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Introduction

1. The purpose of this paper is to consider practical implications of using a valuation approach for the valuation of both hedged items and hedging instruments in a macro hedging model. The basic idea of the valuation approach is to adjust carrying values of items that make up the risk position with a valuation adjustment that quantifies the hedged risk. Therefore, this model requires the valuation of hedged items attributable to the hedged risk, which for the current discussions is interest rate risk.¹ This calculation requires setting a benchmark interest rate representing the hedged risk.
2. The determination of benchmark interest rates interacts with methods applied for setting transfer prices. Therefore this paper provides a more detailed analysis of approaches taken and the respective implications as a basis for possible accounting alternatives. Understanding the basic mechanism of this interaction is important since banks manage their interest rate risks fundamentally in the same manner. In practice, however, the determination of transfer prices is not straightforward. Even though transfer price settings are based on benchmark rates that are prevalent in the financial market, an entity usually adjusts them in order to reflect unique attributes of its internal

¹ Other risks will be discussed at future meetings.

organisation and processes, and of the related financial products. Those adjustments are based on the entity's own fundamental principles for risk management.

3. The setting of transfer prices is also influenced by the pricing (fair value measurement) of hedging instruments, namely interest rate swaps. Prior to the financial crisis, the valuation of plain-vanilla derivatives such as interest rate swaps had not been an issue, since the 'no-arbitrage' condition in their pricing had been satisfied.² Following the financial crisis, however, market developments increasingly called into question whether that condition was still met. That reflects the increase in sensitivity to differences in risks that previously did not have material effects on values and stronger preferences for collateralised transactions among market participants. Reflecting this trend, more and more financial institutions move to an approach that uses multiple yield curves for the pricing of derivatives, dependent on the terms of the actual instrument. This also means valuations of derivatives sometimes use multiple bases for estimating the cash flows as well as for discounting them. This also affects the measurement of fair values in accordance with IFRS 13 *Fair Value Measurement*.

Considerations that apply to the setting of transfer prices

4. In simple terms, a transfer price serves two purposes:
 - (a) it determines the cash flows transferred between two organisational units; and
 - (b) it determines the discount rate used to calculate the present value of those cash flows.
5. In order to determine cash flows and discount rates, financial institutions use a basic interest rate curve and adjustments to that curve that cover further

² 'No arbitrage condition' is the condition in the pricing of financial products in which no one can make profit without paying associated cost or taking risk. This is sometimes referred as the 'no free lunch' condition.

valuation and risk aspects. Cash flows and discount rates can be derived from the same or different (or differently adjusted) curves.³

6. The basic interest rate curve is usually derived from the inter-banking market. This reflects the fact that funding or investment gaps within the non-trading book are often bridged through the inter-banking market. Furthermore, the inter-banking market is also the reference for hedging instruments (interest rate swaps) used to manage interest rate risk.
7. The common approach in the past was to derive one curve per market. This concept however has changed with the significant impact of the financial crisis on the inter-banking rates reflecting the increased counterparty risk. Hence, significant differences between different repricing schemes occurred that need to be reflected.
8. This topic is also increasingly discussed for the fair value measurement of interest rate swaps, which relates to considerations on the setting of transfer prices. This leads to the so called “multiple curve approach”, ie several different curves are used as a basis for setting transfer prices, the fair value measurement of derivatives and consequently for risk management purposes.
9. In addition, transfer prices are often adjusted to reflect further risks like optionality risks or liquidity or counterparty risks. This is to ensure that the pricing of products is adequate and to transfer risks to a central unit for risk management purposes. Therefore, dependent on the approach taken, a transfer price might capture more than just the pure interest rate risk.
10. The variety of possibilities for setting transfer prices results in different policies being used by different financial institutions. But also within a financial institution the setting of transfer prices might differ by jurisdiction or (pool of) products.
11. All these factors have to be adequately considered for the development of a macro hedge accounting model. Refer to the appendix to this paper for further details on considerations that apply to the setting of transfer prices.

³ If different or differently adjusted curves are used, mathematically a “day 1 gain or loss” arises.

Implications for a macro hedge accounting model

12. From the macro hedge accounting point of view, there are two areas that need to be discussed as a consequence of the analysis above:
 - (a) the relationship between the valuation parameters of the hedged risk position and those used for pricing the hedging instruments; and
 - (b) the minimum requirements for the setting of transfer prices and benchmark interest rates for accounting purposes.

Relationship between valuation parameters

13. For accounting purposes an important question is what relationship should exist between the valuation parameters used for the hedged risk position and those used for the hedging instruments that hedge that risk position. This means, in what circumstances would it be appropriate that the risk position is revalued given that such a change in the default accounting treatment would be allowed in contemplation that the fair value changes on the hedging instruments have an offsetting effect? When transfer prices are used in measuring the hedged risk position for risk management purposes the appropriateness of revaluing the risk position for accounting purposes depends on:
 - (a) the relationship between the parameters (terms) of transfer prices that are used to measure the hedged items (ie the homogeneity of the risk position);
 - (b) the relationship between the parameters used for the valuation of the hedging instruments (ie the homogeneity of the hedging position or “hedge book”); and
 - (c) the interaction between the valuation of the hedged items and the hedging instruments (ie how similar the hedged risk position and the hedging position are so that their value changes offset).
14. The first alternative is that using transfer prices for measuring hedged items would only be allowed if the parameters underpinning those transfer prices are highly correlated with those used for the pricing of hedging instruments.

This idea is more or less consistent with the ‘coverage concept’ introduced in paper 7A of the November 2011 Board Meeting. Following this idea, the effects of changes in transfer prices on the values of hedged items are automatically offset by fair value changes in hedging instruments derived from their yield curve developments. Hence, ineffectiveness arises *only* from differences in the timing of cash flows between hedged items and hedging instruments.

15. This alternative might be relevant when one-to-one relationships between hedged items and hedging instruments are clearly specified. In the context of the net valuation approach, if an entity’s net hedged position is managed based on the Single Pool Rate Matching approach (see appendix) this one-to-one relationship can be specified. However, this reflects neither economic reality nor actual risk management of an entity. In the current environment it would rather result in the requirement to split comprehensive positions defined for risk management purposes into smaller units for accounting purposes to meet this requirement. In that sense, there might be an argument against this alternative.
16. The second alternative is that hedged items are valued based on transfer prices and the related benchmark rates assigned for the purpose of risk management thus reflecting a differentiating use of different interest curves for discounting or cash flow parameters. This idea is more or less consistent with the ‘separate valuation concept’ explained in the above-mentioned paper. It also considers the increasing relevance of risk management approaches that use different parameters for pools of transactions or even on a single instrument basis (Multiple Pool Rate Matching Approach—see appendix).
17. This alternative captures interest rate risk based on unique attributes of particular entities and financial products, thereby leading to a more accurate net valuation and information about remaining mismatches. In contrast to the first alternative, those mismatches would *not only* arise from differences in the timing of cash flows between hedged items and hedging instruments but also because of using different interest curves for discounting or different cash flow parameters.

Minimum requirements for setting transfer prices and benchmark rates

18. The analysis in this paper shows that the valuation of hedged items as well as hedging instruments involves management judgment to some extent, while the basic valuation method and mechanism for risk management are quite similar. From an accounting perspective there are two approaches to address this situation.
19. The first approach is basically to allow an entity to choose transfer prices and yield curves for its valuations of hedged items and hedging instruments in line with risk management decisions. The obvious advantage of this approach is that financial statements show how management actually measures and manages interest rate risk. In addition, the operational burden for an entity is low, since this approach allows data compiled for management accounting purpose to be used for financial reporting purposes as well. However, there is also a risk that comparability of financial statements is reduced. In order to mitigate this risk, detailed disclosures on the assumptions and settings for transfer prices and yield curves would be required.
20. The second approach is that accounting standards stipulate what transfer prices and yield curves should be used in valuations or at least require a (standardised) minimum composition of the risk⁴ that can be hedged. The pros and cons of this approach are the mirror image of those for the first one. The comparability between entities could be improved in respect of the valuation adjustments. However, the information may no longer correctly reflect how management measures and manages the hedged risk. In addition, operational costs, including the cost to develop IT systems for financial reporting purposes, would be higher.

Conclusion

21. The analysis in this paper has shown that the valuation of common hedging instruments as well as the determination of interest rate risk is influenced by

⁴ This means mandating what major risk elements must as a minimum be included in the valuation of the hedged risk position—see the diagram in paragraph A5 in the appendix to this paper.

many different factors. Consequently, many different approaches are taken to respond to this, leading to differences in the valuation parameters used even for instruments that are managed for a common narrowly defined risk like repricing risk.

22. Of the accounting alternatives discussed so far, the net valuation approach deals best with this situation. It allows interest rate risk to be determined that reflects the actual terms of the different underlying instruments. The resulting measurement differences automatically lead to valuation mismatches that are reflected in profit or loss if not addressed by risk management activities. This is a flexible solution that provides a high level of transparency regarding the risk management and business activities (in combination with meaningful disclosures). Also it addresses concerns regarding the practicability of a macro hedging approach as it uses risk management data that already exists.
23. In contrast, an accounting approach that requires a high level of homogeneity regarding the managed interest rate risk in the current environment leads to an artificial adjustment of economic hedging relationships for accounting purposes, which increases complexity. Also, the accounting would portray a level of conformity in how interest rate risk is viewed and measured that does not exist in reality, ie there is no single, universally accepted answer.

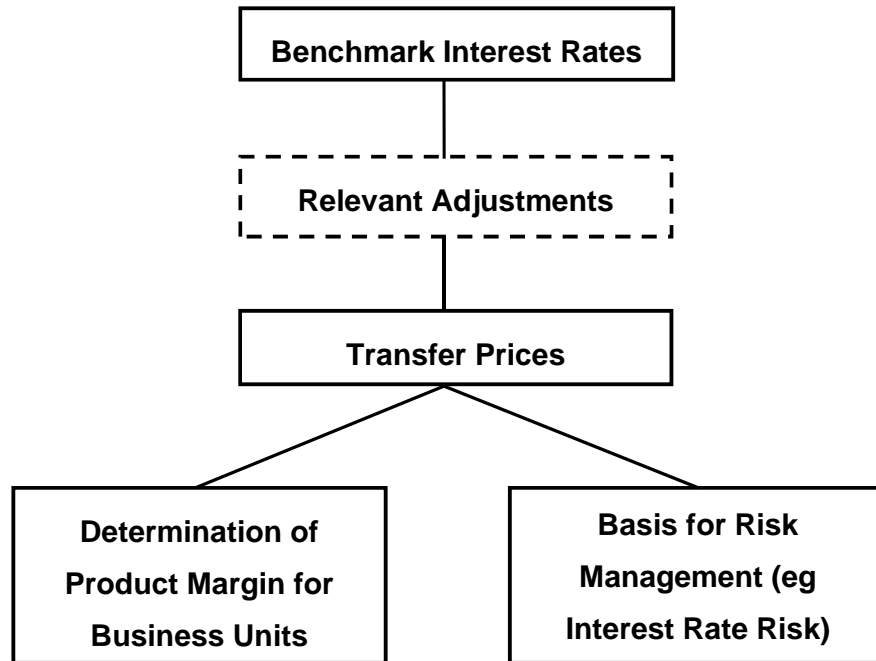
Appendix:**Details on considerations that apply to setting transfer prices*****Hedged items: the interaction between transfer pricing and risk management***

- A1. As a tool to measure and manage interest rate risks, an entity may assign transfer prices to all financial assets and liabilities, with the resulting net interest rate position being managed at the asset–liability management (ALM) unit.⁵ The advantages of this approach are as follows.
- (a) Risks like interest rate risks associated with the underlying financial instruments are transferred to a central unit. This enables the entity to implement relevant hedging activities in accordance with its overall risk management strategy on a centralised basis. This reduces transaction costs and credit risk exposure.
 - (b) The product margin of each type of transaction is captured in accordance with the entity's policy. This supports the assessment of the profitability of the transactions. For instance, some major banks disclose their performance decomposed by business unit. For example, the product margin of deposit transactions is disclosed measured as transfer price minus yield on deposits. In another example, product margins for both loans and deposits are disclosed on a percentage basis. This shows that the transfer price mechanism is already playing an important role as a relevant tool for communication with investors.
- A2. Risk management based on the transfer pricing mechanism obviously depends on how those transfer prices are determined. The practical but critical topic here is to decide which risks the transfer price should cover and how granular the transfer price setting should be. However, the transfer price used for determining the performance of a product or business unit might not always be identical to

⁵ Refer to agenda paper 9A of the September 2011 IASB meeting for a more detailed explanation of the organisation of risk management.

the benchmark used for risk management purposes as the transfer price might follow a broader risk definition.

- A3. Although the basic mechanism of transfer pricing is similar among entities, there is a variety of methods applied. In that sense, there is no ‘one-size-fits-all’ answer. The overall relationship can be summarised as follows:



Choice of benchmark rates

- A4. The setting of a benchmark rate is the basis of determining transfer prices. A common approach is to use the swap curve derived from an interbank interest rate (eg 3-month LIBOR), since it usually forms a basis for an entity in its fund raisings and in determining prices for many financial products (including hedging instruments). However, swap curves based on interbank rates include the credit risk of the market participants the index was derived from (the part of the banking industry that provides the quotes from which the rates are calculated). This effect can lead to wrong incentives, ie financial assets look less profitable than they actually are and financial liabilities look more profitable than they actually are. As a consequence more and more (credit) “risk free” market indices like some treasury yield curves are chosen, or alternatively overnight indexed swap curves are considered. Also multiple curves are used dependent on the respective purpose or underlying transaction.

Adjustments to benchmark rates to arrive at transfer prices

- A5. In addition to the described variety of potential benchmark interest rates various additional adjustments to determine the transfer price might be considered. These adjustments are driven by the entity's own fundamental principles for risk management. In other words, in the figure below the cut-off that defines the transfer price to be managed in the interest rate risk management framework depends on management's judgement. Major elements that are also used for determining the contractual interest rate of products are shown and explained below (in a sequence from bottom to top).

Commercial Margin
Regulatory Requirements
Trading Operation
Foreign Entity
Basis Risk
Credit Risk
Contingent Liquidity
Term Liquidity
Embedded Option (Prepayment Option)
Benchmark Rates (OIS, Libor/Swap)

Embedded option (prepayment option)

- A6. When business units hold financial products with embedded options, the ALM unit may charge appropriate costs associated with bearing the optionality. Business units provide options to customers since they expect a higher product margin—at first glance. Adjustments to reflect this optionality in the transfer price would be necessary. Otherwise, business units naturally have incentives to hold products with embedded optionality in pursuit of a higher product margin at the expense of being exposed to potential losses, which would be realised when embedded options are exercised.
- A7. Among embedded options, prepayment options are most closely related to repricing risk. In fact, prepayment optionality is a part of interest rate risk. For these options, the adjustment to transfer prices hinges on the allocation of

prepayment risk between central ALM and the respective business units. Hence the transfer pricing transaction mirrors the terms of the financial asset. The result of a prepayment (eg a prepayment loss and a potential offsetting prepayment penalty) is passed on to central ALM. This is also reflected in the pricing of the transfer price, ie in the absence of a prepayment penalty in the corresponding financial asset an additional prepayment spread is charged to compensate for the prepayment risk.⁶

Term liquidity

- A8. Term liquidity is the impact of the repricing frequency of an instrument being shorter than the instrument's maturity. For instance, the market price for a financial instrument with 3-month maturity can differ from a 3-year floating-rate instrument with 3-month repricing schedules. In simple terms it covers differences in liquidity risk for interest rate terms that are otherwise identical. While swap rates quote the cost to transfer interest rate risks, they are formed in the market on the assumption that cash liquidity is not exchanged among the parties.

Contingent liquidity

- A9. An entity, especially a bank, has to prepare for possible abrupt and unexpected cash outflows. The reasons for these cash outflows include earlier-than-expected cash withdrawals from core demand deposits and the use of credit lines a bank has given to borrowers. To cope with this liquidity risk, the entity holds highly liquid assets such as cash or treasury securities as a buffer. Less liquid financial assets are usually charged with an extra spread to consider this risk.

Credit risk

- A10. If an entity in its fund raising activities has to pay a premium for its own credit risk, the benchmark rates might be adjusted to reflect that premium.
- A11. The credit risk of products might also be taken into consideration in determining the transfer prices that are applied. Parameters which would be incorporated as

⁶ It has to be considered that the actual pricing of transfer prices is also dependent on the allocation of risk between the business unit and central risk management, ie whether prepayments risk is managed centrally or kept decentralised within the business units.

adjustments to transfer prices are usually PD (Probability of Default) and LGD (Loss Given Default). Without those adjustments, business units may have incentives to lend higher volumes to risky borrowers, since the product margin for these borrowers tends to be high at first glance. However, it comes at the expense of accepting lower credit quality.

- A12. On the contrary, when an entity invests in highly liquid and “risk free” assets such as some treasury securities, the product margin is expected to be very small. It can even be negative. In that case, business units will not have enough incentive to hold them. However, in most cases, such assets can be used as high quality collateral in the entity’s fund raising. Fund raising activities include those in the market and through discount facilities of central banks. This means such assets contribute to cheaper fund raising. Hence, the entity may consider it appropriate to incorporate this effect into the determination of transfer prices in order for business units to have a proper incentive to hold such assets.

Basis risk

- A13. For the purpose of this paper references to “basis risk” relate to risk that arises from imperfect correlation in changes in the interest rates earned and paid on different instruments with otherwise similar repricing characteristics. When interest rates change, that imperfect correlation can give rise to differences in changes in the cash flows and earnings spread for assets, liabilities and derivative instruments of similar maturities or repricing frequencies. An example is basis risk that arises when yields on assets and liabilities are based on different indices, such as Libor versus the Prime rate. This risk can be mitigated by using Prime versus Libor swaps. This also relates to the multiple curve approach described earlier with the setting of benchmark interest rates (see paragraph A4 above).

Foreign exchange spread

- A14. Financial institutions sometimes have to or choose to raise funds in foreign financial markets in foreign currency but manage all instruments for interest rate risk in one comprehensive portfolio (ie irrespective of the instruments’ currency). Even when separately addressing foreign exchange risk on the basis of spot rates

this element remains. The premium basically covers other spreads and changes that are involved with respective external transactions as well.

Trading operation

- A15. Suppose an entity invests in 10-year bonds for trading purposes and they are expected to be sold much earlier than their maturity date. In that case, using the transfer price for a 10-year maturity might be irrelevant for assigning a transfer price to those assets. Instead, the entity may use a transfer price corresponding to the expected timing of sales. This means that the transfer price is adjusted taking into account the expected behaviour of the entity.

Regulatory requirements

- A16. Most central banks make it mandatory for banks to maintain minimum amounts of reserves at central bank accounts to manage liquidity risk. The yields on these assets are usually lower than less liquid assets and no interest may be paid at all. Therefore, the product margin for those assets is inevitably small at best, while there might even be a negative margin. Other examples of regulatory requirements include a levy on financial liabilities of banks, which inevitably leads to a lower product margin if not considered in the pricing of banks' financial products. In order to compensate for such regulatory costs, the entity may require a higher product margin on other assets and liabilities. This consideration can affect the determination of transfer prices. However, this element is not hedged because there are no commercially viable hedge products for the risk of regulation changes, eg changes to regulatory reserve requirements.

The valuation of hedging instruments

- A17. As already shown, determining transfer prices and benchmark interest rates also relates to the pricing of derivatives since key valuation parameters such as the Libor/Swap curve are usually used as benchmarks. Therefore developments regarding the pricing of derivatives can affect the valuation of hedged items as well.
- A18. Prior to the financial crisis, the 'no-arbitrage condition' had been met in derivatives markets. For instance, there had been practically no basis spread between (a) the swap to exchange the fixed rate for 6-month Libor and (b) the

- swap to exchange the fixed rate for 3-month Libor. This meant the fundamental theory in finance called the ‘interest rate parity’ had been satisfied.
- A19. Following the financial crisis, however, market participants have become extremely cautious about counterparty risks as well as liquidity risks. This means lenders strongly prefer transactions with shorter maturities to those with longer maturities. For instance, a market participant who previously had no reluctance lending for 6 months is no longer willing to lend for the same maturity. Instead, the market participant invests for 3 months now, postponing the decision of whether to invest for the next 3 months at maturity. This is because the market participant is extremely wary of the possibility that the counterparty might go bankrupt or the participant itself might face a liquidity shortage in 3 months’ time. This tendency creates segmentation by term in the derivatives market, thereby leading to significant basis spreads between products with a different term. For instance, the prices of (a) the swap to exchange the fixed rate for 6-month Libor and (b) the swap to exchange the fixed rate for 3-month Libor are no longer the same. This phenomenon can also be observed in the basis spread between Libor-based swap curves and a curve based on OIS (Overnight Indexed Swap) increasing significantly.
- A20. Another similar phenomenon resulting from the financial crisis is the increased preference for collateralised transactions. This is obviously because of the cautious attitude among market participants to counterparty risks. In fact, the pricing of derivative transactions is more and more dependent on whether or not they are collateralised.
- A21. Those recent developments mean that the assumption of a single risk-free yield curve in the derivatives market is increasingly replaced by a more differentiating view. That trend results in constructing multiple yield curves, dependent on the basis spreads and whether or not transactions are collateralised.
- A22. Multiple yield curve approaches lead to a range of valuation outcomes for derivatives dependent on the actual contractual terms. This relates to the initial pricing as well as the subsequent valuation (discounting) of the instruments.
- A23. The implication of multiple yield curves on macro hedge accounting is that the valuations of hedging instruments as well as of hedged items has become more

heterogeneous in comparison to the environment before the financial crisis. Just as the valuation of hedging instruments might be based on various different interest rate parameters, the determination of interest rate risk for the hedged risk position on the basis of benchmark rates might also be based on various different yield curves. The latter is dependent on the entity's own fundamental principles for risk management.

Risk management methods based on transfer pricing

- A24. Depending on the risk management approach, differences in the spread of transfer prices and benchmark interest rates can be observed. There are broadly two methods as shown below.
- A25. **Single Pool Rate Matching Approach**—This method uses one rate for determining transfer prices to credit all fund providers and debit all fund users, respectively. The transfer price used here might be the weighted average cost of funds for an entity. The obvious advantage of this approach is its simplicity. However, it treats *all* assets and liabilities equally, without considering any attributes of the individual financial product such as maturity, embedded optionality, liquidity risk, credit risk, basis risk, etc. Therefore, some business units, products, or customers will be cross-subsidised by others.
- A26. **Multiple Pool Rate Matching Approach**—This approach classifies assets and liabilities into pools based on criteria such as maturity, embedded optionality, liquidity risk, credit risk, basis risk, etc. Behavioural assumptions are applied for elements such as prepayment options. Each pool's assigned transfer price is based on the specific pool characteristics. This approach can also be applied on an instrument-by-instrument basis (also called Matched Maturity Approach).
- A27. There is no 'one size fits all approach' in transfer pricing methods. However, considering the diversity of attributes of each financial product as explained above, the Single Pool Rate Matching Approach is usually no longer regarded as an appropriate method for risk management of banks given the changes in the environment.