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CMBX Primer

Securitized Products ● Americas

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The sixth series of the CMBX index launched on Friday January 25 after a hiatus that lasted nearly five years. We believe the latest incarnation has significant potential to be actively traded by a wide variety of market participants and represents a key milestone for the revival of the sector.

One of the constituencies likely to make use of the new indices are CMBS originators. We have previously argued that if the introduction of the CMBX.6 indices is successful, originators will have a better and more liquid hedging tool to manage warehouse risk. This, in turn, should serve to increase issuance further in the coming quarters.

In addition, we believe the index has the potential to appeal to other audiences as well. For example, it could provide an alternative vehicle for long-term CMBS investors who need to gain exposure to new issue CMBS in periods when the primary market is heavily oversubscribed. Finally, this should also be a very suitable product for macro hedge funds that would like to express levered views on the sector either outright or relative to competing products such as corporates.

In this CMBX primer we explore in turn:

- The reasons why CMBX is an important tool for the CMBS investors
- The typical players in this market
- How the CMBX contract works – reviewing the basics of CDS as well as using hypothetical examples to demonstrate cash flow payments
- The characteristics of the CMBX.6 deals and how they differ from the deals in earlier series, and
- The updated rules for inclusion when the index rolls

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The case for CMBX

The main reason we view CMBX as an important component of the CMBS market is that it enables the sector's participants to implement certain views and strategies that would not otherwise be available through cash trading.

For example, CMBX allows investors to short CMBS credit risk across a wide array of vintages and credit ratings. Shorting individual cash bonds is difficult and rarely done, with the exception of a few very liquid names. The market for cusip level CMBS CDS used to exist, but the liquidity proved very poor and it was quickly replaced by trading of the synthetic indices.

While TRX has achieved a moderate amount of trading volume since it was introduced in September 2011, it only allows the transfer of risk between longs and shorts for a very narrow slice of the CMBS market (specifically the last cash flow triple-As of the most recently issued conduit deals). The TRX contract never achieved the level of liquidity that CMBX has enjoyed and we believe it was in part hampered by a lack of transparency on dealers' underlying marks. The introduction of CMBX, referencing newly issued CMBS deals, is likely to further hamper TRX's trading volumes.

Another benefit of CMBX is the way the indices cover a large part of the conduit market, allowing investors to take long and short views across vintages (by using different series) and credit (originally rated triple-A to double-B). We show the coverage in Exhibit 1.

Exhibit 1: The matrix of different CMBX indices across vintages and ratings

Series 1	Series 2	Series 3	Series 4	Series 5	Series 6
25 deals from Aug-05 to Jan-06	25 deals from May-06 to Sep-06	25 deals from Nov-06 to Mar-07	25 deals from Apr-07 to Sep-07	25 deals from Aug-07 to Apr-08	25 deals from Mar-12 to Dec-12
AAA	AAA	AAA	AAA	AAA	AAA
AM	AM	AM	AM	AM	Not applicable
AJ	AJ	AJ	AJ	AJ	AS
AA	AA	AA	AA	AA	AA
A	A	A	A	A	A
BBB	BBB	BBB	BBB	BBB	Not available
BBB-	BBB-	BBB-	BBB-	BBB-	BBB-
Not available	BB	BB	BB	BB	BB

Source: Credit Suisse

Additionally, each of the six CMBX indices is backed by 25 different tranches (reference obligations). This diversification gives exposure to a wide portion of the market while keeping specific deal level risk relatively low (as each deal represents just 4% of each index).

An argument could also be made that CMBX proved to be more liquid than cash bonds during some of the crisis trading periods. The index maintained active, two-way, flows during most of this period even if cash bond trading was relatively muted.

CMBX has attracted a range of participants

The CMBX market also benefits from a wide array of market participants with different goals including:

- CMBS originators who want to hedge a pipeline of newly closed loans. These participants will synthetically sell credit through CMBX as a hedge as loans are originated and then, likely, buy it back once the deal is priced.
- CMBS dealers who use CMBX as a hedge for their existing inventory.
- Portfolio lenders that want to tailor the risk exposure of their balance sheet.
- Investors that want to quickly make an allocation adjustment and take (or reduce) CMBS risk.
- Investors that want to gain exposure without using their balance sheet and who want to benefit from the implied leverage of a derivative trade.
- Participants that want to make basis trades in order to buy the cash bonds they prefer and sell the index.
- CMBS participants that want to put on capital structure arbitrage trades such as credit curve steepening or flattening trades.
- Investors interested in inter-sector relative value trades such as CMBS versus corporates, equities, etc.

How CMBX contracts work

CMBX contracts are essentially baskets of 25 single-name credit default swaps (CDS) bundled into one trade. Therefore, we start with a brief review of the basic CDS mechanics.

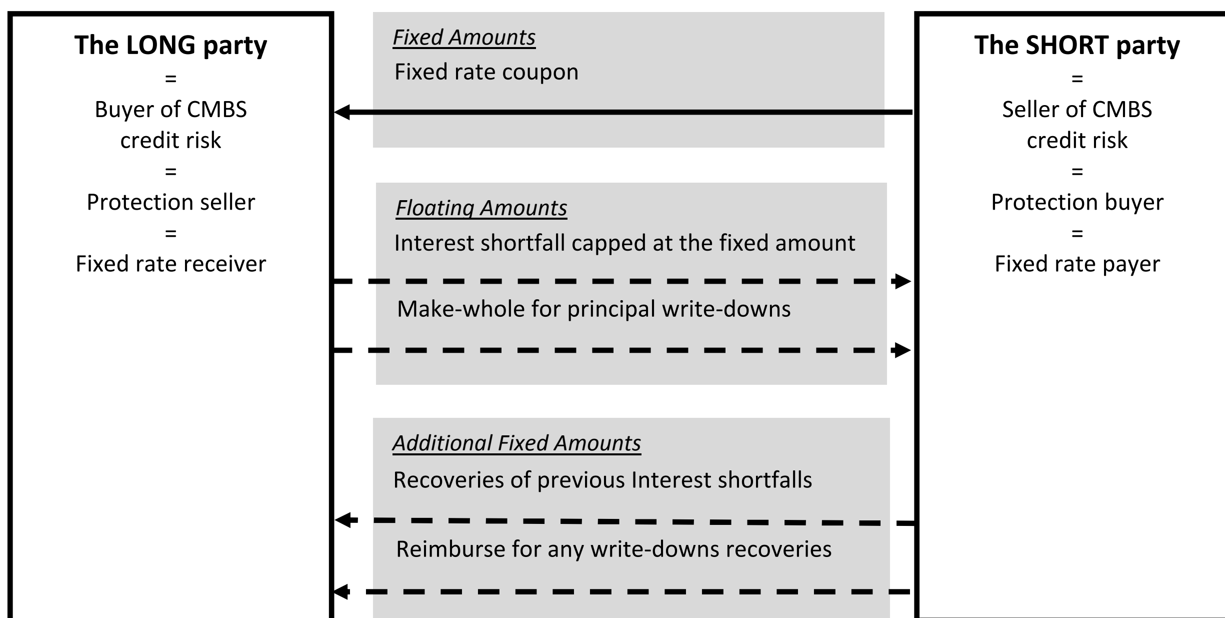
CDS basics

A CDS is a derivative contract that enables investors to synthetically transfer the credit risk of a reference bond (sometimes called a reference obligation) between two counterparties (Exhibit 2). Because there is a specific credit referenced, neither party needs to actually own the referenced bond.

In these agreements, the buyers of protection want to reduce their credit exposure. They pay a fixed premium to insure that they are protected from certain negative credit events (such as a principal write down). If such a negative credit event occurs, the protection buyers receive a payment. **Since the buyer of protection does better if there is a credit event, this makes them effectively short credit risk** (labeled SHORT in Exhibit 2).

The seller of protection is on the other side of the trade and receives the periodic premium payment but is obligated to pay in the case of a credit event**. This makes the seller of protection effectively long credit risk** (the LONG party in Exhibit 2).

Exhibit 2: General mechanics of a CDS contract



Source: Credit Suisse

For CMBX, there are three kinds of CDS cash flows: Fixed Amounts, Additional Fixed Amounts and Floating Amounts. We discuss these in the next few paragraphs and then provide numerical examples of how the flows would work in the following section.

The Fixed Amount is a payment, at a fixed coupon, based on the remaining notional balance, and is paid to the party that is long credit risk (the protection seller) as compensation for taking that risk. It is paid by the party that is short credit risk (the protection buyer).

If a certain credit event occurs, the party that is long risk (the protection seller) pays the party that is short risk (the protection buyer) a Floating Amount. These events include a principal writedown, a principal shortfall[1] and an interest shortfall. The interest shortfall component of the Floating Amount is capped at a maximum of the fixed rate coupon in CMBX. This cap prevents the long credit from having to come out of pocket to pay shortfalls. These flows are shown as dotted lines in Exhibit 2 as they only occur under certain conditions.

There is also the potential, as shown in Exhibit 2, for Additional Fixed Amount payments. These are payments made by the side that is short credit risk when a prior bond shortfall is later recovered, or a prior writedown is reimbursed. In a case where the bond shortfall is cured at a later date, the missed coupon is reimbursed up to the unpaid accrued coupon on the premium leg.

It is important to keep in mind that CMBX contracts were designed to be standardized and fungible swap agreements. Excluding the initial cash flows on the trade's settlement date (we discuss those initial payments below), all future cash flows will be identical on all contracts referencing the same CMBX index, without respect to the trade date or the counterparty. This enables CMBX investors to take a position with one counterparty and exactly offset their exposure, at a later date, by entering into the opposite trade with another counterparty.

[1] Principal shortfalls occurs if the reference obligation fails to pay down its outstanding balance by the Final Amortization Date or the Legal Final Maturity Date. To simplify the presentation, we generally omitted this type of situation and cash flows.

One consequence of this is that outstanding shortfalls and potential writedown reimbursements do not depend on the trade date. As with cash bonds, a party that buys protection on contracts with a large amount of outstanding shortfalls will be entitled to recoveries that accrued before the protection trade was effective.

The pay-as-you-go structure

CMBX, as well as other securitized product CDS, generally use a pay-as-you-go (PAUG) structure. This is a slight deviation from other CDS contracts, which are terminated at the first default and which can be cash settled or physically delivered.

There are several advantages to the pay-as-you-go structure for CMBX. First, eligible credit events in CMBX are not necessarily digital and there can be partial writedowns and shortfalls that do not lead to a termination of the CMBX contract (this is in contrast to corporate CDS). Specifically, partial losses occur through two levels.

First, CMBX contracts are structured as baskets of 25, equally weighted, single-issue CDS. This means that the performance of the 25 CMBS bonds (the reference obligations) is tracked independently through 25 uncrossed CDS components. For instance, if one reference CMBS obligation is fully written down, the long credit side (the protection seller) will make the protection-buyer whole for the loss in the notional amount for this specific bond, but the contract will remain outstanding with flows in later periods based on the remaining bonds.

Secondly, within each individual component, and its related reference bond, a partial write-down of the bond will not trigger the termination of that individual component. The CDS component will simply remain outstanding until the reference obligation is paid down and/or fully written down and the effects of writedowns are cash settled without any form of bond delivery.

Looking at CMBX cash flows using numerical examples

We believe that walking through several examples of CMBX cash flows, using numbers, will provide further understanding of the mechanics.

In our hypothetical examples, we focus on the CMBX.NA.AAA.6 contract and assume a trade with a notional balance of $100 million. The index carries a 50 bp coupon. We have also assumed, in this example, that each of the 25 reference bonds has a current factor of 0.7. Lastly, we have picked a month where the day count is 30 days.

We find it more intuitive when going through these examples to think about the cash flows on each of the 25 obligations separately and then sum them. By construction of the index, each reference obligation has an initial notional value of $4 million ($100 million trade notional divided by 25 reference obligations).

Example 1: No credit events (no writedowns and no outstanding shortfalls)

During a period where there are no outstanding shortfalls, and no new interest shortfalls or bond principal writedowns to any of the underlying reference obligations, there is only one cash flow: the fixed rate coupon on the notional amount (the Fixed Amount in the exhibit).

Under this scenario, the short credit side pays the long credit side $29,166.67

For each of the 25 components, the Fixed Amount on each reference obligation

= Fixed Rate Coupon * Initial Notional * Factor * (Days /360)

Using our numerical example, the fixed amount payment for each reference obligation

= 50 bp * $4 million * 0.7 * (30/360)

= $1,166.67

Since there are 25 reference obligations, the total fixed amount is

= 25 * 1,166.67

= 29,166.67

Example 2: No writedown occurs, but one reference bond starts to shortfall

We consider now the same situation laid out in Example 1, but one of the reference bonds encounters an interest shortfall.

As with Example 1, the short credit side will make a Fixed Amount payment, for all 25 components totaling $29,166.67 (as shown above). However, the shortfall on the one reference bond will generate a Floating Amount payment that will partially offset the fixed amount payment.

We assume that the reference bond with a shortfall has the following statistics:

Underlying Bond Balance = $300 million

Monthly Interest due = $1.5 million (assuming a 6% bond coupon)

Actual interest received = $1.0 million (a $500,000 shortfall)

Under this scenario, the Floating Amount payment totals $1,166.67

Floating Amount

= Writedown Amount + Capped Shortfall Amount

The Writedown Amount = 0 and

The Capped Shortfall Amount = min(Fixed Amount , Shortfall)

The capped shortfall amount is the minimum of these two values since the shortfall amount is capped at the fixed amount payment (which we know from Example 1 is $1,166.67). We next calculate the shortfall amount based on our numerical example:

Shortfall

= (Interest Due – Interest Paid) * (Initial Notional * Factor) / Bond Balance

= ($1.5 million - $1.0 million) * ($4 million * 0.7) / $300 million

= $4,666.67

Therefore:

Capped Shortfall Amount

= min (Fixed Amount, Shortfall)

= min ($1,166.67, $4,666.67)

= $1,166.67

In other words, the CDS component related to the one reference bond that had a shortfall does not result in any cash flow exchange since the Fixed Amount and Floating Amount are equal for this component. We note, however, that the party that is short credit risk will continue to pay the Fixed Amount on the 24 other CDS components and the net payment is:

Net payment

= Fixed Amount - Floating Amount

= $29,166.67 - $1,166.67

= $28,000 (or payment of $1,166.67 on the 24 obligations with no shortfalls)

Example 3: A writedown occurs on a bond; there are no outstanding shortfalls

We consider again the same situation as laid out in Example 1, but the reference bond of one of the 25 components now takes a loss. For our example, we assume the writedown is 50% of the bond's initial balance and on a $100 million trade, the reference bond has an initial notional balance of $4 million ($100 million / 25).

Again, as with Example 1, the position that is short credit risk will make a Fixed Amount payment for each of the 25 components (the same $29,166.67 as shown above in Example 1).

However the writedown on the reference bond will generate a $2 million Floating Amount payment:

Floating Amount

= Writedown Amount + Capped Shortfall Amount

Where the Capped Shortfall Amount = 0 and,

Writedown Amount = Percentage writedown (based on initial balance) * Initial Notional

= 50% * $4 million

= $2 million

In other words, the CDS component related to the one reference bond that had a write-down results in a net $1,998,833 payment from the investor that is long credit risk (the protection seller) to short risk position (protection buyer). This is the difference between the $2 million Floating Amount Payment calculated above and the $1,166.67 Fixed Amount payment.

We note, however, that the party that is short credit risk will continue to pay the Fixed Amount on the 24 other CDS components and the net payment flow is to the short credit risk side (protection buyer) in the amount of $1,970,833.33.

Net payment

= Fixed Amount - Floating Amount

= $29,166.67 - $2,000,000

= -$1,970,833.33

Upfront payments and collateral posting

On the trade's settlement date, the long credit position (the seller of protection) will receive the discount from the par price if the CMBX index is trading below $100. Conversely, the long credit position will need to pay the premium above par if the CMBX index price is above $100[2].

When an investor is entitled to an upfront payment (goes long a CMBX priced at a discount or goes short a premium-priced tranche), it is typical that the investor posts this amount to the dealer, as a form of collateral support, on the next business day after settlement.

Investors are usually also required to post some proportion of the amortized notional amount to act as a buffer against daily market price variations. These collateral posting arrangements can vary over time, but the mechanics are relevant for synthetic investors as they try to estimate their levered returns.

[2] In all cases (regardless of the trade price), the long credit position will also pay an initial accrued coupon to the short credit position.

Vintage CMBX, the new CMBX.6 and beyond

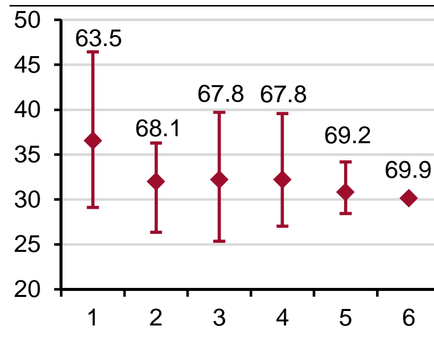
Different vintages, different risk profiles

One important feature of CMBX is the variations in credit metrics between the different series. The new issue CMBX.6 series clearly stands out from the others on many of these measures, but we also see nuances between the characteristics of the vintage series.

We show the average credit enhancement, as well as the range across deals, of each series in Exhibit 3 through Exhibit 8. While the current credit enhancement of triple-A CMBX.6 is comparable to the vintage series, the new issue contracts have much higher credit enhancement levels for all of the other rating classes, from AJ/AS down to double-B. This is especially true at the bottom at the capital stack (BBB- and BB), where writedowns have already started to erode credit support on the legacy deals.

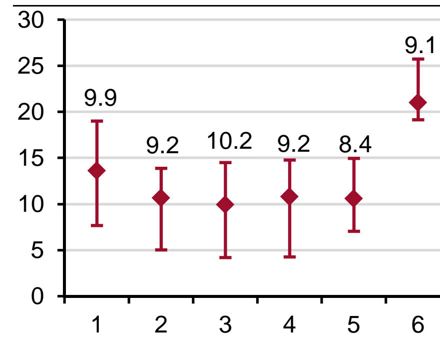
Another interesting point is the average thickness of the new series. We show the average thickness, numerically, above the range line on the exhibits. Indeed, CMBX.6 shows a 5.2% thickness at the double-A compared with 2.3% for CMBX.1, which is the second thickest double-A series. We observe the same behavior at the single-A and triple-B minus ratings. While part of the difference can be explained by differences in credit performance thus far, we believe that the bigger driver is the initial thickness of the AA, A and BBB- classes in new issue deals compared to vintage deals. In particular, it was quite common to see classes more finely tranched, creating AA+, AA-, A+, A-, BBB+ and BBB classes, in vintage transactions. Each of those classes results in thinner AA, A and BBB- classes.

Exhibit 3: Current attachment and thickness for CMBX AAA



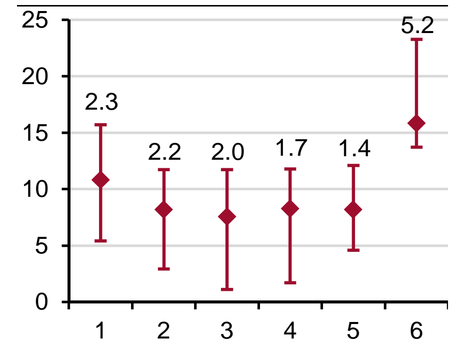
Red lines reflect the range and average of attachment points; the labels reflect the average class thickness as a percentage of the deal
Source: Credit Suisse, Trepp, Markit

Exhibit 4: Current attachment and thickness for CMBX AJ/AS



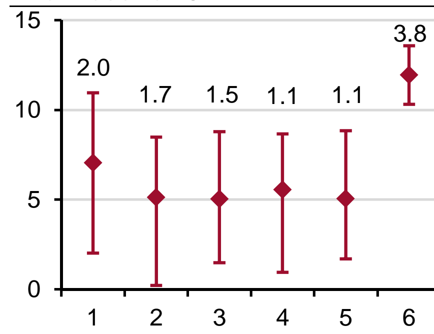
Red lines reflect the range and average of attachment points; the labels reflect the average class thickness as a percentage of the deal
Source: Credit Suisse, Trepp, Markit

Exhibit 5: Current attachment and thickness for CMBX AA



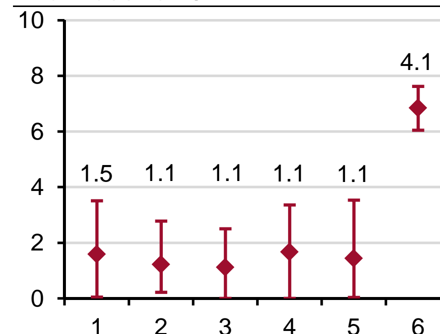
Red lines reflect the range and average of attachment points; the labels reflect the average class thickness as a percentage of the deal
Source: Credit Suisse, Trepp, Markit

Exhibit 6: Current attachment and thickness for CMBX A



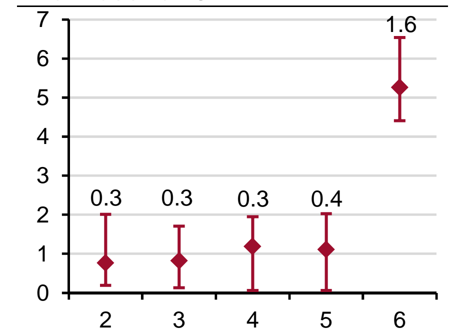
Red lines reflect the range and average of attachment points; the labels reflect the average class thickness as a percentage of the deal
Source: Credit Suisse, Trepp, Markit

Exhibit 7: Current attachment and thickness for CMBX BBB-



Red lines reflect the range and average of attachment points; the labels reflect the average class thickness as a percentage of the deal
Source: Credit Suisse, Trepp, Markit

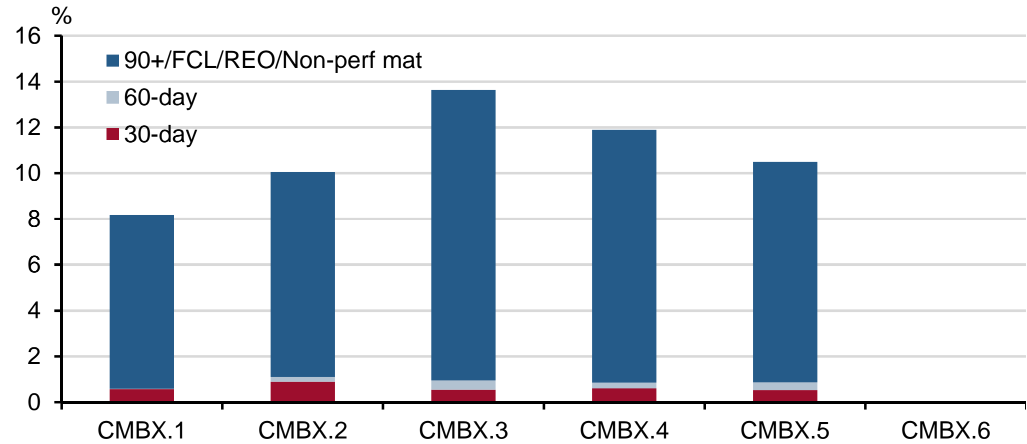
Exhibit 8: Current attachment and thickness for CMBX BB



Red lines reflect the range and average of attachment points; the labels reflect the average class thickness as a percentage of the deal
Source: Credit Suisse, Trepp, Markit

While there are no delinquent loans in the CMBX.6 series, current delinquency rates vary substantially across the legacy CMBX series (Exhibit 9). Interestingly, CMBX.3 currently has the highest 60+day delinquency rate, at 13.0%, 1.8pp higher than CMBX.4. CMBX.1 shows the lowest level at 7.6%.

Exhibit 9: Most recently reported delinquency rates across CMBX series



Source: Credit Suisse, Trepp

In the next set of exhibits, we compare the diversity of the CMBX.6 index to the prior series across geography (by looking at the largest state concentrations in Exhibit 10), across property types (in Exhibit 11) and across top loan concentrations (in Exhibit 12).

While the average top state concentrations of the CMBX.6 index remain in line with the older series, we note some differences with respect to property concentrations. Specifically, CMBX.6 appears to have a slightly higher exposure to the lodging sector and a lower exposure to multifamily. Despite concerns about over-exposure to the retail sector, CMBX.6 appears to have similar concentrations compared to the preceding indices.

There also appears to be a slightly higher top loan concentration in CMBX.6 (and CMBX.5) than the earlier indices.

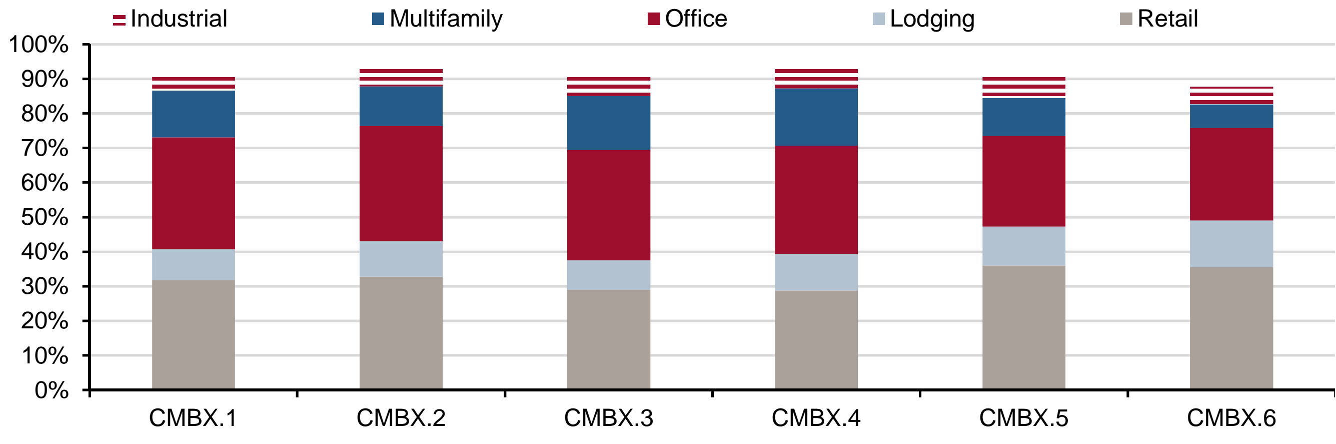
We have provided a cheat sheet on the various deal metrics, for each of the 25 deals backing CMBX.6, at the end of this report.

Exhibit 10: The 10 largest state concentration for each CMBX series

CMBX.1		CMBX.2		CMBX.3		CMBX.4		CMBX.5		CMBX.6	
CA	16.5%	CA	15.7%	CA	14.5%	CA	14.2%	CA	14.1%	NY	14.9%
NY	11.3%	NY	11.2%	NY	13.4%	NY	11.2%	NY	10.5%	CA	13.7%
FL	8.0%	TX	6.6%	TX	7.7%	TX	8.8%	TX	8.5%	TX	9.6%
TX	6.2%	FL	5.2%	FL	5.5%	FL	8.3%	FL	7.0%	FL	6.0%
VA	4.0%	IL	4.7%	IL	4.4%	VA	5.6%	GA	4.3%	IL	4.0%
IL	3.9%	VA	3.8%	GA	4.0%	GA	4.8%	AZ	3.9%	PA	3.9%
NJ	3.8%	MA	3.6%	VA	3.7%	IL	3.6%	MD	3.7%	MD	3.8%
PA	3.5%	PA	3.3%	PA	3.3%	PA	2.9%	VA	3.5%	MI	3.4%
MA	3.2%	OH	3.2%	NJ	3.0%	OH	2.8%	IL	3.3%	GA	3.2%
GA	2.7%	MI	2.9%	MD	2.8%	MD	2.7%	PA	3.2%	OH	3.1%
Covered	63.0%	Covered	60.2%	Covered	62.3%	Covered	65.1%	Covered	62.0%	Covered	65.5%

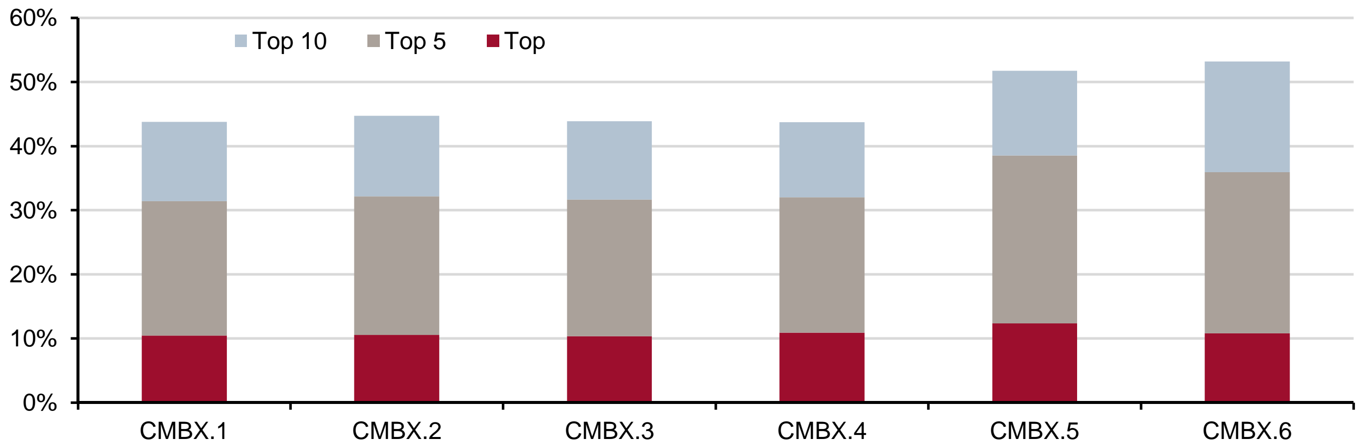
Source: Credit Suisse, Trepp

Exhibit 11: Property type exposure for each CMBX series



Source: Credit Suisse, Trepp

Exhibit 12: Large loan concentration for each CMBX series



Source: Credit Suisse, Trepp

CMBX.6 and beyond – rules and changes for the new indices

It is anticipated that if new issuance remains robust, there will be additional new CMBX indices developed. The frequency for the new rolls will be decided by the eligible CMBX members. The list of current CMBX members is displayed in Exhibit 13.

Exhibit 13: Current CMBX Members

Bank of America	Credit Suisse	JP Morgan	Royal Bank of Scotland
Barclays Capital	Deutsche Bank	Morgan Stanley	UBS
Citigroup	Goldman Sachs	Nomura	Wells Fargo

Source: Credit Suisse, Markit

We also show, in Exhibit 14, the coupons for the various tranches of CMBX.6. The coupons were originally set in the middle of December, well in advance to the start of trading. Given the market rally, the CMBX members voted to revise the coupons (lower) for the single-A and BBB- indices after the market rallied so strongly at the start of the year.

We also thought it worth revisiting the rules for inclusion for the new set of indices as they have been amended slightly, compared to the previous version.

According to the updated index rules, each new series should be comprised of six indices: AAA, AS, AA, A, BBB- and BB. As was the case before, each new index will continue to rely on 25 tranches from 25 distinct CMBS deals (reference obligations).

In turn, the CMBS deals will be considered eligible if they comply with the following criteria:

- The CMBS offerings must include classes rated AAA, AA, A, BBB- and BB. In addition, there must be at least two AAA classes with different levels of credit enhancement. The old rules required that the deals also have a triple-B rated class.
- The classes must carry at least one rating from either Fitch, Moody's or S&P. This is a departure from the rules for the legacy CMBX indices, which needed a minimum of two of these rating agencies to assign ratings.
- The new rules have expanded the list of potential second raters. The classes must now be rated by at least two of the following six rating agencies: DBRS, Fitch, Kroll, Moody's, Morningstar or S&P. The most conservative rating will be used in case of conflicts. Those two ratings should be publicly disclosed.
- The AAA index will reference the AAA class with the highest amount of credit enhancement, and the class with the longest weighted average life among those with equal credit enhancement (subject to the average life limits below). Similarly, the AS index will reference the triple-A class with the least amount of credit enhancement, and then with the longest weighted average life among similarly enhanced bonds. This is similar to the language used for the AJ index in the prior version of the rules.
- The AAA reference obligation must be offered publicly, have an initial balance in excess of $100 million and a weighted average life between eight and twelve years under a 0% CPY scenario. In addition, that weighted average life shall not decrease by more than one year when it is run at 100% CPP scenario and not decline more than two years when it is run at 100% CPY.
- The classes should be US denominated securities backed by the cash flow from a discrete pool of commercial mortgages. The securities cannot be secured by credit-linked notes, synthetic CDOs or similar synthetic obligations.
- The current factor for the class should 1.00. It cannot be insured or guaranteed by a third party.
- The prior rules for inclusion had a minimum deal size of $700 million to be included. There is no such deal size requirement in the updated rules.
- Each deal must contain at least ten mortgages and at least 95% of the mortgages must be backed by properties located in the US. The mortgages should be made to at least to two unaffiliated borrowers or unaffiliated with the CMBS issuer. This is also a reduced hurdle relative to the original rules, which required a minimum of 50 borrowers to at least 10 unaffiliated borrowers.

Exhibit 14: CMBX.6 Series coupons

Index	Coupon (bps)
AAA	50
AS	100
AA	150
A	200
BBB-	300
BB	500

Source: Credit Suisse, Markit

- No one property type (multi-family, office, etc.) can represent 100% of the deal's collateral. The old rules had a maximum allocation of 60% to the largest property type. Additionally, the rules about state concentration were also relaxed. The old rules required that the eligible deals could not have more than 40% of the aggregate value of properties in one state. There are no geographic requirements under the new rules.
- The class should be listed and described on Bloomberg. The trustee report and the offering documentation must be reasonably obtainable by the Administrator.

Exhibit 15: CMBX.6 components 1 through 12

	MS 2012-C4	WFRB 2012-C6	JPMC 2012-C6	UBSC 2012-C1	COM 2012-CR1	GSM 2012-GCJ7	WFRB 2012-C7	JPM C 2012-CBX	UBSBB 2012-C2	MSBAM 2012-C5	WFRBS 2012-C8	COMM 2012-CR2
Date priced	3/9/12	3/16/12	4/18/12	4/24/12	5/18/12	5/18/12	6/7/12	6/22/12	6/28/12	7/13/12	7/20/12	8/8/12
Orig. Balance ($billion)	$1.10	$0.93	$1.13	$1.33	$0.93	$1.62	$1.10	$1.29	$1.22	$1.35	$1.30	$1.32
Subord. of AAA tranche	19.88	19.13	21.25	21.50	19.75	19.38	22.50	20.88	22.25	21.25	21.25	20.13
Largest loan	11.8	8.3	11.2	9.0	12.9	8.0	14.3	12.0	11.6	13.3	11.5	8.9
Top 10 Loan Pct	62.7	37.5	51.7	55.4	51.1	45.5	62.6	56.3	60.7	53.6	53.8	57.6
# Loans	38	89	49	73	76	79	61	49	54	72	80	64
# Prop	77	152	118	100	54	175	80	59	83	98	122	98
Pct Full IO	0.6	1.0	16.2	11.6	4.3	7.3	11.4	1.2	10.2	12.1	16.3	14.1
Pct Partial IO	19.5	19.8	21.8	16.8	19.9	27.1	20.9	32.8	19.5	27.9	28.0	14.7
Rating Agency	D/K/M	F/K/M	F/M	F/K/M	F/K/M	D/M/MS	F/K/M	D/M	F/K/M	F/M	F/K/M	F/M
UW DSCR	1.66	1.58	1.62	1.41	1.60	1.50	1.82	1.46	1.55	1.61	1.64	1.67
Fitch DSCR	na	1.25	1.23	1.12	1.22	na	1.35	na	1.18	1.15	1.24	1.25
Moody's Actual DSCR	1.57	1.50	1.57	1.32	1.52	1.42	1.66	1.41	1.48	1.55	1.58	1.58
Moody's Stressed DSCR	1.18	1.16	1.07	0.99	1.11	1.09	1.11	1.04	1.02	1.01	1.05	1.06
S&P DSCR	na	na	na	na	na	na	na	na	na	na	na	na
UW LTV	58.4	61.1	65.5	66.9	63.7	64.4	62.5	63.0	66.8	63.9	63.4	62.8
Fitch LTV	na	93.0	95.5	100.5	95.2	na	92.3	na	98.7	102.7	97.4	93.8
Moody's LTV	90.5	94.7	97.8	101.9	94.9	97.8	96.4	99.5	101.9	102.7	101.9	95.9
S&P LTV	na	na	na	na	na	na	na	na	na	na	na	na
Retail Anchored	38.8	29.7	33.3	25.9	39.6	23.5	55.6	36.2	43.0	32.5	35.4	22.5
Retail Unanchored	3.5	6.2	8.0	3.0	4.8	3.1	1.7	0.9	3.1	2.5	1.8	0.9
Office	14.4	14.0	38.1	28.8	22.9	22.6	13.3	17.8	31.0	32.5	32.6	52.0
Multifamily	11.9	4.2	0.4	9.4	8.4	10.7	8.5	21.4	4.9	1.9	3.5	10.6
Hotel Full Service	15.1	9.7	2.5	4.9	2.4	5.2	4.4	13.8	2.2	9.9	4.8	3.5
Hotel Others	2.1	10.1	7.3	8.5	5.2	2.3	6.7	4.6	2.6	6.7	4.0	2.2
Industrial	1.0	5.2	4.2	4.3	1.5	22.4	1.2	4.4	0.0	3.0	12.3	3.0
Mixed Use	0.0	2.6	3.1	2.0	9.3	4.9	2.8	0.0	0.0	0.9	0.0	1.8
Storage	4.7	10.8	2.3	1.8	5.8	3.1	4.3	1.0	0.5	1.0	3.1	1.6
Mobile Housing	8.5	7.5	0.5	2.3	0.0	2.2	1.5	0.0	9.5	3.7	2.1	1.0
Other	0.0	0.0	0.4	9.0	0.0	0.0	0.0	0.0	3.2	5.4	0.6	0.9
CA	14.9	29.2	8.6	5.7	19.0	10.4	27.6	16.3	6.9	13.8	18.6	15.1
NY	15.0	1.8	0.2	29.6	21.4	10.8	10.7	12.8	22.0	9.7	12.1	27.4
IL	2.7	3.1	4.6	8.8	0.5	4.1	0.0	15.5	7.2	3.6	0.7	9.3
TX	8.4	12.5	20.6	2.5	2.8	1.4	8.5	4.1	6.0	5.0	8.7	12.2
FL	6.2	9.8	5.5	1.8	4.4	11.5	0.9	1.9	8.4	11.3	2.6	1.0

Source: Credit Suisse, Fitch, Moody's, S&P, Morningstar (Realpoint), DBRS, Kroll, Commercial Mortgage Alert

Exhibit 16: CMBX Components 13 through 25

	CGCMT 2012-GC8	UBSBB 2012-C3	WFCM 2012-LC5	MSBAM 2012-C6	COMM 2012-CR3	JPMCC 2012-C8	WFRBS 2012-C9	COMM 2012-CR4	GSMS 2012-GCJ9	COMM 2012-CR5	WFRBS 2012-C10	UBSBB 2012-C4	JPMCC 2012-LC9
Date priced	9/10/12	9/14/12	9/19/12	10/3/12	10/3/12	9/27/12	10/16/12	11/2/12	11/16/12	12/6/12	11/30/12	12/6/12	12/12/12
Orig. Balance ($billion)	$1.04	$1.08	$1.28	$1.12	$1.25	$1.14	$1.05	$1.11	$1.39	$1.13	$1.31	$1.46	$1.25
Subord. of AAA tranche	21.00	21.13	20.25	21.25	20.50	21.00	21.13	20.00	22.00	19.13	20.25	20.00	22.00
Largest loan	11.0	10.4	12.1	11.1	10.1	11.0	10.4	11.3	10.1	7.9	9.6	9.6	12.1
Top 10 Loan Pct	59.7	45.6	52.2	53.2	63.9	58.5	44.4	56.9	55.5	50.0	48.9	47.3	58.0
# Loans	57	85	70	61	50	43	73	48	74	63	85	89	45
# Prop	139	113	124	76	74	84	100	152	135	98	122	131	79
Pct Full IO	14.0	11.8	13.8	17.8	24.5	5.5	0.0	33.0	17.6	8.3	12.0	18.8	16.2
Pct Partial IO	23.3	10.2	25.1	23.8	15.5	25.8	18.7	16.4	21.3	21.6	24.2	27.7	50.3
Rating Agency	F/K/M	D/K/M	F/M	F/M	F/M	D/F/K/S	F/M/MS	F/M/S	F/K/M	F/M	D/K/M	D/F/S	M/S
UW DSCR	1.73	1.64	1.86	1.67	1.78	1.63	1.57	1.92	1.66	1.75	1.82	1.90	1.74
Fitch DSCR	1.28	na	1.29	1.22	1.31	1.20	1.18	1.38	1.19	1.26	na	1.34	na
Moody's Actual DSCR	1.61	1.60	1.75	1.61	1.68	na	1.50	1.85	1.57	1.68	1.74	na	1.67
Moody's Stressed DSCR	1.07	1.10	1.12	1.03	1.06	na	1.06	1.13	1.03	1.08	1.10	na	1.03
S&P DSCR	na	na	na	na	na	1.56	na	1.73	na	na	na	1.77	1.34
UW LTV	63.1	63.0	61.1	62.6	61.8	64.6	65.2	59.7	61.9	63.7	62.6	66.3	64.4
Fitch LTV	96.4	na	95.4	104.3	95.6	100.6	103.1	93.7	103.2	96.9	na	100.5	na
Moody's LTV	99.3	99.0	98.6	101.0	96.4	na	103.2	94.4	101.8	94.4	98.3	na	100.4
S&P LTV	na	na	na	na	na	82.4	na	79.8	na	na	na	82.4	84.6
Retail Anchored	14.2	34.3	40.8	31.7	37.2	25.1	32.0	27.8	10.8	30.5	42.3	25.9	30.0
Retail Unanchored	5.4	2.8	2.1	3.5	2.0	1.2	2.5	12.8	2.0	1.9	1.5	3.5	15.8
Office	44.2	16.6	23.7	26.4	25.2	35.6	24.7	24.5	34.5	33.8	17.2	29.0	26.3
Multifamily	8.5	6.6	2.0	2.1	8.5	1.7	3.2	0.4	12.3	13.6	3.7	6.0	7.7
Hotel Full Service	11.7	1.4	0.8	15.9	3.6	5.6	7.8	1.1	10.2	6.2	5.1	4.8	7.1
Hotel Others	5.7	14.5	18.3	5.8	7.4	1.7	13.5	10.9	7.7	2.4	13.7	8.8	4.7
Industrial	0.0	4.9	1.9	3.2	11.8	9.0	5.2	4.7	0.0	0.6	6.8	1.1	8.3
Mixed Use	2.4	8.3	3.8	6.7	4.4	16.3	0.0	14.6	16.9	1.0	3.3	5.8	0.0
Storage	5.3	3.5	3.9	3.4	0.0	3.2	3.1	2.8	4.0	6.8	4.8	4.0	0.0
Mobile Housing	2.4	4.4	2.6	1.4	0.0	0.6	8.0	0.0	1.5	3.1	1.6	1.4	0.0
Other	0.2	2.8	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	9.6	0.1
CA	2.2	7.7	19.7	20.6	9.9	0.9	11.3	22.7	16.7	11.2	5.1	13.9	14.1
NY	31.4	5.9	19.4	26.6	29.0	0.0	3.5	23.0	24.2	20.4	3.1	8.4	4.4
IL	9.5	3.0	0.8	2.2	0.0	0.8	2.5	1.7	7.4	0.0	6.5	3.2	1.4
TX	14.9	7.9	14.4	15.1	14.0	19.6	11.9	9.9	3.8	1.3	6.3	20.5	7.7
FL	13.3	5.3	8.9	3.1	1.4	7.8	4.0	4.5	8.3	10.0	8.9	3.2	6.7

Source: Credit Suisse, Fitch, Moody's, S&P, Morningstar (Realpoint), DBRS, Kroll, Commercial Mortgage Alert

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