Analytics Insights

Product Engineering

Yield Book Agency MBS: How valid is the current CMM102 calculation?

Incorporating liquidity scoring to strengthen price interpolation for the CMM102 coupon

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Introduction

While employed as a linchpin for models that incorporate primary/secondary mortgage rate spreads, which ultimately charts prepayments, the CMM102 coupon has floundered in the recent market volatility, raising questions over the validity of its inherent characteristics.

To illustrate, in our study, we have taken two main pricing coupons for CMM102 -- 30yr UMBS/FNMA 6%s and 6.5%s with the higher coupon experiencing the usual bouts of initial Illiquidity, erratic marks, eliciting doubt among its users.

As the market explores new price levels, with interest rates suddenly shifting, the newer coupons are not yet fully supported, while the bid levels associated with the higher coupons are not reliable, making it a difficult task when trying to solve for a 102 strike that the industry currently depends upon.

Simple price interpolation does not address the lack of reliable marks and so we embarked on a project to incorporate both price levels and liquidity to arrive at a more dependable CMM102.

Our test covers issuance that defines the forward TBA contract upon settlement, trading flows that measure the depth of liquidity, as well as bid: ask spreads that are highly indicative of either a thinly traded market or one of depth and dependable execution.

With these parameters, we examined the validity of these marks used to interpolate and re-calculate CMM102.

As CMM102 is an interpolation of prices relative to strike to coupons, our liquidity weighting maintains the same, assigning value to each basis point of interpolation that pricing accomplishes which is a 50 basis points (bps) interval between constituent coupons.

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Backdrop to Liquidity

Over the past several years, the Federal Reserve has kept interest rates capped with massive MBS and Treasury buying operations.

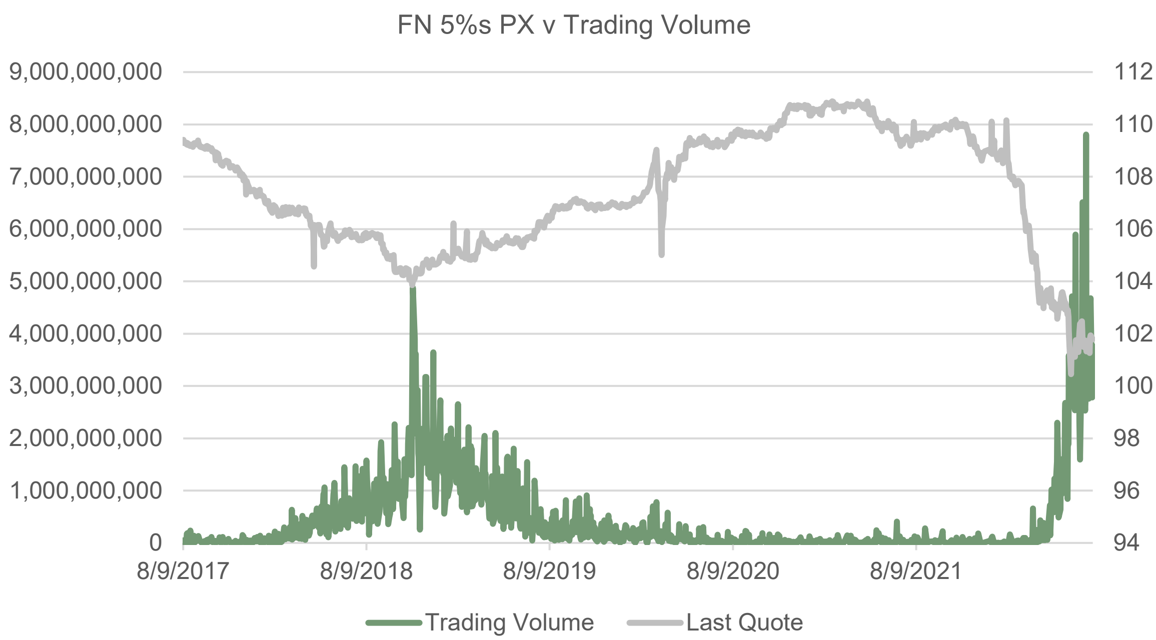
But once the Fed removed itself from the markets, volatility spiked, and overall liquidity suffered as buyers were able to pick and choose their re-entry points.

Prices fell precipitously in 2022. The MBS index lost 20 points this year alone and at one point nine out of the 11 TBA coupons on the stack traded at a discount to par.

Trading in premium coupons became a lonely existence, as there was little pool issuance to support the market, limited TBA hedging, and ultimately gapping bid: ask markets as a result.

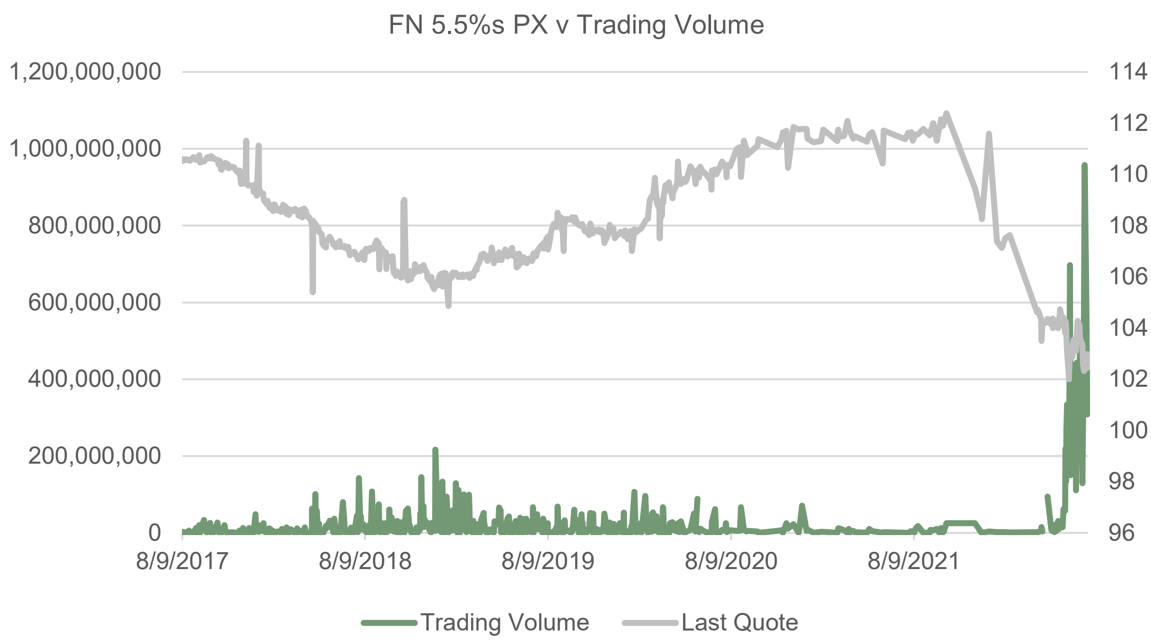
As the following price to volume charts (charts 1 through 4) indicate, higher TBA dollar prices coincide with low or no trading volume.

Chart 1



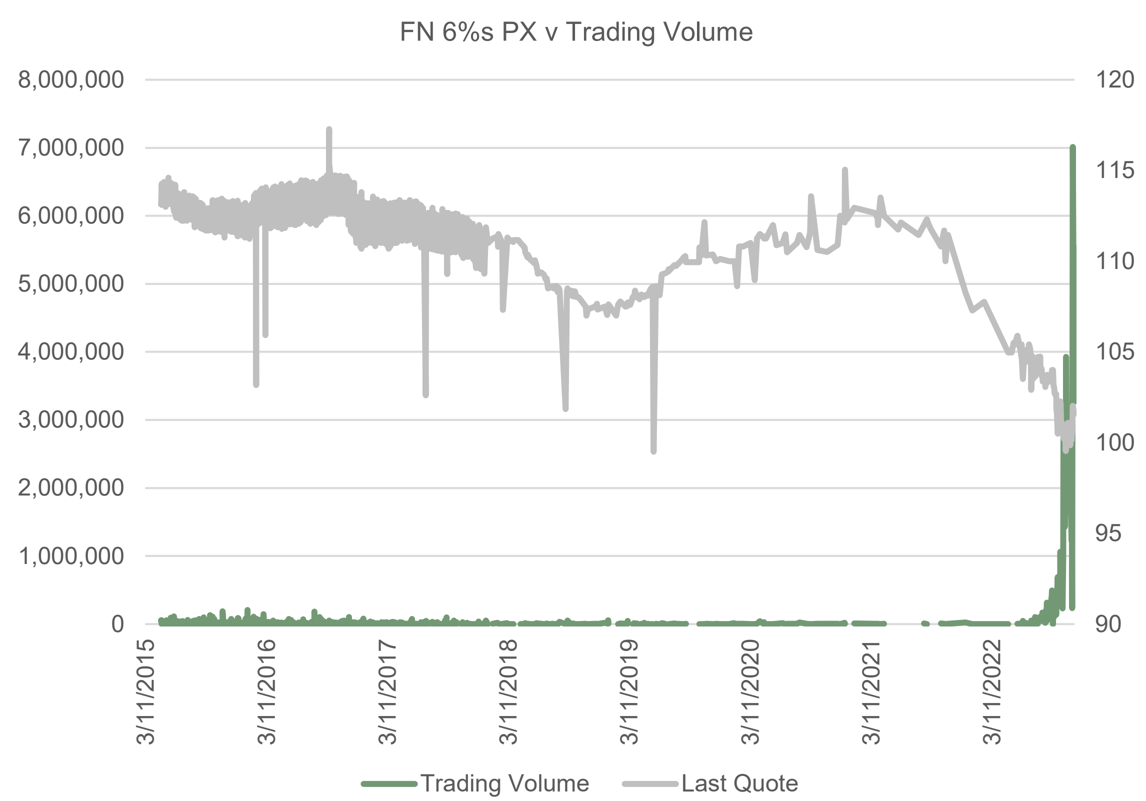
Source: FINRA/TRACE

Chart 2



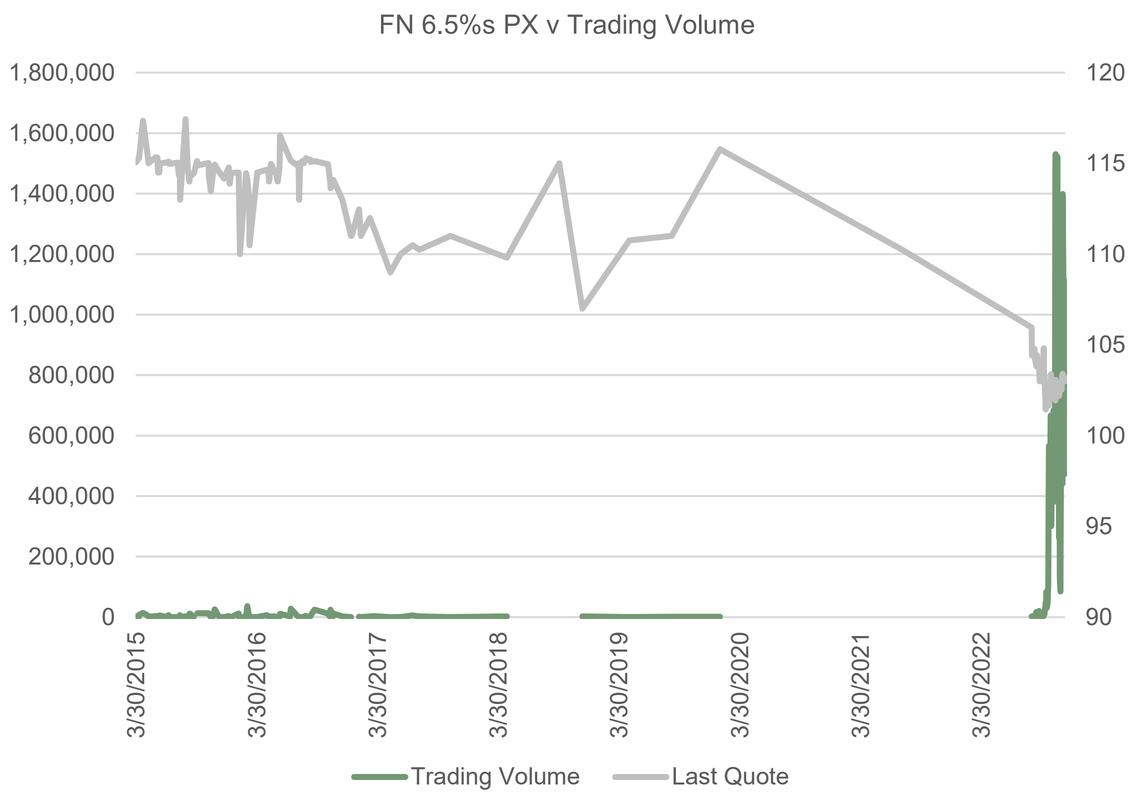
Source: FINRA/TRACE

Chart 3



Source: FINRA/TRACE

Chart 4



Source: FINRA/TRACE

Trading Volume

One of the first aspects to a liquid market is the depth of trading within, and the volume executed daily in that sector.

For TBA trades, we accessed FINRA's TRACE system, forgoing pool trading, dollar rolls and "stip" trades and instead focused on forward TBA contracts that define the CMM calculations.

In our test, we set ranges and assigned scores associated with daily trading volume as follows:

IF FINRA DAILY TRADING VOLUME is <100mm .... 0 Weighting

IF FINRA DAILY TRADING VOLUME is >100mm but <500mm .... 1 Weighting

IF FINRA DAILY TRADING VOLUME is >500mm but <1billion .... 2 Weighting

IF FINRA DAILY TRADING VOLUME is >1billion but <2billon .... 3 Weighting

IF FINRA DAILY TRADING VOLUME is >2billion but <3billon .... 4 Weighting

IF FINRA DAILY TRADING VOLUME is >3billion .... 5 Weighting

These ranges were derived after observing the daily trading volume across all coupons on TRACE.

Issuance Levels

Agency issuance, which is reported the first week of each month, remains constant when used for a daily weighting variable. It is a direct indication of originations and ultimately support for the TBA contract, which is populated when pools are allocated into the open contract upon settlement (48-hour day pool notification).

A lack of issuance will decrease liquidity in the market, conversely ample issuance will support depth of market theoretically.

Our weightings are as follows:

IF ISSUANCE for that Month is <100mm .... 0 Weighting

IF ISSUANCE for that Month is >100mm but <1billion .... 1 Weighting

IF ISSUANCE for that Month is >1 billion but <3billion .... 2 Weighting

IF ISSUANCE for that Month is >3billion but <5billion .... 3 Weighting

IF ISSUANCE for that Month is >5billion but <7billion .... 4 Weighting

IF ISSUANCE for that Month is >7 billion .... 5 Weighting

Again, these ranges were selected after observing monthly reporting figures from the agencies over the past several months.

Bid: Ask Spreads

The third barometer of liquidity used is the bid: ask spreads accessed via Trade Web (at 3pm daily). This market is “request for quote” (RFQ), using an algorithm derived from dealer-to-dealer trading markets (Dealer Web) and movements in rates and Treasuries.

Although these are not actual trades, frequency and fluidity of trades are still highly indicative of liquidity.

Our weightings for bid: ask spreads are as follows:

IF BID ASK IS BLANK OR > 1pt .... 0 Weighting

IF BID ASK IS <1pt but > 3/4 of 1 PT .... 1 Weighting

IF BID ASK IS <3/4 of 1 PT but >1/2 PT .... 2 Weighting

IF BID ASK IS <1/2 of 1 PT but >1/4 PT .... 3 Weighting

IF BID ASK IS <1/4 of 1 PT but >2/32nds .... 4 Weighting

IF BID ASK IS <2/32nds .... 5 Weighting

Daily origination hedging totals (of TBAs), although a direct reflection of pipeline hedging and forward issuance, has no standardized documentation and is subject to counterparty experience. Hence, it was omitted from our scoring.

Using the Scoring System

The CMM strike is calculated daily, so our scoring system is updated daily as well, with issuance held constant day over day (monthly figure).

Once the individual or “Sub” scores are calculated on the two constituent coupons, each of the three categories are summed and divided by the total score for both constituents. Ratios are then applied to each coupon to proportion the 50bps between constituent coupons. After this is solved, pricing is incorporated, using an average between the two CMM components, pricing, and liquidity. In that way, we have added pricing back into our coupon weightings and updated the CMM to better reflect liquidity as a function of price.

In table 1, you can find October’s recap of coupon scoring across trading volume, bid: ask, and issuance scored across our metric using FNMA 6%s and FNMA 6.5%s

Table 1

FINRA trading volume					TW BID ASK(32nds)				Issuance			
		sub score		sub score		sub score		sub score		sub score		sub score
	6.5		6.0		6.5		6.0		6.5		6.0	
31-Oct	150,000,000	1	2,434,760,000	4	9.5	3	7.0	4	596,000,000	1	2,497,000,000	2
28-Oct	250,700,000	1	2,311,800,000	4	6.0	4	4.0	4	596,000,000	1	2,497,000,000	2
27-Oct	654,250,000	2	2,756,684,000	4	6.0	4	4.5	4	596,000,000	1	2,497,000,000	2
26-Oct	532,600,000	2	2,811,818,000	4	3.5	4	0.5	5	596,000,000	1	2,497,000,000	2
25-Oct	449,500,000	1	2,491,575,000	4	6.0	4	5.5	4	596,000,000	1	2,497,000,000	2
24-Oct	468,800,000	1	2,125,233,000	4	7.5	4	4.0	4	596,000,000	1	2,497,000,000	2
21-Oct	520,900,000	2	4,223,963,000	5	9.0	3	7.5	4	596,000,000	1	2,497,000,000	2
20-Oct	284,022,000	1	2,269,517,000	4	10.5	3	3.0	4	596,000,000	1	2,497,000,000	2
19-Oct	106,700,000	1	3,485,007,000	5	36.0	0	3.5	4	596,000,000	1	2,497,000,000	2
18-Oct	79,000,000	0	1,720,896,000	3	26.5	1	1.5	5	596,000,000	1	2,497,000,000	2
17-Oct	46,050,000	0	1,470,150,000	3	21.0	2	3.5	4	596,000,000	1	2,497,000,000	2
14-Oct	15,866,000	0	1,990,075,000	3	13.0	3	1.5	5	596,000,000	1	2,497,000,000	2
13-Oct	59,250,000	0	3,492,372,000	5	52.5	0	4.5	4	596,000,000	1	2,497,000,000	2
12-Oct	31,200,000	0	1,034,986,000	3	63.5	0	5.0	4	596,000,000	1	2,497,000,000	2
11-Oct	26,500,000	0	1,282,199,000	3	72.0	0	1.5	5	596,000,000	1	2,497,000,000	2
7-Oct	3,400,000	0	564,250,000	2	45.5	0	6.0	4	596,000,000	1	2,497,000,000	2
6-Oct	-	0	216,250,000	1	43.5	0	3.0	4	596,000,000	1	2,497,000,000	2
5-Oct	3,000,000	0	238,800,000	1	72.5	0	3.50	4	596,000,000	1	2,497,000,000	2
4-Oct	4,100,000	0	248,650,000	1	96.5	0	3.5	4	596,000,000	1	2,497,000,000	2
3-Oct	1,800,000	0	210,000,000	1	97.0	0	5.0	4	596,000,000	1	2,497,000,000	2

Source: FINRA, TRACE, TradeWeb, eMBS

Total Scores and Coupon Weightings

Adding the “sub” scores (in table 1) and deriving a percentage of the sub score versus the total scoring brings us to a weighting between the two principal coupons.

Table 2

CMM 102	WGT'd	Synthetic	Date	PMMS	PS102	WGT	PSSYNTHETIC	Total scores			WGT		CPN	
6.402	6.167	6.284	31-Oct	7.080	0.68	0.91	0.80	5.0	10.0	15.0	0.3333	0.667	2.17	4.00
6.3	6.188	6.244	28-Oct	7.080	0.78	0.89	0.84	6.0	10.0	16.0	0.3750	0.625	2.44	3.75
6.221	6.206	6.213	27-Oct	7.080	0.86	0.87	0.87	7.0	10.0	17.0	0.4118	0.588	2.68	3.53
6.326	6.194	6.260	26-Oct	6.940	0.61	0.75	0.68	7.0	11.0	18.0	0.3889	0.6111	2.53	3.67
6.397	6.188	6.292	25-Oct	6.940	0.54	0.75	0.65	6.0	10.0	16.0	0.3750	0.625	2.44	3.75
6.502	6.188	6.345	24-Oct	6.940	0.44	0.75	0.60	6.0	10.0	16.0	0.3750	0.625	2.44	3.75
6.488	6.176	6.332	21-Oct	6.940	0.45	0.76	0.61	6.0	11.0	17.0	0.3529	0.647	2.29	3.88
6.605	6.167	6.386	20-Oct	6.940	0.34	0.77	0.55	5.0	10.0	15.0	0.3333	0.667	2.17	4.00
6.468	6.077	6.272	19-Oct	6.920	0.45	0.84	0.65	2.0	11.0	13.0	0.1538	0.846	1.00	5.08
6.351	6.083	6.217	18-Oct	6.920	0.57	0.84	0.70	2.0	10.0	12.0	0.1667	0.833	1.08	5.00
6.405	6.125	6.265	17-Oct	6.920	0.52	0.80	0.65	3.0	9.0	12.0	0.2500	0.750	1.63	4.50
6.439	6.143	6.291	14-Oct	6.920	0.48	0.78	0.63	4.0	10.0	14.0	0.2857	0.714	1.86	4.29
6.385	6.042	6.213	13-Oct	6.920	0.54	0.88	0.71	1.0	11.0	12.0	0.0833	0.917	0.54	5.50
6.342	6.050	6.196	12-Oct	6.660	0.32	0.61	0.46	1.0	9.0	10.0	0.1000	0.900	0.65	5.40
6.318	6.045	6.182	11-Oct	6.660	0.34	0.61	0.48	1.0	10.0	11.0	0.0909	0.909	0.59	5.45
6.26	6.056	6.158	7-Oct	6.660	0.40	0.60	0.50	1.0	8.0	9.0	0.1111	0.889	0.72	5.33
6.204	6.063	6.133	6-Oct	6.660	0.46	0.60	0.53	1.0	7.0	8.0	0.1250	0.875	0.81	5.25
6.065	6.063	6.064	5-Oct	6.700	0.64	0.64	0.64	1.0	7.0	8.0	0.1250	0.875	0.81	5.25
5.977	5.294	5.826	4-Oct	6.700	0.72	1.41	0.87	1.0	7.0	8.0	0.1250	0.875	0.81	5.25
6.038	6.063	6.050	3-Oct	6.700	0.66	0.64	0.65	1.0	7.0	8.0	0.1250	0.875	0.81	5.25

The last two columns (titled CPN in table 2) is the coupon allocation of the 50bps between the two constituents. The second column (titled WGT’d in table 2) is the total coupon arrived at.

As the table indicates, the results are heavily biased toward lower and more liquid 6%s, with the percentages of coupon lending further support to the results.

From the price based CMM102 in the first column, you can observe the difference against the Weighted to be 30bps and 20-25 against Synthetic at their widest points.

Again, our method ignores price movements while the prevailing methods disregard lack of price dependability (liquidity).

Taking a closer look at the results from 31 October 2022:

- CMM102 figures 80% 6.5%s, 20% 6%s using price alone.
- Weighted CMM that we calculated shows 67% 6%s and 33%s 6.5%s.

- The 6.5 price allocation of 80% added to the liquidity allocation of 33%, divided by 2, drops the weighing down to a 56.6% and the coupon contribution to 3.679.
- 6s similarly calculate the to a 43.4% split (20% +66%/2), contributing 2.601 instead of 1.2.
- Total CMM102 Synthetic (weighted/price) is 6.28, or the sum of 3.679+2.601.

Using Constant OAS Spread to Better Equate Producible Coupons

Instead of laddering up to the current Primary Mortgage Market Survey (PMMS), we have used the Current Coupon Option Adjusted Spread (CCOAS) to arrive at a more producible primary rate that better tracks true borrowing levels.

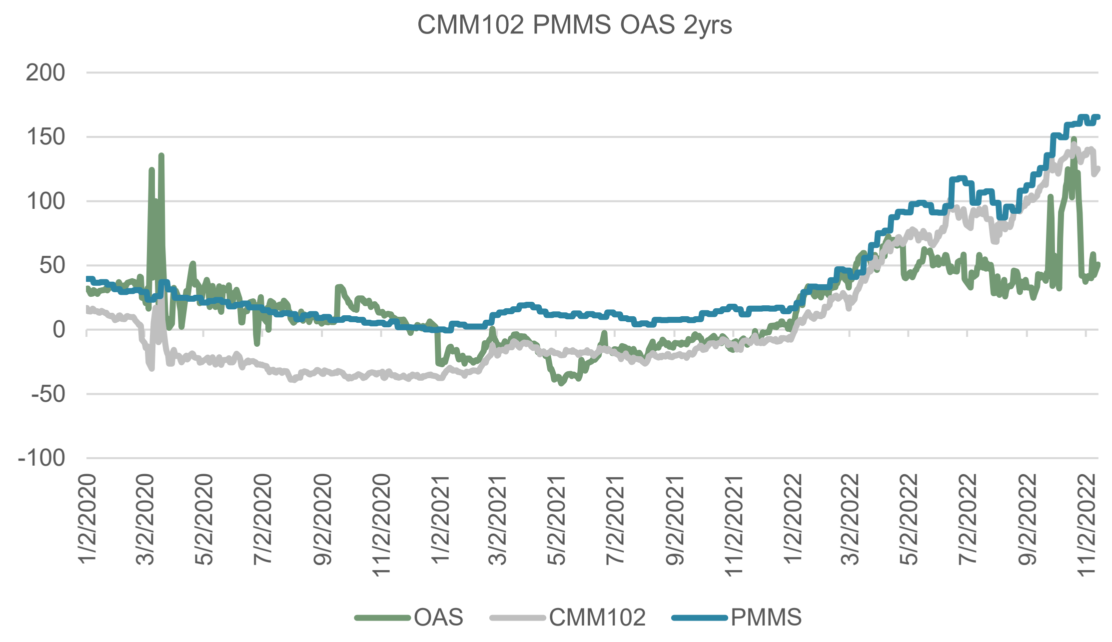
The 2yr CMM102 OAS average is about 50 bps (chart 5). Leveraging this arrives at a 6.72 primary rate (6.22 synthetic CMM + 50 bps CCOAS). Best execution from there (80bps) slots a net coupon of 6% or 5.5% - which is more in line to daily originator hedging and issuance (table 3).

Table 3

	FNMA	4%	4.50%	5%	5.50%	6%	6.50%	7%
1-Nov	1,800.00		-171	514	-67	552	189	111
2-Nov	2,400.00	357	568	-1501	788	110	288	
3-Nov	2,300.00	-85	-128	157	148	710	546	54
4-Nov	1,500.00	-29	-108	38	298	266	324	19
7-Nov	1,300.00	-70	-13	-6	-73	326	330	14
8-Nov	2,000.00	-253	105	98	562	358	476	13
9-Nov	1,400.00	-38	234	134	-63	198	333	44
10-Nov	1,900.00	-100	75	310	-160	1345	-148	6
14-Nov	1,800.00	-66	220	182	492	539	-89	-91
15-Nov	2,000.00	43	-182	77	297	865	-18	29
16-Nov	2,000.00	109	-61	-215	852	423	234	-4
17-Nov	1,500.00				734	114	196	
18-Nov	1,700.00		-138	255	398	394	75	17
21-Nov	2,100.00		-17	446	118	434	215	13
22-Nov	1,900.00	91	54	100	211	396	249	24
23-Nov	500.00	-17	-11	15	270	21	83	14
25-Nov	400.00		163	-22	47	10		
28-Nov	1,200.00		50	182	29	181	192	20
29-Nov	1,900.00	20	51	22	605	57	440	2
30-Nov	1,300.00	94	12	-189	543	72	204	20
Total	32,900.00	56.00	703.00	597.00	6,029.00	7,371.00	4,119.00	305.00
Daily avg	1,645.00	0.17%	2.14%	1.81%	18.33%	22.40%	12.52%	0.93%

Source: Yield Book

Chart 5



Source: Yield Book

Primary/Secondary Spreads, Issuance and Borrower Psychology

When retail lending rates surged above 7% in late October/early November it was it was noteworthy that the bulk of agency issuance was concentrated among 30yr 5.5%s and 5%s than 6%s and 6.5s.

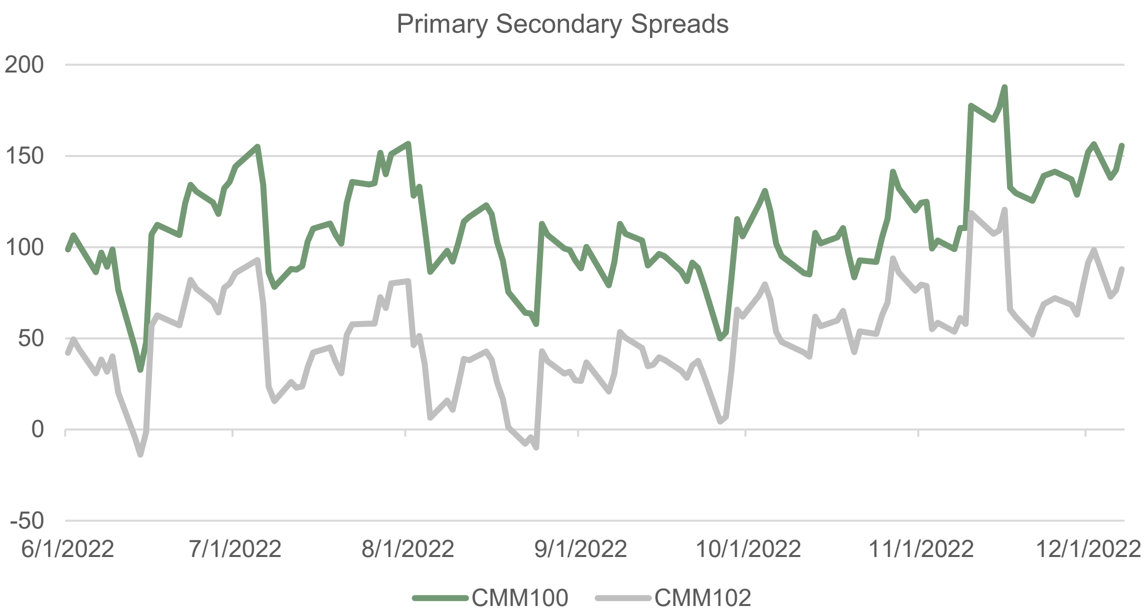
This was mainly due to borrower psychology, appearing spooked by a 7% handle on their mortgage. Borrowers would rather pay “points” up front to lower the interest rate than be saddled with the stigma of locking in at the recent high-water mark.

After netting down from the aforementioned whole loan rate, deducting G-fees and servicing (call it 80bps), the net coupon would have slotted between a 6% and a 6.5%. However, production was more prevalent in 5.5% and 6%s as points paid upfront lowered that slotting.

In chart 6, CMM100 and CMM102 primary/secondary spreads over the past six months display similar patterns, both spiking on 10 November when rates and MBS rallied causing yields to dive (FHLMC PMMS held constant as it’s a weekly lookback print).

Both spreads displayed six-month highs and moved 25 standard deviations, with the increase from the averages 2.2 times for CMM102 and 1.59 times for CMM100.

Chart 6



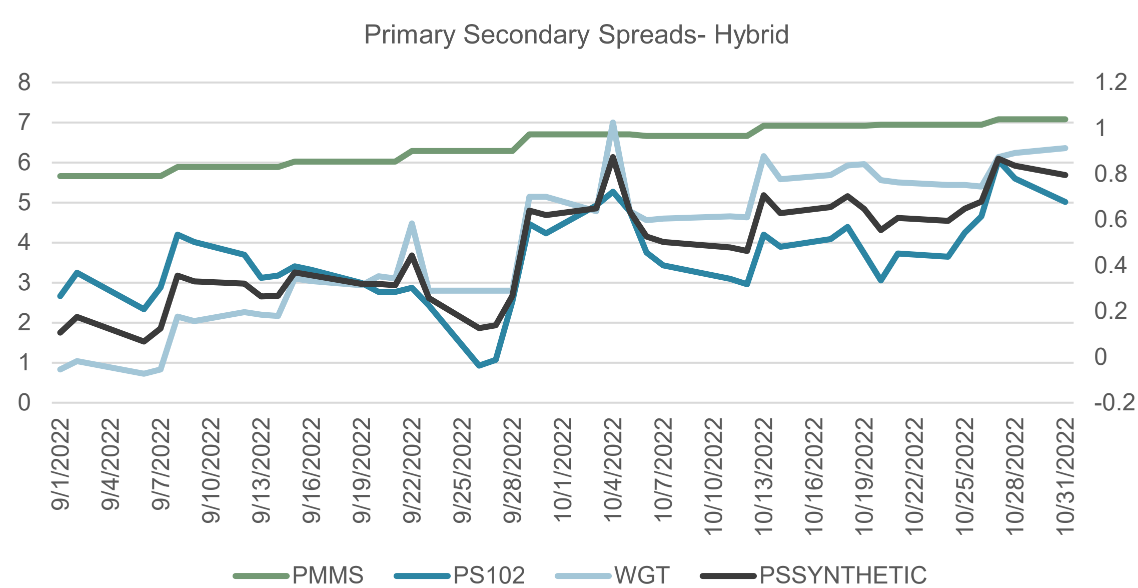
Source: Yield Book

Synthetic CMM102 Primary / Secondary Spread

The arch of the primary/secondary spreads (chart 7) are somewhat in harmony, relative to their trajectory, while the drop off at of the end of October is more dramatic on price based CMM102 than on the hybrid synthetic primary/secondary result (PSSYNTHETIC).

Volatile price action was at the center of that move while a hybrid approach (weighted and price interpolation) is more measured.

Chart 7



Source: Yield Book

Summary

In summary, we see that the

- Current CMM102 has flaws founded in price movements and when markets are thinly supported.
- Weighted scoring alone disregards the foundation of price to plot CMM strike
- Hybrid method incorporates both price and weightings, more reasonable approach
- Arch of primary/secondary spreads become less noisy among hybrid (Synthetic), mutes price volatility (Q3/Q4)

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