NOMURA

"The Bespoke [bispóuk]"

– A Guide to Single-Tranche Synthetic CDOs

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I. Introduction

A single-tranche synthetic CDO, often called a "bespoke[1]" tranche, is a popular second-generation product in the global structured credit market. Unlike traditional CDOs,[2] the single-tranche CDO is created on a stand-alone basis, and does not involve distribution of the entire "capital structure." A single-tranche CDO can be tailor-made to fit an investor's particular risk appetite. Since only one tranche is structured and sold, a single-tranche deal can be put together in a relatively short time. Moreover, the rapid growth of the CDS market has facilitated sponsoring institutions' hedging capabilities via their "correlation books." This paper provides an overview of the product and identifies several important issues for potential investors.

II. What is a Single-Tranche Synthetic CDO?

The underlying structure of a single-tranche synthetic CDO is very similar to that of more traditional, multiple-tranche synthetics. As in a full-structure synthetic CDO, credit risk is transferred through a portfolio of credit default swaps (CDS). The main difference is that, in a single-tranche transaction, only a specific portion of the portfolio's risk, rather than the entire capital structure, is transferred to the investor. A single-tranche transaction is sometimes referred to as *bespoke*, because the investor can customize various characteristics such as the portfolio composition, term, credit rating, tranche size and subordination, management/substitution rights, issued currency, etc.

Single-tranche or not, a CDO tranche generally represents a portion of the underlying portfolio's risk. Losses are first distributed to the equity tranche; hence it is also called the "first loss" tranche. Once the equity tranche is wiped out, losses are absorbed sequentially by the mezzanine tranches and then the senior tranches. "Single-tranche" CDO refers to a case when only one tranche is created and sold to an investor. The attachment point and the detachment point define the size and subordination of the single tranche. For example, a "3%-6%" tranche with a $1-billion underlying portfolio would absorb losses after the portfolio losses exceed $30 million (= 3% x $1 billion). The tranche is wiped out after the portfolio losses reach $60 million. The structure is similar to an insurance policy with a $30-million deductible and a $30-million policy limit.

Despite having the name "CDO," a single-tranche synthetic CDO is a closer cousin of credit default swaps (CDS) than of traditional CDOs. A single-tranche deal often takes the form of a CDS contract between a dealer and an investor, but a form of credit-linked note issued by an SPV is also available.

Any type of risk can be included in the underlying reference portfolio. Many single-tranche CDOs involve a portfolio of 100 to 200 liquid corporate names. Some deals use a traded CDS index such

[1] The word *bespoke* means "custom-made."

[2] A collateralized debt obligation (CDO) is a kind of asset-backed securities where the underlying collateral pool consists of various types of debt - corporate bonds, loans, ABS, RMBS, CMBS, municipal bonds, etc. Synthetic CDO refers to a structure where credit risk is sourced *synthetically* via credit derivatives. For a brief overview of CDOs, see *CDOs in Plain English*, Nomura Fixed Income Research (13 September 2004).

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as the Dow Jones CDX.IG.NA™ index as a reference portfolio for its transparency and liquidity. More recently, some deals started to include structured finance assets such as asset-backed securities (ABS) and commercial mortgage backed securities (CMBS) in the referenced portfolio.

The sponsor of a single-tranche synthetic CDO, who is the buyer of protection, often hedges its position dynamically using a technique called "delta-hedge." Delta hedging involves offsetting the impact of changing spread levels on the tranche value (often referred to as "marked-to-market" risk) by selling protection in a single-name CDS in an appropriate fraction of the tranche's notional amount. This specific fraction is called "delta," and is calculated using Monte Carlo simulation. However, the delta hedge is not a perfect hedge, and it does not offset the risk of changing correlation or recovery rates. Nor does delta hedge protect against risk of an immediate default.

While a synthetic single-tranche CDO allows great flexibility in the deal parameters, it also becomes more important that investors understand the mechanics of the deal. In the following sections, we illustrate examples of single-tranche CDOs and discuss their risk factors.

III. Basic Structure

One of the major features of a single-tranche deal is that, unlike in a full-structure CDO, the investor and the deal's sponsor would have much more in-depth dialogue during the structuring process. This point is significant, because it may prevent the "moral hazard" problem that was evident in some earlier CDOs. In those deals, the deal's sponsor allegedly dumped unwanted assets into the CDO portfolio.

The first step in creating a single-tranche synthetic CDO is to determine an underlying portfolio. For example, a single-tranche synthetic CDO may reference a portfolio of 125 investment-grade corporates, with each reference entity accounting for a $10 million notional amount. Unlike in a full-structure deal, the reference portfolio of a single-tranche deal can be highly customized. For example, if an investor would like a diversified portfolio but would like to avoid a specific company, the reference portfolio can be constructed to satisfy that requirement. Once the initial reference portfolio is created, the portfolio may remain static, meaning that no names are dropped or added during the deal's life. Alternatively, the pool may be moderately managed, where the deal's sponsor or the investor is allowed to replace a limited number of credits within certain parameters.

The second step is to determine the size and subordination of the single tranche to be created. A tranche's "attachment point" defines the amount of losses in the reference portfolio where losses begin to accrue to the tranche. In other words, it defines the tranche's subordination level. Likewise, a tranche's detachment point defines the maximum amount of losses in the reference portfolio that can be absorbed by the tranche. Hence, the difference between the tranche's detachment point and the attachment point together defines its size (*i.e.,* its notional amount). Many single-tranche deals are rated by the rating agencies. If necessary, the tranche's subordination (*i.e.,* attachment point) is adjusted in order to achieve a desired rating.

Many synthetic deals have 5-year maturities. This reflects the fact that the 5-year maturity is still by far the most liquid maturity in the credit default swap (CDS) market. However, some of more recent deals have longer maturities such as 10 years.

The following table illustrates examples of single-tranche synthetic CDOs. Tranches A and B both reference a $1.25 billion portfolio of 125 investment-grade corporate obligations. Both tranches have a notional amount of $25 million, or 2% of the reference portfolio. The only difference between the two tranches is the level of subordination. Tranche A's attachment point is 5.5%, meaning that it starts to absorb losses after the portfolio losses exceed 5.5% of $1.25 billion, or $68.75 million. Tranche B, on the other hand, starts to absorb losses before Tranche A, with subordination of just 4.5%, or $56.25 million (= 4.5% x $1.25 billion). Obviously, Tranche B is riskier than Tranche A, and, while Tranche A is triple-A rated, Tranche B is double-A rated. Naturally, spreads would be wider for

Tranche B. Unlike a traditional, whole-structure CDO, it is possible to create two overlapping (*i.e.,* 5.5%-7.5% and 4.5%-6.5%) single tranches, as in this example, that reference the same portfolio.

Table 1: Example of Single-tranche Synthetic CDOs

	Tranche A	Tranche B
Reference Portfolio	$1.25 billion of 125 investment-grade corporates	$1.25 billion of 125 investment-grade corporates
Pool	Static	Static
Initial Principal (Notional)	$25 million	$25 million
Tranche Size	2.0%	2.0%
Subordination	5.5%	4.5%
Maturity	5 years	5 years
Rating	AAA	AA

As in a full-structure CDO, a single-tranche deal can be in the form of a credit-linked note issued by an SPV.[3] This type of deal is called "funded," because the investor makes a principal investment by purchasing the issued note. The amount paid to the SPV would be invested in low-risk securities. In a funded case, credit risk is transferred via a CDS between the SPV and the sponsor. Alternatively, a deal can take the form of a credit default swap directly between the investor and the sponsor. Such a structure is called "unfunded," and the investor does not make a principal investment.

A single-tranche synthetic CDO is a multi-layered financial derivative. The tranche itself is a derivative of its underlying reference pool, defined by attachment and detachment points. The reference pool is a derivative of its individual components. The components of the reference pool, CDSs, are derivatives of their specific reference credits. The predominantly "conceptual" character of most elements of the single-tranche synthetic CDO distinguishes it from simpler derivatives (like equity options) which have a single derivative relationship based on a single traditional financial asset.

IV. Delta Hedging and Other Risk

One major characteristic of a single-tranche CDO is that the deal's sponsor, or sometimes the investor, hedges the risk using a proprietary computer model. In contrast, credit risk in a traditional, full-structure CDO would be "tranched" and distributed among multiple investors. Market participants use the term "delta hedge" for neutralizing impacts of spread changes on the value of a tranche. For a deal's sponsor, who is typically the buyer of protection, delta hedging involves buying single-name CDS (selling protection) in an appropriate notional amount for each of the underlying names. As spreads fluctuate, however, deltas also change, and the hedge must be frequently adjusted.

The concept of delta hedging hinges on an assumption that we can determine the value of a CDO tranche using "market-implied" default risk in credit spreads. Also, calculation of deltas, and hence implementation of a hedging strategy, is entirely model-dependent. In other words, different models would spit out different delta numbers and give different hedge results. Given market-implied default risk AND a pricing model, we can determine a *theoretical* value of the tranche and its sensitivity to changes in market conditions. If a valuation model uses credit spreads to measure default risk, expected losses to a portfolio or a tranche increase as credit spreads widen, and the value of portfolio or a tranche declines. The relation between the value and credit spreads is analogous to the one between a bond value and interest rates. There are two ways to conduct delta hedging: (1) using an overall CDS index, and (2) using single-name CDS.

[3] Single-tranche deals typically use a multi-issuing SPV, rather than a separate SPV for each deal.

A. Hedging with CDS Index and "PV01"

First, a CDO tranche can be delta hedged using the CDS index or a portfolio of CDS. This approach focuses on a general spread movement, rather than a change in a particular credit's CDS spread. As overall credit spreads widen, the credit risk of the portfolio increases and the tranche value declines. However, we can hedge a long position in the tranche (selling protection) with an appropriate amount of short position (buying protection) in a diversified CDS portfolio, such as the DJ iTraxx^{SM} index or DJ CDX^{SM} index. If the hedge is successful, the decline in the tranche value is offset by the increase in the value of the CDS index position.[4]

In order to delta hedge a tranche with the CDS index, we need to calculate a "delta" for the tranche. The delta is effectively a *hedge ratio*, and determines the size of the hedge required. "Delta" for the tranche is calculated as the ratio of a tranche's "mark-to-market"[5] change to that of a CDS index position, given a 1-bp movement in the *average* of all CDS spreads in the reference portfolio:

Tranche Delta = - [Change in Tranche Value] / [Change in the Index Value]

The underlying CDS portfolio has a delta of 1. If a tranche is riskier than the underlying CDS portfolio, the tranche delta will be greater than one, implying that we need to buy (or sell) protection for a larger notional amount than the tranche to be hedged. Some market participants call change in the value of a tranche caused by a 1bp widening in the average credit "PV01." PV01 is often expressed in a unit of $1,000 on a notional amount of $10 million. In other words, tranche delta is the ratio of the tranche's PV01 to the index's PV01. Dealers often report tranche deltas in their quotes for the standardized index. Tranche delta is sometimes viewed as "leverage" of the tranche to the index portfolio.

To illustrate, let's assume that we have a long position in the 3%-6% tranche in a CDS index. A tranche delta of seven implies that a 1-bp increase in the *average* spread of CDS in the CDS index would cause a change in the value of the tranche that is seven times as large as that of the index. In that case, we need to sell the index (buy protection) for a notional amount of $70 million to hedge a tranche position of $10 million. The combined positions should neutralize mark-to-market changes caused by a 1bp change in the average spread. The table below shows how the hedge works:

Table 2: Delta Hedging with an Index

	Change in value ("PV01") ($000)	Initial Position ($ million)	Value of Position After Spread Move	Initial Spread* (bps)
3%-6% Tranche	30.8	10	- 30,800	238
Underlying Index	4.4	70	+ 30,800	40
Tranche Delta	7.0x		Carry for the hedged position	- 42

* Sample spread levels
Source: Nomura

Suppose that a 1-bp spread widening causes the value of the CDS index portfolio to decline by 4.4 bps, or $4,400 per the notional amount of $10 million, while it causes the value of the 3%-6% tranche to decline by 30.8 bps, or $30,800 per $10 million. If we hedge a $10-million long position in the 3%-6% tranche with a $70-million short position in the index, the value of the two positions would change by $30,800, in the opposite position.

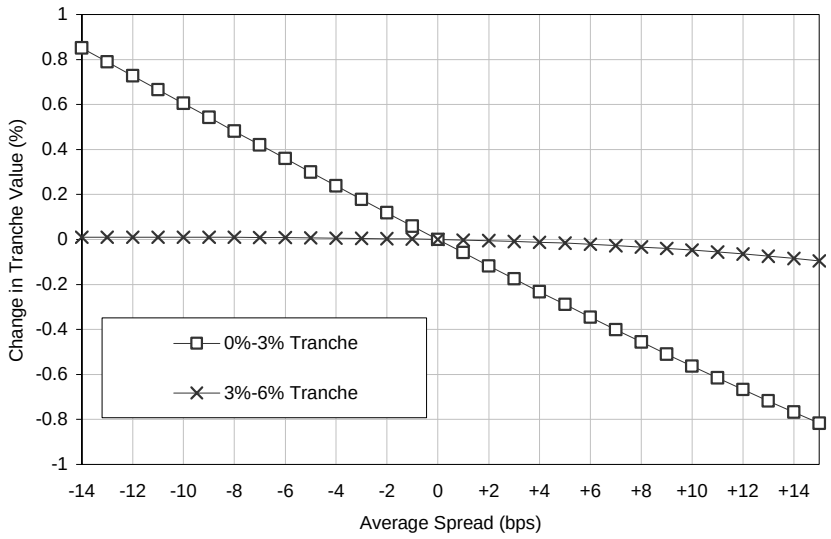
[4] If a CDO's reference portfolio is exactly the same as the CDS index, the hedge using the index should be more successful. By the same token, hedge would be less effective if the reference portfolio is significantly different from the CDS index.

[5] The term "mark-to-market" here actually refers to a modeled fair value based on the market-implied default risk (*i.e.,* credit spreads).

In a delta-hedged position, periodic net spread payment can be positive or negative, depending on the spread levels of the long and short positions. In the table above, the delta-hedged position has a "negative carry," because the long tranche position pays 238 bps per annum, while the short index position requires payment of 280 bps (= 40 bps x 7). Therefore, delta hedging can be an expensive strategy.

As credit spreads widen, the value of a CDO tranche declines, and vice versa. The following graph illustrates the relation between levels of the average spread and the values of the 0%-3% tranche and the 3%-6% tranche:

Graph 1: Tranche Value and Average Spread Level
(Zero correlation; 5-year; 125-name; recovery rate = 40%)



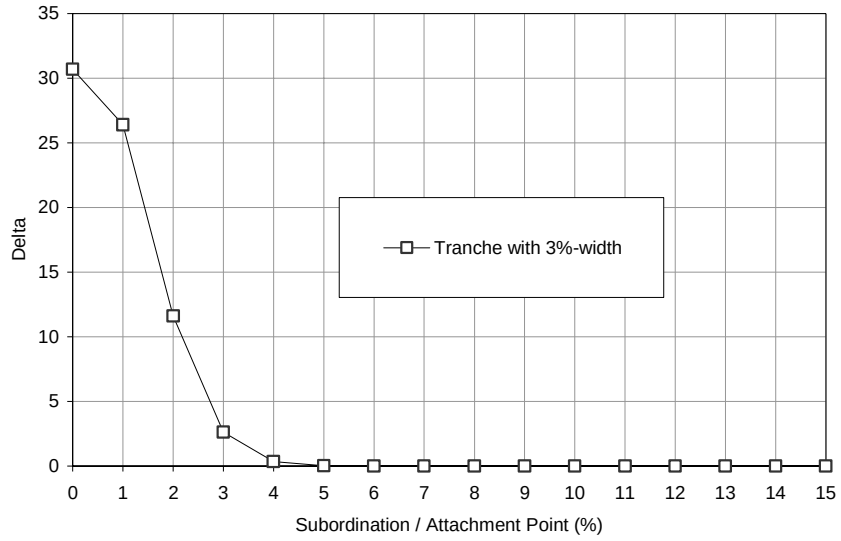
Source: Nomura

Analogous to the concepts of duration in bond valuation, tranche delta measures the price sensitivity of a tranche to movements in the average credit spread. In the graph above, tranche delta is the slope of the price-spread curves. Tranche deltas have the following characteristics:

- **Tranche Delta Is Higher for the Equity Tranche Than for Senior Tranches.**

The equity tranche is more sensitive to movements in credit spreads than senior tranches. A wider spread means a higher likelihood of losses, which are absorbed by the equity tranche first. Accordingly, as we move a tranche's attachment point higher, the tranche's delta declines. The following graph shows that tranche delta declines as subordination (*i.e.,* attachment point) increases:

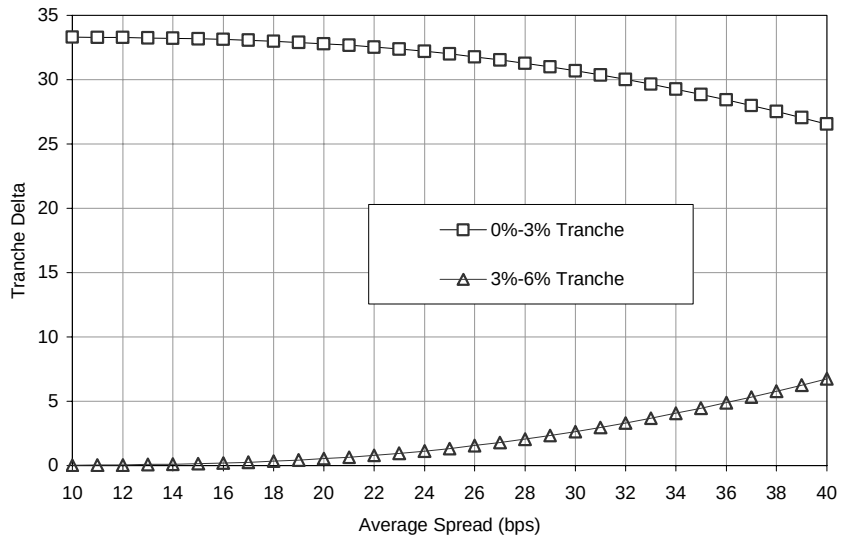
Graph 2: Tranche Delta and Subordination
(Zero correlation; 5-year; 125-name; recovery rate = 40%; Initial spread = 35 bps)



Source: Nomura

Tranche delta changes as the underlying portfolio's average credit spread moves. The graph below plots tranche delta for the 0%-3% tranche and the 3%-6% tranche at different levels of the average spread:

Graph 3: Tranche Delta and Average Spread Levels
(Zero correlation; 5-year; 125-name; recovery rate = 40%)



Source: Nomura

Graph 3 shows that, as the spreads move wider, tranche delta goes down for the equity (*i.e.,* 0%-3%) tranche. On the other hand, tranche delta increases for the 3%-6% tranche as the spreads widen. The results are similar for more senior tranches. As spreads move wider, the likelihood of losses reaching higher tranches increases, making a senior tranche more sensitive to spread movements. In contrast, the equity tranche becomes less sensitive as the probability of escaping losses becomes remote. This phenomenon is associated with the tranche's "gamma," or the sensitivity of delta to a change in the spread level. Tranche gamma is *negative* for the equity tranche but *positive* for the senior tranche.

B. Hedging with Single-Name CDS

Alternatively, a tranche can be hedged using a single-name CDS. Suppose that we buy a first-to-default (FTD) basket (*i.e.,* sell protection) on a 10-name portfolio for a notional amount of $10 million.[6] Generally, single-name delta is defined as the ratio of the value change of a tranche to that of an individual CDS when the single-name spread moves by a small amount (*e.g.,* 1 bp):

Delta to single-name CDS = - [Value Change in Tranche] / [Value Change of CDS]

Here is how we can hedge a long position in a tranche against the spread risk of one reference entity. A delta of 0.47, for example, means that a 1-bps spread increase in one reference entity's credit spread would cause the tranche value to go down by 0.47 times the price decline of the single-name CDS, for the same notional amount. In order to hedge the exposure, we need to buy the CDS (buy protection) for a notional amount of 0.47 times $10 million, or $4.7 million. The combined position should neutralize mark-to-market changes caused by a 1-bp widening in the single-name CDS spread. The table below shows how the hedge works:

Table 3: Delta Hedging with a CDS

	Change in value by a 1-bp widening of a CDS ($10 million notional)	Initial Position ($ million)	Position After Spread Move	Initial Spread (bps)
FTD Basket	$2,270	10.0	- $2,270	660
CDS for Credit 1	$4,830	4.7	+ $2,270	50
Delta	0.47x		Carry for the hedged position	+ 636.5

Source: Nomura

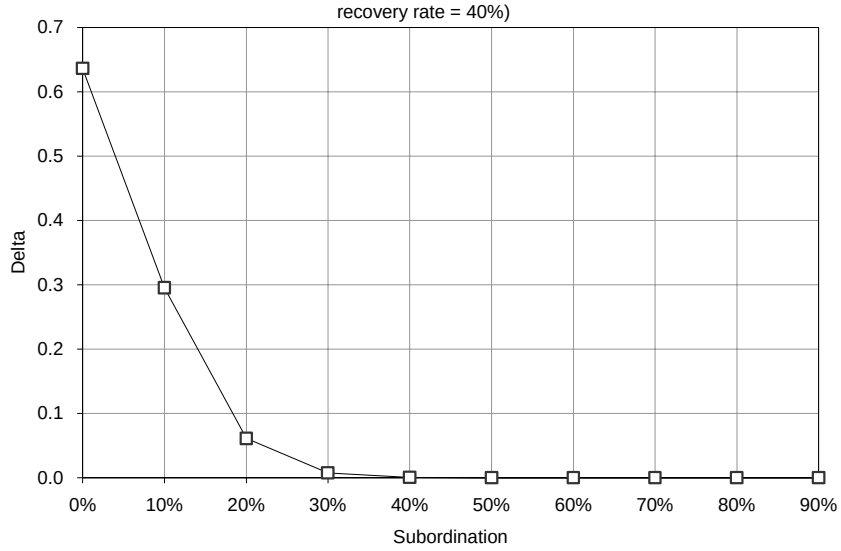
Delta for a single-name credit is generally a small fraction, because the credit represents only a fraction of the underlying portfolio. This type of hedge may be useful if an investor is concerned about just a handful of credits in the underlying portfolio. If the hedge covers selected credits only, hedge costs tend to be lower than when hedging with the whole index. Single-name delta has the following characteristics:

- **Delta for an Individual Credit Declines as Subordination Increases.**

The equity tranche is more sensitive to movements in an individual credit spread than senior tranches. This is a similar phenomenon to the previous case where we considered a change in credit spreads of *all* credits in the portfolio. The following graph plots single-name delta at varying levels of subordination:

[6] An "Nth"-to-default basket is a CDS-like transaction where a "basket" of credit risk is transferred. For example, the protection seller in a first-to-default basket consisting of 10 credits would receive periodic spread payments from the protection buyer until *any* of the 10 credits defaults during the term of the contract. Upon the first default, the contract ends and the protection seller must pay to the protection buyer a specific amount based on the pre-determined terms. Likewise, the protection seller in a second-to-default basket would pay to the protection buyer if the second default occurs. Essentially, the FTD basket can be viewed as an equity tranche of the 10-name portfolio, while the 10th-to-default tranche is equivalent to the most senior tranche in that portfolio.

Graph 4: Tranche Delta and Subordination
(Zero correlation; 5-year; FTD on 10 names; spread = 100 bps; recovery rate = 40%)

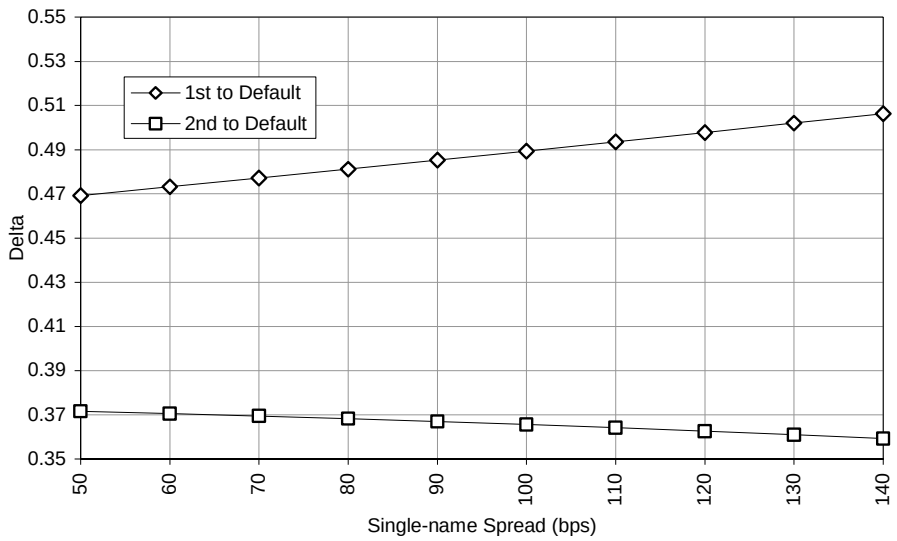


Source: Nomura

- **The Equity Tranche's Single-Name Delta is Higher for Risky Credits, but the Opposite is True for Senior Tranches.**

For the equity tranche, single-name delta is higher for a credit with a higher risk of default. To understand this point, think as follows. A credit with the highest risk is most likely to default first, and the first few defaults affect the equity tranche significantly. On the contrary, later defaults are unlikely to affect the equity tranche very much, because by that time the tranche would have already been wiped out. Hence, the equity tranche tends to be more sensitive to a spread change in a high-risk credit (with a wide spread). However, the contrary is true for the senior tranche. That is, at the senior tranche, single-name delta is higher for a low-risk credit with a low spread. While early defaults affect the equity tranche, they do not affect the senior tranche very much. On the other hand, a low-risk credit is likely to default after high-risk credits default, affecting the senior tranche. To show this point, the following graph depicts deltas for first-to-default and second-to-default baskets at varying levels of spreads:

Graph 5: Tranche Delta and Single-CDS Spread
(5 year; 10-name nth-to-default; zero correlation; recovery rate = 40%)



Source: Nomura

Graph 5 shows that single-tranche delta in the first-to-default basket is higher for higher spread credits. In contrast, single-name delta for the second-to-default basket is higher for the single-name CDS with a lower spread. Again, the equity tranche is more sensitive to spread changes of a riskier credit, while senior tranches are more sensitive to spread changes of a less risky credit. It follows that, with respect to single-name spreads, the equity tranche has a *positive* gamma, while senior tranches have a *negative* gamma. Note that this result is in contrast to the case we discussed earlier, where spreads of *all* credits moved.

C. What is a "Delta Exchange"?

Some dealers offer structured credit products (*e.g.,* FTD baskets) with "delta exchange." A delta exchange refers to an arrangement where an investor in a single-tranche CDO buys single-name CDS to delta-hedge its exposure on the CDO. For example, in a FTD with a delta exchange, the investor gains the exposure to the credit risk of the FTD (selling protection), but at the same time buys five single-name CDS contracts in the opposite direction (buying protection). The size of each of the single-name CDS is based on the delta of the particular credit. The arrangement reduces spread risk for the investors (and for the dealer as well). A transaction with a delta exchange also allows the dealer to delta hedge its position with the investor directly, thus reducing its transaction costs. Pricing on single-tranche CDOs often reflects this fact, with a narrower bid-ask spread for a trade with a delta exchange.[7] The hedged positions are adjusted from time to time after the initial transaction.

D. Other Risks – Default, Correlation, and Recovery Rate

Importantly, delta hedging does not neutralize the impact of sudden defaults. The dollar exposure to risk of an immediate default is the largest in the equity tranche, because the tranche absorbs the losses. On the other hand, the values of senior tranches are less affected by an immediate default of a credit, because it only erodes subordination of these tranches.

[7] For example, on November 10, 2004, the indicative spreads for Nomura's benchmark FTD basket for five industrial names were quoted at 356 bps (bid) and 374 bps (ask). Without a delta exchange, the same basket commanded a wider bid-ask spread, with 340 bps (bid) and 387 bps (ask).

Recently, market participants became more focused on correlation among the credits in a portfolio of credit risks. In general, a higher correlation benefits the equity tranche and hurts senior tranches, and vice versa. In particular, an investor may use a delta-hedged position[8] to pursue a strategy purely based on a specific view about correlation. However, the success of such a strategy is highly dependent on the mathematical model employed in the analysis. At present, market participants have only a general consensus on how to measure and model correlation in a portfolio of credit risk. Moreover, it is unclear if simply using a more elaborate model would necessarily improve the results.[9]

Market participants also began to pay attention to the risk of assuming the wrong level of recovery upon default. Empirical studies have shown that recovery rates vary depending on factors such as asset type, geographical region, seniority of debt, and the general economic landscape. To address uncertainty about recovery, some CDO deals include credit default swaps with a fixed recovery rate.[10] The protection seller in a fixed recovery CDS pays a predetermined amount upon default of a reference obligation.

V. Non-quantitative Considerations

Besides quantitative risk factors in a single-tranche transaction, there are a few additional issues that warrant consideration. Most single-tranche synthetic CDOs are backed by static portfolios. However, a handful of deals that came out in 2004 are "managed" by a third-party asset manager. Discussion about merits or demerits of having an asset manager is beyond the scope of this paper, but it suffices to say that the issue has become one of the hottest topics among market participants. Some market participants expect managed single-tranche CDOs to increase in coming quarters.[11] A deal's pool may also be lightly managed by the investor. In such a deal, the investor can make substitutions of credits in the reference portfolio in order to avoid losses, within some predetermined parameters. However, manager fees and trading costs may not be negligible.

Nevertheless, one of the most remarkable aspects of single-tranche synthetics is that they reduce the moral hazard that was evident in some of the early balance sheet CDOs. Some of earlier balance sheet deals were managed by the same dealer that structured the transaction, resulting in conflicts of interest. Newer deals, in contrast, feature stricter rules regarding substitutions and the investor often participates in setting these rules. If a dealer retains substitution rights, the investor should receive a slightly higher spread in return.

Another important issue is liquidity. Traditionally CDOs were held by long-term investors and were not marked to market. Lately, however, some dealers began to trade cash CDOs in the secondary market.[12] Due to their tailor-made nature, however, single-tranche synthetics tend to be unique and are likely to be less liquid in the secondary market than full-structure deals. Hence, an investor should pay close attention to the deal language just in case the transaction must be "unwound."

VI. Conclusion

In this paper, we introduced single-tranche synthetic CDOs. The issuance trend appears to point toward more single-tranche synthetics in coming years, as investors acquire more understanding of the product. We view the growth of customized, or *bespoke*, CDOs as a positive development for the CDO market. Unlike earlier deals, an investor is able to set various parameters in constructing a deal

[8] A delta-hedged position is sometimes referred to as being "delta-neutral."

[9] For more on correlation, please see, *Correlation Primer*, Nomura Fixed Income Research (6 August 2004).

[10] These CDS are sometimes called "digital-" or "binary-" recovery CDSs.

[11] See, *Managed Single-tranche Make Their Mark*, Creditflux special report (1 November 2004).

[12] The secondary market for cash CDOs emerged in 2003. See, *Portfolio Volumes Grow After Slow Start*, Creditflux special report (1 May 2004).

and to influence performance of the deal over its life. However, as one investor attending a recent conference put it, single-tranche synthetics remain a “big boy” product, and the responsibility for heavy-duty due diligence falls on the investor’s shoulders. Therefore, we encourage investors to engage in active dialogue with their dealer. Doing so may help mitigate problems and keep them informed about the latest developments in this ever-evolving market segment.

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- U.S. Fixed Income 2004 Outlook/2003 Review (18 December 2003)
- Securitization Glossary (26 November 2002)

ABS/CDO

- ABS Gold Coast Report 2004: Coverage of Selected Sessions of ABS East 2004 (21 October 2004)
- Tranching Credit Risk (8 October 2004)
- CDOs in Plain English (13 September 2004)
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- ABS/MBS Disclosure Update #5: Reactions to the Comment Letters (4 August 2004)
- ABS/MBS Disclosure Update #4: Issues from ASF Sunset Seminar (13 May 2004)
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- CDS Primer (12 May 2004)
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- Commercial Real Estate Sector Update - Hotels (10 August 2004)
- Commercial Real Estate Sector Update - Industrial (4 August 2004)
- Value in Two-Tiered Index Bonds (TTIBs) (30 July 2004)
- Commercial Real Estate Sector Update - Multifamily (30 July2004)
- Commercial Real Estate Sector Update - Retail (29 July 2004)
- Commercial Real Estate Sector Update - Office (22 July 2004)
- FICO Scores: A Quick Refresher (13 July 2004)
- Partial Duration: A Portfolio Strategy Tool (10 June 2004)
- Using Interest Rate Swaps as a Portfolio Duration Tool (19 April 2004)
- Z Spread: An Important Tool in Shifting Yield Curve (15 April 2004)

Corporates

- Corporate Weekly - For the week ended 15 October 2004
- Corporate Relative Value (4 October 2004)
- U.S. Corporate Sector Review - September (6 October 2004)

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