PUBLIC FIXED INCOME

Changes to Investments Risk-Based Capital for U.S. Insurers:

A Potential Positive for Public Structured Products

June 29, 2021

Introduction

The insurance industry is expecting significant changes in investments risk-based capital (RBC) this year, and for structured products portfolios these changes could amount to a paradigm shift. The National Association of Insurance Commissioners (NAIC) is planning two main changes in determining investments RBC that will specifically affect structured products: the elimination of price breakpoints to determine NAIC designations for modeled RMBS and CMBS issued after 2012, and for CMBS a move from a pro-cyclical modeling approach to a through-the-cycle approach. These changes will likely be implemented in 2021 and 2022.

The NAIC is also working on the adoption of a new set of RBC factors for all bonds (including structured products) held by life insurance companies that will differentiate capital requirements based on more granular measures of credit quality – mostly ratings notching. All these changes have the potential to alter the way some insurance companies approach capital efficiency when investing in bonds. For structured products these changes could: resolve some recent RBC distortions, better align RBC with the credit risk of high-quality securities, and significantly enhance the relative capital efficiency of higher credit-quality structured products versus other asset classes. The sections below analyze the expected changes and their potential implications for insurers.

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Change #1: Elimination Of Price Breakpoints

Background

The financial markets were still assessing the damages when in 2009 and 2010 the NAIC took the bold step of changing the RBC framework for two sectors that were at the epicenter of the Great Financial Crisis (GFC.) The RMBS and CMBS markets had been battered by speculative lending, aggressive structuring, and declining ratings standards, all of which contributed to the GFC. Once the crisis hit, holders of RMBS and CMBS bonds, including insurers, were left holding the bag.

In 2009, mortgage loan losses had started causing shortfalls in subordinated tranches of RMBS and CMBS transactions with no end in sight. Prices of senior tranches in these transactions had plummeted. Rating agencies had revised their methodologies and downgraded large swaths of these securities. Given their reliance on ratings, regulatory capital frameworks left regulated investors stuck between a rock and a hard place: sell severely downgraded securities at basement prices or hold enormous amounts of capital to keep these securities on their books.

In that kind of environment distortions were abundant. Many senior tranches that were unlikely to see large losses were trading at large discounts and had been severely downgraded. The capital requirements for that profile of bond were disproportionate to the actual risk of economic loss that long-term holders faced. But selling these securities to avoid the high capital charges would've had damaging effects for regulated investors' bottom lines.

The NAIC understood the nature of these distortions and implemented a new RBC framework that addressed them: instead of relying on rating agencies, the NAIC would model RMBS and CMBS bonds to determine the magnitude of potential losses, and it would consider the basis at which insurers owned those bonds to determine the appropriate amount of capital to support the potential level of bond economic loss. In order to determine the appropriate RBC charge for a modeled RMBS or CMBS security, the NAIC developed a grid of prices (a.k.a. price breakpoints) based on its modeling that would be compared to the book price at which each insurance company owned that bond. That mapping of securities resulted in NAIC designations and RBC charges that were specific to each insurance company, and that would be updated each year after a new modeling exercise.

Here's an example of how that modeling and price breakpoint approach worked in the aftermath of the GFC:[1]

Mechanics of Modeled RBC Framework and Price Breakpoints					
Bond Type	RMBS				
NRSRO Rating	CCC-				
Hypothetical Book Price	$75				
Modeling Scenario	Optimistic	Baseline	Conservative	Most Conservative	
Scenario Probability	10%	55%	25%	10%	
Modeled Loss NPV	$0	$0	$45.80	$100	
Weighted Loss NPV	$21.44	*Modeled loss NPV weighted by scenario probability*			
Intrinsic Price *[IP]*	$78.56	*Par minus Weighted Loss NPV*			
NAIC Designation	1	2	3	4	5
Designation Expected Loss *[E(L)]*	0.85%	2.95%	7.30%	16.50%	26.50%
Bond Breakpoint *[IP / (1 -E(L))]*	$79.23	$80.94	$84.74	$94.08	$106.88
Gross RBC Factor	0.39%	1.26%	4.46%	9.70%	22.31%
2020 Designation	NAIC 1	*Book Price below NAIC 1 Breakpoint*			
Assigned Gross RBC Factor	0.39%				

From the example above we can see that the new framework accomplished the objective of ensuring that RBC requirements are commensurate with the expected risk of economic loss in a long-term investment. By contrast, in the ratings-based framework that was used before the model- based one was introduced, this security would've received a NAIC 5 designation and carry a 22.31% gross RBC factor. That high level of capital requirement would've ignored the loss cushion this hypothetical insurance investor had by virtue of the large discount in its carrying price of $75 for the RMBS bond in the example. By all measures the NAIC's introduction of the modeled framework for RMBS and CMBS with price breakpoints was a groundbreaking innovation that incented prudent risk taking by insurers while right-sizing capital requirements to better reflect investment risk.

What's Changing And What Are The Implications?

By early 2020 the NAIC had been working for several years on a project to revise their six-category investment RBC factor (NAIC designations) approach. In addition to revisiting the factors themselves, the NAIC wanted to develop a much more granular approach to assigning RBC factors and had settled on moving from six NAIC designations to twenty – each designation reflecting one notch in the traditional rating agency scale.

With this backdrop, the Structured Securities Group (SSG) at the Securities Valuation Office of the NAIC was becoming concerned that the new twenty-category scale of NAIC designations was going to make the price breakpoint component of the modeled RMBS and CMBS RBC methodology significantly more complex and costly – the SSG would need to produce a significantly larger amount of data points for insurance companies to map their modeled securities

to the more granular NAIC designations. At the same time, in some corners of the NAIC, regulators had grown somewhat uncomfortable with the differentiated RBC treatment that discount-priced RMBS and CMBS holdings received versus other bond types.

In this context, in early 2020 the SSG started exploring the elimination of the price breakpoints component of the modeled RMBS and CMBS methodology. Insurance companies, however, weren't so keen on parting ways with a component of the RMBS and CMBS RBC methodology that had proven so effective in the aftermath of the GFC. Responsive to insurance company concerns, the SSG decided not to pursue this initiative. Little did anyone know at the time that a global pandemic was rapidly unfolding, and that the economic havoc it would wreak would reveal some impactful shortcomings in the current methodology.

Fast-forward to the fourth quarter of 2020 when the pandemic had devastated the global economy. The SSG released a report with interim results of the modeling of RMBS and CMBS to help insurers prepare for the year-end RBC determination process. Those interim results showed a dramatic decline in NAIC designations even for many highly-rated bonds – primarily CMBS. This implied that insurance companies would need to hold a larger amount of capital than anticipated for that year-end. But how did that happen?

> Little did anyone know at the time that a global pandemic was rapidly unfolding, and that the economic havoc it would wreak would reveal some impactful shortcomings in the current methodology.

The answer lay in a couple of steps in the RBC methodology for RMBS and CMBS that, when combined with the economic effects of the pandemic, translated into distortions in the modeling results. Namely, price breakpoints are derived with the assumption of par value purchases and therefore do not account for the large decline in rates that followed the GFC; and the modeling approach for CMBS followed a pro-cyclical methodology that was using the highly negative economic data from the pandemic to forecast the trajectory of potential bond losses. More on the pro-cyclical approach to CMBS modeling later, but first let's focus on the price breakpoints' par purchase assumption.

At a high level price breakpoints are derived by subtracting from par the weighted modeled principal loss for RMBS and CMBS bonds, and then applying the expected loss for each NAIC category (as implied by its RBC charge) to that number. Conceptually this approach tries to assign RBC based on the risk of economic loss to an insurance investor given the basis at which that investor owns a bond. The unanticipated shortcoming of this approach is that by focusing exclusively on principal cash flows rather than on the full economics of a security it unduly penalizes premium bonds versus par or discount bonds that may have the same exact cash flow economics. This unexpected shortcoming became glaringly apparent in 2020.

While this principal-only focus of price breakpoints had been part of the methodology from its inception, it hadn't really created broader problems before because the RBC framework doesn't require bonds with no losses in any of the modeled scenarios ("zero-loss bonds") to go through the breakpoints. Zero-loss bonds automatically get a NAIC 1 designation as long as they're rated A- or higher. Effectively an insurance company could buy zero-loss bonds at a premium without any RBC penalty. This was particularly relevant for CMBS bonds given their common long duration and

the shifts in interest rates seen in the last several years. Because most highly-rated CMBS bonds had been zero-loss bonds up until 2019, many insurance companies were comfortable buying those bonds at a premium. The 2020 NAIC modeling results turned that comfort into despair as large swaths of former zero-loss bonds now showed losses and therefore had to go through price breakpoints. The results weren't pretty.

The example below1 shows how the price breakpoints can cause even highly rated bonds to have a punitive RBC treatment. In this hypothetical example, a AA- rated bond that the previous year received a NAIC 1 designation because it was a zero-loss bond moves to NAIC 4 when it loses the zero-loss status and its gross RBC factor increases exponentially from 0.39% to 9.70%:

Current RBC Framework *with* Price Breakpoints					
Bond Type	CMBS				
NRSRO Rating	AA-				
Hypothetical Book Price	$114				
Modeling Scenario	Optimistic	Baseline	Conservative	Most Conservative	
Scenario Probability	10%	55%	25%	10%	
Modeled Loss NPV	$0	$0	$0	$8.80	
Weighted Loss NPV	$0.88	*Modeled loss NPV weighted by scenario probability*			
Intrinsic Price *[IP]*	$99.12	*Par minus Weighted Loss NPV*			
NAIC Designation	1	2	3	4	5
Designation Expected Loss *[E(L)]*	0.85%	2.95%	7.30%	16.50%	26.50%
Bond Breakpoint *[IP / (1 -E(L))]*	$99.97	$102.13	$106.92	$118.71	$134.86
Gross RBC Factor	0.39%	1.26%	4.46%	9.70%	22.31%
2020 Designation	NAIC 4	*Book Price between NAIC 3 and NAIC 4 Breakpoints*			
Assigned Gross RBC Factor	9.70%				

Fortunately, the NAIC was clear about the distortions created by the modeling results in 2020 and calibrated the zero-loss parameters to capture additional bonds and somewhat reduce the excessively adverse impact on RBC for CMBS. As a longer-term solution, the NAIC plans to eliminate the price breakpoints component of the methodology. Instead of basing RBC on insurers' carrying values of RMBS and CMBS holdings versus modeled losses, it will simply determine RBC based on the modeling results alone (except for bonds issued prior to 2013, which will continue to use price breakpoints.) The process will otherwise remain the same, and the NAIC designation will be determined by comparing the modeled intrinsic price of a bond to the par value net of the expected losses implied by each NAIC designation's RBC factor.

The example below[1] shows the effect that this change would have in the same bond from the previous example above – the same AA- rated bond that went from NAIC 1 to NAIC 4 in the course of a year, would now move back up to a NAIC 2 designation and its gross RBC factor would decrease substantially from 9.70% to 1.26%:

Planned RBC Framework *without* Price Breakpoints					
Bond Type	CMBS				
NRSRO Rating	AA-				
Hypothetical Book Price	$114				
Modeling Scenario	Optimistic	Baseline	Conservative	Most Conservative	
Scenario Probability	10%	55%	25%	10%	
Modeled Loss NPV	$0	$0	$0	$8.80	
Weighted Loss NPV	$0.88	*Modeled loss NPV weighted by scenario probability*			
Intrinsic Price *[IP]*	$99.12	*Par minus Weighted Loss NPV*			
NAIC Designation	1	2	3	4	5
Designation Expected Loss *[E(L)]*	0.85%	2.95%	7.30%	16.50%	26.50%
Bond Breakpoint *[IP / (1 -E(L))]*	$99.15	$97.05	$92.70	$83.50	$73.50
Gross RBC Factor	0.39%	1.26%	4.46%	9.70%	22.31%
2020 Designation	NAIC 2	*Intrinsic Price between NAIC 1 and NAIC 2 Boundaries*			
Assigned Gross RBC Factor	1.26%				

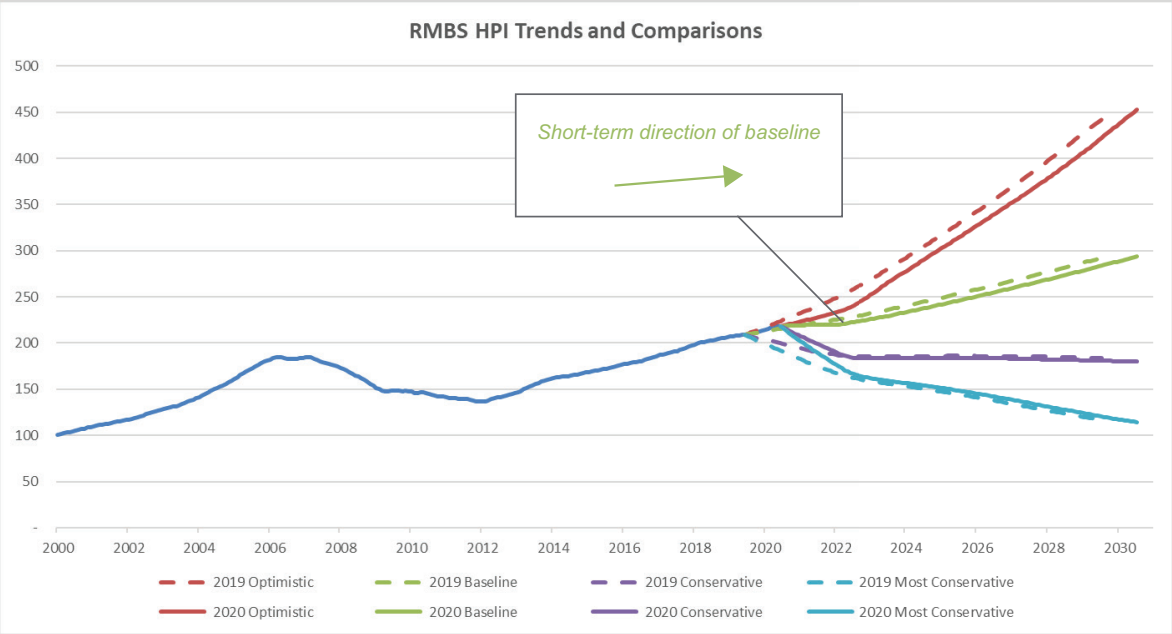
As we mentioned earlier, the price breakpoints component of the RMBS and CMBS RBC methodology is one of two main culprits for the distortions seen in insurance RBC requirements for 2020. The second one is the pro-cyclical approach to modeling CMBS.

Change #2: Through-the-Cycle Modeling for CMBS

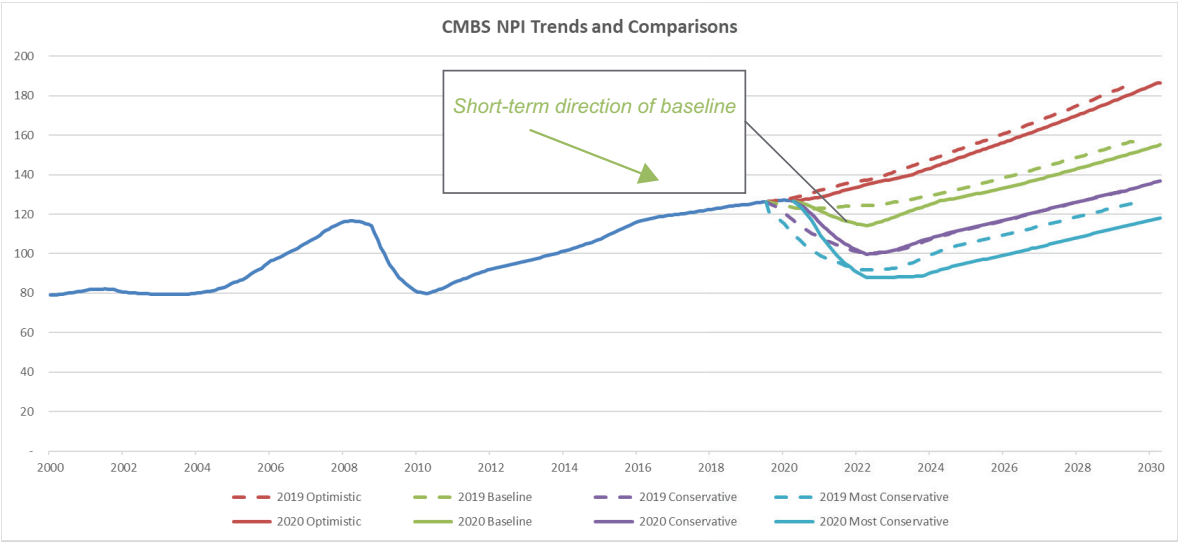
When the SSG first started modeling RMBS and CMBS it decided to use a pro-cyclical methodology. That is, use the most recent performance of the model's fundamental variables to predict the near-term path for those variables. In this context, a positive sector environment would result in a positive near-term forecast, and a negative environment would lead to a negative forecast.

This pro-cyclical modeling methodology has the potential to overshoot in either a positive or negative direction, even in instances when that forecasted near-term performance is unlikely. Recognizing this potential pitfall, the NAIC proposed moving RMBS modeling to a through-the-cycle methodology in 2017 and subsequently adopted this new approach with the plan to study it and propose it for CMBS as a next step.

In 2020 the divergent methodologies between RMBS and CMBS were still present, and the short term forecast of residential and commercial property values showed this discrepancy. The NAIC used the charts below to communicate the changes in modeling assumptions for 2020:



Source: Case-Shiller and BlackRock Solutions ***National HPI (Indexed 2000M1 = 100)***



Source: NCREIF and BlackRock Solutions ***NPI (Indexed 1990M1 = 100)***

From the two charts above we can see a projection of residential property values reflecting the moderately positive slope of their long-term trajectory, while commercial property values show a steep decline consistent with the severely adverse pandemic environment. Considering all the government stimulus and the short-term nature of the negative economic impact, it would've been unlikely to see a broad, large magnitude fall in commercial property values at the time. However, the pro-cyclical modeling methodology forecasted exactly that.

The negative bias in the forecast of commercial real estate performance increased the number of CMBS bonds that went from showing no modeled losses in 2019 to showing some level of loss in 2020. As discussed before, this was a key dynamic that, when combined with bonds being held at a premium, resulted in a significant increase in the RBC required for CMBS holdings.

The SSG was very clear about the distortions created by the pro-cyclical modeling methodology in CMBS and has indicated that it plans to move to a through-the-cycle modeling approach for CMBS in 2021 or 2022. While we continue to see softness in parts of the CMBS market that will likely weigh on new modeling results, the move to a through-the-cycle methodology should help avoid volatility in modeling results like we saw in 2020.

The final change that we are likely to see in 2021 is the move to a more granular scale of RBC factors for bonds. At this point we expect the change to apply equally across bond sectors including structured products. We address this expected change in the next section.

Change #3: Increased RBC Factor Granularity for Bonds

The NAIC has sought to revamp the current six-category designation scale used to determine life insurance bond RBC factors for several years. Part of the impetus for this effort is that the current factors have been in place for a long time and haven't incorporated the bond loss experience of the most recent economic cycles. Additionally, the NAIC wanted to refine the approach so that RBC factors more granularly reflect the risk of bonds versus the current six-category scale.

The new bond RBC factors, which the NAIC Life RBC Working Group adopted on June 11, 2021, are based on Moody's Analytics' historical default and loss data. The table on the right outlines the new NAIC designations along with their corresponding new gross (i.e. pre-tax and other adjustments) RBC factors and compares them to the factors under the current six-category designation scale.

Rating	New NAIC Designation	Proposed RBC Factors	Current RBC Factors
AAA	1A	0.158%	0.39%
AA+	1B	0.271%	0.39%
AA	1C	0.419%	0.39%
AA-	1D	0.523%	0.39%
A+	1E	0.657%	0.39%
A	1F	0.816%	0.39%
A-	1G	1.016%	0.39%
BBB+	2A	1.261%	1.26%
BBB	2B	1.523%	1.26%
BBB-	2C	2.168%	1.26%
BB+	3A	3.151%	4.46%
BB	3B	4.537%	4.46%
BB-	3C	6.017%	4.46%
B+	4A	7.386%	9.70%
B	4B	9.535%	9.70%
B-	4C	12.428%	9.70%
CCC+	5A	16.942%	22.31%
CCC	5B	23.798%	22.31%
CCC-	5C	30.000%	22.31%
CC and lower	6	30.000%	30.00%

The RBC factors above could have a profound impact on structured products holdings in insurance portfolios that are constrained by their regulatory capital. For modeled securities (i.e. RMBS and CMBS), the more granular designation is likely to allow higher credit-quality bonds to obtain stronger NAIC designations with more modest RBC factors, even for securities that have small modeled losses. While the SSG has not yet provided precise guidance on how the new designation mapping will work for modeled securities, the example below[1] takes the same CMBS bond from prior examples and assigns a designation following the same intrinsic price approach that the NAIC will follow this year:

Planned RBC Framework *without* Price Breakpoints *and* New Granular Bond Factors				
Bond Type	CMBS			
NRSRO Rating	AA-			
Hypothetical Book Price	$114			
Modeling Scenario	Optimistic	Baseline	Conservative	Most Conservative
Scenario Probability	10%	55%	25%	10%
Modeled Loss NPV	$0	$0	$0	$8.80
Weighted Loss NPV	$0.88	*Modeled loss NPV weighted by scenario probability*		
Intrinsic Price *[IP]*	$99.12	*Par minus Weighted Loss NPV*		

New NAIC Designation	Designation Expected Loss *[E(L)]*	Boundary *[Par minus E(L)]*	Gross RBC Factor
1A	0.21%	$99.79	0.158%
1B	0.35%	$99.66	0.271%
1C	0.47%	$99.53	0.419%
1D	0.59%	$99.41	0.523%
1E	0.74%	$99.26	0.657%
1F	0.92%	$99.08	0.816%
1G	1.14%	$98.86	1.016%
2A	1.39%	$98.61	1.261%
2B	1.85%	$98.15	1.523%
2C	2.66%	$97.34	2.168%
3A	3.84%	$96.16	3.151%
3B	5.28%	$94.72	4.537%
3C	6.70%	$93.30	6.017%
4A	8.46%	$91.54	7.386%
4B	10.98%	$89.02	9.535%
4C	14.69%	$85.32	12.428%
5A	20.37%	$79.63	16.942%
5B	26.90%	$73.10	23.798%

2020 Designation	NAIC 1F	*Intrinsic Price between NAIC 1E and NAIC 1F Boundaries*
Assigned Gross RBC Factor	0.816%	

We emphasize that the SSG has not yet provided specific details on how these new factors will be mapped for modeled securities, and future methodology changes to capture the added granularity are a distinct possibility. The example above, however, highlights how a more granular approach to RBC factors can help the industry right-size the amount of capital it holds for lower risk exposures. This improved proportionality between RBC and credit risk may influence some insurers' asset allocation decisions. Structured products, both modeled and non-modeled, will offer insurers significant opportunities to improve regulatory capital efficiency given the abundance of low-risk bonds that structural enhancements create in securitizations.

The example below[1] shows the increased relative regulatory capital efficiency that lower-risk bonds may have under the new RBC factors, and how this could inform asset allocation decisions:

	Non-Financial Corporate	FFELP Student Loan ABS Senior
Rating	A	AAA
Weighted Avg. Life	5	5
LIBOR Spread (bps)	30	60
5-year Swaps Rate	0.85%	
Implied Yield	1.15%	1.45%
Gross RBC Factor - 2020	0.39%	0.39%
Yield to RBC	2.9	3.7
Gross RBC Factor - 2021	0.816%	0.158%
Yield to RBC	1.4	9.2

We can see in the example above how an A-rated corporate bond and an AAA-rated ABS bond could almost be thought of interchangeably given the relative proximity of their yields and their identical RBC charge under the current regime. However, when we use the more granular factors adopted for 2021 the capital efficiency difference becomes too large to ignore. The relationship of yield to RBC between the ABS and the corporate bond in the example goes from 1.3x (3.7 vs. 2.9) to 6.5x (9.2 vs. 1.4.) We believe that dynamics like the one showed in this example will possibly cause a re-thinking of asset allocation decisions among insurers with regulatory capital constraints.

Conclusion

The various changes to the RBC framework that the NAIC is implementing are likely to have a material impact on the level of RBC for structured products in 2021 (and beyond) versus the 2020 levels. The changes specific to modeled RMBS and CMBS are likely to bring RBC charges for these sectors back in line after some of the negative distortions seen in 2020. The broader change to RBC factor granularity is likely to provide a closer alignment between the credit risk of high-quality securities and their capital requirements. This latter change could make structured products a more frequent choice for asset allocation decisions among some life insurers.

Endnote:

[1] **Schematic Illustration Explaining an Investment Concept:** The charts referenced are intended to help illustrate certain investment concepts/processes and is not intended to represent actual past, or expected future, performance of any security, investment product or investment strategy.

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Appendix

This appendix contains details for the preceding charts and provides additional information for greater accessibility.

RMBS HPI Trends and Comparisons

Note:

- All values are approximate.
- National HPI (Indexed 2000M1 = 100).
- For the "2020 Baseline" curve at year 2022 on the x axis, there is a callout text box indicating "Short-term direction of baseline", and a right-hand arrow pointing slightly upward.
- Except for the "Pre-2020" curve, all the other curves have no values from year 2000 to 2018.
- The curves have the following characteristics:
    - Baseline: Rises moderately to 2006, declines moderately and then gradually to 2012, and then rises moderately to 2020, where the other curves split off in different directions.
    - 2019 Optimistic and 2020 Optimistic: Track each other closely, with 2019 Optimistic being slightly higher. The curves rise moderately to 2030.
    - 2019 Baseline and 2020 Baseline: Track each other closely, with 2019 Baseline being slightly higher. The curves rise between gradually and moderately to 2030.
    - 2019 Conservative and 2020 Conservative: Track each other very closely, with 2019 Baseline being very slightly higher. The curves decline moderately between 2020 and 2022 and then decline very gradually to 2030.
    - 2019 Most conservative and 2020 Most conservative: The 2020 Most conservative curve rises moderately around the year 2020 point and then declines moderately to join the 2019 Most conservative curve after 2022 after which the curves track each other very closely, with 2020 Most conservative being very slightly higher. The 2019 Most conservative curve declines moderately from 2020 to 2022 and then declines between gradually and moderately to 2030.
- Source: Case-Shiller and BlackRock Solutions.

Year	Pre-2020 Curve	2019 Optimistic	2020 Optimistic	2019 Baseline	2020 Baseline	2019 Conservative	2020 Conservative	2019 Most conservative	2020 Most conservative
2000	100	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2002	116	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2004	141	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2006	182	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2008	174	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2010	148	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2012	137	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2014	161	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2016	176	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2018	197	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2020	213	215	215	213	213	203	215	199	215
2022	n/a	250	234	226	219	188	190	168	176
2024	n/a	292	275	238	234	186	182	153	157
2026	n/a	341	325	257	250	186	182	141	145
2028	n/a	395	377	275	267	184	182	128	130
2030	n/a	453	434	296	288	182	180	114	118

CMBS NPI Trends and Comparisons

Note:

- All values are approximate.
- NPI (Indexed 1990M1 = 100).
- For the “2020 Baseline” curve at year 2022 on the x axis, there is a callout text box indicating “Short-term direction of baseline”, and a right-hand arrow pointing moderately downward.
- Except for the “Pre-2020” curve, all the other curves have no values from year 2000 to 2018.
- The curves have the following characteristics:
    - Baseline: Flat to 2004, then rises moderately to 2008, declines moderately to sharply to 2010, then moderately to 2016, and then gradually to 2020, where the other curves split off in different directions.
    - 2019 Optimistic and 2020 Optimistic: Track each other closely, with 2019 Optimistic being slightly higher. The curves rise moderately to 2030.
    - 2019 Baseline and 2020 Baseline: The 2019 Baseline curve rises gradually to 2023 and then rises moderately to 2030. The 2020 Baseline curve declines moderately to 2022, then rises moderately to 2024. After 2024, both curves track each other closely, with 2019 Baseline being slightly higher. Both curves rise moderately from 2024 to 2030.
    - 2019 Conservative and 2020 Conservative: The 2019 Conservative curve declines moderately to 2022 and then rises moderately to 2030. The 2020 Conservative curve declines gradually and then moderately to 2022, then rises moderately to 2030. After 2022, both curves are within 1 point of one another.
    - 2019 Most Conservative and 2020 Most Conservative: The 2019 Most conservative curve declines moderately to sharply to 2022, then rises moderately to 2030. The 2020 Most conservative curve declines fairly sharply to 2022 after which it rises moderately to 2030. The 2019 Most conservative curve is well below the 2020 Most conservative curve until 2022, where the curves cross and then the 2020 Most Conservative curve is well below the 2019 Most Conservative curve.
- Source: NCREIF and BlackRock Solutions.

Year	Pre-2020 Curve	2019 Optimistic	2020 Optimistic	2019 Baseline	2020 Baseline	2019 Conservative	2020 Conservative	2019 Most conservative	2020 Most conservative
2000	80	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2002	80	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2004	81	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2006	97	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2008	116	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2010	81	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2012	93	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2014	102	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2016	117	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2018	123	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2020	128	128	128	128	125	122	128	117	128
2022	n/a	137	134	125	115	101	102	93	92
2024	n/a	148	143	130	126	108	107	100	91
2026	n/a	161	157	140	134	117	117	109	99
2028	n/a	176	171	149	143	127	127	119	108
2030	n/a	190	184	160	154	136	136	129	117