resolution than in insolvency.

iii. **Resolution cash call**: Usually CCPs are allowed to ask clearing members for cash contributions if contractually agreed. The resolution cash call would come in addition to the cash call(s) applied by the CCP itself and will be reserved for the exclusive use of the resolution authority.

It is important to note that the European proposal on recovery and resolution of CCPs does not exclude the haircutting of initial margins in resolution. However, while constituting an additional pool of prefunded financial assets in resolution, initial margin haircutting would expose clearing members to contagion risks, as their initial margin contributions would be written down to cover the exposure of another clearing member in default.

* Committee on Payments and Market Infrastructures – International Organisation of Securities Commissions (2014), "Recovery of financial market infrastructures" (updated in July 2017).
** FSB, 2014, "Key attributes of effective resolution regimes for financial institutions" (updated in July 2017).

3.5 Derivatives and bank resolution

The EU Bank Recovery and Resolution Directive (BRRD), which sets out the regulatory framework for resolution of failed or likely-to-fail banks, requires derivatives contracts to be subject to bail-in during bank resolution procedures. This requirement raises a number of concerns, given the complexity and the specificities of derivatives contracts. First, in theory, resolution authorities are required to bail in unsecured derivatives instruments if a bail-in is being applied on other instruments with the same ranking. However, for reasons discussed below, the bail-in of derivatives is likely to create only limited loss absorption. In addition, bail-in of derivatives is technically difficult to accomplish (due to valuation issues and legal issues), and it may increase the risk of litigation. Finally, the bail-in of derivatives may trigger contagion effects. Yet, in spite of these difficulties, the possibility of excluding derivatives from the scope of bail-in is quite limited.

A bail-in of derivatives is likely to generate limited loss absorption. The BRRD requires that when undertaking a bail-in of derivatives, the resolution authority must respect all netting and collateral arrangements applying to derivatives contracts. This means that the bail-in rules will apply only to the portion of the value of derivatives liabilities that exceeds the value of the pledged collateral. Given that EMIR imposes the obligation on counterparties to exchange collateral even for derivatives contracts that are non-centrally cleared, the amount of derivatives liabilities that will ultimately be subject to bail-in is likely to be small for many banks, at least with respect to derivatives contracts with counterparties that are external to the group. In this context, if a collateral exemption has been granted for intragroup derivatives transactions, such transactions will likely become eligible for bail-in in a resolution procedure. In addition to the fact that such a bail-in would result in a transfer of losses from the entity facing the bail-in to other entities within the group, this procedure would also appear to be inconsistent with the philosophy of "single point-of-entry" resolution strategies, whereby the losses are supposed to be absorbed by the external creditors of the parent entity (or the entity serving as the single point of entry), and not reshuffled within the group.

Valuation and determination of closed-out net positions. When a bank is failing or likely to fail, the resolution authority or an independent valuation expert must determine the value of both the secured and the unsecured portion of the bank's derivatives portfolio. In practice this is likely to be a complex process, which could require significantly more time than the resolution authority has to conclude the resolution procedure. The European Commission has specified methodologies and principles to be applied in the valuation of derivatives; however, the methodologies are highly technical and difficult to apply in practice.

According to the BRRD, resolution authorities should exercise write-down and conversion powers in relation to a liability arising from a derivative only following a close-out of the derivative contract. Resolution authorities are thus empowered to terminate and close out any derivative contract upon a bank's entry into

a resolution procedure. In addition, when derivatives transactions are subject to a netting agreement, the amount of the liability arising from those transactions will be determined on a net basis, in accordance with the terms of the agreement.

The examples below illustrate some of the specific issues that may arise with respect to the valuation of derivatives liabilities and that contribute to the complexity of the process and the risk of litigation.

- Derivatives contracts may employ different methodologies for determining the amount due to the counterparties upon close-out, with some of the methodologies leaving the determination of the close-out amount, the close-out date, or both, entirely to the non-defaulting counterparty.

- Derivatives contracts subject to netting agreements give rise to a single close-out amount in the event of an early termination of the contract. The value of such contracts has to be determined in accordance with the terms of the agreement, which may be specific to each contract.

- The valuation should respect the netting sets defined in the netting arrangements; hence, it is not possible to include certain contracts and to exempt others.

- The close-out date may not coincide with the actual date of valuation, e.g. when no market price is available for the underlying asset on the close-out date. In such a case the resolution authority can decide to carry out a provisional valuation; however, this can create additional uncertainty and increase the risk of error (and thus potential litigation).

- It is not possible to define a single, unique market practice for entering into replacement trades. Counterparties must in general provide resolution authorities with evidence of commercially reasonable replacement trades within a certain deadline. This leaves room for interpretation and associated legal challenges.

For institutions that are members of a CCP, the close-out of derivative contracts prior to bail-in would lead to the qualification that the clearing member has defaulted with regard to the CCP in relation to particular netting sets. In such a case the CCP default procedures offer a reliable basis for value determination. However, conducting CCP default procedures may take several days, and these procedures are not adapted for a resolution procedure over a weekend. It is key, therefore, that the resolution authority, the CCP and its competent authority agree on a deadline by which the early termination amount has to be determined.

Possibility to apply bail-in on derivatives governed by non-EU law. In principle, liabilities governed by the law of a third country are bail-inable. However, there is a risk that in certain cases it may be difficult to bail in such liabilities within a reasonable time period. This issue is quite relevant for derivative contracts, as these contracts are most frequently based on ISDA master agreements, which govern all derivatives transactions of the parties that adhere to the master agreement. ISDA agreements foresee that the parties can choose their governing law (although the most frequently chosen options are English law, New York law and Singapore law). ISDA has created protocols in order to insert a contractual clause recognising that liabilities could be subject to bail-in; however, not all ISDA contracts will include such a contractual clause.

Legal ownership of collateral and market consequences of a forced sale of collateral. As secured liabilities are not subject to bail-in, only the unsecured portions of derivatives contracts are eligible for bail-in. Given the complexity of determining the secured and unsecured amounts of a derivative contract, and considering the complexity of bailing in only a part of a derivative contract, resolution authorities may not feel comfortable applying bail-in to the unsecured amounts of derivatives.

The BRRD specifies that crisis prevention or crisis management measures are not deemed to be enforcement events provided that the substantive obligations of the contract, including payment and delivery obligations and the provision of the collateral, continue to be performed. If an event of default actually occurs, the BRRD provides resolution authorities with the power to impose a stay, which is limited

in time, but whose objective is to prevent the enforcement of security interests on pledged collateral or termination rights of the entity's counterparties. No such stay has yet been applied in Belgium. It thus remains unclear how the stay would work in practice and how difficult it might be to impose a stay, in particular in a cross-border perspective. In the absence of any precedent, it is also difficult to assess the potential knock-on effects resulting from such a measure.

Although collateralised claims are excluded from bail-in and resolution measures cannot be considered as enforcement events triggering closeout, it is nevertheless possible that the resolution procedure leads to an actual default on collateralised obligations. In this case, the non-defaulting counterparty is authorised to seize the collateral. In the case of enforcement of the collateral agreement upon closeout, the collateral receiver may either realise or appropriate the collateral. If the realisation is likely to have a negative impact on the market, the collateral receiver may decide to appropriate the collateral and wait for a more appropriate period for its realisation.

Nevertheless, the decision to appropriate collateral and to avoid selling it right away is in the hands of the collateral receiver, and not the resolution authority. Most collateral receivers are likely to be more interested in the realised value of the collateral than in the impact that such a sale might have on the markets. In order to mitigate this risk, some systemically important collateral receivers, such as market infrastructure operators (Euroclear Bank) which could have substantial positions to realise, have developed policies and contractual documentation in order to avoid self-defeating fire-sales and, rather, to implement a gradual realisation of the collateral.

Possibilities of excluding derivatives from bail-in. Despite the difficulties associated with the bail-in of derivative contracts, resolution authorities are not allowed to systematically exclude derivatives from the scope of bail-in. The BRRD requires that authorities limit to the maximum extent possible the number of exclusions from bail-in, since such exclusions raise the risk of breaching the principle that no creditor should be worse off in resolution than in a traditional liquidation (i.e., the no-creditor-worse off principle). Hence, in practice the exclusion of derivatives from bail-in will only be possible on a discretionary and case-by-case basis.

In practice, many derivatives will be excluded from bail-in because they are secured. With respect to unsecured derivatives, resolution authorities may exclude them from bail-in on a discretionary basis only if the exclusion is motivated by one of the following conditions:

> (a) It is not possible to bail in the liability within a reasonable time notwithstanding the good faith efforts of the resolution authority;
>
> (b) The exclusion is strictly necessary and is proportionate to achieve the continuity of critical functions and core business lines in a manner that maintains the ability of the institution under resolution to continue key operations, services and transactions;
>
> (c) The exclusion is strictly necessary and proportionate to avoid giving rise to widespread contagion, in particular as regards eligible deposits held by natural persons and micro, small and medium-sized enterprises, which would severely disrupt the functioning of financial markets, including of financial market infrastructures, in a manner that could cause a serious disturbance to the economy of a Member State or of the Union;
>
> (d) The application of the bail-in tool to those liabilities would cause a destruction in value such that the losses borne by other creditors would be higher than if those liabilities were excluded from bail-in.

Conditions (a) and (d) could be expected to serve more typically as a basis for the exclusion of derivatives.

Several restrictions nevertheless apply to discretionary exclusions from bail-in. First, resolution authorities must minimise exclusions in order to respect the principle that shareholders and creditors should absorb

the costs of the resolution. In addition, shareholders and creditors should absorb losses in resolution in accordance with the order of priority of their claims under normal insolvency proceedings, and creditors of the same class are to be treated in an equitable manner. Any deviation from the principle of equal treatment of creditors of the same rank (i.e., the *pari passu* principle) must satisfy the conditions of being proportionate, justified by the public interest, and non-discriminatory. In addition, the ability to exclude liabilities from bail-in on a discretionary basis should not violate the no-creditor-worse-off principle.

Another restriction on discretionary exclusions from bail-in relates to the use of the resolution fund. If the exclusion of the liabilities would imply the use of the resolution fund, the European Commission must decide within 24 hours whether to allow or prohibit the exclusion.

Finally, if the exclusion of certain liabilities from bail-in has not been considered in the resolution planning process and if the exclusion would imply the use of the resolution fund, the resolution authority must explain which exceptional circumstances justify the exclusion, together with providing the reasons as to why those exceptional circumstances could not have been foreseen by the resolution authority at the time of the resolution plan.

In conclusion, the bail-in of derivatives poses several obstacles for achieving successful, timely resolution procedures. The European legislator has opted not to explicitly exclude derivatives from bail-in, but by so doing has left resolution authorities with significant challenges to face in practice.

SECTION 4 DERIVATIVES ACTIVITIES IN BANKS

This section discusses the most important developments in derivatives activities by Belgian banks over the past ten years. Eighteen Belgian banks make use of derivatives, with a total notional amount at the end of 2016 of 3.3 trillion euro, which represented 309% of their combined balance sheet.[20] In terms of the different types of derivatives, in 2016 the notional value of interest rate derivatives represented approximately 2.5 trillion euro (or 78% of the total) and the notional value of exchange rate derivatives accounted for 619 billion euro (19% of the total). As the smallest bank users have very small derivatives exposures, most of the analysis presented in this section is, based on detailed data for the eight Belgian banks making the greatest use of derivatives. These institutions account for approximately 80% of the total notional amount of derivatives held by all Belgian banks.

4.1 Derivatives activities in Belgian banks and banks in other countries

While it is interesting to compare the types and amounts of derivatives exposures of Belgian banks with banks in other countries, very little cross-country data on derivatives exposures exists. We make use here of the very limited amount of data that is available; however, care should be taken in drawing strong conclusions on the basis of these data, as the scope of coverage may differ across countries.

Table 2 presents the proportions of different types of derivatives held by Belgian banks, in comparison with banks in Germany, the Netherlands, and the US. This table shows that in terms of notional values, interest rate derivatives are by far the most common type of derivative in each of these countries. Belgian banks appear to use slightly greater proportions of foreign exchange derivatives and slightly lower proportions of interest rates swaps than Germany and the Netherlands.[21]

Table 2 Proportions of different types of derivatives in different countries (end 2016)

[20] Based on supervisory reporting data.

[21] As the scope of coverage may differ across the countries, the data in this table should be taken as providing more of a general than a precise comparison of proportions of different types of derivatives.

Type of derivative	Belgium	Germany	Netherlands	US
Interest rate	78%	83%	84%	75%
Foreign exchange	19%	12%	15.5%	19%
Equity	3%	1%	0.5%	2%
Commodities	0%	0%	0%	1%
Credit default swaps	0%	4%	0%	3%

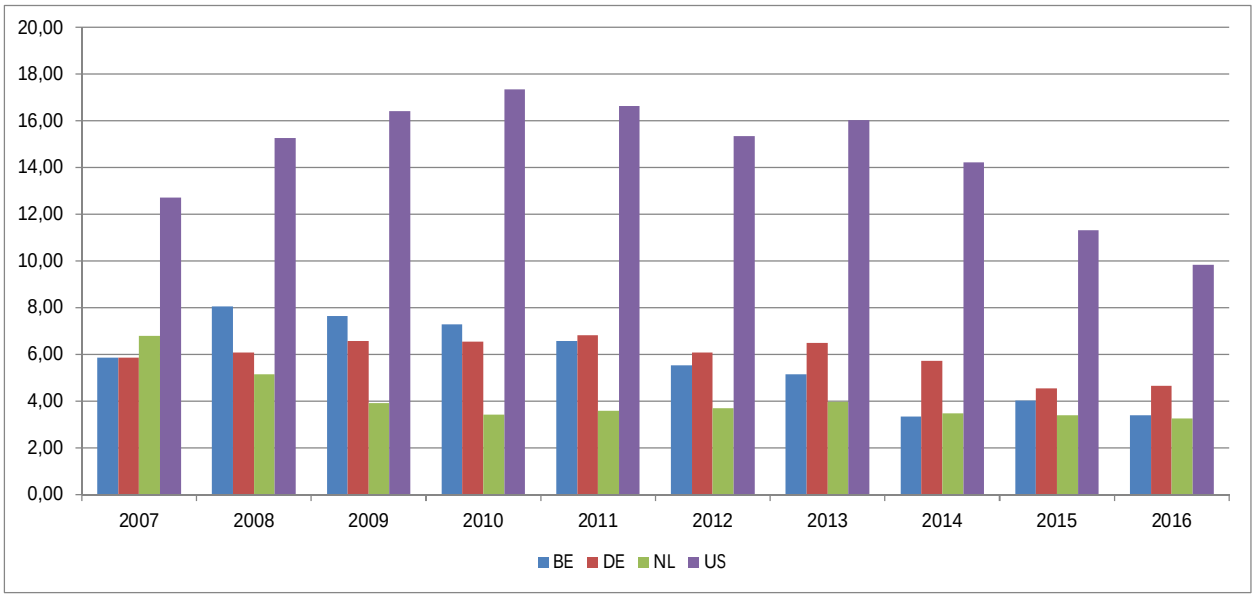
Source: Belgium: consolidated supervisory reporting; US: OCC Quarterly Derivatives report; Germany: Bundesbank; Netherlands: DNB.

Although it is not reported here, considerable heterogeneity exists across Belgian banks with respect to the types of derivatives used, with smaller banks often holding only interest rate derivatives in their portfolios and some larger banks holding only around 50% of interest rate derivatives in their portfolios.

Figure 4.1 provides an idea of the notional amounts of derivatives activities of banks in Belgium, Germany, the Netherlands, and the US. It is clear that the ratio of the notional value of derivatives over total assets is far greater for US banks than for banks in the other countries; however, a very large percentage of US banks' exposure is accounted for by the four largest US dealer banks. At the end of 2016, these four banks accounted for 89% of the total notional amount of derivatives of the entire US banking sector.

For Belgian banks the ratio of notional amounts of derivatives to total assets at the beginning of the period resembles that of German banks and then more that of Dutch banks towards the end of the period, ranging from three to four times the value of total assets.

Figure 4.1 Notional values of derivatives over total assets in different countries



Source: Belgium: consolidated supervisory reporting; US: OCC Quarterly Derivatives report; Germany: Bundesbank; Netherlands: DNB.

In terms of derivatives counterparties of Belgian banks, there is a large degree of heterogeneity across banks. For some banks a central counterparty (CCP) is the main counterparty, due to the requirement in the EMIR legislation for central clearing of standardised derivatives. Other, typically smaller, banks, which are not direct clearing members, have only financial institutions (i.e., other than CCPs) as counterparties, as the smaller banks must pass their standardised derivatives contracts through other financial institutions which are clearing members. It is also worth noting that for some Belgian banks, intragroup transactions can represent a large fraction of their derivatives transactions. For these cases, one or more entities within the same group may be the main counterparty or counterparties to a bank.

With respect to the importance of the collateral pledged for derivatives transactions, collateral for derivatives accounts for varying proportions of the total amount of Belgian banks' encumbered assets. Collateral pledged for derivatives ranges from as little as 10% of total encumbered assets for some banks with more complex business models to 95% or more of total encumbered assets for retail-oriented banks.

4.2 Notional Values of Derivatives

For most Belgian banks the notional amounts of derivatives have fallen significantly since the crisis. There are nevertheless large variations in growth rates across banks and over time for given banks. Figure 4.2 displays the notional amounts of total derivatives as a proportion of total assets for the combined balance sheet of the largest eight bank derivatives users. The figure also presents the ratios for the subcategories of hedging derivatives and derivatives in the Held for Trading (HFT) category.

Derivatives that are used for hedging may be classified in the accounting category of Hedging derivatives if they satisfy certain strict criteria. Derivatives which do not meet these criteria must be booked in the category of HFT. However, since 2014 banks have been required to report the proportion of derivatives that are booked in the HFT category but which are nevertheless used for the purposes of economic hedging.

Our analysis reveals that the proportions of derivatives for hedging (either in hedge accounting or as economic hedges in the HFT category) can vary significantly across banks and over time. Nearly 100% of the derivatives held by smaller retail banks are for hedging purposes, while for other banks the proportions of derivatives held for hedging are considerably lower.

It is apparent from Figure 4.2 that the decline in the ratio of notional values over total assets is almost entirely due to a decline in the derivatives in the HFT category. Indeed, a more detailed analysis suggests that a significant amount of the reduction in notional values of derivatives since 2008 for the eight largest users appears to be linked to the reduction or elimination of certain types of risky trading activities that had been undertaken by certain banks prior to the crisis. In addition to the decrease in derivatives by these banks, portfolio compression procedures undertaken by other banks also explain a part of the decline in notional values for the banks.

More generally, several factors have likely played a role in the notional decline in derivatives in the HFT category, including: i) requirements of the restructuring agreements signed with the European Commission following the receipt of state aid by certain banks during the crisis; ii) reductions in risk appetites of bank management; iii) changes to the international and European regulatory framework relating directly or indirectly to derivatives; iv) structural reform measures introduced in the Belgian banking law, which prohibit banks from undertaking proprietary trading activities; and v) transfers of some derivatives trading activities to a different institution within the same banking group.

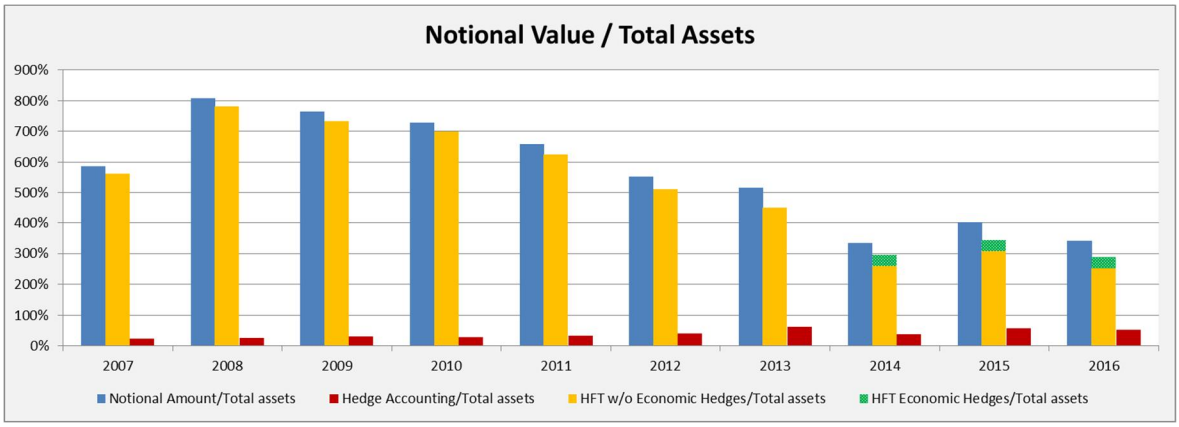
Figure 4.2 also reports for 2014 onwards the proportion of derivatives that are booked in the HFT category but that actually represent economic hedges. The sum of the values of derivatives booked in hedge accounting and those booked as economic hedges in the HFT category indicates the total amounts of derivatives used for hedging. As revealed by the figure, trading derivatives account for the most significant proportions of the notional value of derivatives held by the eight banks as a group.[22]

Figure 4.3 provides an idea of the distribution across the eight banks of the ratio of notional values of derivatives over total assets, revealing a large degree of heterogeneity across banks and over time. The banks in the 10th percentile of the distribution (shown by the minimum values of the black bars) hold almost no derivatives on their balance sheets while the banks near the 90th percentile (shown by the maximum values of the black bars) held notional values of almost 120 times (1200% of) the value of their assets in 2008.

An interesting trend is the sharp decline in the dispersion of this ratio over time. At the same time, the median value has moved in a relatively narrow range over the period, between 236% and 344%. Since by construction the median divides the sample of banks into two groups of equal size, it is apparent that the reduction in the ratio of the notional values over total assets is almost exclusively explained by the banks in the upper 50th percentile of the distribution. It is nevertheless worth stressing that much of the dispersion in the earlier part of the period was generated by one or two banks. The 75th percentile of the distribution prior to 2011 lies between 600% and 700%.

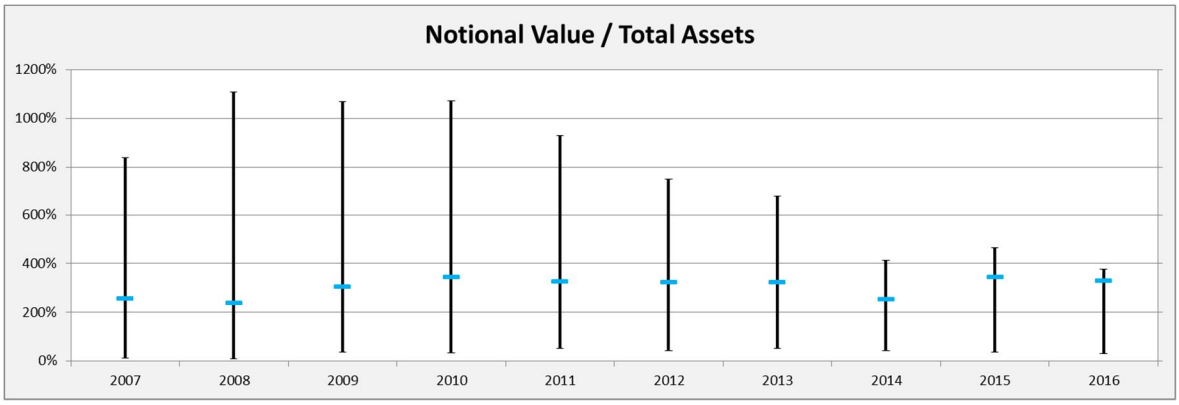
[22] Some banks argue that some of the derivatives that are booked in HFT and that do not satisfy the rules for hedge accounting or for classification as an economic hedge are nevertheless used for hedging or risk reducing purposes. Clearly, a transaction-level examination would need to be undertaken in order to determine which of the HFT derivatives that do not qualify as economic hedges are actually used for hedging purposes.

Figure 4.2 Notional values of derivatives over total assets for the eight largest bank users



Source: Supervisory data

Figure 4.3 Distribution of notional values over total assets for the eight largest bank users *



*The minimum of the black bar corresponds to 10th percentile, and the maximum corresponds to the 90th percentile. The light blue horizontal line in each bar represents the median.

Source: Supervisory data

4.3 Net Market Values

The market value of a derivative for a counterparty is computed as the net present value of the future cash flows generated by that derivative. The market value of a derivative can be positive or negative, depending upon whether the net cash flows of the counterparty are positive or negative. Hence, derivatives can be booked either on the asset or on the liability side of the balance sheet, depending on the sign of their market value. The net market value of a derivatives portfolio, which is computed by subtracting the total market value of derivatives liabilities from the total market value of derivatives assets, represents the net amount that the bank would receive from or have to pay to its counterparties if all its contracts were closed out today, in the absence of netting agreements or collateral.

Figure 4.4, which reports the net market values of derivatives over total assets (blue bars) for the eight largest bank users, shows that the net market value of derivatives for this group has become increasingly negative over the past ten years. At the beginning of the period the group held almost equal amounts of derivative assets and liabilities, leading to a net market value close to zero. However, from 2008 on, the amounts of derivatives liabilities were consistently higher than for derivatives assets, with the net value reaching -1.5% of the combined balance sheet in 2011. Since 2014 the net market value has increased somewhat, although it was still approximately -0.9% in December 2016.

Figure 4.4 also shows the separate contributions to the net market value of derivatives from the categories of HFT derivatives and derivatives in hedge accounting. Whereas the contributions of both categories to the net market value were roughly similar in magnitude from 2008-2010, the hedge accounting category has generated most of the increase in liabilities (or the decrease in net market value) from 2011 onwards.

Several factors underlie these developments. In the early part of the period, the contribution of HFT derivatives to the negative net market value for the combined balance sheet of the eight banks reflected the situation of some of the largest banks which had engaged in significant amounts of trading activities prior to the crisis and which were negatively affected by the crisis.

The importance of hedging derivatives after 2011 is due more to the general structure of Belgian banks' balance sheets and to the decline in interest rates. Belgian banks appear to have larger duration gaps than their European peers, due in part to the Belgian banks' relatively large portfolios of longer-maturity fixed-rate loans. As a consequence, they tend to make more intensive use of fixed-payer interest rate swaps than many other European banks, whereby they pay a fixed rate in return for a variable rate. For the counterparties of interest rates swaps, a decline in the interest rate will have a negative impact on market value for the counterparty paying the fixed leg and a positive impact for the counterparty paying the variable leg. Not surprisingly, the derivatives portfolios of Belgian banks have been negatively affected by decline in interest rates since the crisis.

This of course implies that many Belgian banks will see the market values of their derivatives increase with a rise in interest rates. If the increase in rates is high enough, the value of the fixed payer swaps could even turn positive. This in turn implies that the counterparties paying the variable leg of the swaps will experience a reduction in the market value of their swaps.

One may ask whether an increase in interest rates could have significantly negative impacts on the counterparties who use receiver swaps (i.e., pay the variable leg), to the point of negatively affecting the financial system or the economy. The answer to that question would depend upon many factors, including the nature of the counterparties (e.g., whether financial or nonfinancial institutions), the concentration of counterparties holding receiver swaps, the importance to the counterparties of the income from their receiver swaps, and the solvency of the counterparties. The ECB reports that among the large banks in the Eurozone, around 45% of the banks have net receiver (i.e., variable-leg) positions in interest rate swaps, and 55% have net payer (i.e., fixed-leg) positions.

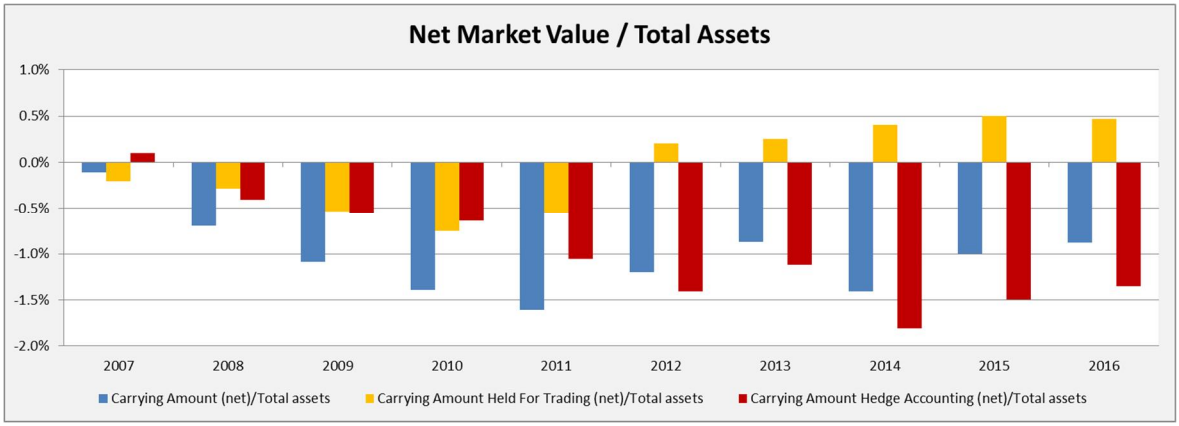
Care must be nevertheless taken when interpreting the net market values of derivatives. First, the novation[23] or recouponing[24] of derivatives contracts can result in situations where the fair values of the "new" contracts replacing the old ones are zero. This can lead to one-time "jumps" in the market values of derivatives that may then be compensated through a payment between the counterparties that would show up through the Profit and Loss Account. In other words, a sharp increase in the net market value of a derivatives portfolio due for instance to a novation agreement with a counterparty may be perfectly counterbalanced by a payment made by the bank to the counterparty.

A second issue concerns the reporting of the market values of derivatives. The current accounting rules require that assets and liabilities be reported separately unless certain offsetting conditions specified in the accounting standard IAS 32 are met. When these conditions are met, financial assets and liabilities (including derivatives) have to be reported on a net basis. In the case of derivatives contracts between a clearing member and a CCP, for example, the IAS32 conditions tend to be met (although a case-by-case

[23] Novation of derivatives refers to an agreement by which one counterparty to a derivatives contract is replaced by another. Often novation involves replacing a bilateral contract between counterparties by two contracts with a CCP.
[24] A recouponing is an early termination of a derivatives transaction combined with the conclusion of a new transaction between the same parties with substantially similar terms but struck at market with a zero net present value, *i.e.* recoupon.

analysis is still required). In this case, the derivatives assets (liabilities) are reported net of any cash collateral received from or pledged to the CCP. One of the unintended consequences of this rule is that it may not be meaningful to use supervisory reporting data to compare the market values or changes in the values of derivatives across different banks, as some are able to make use of this offsetting exemption for at least some of their derivatives, while others are not.

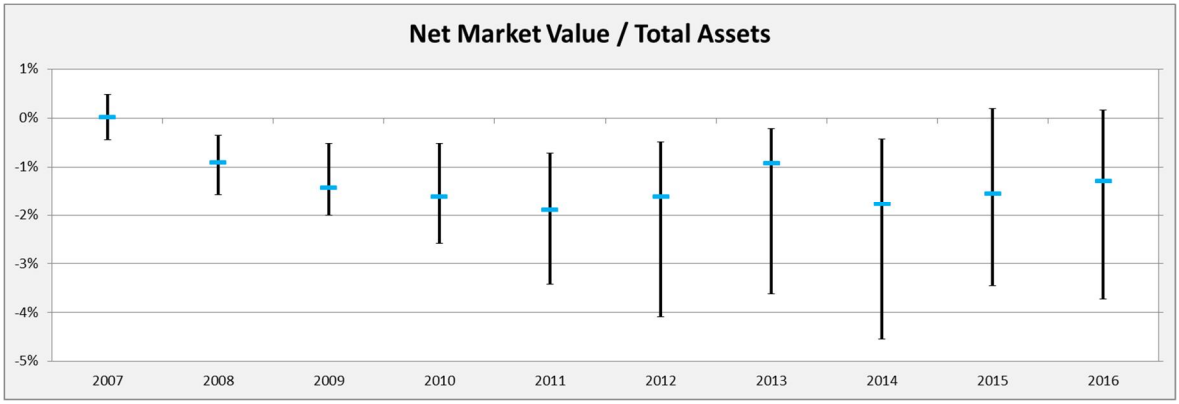
Figure 4.4 Net market values* of derivatives over total assets for the eight largest bank users



*The net market value corresponds to market value of derivative assets minus the market value of derivative liabilities of the eight banks in the sample.
Source: Supervisory data

Figure 4.5 contains information relating to the distribution of the ratio of net market values of derivatives over total assets across banks and over time for the eight large bank users. As was the case for the notional values, closer examination of the net market value over total assets at the individual bank level reveals significant heterogeneity, both over time for given banks and across banks. The figure indicates that the dispersion of the market value over total assets has increased since the onset of the financial crisis. In December 2007 the 10th to the 90th percentile of the distribution ranged from -0.5% to 0.5%, with a roughly equal number of banks on the asset and on the liability side (median equal to 0). This stands in sharp contrast with the situation in December 2016, when the 10th to 90th percentile range was from -4% to 0%, while the median bank had a net value of around -1.2%.

Figure 4.5 Distribution of the net market value over total assets for the eight largest bank users



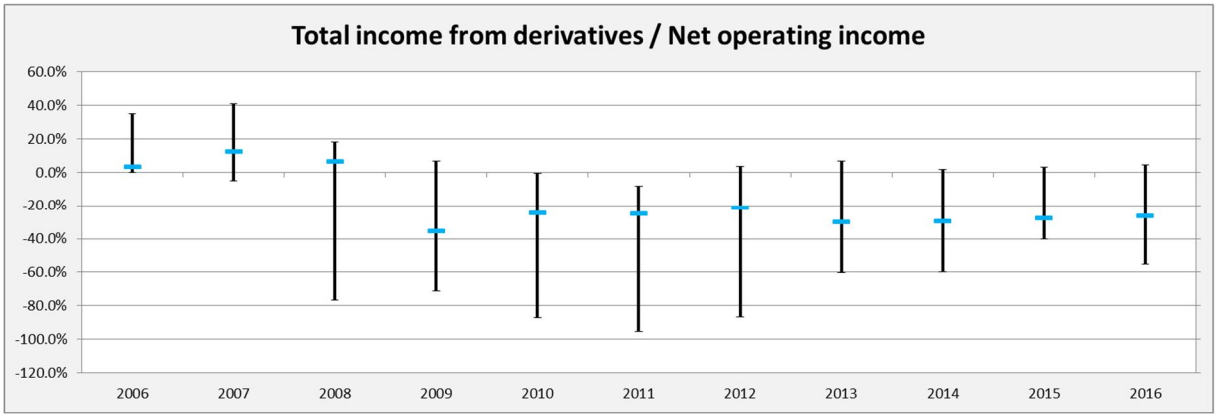
*The minimum of the black bar corresponds to 10th percentile, and the maximum corresponds to the 90th percentile. The light blue horizontal line in each bar represents the median.
Source: Supervisory data

4.4 Contribution of Derivatives to Profits and Losses

Income associated with derivatives can contribute quite significantly, either positively or negatively, to banks' profit. Figure 4.6 illustrates the bank-level distribution for the eight banks of Total Income from derivatives (Net Interest Income plus Gains and Losses) over Net Operating Income (NOI). Figures 4.7 and 4.8 decompose the total income from derivatives into its two components: (1) Net Interest Income from derivatives; and (2) Gains and Losses from derivatives.

It is apparent from Figure 4.6 that some banks have experienced very high accounting losses associated with derivatives since 2008, with a significant impact on net operating income and profit. Prior to 2008 derivatives appear to have had a rather mild, positive impact on income for the median bank. Afterwards, the impact turned negative and became much stronger.

Figure 4.6 Distribution of Total Income from derivatives (Net Interest Income plus Gains & Losses) over Total Net Operating Income for the eight largest bank users.



*The minimum of the black bar corresponds to 10th percentile, and the maximum corresponds to the 90th percentile. The light blue horizontal line in each bar represents the median.
Source: Supervisory data

The very high negative impacts of some Belgian banks' derivatives on NOI in recent years reflect in part the materialisation of risks that can be encountered with derivatives even when they are used for hedging, as acquiring a more stable economic value and/or net result over time implies not only reducing losses in adverse scenarios but also lowering profits in favourable scenarios.

Hence, it is important that the banks understand beforehand the possible implications of their hedging strategy. For instance, the longer the maturity of the hedging derivatives contracts, the higher the probability that an "unexpected" event will have an impact on the bank's balance sheet or NOI. Unexpected losses (or gains) on a hedging derivative may be (partially) offset by gains (or losses) of the hedged item, but often the gains (or losses) on hedged items cannot be realised, as these items may be illiquid assets that have been booked at amortised cost.

Given that Belgian banks generally have large fixed-income loan and securities portfolios, they have a need to hedge against interest increases, and therefore, they make heavy use of fixed-payer interest rate swaps. As interest rates have declined sharply in recent years, banks have earned losses on these swaps. Moreover, in the current environment, with extremely low interest rates and even negative short-term rates, these payer swaps have become very expensive. As Figure 4.7 below shows, the losses from derivatives on net interest income can be quite significant. Clearly, when interest rates rise, the losses associated with Belgian banks' fixed-payer swaps will also diminish.

In the case of Belgian banks, the losses on derivatives have occurred not only as a result of the decline in interest rates but also as a result of an unprecedented number of refinanced mortgage loans at lower rates. These refinancings have reduced the interest income from the loans relative to the fixed payments that the banks have to make on their fixed payer swaps, and in some cases the refinancings have resulted in the derivatives no longer qualifying as hedges. Analysis suggests that the high duration gaps of Belgian banks relative to many other European banks makes the Belgian banks somewhat more sensitive to movements in interest rates.

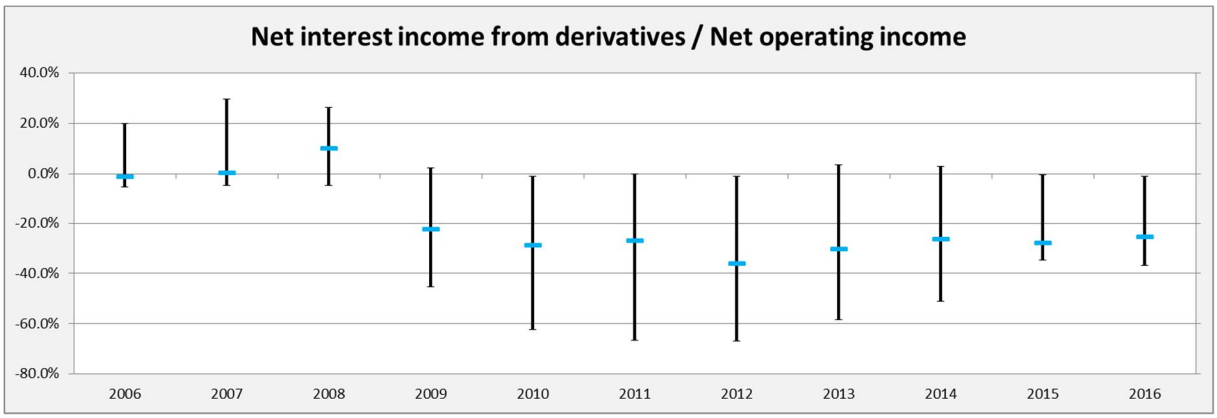
Figure 4.7, which reports the net interest income component of income from derivatives, shows that the dispersion across banks of the ratio of net interest income from derivatives to net operating income has increased considerably since 2009, while narrowing somewhat in the last two years. At the same time, the median has remained relatively stable since 2009, at around -25% of NOI, which supports the observation that the decrease in interest rates since the onset of the financial crisis has had a fairly generalised, negative impact on the derivatives portfolios of Belgian banks.

As suggested above, interest income and expenses are not the only source of income from derivatives; changes in the market value of derivatives also generate gains and losses that feed into income, as does the unwinding of derivatives contracts. All of the gains and losses need to be reported accordingly.[25] Figure 4.8 provides information on the gains and losses from derivatives as a proportion of NOI for the eight banks. Interestingly, the impact of gains and losses from derivatives on NOI is considerably smaller than that of net interest income from derivatives. Immediately following the financial crisis, several Belgian banks systematically reduced the size of their derivatives portfolio, which increased the losses from derivatives reported by these institutions. This was particularly evident in 2008, as can be seen from Figure 4.8. Nevertheless, the median of the gains and losses over NOI has remained very close to zero over the entire period, while the large losses suffered by the 10th percentile can be attributed to very few banks.[26]

[25] At the same time, it should be kept in mind that the treatment of gains and losses depends whether they are recognised in hedge accounting and whether they are classified as a fair-value or a cash-flow hedge.

[26] It should also be kept in mind that for derivatives booked in hedge accounting, the gain or loss that is reported for the derivative is net of the associated loss or gain on the hedged item.

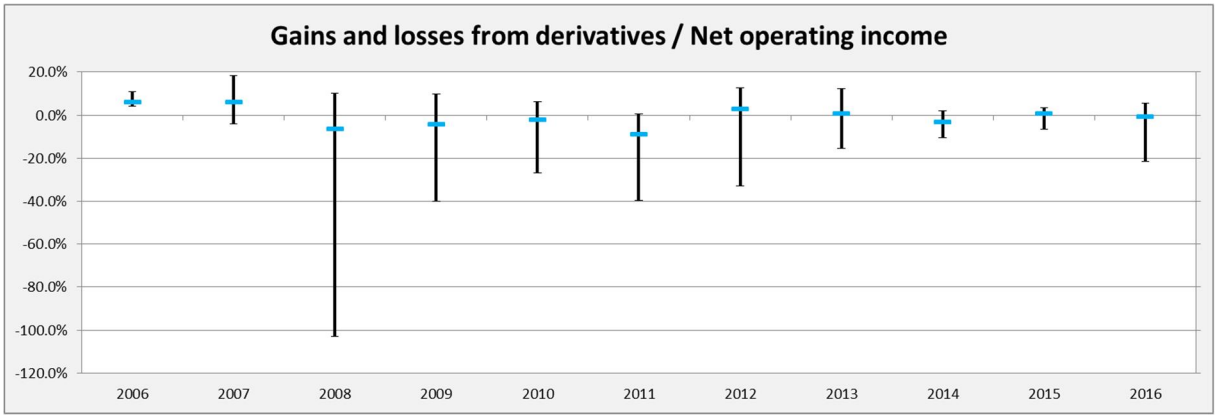
Figure 4.7 Distribution of Net interest income from derivatives/ Net operating income for the eight largest bank users



*The minimum of the black bar corresponds to 10th percentile, and the maximum corresponds to the 90th percentile. The light blue horizontal line in each bar represents the median.

Source: Supervisory data

Figure 4.8 Distribution of Gains and Losses from derivatives / Net operating income for the eight largest bank users



*The minimum of the black bar corresponds to 10th percentile, and the maximum corresponds to the 90th percentile. The light blue horizontal line in each bar represents the median.

Source: Supervisory data

Data on derivatives contracts reported by the six largest banks as a consequence of the EMIR legislation suggests that there is significant heterogeneity among Belgian banks with respect to contract maturities, which represent, at least in part, differences in banks' business models. For most banks the largest fraction of their derivatives (measured by their notional amounts) matures in more than 10 years; i.e. the median proportion of derivatives maturing in 10 years or more is 75%. Once again, there is large degree variation across banks, with the 10th – 90th percentile ranging from 51% to 86%.

SECTION 5 DERIVATIVES ACTIVITIES IN INSURANCE COMPANIES

Insurance firms typically make significantly less use of derivatives than banks. Of the 68 firms in the Belgian insurance sector, eighteen reported derivatives exposures at the end of 2016. The total notional amount of derivatives for these firms was 27.9 billion euro, representing around 10% of their aggregated balance sheet. Of the eighteen insurance firms that made use of derivatives (actually only 15 of these firms

conducted derivative transactions in the course of 2016), the median value of the end-2016 notional derivatives was 104 million euro.

There is nevertheless significant variation in this proportion across firms, with the 90th percentile value equal to around 25% of the firm's balance sheet. In terms of notional values, the extent of derivatives activities of the most active Belgian insurance firms appears to be rather similar to the activities of the smallest Belgian banks that engage in derivatives transactions. At end 2016, the net carrying values of derivatives for the seven largest insurance firms accounted for less than one percent of their balance sheets.

The reported notional amounts for insurance firms include the derivatives held to cover both Class-21 and Class-23 insurance contracts. At the end of 2016 the notional value of the derivatives exposures linked to the Class-21 contracts was 25.5 billion euro, whereas the amount linked to the Class-23 contracts was 2.4 billion euro. In reality, however, the amount of derivatives linked to the Class-23 contracts is higher than the reported value of 2.4 billion, particularly in relation to structured Class-23 products with capital protection. Derivatives for such products are part of the fund in which the Class-23 contracts are invested and are not reported on an item-by-item basis in the prudential reporting for insurance firms.[27]

With respect to the derivatives relating to the class-21 products, 54% of the notional values are accounted for by interest rate derivatives (13.9 billion euro), 21% by credit derivatives (5.3 billion euro), 16% by foreign exchange derivatives (4.1 billion euro), and 3% by equity derivatives (0.8 billion euro).

Belgian insurance companies use interest rate derivatives for hedging the duration gap, for optimising cash flow mismatches, for hedging reinvestment risk linked to a decline in interest rates or for hedging against increased lapses of certain Class 21 contracts in case of increasing interest rates, which would permit clients to earn higher rates elsewhere. Another risk mitigation technique is the hedging of the risk of increasing spreads on significant sovereign exposures. In addition, inflation-linked derivatives are used to hedge the inflation risk of the portfolios on workers' compensation and index-linked contracts.

Credit derivatives are used to hedge the credit risk on the investment portfolio. The credit derivatives strategies consist of CDS on indices (hedging the corporate spread risk), and CDS on sovereigns (hedging the sovereign spread risk). Foreign exchange derivatives are used to hedge the currency risk of the investment portfolio (mainly against the US dollar). Equity derivatives are used to protect against a fall of the prices of the equities that are held in the investment portfolio.

The results of stress tests conducted by the European Insurance and Occupational Pensions Authority (EIOPA) in 2016 indicated that the above-mentioned techniques effectively reduce the risks of the balance sheet of the insurance company, as the Solvency Capital Requirement Coverage Ratio (the SCR-ratio) increases as a result of these derivatives.

With respect to portfolio management, while the prudent person principle of Solvency II allows insurance firms to use derivatives for risk reduction or efficient portfolio management, no quantitative limits are imposed in relation to derivatives exposures for portfolio management. Along these lines, some insurance companies have begun increasing returns on their investment portfolios via derivatives strategies, which may be difficult to classify as either risk reduction or efficient portfolio management. In addition, new risk-reduction strategies currently being scrutinised consist of the purchase of reinsurance contracts which aim to reduce the market risk of a portfolio of Class 21 contracts via derivatives, but in combination with the reduction of specific technical insurance risks (such as mortality or longevity risk) of the portfolio.

[27] See the discussion of structured Class 23 products in Section 2.5 of the FSMA-NBB *Report on Asset Management and Shadow Banking.*

NBB supervisors have recently initiated a dialogue with the relevant firms (or with the relevant supervisory authorities of the parent entities) concerning these new types of strategies, in order to incentivise the firms to better delineate their investment policies and risk appetite in light of the prudent person principle.

It is of utmost importance that insurance supervisors understand firms' derivatives strategies in order to be able to follow the evolution of asset allocations in the firms' investment portfolios. Several sources of information on derivatives exposures are foreseen in the Solvency II framework. First, the firm must include information in the Regular Supervisory Reporting (RSR), which is updated every three years, on how it fulfils its obligation to invest all of its assets in accordance with the prudent person principle.

Second, in the own risk and solvency assessment (ORSA) the firm must include risk analysis of its investment portfolio, as well as the results of stressed and forward-looking scenarios relating to its solvency position. In general, however, derivatives exposures are not specifically analysed within the ORSA.

Third, firms must also report transaction-specific data on the derivatives contracts they hold, together with more aggregate data on the derivatives held within collective investment undertakings. Finally, the NBB performs annual stress tests on the balance sheets of insurance firms.

While all of these data sources exist, they do not currently allow the supervisor to obtain a comprehensive view of the evolving risks of derivatives, in particular as the reporting is not sufficiently granular (or not yet fully implemented) in terms of items such as the following: firms' descriptions of their derivatives strategies; detailed explanations (with evidence) of the application of the prudent person principle; reporting on the risk-mitigating effect of derivatives via impact on the solvency capital requirement (SCR) and on profit and loss; portfolio-specific analysis of the basis risk of derivatives positions; specific stress tests and the impact of derivatives in the annual NBB stress testing exercise; further information on collateral management and on exposures gross and net of collateral by counterparty and derivative type, and link with the aggregated prudential reporting.

In addition to the need for supervisors to obtain such information, a constructive dialogue with insurance firms is crucial for supervisors to be able to evaluate developments relating to the risk of derivatives positions of firms and the sector, taking into account the proportionality of the positions.

SECTION 6 KEY POLICY CONCLUSIONS AND MESSAGES

This section draws on the quantitative analysis of Sections 4 and 5, complemented by qualitative analysis and supervisory dialogue, to highlight the key policy concerns and messages emerging from our study.

Derivatives are important in terms of their contributions to banks' balance sheets and income statements. Belgian banks appear to have larger duration gaps than many of their European peers, due in part to their relatively large portfolios of fixed-rate loans combined with large proportions of non-maturing deposits. In order to reduce this duration gap, Belgian banks tend to make more intensive use of derivatives than many other European banks. Indeed, our analysis indicates that Belgian banks are quite sensitive to interest rate variations, and more so than a number of other European banks. *The NBB will perform regular transversal analyses of derivatives activities, in order to help identify emerging areas of concern at an early stage*.

Derivatives can reduce risk but also create new risks. For example, interest rate swaps may lower the interest rate duration gap, while increasing liquidity risk, counterparty risk or systemic risk (because of higher interconnectedness to other banks, and also via CCPs). Yet, understanding derivatives activities by banks and the risks associated with them is complex and involves many dimensions: trading versus hedging; differences in types of hedging and hedge accounting; carrying versus notional values; impacts on balance sheets and on income statements; risks associated with different types of derivatives and counterparties; difficulties with existing reporting data.

Our analysis leads us to question whether senior bank management or banks' Boards of Directors always have a complete understanding of the uses of derivatives within their institution or of the importance of "new" risks created by these transactions. For at least some banks, knowledge of derivatives activities seems to be lodged in silos, and an overall, top-down view is missing. This not only makes it difficult for management to form a full view of the potential risks but also for supervisors to make an accurate assessment.

The NBB is working within the SSM to encourage in-depth studies of the derivatives activities of large banks, together with assessments of the overall understanding by senior management of the derivatives activities within the banks, in order to determine the extent to which a broad view of derivatives activities exists and whether an appropriate governance framework is in place to allow senior management to fully understand the origin of the derivatives positions and to assess the risks associated with derivatives.

Risks of income losses associated with derivatives, even for hedging, can be significant. Derivatives can serve a very important purpose by allowing banks to hedge risks, such as maturity and funding mismatches, that are inherent to their business. At the same time, even banks with simple, retail-oriented business models that use derivatives for hedging can sometimes find themselves exposed to large, unanticipated losses. Indeed, hedging decisions are based on risk assessments of future, uncertain movements of market indicators in light of banks' business models and balance sheet evolution and vulnerabilities. If, ex post, the actual events do not coincide with the hedging decision based on the ex-ante risk assessment, banks may make unexpected losses (or gains). The unexpected losses may be (partially) offset by gains of the hedged item, but often the latter cannot be realised, as they are related to non-liquid assets booked under amortised cost.

The longer the maturity of a derivatives contract, the higher the probability that an "unexpected" event will occur. Hence, it is important that the banks fully understand the possible implications of their hedging strategy.

Supervisory assessments of banks' hedging decisions have revealed some inadequacies in certain banks' hedging strategies and hedging risk frameworks. It is, therefore, important to ensure that banks have adequately assessed the risks associated with their hedging activities and that banks have appropriate hedging risk frameworks in place. Such frameworks should include risk dashboards and metrics to capture all of the relevant risks associated with the hedging derivatives and the hedged instruments, including solvency, liquidity, and profitability. Dashboards can also help to provide the insight needed for the appropriate market pricing of commercial products that require hedging by the bank.[28]

The NBB is working within the European supervisory framework to ensure that all Belgian banks that make use of derivatives for hedging have appropriate frameworks in place to assess the potential risks associated with hedging.

Central clearing of derivatives and central counterparties. CCPs have become essential to the global financial landscape since the crisis. Mandatory central clearing for standardised derivatives contracts, together with collateralisation and higher capital requirements for non-centrally cleared contracts, have become the cornerstones of derivatives risk management. At EU level, EMIR requires centralised clearing for standardised OTC interest rate derivatives in major currencies and for standardised credit default swap indices.

Central counterparties are generally considered to decrease systemic risk, as they contribute to a reduction in counterparty risk and they reduce the opacity of interconnectedness between individual credit institutions, together with improving the efficiency of collateral management. At the same time, CCPs can pose a

[28] EBA also makes similar recommendations in its Consultation paper on Draft guidelines on the management of interest rate risk arising from non-trading book activities, October 2017.

number of risks to financial stability**.** First, they stand at the very centre of the financial system, interconnecting their clearing members on a global scale. Second, the volume of transactions cleared by CCPs has increased dramatically in recent years and is expected to increase even further in the future. Third, there is a very high concentration within the CCP industry, with a very small number of CCPs clearing most derivatives transactions in the EU. Finally, CCPs apply margins and haircuts pro-cyclically.

Given these risks, the appropriate licensing and supervision of CCPs becomes critical. In addition, the stress testing of CCPs to extreme market shocks – as undertaken annually for all EU CCPs by ESMA, in cooperation with the ESRB – is a useful exercise. It is also crucial that supervisors of entities using a CCP have access to adequate information relating to the CCP's risk management and concerning any remaining risks that CCP users face, as well as on the outcomes of CCP stress testing exercises. CCP supervisors should also have access to information relating to the size and interconnectedness of CCPs' major counterparties.

The NBB currently contributes and will continue contributing, via dedicated international working groups or committees, to the ongoing international and European regulatory efforts to enhance CCP licensing and supervision, including via the implementation of frameworks for CCP stress testing and by establishing the rules for CCP recovery and resolution planning.

Intragroup derivatives exposures. EMIR allows intragroup derivatives transactions that satisfy certain conditions to qualify for a waiver of the obligation of central clearing. EMIR also allows intragroup transactions between counterparties which are established in different Member States to be exempted, under certain circumstances, from the obligation to provide collateral for non-centrally cleared derivatives transactions.

Since 2016 several institutions have submitted applications to the NBB to obtain waivers for their intragroup transactions of one or both of these items. Nine Belgian institutions have obtained a waiver of the central clearing obligation, and two have obtained an exemption for collateral for non-centrally cleared intragroup transactions. Given that Belgium hosts a number of important subsidiaries of large financial groups which centrally manage their derivatives business at parent level, the risks associated with large volumes of non-centrally cleared or non-collateralised intragroup transactions should be closely monitored.

The NBB will regularly monitor the characteristics and volumes for intragroup derivatives transactions, in order to identify any potential risks, particularly in those cases in which an exemption has been granted.

Data quality issues hinder the ability of authorities to analyse and assess the risks associated with derivatives. EMIR requires all derivatives counterparties to report detailed data for each derivative transaction (e.g., contract amounts, price, counterparties, maturity, etc.). The analysis of such granular data should prove invaluable for understanding microprudential risks, as well as systemic risk, including interconnections between banks and between banks and shadow banks. The EMIR reporting requirements are indeed partly a response to the fact that little information existed prior to the crisis concerning the vast financial interlinkages among banks that contributed so significantly to the geographic scope and amplitude of the crisis.

Analysis of EMIR data is all the more important because it is not possible to conduct detailed analysis of the risks of derivatives based on regular balance-sheet level supervisory data, as the latter data are not sufficiently granular. Moreover, some accounting practices applied to balance-sheet level data may reduce the transparency of certain risks; e.g., the practice of amortisation of derivatives losses in the P&L over several years.

The EMIR data can also help to better identify common risks among financial institutions, such as exposures to specific sectors (e.g. shadow banking), or the impacts of market and interest rate movements

on derivatives portfolios. One example of the use of these data is given by a recent analysis by the ESRB of the potential impact of interest rate increases on banks' balance sheets.[29]

In practice, however, there are major technical obstacles to managing and analysing such huge data sets. There is thus considerable scope for international cooperation by authorities in building the necessary IT platforms and sharing data and expertise in order to achieve the advances in our knowledge of interconnectedness and systemic risk intended via the EMIR derivatives reporting requirements.

Our analysis has revealed a number of data issues, including reporting issues and some potential reporting errors, in supervisory data. These issues may significantly limit the degree to which comparisons can be made across banks and for given banks over time. It is important to verify that banks are consistently and correctly reporting data relating to their derivatives transactions.

The NBB will examine in detail a number of specific issues relating to supervisory reporting data on derivatives, in order to identify any potential inconsistencies across banks in reporting practices. *The NBB is also devoting resources to developing an IT platform for the analysis of EMIR derivatives reporting data. A platform allowing for some initial data quality control and analysis should become operational during 2018. The NBB is also pursuing avenues for international cooperation with the ESRB and other Central Banks in the analysis of EMIR data.*

Derivatives can also pose material risk for insurance firms. Although insurance firms engage in considerably less derivatives activity than banks, derivatives can still create significant risks for insurance firms. EMIR offers one means of managing the risk, through the requirement that all derivatives counterparties apply risk-mitigation techniques to all non-centrally cleared derivatives transactions. Regular supervisory data for insurance firms, however, do not currently permit insurance supervisors to obtain a clear view of the impact of these risk-mitigation techniques.

For insurance companies with significant derivatives exposures it would be useful to complement annual supervisory data with additional data such as information on collateral management; data on gross values of derivatives exposures and derivatives values net of collateral, by counterparty and derivative type; and links with more aggregate supervisory data.

The NBB will work with insurance firms with significant derivatives exposures, in order to ensure that sufficient data and information are provided within the existing supervisory reporting framework to allow supervisors to assess the impact of risk-mitigation techniques that are in place for non-centrally cleared derivatives and to determine whether insurance firms' use of derivatives is in conformance with the prudent person principle.

Derivatives can be used to take positions in the hope of improving profitability, because they involve making assessments concerning the uncertain, future movements of market variables. The Belgian structural reforms measures in the Banking Law prohibit proprietary trading by banks, and therefore the use of derivatives by banks for the purpose of improving profit. For insurance companies, the prudent person principle should serve a similar purpose. This principle states that insurance firms may use derivatives only for the purposes of reduction of risks and efficient portfolio management.

Current insurance supervisory data nevertheless need to be supplemented with additional information in order for supervisors to accurately assess whether insurance firms' derivatives activities conform strictly to the prudent person principle. Additional information that could help supervisors to make this assessment include:

- Description of the firm's derivatives strategies;

[29] Hoffmann P., Langfield, S, Pierobon F., and Vuillemey G. "Who bears interest rate risk", Working paper, 2017.

- Detailed explanation of the application of the prudent person principle, with evidence provided, for each of the derivatives strategies, that the derivatives are used only for reduction of risks or efficient portfolio management.
- Reporting on the risk-mitigating effect of these derivatives via impact on the solvency capital requirement (SCR) as well as on profit and loss
- Portfolio-specific analysis analysing the basis risk of the derivatives positions, including specific stress tests
- A separate reporting on the impact of derivatives in the annual NBB-stress testing exercise (i.e., SCR-ratio with and without derivatives)

Bank resolution and derivatives. The BRRD requirements for applying bail-in to derivatives contracts in bank resolution procedures raise a number of feasibility concerns, given the complexity and the specificities of derivatives contracts.

In particular, the BRRD requires that the resolution authority respect any netting and collateral arrangements applying to derivatives contracts, meaning that the bail-in rules will only apply to the portion of the value of derivatives liabilities that exceeds the value of the pledged collateral. That is, only the unsecured part of a derivatives liability can be bailed-in. Given that EMIR imposes an obligation for counterparties to exchange collateral even for derivatives contracts that are non-centrally cleared, the amount of derivatives liabilities that will ultimately be subject to bail-in is likely to be small for many banks.

The BRRD requirements imply that during a resolution procedure the independent valuation expert will need to determine - accurately and on very short notice - the value of both the secured and the unsecured portion of the bank's derivatives portfolio. In practice this is likely to be a complex process, which could require significantly more time than the resolution authority has to conclude the resolution procedure. Other difficulties linked to the bail-inability of derivatives include the fact that certain derivatives are governed primarily by third-country laws and that these contracts often include close-out netting clauses.

Whereas one apparent solution to these difficulties might be to exclude derivatives from the set of bail-inable liabilities, resolution authorities are not allowed to systematically exclude derivatives from the scope of bail-in. The BRRD requires that authorities limit to the greatest extent possible the number of exclusions from bail-in, since such exclusions raise the risk of breaching the principle that no creditor should be worse off in resolution than in a traditional liquidation. Hence, in practice the exclusion of derivatives from bail-in will only be possible on a discretionary and case-by-case basis.

In conclusion, this report has examined issues related to banks' and insurance firms' derivatives activities, in light of the question raised by the High Level Expert Group regarding potential systemic risks associated with derivatives. This section has highlighted a number of potential risks and policy concerns that have emerged from our analysis, as well as measures that the NBB and other authorities can take to address the potential risks.