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Bank Asset/Liability Management

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Cleared Swaps & Swap Futures

Historically, the world of interest rate derivatives divided nicely between contracts transacted on futures exchanges and those traded *over-the-counter* (OTC). As a rule, contracts traded on futures markets are standardized contracts, with contract features dictated by the listing exchange. OTC contracts, on the other hand, are negotiated contracts where any mutually agreeable terms (e.g., notional amounts, reset dates, and settlement dates) may be arranged. Although these differences remain today, the enactment of the Dodd-Frank legislation in 2010 brought these distinct market venues closer, by mandating critical futures market processing elements into the OTC derivatives marketplace.

Traditional Futures Contracts

By way of background, traditional futures are traded on futures exchanges, where exchange members enjoy the right to trade in the contracts that are listed by the futures market in which they are members. These members are free to operate as market makers who post bids and offers or as price takers, who accept the bids and offers of other members. Non-exchange members can still access futures markets. However, to do so, they need to establish a relationship with a futures commission merchant (FCM), which acts as a broker or conduit to the exchange.

The second element of futures processing is clearing. Once buyers and sellers agree on a price, the contract is consummated, and the futures' clearing house becomes the counterparty for each of the original contract participants. The clearing process imposes the requirement that all open positions must be marked to market at the prescribed settlement time; and gains and losses must be settled daily, in cash. Losers pay; winners receive, with the exchange clearing house acting as the intermediary. This daily settlement processing effectively eliminates the risk of default, or credit risk. Further to that assurance, before a trade can be executed

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on the exchange, both of the original parties must put up collateral in an amount that is expected (in the eyes of the exchange) to cover the risk of a prospective price change over the coming day with a high degree of confidence.

The daily cash flow obligation is called *variation margin* or *variation settlement*, and the starting collateral requirement is called *initial margin* or *original margin*. Critically, while variation margin must be settled in cash, the initial margin can be satisfied with either cash or, more typically, some acceptable form of non-cash collateral, like Treasury securities. Ultimately, initial margin serves as a stopgap for the situation where variation margin requirements are not satisfied in a timely manner; but assuming they are, initial margin would ultimately be returned to the posting party after the futures position terminates.

Gains or losses on any futures contract could be calculated either by summing the daily settlements or more simply by measuring the difference between the starting futures price when initially traded and the ending futures price when the contract is liquidated. That difference, times the contract multiplier, times the number of contracts bought or sold, yields the identical overall gain or loss.

In fact, this calculated result fails to reflect the *true* economic gain or loss, as it ignores the timing as to when the trader actually receives or pays the cash reflecting the associated price change. Having incremental cash inflows during the futures' holding period allows for investing those inflows and earning incremental income. On the other hand, the obligation to make cash payments during that holding period fosters either direct financing costs (if funds were borrowed) or opportunity costs (if existing assets were liquidated).

For the most part, when futures expiration dates are relatively close by, these incremental earnings or losses may be deemed to be trivial, and they're generally ignored. That said, sharp-penciled traders may employ a process called *tailing*, whereby the size of the hedge is adjusted in a dynamic manner (i.e., where the size of the tail position ultimately diminishes to zero), to try to affect the outcome where the gain or loss on the base position of the contract, combined with the above-described incremental gain or loss on the tail position sum to the *correct* economically intended gain or loss. In effect, the application of the tail serves to foster an economic gain or loss reflective of the *present value* of the change in the futures price, where the untailed hedge generates the undiscounted change in the forward (or futures) price. (For a more complete discussion on tailing see Kawaller, *"Tailing Futures Hedges/ Tailing Spreads," Journal of Derivatives*, Winter, 1997.)

Dodd-Frank Derivatives Regulations

Before the Dodd-Frank legislation, OTC derivatives were strictly bi-lateral contacts, typically between a swap dealer and an end-user. However, Dodd-Frank ushered in new execution and clearing requirements for OTC derivatives. Albeit with certain exemptions, Dodd-Frank requires swaps traded by U.S. financial institutions and other major swap users to register their trades with a central clearing facility or central clearing participant (CCP), which mandates daily cash settlements for all registered positions. This clearing process is much like the daily settlements for futures contracts, with one critical modification. Specifically, the settlement amount incorporates a second component beyond the value assigned to represent an estimate of the gain or loss of the swap, per se. That is, a *price alignment amount* or *price alignment adjustment* (PAA) is incorporated into the daily settlement amount.

The rationale for imposing the PAA is as follows: In the infancy of the OTC swaps market, trades were arranged with little or no consideration of credit risk. But over time, mandatory collateral adjustments have been instituted, with adjustments dictated by swap values surpassing agreed-upon thresholds. Typically, these collateral adjustments have been handled by posting interest-bearing securities. Revenues derived from that collateral, however, continue to benefit the posting party. Under a cleared swap today, daily cash settlements substitute for interest-bearing collateral. Thus, the PAA has been instituted to compensate the losing party of the cleared swap for having to forego incremental earnings that would have otherwise accrued with the posting of non-cash collateral.

Swap Futures

Meanwhile in exchange traded space… the CME Group lists two swap futures contract designs: Market Agreed Coupon (MAC) swap futures and Eris swap futures.

All MAC futures contracts are of a notional size of $100,000, available with tenors of 2-, 5-, 7-, 10-, 20-, and 30-years. MAC contracts are listed with a quarterly expiration cycle, with fixed rates on these swap futures set by the exchange. The assigned fixed interest rate upon listing will be the closest 0.25% of the current, at-market rate for the equivalent OTC swap. For example, if the at-market fixed rate for the relevant tenor and start date was 2.32%, the fixed rate on the MAC contract fixed rate would be set to 2.25%. In any case, regardless of the fixed rate, these contracts represent forward-starting

swaps, such that no underlying scheduled settlements arise during the term of the futures contracts. By design, the daily variation margin obligation reflects only the change in the MAC swap futures' settlement prices, with no PAA.

The underlying deliverable instrument under the MAC futures contract is an interest rate swap having a start date equal to the third Wednesday of the contract expiration month with stipulated tenors and fixed rates dictated by the selected contract. Put another way, the contract expiration month indicates the start date for the cleared OTC interest rate swap that would be delivered under the contract at expiration; and if such a delivery occurs (i.e., if the contract is not liquidated prior to expiration), upon delivery, the trader no longer holds a futures position but instead is party to a cleared swap. This delivered interest rate swap, like any other cleared swap, is marked to market with a daily cash settlement, inclusive of PAA.

The transition from futures to an OTC swap imposes one additional adjustment relating to the size of the required initial margin obligation. By statute, the initial margin requirements for cleared swaps are approximately twice that of precipitating futures positions. Thus, upon delivery of the underlying cleared swap under the MAC futures design, the position holder would have to increase the collateral amount posted with the clearing facility, relative to the initial margin requirement for the futures.

A further feature of MAC swap futures contracts is that they are traded on the basis of prices, much like bonds, having a par value of 100. Prices above par reflect swaps with positive value to the buyer, and prices below par reflect value to the seller; but in the futures venue, the buyer is the entity that agrees to receive fixed and pay variable. In contrast, in the OTC market, the seller pays fixed and receives variable and swaps are identified by their associated fixed interest rates and tenors, with prices reflecting net present values of expected future settlements. For valuation purposes, the MAC contract design calls for the fixed coupon being settled semi-annually, with the variable leg pegged to three-month LIBOR settling quarterly – i.e., the standard convention of OTC swaps.

The second contract design is the Eris Swap Futures, which is available with tenors of 2-, 3-, 4-, 5- 7-, 10-, 12-, 15-, 20- and 30-years – each contract having a notional size of $100,000. A critical difference in the Eris contract relative to the traditional structure of futures, is that Eris contracts last throughout the entire tenor of the scheduled swap cash flows, and the price incorporates all the cash flows of the analogous collateralized OTC swap. The listing month of the Eris contract indicates the start date of an associated interest rate swap, with contract expirations dictated by the tenor of the contract in question. For example, the March 2020 5-year Eris contract reflects the cash flows of a 5-year swap with a start date of the third Wednesday of March 2020 and an end date (the contract expiration date) that's five years after the contract's swap start date – i.e., the same calendar day in March 2025. Thus, the listing month is *not* the expiration month. Instead, the expiration date is implied by the start date of the contract and the contract's tenor.

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Pricing conventions in Eris contracts copy those of the MAC futures, whereby the buyer is the implied receiver of fixed rates (payer of 3-month LIBOR) and the seller is the implied payer of fixed rates (receiver of 3-month Libor). However, Eris settlement prices (and hence bids and offers) represent a unique design feature. That is, these settlement prices include three components: 1) the present value of all expected, scheduled swap settlements (i.e., periodic fixed and forecasted floating amounts of the equivalent OTC swap), 2) the sum off all prior scheduled fixed and floating amounts made, and 3) the sum of all prior PAAs. With this construction, day-to-day changes in Eris settlement prices will reflect a single day's gain or loss for the contract, per se, inclusive of the latest PAA contribution.

When initially listed (9 months prior to the start of trading for any listing month), the swap associated with the Eris futures contract would be a forward starting swap, with the fixed interest rate determined in the same manner as that prescribed for the MAC futures. It won't be exactly equal to the at-market fixed rate, but it will be close.

The careful reader should appreciate the following differences of a) buying a MAC futures and taking delivery of the underlying swap and b) trading and holding a Eris contract. Settlements for MAC futures don't include PAAs during the life of the MAC futures (i.e., prior to the delivery of the underlying interest rate swap), while the Eris Swap Futures settlements include PAAs throughout the entire term. As Eris Swap Futures are structured to remain live for the entire tenor of the underlying swap,

they may therefore be used for long term cash flow and fair value hedging in the same way one might use OTC swaps. Also, the substantially lower margin required for swap futures relative to cleared OTC swaps – approximately half – makes them an attractive alternative.

Accounting Concerns

The transition of a non-cleared swap to that of a cleared swap changes the nature of the contract in two ways: first, the substitution of daily cash settlements for the originally scheduled periodic settlements introduces considerably higher cash flow requirements for cleared swaps (and swap futures, as well) relative to un-cleared OTC swaps. In effect, daily variation margin accelerates all prospective cash flow obligations and forces them to be settled on a current basis. The non-cleared OTC participant, on the other hand, spaces out that obligation, accrual period by accrual period. Second, the reported income for the non-cleared swap and the reported income for the cleared swap will differ by the cumulative sum of the PAAs. Given this economic difference, it may be reasonable to wonder if GAAP treats cleared swaps differently from non-cleared swaps, in particular with reference to the application of hedge accounting.

In fact, GAAP is silent about both issues, and practice essentially ignores them, as well. As a consequence, when seeking to address the hedge effectiveness prerequisites for hedge accounting, entities analyze the prospective and retrospective offsets of the contracts on the basis of the scheduled cash flow requirements, ignoring the realities of daily variation settlements or considerations of PAAs. As a result, when the reset and settlement dates of the swap and the exposure match, and when the swap notionals equal principal amounts of associated exposures, swaps users can typically rely on the shortcut method or *qualitative* effectiveness tests, whereby these qualifying conditions are simply stated in the hedge documentation.

Put another way, despite the economic differences, the same test would apply to cleared and non-cleared swaps, alike. This treatment is certainly welcome by the swap-using community, where it's generally easy to structure a swap to meet these criteria; but there's a bit more to the story, specifically in connection with cash flow hedges.

GAAP for cash flow hedges dictates that derivative gains or losses are initially to be posted to other comprehensive income and later reclassified to earnings in the period(s) in which the hedged item impacts earnings. For cash flow hedge accounting with interest rate swaps, those reclassification periods correspond to the accrual periods for each interest payment/receipt of associated hedged items. With a cleared swap, however, results incorporate two components: the swap's result (i.e., the change in the net present value of future settlements as well as any scheduled settlement during the relevant period) and PAAs.

While PAAs might be trivial amounts, if they aren't reclassified to earnings on a current basis, the accumulated PAA during the entire holding period would be *left over* and remain to be reclassified to earnings when the exposure terminates or matures. It clearly makes sense to think of PAAs as realized gains or losses and to report these values in current earnings, irrespective of their magnitudes. This concern is largely moot in the case of fair value hedges, where all derivative gains or losses are realized in earnings on a current basis, anyway. With fair value hedges, however, reporting entities appear to have the discretion to separate the PAA and report it as a separate line item from the swap's gain or loss, or not; but the total earnings amount would be the same, either way.

While most OTC swap users are likely to be able to apply a qualitative effectiveness test for their swap hedges, the standardized nature of swap futures precludes this option for futures hedgers. Instead, quantitative effectiveness test are required for hedges when swap futures contracts serve as the hedging derivative.

Satisfying a quantitative effectiveness test requires articulating an analytical methodology that demonstrates the fact that that the gain or loss on the futures contract can be expected to (prospectively) and will (retrospectively) closely offset the loss or gain on the defined hedged item. Alternatively, the test could compare the results of the actual deriative to those of a hypothetical derivative – i.e., a derivative that, if traded, would generate the perfect offset. Reporting entities are free to devise a variety of methodogies for effectiveness testing, and it's left to the auditor to determine if the methodology passes muster. Thus, the more intuitive and understandable the approach, the better.

Our preferred method for the prospective test is two-fold. Ineffectiveness would arise whenever the two respective variable reset rates differ (i.e., the variable rate for the debt versus the variable rate for the swap). Thus, the first element of the test serves to demonstrate that, incorporating the time discrepancy of the resets, the two rates have been highly correlated. The second element looks to the issue of interest rate sensitivity more broadly, by appealing to the DV01 metric — a standard measure of interest rate sensitivity. The test simply assesses the DV01 for the actual swap futures contract being used for hedging, relative to the DV01 of a hypothetical swap (i.e., the swap with a notional amount equal to the

intended exposure and matching reset and settlement dates, with an at-market fixed rate as of the start of the hedge). Generally, if the tenors of the swap futures reasonably approximate those of the hypothetical swap (or the associated hedged items), the ratio of these two DV01s will be close to unity, falling comfortably within the traditional 80% to 125% boundary condition that is the ubiquitously applied qualifying condition.

The retrospective test would simply compare futures results to results that would have been generated by use of the hypothetical swap, again expecting to find this ratio falling within the qualifying boundary condition. In performing this calculation, the reporting entity can choose to construct this ratio using period-by-period changes or using accumulated changes as of the end of each accounting period throughout the term of the hedge. In either case, it would seem reasonable and appropriate to exclude PAA components of the derivative's gain or loss in contstructing this ratio.

Conclusion

Cleared swaps and swap futures can both serve the same economic functions, and both have very similar cash flow processing. Arguably, the notional size of swap futures contracts ($100,000) may make them better suited for banks hedging modest exposures. By way of comparison, the OTC market regularly trades in sizes in the range of $20 million and higher.

Hedgers will also find swap futures more economical to maintain from a margining standpoint, relative to cleared OTC swaps. As a reminder, in today's environment futures positions require approximately half the initial margin as that required for the equivalent OTC swap. And finally, swap futures may offer the prospect of greater liquidity and efficiency in connection with unwinding seasoned positions. This comparative advantage for futures derives from the fact all the futures' trading volume for a given original tenor ending in any given quarter are concentrated in a single futures contract. In contrast, the OTC is much more diffuse.

Perhaps the biggest hurdle for swap hedgers would be the need to satisfy a quantitative effectiveness test. In connection with this issue, the exchange provides all of the critical information for the hedging derivative, but the hedger would need to generate comparable data for the exposure or the hypothetical derivative, independently. With this information, as long as the features of the selected futures come close to those of the appropriate OTC swap that would be needed to address the exposure in question, effectiveness testing requirements should be easy to satisfy; and the advantages of the futures markets should be accessible.

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