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Testing the protocols

A detailed analysis of the functioning of the new CDS protocols following the restructuring and bankruptcy events of Thomson SA

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Highlights:

- We set out in detail how the credit derivatives market managed the events following the restructuring and subsequent bankruptcy of French media and electronics company Thomson SA.
- This was the first test of the Small Bang protocol introduced in July 2009, which focuses on the mechanics of the settlement process following a restructuring credit event.
- We begin with a thorough presentation of the mechanics of a restructuring event under the new protocol including the event determination procedure, the compilation of the list of deliverable obligations, the triggering of the contract and the auction procedure.
- We set out all of the steps of the Thomson restructuring, with a special focus on the economics of the decision to trigger the credit default swaps and what happened in the resulting auction procedure.
- We examine the impact of the Thomson restructuring on CDS indices and index tranches.
- We also discuss the final Thomson bankruptcy and how it played out for those who had triggered their CDS contracts on the restructuring and those who had decided to wait.
- The private nature and low liquidity of Thomson's debt plus the widespread occurrence of Thomson as a name in the major CDS indices highlighted any weaknesses in the protocols. However, this was a rare combination of factors which are unlikely to recur.
- We note favourably the fact that many market participants used the compression cycle to reduce operational risks due to last-minute triggering.

1 INTRODUCTION

The French media company Thomson experienced two credit events at the end of 2009

Over a four-month period at the end of 2009, Thomson SA, the French media and electronics firm, experienced two credit events. On 8 August 2009, it published a statement on its website announcing that holders of its 6.05% senior notes due 2009 had entered into a waiver and forbearance agreement to defer the repayment of principal. This constituted a restructuring credit event. Then, four months later, on 31 November, Thomson announced that it had just entered into a French Sauvegarde procedure. This triggered a bankruptcy credit event.

These provided an early and forceful test of the new credit derivative protocols

Both of these events provided a test of the revised credit derivatives protocols introduced to the credit derivatives markets during 2009. However, of the two, we will see that it was the restructuring event that was the most testing for the market. This is because (1) it was the first restructuring event to occur under the new protocols; and (2) the nature of the restructuring event meant that it had a more technically complicated post-credit event settlement process than other standard credit events.

Using the Thomson credit events as a case study, this report analyses how the market worked through them both. We first detail the new mechanics for credit event settlement which now exist and then, using the Thomson experience, we examine how well they functioned, in the process highlighting their strengths and weaknesses.

These protocols were designed to enable the transfer of credit derivative contracts to central clearing counterparties

The introduction of the new protocols was prompted by fears of the systemic risk and contagion that could lurk in the credit derivatives market as a result of its size and entanglement[1]. These fears were heightened by the lack of clear information about the number of trades, counterparty exposures and concentrations of credit risks. The credit derivatives market, under the stewardship of the International Swaps and Derivatives Association (ISDA), therefore put in place a process to address these concerns. The primary goal was to move as many credit default swaps (CDS) and CDS index trades onto central clearing counterparties (CCPs) as possible. This necessitated changing the mechanics of the contracts to make them more fungible so that they can be more easily offset. It also necessitated establishing a more global mechanism for the post-credit event settlement of contracts so that all contracts are treated identically.

The new protocols came in two stages, Big Bang and Small Bang

To achieve these aims, it was necessary to revise the legal protocols which govern the mechanics of how credit derivatives work, and these revised protocols were implemented by the market during the course of 2009. These changes came in two stages, the first called the “Big Bang” and the second called the “Small Bang”. The Big Bang protocol came into effect in April 2009. It made three important changes:

1. It hardwired the auction mechanism for the “hard” credit events of *failure-to-pay* and *bankruptcy*. This means that following one of these credit events, all contracts can be settled by a standard auction procedure which is generic to all hard credit events – previous auction protocols were *ad hoc* as they were created individually for each event. Furthermore, the new protocol specified that CDS are automatically triggered by a hard credit event. This was a change from the previous situation in which the parties to a contract had to choose to trigger.
2. It created a determinations committee (DC) tasked with determining whether a credit event[2] has occurred and organising the resulting settlement procedure.
3. It introduced a rolling credit backstop date which falls 60 days[3] before the time when a request to consider a credit event is submitted to the DC. As well as introducing an effective statute of limitations on credit events, the purpose of this change was to ensure that all CDS contracts on the same credit with the same scheduled termination date (maturity date) would be triggered by a hard credit event irrespective of when they were traded.

[1] Entanglement is a term used to describe the complex web of bilateral trades between the many different dealers and their clients. Even though the net outright credit risk of these trades is zero – for every protection buyer there is a protection seller – they do create a counterparty risk exposure whose cumulative size may be significant.
[2] The DC, among other things, determines succession events.
[3] For a succession event the backstop date is 90 days before the credit event determination date.

Big Bang came into effect in early 2009 and was focused on credit events experienced by North American credits

The Big Bang protocol purely relates to North American credits. Its changes did not address the treatment of the restructuring credit event. The restructuring credit event was never included as one of the standard credit events in North American CDS index contracts and is no longer included in single-name CDS. However, it is included as a standard credit event in the European and Asian markets and plays a much larger role there. This is because the European and Asian bank loan markets dominate their respective corporate bond markets, and because bank regulatory capital rules require restructuring in order for banks to obtain a full regulatory capital offset.

Big Bang ignored the restructuring credit event which applies only to European and Asian credits

The aspects of restructuring that make it different from other credit events include its informal and often private nature. However, most important is the fact that since debt continues to trade with a term structure after a restructuring, there is value in the protection buyer's "delivery option" which can be detrimental to the protection seller. This issue has been addressed in the past with the consequence that CDS contracts with different scheduled termination dates[4] are settled using different baskets of deliverable obligations.

Small Bang came into effect in July 2009 and addressed the issue of the restructuring credit event

Following an undertaking by European dealers to their European regulators to begin clearing index and single-name CDS trades through a central clearing house by the end of July 2009, the market worked quickly and released the Small Bang protocol on 27 July 2009. It introduced three innovations:

1. It extended the "hardwiring" of the auction mechanism to restructuring credit events.
2. It expanded the role of the DC to run post-restructuring auctions.
3. It stated that a CDS does not trigger automatically on a restructuring event, unlike bankruptcy and failure-to-pay credit events. It has to be explicitly triggered by either the protection buyer or the protection seller. If it is not triggered within the specified time window, it cannot subsequently be triggered for this restructuring event. However, the CDS can still be used for later credit events. This innovation is known as "use it or lose it".

To adopt these new protocols, dealers and customers had to sign up to them with ISDA. Signing up does not just apply the protocols to new credit derivative trades; it also applies them to existing credit derivative positions. Over 2,000 parties signed up to the new protocols, representing essentially all of the participants in the credit derivatives market.

The aim of this report is to set out the new protocols, with a special focus on the Small Bang protocol

In Part 2 of this report, we explain how these protocols function by working through the whole post-credit event settlement procedure step-by-step. Our focus is on a restructuring credit event. We describe how the event is determined, whether the CDS is triggered, what the deliverable obligations are, how the auction is used to set a price for the deliverable obligations and what happens to our related positions after the auction.

In Part 3 we compare the theory of Part 2 with what actually occurred following the Thomson restructuring credit event. We set out in detail the timeline and the steps that were followed. We also examine the events surrounding the subsequent Thomson bankruptcy event.

We will use the Thomson restructuring event as the basis for our analysis of the practical performance of the protocols

We conclude with a discussion of how the new protocol worked and any weaknesses exposed by the Thomson events. We consider how the market may decide to amend the rules for subsequent restructuring events.

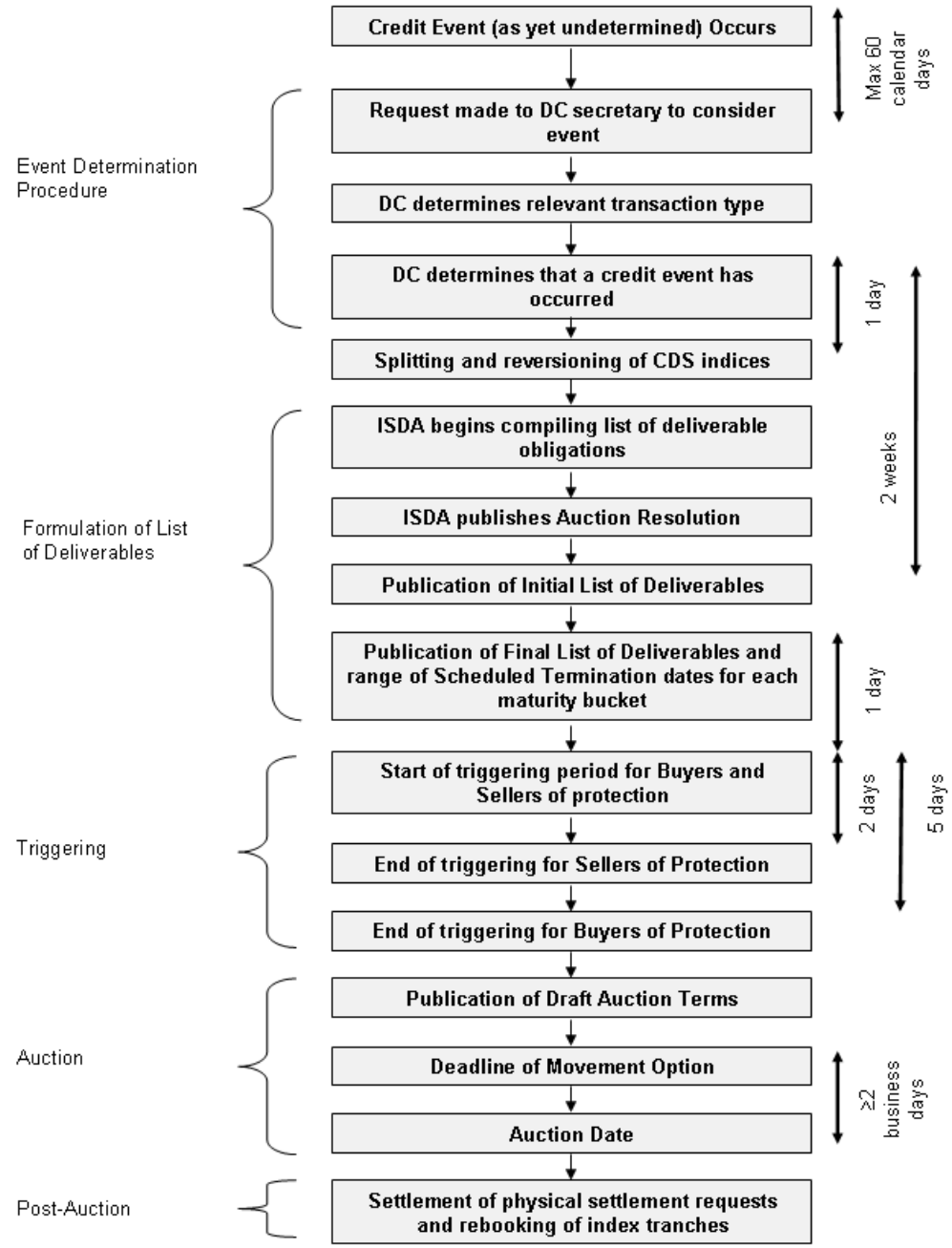
[4] The scheduled termination date is the maturity date of the CDS contract and is the last date for which the protection applies.

2 THE CREDIT EVENT SETTLEMENT PROCESS

Restructuring has a more complicated settlement process than the hard credit events

In this section, we analyse in detail the new and complete process by which a credit event is settled. We do this for both the hard credit events of bankruptcy and failure-to-pay, and the soft credit event of restructuring. A timeline showing the steps of the process for a restructuring credit event is shown in Figure 1. In this figure we have grouped these steps into five main stages: event determination, formulation of the list of deliverables, triggering of the contract, the auction and post-auction. The timeline for a hard credit event is similar – the main difference being that it does not include a triggering stage.

Figure 1. Timeline for the restructuring credit event settlement procedure with estimated timings. The timeline can be amended by a vote of the determination committee.



2.1 A credit event occurs

There are three recognised credit events for a corporate credit:

1. The company can simply allow a coupon or principal payment date to pass without making the promised payment subject to some grace period[5]. This is called a failure-to-pay credit event.
2. Alternatively, the company may file for bankruptcy. This is typically done in anticipation of a failure-to-pay.
3. A restructuring occurs in which a still-solvent company agrees with its creditors a change in the structure of its current liabilities. The restructuring must be a consequence of a decline in the creditworthiness of the company and so encompasses:
    i. a reduction in the amount of interest payable,
    ii. a reduction in the principal,
    iii. a postponement or deferral of interest or principal,
    iv. a change in subordination, or
    v. a change in currency to a currency that was not permitted originally.

The main corporate credit events are failure-to-pay, bankruptcy and restructuring

A restructuring requires an overwhelming vote in favour by the company's creditors in order to make it binding. It is generally concluded out-of-court. The event can be private as long as the debt obligations are not publicly issued. Note that while the US Chapter 11 procedure and the French *Sauvegarde* procedure are intended to rehabilitate and restructure companies, they do not constitute restructuring credit events. Instead they qualify as bankruptcy credit events since they typically use bankruptcy law to provide debtor protection and to override the wishes of some creditors.

We usually divide these three credit events into two distinct categories: **hard** and **soft** credit events. Both failure-to-pay and bankruptcy are known as hard credit events while restructuring is known as a soft credit event.

Following a hard credit event, all *pari passu* debt trades at the same price

In a hard credit event, as soon as one obligation defaults, all of the debt of the company cross-defaults and accelerates. The result is that all *pari passu* debt obligations have the same claim on the company's assets and as a consequence will trade at similar prices. Following a hard credit event, CDS contracts now trigger automatically.

Restructuring is different because the bonds and loans continue to trade with a term structure

Restructuring is a soft credit event because following it, the debt of the company continues to trade with a term structure of prices. This means that (i) bonds and loans with a longer time to maturity will generally trade at a lower price than bonds with a shorter time to maturity provided they have a similar coupon, and (ii) bonds and loans with a higher coupon will trade at a higher price than bonds and loans with a lower coupon provided they have a similar maturity date. Following a restructuring event, CDS contracts will not trigger automatically.

2.2 Event determination

The job of determining credit events has been assigned to a single body called the determination committee (DC)

Before the new protocols were introduced, the determination of a credit event involved one party to the CDS sending a notification to the CDS counterparty with two sources of publicly available information evidencing the credit event. Once it was accepted that a credit event had occurred, the corresponding settlement process began.

Under the new protocols, the determination of credit events for credit default swaps has been shifted from the CDS parties to the determinations committee. The DC, which was newly established by the Big Bang protocol, actually consists of five regional committees which cover:

1. the Americas
2. Asia excluding Japan

[5] This is typically up to 30 days.

3. Japan
4. Australia-New Zealand, and the
5. EMEA (Europe, the Middle-East and Africa).

Each regional DC has the ability to amend the settlement process as required subject to supermajority

In an attempt to remove any bias, each committee is set up with both buy- and sell-side representation.

The advantage of these new committees is that the market now has a single body for each region that is both representative and transparent and which can rule on all of the issues relating to each credit event. A supermajority of 80% is needed in order to approve any decision. A failure to achieve such a supermajority results in the decision being passed to an external review panel. The procedure for determining a credit event is as follows:

1. Any party who has signed up to the protocols and who suspects that a credit event has occurred has to request the DC to investigate. This is done by contacting the DC secretary via the ISDA website. Any request to the DC to rule on a credit event must be accompanied with a notice of publicly available information (PAI) which refers to the event. This process was revised on 9 October 2009 when it was agreed by the DCs that an eligible market participant can submit the request as a "general interest question", in which case their identity will not be disclosed.
2. At least one DC member must endorse the question.
3. The DC may vote not to determine the question (requires 80% majority).
4. The DC must determine the question within two business days unless it votes to extend this deadline.

If the DC determines that a credit event has occurred, then the date on which the question was raised becomes the Event Determination Date. The committee must also determine the date on which the credit event occurred – the Credit Event Date.

To qualify as a credit event, it must have occurred within 60 days of the submission of the request to the DC

Any determination of a credit event must also require that the credit event occurred after the Credit Backstop Date which falls 60 days before the request is submitted to the DC. If the DC considers that the credit event occurred more than 60 days in the past, the credit event cannot be determined. It is too late.

This rule was introduced in the Big Bang protocol and changed the previous starting date for protection, known as the effective date, which was set to the date one calendar day after trade date. One reason for this change was to grant some effective statute of limitations to protection sellers and to so avoid the scenario in which a contract is triggered several months or even a year or more after a credit event.

The date 60 days before submission of the request is known as the credit backstop date

However, the main reason for the change was to ensure that all credit derivative contracts linked to the same reference credit will trigger irrespective of when they were traded in order to assist the netting procedure for trading credit derivative contracts via centrally cleared counterparties. Consider the following example.

Example: *Protection is sold on a reference credit on 1 June using a fixed coupon CDS. A month later on 1 July an offsetting CDS contract on the same reference credit is transacted using the same fixed coupon to the same scheduled termination date. On 15 July the DC determined that a hard credit event occurred on 15 of June, less than 60 days earlier but before the second CDS was traded. Both contracts trigger and offset each other exactly. Note that this offset may not apply if the credit event is a restructuring because in this case the contracts do not trigger automatically and because the payoff depends on who triggers the contract. This is explained in section 2.11.*

It ensures that CDS contracts bought after the credit event but before the event determination date can be triggered

These new rules mean it would be possible to buy protection *after* a credit event had occurred but before a determination had been made by the DC. This can be done unknowingly if the contract is transacted in the time period while the credit event remains private. The protection buyer would then receive a windfall payment on the protection leg. Once the credit event is made public even if it has not been determined, the CDS contract should be trading at its credit event price and so no gain should result.

2.3 Index reversioning and spin-off

In order to handle the fact that a CDS in a CDS index may or may not be triggered following a restructuring event, the market "spins off" the restructured credit from the index. This means that as soon as a restructuring credit event has been determined, the restructured credit is removed from all of the CDS indices in which it sits. A new single-name position in the CDS is created with the corresponding notional which then sits alongside the initial index position. The new indices without the restructured credit are then given new version numbers and these indices become the new standard indices, i.e. the versions of these indices with the greatest liquidity. The process is shown in Figure 2.

Figure 2. An example of the spin-off and reversioning of a restructured credit from an unspecified series of the iTraxx index which initially contains all 125 credits so that each credit represents 0.8% of the index notional.

Following a restructuring credit event, an index containing the credit is split into a new CDS index and a standalone CDS which may or may not be triggered

The rationale behind this spinning-off is to ensure that there will be only one new version of the index after a restructuring credit event. This is better than the alternative approach which would be to keep the restructured credit in the index and then have two versions of the index, one in which the restructured credit was triggered and the other with it un-triggered. Having two indices would split the market liquidity. By splitting the index into a new CDS index and a standalone CDS contract which can then be triggered or not triggered separately, this is avoided. However, the spinning-off is only possible because the CDS index is a linear product – a position in the index with the restructured credit has exactly the same economics as a position in the index without the restructured credit and a position in the single-name CDS[6] on the restructured credit.

2.4 Can this event trigger my contract?

Most, but not all credit derivative contracts are covered by the new protocol

To determine whether a contract is triggered, we must check that the contract is covered by the new protocols. Not all credit derivative transactions are subject to the new protocols. Those that are subject are called covered transactions and those that are not are called non-covered transactions. Covered transactions include:

- single-name CDS transactions
- CDS index transactions
- option and tranche transactions on CDS and CDS indices
- first-to-default and N-to-default basket transactions
- bespoke portfolio transactions
- principal-only and interest-only transactions
- recovery locks / recovery swap transactions
- constant maturity swap transactions (single-name and portfolio)

Non-covered transactions include:

- loan-only CDS
- US Municipal CDS
- CDS on ABS or CDO's
- transactions excluded by bilateral agreement

[6] The CDS contract has the same fixed coupon as the index it was in, this may be different from the standard coupon which is traded on that credit.

It is important to note that funded bespoke CDO transactions between dealers and customers will generally not be covered, because the issuing SPV is not signed up to the protocols. As we shall see later, these non-covered transactions generate dealers physical settlement requests in the auction.

If the transaction held by the market participant is a covered transaction, then the next step is to check that the contract is triggered by the type of credit event that occurred. All standard credit derivative contracts include bankruptcy and failure-to-pay as credit events. However, they do not all include restructuring as we discuss below in section 2.6. Indeed we will see that there is a strong regional influence in whether or not the standard CDS contract includes restructuring.

2.5 Determination of the deliverable obligations

Parties to a CDS continue to have a choice of cash or physical settlement

Settlement of a credit derivative ultimately involves the physical delivery of the contract face value of deliverable obligations in return for a payment of the face value amount in cash. Alternatively it will involve a single cash payment which should have the same economic value as the physical settlement. The economic value of this exchange depends on what constitutes a deliverable obligation.

The rule for determining what constitutes a deliverable obligation depends on the type of credit event. If the credit event is a bankruptcy or a failure-to-pay, the deliverable obligations are bonds and loan obligations which are not subordinated to the reference obligation specified in the actual credit derivative contract. The contract usually imposes a maximum maturity limit of 30 years on these deliverable obligations.

The set of deliverable bonds can be different for hard and soft credit events

However, if the credit event is a restructuring, determination of the deliverable obligations that apply to a contract becomes much more complicated. The underlying cause of this complication is the “delivery option”. This is the fact that the protection buyer can choose which obligations to deliver from a basket[7] of deliverables. For a hard credit event, such a choice would have no value since all of the deliverables obligations would trade at the same price. However, following a restructuring, these obligations tend to trade at different prices. To maximise their gain, protection buyers will always find it economically optimal to choose the cheapest bond or loan to deliver. This option to choose the deliverable is known as the “CDS delivery option”. While it has value for the protection buyer, this option is disliked by protection sellers since they end up being delivered the cheapest asset. Since 2003 the market has attempted to limit the value of this option using a mechanism known as a restructuring clause described below.

2.6 The restructuring clause

Whether the restructuring credit event is included as one of the standard credit events depends on the geographical location of the credit

Whether restructuring is included as a credit event in the standard CDS contract depends largely on the geographical region in which the reference credit underlying the CDS contract is based. To make this clear, we have included a regional breakdown of the standard contract credit events and restructuring clauses (Figure 3). In North America, we note that:

- The restructuring credit event has recently been removed from all standard North American CDS single-name contracts.
- Restructuring has never featured as a credit event in the North American CDS indices.
- Restructuring as defined in the credit derivatives market is not a common credit event in North America. For example, in the US most restructurings are carried out under Chapter 11 and this constitutes a bankruptcy credit event.

This contrasts with Europe and Asia. In Asia, CDS contracts trade with restructuring as a credit event. However, these contracts trade according to the standard CDS contract before the advent of restructuring clauses. This is known as Old Restructuring (Old R).

[7] The alternative to allowing multiple obligations to be delivered into a single contract would be to have one contract per deliverable obligation. However, the resultant loss of liquidity and fungibility would almost certainly cause more harm to the market than allowing a single contract with multiple deliverables.

These contracts simply impose the maximum maturity limitation, which is usually 30 years, on all deliverables.

Figure 3. Standard credit events and restructuring clauses by geographic region

Region	Credit events	Restructuring clause
North America	CDS indices have always traded with just bankruptcy and failure-to-pay Before April 2009 single-name CDS traded with bankruptcy, failure-to-pay and restructuring After April 2009, single-name CDS dropped restructuring	CDS indices have always traded using the No-Restructuring clause Before April 2009 single-name CDS traded under the Modified Restructuring clause After April 2009, single-name CDS traded using the No Restructuring clause
Europe	Both CDS indices and single-name CDS trade with bankruptcy, failure-to-pay and restructuring	Both CDS indices and single-name CDS trade with the Modified Modified Restructuring clause
Asia	Both CDS indices and single-name CDS trade with bankruptcy, failure-to-pay and restructuring	Both CDS indices and single-name CDS trade with the Old Restructuring clause. This imposes no limits (other than a maximum maturity of 30 years on deliverables)

The rule which determines what can be delivered in European contracts is known as the Mod Mod R clause

The situation is more complicated in the European market where the standard restructuring clause is known as Modified Modified Restructuring (Mod Mod R). The specific purpose of the Mod Mod R clause is to impose a maturity limit on the deliverable obligations in order to limit the value of the delivery option. This maturity limit is known as the restructuring maturity limitation date (RMLD). No deliverable obligation with a maturity date that falls after the RMLD can be delivered by the protection buyer to the protection seller. According to the Mod Mod R convention, the RMLD for a credit derivative contract is calculated as follows:

- For restructured obligations the RMLD is the maximum of the restructuring date plus 60 months (5 years) and the CDS scheduled termination date.
- For non-restructured obligations the RMLD is the maximum of the restructuring date plus 30 months (2.5 years) and the CDS scheduled termination date.

Figure 4. The Mod Mod R maturity limitation date as a function of the CDS scheduled termination date for restructured and non-restructured debt

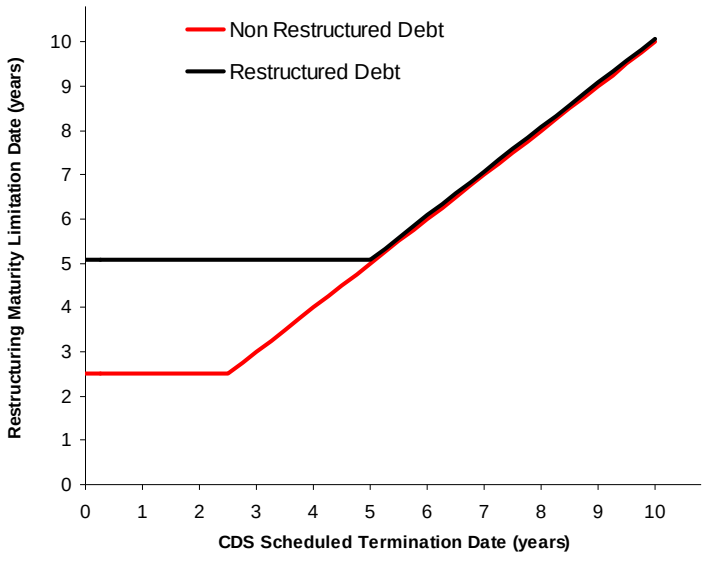


Figure 4 shows how the resulting RMLD depends on the scheduled termination date of the CDS for a Mod Mod R restructuring clause CDS. Note that the rules differentiate between restructured and non-restructured debt obligations as follows:

- For a CDS contract with a scheduled termination date in less than 2.5 years, it is not possible to deliver non-restructured debt with a maturity of more than 2.5 years but it is possible to deliver restructured debt with a maturity of up to 5 years.
- For a CDS with a scheduled termination date in more than 2.5 years but less than 5 years, restructured obligations can have a maturity of up to 5 years but non-restructured debt must have a maturity less than the scheduled termination date.
- For a CDS with a scheduled termination date in 5 or more years, there is no difference between restructured and non-restructured obligations. The RMLD is the scheduled termination date.

The Mod Mod R clause restricts the ability of the protection buyer to deliver long-dated obligations into shorter-dated contracts

While the Mod Mod R clause restricts the value of the delivery option by preventing a long-dated bond from being delivered into a short-dated contract, it does not eliminate the delivery option completely. For CDS contracts with scheduled termination dates after the maturity date of the longest maturity debt obligations, all bonds and loans can be delivered, making the delivery option as valuable as if there were no restructuring clause.

Before the new protocols were introduced, the basket of deliverable obligations into a CDS contract would simply have been determined using these restructuring clause rules, i.e. given the maturity of the CDS contract, a basket of deliverable obligations would have been determined. Based on this, a dealer poll would then have been conducted to determine the final price of deliverables and then settle the contract.

By using maturity buckets, the Small Bang protocol has adapted the main features of the Mod Mod R clause to the auction process

This approach is no longer possible because the market has switched to using an auction procedure to determine the final price of the deliverable obligations. The problem with the Mod Mod R approach is that it could result in a large number of auctions - recall that the basket of deliverable obligations in a Mod Mod R contract depends on the scheduled termination date of the contract. As a result, there could be more than 30 distinct baskets of obligations[8] and hence the same number of auctions. As so many auctions would be operationally challenging, ISDA decided to limit the number of auctions to a maximum of eight using "maturity buckets" as we explain in the next section. These maturity buckets have therefore taken the place of the restructuring maturity limitation date.

2.7 Determining the maturity buckets

To limit the number of possible auctions, the market uses a maximum of eight maturity buckets

One important role of the DC is to determine which debt obligations can be delivered into a CDS contract. This is done by specifying a number of maturity buckets, with each maturity bucket defined by its maturity end date. A bucket contains only deliverable obligations which mature before its maturity end date. The T-year maturity end date is on the first IMM date following the date T years after the restructuring credit event date. There are eight possible maturity buckets with the following values of T:

- 2.5 years (non-restructured debt) and 5 years (for restructured debt)
- 5 years
- 7.5 years
- 10 years
- 12.5 years
- 15 years
- 20 years
- 30 years (also known as the 20+-year bucket)

The shortest bucket has a different treatment for restructured and non-restructured debt

The reason for the two maturity dates in the first bucket is due to the Mod Mod R rules which allow CDS contracts with a scheduled termination date in less than 30 months to be delivered restructured debt with a maturity of less than 5 years and non-restructured debt with a maturity of less than 2.5 years.

[8] The maximum number of auctions assuming quarterly scheduled termination dates out to 10 years would be 31 – for restructured obligations we have a 30-month bucket and then quarterly buckets out to 10 years.

The remaining buckets contain both restructured and non-restructured debt with the same maturity bucket end date. The final 30-year bucket contains all deliverable obligations with a maximum maturity of 30 years[9].

Example: *We wish to calculate the maturity bucket end dates given a restructuring date (RD) of 25 January 2010. The first four bucket maturity dates are shown in Figure 5.*

Figure 5. Calculation of the maturity bucket end dates

Bucket maturity	Restructuring date + bucket maturity	Maturity bucket end date
2.5-year	25 July 2012	20 September 2012
5-year	25 January 2015	20 March 2010
7.5-year	25 July 2017	20 September 2017
10-year	25 July 2012	20 September 2020

Since each successive bucket of deliverable obligations includes all of the deliverable obligations in the earlier bucket, the delivery option becomes more valuable as the bucket maturity limit increases.

2.8 Determining the range of scheduled termination dates

The maturity bucket which applies to a CDS depends on the CDS contract's scheduled termination date

For the hard credit events the only maturity bucket is the 30-year bucket and there will only be one auction. All covered transactions will reference the final price produced by this auction. However, for a restructuring event, there will be as many as eight buckets and the DC needs to specify which bucket applies to which contract. Or to put it another way, the DC must determine the range of scheduled termination dates that use each maturity bucket. With this information, each market participants can determine which maturity bucket applies to each of his contracts.

This date range is determined by considering CDS contracts with increasing scheduled termination dates. We begin with CDS contracts that have a scheduled termination date of less than 2.5 years. In accordance with the Mod Mod R rules, these will use the first bucket consisting of non-restructured debt with a maturity of less than 2.5 years and restructured debt with a maturity of less than 5 years.

When there is a gap in the maturity profile of deliverable obligations between the end of the earlier maturity bucket and the CDS scheduled termination date, the CDS will "round down" to the earlier bucket

What happens next depends on the maturity profile of the deliverable obligations. Suppose we have a 3-year CDS contract and suppose that there are no restructured obligations with a maturity between 2.5 and 5 years apart from one non-restructured deliverable obligation with a maturity of 4 years. According to the new protocols, the 3-year CDS will "round down" to the earlier 2.5-year bucket meaning that it will share the same deliverables. In fact, so will all CDS contracts with a scheduled termination date up to the day before the 4-year obligation's maturity date.

Any CDS contract with a scheduled termination date on or after the maturity date of the 4-year bond will then map to the 5-year bucket and contain the same deliverable obligations. This is true *even* if they mature later than the CDS. This is another application of the "rounding down" convention.

[9] The 30-year bucket is also known as the 20+ year bucket. Here we call it the 30-year bucket because in practice the CDS contracts impose a maximum maturity limit on deliverables which is usually 30 years.

Figure 6. Example showing a set of deliverable obligations (A-J) and how these determine the range of scheduled termination dates which map to each maturity bucket. The 12.5-year bucket has no new deliverable obligations and so is not used – it has no auction.

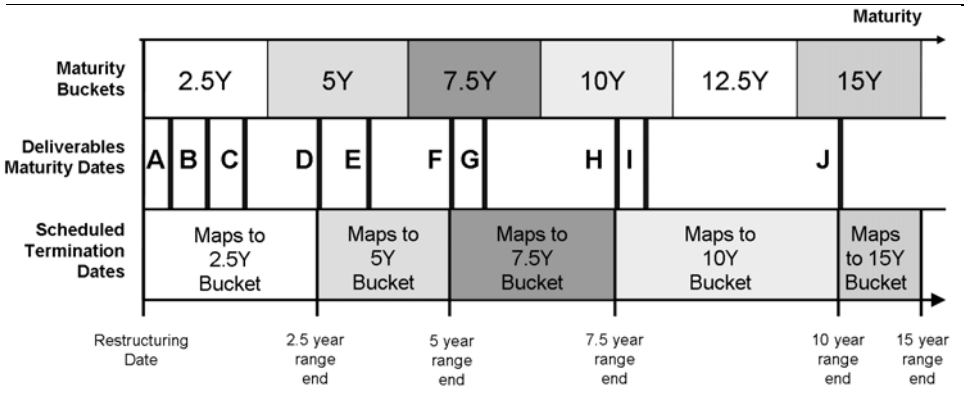


Figure 6 shows a more realistic example in which there are 10 deliverable debt obligations (labelled A-J) which we assume are all non-restructured. The range of scheduled termination dates for the 2.5-year bucket begins at the restructuring date and runs past the 2.5 year maturity end date all the way up to the date preceding the maturity of obligation D. A contract with a scheduled termination date in this range will be delivered obligations from the 2.5-year maturity bucket. The range of scheduled termination dates for the 4-year bucket range from the maturity date of obligation D up to the day preceding the maturity of obligation F. It is important to note that there are no new obligations in the 12.5-year bucket. As a result, there will be no auction for this bucket as discussed in section 2.10. This means that the range of scheduled termination dates for the 10-year bucket starts at the maturity date of bond H and extends right up to the day preceding the maturity of bond J.

In practice, this mapping process is carried out based on the calculated maturity end dates for the buckets and the compiled list of all deliverable obligations. The resulting ranges of scheduled termination dates are then published on the ISDA website by the DC.

2.9 The trade compression cycle

The next step of the settlement mechanism is the triggering of the contracts and then the auction. However, it is possible to reduce the number of contracts that go into the triggering and auction by conducting a trade compression cycle beforehand.

The trade compression cycle has become a regular event in the credit derivatives market where it is carried out periodically to net out as many contracts as possible for credits which are perfectly healthy. In this context, the aim of the compression cycle is to reduce the amount of counterparty risk within the credit derivatives market. However, here we focus on the use of the compression cycle following a restructuring credit event. In this context, the aim of the compression cycle is to assist an orderly and manageable triggering process and auction.

Before we explain this compression cycle, it is worth mentioning that counterparties to bilateral credit derivative contracts are free to agree to net out any offsetting transactions they have before the auction begins. However, when the event is a restructuring, contracts can be netted only if they are in the same maturity bucket and parties can agree in advance that the same side of each contract would have triggered first as discussed in section 2.11.

A compression cycle is a process conducted by a third-party firm to net out offsetting trades across multiple counterparties

The compression cycle is a multilateral netting procedure conducted by various third-party firms. The participants in this procedure typically include most if not all of the main dealers. In the first stage of the procedure, participants upload details of the trade population they want to include in the compression. The third party then submits all of these positions to a proprietary computer algorithm which studies the whole set of trades between all of the participants with the aim of being able to identify sets of trades that can be netted or reassigned. The output of this compression process is a list of proposed

reassignment trades and trade cancellations which if executed should reduce the number and notional of outstanding trades.

When used following a restructuring credit event, netting is only possible if parties pre-agree that one side will always trigger

When the credit event is a restructuring, the compression procedure is run for trades in each maturity bucket. It also requires participants to pre-agree on which party will be triggering. This is because of the asymmetry of the triggering payoff as described in section 2.11. In practice, it is common for parties to assume that the protection buyer always triggers first. Although they may be giving up some potential gain, all protection buyers in a chain of offsetting CDS contracts will be giving up the same amount so no party is gaining at the expense of another. Furthermore, the reduction in operational risk from having fewer trades to trigger makes giving up the asymmetry option worthwhile for many participants. This is also discussed more fully in section 2.11.

2.10 Determining which auctions will be held

An auction will only be held for a maturity bucket if it does not contain the same deliverables as the earlier bucket and there is the required level of liquidity in CDS contracts

Even if the maturity profile of deliverable obligations extends out to 30 years, it does not automatically follow that there will be eight auctions. If the maturity profile of the deliverable obligations means that two or more maturity buckets contain the same deliverable obligations, a single auction will be held for the earlier of the buckets.

The decision to hold an auction also requires that there are enough outstanding contracts which use the maturity bucket and that there are a sufficient number of dealers trading these contracts to provide the necessary liquidity and pricing input needed to run the auction successfully. Specifically, the Small Bang protocol addresses these requirements by imposing the "300/5" criteria. These criteria state that in order for an auction to proceed:

1. 300 or more contracts assigned to a maturity bucket must have been triggered
2. five or more dealers have to be party to these transactions

If an auction is not held for a maturity bucket there is a movement option

If an auction is not held for a maturity bucket there is a **movement option**. This can be exercised by either the protection buyer or the protection seller up to nine business days after the publication of the final list of deliverables. Using it, the protection buyer can move his maturity bucket to the next earliest maturity bucket for which there is an auction while the protection seller can elect to move the maturity bucket to the 30-year bucket. If both parties exercise the movement option then it is the protection buyer's decision that is used.

2.11 Triggering a contract

CDS contracts are triggered automatically for hard credit events but not for soft credit events

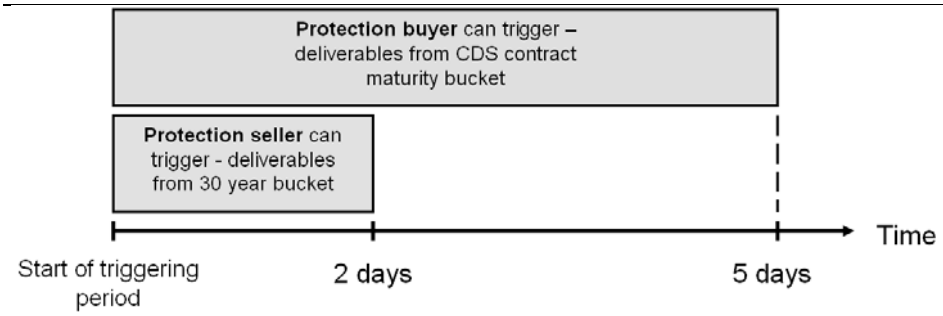
In the case of a hard credit event the contract is triggered automatically. However, if it is a restructuring credit event, the triggering of the CDS is not automatic. Participants can begin triggering contracts at any time once the DC has determined that a credit event has occurred. However, participants generally wait until the final list of deliverable obligations has been published, as only then is it possible to really assess the recovery rate risk. To complicate matters further, the payoff post-triggering is not symmetrical – the economics of the decision change depending on which party triggers the contract. According to the Small Bang protocol the rules are as follows:

1. There is no automatic triggering of a CDS contract following a restructuring. The decision to trigger can be made by either the protection buyer or the protection seller.
2. After the publication of the final list of deliverable obligations, the protection seller has a triggering window which extends for two business days. If he decides to trigger before the protection buyer then the deliverable obligations switch to the longest maturity bucket to have an auction.
3. Again following the publication of the final list of deliverable obligations, the protection buyer has an exercise window which extends for five business days. If he decides to trigger before the protection seller then the price of the deliverable obligations is set by the auction corresponding to the scheduled termination date of the CDS.

Protection buyers have more time to trigger after a restructuring event than protection sellers

The triggering timelines are shown in Figure 7. If both protection buyer and seller trigger within the first two days, the protection seller's trigger is the one which applies.

Figure 7. Triggering timeline following a restructuring credit event



The maturity bucket which applies to a contract depends on who triggers the contract

The parties also have the right to partially trigger. So for a $10mn contract, one or other party may choose to trigger $5mn and leave $5mn un-triggered[10].

These new rules mean that CDS counterparties have to consider not just whether to trigger, but whether to trigger first. We now look at the economics of this from the perspective of an outright protection buyer, an outright protection seller and a hedged dealer.

Protection buyer triggers

The protection buyer will often be motivated to exercise his protection following a credit event since it will result in a positive payoff. The maturity bucket that determines the final auction price will be the one that applies to the scheduled termination date of his contract.

To decide whether to trigger or not, protection buyers need to take a view on the market value of the untriggered contract after the auction

However, following a restructuring credit event, the decision to trigger may not be optimal since by not triggering, it may be possible to receive a higher payoff later. On a mark-to-market basis, an investor has to estimate whether by triggering it will be possible to receive more than by selling the un-triggered contract immediately after the auction. To make this decision, the protection buyer must have a view on the level of spread at which the restructured company trades after the auction, and the final price in the corresponding maturity bucket in the auction.

A protection buyer might not trigger the contract if he believes that a hard credit event with a lower recovery rate will occur soon after the restructuring credit event. However, he should trigger the contract if he believes that this restructuring will be a positive event for the company, reducing the probability of a subsequent default.

Protection seller triggers

In general, a protection seller will not want to trigger following a restructuring credit event since it will result in a payment out to the protection buyer. The only reason to trigger is if the protection seller believes that by triggering now he is avoiding a larger loss later. The protection seller has to decide whether the post-auction CDS contract value will be higher (less negative) than the loss payment if the contract is triggered.

Protection sellers will be motivated to trigger a loss in order to avoid a larger loss following a later credit event

To a longer horizon, the protection seller would be motivated to trigger the CDS contract if he believes that the recovery value from the restructuring event will be higher than the recovery value if there is then a full default. If the protection seller believes that the company will make a full recovery and is indifferent to potential mark-to-market volatility, he should not trigger the contract.

Asymmetric payoff

The asymmetric payoff means that a higher payoff will result if the opposite party triggers first

We should not ignore the asymmetry of the payoff. When the protection seller triggers the final price is determined by the auction for the longest maturity bucket and when the protection buyer triggers the maturity bucket used corresponds to the scheduled termination date. Since the longest maturity bucket will tend to have a lower final price than the other buckets, we should find that:

[10] There is a minimum unit of size which can be triggered which is typically $1mn or €1mn depending on the currency of the contract.

- A protection buyer who wants the contract to be triggered will tend to wait until the last moment to trigger hoping that the protection seller triggers since the payoff received will in general be greater.
- A protection seller who wants the contract to be triggered will tend to wait until the last moment to trigger hoping that the protection buyer triggers first since the loss payment will in general be smaller.

As a result, protection buyers and protection sellers will prefer to wait until the last moment to trigger

So we can easily have a situation in which both parties wish for a contract to be triggered but neither wishes to be the party who triggers first. There is a further complication to the triggering decision due to the different triggering periods.

Asymmetric timing

Since the protection seller's contract triggering period finishes before that of the protection buyer, there is an asymmetry in the timing of the triggering option. This means:

- Protection sellers who wish the contract to be triggered but do not wish to do it themselves will wait until the last moment on the second day of the triggering period before they trigger.
- Protection buyers who want the contract to trigger but do not want to be the one who triggers will therefore tend to wait until the protection seller's triggering period has terminated before they act. If the protection seller has not triggered then they have three days to decide whether to trigger the contract or not.

This creates a risk that a party may fail operationally to trigger its contract

The risk here is that a party who wishes to trigger waits too long and fails to trigger the contract before the specified deadline.

Hedged participants

Both the asymmetric payoff and the asymmetric timing come into play when a participant is hedged. For example, consider a dealer with a long and a short protection CDS position with the same scheduled termination dates. His aim is to be hedged after the auction by having either both contracts triggered or both contracts un-triggered. He does not wish to have one of the CDS legs triggered while the value of the other un-triggered leg is exposed to market movements in the CDS spread of the restructured credit after the auction.

One strategy is for the dealer to wait until the last moment on the second day of the triggering period to decide, hoping that his long protection position is triggered first by the counterparty who has sold protection to him. If the counterparty does not trigger, the dealer will then have to consider triggering later as protection buyer. The choices are as follows:

1. If the counterparty on the dealer's long protection leg does trigger, the dealer will also trigger his short protection position and will have to do so before the end of the two-day period. He will be hedged since the two legs were triggered as protection sellers and so will have the same final price.
2. If the counterparty on the dealer's long protection leg does not trigger, the dealer will not trigger his short protection position. His ability to subsequently trigger this leg is gone. If nothing else happens, he will be hedged since the two un-triggered CDS legs will have offsetting sensitivities to the post-auction credit spread of the restructured credit.
3. If the counterparty on the dealer's long protection leg does not trigger and the dealer does not trigger his short protection position, then the only other possibility is for the counterparty on the short protection position to trigger, and this will probably occur towards the end of the fifth day of the triggering period. To be hedged, he will need to trigger his long protection position.

The main risk here is operational. If many parties with hedged positions wait until the very last moment to trigger, the sudden surge of triggering requests may fail to reach the appropriate parties[11] in time. If this happens, the positions will not be triggered as desired and the dealer will not be hedged.

[11] Triggering can be done by fax or email to the counterparty or electronically via the DTCC.

To avoid this operational risk, hedged parties can agree to trigger on one side, usually their long protection legs

One way around this problem is for participants with hedged positions to pre-agree to trigger their long protection legs before the end of the triggering period, leaving all hedged positions flat (provided they share the same maturity bucket). This would require market participants to forgo any "gaming" of the triggering optionality in return for an elimination of the operational risk.

2.12 The auction procedure

For a hard credit event there is only one auction; for a restructuring credit event there can be up to eight

We now set out the auction procedure. For a hard credit event there is only one auction since there is only one basket of deliverables. For the soft restructuring credit event, there can be as many as eight auctions and the number of auctions depends on the maturity profile of the obligations of the reference credit and the extent to which CDS contracts on this reference credit are traded in the market as discussed in section 2.10. These auctions are all conducted in parallel. Apart from determining the number of auctions held, the type of credit event has no effect on the actual mechanics. The following description of the auction procedure is therefore generic, and applies to both soft and hard credit events.

Auction overview

The process in which the final price of a maturity bucket is determined has two stages:

1. First determine an indicative price for the deliverable obligations in a maturity bucket. This price will be used to constrain the final auction price obtained in the second part of the auction. At the same time, the auction also determines how much demand there is from the holders of covered transactions to use physical settlement in the auction to either buy or sell an amount of deliverable obligations. This is known as the net open interest.
2. There is then an auction in which anyone can participate in order to satisfy the need to buy or sell the net open interest of deliverable obligations. This auction will establish a price for the maturity bucket which will be used to close out all cash and physically settled contracts.

One party to a CDS contract can choose cash settlement while the other party to the same contract can choose physical settlement; both will be settled at the auction final price

Another key change to the previous settlement approach is that within the auction framework, the link between the two parties to a CDS contract is broken. This means that a protection buyer can submit a physical settlement request to sell bonds while his counterparty on the same contract who has sold protection may choose to be cash settled. This is one reason why the net open interest in an auction may not be zero, i.e. not every physical settlement request to buy will be matched by one to sell. In this sense, the symmetry of the settlement mechanism is broken.

We now address the auction procedure in detail. This auction procedure is administered by Creditex[12] and Markit who provide the operations and the technology platform. While all market participants including hedge funds, insurance companies, traditional investment managers and smaller banks can participate in the auction, they must do so via the dealers. The auction is carried out using the Creditex inter-dealer electronic trading platform. Results are published on the www.creditfixings.com website.

Setting the currency and exchange rates

Before the auction begins its currency has to be set. In addition, the exchange rates between the currency of the auction and any other currency in which deliverable obligations of the company are denominated must also be fixed.

2.13 Submission of physical settlement requests

Parties who wish to end up long or short physical deliverables must submit a physical settlement request via their dealer

One of the main features of the auction is that participants have the choice of cash or physical settlement on their covered transactions; doing nothing means that the participant has elected for cash settlement. Following the auction procedure, any participant who has made a physical settlement request will end up with a position equivalent to what they would have had if they had done an old-style physical settlement. The mechanics are as follows:

[12] Creditex is a wholly owned subsidiary of the Intercontinental Exchange. They specialise in credit derivative trade execution services using both an electronic and a voice platform.

- Previously, protection buyers delivered the bond or loan to the protection seller for par. In the new auction they receive par in cash and end up with a short position in the deliverable obligations.
- Previously, protection sellers were delivered bonds or loans and paid par in cash. In the new auction they pay par in cash and end up with a long position in the deliverable obligations.

Example: *A protection buyer with $10mn of face value can submit a physical settlement request to sell bonds and so will end up with a $10mn short position in deliverable obligations. A protection seller with $10mn of face value will submit a physical settlement request to buy bonds and will therefore end up with $10mn face value long of deliverable obligations.*

Protection buyers are sellers of bonds while protection sellers are buyers of bonds in part 1 of the auction

Customers of dealers who wish to participate in the auction do so by submitting a customer physical settlement request to their dealer before 5pm on the business day prior to the auction date. The customer must undertake that this physical settlement request is not greater in size than his net position in covered transactions (such as CDS, indices and index tranches) and that it is in the same direction.

Example: *If the customer has many CDS positions on the reference entity which net out to a short protection position with a size of $25mn then the size of his request cannot be more than $25mn and it must be a request to buy deliverables. It cannot be a request to sell.*

The size of customer and dealer physical settlement requests must be less than the size of their net covered transactions position and in the same direction

If the customer request only relates to trades with the dealer receiving the request, the dealer will be able to see on its trading books the net position of the customer and so be able to verify this fact. However, if the customer has positions with other dealers which mean that the net size and direction of his position is different from the one with that dealer alone, then the dealer may elect to accept or reject the request.

Dealers also submit their own physical settlement requests to the auction. Like customers, they also have to provide an undertaking that the size of their physical request submission is not greater than the net size of their covered transactions and is in the same direction.

Although most dealer positions will be covered transactions, for legacy reasons, dealers may also hold non-covered transactions. If this is the case, it will generally mean that a dealer will be hedging long protection, client-facing, non-covered transactions with short protection, dealer-facing, covered transactions. As we will explain in section 2.14, this covered-non-covered basis is one reason why dealers submit requests to buy physical assets in the auction.

Dealers submit the aggregate of their own and their client's physical settlement requests

The aggregate of all dealer and customer physical settlement requests is known as the net open interest. The rules limiting the size and direction of physical settlement requests are intended to prevent the net open interest number from being manipulated and to ensure that this number is hard-linked to the purpose of the auction which is the settlement of many thousands of covered credit derivative transactions.

The remaining auction procedure occurs on the auction date. There are two stages to this auction procedure. The first occurs on the morning of the auction date and the second in the afternoon. We now describe both of these stages in detail.

2.14 Auction: Stage 1

The first step of the auction is the submission by dealers of firm market bid and offer levels. These are used to determine an indicative market price for the deliverable obligations.

Submission of initial market bids and offers

Over the first 15-minute period of the auction dealers submit two-way bid and offer prices for the deliverable obligations. To be precise, each dealer provides a firm price at which they would buy and sell the deliverable obligations. Before the auction begins, the DC imposes a maximum bid-offer spread for these prices. It also determines the minimum amount on which the quotes are based.

Example: *Figure 8 shows an example of a set of quotes which have been submitted by eight fictional dealers A to H. The maximum bid-offer spread has been set to 2% and the quotation size is $5mn. For example, we see that dealer B is willing to pay a price of 37.25% of par to buy deliverable obligations and is willing to receive 39% of par to sell deliverable obligations.*

Figure 8. Bid and offer quotes submitted by the dealers on trade sizes of $5mn

Dealer	Bid (%)	Offer (%)
A	38.00	40.00
B	37.25	39.25
C	39.50	41.50
D	37.50	39.50
E	37.75	39.75
F	37.125	39.125
G	38.25	40.25
H	37.00	39.00

Our primary observation is that the bids range from 37.00 to 39.50 while the offers range from 39.00 to 41.50. The highest bid of 39.50 from dealer C seems especially aggressive compared with the others.

Part 1 of the auction establishes an estimate of the market price of deliverables obligations

At the end of this 15-minute period when all bids and offers have been submitted, there is then another 15-minute period during which the input prices and market orders are processed and the internal market midpoint (IMM) price is calculated and then published. The IMM price is calculated as follows:

1. The initial market bids are sorted into decreasing order and the initial market offers are sorted into increasing order.
2. The bids and offers are paired up according to where they rank in these lists so that the highest bid is paired with the lowest offer; the next highest bid is paired with the next lowest offer and so on.
3. Pairs where the bid and offer prices match are known as a “touching market”. For pairs where the bid exceeds the offer, these prices can be automatically traded. The prices are called “crossing markets”. Both touching and crossing markets are termed “tradeable markets”. All other pairs are called “non-tradeable markets”.
4. Tradeable markets are excluded from the averaging procedure used to determine the IMM. The reason for doing this is to prevent the IMM price being manipulated by a small number of dealers submitting either very high bid or very low offer prices.
5. The first half of the pairs of non-tradeable markets is then selected. If the number of non-tradeable market pairs is odd then the number of non-tradeable markets used in the average is rounded up, e.g. if there are 13 non-tradeable markets then the first seven pairs in the list are selected.
6. The bid and offer prices in these selected pairs are averaged (arithmetically) and then rounded to the relevant pricing increment, usually equal to one-eighth of a point, to give the internal market midpoint price.

Example: *Continuing with the previous example, these ordered bids and offers are shown in Figure 9. We see that the highest bid of 39.50 which is from dealer C exceeds the lowest offer from dealer H. This is the only “crossing” or automatically tradeable pair of prices and as a result it is not used in the calculation of the IMM.*

Figure 9. Ordered bids and offers. The price pairs in bold are used to compute the IMM

Sorted bids in descending order		Type of price pair (bold text rows are used in average)	Sorted offers in ascending order	
Dealer	Initial bid (%)		Dealer	Initial offer (%)
C	39.50	Tradeable market	H	39.00
G	**38.25**	**Non-tradeable market**	**F**	**39.125**
A	**38.00**	**Non-tradeable market**	**B**	**39.25**
E	**37.75**	**Non-tradeable market**	**D**	**39.50**
D	**37.50**	**Non-tradeable market**	**E**	**39.75**
B	37.25	Non-tradeable market	A	40.00
F	37.125	Non-tradeable market	G	40.25
H	37.00	Non-tradeable market	C	41.50

We have seven pairs of non-tradeable quotes and so we take an average over the first half, i.e. the first four pairs (we always round up if the number of non-tradeable quotes is odd). In this example the resulting IMM is equal to

$$(38.25+38.00+37.75+37.50+39.125+39.25+39.50+39.75)/8=38.641$$

This is then rounded to the nearest eighth of a point. In this case the final value of the IMM is 38.625%.

Submission of the aggregate physical settlement requests

Part 1 of the auction also establishes the net market demand of covered transaction holders to buy or sell deliverable obligations

At the same time as the dealers submit their two-way prices on the deliverables, they also submit physical settlement requests. Each submission by a dealer consists of the dealer's own physical settlement requests plus the aggregate of all of that dealer's customer physical settlement requests.

As stated earlier, each of the dealer's and the customer's physical settlement requests should not exceed the size of their net positions and should be in the same direction (a net long protection position means that the dealer or customer must be a seller while a net short position means the dealer or customer must be a buyer).

Once all of the submissions have been made through the Creditex trading platform, the auction administrators aggregate them to calculate the net open interest.

Reasons for submitting physical settlement requests

Let us consider some reasons why dealers or their customers would submit physical settlement requests to buy deliverable obligations and why others would submit physical settlement requests to sell deliverable obligations rather than simply allow their contracts to be cash settled at the auction final price.

Parties who submit a physical request to buy deliverable obligations are usually taking a bullish view on their post-auction price

Consider a party who has a net short protection position. They can submit a physical settlement request to buy and will end up holding deliverable obligations at the auction final price. Why would they do this rather than cash settle since both choices should be economically equivalent? The answer is that the party may believe that the current value of the deliverable obligations is too low and is hoping that their price will rise after the auction. By holding physical assets they can hope to profit from this view.

Now consider a dealer correlation desk which has bought protection on bespoke CDOs and has hedged this position by selling protection using single-name CDS contracts. Although bespoke CDOs can be covered transactions, this is not true for all bespoke transactions, especially for those issued via an SPV-structure. Since these bespoke CDOs are not subject to the new protocol, these will be settled using a dealer poll which takes place some weeks after the ISDA auction. This settlement is economically equivalent to the dealer delivering obligations in return for par. To hedge any increase in the value of the obligations over the intervening period the correlation desk can simply buy them in the auction and hold them until the dealer poll. This requires the correlation

desk to enter a physical settlement request to buy bonds or loans in the ISDA auction. Note that this is possible only because the correlation desk is short protection for the purpose of the auction.

Physical settlement requests are submitted at the level of legal entity

However, this approach may not be possible for the correlation desk because the physical settlement requests are submitted at the level of legal entity. If the dealer has a trading desk with a large long protection position, the dealer's net position could be long protection. In this case, the correlation desk would not be able to submit a request for physical settlement to buy physical assets. One alternative course of action would be for the correlation desk to enter a bid to buy bonds as a limit order in part 2 of the auction. However, this is possible only if the net open interest in the first part of the auction is to sell. If the net open interest is to buy, the correlation desk will have to source the deliverables in the market away from the auction.

A protection buyer can use the auction to sell bonds currently held at the auction final price

Now consider a protection buyer who already owns the same face value of deliverable obligations. He can use the auction to submit a physical settlement request to sell his bonds. Through the auction he can be sure that his bonds will be sold at the final price of the auction and that this same final price will be used to determine his cash payment so that he will end up with a total payment of par. Note that if he does not do this, he may be able to sell his bonds in the second part of the auction described below. However, this can only happen if the net open interest is to buy bonds. Failing this he will have to sell his bonds in the open market.

Someone who simply holds deliverable obligations (bonds or loans) and does not hold any covered transactions cannot participate in this stage of the auction.

Example*: The physical settlement requests are submitted and listed below.*

Figure 10. Physical settlement requests

Dealer	Buy or sell	Size ($mn)
A	Buy	50
B	Sell	20
C	Buy	120
D	Buy	60
E	Sell	30
F	Buy	60
G	Sell	40
H	Buy	90
Total	**Buy**	**290**

Each row of Figure 10 shows the dealer's submitted physical settlement request. Some dealers have a net demand to buy bonds and some a net demand to sell bonds. In aggregate, the net open interest is to buy $290mn of bonds.

The adjustment amount

To discourage dealers from submitting very high bids and very low offers there is a financial penalty. However, the penalty only applies if the market open interest is skewed in the opposite direction to the submitted outlying price, i.e.

- If a dealer submitted a bid price which exceeds the IMM and the market open interest is to sell bonds then there is a penalty equal to the difference between the bid price and the IMM times the market quotation amount. Here the penalty is imposed because a demand to sell bonds should be expected to result in prices below the IMM.
- If a dealer has submitted an offer price which is below the IMM and the open interest is to buy bonds then there is a penalty equal to the difference between the offer price and the IMM times the market quotation amount. Here the penalty is imposed because a demand to buy bonds should be expected to result in prices above the IMM.

Dealers are penalised for submitting initial high bids and low offers which are not consistent with the net demand of the auction

One can think of the adjustment amount as a way of punishing dealers for inconsistent behaviour. It encourages a dealer who submits a large physical settlement request to buy bonds to submit a high bid. In the same way, it encourages dealers who enter a large physical settlement request to sell bonds to submit a low offer.

Any such payments will also be announced on the Credit Fixings website and paid to the ISDA which uses it to cover auction administration costs.

Example: *From the earlier examples, we recall that the IMM price was calculated to be 38.625 and the open interest is to buy deliverable obligations. The only tradeable market was submitted by dealer C and we see below that the bid exceeds the IMM price.*

Dealer	Bid Price (%)		Dealer	Offer Price (%)
C	**39.50**	Tradeable market	H	38.875

However, since open interest was to buy deliverable obligations then there is no penalty. Out of interest's sake, let us consider what would have happened if the net open interest had been to sell bonds. Since the bid price is 39.50 and the IMM price is 38.625, and given that the market quotation size is $5mn, the adjustment amount is:

(39.50% - 38.625%) x $5mn = $43,750.

In this case, dealer C would be required to make this payment to the ISDA.

Publication of results

Auction results consisting of all initial bids and offers and physical settlement requests are published

Within 30 minutes of the end of the submission process the IMM and net open interest are published on the website www.creditfixings.com together with all of the submitted data – all initial bids and offers and physical settlement requests. Any adjustment amounts are also published.

Note that if the net open interest is calculated to be zero, the auction procedure ends as there is no need to buy or sell any physical bonds in this scenario. In this scenario, all physical settlement requests are matched up at the IMM price which becomes the final auction price. The second part of the auction does not then occur.

The net open interest tells us the net market demand to source debt obligations

Before we continue, let us consider for a moment what the net open interest tells us. If it is to buy, then it tells us that more protection sellers wish to buy bonds than protection buyers wish to sell bonds. This could be driven by a need to source the deliverable obligations to hedge the settlement of non-covered transactions or because many market protection sellers have a bullish view on the post-auction recovery price.

If net open interest is to sell then it tells us that more protection buyers wish to deliver bonds than protection sellers wish to receive bonds. This could reflect a negative view on the post-auction recovery price.

Dealer physical settlement requests tell us very little about the actual internal positions of dealers and their customers

These are the sorts of considerations that can affect the orders placed by market participants in the second part of the auction. In terms of position information, the open interest can only provide us with a lower limit on the aggregate position of the dealer and the dealer's clients. As a result, it reveals very little about the actual internal positions of dealers and their clients.

2.15 Auction: Stage 2

The aim of the second part of the auction is to find counterparties to match the net open interest and a price at which this interest can be filled

The aim of the second part of the auction is to establish the final auction price that will be used to satisfy all of the physical settlement requests. This same price will then be used to settle all cash-settled transactions.

Part 2 of the auction occurs in the afternoon of the auction date and so begins two or three hours after the end of part 1 of the auction. This delay is intended to allow market participants enough time to study the output from the first part. Whether the auction is to buy or sell deliverable obligations depends on the net open interest calculated in the first part of the auction:

- If the net open interest was to sell bonds, then the aim of stage 2 of the auction is to find bond buyers. As a result, we have an auction in which parties submit limit orders to buy bonds.
- If the net open interest was to buy bonds, then the aim of stage 2 of the auction is to find bond sellers. In this case we have an auction in which parties submit limit orders to sell bonds.

There are no restrictions on the number of limit orders or the size and price at which they can be submitted other than the size of the order should not be for more than the net open interest. All orders are submitted over a 15-minute period and consist of limit orders submitted by dealers in their own capacity or by their customers. The only requirement is that customers have to sign up to the protocol and they have to be willing to buy or sell bonds at the final auction price.

Market orders from the first part of the auction are carried forward to the second part of the auction

Those market orders submitted in part 1 of the auction that are on the correct side of the market (bids if the open interest is to sell and offers if the open interest is to buy) are converted from market orders into limit orders. The initial crossing markets are also carried forward as limit orders into the second part of the auction. However, in this case, if the net open interest is to buy (sell) then the offers (bids) are carried forward at the higher (lower) of the initial market submission and the IMM price. The size of these limit orders is simply set equal to the market quotation size. Figure 11 shows the carried forward orders from part 1 of the auction example used earlier.

Figure 11. Carried forward offers. The crossing market submitted by H is entered at its initial price and the offer size is the market quotation size

Dealer	Offer (%)	Size
A	40.00	$5mn
B	39.25	$5mn
C	41.50	$5mn
D	39.50	$5mn
E	39.75	$5mn
F	39.125	$5mn
G	40.25	$5mn
H	39.00	$5mn

For the purpose of this part of the auction, the initial submission of 39.00 by dealer H exceeded the IMM price of 38.625 and the order was therefore carried forward at a price of 39.00. The dealers have also submitted the new limit orders listed in Figure 12 and combined with the carried forward orders in Figure 13.

Figure 12. New limit orders submitted

Dealer	Offer (%)	Size
A	39.25	$50mn
D	39.875	$75mn
E	39.125	$115mn
F	39.50	$45mn
G	38.75	$80mn

Sorting these into increasing price order we have the following list of limit orders to sell deliverable obligations.

Figure 13. Full list of limit orders

Dealer	Offer	Size
H	39.00	$5mn
G	38.75	$80mn
B	39.25	$5mn
F	39.125	$5mn
E	39.125	$115mn
D	39.50	$5mn
A	39.25	$50mn
E	39.75	$5mn
F	39.50	$45mn
D	39.875	$75mn
A	40.00	$5mn
C	41.50	$5mn
G	40.25	$5mn

These orders are then filled as follows:

1. If the open interest was to buy bonds, the sell limit orders are then matched up with the open interest starting at the lowest offer price and working through the orders in increasing offer price.
2. If the open interest was to sell bonds, the buy limit orders are then matched up with the open interest starting at the highest bid price, working through them in decreasing bid price.

The final price is the last limit order price at which the net open interest has been matched - all orders are then transacted at this price

The process of matching the open interest with limit orders continues until all of the open interest has been matched. The price of the last limit order to fill all the open interest is the final price of the auction that is published. All of the filled limit orders are transacted at this final price.

Example: *Due to the net open interest being to buy $290mn of deliverable obligations, the limit orders are offers to sell bonds and these are ordered in increasing offer price. They are then filled in this order – the need for bonds is satisfied starting with the lowest price and working up as show in Figure 14.*

Figure 14. Matching limit orders with open interest

Dealer	Offers (increasing) (%)	Size	Amount remaining to be filled after order has been filled
			$290mn
H	39.00625	$5mn	$285mn
G	38.75	$80mn	$205mn
B	39.25	$5mn	$200mn
F	39.125	$5mn	$195mn
E	39.125	$115mn	$80mn
D	39.25	$5mn	$75mn
A	39.25	$50mn	$25mn
E	39.50	$5mn	$20mn
F	39.50	$45mn	$0mn COMPLETELY FILLED
D	39.875	$75mn	
A	40.00	$5mn	
C	41.50	$5mn	
G	40.25	$5mn	

We see that the net open interest does not get completely filled until the offer price of 39.50% is reached. The final auction price is therefore 39.50%.

The final price must be within a specified range of the internal market midpoint

There are two important bounds on the final price when the auction is completely filled. First let us define the cap amount. This is equal to half of the maximum bid-offer price spread used for the initial bid and offers in part 1 of the auction. The bounds depend on whether the open interest is to sell or buy bonds.

1. If the open interest is to sell bonds then the final price cannot be more than the IMM price plus the cap amount.
2. If the open interest is to buy bonds then the final price cannot be less than the IMM price minus the cap amount.
3. There is also an upper bound of 100% and a lower bound of 0% on the final price.

The end result of the auction procedure is that all CDS contracts that opted for a physical settlement request see a transaction with the bonds traded at the auction final price. The remaining cash-settled CDS contracts are closed out in cash terms using the final price.

2.16 Auction settlement

Dealers are paired up after the auction so that physical assets can be exchanged at the auction final price

After the auction, each dealer who submitted an aggregate physical settlement request to buy or sell is paired up with another dealer who submitted a limit order to sell or buy physical obligations so that they can exchange deliverables. This results in the creation of a set of trades. Each of these trades is known as a representative auction-settled transaction (RAST). The seller has to notify the buyer using a notice of physical settlement stating which obligations from the corresponding maturity bucket will be delivered. This usually happens within a week of the auction date. Once the bonds have been traded and settled, the dealers will then enter into trades with their customers to satisfy their customers' physical settlement requests.

2.17 Tranche rebooking

Following a restructuring, each maturity of a synthetic CDO tranche can split into as many as three new tranches

We now consider the implication of a restructuring credit event on a synthetic CDO, either bespoke or index-based. If there is a loss in the portfolio referenced by a tranche due to a credit event, the tranche attachment and detachment points need to be modified. While this is a straightforward procedure for hard credit events, it becomes more complicated for restructuring because of the triggering option. Below we describe the modification of index tranches, for bespoke tranches the behaviour is analogous.

Unlike CDS indices, we cannot simply remove the restructuring CDS from the reference portfolio of an index tranche and hold it separately without changing the economics of the initial trade. Instead, we must create additional new tranche positions, each based on one of the three possible outcomes. The outcome also depends on which maturity bucket the index tranche maps to. We have:

1. **Not triggered**: The reference portfolio consists of the new index without the restructured credit plus the un-triggered CDS on the restructured credit. The attachment and detachment levels are unchanged. This is effectively a bespoke CDO since the reference portfolio is no longer the official version of the index.
2. **Triggered by the protection buyer**: The reference portfolio consists of the new index without the restructured credit. The CDS has been triggered by the protection buyer so a loss is taken on the CDS and this reduces the CDO attachment and detachment points and notional. The reference portfolio is the new official index.
3. **Triggered by the protection seller**: The reference portfolio consists of the new index without the restructured credit. The CDS is triggered by the protection seller and so the maturity bucket end date is 30 years, resulting in a recovery rate which may be lower than in (2). This means that the CDO attachment and detachment points and notional will not generally be the same as in (2). The reference portfolio is the new official index.

The splitting of tranches can pose a significant burden on dealer back- and middle-office staff

As a result, a correlation trader with a portfolio of index tranches will find that he will then have each index tranche split into several new tranches. For each tranche and each traded maturity, the trader can have up to three different tranches: buyer-triggered, seller-triggered and untriggered. This will reduce the fungibility and liquidity of these trades. It also might place a significant burden on back- and middle-office staff depending on the flexibility of available booking systems.

3 THE THOMSON CREDIT EVENTS

In this section our aim is to show how the credit derivatives market applied this Small Bang protocol to the Thomson restructuring.

3.1 A credit event occurs

Thomson announced an intended restructuring in late July 2009. This was not enough to trigger a credit event

Information about an intended debt restructuring at Thomson first became public on 27 July 2009 when the company published a presentation on its website setting out a restructuring plan which had not yet been publicly approved. This was not yet a restructuring event, just the publication of an intention to restructure. The presentation set out a restructuring plan in which it was proposed that Thomson's creditors agree to reduce its total debt from €2.94 billion to €1.29 billion, a reduction that would be financed through a €350mn euro rights issue and by issuing €639mn of notes redeemable into €964mn of ordinary shares in 2010 and 2011.

In early August 2009, Thomson published information stating that a specific Thomson bond had been restructured

Almost two weeks later, on Saturday 8 August 2009, Thomson SA published a second statement on its website which said that it had *already* agreed a restructuring agreement on 15 June with all of the holders of its 6.05% senior notes of June 2009. According to this statement, they had agreed to defer the payment of $72.5mn of principal from June 17 to July 25. At this point there was public information that a restructuring event had occurred.

There was also a subsequent bankruptcy event which is described in section 3.17. The full timeline of the settlement process for the restructuring and subsequent bankruptcy credit events is given in Figure 15.

3.2 Event determination

On the first business date following the publication of the statement by Thomson, Commerzbank AG in London submitted a request to the ISDA determinations committee to consider the question:

Has a restructuring credit event occurred with respect to Thomson SA?

The European DC was asked to determine whether this constituted a restructuring credit event and the DC said yes

The EMEA credit derivatives determinations committee then met on 11 August and decided to defer the resolution announcing the credit event until 12 August when the question of whether there had been a restructuring credit event was voted on. It determined that a restructuring event had occurred. It also determined that the date of the credit event was 15 June 2009. This was the first major restructuring credit event to occur in the global credit derivatives market since the June 2002 restructuring of Xerox Corp.

3.3 Index reversioning and spin-off

Thomson was removed from all relevant indices

Thomson was immediately removed from all of the CDS indices in which it existed on 12 August. It was a widely included credit, being present in the following indices:

- iTraxx Europe Series 1-7
- iTraxx Europe Consumer Cyclical Series 1
- iTraxx Europe Consumer Series 1-5
- iTraxx Europe Crossover Series 8-11
- iTraxx Europe HiVol Series 4-7
- iTraxx Europe Non-Financial Series 1-7

After its removal, the new indices were assigned a new version number.

Example: *Consider a $10mn position in the 10-year[13] issue of iTraxx Europe Series 7 version 2. Before the Thomson restructuring this index had a coupon of 50bp and 125 names so that the exposure to Thomson was 0.8% of the notional. After the spin-off, the new index position was a $9.92mn position in iTraxx Europe Series 7 version 3 plus a $0.08mn position in a single-name CDS contract on Thomson with a coupon of 50bp.*

[13] The index maturity date was 20 June 2017.

Figure 15. The Thomson credit events timeline (all dates are in 2009)

	Restructuring event
15 June	Thomson enters into a waiver and forbearance agreement with creditors to defer payment of principal worth $72.5mn on its 6.05% senior notes from 15 July to 25 July. At this time this event was private information.
27 July	Small Bang protocol comes into effect.
27 July	Thomson publishes information showing that it has agreed with its senior creditors to restructure its debt but that the process is ongoing.
8 August	Thomson revealed information on its website regarding the waiver and forbearance agreement on the 6.05% of 2009 which was finalised on 15 June.
10 August	Credit event resolution date – date when request to consider credit event was made to the EMEA DC by Commerzbank AG. Following determination that a restructuring credit event had occurred, this date also became the event determination date.
11 August	EMEA DC met to consider whether Thomson restructuring had occurred. It was agreed to defer the resolution to the following day.
12 August	EMEA DC reconvenes to discuss resolution and declares that a Thomson restructuring credit event occurred on 15 June 2009.
13 August	Thomson was spun off from the relevant indices which were then reversioned.
10 September	The EMEA DC voted to postpone the auction date
18 September	The initial list of deliverable obligations was published followed by a three-day period for market participants to suggest additions and three more days for challenges. This took longer than expected due to the private nature of the debt – both bonds and loans were held privately.
20 September	Protection buyers pay a full fixed coupon on the premium leg of Thomson CDS contracts. This will be partly refunded by the protection seller if the contract is triggered since in that case, premium was only due to be accrued up to the event determination date.
22 September	The EMEA DC voted to postpone the publication of the final list of obligations until after completion of a TriOptima compression cycle.
6 October	Final list of obligations published.
6 October	Fourth and final Thomson compression cycle completed by TriOptima.
7 October	CDS triggering period begins at start of business.
8 October	CDS triggering period ends for protection sellers at close of business.
13 October	CDS triggering period ends for protection buyers at close of business.
19 October	FX fixing date
22 October	Auction date
29 October	Auction settlement date
	Bankruptcy event
30 November	Thomson announces that it has entered into a French Sauvegarde process.
1 December	The EMEA DC meets and determines bankruptcy credit event.
10 December	Auction date
17 December	Auction settlement date

3.4 Can this event trigger my contract?

The Thomson restructuring credit event date fell just after the credit event backstop date

In order to determine whether the event triggers a contract, it must first have happened less than 60 days before the submission of the request to the credit derivatives determination committee. Since the submission to the DC occurred on 10 August, the credit event backstop date was 11 June 2009. As the credit event was determined to be 15 June 2009, we note that had Thomson waited another five days before publicising the restructuring event, it would not have been possible to determine a credit event and it would not have been possible to trigger contracts.

The event triggered all covered transactions with Thomson SA as a reference entity. Thomson was present in a large number of trades including index tranches, bespoke tranches and index swaptions.

3.5 Determination of the deliverable obligations

On Tuesday 6 October, the ISDA published the final list of obligations. This was more than eight weeks after the event had been determined by the DC, which is much longer than the two-week period which is usually assumed. The list of obligations is shown in Figure 16.

Figure 16. The final list of deliverable obligations for all the Thomson restructuring auctions

	Bonds
Maturity date	**Deliverable obligation**
30 June 2010	$96mn 4.13% Senior Notes, Series A
17 May 2011	$191.5mn 6.20% Senior Notes, Series B
24 October 2012	€50mn Floating Rate Senior Notes, Series A
30 June 2013	$192mn 4.74% Senior Notes, Series B
6 December 2013	€100mn Floating Rate Senior Notes
24 October 2014	€100mn Floating Rate Senior Notes
30 June 2015	$118mn 4.84% Senior Notes, Series C
27 October 2016	$100mn Floating Senior Notes, Series A
27 October 2016	$100mn Floating Senior Notes, Series B
	Loans
22 June 2010	€100mn (approx) of outstanding principal amount under €1,750mn Multicurrency Revolving Loan Facility
22 June 2011	€256mn (approx) of outstanding principal amount under €1,750mn Multicurrency Revolving Loan Facility
21 June 2012	€1,394mn (approx) of outstanding principal amount under €1,750mn Multicurrency Revolving Loan Facility

Due to the private nature of Thomson's debt, it took longer than usual for the DC to compile the final list of deliverable obligations

These deliverables consisted of both bonds and loans. Both bonds and loans were privately held and this explains why it took so long for the ISDA to obtain information about them.

One important question was what proportion of the roughly €2.53bn of deliverable obligations had been signed up to the Thomson restructuring agreement. This was important because debtholders who had signed up to this agreement would not be permitted to trade their bonds in the auction. However, such information was private, although it was believed to be well over half of the deliverable obligations. It was also reported[14] that Deutsche Bank was the most significant creditor as a holder of a large amount of the private placement notes.

3.6 Determining the maturity buckets

From the list of deliverables in Figure 16 we see that the longest maturity deliverable has a maturity date of 27 October 2016. Given that the restructuring date was 15 June 2009, this is inside the maturity bucket end date for the 7.5-year bucket and we should only need at most the first three buckets.

[14] *Risk Magazine*, 13 August 2009.

The maturity profile of Thomson's debt required the use of three maturity buckets

Consider how we calculate the first bucket. Two and a half years after 15 June 2009 takes us to 15 Dec 2011. The following IMM roll date is 20 Dec 2011. The first bucket should therefore be from 15 June 2009 to 20 December 2011. The other two maturity bucket end dates are calculated in the same way and are shown in Figure 17.

Figure 17. Maturity buckets to which deliverable obligations are to be assigned

Bucket	Bucket start date	Bucket end date
2.5 year	15 June 2009	20 December 2011
5 year	21 December 2011	20 June 2014
7.5 year	21 June 2014	20 December 2016

The buckets are used to establish the bonds which are included in each of the three auctions. We can then assign the deliverable obligations to each bucket.

Figure 18. Deliverable obligations for 2.5-year maturity auction

Amount	Maturity	Coupon	Description
€100mn (approx)	22 June 2010	E+35bp	Part of principal amount under €1,750mn Multicurrency Revolving Loan Facility
$96mn	30 June 2010	4.13%	Privately placed Senior Notes, Series A
$191.5mn	17 May 2011	6.20%	Privately placed Senior Notes, Series B
€256mn (approx)	22 June 2011	E+35bp	Part of principal amount under €1,750mn Multicurrency Revolving Loan Facility

The deliverable obligations in the 2.5-year bucket are shown in Figure 18. The bucket contains two bonds and two loans. The 5-year bucket deliverables include all of these plus the bonds and loans shown in Figure 19.

Figure 19. Additional bonds in the 5-year bucket

Amount	Maturity	Coupon	Description
€1,394mn (approx)	21 June 2012	E+35bp	Part of principal amount under €1,750mn Multicurrency Revolving Loan Facility
€50mn	24 Oct 2012	Floating	Privately placed Floating Rate Senior Notes, Series A
$192mn	30 June 2013	4.74%	Privately placed Senior Notes, Series B, due 2013
€100mn	6 Dec 2013	Floating	Privately placed Floating Rate Senior Notes

Finally, we have the 7.5-year bucket. The additional bonds and loans are shown in Figure 20.

Figure 20. Additional bonds in the 7.5-year bucket

Amount	Maturity	Coupon	Description
€100mn	24 Oct 2014	Floating	Privately placed Floating Rate Senior Notes
$118mn	30 June 2015	4.84%	Privately placed Senior Notes, Series C
$100mn	27 October 2016	Floating	Privately placed Floating Senior Notes, Series A
$100mn	27 October 2016	Floating	Privately placed Floating Senior Notes, Series B

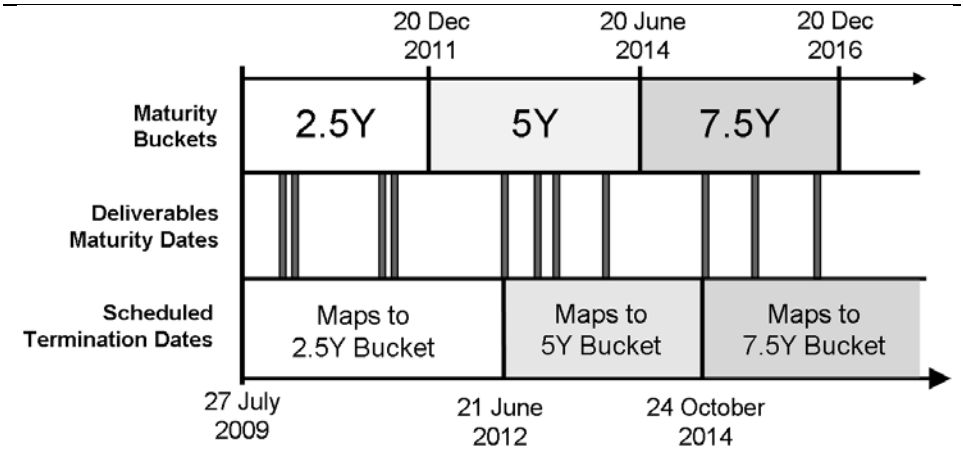
All three buckets satisfied the liquidity criteria and so it was determined that three auctions would be held

One of the conditions used to test whether or not an auction would be run were the 300/5 criteria. Information from the DTCC and dealers showed that there were more than 300 contracts against each maturity bucket. Discussions with the market showed that the number of dealers trading Thomson was more than 5 – we will see that there were 14 dealers in each auction. As a result, this test was easily passed and all three baskets would have their own auctions.

3.7 Determining the range of scheduled termination dates

Figure 21 shows the maturity profile of the bond and loan obligations of Thomson after the restructuring credit event. Also shown are the bucket end dates. We examine the process of determining the range of scheduled termination dates that apply to each maturity bucket.

Figure 21. The maturity buckets, maturity profile of deliverable obligations and the range of scheduled termination dates for Thomson



Once the maturity profile of Thomson's debt was made public, calculation of the range of scheduled termination dates for each maturity bucket was straightforward

The first bucket ends on 20 December 2011. All CDS with scheduled termination dates up to and including this date will have deliverable obligations from the 2.5-year maturity basket. However, there are no deliverables between 21 December 2011 and 20 June 2012. As a result, all CDS with scheduled termination dates in this period will have the same basket of deliverables as the 2.5-year maturity basket. This is the "round-down" rule. The range of scheduled termination dates which use the 2.5-year bucket therefore extends up to 20 June 2012.

Those CDS contracts with scheduled termination dates which start on or after 21 June 2012 will use the 5-year maturity bucket. Although this bucket end date is 20 June 2014, the next deliverable obligation to mature does so on 24 October 2014. Once again we use the round-down rule to make all of the CDS contracts with scheduled termination dates up to 23 October 2014 use the 5-year bucket. The range of dates is shown in Figure 22.

Figure 22. The maturity bucket which corresponds to a CDS scheduled termination date

Range of scheduled termination dates	Bucket	Used if the CDS is triggered by:
Up to 20 June 2012	2.5 year	Protection buyer only
21 June 2012 to 23 October 2014	5 year	Protection buyer only
24 October 2014 onwards	7.5 year	Protection buyer or protection seller

After 24 October, the next maturity end date is the 7.5-year date which falls on 20 December 2016. As all the remaining deliverable obligations fall in this bucket then all CDS with scheduled termination dates in this range use this 7.5-year bucket. But then so do all CDS with longer maturities because, since there are no longer-maturity deliverable obligations, they are all rounded down into the next longest bucket which is the 7.5-year bucket.

3.8 The decision to trigger on the restructuring event

Once the DC announced that a restructuring event had occurred, the holder of a CDS had to decide whether or not to trigger their contract. In the case of Thomson, this triggering period began on Wednesday 7 October. Let us first make clear the mechanics of the decision:

1. The protection seller had two days from start of business on Wednesday 7 October to close of business on Thursday 8 October to trigger. If he triggers, the deliverable obligations in the auction are those in the longest-maturity bucket.
2. The protection buyer had five business days to trigger from start of business on Wednesday 7 October until close of business on Tuesday 13 October (the five days exclude the weekend). Were he to trigger, the protection buyer could choose deliverable obligations in the auction which are in the maturity bucket corresponding to the scheduled termination date of the CDS.
3. If neither party triggered, there was no payment and the CDS remained alive.

Given these facts, the decision for outright protection buyers and sellers came down to a view on the post-auction credit quality of Thomson as captured by its spread, plus its ability to survive the restructuring or end up experiencing a hard credit event. For those participants, mostly dealers, who had hedged positions consisting of a purchase of protection hedged with a sale of protection, the decision to exercise was also based on a desire not to be left exposed, with one contract triggered and the other not.

Protection sellers who anticipated a high recovery rate were motivated to trigger but generally waited until the last moment

It was generally believed before the triggering that the final auction price would be high, especially for the shortest 2.5-year maturity bucket. Protection sellers were therefore motivated to trigger in the expectation that the resulting loss would be lower than a later and more severe hard credit event. However, due to the asymmetry of the payoffs, they tended to wait until the very last moment to trigger. As a result, there was a lot of last-minute triggering by protection sellers at the end of the second day of the auction.

At this point, the market had contracts which had been triggered mainly by protection sellers and contracts which had not been triggered. Protection buyers then had to decide whether to trigger their untriggered CDS contracts. In this situation there was no need to trigger early since the other party was no longer able to trigger. Those who had outright long protection positions triggered if they thought their Thomson position would be worth less after the auction. Those with hedged long protection positions where the short position had already been triggered also then triggered in order to flatten their position. Those with hedged long positions where the short position had not been triggered tended to choose not to trigger, retaining a hedged position in CDS.

3.9 The trade compression cycle

Four compression cycles were run by TriOptima in the period before the auction

One reason for the delay in holding the auctions was the need to run a number of compression cycles for Thomson. This is a process in which dealers submitted their Thomson single-name CDS, index and index tranche positions to a third party company called TriOptima. These positions were then analysed to identify combinations of trades which can be closed out and so removed from the auction settlement process.

Many dealers agreed to allow contracts to be triggered as protection buyer

All together, four compression cycles were run by TriOptima in order to reduce the number of trades and counterparties involved in the forthcoming Thomson auction. In order to deal with the asymmetry of the triggering procedure, many of the dealers participating in the compression cycle decided to allow contracts to be triggered by the protection buyer. Provided long and short protection contracts shared the same maturity bucket, they could then be netted out. This was not just as a gesture of “good citizenship”, but also one of self-interest since the fewer contracts involved in the triggering process, the lower the operational risk of failing to trigger. This was especially important for those dealers who had offsetting index trades and wanted to be hedged against an outright exposure to Thomson.

Over three-quarters of Thomson single-name trades were eliminated by this process

The first compression cycle was conducted on 14 August, soon after the announcement of the credit event. A second compression cycle for all Thomson trades was completed on 26 August 2009 and involved 28 dealers. Then in September and at the start of October, two additional compression cycles were run with 31 dealers involved. To encourage this process, the EMEA DC voted on 22 September to delay the publication of the final list of deliverable obligations to a date after these compression cycles had been completed.

In addition to netting out CDS indices, these cycles resulted in the termination of 8,105 CDS single-name trades with a notional value of $19.6bn plus 5,232 index tranche trades with a total notional of $215bn. The eliminated single-name trades accounted for over three quarters of all Thomson single-name trades held in the DTCC's trade information warehouse.

3.10 The auction procedure

Fourteen dealers were involved in all of the Thomson restructuring auctions. They were Bank of America Merrill Lynch, Barclays Capital, BNP Paribas, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan, Morgan Stanley, Nomura, RBS, Société Générale, and UBS.

The auction for the 2.5-year, 5-year and 7.5-year baskets were all conducted in parallel on 22 October 2009. At the time of the auction, the gross notional of contracts referencing Thomson SA at the DTCC was equal to $21.2bn, with a net notional of $2.02bn. The number of contracts that could be settled was 5,067.

Due to the combination of euro- and dollar-denominated debt, the auction exchange rate had to be specified on the business day before the auction. The relevant currency for the auction was determined to be euros. The euro-dollar exchange rate was determined to be 0.66921. The minimum quote amount in the auctions was set by the DC to be €2mn, the bid-offer pricing spread was 10% and the cap amount 5%.

3.11 The 2.5-year maturity bucket auction

14 dealers participated in all three auctions

All 14 dealers submitted bids and offers into the first stage of the auction. The bids ranged in value from 80% to 90% and the offers from 90% up to 100%. The IMM was calculated at 91.25%. Physical settlement requests came from only five dealers (Figure 23).

Figure 23. Physical settlement requests in 2.5-year auction

Dealer	Direction	Amount
BNP Paribas	Offer	€30mn
Deutsche Bank AG	Offer	€120mn
Barclays Bank PLC	Bid	€63mn
Credit Suisse Intl	Bid	€1mn
Morgan Stanley & Co. Intl. Plc.	Bid	€5mn
Net Open Interest		€80.967mn to sell

Net open interest was €80.967mn to sell deliverable obligations. There were no adjustment amounts. Following this, dealers submitted limit orders to buy the bonds that the net open interest was intending to sell. Since the auction is Dutch, these limit orders were filled starting with the highest price.

Figure 24. Limit orders in the 2.5-year auction

Dealer	Bid (%)	Size
JPMorgan Chase Bank N.A.	**96.25**	**€80.967mn**
Barclays Bank PLC	96	€10mn
Barclays Bank PLC	91.25	€2mn
Many more unfilled limit orders which we do not show		

Figure 24 shows only the filled order plus the next two. We see that the open interest was filled by the first order. The size of this order was exactly equal to the net open interest and had the highest bid of 96.25%. This had been submitted by JPMorgan. The final price was therefore 96.25%. Note that had JPMorgan bid for a slightly smaller amount then the final price of the auction would have been determined by the next highest bid.

The shortest maturity 2.5-year bucket auction resulted in a high recovery price of 96.25 due to one high buy order on the entire net open interest

Given that the IMM was at 91.25%, the final price was the highest it could possibly be. This is because the highest final price is the IMM plus the cap amount. We therefore see that JPMorgan submitted a buy order at the maximum bid price and used it to be all of the open interest. The fact that this final price exceeded the IMM seems unusual given that there were more sellers of bonds than buyers in terms of physical settlement requests. This high final price was good for those with large short protection positions who were being cash settled.

3.12 The 5-year maturity bucket auction

Again all 14 dealers submitted inside bid and offer prices to the auction. Bids ranged from 72% to 80% while offers ranged from 82% to 90%. The IMM was calculated at $80.375. The physical settlement requests are shown in Figure 25.

Figure 25. Physical settlement requests for the 5-year bucket

Dealer	Side	Size
Deutsche Bank AG	Offer	€227.954mn
Société Générale	Offer	€136.715mn
Barclays Bank PLC	Bid	€85mn
Morgan Stanley & Co. International PLC	Bid	€30mn
Nomura International PLC	Bid	€18mn
The Royal Bank of Scotland PLC	Bid	€11mn
Net		€220.669mn to sell

The net open interest was €220.669 to sell. No adjustment amounts were charged since none of the initial bids exceeded the IMM price of 80.375%. The next step was the compilation of limit orders to bid for the physical assets which the physical settlement requests wished to sell. There were a large number of limit orders with four dealers submitting orders at the highest bid of 80%. Most bid sizes were small, in the order of €5mn to €20mn, compared to the net open interest so this was not completely filled until the price had fallen to 65.125%.

The final price of the 5-year maturity bucket auction was 65.125

The final price was therefore 65.125%, much lower than the IMM of 80.375%. Note that there is no lower bound on the final price when the open interest is to sell. In a way it is not surprising that the final price is lower than the IMM given that net interest was to sell bonds. What is surprising is how low it fell given the range of bids in the first part of the auction.

3.13 The 7.5-year maturity bucket auction

All 14 dealers participated in the 7.5-year maturity auction. The initial bids ranged from 68% to 78% and the offers from 78% to 88%. The IMM was calculated to be 80%. The net open interest is shown in Figure 26.

Figure 26. Physical settlement requests for the 7.5-year auction

Dealer	Bid/Offer	Size
Bank of America N.A.	Offer	€32mn
Deutsche Bank AG	Offer	€253.918mn
Barclays Bank PLC	Bid	€101.15mn
Credit Suisse International	Bid	€1mn
Morgan Stanley & Co. International PLC	Bid	€20mn
Nomura International PLC	Bid	€15mn
The Royal Bank of Scotland PLC	Bid	€1.2mn
Net		€147.6mn to sell

The 7.5-year maturity bucket auction resulted in a final price of 63.25

The net open interest was calculated to be €147.6mn to sell. The limit orders to buy bonds were filled starting with the highest bid price of 80%. However, there were many small bids at decreasing prices so that the open interest was not completely filled until the price reached 63.25%. This only happened once the price fell to 63.25%. This is much lower than the IMM of 80%. Due to this being the largest basket of deliverables, we would have expected this auction to have the lowest final price.

3.14 The triggering decision

Immediately after the auction it was possible to look at the market prices of CDS contracts to determine whether the decision to trigger the contract had yielded a higher payment than the decision not to trigger. Figure 27 shows the up-front value of a CDS contract with a zero running coupon as implied by market spreads at the close of business on the day of the auction[15]. This value can be directly compared with the triggering payoff of (100% - final price) to determine (with 20:20 hindsight of course) whether the contract should have been triggered.

The profitability of a decision to trigger was highly dependent on the maturity of the CDS contract

We see that the high recovery rate in the 2.5-year bucket meant that it was not optimal to trigger short-dated contracts early since the payoff was only (100% - 96.25%) = 3.75%. For the remaining buckets, the auction payoff was higher than the CDS up-front values reflecting the high expected recovery rate in the market of 75% and the fact that a subsequent default event was seen by the market as possible but not certain.

Figure 27. Comparison of auction payoff with the value of the untriggered contract at close of business on the auction date

CDS term	1Y	2Y	3Y	5Y	7Y	10Y
Auction payoff for triggered contract	3.75%	3.75%	34.875%	34.875%	36.75%	36.75%
Up-front value of contract	14.17%	18.76%	21.81%	24.00%	24.09%	24.16%
Optimal to trigger for a protection buyer?	No	No	Yes	Yes	Yes	Yes
Optimal to trigger for a protection seller?	Yes	Yes	No	No	No	No

3.15 Auction settlement

After the auction, those who submitted physical settlement requests to buy assets ended up with deliverable obligations at the final auction price. This occurred on the auction settlement date which was Thursday 29 August, one week after the auction. For dealers who had submitted a request to buy (sell), a buy (sell) transaction would be executed and settled with one of the parties in the second part of the auction who had been filled and the bond would be traded.

[15] Note that a recovery rate of 75% was used to calculate these up-front values.

3.16 Tranche impact of restructuring

The Thomson restructuring credit event had a major impact on the tranche market because of its inclusion in a wide range of indices. This is because the tranche loss and the tranche post-auction attachment and detachment levels depend on:

1. Whether the CDS in the tranche was triggered following the restructuring.
2. Which party, if any, triggered the contract.
3. What the final price was for the corresponding bucket following the auction.

Thomson's widespread occurrence in the main index tranches caused a considerable amount of back- and middle-office work as these were modified

This led to the creation of several new tranches for each index. Figure 28 presents the new attachment and detachment points using the example of an iTraxx main tranche which had initial attachment and detachment levels of 0-3%, 3-6%, 6-9%, 9-12% and 12-22% (series 2-7 of this index had suffered some succession events but no credit events until the Thomson restructuring so the weighting of Thomson in the index remained 1/125 of the index notional).

Figure 28. Changes in tranche strikes[16] after restructuring event

Auction Final Prices

2.5 Year Bucket	5 Year Bucket	7.5 Year Bucket
96.25%	65.125%	63.25%

Index Loss as percentage of notional

0.030%	0.279%	0.294%

INDEX TRANCHES

Neither party triggers

All Buckets	
Attach (%)	Detach (%)
0	3
3	6
6	9
9	12
12	22

Protection Seller Triggers

All Buckets	
Attach (%)	Detach (%)
0.000	2.728
2.728	5.752
5.752	8.776
8.776	11.800
11.800	21.881

Protection Buyer Triggers

2.5-Year Bucket		5-Year Bucket		7.5-Year Bucket	
Attach (%)	Detach (%)	Attach (%)	Detach (%)	Attach (%)	Detach (%)
0.000	2.994	0.000	2.743	0.000	2.728
2.994	6.018	2.743	5.767	2.728	5.752
6.018	9.042	5.767	8.791	5.752	8.776
9.042	12.067	8.791	11.816	8.776	11.800
12.067	22.147	11.816	21.896	11.800	21.881

Figure 28 shows clearly how three distinct[17] new variations of the attachment and detachment levels of iTraxx tranches were created following the restructuring event. For the correlation desks of dealers, the resulting rebooking of trades to account for the triggering and maturity bucket was time-consuming. It also resulted in a reduction of tranche liquidity due to the decrease in fungibility.

[16] These tranche attachment and detachment levels are calculated by subtracting the portfolio loss and then dividing by the remaining portfolio notional. For a 125-name index like iTraxx this is 99.2%. The attachment and detachment levels are floored at zero.
[17] If neither triggers then the tranches are unchanged. If the protection buyer triggers there is a new tranche for each maturity bucket. If the protection seller triggers then the result is the same as the longest bucket. Since we have three buckets here, we have three new tranches.

3.17 Thomson bankruptcy credit event

Thomson filed for bankruptcy about a month after the final settlement of the restructuring credit event

On 30 November, Thomson entered into the French Sauvegarde restructuring process. This time the request to consider the credit event was made as a "general interest question" so the identity of the party who submitted the question to the DC was not made public.

The EMEA DC met on 1 December to discuss whether or not a Thomson bankruptcy event had occurred. The vote was 14-1 in favour of determining that a bankruptcy credit event had occurred. The credit event date was determined to be 30 November. Only the 30-year bucket was needed for the auction and the deliverables were the same as those already listed in Figure 16. The auction was set for 10 December with an auction settlement date of 17 December.

As with the restructuring event, the relevant currency was determined to be EUR and on the day before the auction the EUR/USD exchange rate was fixed at 0.67866.

As bankruptcy is a hard credit event, there was only one auction

At the time of the auction, the DTCC gross notional was $7.75bn and the net notional was $906mn. There were 1,585 contracts. For the auction, the inside market quotation amount was set to €2mn and the bid-offer spread was set to 4% with a 2% cap amount. The bids ranged from 71% to 75% and the offers from 75% to 79%, and the IMM price was calculated to be 75.75%. There were no adjustment amounts. The physical settlement requests are shown in Figure 29.

Figure 29. Physical settlement requests for Thomson bankruptcy auction

Dealer	Bid/Offer	Size
Bank of America N.A.	Offer	€10mn
JPMorgan Chase Bank N.A.	Offer	€64mn
Morgan Stanley & Co. International PLC	Offer	€13mn
Société Générale	Offer	€3.393mn
BNP Paribas	Bid	€8mn
Credit Suisse AG	Bid	€8.5mn
HSBC Bank PLC	Bid	€5mn
Nomura International PLC	Bid	€8.358mn
The Royal Bank of Scotland PLC	Bid	€3.04mn
Net Open Interest		€57.495mn to sell

The net open interest was to sell €57.495mn of deliverable obligations.

The final price at the bankruptcy auction was 77.75 and was driven mainly by fundamentals

In the second part of the auction the limit orders to buy obligations were submitted. The highest bid which was the first fill was at 77.75. Note that this was at the maximum bid as it equals the IMM price of 75.75% plus the cap amount which is 2%. A number of dealers entered bids of between €5mn and €30mn at this price and not all were filled. The final price was therefore set equal to 77.75%.

3.18 The triggering decision on restructuring in hindsight

At the time of the restructuring auction on 21 October, the DTCC outstanding notional of Thomson-related contracts was equal to $21.2bn, with a net notional of $2.02bn. The number of contracts that could be settled was 5,067. Later, at the time of the bankruptcy auction on 10 December, the DTCC gross notional was $7.75bn and the net notional was $906mn. There were 1,585 contracts. Assuming that this drop in the size and number of Thomson contracts at DTCC was caused mainly by them being triggered, this implies that roughly 69% of the contracts by number and 63% by gross notional were triggered in the restructuring. The question we can ask with hindsight is whether or not triggering was the right decision.

Figure 30. Comparison of the non-trigger versus trigger decision

	Trigger restructuring	No trigger restructuring	Was it optimal to trigger following the restructuring event?	
CDS bucket	Payoff (%)	Bankruptcy payoff (%)	Protection buyer	Protection seller
2.5 year	3.75	22.25	NO	YES
5 year	34.875	22.25	YES	NO
7.5 year	36.75	22.25	YES	NO

After the bankruptcy, the profitability of triggering or not on the earlier restructuring was similar to what it was after the restructuring auction

For those who did not trigger, the likely explanation is that they were naked protection buyers who expected a further deterioration in the credit quality of Thomson post-auction resulting in a full default with a low recovery. Indeed, they were correct about the subsequent bankruptcy and correct not to trigger. If they had had a contract which mapped to the 2.5-year maturity bucket then they would have received only 3.75% on the restructuring but 22.25% on the bankruptcy. Waiting was the right choice. However, if their contract had mapped to either the 5-year or 7.5-year bucket then they would have lost 12.625% and 14.5% respectively by not triggering. This is shown in Figure 30.

4 DISCUSSION

The two Thomson credit events were a forceful test of the new protocols

The two Thomson credit events have provided a forceful test of the new protocols. A number of the new features of the protocols proved to work well. In particular, the determination committee was quick to determine the restructuring credit event and the subsequent bankruptcy event. Determination of the final list of deliverable obligations was done, although it took longer than expected due to the private nature of Thomson's debt and the desire to allow multiple runs of the trade compression cycle. The auction process worked smoothly as did the settlement of bonds afterwards.

The test was made all the more harsh by the private nature of Thomson's debt

Despite this success, some potential issues were highlighted by the settlement of the Thomson restructuring credit event. One concern stemmed from the fact that all of Thomson's debt was held privately. This meant that:

- There was no public announcement of the restructuring event until well after the actual restructuring had occurred. In addition, this publication was not required but was at the company's discretion.
- It took the determinations committee longer than the recommended period of two weeks to compile a final list of deliverable obligations since obtaining information including the issue size, coupon, maturity dates and transferability of the loans was not straightforward.
- It was unclear what percentage of the debt-holders had signed up to the restructuring agreement proposed by Thomson. It was therefore not possible to know how much of the outstanding debt was free to trade in the auctions.

These issues have raised the question of whether credits with no outstanding publicly traded debt should be included in the main credit indices.

The optional triggering of contracts following a restructuring event left some participants exposed

The second group of issues relate to the optional triggering of contracts following a restructuring event. At the heart of this is the fact that the option is asymmetric in terms of payoff and also in terms of when it can be exercised. In the case of the Thomson restructuring, CDS index investors with a long and short position who were not fully versed with the new protocols and the nature of the triggering option, may have experienced some surprises.

- For example, after the splitting of the indices, index investors with a long and short position in a CDS index ended up with a long and short single-name CDS position in Thomson. If they exercised both CDS, then they would have found that the gain on the long protection position was not sufficient to offset the loss on the short protection position which used the longest maturity 7.5-year bucket. For short-dated contracts which mapped to the 2.5-year bucket, this difference was large, i.e. 3.75% in versus 36.75% out, resulting in a loss of 33%. It was clearly very important for the investor to wait until the other party triggered first.
- A loss could also occur for an index investor with a long and short index position with different maturities, even if both positions were exercised by the protection buyer. Such a loss could have arisen as the result of a CDS index curve trade where one index leg had a scheduled termination date on or before 20 June 2012 and the other after. One index leg would have been assigned to the 2.5-year bucket while the other would have been assigned to the 5-year bucket. There would then have been an exposure to the differences in final prices between these two buckets. In the case of Thomson, this difference was significant.

It is therefore important that CDS index participants know these mechanics so that they are aware that following a restructuring credit event a supposedly hedged CDS index trade or a simple CDS index curve trade can create an exposure to the term structure of auction final prices of a single credit.

Triggering created operational risks as parties waited until the last moment

The triggering optionality also created problems of an operational nature. Since it is optimal for both parties to wait until the last moment before triggering the contract, this can create significant operational risk for other parties who have offsetting positions to trigger in response. The risk is that they end up with one CDS leg triggered and the other

not, resulting in a portfolio whose value is exposed to the post-auction credit spreads of the restructured credit.

However, it is encouraging that the market did its utmost to mitigate these risks. For example, many dealers agreed to use the compression cycle to net out a lot of trades. To do so, they agreed that contracts should be treated as though they had been triggered by the protection buyer. In doing so, these parties decided to forgo the asymmetric aspects of the trigger for the benefit of avoiding operational risk.

This risk was mitigated by many dealers using the compression cycle to reduce the volume of trades which needed to be triggered

This is a positive sign, and it is hoped that this will be repeated in any future similar events. However, it would be advisable for the market to put in place a more formal mechanism to reduce the operational risk involved in late triggering. This is especially important if we recognise that Thomson was not even in the top 100 of reference entities in terms of its credit derivatives notional outstanding[18]. If a restructuring of a reference credit with a larger number of contracts were to occur, the operational risks would only be greater. One solution would be for the DTCC to allow dealers to set up conditional triggers so that if one contract is triggered, other contracts are immediately and automatically triggered.

Furthermore, allowing the CDS parties the option to trigger in the case of a restructuring means that after the auction, non-linear tranche trades mutate into at least three different forms for *each* maturity bucket. This can impose a large workload on the back office of dealers who have to rebook these positions. Also, having multiple versions of tranches diminishes fungibility and liquidity.

The treatment of tranched trades after a restructuring event may need to be revisited

Unfortunately there does not seem to be any simple solution to this tranche problem as there is no way to remove a restructured credit from a reference portfolio without changing the economics of the tranche position – a tranche is a non-linear product. While it has been suggested that a delta-weighted amount of the reference credit be removed, such a method can only preserve the economics of the initial position momentarily. If this approach were to be pursued, agreement on a model and methodology for calculating the tranche delta would be a necessary first step.

The auctions proceeded without any problems and final prices were driven by a combination of market technicals and fundamentals

The three auctions for the three maturity buckets following the restructuring event proceeded smoothly. As expected, the final prices decreased with auction maturity bucket reflecting the increasing value of the cheapest-to-deliver option. What was surprising was the very high recovery on the shortest maturity auction. This was caused by a bid at the maximum price by one dealer for the entire net open interest. In this sense, the 2.5-year auction appeared to be driven by market technicals rather than fundamentals.

The second bankruptcy credit event proceeded without any surprises. This was largely because it was a hard credit event so that contracts triggered automatically. In addition there was only one maturity bucket and one auction and so the liquidity of the deliverable obligations was not split and so pricing was driven largely by fundamentals.

Overall, the Small Bang protocol performed well in response to the Thomson credit events

Overall, these events have shown that the Small Bang protocol works. Because of its privately held debt, Thomson was not really a fair test of the protocols and therefore should not necessarily be used to draw firm conclusions about the future performance of the protocols for other credits. What is encouraging about the Thomson experience is the desire of the market, in particular the dealer community, to go beyond the protocols to ensure that the market functions smoothly. This was seen in the widespread use of the TriOptima compression cycle and the willingness of parties to pre-agree to trigger their contracts as protection buyers.

[18] Based on DTCC figures from December 2008, Thomson was ranked 115th in terms of outstanding notional (for the purpose of comparison we have considered a period well before Thomson's credit events).

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