ISDA Safe, Efficient Markets

Interest Rate Swaps Compression: A Progress Report

ISDA Study, February 2012

Summary
This paper describes a risk reduction practice, portfolio compression (compression), which is conducted in the interest rate swap (IRS) market. Compression enables swap dealers with substantial two-way (pay and receive) swap activity to terminate substantial amounts of swap contracts before they expire by their terms. The benefits of compression include reductions in counterparty credit exposure, operational risk and cost, as well as lower legal and administrative expenses in the event of a default of any participating dealer. Importantly, since contracts are actually eliminated, under some regimes capital costs can be reduced. Together with expanded clearing of IRS, compression produces tremendous reduction of risk in the derivatives marketplace.

Compression was introduced to the IRS market in 2003 by TriOptima. Through year-end 2011, participating institutions have eliminated $164 trillion of notional principal outstanding with $56 trillion compressed in 2011 alone. Much of the recent progress has been the result of collaboration between TriOptima and LCH.Clearnet Ltd.'s swap clearing service, SwapClear. We estimate that without compression, the size of the IRS market would be approximately 30% larger.

While results have been very positive, challenges remain to improve the scope of compression. Meeting these challenges could result in a marked increase in compression, and might very well enable the derivatives market to shrink in terms of notional outstanding even as annual activity increases.

In this paper, we will first set out an overview of the compression process, followed by a series of metrics that evidence the significant progress achieved to date. We will then highlight the challenges that need to be met to increase compression by a significant amount. We will describe the approaches of four major dealers to maximize the benefits of compression and how adoption of best practices is essential. We will then provide an estimate of what is possible in terms of potential notional that might be compressed. Finally, after a conclusion, an appendix will contain a simple example of the principles behind compression.

Overview of the Compression Process

In compression, participating dealers are able to eliminate trades among themselves where the risks of those trades offset one another according to the parameters agreed by each participant. The first step is to get as many dealers as possible to participate. Each dealer is able to specify its tolerances to changes in its portfolio as a result of compression. This is an important step. Dealers specify how much change in interest rate risk they will accept and across what tenor periods. These tenor periods are called "buckets" and may be in three-month, six-month or other increments of time out to 50 years. In addition to numerous interest rate risk parameters, dealers are also able to specify rate reset, cash flow and counterparty risk limits. TriOptima does not require dealers to compromise their risk management practices. While each dealer specifies unique tolerances, similar and permissive tolerances across dealers will increase the effectiveness of compression.

Compressions are executed in what are called "cycles" in a single currency at a time. TriOptima schedules a cycle for a currency with a group of dealers. Each participating dealer submits transactions that it has identified as eligible for compression, based upon an analysis of its swap portfolio in the currency. Each dealer also specifies the tolerances it is willing to accept. TriOptima then uses its compression algorithm to produce an unwind proposal that respects all the tolerance limits specified by each participating dealer. In IRS cycles, unwind proposals identify trades that will be completely or partially terminated to produce the compression results. The transactions are terminated only after all participating dealers have accepted the unwind proposal. After the cycle, each dealer's remaining portfolio has the same market risk (interest rate risk) profile as at the start (adjusted for the changes permitted in the tolerance setting phase) and the counterparty risk profile is changed in accordance with the tolerances set by each dealer at the start of the cycle. Reducing and leveling counterparty exposures is a frequent result of compression cycles.

Compression Metrics: Progress to Date

Globally, over 150 institutions have participated in various compression cycles in a remarkable 25 currencies since the introduction of triReduce in 2003. In 2008, TriOptima began working with SwapClear and its members to compress cleared swaps. Since a significant inventory of IRS had built up in SwapClear over the years and it was a closed, or nearly closed system, all the risk was contained within its members. Compression in SwapClear reached $89 trillion by the end of 2011. In total, $164 trillion of IRS notional has been eliminated as of the close of 2011. Compression cycles in euro, Yen and USD through February 10, 2012 have reduced notionals in SwapClear by another $20.4 trillion.

Much of the progress occurred in the last year or two. Compression cycles at SwapClear now include four currencies: USD, euro, Sterling and Yen. Twenty-one dealers have actively participated in cycles and an additional eight have agreed to participate going forward. In all, these dealers represent 29 of SwapClear's 62 members. Through this process, more than 950,000 transactions have been completely terminated.

The table below outlines the effects of compression on the aggregate amount of IRS in the marketplace, using BIS June 2011 data.[1] The first part of the table is labeled Gross Analysis and makes no adjustment for the double-counting of cleared IRS. As can be seen, if compression had not occurred, the notional amount of IRS would be $572 trillion or 29% higher than the latest BIS data of $442 trillion. The lower part of the table is labeled Adjusted Analysis and it reduces the size of the market and the amount of compression to eliminate the double-count resulting from clearing[2]. The adjusted BIS IRS market is $293 trillion. If not for compression, the adjusted market would have been $393 trillion, or 34% higher. This data does not reflect the additional progress in the second half of 2011 because it will be several months before the BIS releases data for year-end 2011.

Effects of Compression ($ trillions)

as of June 30, 2011

Gross Analysis

Aggregate IRS outstanding*	442	
Aggregate IRS compression	130	
Pro forma IRS	572	+29%

Adjusted Analysis

Aggregate IRS outstanding*	442	
Cleared swap adjustment	(149)	one-half of SwapClear portfolio
Adjusted IRS outstanding	293	
Adjusted compression	100	reduces compression by $30 trillion
Pro forma adjusted IRS	393	+34%

** BIS Survey, June 2011*

In many ways, compression works because the risk inherent in large swap portfolios can be relatively modest. In fact, over $100 trillion of swaps have been terminated through compression without significantly changing the risk of the participants' market risk portfolios. Active participants fully realize it is exposure to outright interest rate risk, to curve risk and to spread risk that is most important to risk management, rather than the outstanding notional size of the market. Nonetheless, through compression, it is possible to eliminate the equivalent of trillions of dollars of notional through a small investment of time and resources and a modest change in risk management organization. We strongly believe this small investment represents extremely good value for the industry.

Compression Challenges

The figures in the previous section are impressive. However, there is scope for much greater success both in the continued compression of bilateral swaps as well in compression of the growing volumes of cleared IRS swaps between dealers. There are three main challenges to overcome. These are:

[1] The table assumes that all compressed IRS would otherwise be outstanding and, as a result, it overstates the size of the market somewhat.

[2] Compared with bilateral execution, clearing double-counts the amount of outstanding swaps, as both parties to each cleared transaction book a swap with the clearing house.

- *Numerous Booking Desks.* Most dealers have several units that execute IRS. These units might include the main market-making desk, options desks, asset swap desks, exotic desks, asset management units, etc. Many of these desks do not participate in compression cycles even though the results for the dealer could be quite significant if all participated. This is, perhaps, the largest impediment to much greater compression results.

  To address the above issue, some banks have adopted the one-book approach, where trades are effectively contained in a single trading unit for the purposes of clearing and compression. This has several advantages. First, participation needs to be coordinated by only one desk. Second, the desk will have a much larger portfolio of swaps which produces many more offsetting swaps and opportunities for compression. The impact of these central booking desks would also yield important results for compression of uncleared IRS.

  In any case, we believe the decisions to clear and/or participate in compression (bi-lateral and through SwapClear) should be defined at the legal entity level, not the execution desk level. With limited exception for individually excluded transactions (hedge accounting treatment or other pre-agreed exception) decisions to participate in compression should cover the legal entity's entire portfolio of eligible transactions.

- *Swap Valuation Methodologies.* The markets have changed over the past few years with respect to the valuation of swaps and to borrowing and reinvesting cash that is required to manage the swaps business. Prior to these changes, there had been widespread agreement on IRS valuation using LIBOR as the valuation metric for swaps, i.e., it was the borrowing and reinvestment rate that kept mismatches of cash flows in balance. Market practice changed with the growth of swap collateralization and as the spread between LIBOR and overnight rates widened. These issues dampened the willingness of some firms to participate in compression cycles.

- *Regulatory Burdens.* The pace and scope of global regulatory reforms have placed huge compliance burdens on firms. Regulators around the world have developed different standards for clearing and execution of IRS. This has impacted not only the dealers themselves but their clients as well. The groups that might otherwise create one-book desks and processes to optimize compression are busy responding to regulatory developments and client requirements.

The industry is making progress addressing these challenges. In their March 31, 2011 letter to the global regulators, the G-14 institutions committed to "… optimizing the concentration of their portfolios on an ongoing basis in order to maximize the success of the tear-up algorithms." In addition, TriOptima developed new tools for cycle participants that address potential funding concerns giving them confidence to compress their trades.

Several banks have begun centralizing their business with SwapClear through the one-book approach. Expanded SwapClear membership and a reprioritization of compression within all SwapClear member firms have also improved compression results.

Approaches of Major Dealers

The current success of compression may be explained, in large part, by the approaches of major dealers to achieve its maximum benefits. If these practices are adopted by all participants, we believe much greater progress may be possible. Four firms, JP Morgan, Morgan Stanley, Deutsche Bank and Barclays Capital, explain their approaches below.

J.P. Morgan has taken a comprehensive approach to counterparty and market risk by utilizing the one-book approach to IRS. The vast majority of transactions with third parties executed by any of J.P. Morgan's trading desks are rebooked into a central book. This means multiple desks may execute IRS but all the benefits from compression and risk offsetting can be managed centrally. It has taken some time and investment for the infrastructure to be established, but management firmly believes it is working.

According to Andy Powell, J.P. Morgan's COO of Rates, the bank's trading managers are very particular in developing risk tolerances. He believes the bank is more restrictive than many other dealers, yet the results speak for themselves. Powell comments: "We have found that our one-book approach to compression has resulted in significant efficiencies. In SwapClear alone, we were able to terminate $5.4 trillion in notional principal in 2011. It is clear that if all market participants adopted this approach, J.P. Morgan would get even better results and the potential for the industry as a whole would be truly impressive. We greatly value reduction in our trade volumes for multiple reasons including capital management, reduced operating costs, improved systems performance and lower levels of systemic risk."

Morgan Stanley is a strong advocate of portfolio compression and supports the industry's commitments to global regulators in this area. Morgan Stanley has centralized key elements of compression cycle decision making to reduce the impact of the valuation methodologies discussed above. Morgan Stanley agrees that there will be improved compression results achieved with a reduction in the number of decision nodes (entity level vs. desk level). The centralization of compression management has radically improved the compression results observed across the firm.

Deutsche Bank has also placed a high priority on IRS compression. In 2011, it terminated $6.3 trillion of notional principal, an increase of 26% from 2010. It has also adopted the one-book approach for the major currencies (USD and EUR), and has focused on reducing both notional principal and trade volumes to the greatest extent possible within acceptable risk parameters. Like JP Morgan, it permits several desks to execute trades that are eligible for clearing but operationally transforms them into interbook trades so that only one book faces SwapClear. The bank believes it will improve operational efficiency and enhance its capital management as it continues to refine its approach to compression. It is assessing its assumptions about risk tolerances as a means of compressing even greater volumes of transactions.

Jon Eilbeck, Deutsche Bank's Chief Operating Officer Global Rates and Commodities, encourages other dealers to promote better compression practices. "We have worked with TriOptima on how to maximize the benefits of compression. We strongly believe the one-book approach should be adopted by all members of SwapClear. We see how this has benefited Deutsche Bank and are very encouraged with the potential of compression. We also believe risk

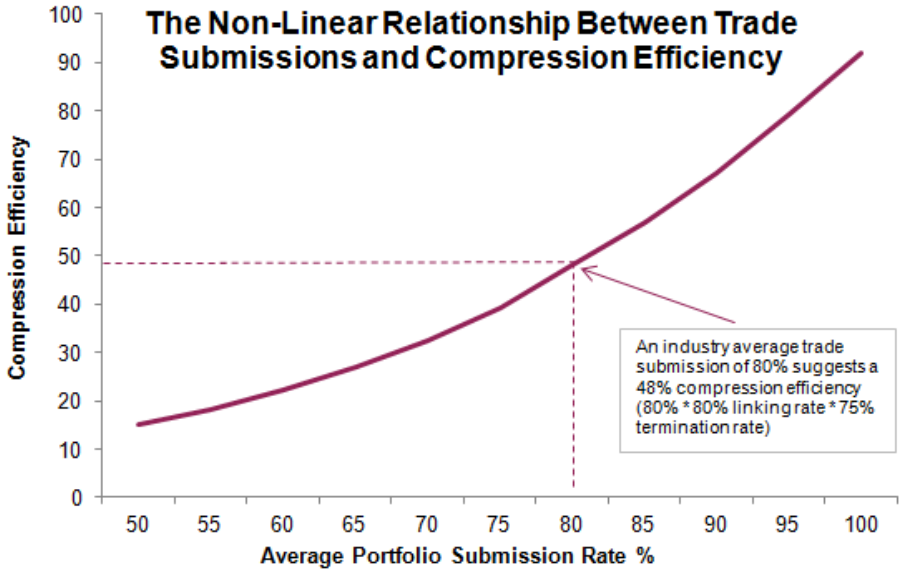
tolerances need to be tested as acceptance of small increases in risk might drive compression further."

Like JP Morgan, Morgan Stanley and Deutsche Bank, Barclays Capital was also an early adopter of practices to promote compression. Barclays has instilled trade life-cycle discipline not only in operations but also in trading, which helped create a consistent culture throughout Barclays that values compression. Barclays has a one-book approach in some currencies and currently has technology initiatives in place to expand its breadth. Barclays further maximizes the benefits of compression with specialist teams meeting before and after each cycle to apply custom risk tolerances designed to fit the currency and risk appetite at that time. The evaluations and risk impacts from previous completed cycles are documented and actioned which effectively create progressive improvements**.** In 2011, as a result of compression, Barclays Capital terminated $6.4 trillion of notional principal from SwapClear, doubling the amount from 2010 in both nominal and line item terms.

Ralph Orciuoli, the COO for Rates Trading at Barclays Capital, fully endorses the compression initiative citing successes at his firm: "The return on resources for multi-lateral compressions has been tremendous. We greatly support the one-book approach and look forward to moving further up the efficiency curve again this year."

What is Reasonably Possible?

TriOptima provided the graph below as well as the analysis in this section of the paper. The graph is based on TriOptima's years of experience with literally hundreds of compression cycles. It illustrates how increased participation from side books and higher trade submissions improve the trade linking rate, which, in turn, provides a greater pool of swaps for inclusion in the compression algorithm. The greater pool of swaps leads to greatly improved results for the entire industry. One can readily see the graph is not linear. Higher participation rates do more than increase compression proportionately.



The graph indicates that if market participants submitted all their trades that are eligible for compression, it is reasonable to assume an 80% trade submission ratio, of which 80% would be linked to other dealers participating in the cycle. Of these, 75% might then be terminated and the result would be compression of 48%. Based on the January 20, 2012 outstandings in IRS on the SwapClear website, $138 trillion of the $287.5 trillion in notional outstanding in EUR, USD, GBP and JPY could be eliminated. These statistics are an estimate of the potential for compression at a given point in time and will change based on the volume of new trades executed.

TriOptima believes its estimates are reasonable and points to great success in the compression cycles for South African Rand (ZAR) and Mexican Peso (MXN). Most dealers only trade ZAR and MXN in one book, and there is widespread participation in the cycles. Similar results could be achieved for all currencies, cleared and uncleared, if the industry coalesced around the one-book management approach.

Conclusion

Compression has quietly become one of the industry's most successful means of managing interest rate derivatives portfolios, and has helped to reduce counterparty credit risk and interconnectivity between dealers. As of year-end 2011, compression has eliminated $164 trillion of swaps since the inception of the product in 2003. Compression has significantly reduced the size of the IRS market.

The commitment to compression by derivatives industry participants, as well as firms such as SwapClear and TriOptima, is clear. Further progress in this area lies ahead, both with regard to cleared and uncleared swaps, as firms that currently engage in compression continue their efforts, and as more firms realize its manifold benefits and begin to do so.

This great success could be compounded and have an even greater impact if all dealers participated in compression cycles and adopted the one-book approach that several of the major dealers have employed.

APPENDIX

IRS Portfolio Compression: Basic Concepts

IRS portfolio compression is built on a simple idea. As dealer firms continue to trade swaps with each other, trades can begin to be removed without impacting the interest rate risk profile of the swap portfolio.

For example, Dealer A may have written a swap with Dealer B such that it is receiving fixed rate cash flows from Dealer B with a maturity slightly longer or shorter than five years. Suppose a new swap is written for the same notional amount where Dealer A pays fixed rate cash flows to Dealer B for five years. In this case, the macro interest rate risks have been largely offset. Dealer B is paying fixed in the first swap while Dealer A is paying fixed in the second swap. The notional principal is the same. All the dealers need to do is determine the difference in value between the two swaps caused by the mismatch in dates and in the fixed rate payments. If the parameters for valuing these mismatches are agreed, there is no reason why the swaps cannot literally be torn up – this is what is meant by the term compression in a bilateral context.

This type of exercise had been going on in an ad hoc manner for years between dealers as a means of reducing notionals, cleaning up portfolios and reducing operational costs. ISDA reports that an exercise similar to compression was used in 1999 to tear up nearly $1 trillion of interest rate swaps at Long Term Capital Management.

The examples used in this appendix require dealers to tear up and rewrite swap contracts. It may sound simple in concept but it involves considerably more negotiation among dealers than the successful process currently in use managed by TriOptima.

Multi-Lateral Compression

The benefits of compression between two dealers are obvious. To achieve meaningful reductions in notional outstanding, however, bilateral compression is a cumbersome exercise. If applied across the dealer community, meaningful results for the industry would involve literally hundreds of compression exercises per currency. Multi-lateral compression, on the other hand, can produce tremendous results in a very efficient manner provided there is widespread acceptance by market participants. This is the approach adopted by TriOptima in its triReduce service.

Consider, for example, a closed world where there are only four dealers: A, B, C and D. Consider as well their interdealer swaps in five years are as follows, as seen on the next page:

Dealer	Dealer	P(ay)/R(eceive)	Amount
A	B	P	100
A	C	R	50
A	D	R	75
Net: A		**R**	**25**
B	A	R	100
B	C	R	50
B	D	P	75
Net: B		**R**	**75**
C	A	P	50
C	B	P	50
C	D	R	50
Net: C		**P**	**50**
D	A	P	75
D	B	R	75
D	C	P	50
Net: D		**P**	**50**
		Net of all swaps	**0**

As can be seen, the total Net Amounts of Rs are 100 and the total Net Amounts of Ps are 100. This is a closed system. All the swaps among the four have to net to zero. In a bilateral compression world, the dealers will not be able to compress any trades because in this simple world they only have one swap with each other dealer.

In a multi-lateral compression world, all the work can be done at once. Dealer A needs to receive fixed for 25 and Dealer B needs to receive fixed for 75. C and D need to pay fixed for 50 each. The compression will result in A receiving 25 from C and B receiving 25 from C and 50 from D. We started with 400 of notionals and are down to 100.

This was a very simple example but it shows the value of increasing participants in compression.