SFBTA 2022 Conference

TOMS Mortgages → Take your OMS to the next level with BAM Analytics

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Jeff Hingst
TOMS Mortgage Product Manager
212-617-7612 jhingst13@bloomberg.net

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Current Mortgage Prepay Landscape

The paradigm of mortgage prepayment behaviors has shifted over the past 2 years due to factors such as:

- Increased technology and human capital spend by larger originators (streamlined pipeline mgmt.)
- Ongoing policy changes issued by Trump & Biden administrations throughout COVID pandemic (PIW, forbearance plans, modifications, investor property reversals etc.)
- Record lows in mortgage rates and increased margins in secondary markets for new originations (FHLMC 30 day survey @ 2.86% 9/16/21)
- Home Price Appreciation much higher than prior expectations (16.5% projected for 2021)
- Economic recovery and lower unemployment from early pandemic era

As a result: The need for advanced analytics and model insight is at an all time high

- Ability to assess the FEDs impact on markets through their MBS purchasing program
- Net supply at $850bln for 2021 would be the highest since 2002, ($311 bln per yr avg over the last 10yrs)
- Capturing recent & new expected prepayment behaviors—regressing empirical evidence and new assumptions based on new policy changes are keeping prepay modelling teams very busy
- Beta versions of models(vs Production) will become more and more predominant for the foreseeable future
- Ability to dial the model gives clients the ability to do "what-if" scenario analysis on underlying model, or impose their own assumptions with the ability to see impact of risk and relative value metrics on securities & portfolios
- Need to capture alpha through security selection in era of poor mortgage performance (MBS Index excess returns -0.65 YTD as of 9/15/21)

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BAM Modelling team response BAM v1.42.2 test

On **Tuesday, June 29,** we released an updated version of the BAM prepayment model, V1.42.2. Please note this model version is a **test model release**, and is subject to change. You can access this model in the Terminal or through CMP by setting your model version to "V1.42.2".

Key model updates include:
- **Updated Conventional Fixed Rate Models (30Y, 15Y)**
- Updated Home Price Projections
  - V1.42.2 incorporates much stronger HPA assumptions versus previous model versions (13.5%, 7%, and 5% for 2021, 2022, and 2023, respectively)
- **New Appraisal Waiver Effects**
  - Model captures faster prepayments for loans that have previously received an appraisal waiver (this can add as much as 10-20 CPR relative to a loan that received an appraisal)
- **New FHFA Low Income Refinance Program**
  - Model incorporates reduced LLPAs and faster prepayments for borrowers eligible for the Refi Now / Refi Possible programs (income at or below 80% of area median income and loan sizes less than or equal to 300K)

Impact on TBA Analytics
- Increase in base case prepayments
  - LT speed projections for TBA rise by 2-13 CPR for UMBS 30Y, and 1-6 CPR for UMBS 15Y.
- Lower OADs and tighter spreads
  - TBA OADs decline by 0.5-1.5 years for 30Y UMBS, and 0.3-0.8 years for 15Y UMBS (1.5s-3s). LOAS declines by 10-50bp for 30Y UMBS, and 2-20bp for 15Y UMBS.
- Pricing and analytic reports using the new V1.42.2 test model are available on BMMI<GO> -> Model Projections -> BAM Reports / Pricing Reports under the BAM Research model version

- Test or Beta model versions allow clients to access our latest "dialed" version of the model before released to production
- In an ever changing environment like now, modelers are constantly trying to "catch up"
- Start with our test version, and add your own dials for further custom analysis based on your own assumptions
- Direct access to our modelling team for additional insights into expected behaviors
- Complete transparency into all of the inputs and outputs of BAM model
- Full Impact reports and whitepapers available on BMMI<go> for all models

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BAM v1.43 into production Jan 21, 2022

Key model updates (versus V1.42):

1) Revised Conventional and GNMA Fixed Rate Models (30Y, 15Y) to include specs / non-deliverables.

2) Weaker Burnout for Conventional and GNMA Base Models
   - We have moderated the burnout effect relative to the production model (V1.42).

3) New Appraisal Waiver Effects
   - Model captures faster prepayments for loans that have previously received an appraisal waiver. This can add as much as 5-20 CPR relative to a loan that received an appraisal.

4) Updated Home Price Projections
   - V1.43 revises 2021 HPA assumptions substantially higher versus the current production model (16.5 vs 3.5), while projections for 2022 and later moderate toward long run averages (6.5%, 5%, and 4% for 2022, 2023, and 2024, respectively).

5) Updated Involuntary Prepayment Model Structure
   - Incorporated cures from the end of forbearance terms into the roll rate model. This allows the model to produce negative rolls and lower CDRs.

   - Introduced a new buyout rate model for Conventional MBS which captures changes to the GSEs buyout policy for seriously delinquent loans. This includes the transition to a mandatory 24M buyout policy.

6) Removal of Adverse Market Refinance Fee (AMRF) for refinance loans greater than 125K
   - For delivery dates after October 1st 2021, the FHFA has rescinded the AMRF.

   - This will lower mortgage rates by 12.5bp for affected borrowers.

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BAM v1.43 Impact on TBA Analytics vs. v1.42

Pricing Date 12/13/2021			V1.42					V1.43					Change (V1.43 - V1.42)				
Security	Price	Settle Date	OAS	OAD	1YR CPR	3YR CPR	LT CPR	OAS	OAD	1YR CPR	3YR CPR	LT CPR	OAS	OAD	1YR CPR	3YR CPR	LT CPR
FNCL 1.5	96.61	01/13/2022	11.9	6.96	6.1	7.4	8.6	3.0	6.48	6.5	7.6	8.8	-8.9	-0.48	0.5	0.2	0.2
FNCL 2	99.78	01/13/2022	11.9	6.12	5.7	8.0	9.7	-2.6	5.21	6.8	9.6	11.8	-14.5	-0.91	1.1	1.6	2.1
FNCL 2.5	102.16	01/13/2022	27.8	5.46	8.2	10.7	11.5	4.8	4.05	14.0	16.2	16.2	-22.9	-1.41	5.8	5.6	4.7
FNCL 3	103.63	01/13/2022	39.8	3.74	25.2	20.4	17.8	-0.5	2.12	37.8	32.6	29.4	-40.4	-1.62	12.7	12.2	11.6
FNCL 3.5	105.27	01/13/2022	54.3	3.34	27.0	21.2	18.8	-0.1	1.83	42.1	32.9	29.4	-54.4	-1.51	15.1	11.7	10.7
FNCL 4	106.45	01/13/2022	81.1	3.46	25.3	21.1	18.8	12.5	1.63	41.1	31.7	28.6	-68.6	-1.83	15.8	10.6	9.8
FNCL 4.5	107.18	01/13/2022	110.6	3.36	24.9	21.5	19.2	30.2	1.27	42.3	32.7	29.8	-80.4	-2.08	17.4	11.2	10.6
FNCL 5	109.03	01/13/2022	117.9	3.39	23.3	21.0	19.0	34.1	1.28	39.7	31.0	28.1	-83.8	-2.11	16.4	10.0	9.1
FNCI 1.5	100.40	12/16/2021	-15.4	4.27	9.0	10.7	11.3	-20.2	4.00	8.7	11.2	11.9	-4.7	-0.27	-0.3	0.6	0.6
FNCI 2	102.53	12/16/2021	-16.3	3.65	11.9	12.9	13.0	-23.2	3.33	13.2	15.9	15.6	-6.9	-0.32	1.4	3.0	2.7
FNCI 2.5	103.51	12/16/2021	-0.5	2.73	19.3	17.5	16.9	-11.2	2.47	26.6	22.9	21.8	-10.7	-0.26	7.4	5.4	4.9
FNCI 3	104.66	12/16/2021	10.8	2.38	19.9	17.9	17.6	3.8	2.34	24.3	20.5	20.1	-7.0	-0.03	4.4	2.6	2.5
FNCI 3.5	105.36	12/16/2021	29.4	2.15	23.9	21.0	20.3	29.2	2.44	25.7	22.2	21.5	-0.2	0.30	1.8	1.2	1.1
FNCI 4	105.18	12/16/2021	78.7	2.22	25.3	22.6	22.0	81.4	2.54	25.9	22.4	21.9	2.7	0.32	0.6	-0.2	-0.1
G2SF 1.5	97.65	12/20/2021	12.1	5.92	7.3	10.3	11.4	11.8	5.38	13.2	14.6	13.9	-0.3	-0.54	5.9	4.2	2.4
G2SF 2	101.25	12/20/2021	-7.6	4.93	6.4	10.7	12.6	-16.3	4.11	11.3	14.8	14.8	-8.7	-0.82	5.0	4.1	2.2
G2SF 2.5	102.74	12/20/2021	14.5	4.38	9.7	12.8	13.7	2.8	3.40	17.6	18.1	17.6	-11.6	-0.99	8.0	5.3	3.8
G2SF 3	103.48	12/20/2021	41.8	3.29	25.1	23.2	20.2	10.7	1.97	39.3	32.8	28.1	-31.1	-1.33	14.2	9.6	7.9
G2SF 3.5	104.49	12/20/2021	71.9	3.31	28.3	22.7	19.2	36.2	1.93	41.0	31.8	26.7	-35.7	-1.38	12.7	9.1	7.6
G2SF 4	105.42	12/20/2021	104.6	3.43	27.9	22.3	18.8	62.9	2.08	41.2	31.5	26.3	-41.7	-1.36	13.3	9.2	7.6
G2SF 4.5	105.73	12/20/2021	138.0	3.19	31.2	24.5	20.3	85.5	1.90	45.5	34.0	29.4	-52.5	-1.29	14.3	9.4	9.1
G2SF 5	106.62	12/20/2021	147.4	2.85	33.8	26.9	22.8	77.9	1.64	48.5	36.7	32.5	-69.5	-1.21	14.7	9.8	9.7
G2JO 2	102.49	12/16/2021	-17.8	3.19	14.2	16.2	16.1	-23.2	2.96	17.1	17.8	17.1	-5.4	-0.23	2.8	1.6	1.0
G2JO 2.5	103.25	12/16/2021	9.5	2.72	18.8	18.0	17.5	0.6	2.35	22.0	20.1	19.4	-8.9	-0.37	3.2	2.2	1.9
G2JO 3	105.03	12/16/2021	-4.8	2.52	18.6	17.3	17.0	-12.8	2.25	22.1	19.4	18.9	-8.0	-0.27	3.4	2.0	1.9
G2JO 3.5	105.91	12/16/2021	19.3	2.60	19.9	18.2	17.8	4.9	2.21	24.8	21.4	20.6	-14.4	-0.39	4.9	3.1	2.9

BAM v1.43 BPMD<go> Model Performance

Mortgages are Story Bonds: The importance of model transparency & flexibility due to market & policy changes

Home-Owner with Mortgage

Delinquent in mortgage payments amidst pandemic

Govt orders buy-out of delinquent loans to protect home-owners

Mortgage Servicer

Govt

Buyout => Faster pre-payment => principal returned early

CMP API Dials

Calibrates model with CMP

Send trade idea : this MBS is over-valued! I can sell you at $99.5, and here's why!

Pre-trade Sandbox App - BQNT / TOMS BQL

Buyside MBS Investor

Sell-side Agency Mortgage Trader

With the Biden administration's recent announcement that servicers must evaluate all seriously delinquent homeowners for a loan modification -- which when completed, will trigger buyouts -- it's important to know which servicers have been most aggressive in buying out delinquent loans from the pools on their books. Some have already done much to work their way through the backlog, some have done little. It's likely best to avoid any pools with large concentrations of the latter type of servicer.

For example, looking again at the Ginnie Mae II 30-year 4% pools, which hold $7.5 billion of loans in forbearance, shows those loans in aggregate sport a three-month average Constant Default Rate of 51.9, according to data from Bloomberg's Collateral Performance Research. This means the current pace of servicer buyouts on an annualized basis will reduce the outstanding mortgage principal by about 52% over the course of a year.

Looking only at servicers with at least $400 million of those 4% coupon loans in forbearance on their books, Freedom Mortgage is the largest with about $1.8 billion and its 3-month CDR is just 0.3. This suggests that over the near-term, any Ginnie Mae II 30-year 4% mortgage bond for which Freedom makes up a large component of the servicers may experience outsized overall prepayment speeds as it cleans up its books.

Quicken Loans, on the other hand, has a trailing three-month CDR of 87.69 on the 4% loans in forbearance that it services. It has reduced the amount of such loans on its books to $440 million from over $1.1 billion at the end of last year.

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PSU: BAM now integrated for position pricing

- 100 BAM supported in PSU
- Constant spread to BAM in TW
- Consistent Yield calc with YT
- LT BAM speed equivalent coming soon to PSU
- Medians and custom speed overrides supported
- BAM scalers ie. 120 BAM for MARS FO clients

TW → existing API CalcRt fields

	Security	GWAC(s)	WAM(s)	WALA(s)	CPR 1 Mon...	CPR 3 Mon...	Mtge AOLS...	Max OLS(s)	FICO(s)	Top Geo(s)	Avg Life(s)	A/L +300(s)
	USD Total											
	Short											
9.	FN MA4019 2 ½	3.42	338	17	39.78	34.18	319,892	1,473,000	761.00	20.8% CA	4.77	9.43
10.	FN CA8327 3	3.90	329	16	22.88	21.33	318,738	620,000	732.00	31.1% CA	4.51	9.08
11.	FN MA3834 3	3.89	332	23	50.43	46.74	325,588	926,000	755.00	19.7% CA	3.84	9.02
12.	FR RA1801 3	3.63	330	23	28.29	21.37	99,708	110,000	760.00	12.9% OH	3.45	8.93
13.	FNCL 3 Sep21	3.89	332	23	45.58	43.65	300,698		755.46	16.7% CA	3.89	9.26
14.	FHR 4200 AE 1 ¾	3.55	71	102	13.31	18.55	195,361	394,000	731.42	12.9% NY	2.20	2.45
15.	FNR 2021-20 AI 3	3.64	178	56	31.51	34.47	215,443	1,166,000	759.78	14.6% CA	3.28	5.56
16.	FNR 2021-30 AL 3 ¼	3.68	170	63	35.89	34.04	208,887	966,000	755.85	14.4% CA	3.46	5.32
17.	FNR 2021-8 KA 2	2.83	351	7	12.96	8.75	364,860	1,525,000	766.00	34.6% CA	3.30	5.85
18.	GNR 2018-72 IB 4	4.35	276	75	27.73	37.12	137,471	175,000	682.37	15.3% TX	4.49	6.42
19.	GNR 2018-21 PI 4 ½	4.91	302	54	48.03	48.39	175,456	610,624	641.00	13.3% FL	3.76	5.98
20.	GNR 2018-120 DF 0.3993	5.45	318	40	30.94	33.68	141,158	199,323	652.56	30.7% NC	4.33	5.93
21.	GNR 2019-111 SK 3.3464	4.44	333	26	50.23	47.26	166,535	383,838	685.35	7.2% MO	4.72	7.17
22.	FNR 2019-61 PA 2 ½	5.67	318	30	33.96	34.83	104,991	225,000	713.75	14.6% TX	4.73	6.37
23.	FHR 5050 ZC 2	2.92	348	10	25.00	19.57	633,809	1,473,000	769.00	67.1% CA	3.59	21.84
24.	GNR 2021-50 NI 2 ½	2.98	352	8	11.09	11.56	366,891	778,998	665.72	18.9% CA	4.27	5.37
25.	GNR 2021-59 SM 6.2066	3.95	334	22	55.51	59.11	213,796	1,016,498	646.00	11.7% CA	3.40	7.71
26.	FNR 2019-62 LB 2	4.33	291	120	26.03	27.70	230,024	532,000	645.00	13.1% CA	3.97	5.67
	▾ Intermediate											
27.	FN MA4325 2	2.79	353	5	5.33	4.34	365,810	1,219,000	765.00	28.7% CA	6.58	10.43
28.	FN MA4378 2	2.90	356	3	4.85	2.86	362,397	1,273,000	766.00	30.2% CA	6.22	10.59
29.	FN MA4446 2	2.86	239	0	N.A.	N.A.	254,663	1,000,000	759.00	15.1% CA	5.01	7.93
30.	FN BK2176 2 ½	3.40	323	20	21.50	8.57	98,067	108,000	772.00	19.4% TX	6.43	9.11

TW → new "real-time" extended OAS fields

Security	OAS	OAC	OASD	OASC	dn25bps Px	up25bps Px	Pure Vega	ZV Sprd	ZV Dur	ZV Conv	ZV Sprd Dur
USD Total											
STRU BBG-8533 PR1 1.26	-38.98	0.81	8.54	0.76	105.21	100.78		-38.98	8.61	0.81	8.54
FNCL 2 Jul21	549.49	0.37	4.57	0.34	103.09	100.74		549.49	4.60	0.37	4.57
FHR 4450 NZ 3 ½	59.81	-1.70	7.38	0.74	113.34	109.30	-0.37	72.20	6.40	-0.62	7.21
GNR 2015-43 AM 4	61.12	-1.45	5.34	0.51	112.52	110.15	-0.18	71.72	4.22	-1.69	5.40
FNR 2016-53 KA 1.85	14.79	0.40	4.96	0.43	103.63	101.02	-0.05	21.32	4.91	0.60	4.91
FNR 2021-52 CA 1 ½	-48.86	-1.52	6.00	0.55	104.54	101.48	-0.40	-23.59	6.13	-2.02	6.00
FNR 2018-80 GB 3 ½	65.13	-1.70	5.04	0.28	109.80	107.25	-0.28	81.37	4.09	-1.81	4.99
FNR 2019-50 CP 2 ¾	60.91	-1.70	5.61	0.63	105.10	102.33	-0.20	79.10	5.17	-2.39	5.69
FNR 2019-50 SA 5.9584	1621.27	-20.80	2.36	0.11	14.30	13.48	-0.08	1727.68	14.81	13.54	2.36
FNR 2021-17 PA 1 ½	-8.61	1.03	5.57	0.56	101.36	98.84	-0.36	23.35	5.54	3.17	5.95
BMARK 2019-B15 A5 2.928	-5.30	0.61	7.31	0.57	115.55	111.37		-5.30	7.36	0.61	7.31
▼ Long											
FNR 2016-25 GB 3 ½	59.44	0.16	10.66	1.36	118.43	112.36	-0.28	66.84	10.31	0.14	10.66
FNR 2018-8 KZ 3	87.93	-1.39	15.15	2.42	109.04	101.09	-1.04	108.42	15.87	-1.39	15.77
FNR 2019-61 DB 2 ½	-22.02	-2.47	10.17	1.31	113.90	108.59	-0.70	0.49	9.23	-3.08	10.27
GNR 2020-183 BC 1 ¼	53.30	1.73	11.66	1.64	94.04	88.65		53.30	11.79	1.73	11.66
GNR 2020-183 BD 1 ¼	16.70	0.89	9.17	1.51	93.54	86.53	-0.67	49.07	17.59	3.34	12.77
GNR 2021-50 KZ 2 ½	85.24	-0.75	12.81	1.85	101.09	93.89	-1.01	115.74	14.81	-2.72	13.29
FNR 2021-18 EZ 2 ½	-45.67	-22.91	11.41	2.16	105.83	104.65	-2.45	51.25	14.15	-17.43	16.43
FNR 2021-37 YW 2	89.45	1.60	13.81	2.18	96.71	90.01	-0.13	94.56	13.86	1.52	13.60

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TW → new "real-time" extended OAS fields

- Calc sent at time of new trade

- Automatic periodic risk every 2 hrs

- New "Calc Time Stamp" AR589 for market env transparency

- End of Day calcs on all risk metrics

- See appendix for full listing of all new CalcRt fields

12mo CPR	36mo CPR	Life CPR	Yield	WAL	Mod Dur	Yld Spread	Calc Time ...
28.37	24.42	21.10	1.35	3.83	3.61	74.65	10:51:04
26.33	21.33	18.15	2.97	4.41	3.80	225.14	10:51:29
49.23	38.86	35.17	0.89	2.23	2.21	61.67	10:51:29
8.23	9.54	10.70	1.62	4.91	4.58	80.97	10:48:24
22.51	23.42	23.48	0.61	3.44	3.35	7.50	10:52:15
17.50	16.47	16.68	0.80	2.21	2.16	53.22	10:43:08
26.59	22.69	20.63	3.09	3.30	3.01	258.28	10:47:28
24.58	20.47	18.74	1.06	3.48	3.34	52.29	10:45:16
9.82	10.85	11.60	1.37	3.22	3.08	88.26	10:45:31
25.77	21.15		-50.28	3.86	24.97	-5089.26	10:41:29
33.08	25.98	21.46	2.62	3.74	4.14	203.63	10:43:08
24.72	21.72	18.77	0.29	4.32	4.26	-40.74	10:43:08
34.56	29.51	24.40	11.39	3.33	2.68	1088.02	10:43:08
20.48	17.61	15.93	1.34	4.71	4.41	56.60	10:43:08
17.40	17.67	17.99	7.84	4.27	2.65	715.13	10:47:03
19.30	17.48	15.71	1.65	4.98	4.56	83.42	10:49:54
44.21	31.29	27.02	10.98	2.98	2.74	1053.79	10:45:16
16.30	13.46	11.82	1.45	3.95	3.74	81.77	10:43:08

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TW MARS → BAM beta model, scalers & dials

- MARS Front Office Premium required

- BAM beta model versions

- BAM model scalers

- Custom BAM dials/knobs

- Create custom duration alerts to see model duration differences

Security	OAD	OAD Diff(a…	BAM Model	OAS	OAC	OASD
USD Total		-0.29				
FN MA3834 3	1.30	-1.53	BAM v1.42.2	-6.54	-1.85	2.84
FR RA1801 3	3.32	-1.73	150 BAM	-32.21	0.22	3.31
FNCL 3 Sep21		0.00	BAM v1.42.2			
FHR 4200 AE 1 ¾	2.07	0.00		16.77	-0.27	2.17
FNR 2021-20 AI 3	-24.56	-0.14		499.08	-4.40	3.04
FNR 2021-30 AL 3 ¼	2.09	-0.03		5.38	-1.62	3.52
FNR 2021-8 KA 2	3.10	-0.05		22.42	-2.95	3.48
GNR 2018-72 IB 4		0.00	REFI_HT_125%			
GNR 2018-21 PI 4 ½	-9.16	0.04	RR_Buyout	259.26	0.78	4.06
GNR 2018-120 DF 0.3993	0.93	0.03		16.88	1.93	4.20
GNR 2019-111 SK 3.3464	9.77	-9.49	BAM v1.42.2	300.80	-29.78	2.91
FNR 2019-61 PA 2 ½	4.29	-0.01		19.38	-0.53	4.45
FHR 5050 ZC 2	36.52	0.08	BASE	327.06	-16.92	3.25
GNR 2021-50 NI 2 ½	1.04	-0.12		861.54	-3.69	2.85
GNR 2021-59 SM 6.2066	-8.06	-0.87	GN_MOD_BO	657.73	-23.23	2.89
FNR 2019-62 LB 2	4.04	-0.01		35.26	-0.91	3.91
▾ Intermediate		0.92				
FN MA4325 2	6.27	-0.51	BAM v1.42.2	61.21	-2.38	5.47
FN MA4378 2	5.82	0.00		12.06	-2.91	6.13
FN MA4446 2	4.42	0.01		2.69	-2.93	5.00
FN BK2176 2 ½	5.56	-0.04		22.05	-0.90	5.90
FN CA7721 2 ½	6.16	-0.01		10.41	-0.61	6.50

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KRRs→ BAM beta model, scalers & dials Q1 '22

- MARS Front Office Premium required

- Bucketed KRRs w/100 BAM currently

- BAM beta model/scalers/dials available Q1 2022

- Bump and reprice methodology

- Bucketed Credit Risk (CRR) for Non-Agy securities utilizing our BTM model

IR KRR Tot	0-2yrs	3-4yrs	5-6yrs	7-9yrs	10-20yrs	25-40yrs
309,653	23,718	30,948	32,155	50,016	143,437	29,379
3,185	200	312	362	526	1,605	180
1,709	4	2	0	1,591	112	0
888	-3	2	0	830	59	0
0	0	0	0	0	0	0
5,041	45	612	727	1,029	2,662	-34
2,368	290	289	304	426	1,154	-95
2,508	202	305	361	570	1,056	14
6,007	361	640	780	1,221	3,105	-100
1,007	27	149	632	251	-38	-14
9,209	680	814	920	1,372	4,819	604
3,965	981	1,230	767	610	421	-44
11,013	1,420	1,440	1,330	1,716	4,564	543
1,004	80	115	133	189	473	14
927	61	67	107	167	493	32
11,926	102	196	424	11,576	-372	0
74,024	512	20	369	2,635	56,065	14,423
2,396	18	28	45	240	2,116	-51
8,829	-28	-45	-43	-141	8,738	348
10,526	80	115	607	2,091	6,996	637
3,410	-11	289	163	193	2,107	669
3,738	-30	316	212	259	2,268	713
15,760	-133	2	224	1,574	12,239	1,854
26,682	620	-683	-851	-1,611	19,076	10,131
2,683	-4	-2	12	30	2,525	122

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Interest Rate and Vol Sock Scenarios

- MARS Front Office Premium required

- Bloomberg SHOC library or create custom IR & Vol scenarios

- End of day scheduled reports as well as on-demand

- Retrieve daily scenario results via BQL for custom risk dashboards

Future Development → BQNT Sandbox App prototype

- MARS Front Office Premium required

- BQNT>BQL>CMP

- Fetch line item position sizes, prices, analytics & bucketed risk

- Create Sandbox "what-if" environment

- Access to full library of BAM model dials + Beta model versions

- See pro-forma bucketed risk of holdings on proposed trades

Dials – CMP Template

- Model Version

- Model Scaling

- HPA and Macro Environment

- All prepay sub-components: (Refi, Cash-out, Turnover, Curtailment)

- Elbow Shifts

- And all sub-components can be further controlled for Geography, Purpose, Channel, and others

- Dials can be run in isolation or in a combined scenario

Basic	Enhanced	
Model Version	ARM / IO	Involuntary
HPA Assumptions	Cashout	Loan Purpose
General	Channel	Mortgage Rate
Subcomponents	Curtail	Occupancy
Mortgage Rate	Elbow	Refinance
Lag Structure	Geography	Servicer
Daycount	GNMA Progr	Turnover

Category	Key Value	Effect	Va	Description (Click to read)	CMP Wrapper Field Name	Default Values	None	HPA	AMRF	INVESTOR
Basic - Model Version		MODEL VERSION			model_version	Check SYT		V1.42.2	V1.42.2	V1.42.2
Basic - HPA Assumptions		HPA SCENARIOS			dial_HPA_SCEN_NAME	None		BASE+20		
		HPA OVERRIDE			dial_HPA_OVERRIDE	None				
Basic - General		VPR MULT			dial_VPR_MULT	1				
		CDR MULT			dial_CDR_MULT	1				
		VPR ADD			dial_VPR_ADD	0				
		CDR ADD			dial_CDR_ADD	0				
		PSA ADD			dial_PSA_ADD	0				
		SERVICER EFFECTS ON?			dial_SERVICER_EFF	1				
		GEO EFFECTS ON?			dial_GEO_EFF	1				
		HFA EFFECTS ON?			dial_MUNI_EFF	1				
Basic - Model Subcomponents		REFI MULT			dial_REFI_MULT	1				
		ELBOW SHIFT			dial_ELBOW_SHIFT	0			-12.5	
		BURNOUT MULT			dial_REFI_BURNOUT_MULT	1				
		TURNOVER MULT			dial_TURNOVER_MULT	1				
		TURNOVER LOCKIN MULT			dial_TURNOVER_LOCKIN_MUL	1				
		CASHOUT MULT			dial_CASHOUT_MULT	1				
		CASHOUT LOCKIN MULT			dial_CASHOUT_LOCKIN_MULT	1				
		CURTAILMENT MULT			dial_CURTAIL_MULT	1				
		CURTAILMENT ADD			dial_CURTAIL_ADD	0				
		ARM RESET MULT			dial_ARM_RESET_MULT	1				
	INVESTOR	REFI MULT			dial_REFI_MULT:OCC:INVESTO	1				0.8
	INVESTOR	ROLL RATE MULT			dial_ROLLRATE_MULT:OCC:IN\	1				

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Dials – HPA Assumptions- Scenarios

- Model Version Set to newest Test V1.42.2 which incorporates stronger HPA assumptions (13.5%, 7%, and 5% for 2021, 2022, and 2023, respectively)

- S&P CoreLogic Case-Schiller 20-City Comp YOY% latest print 19.08

CMP Solution:

- Run a Base+defined scenario or input a custom HPA rate
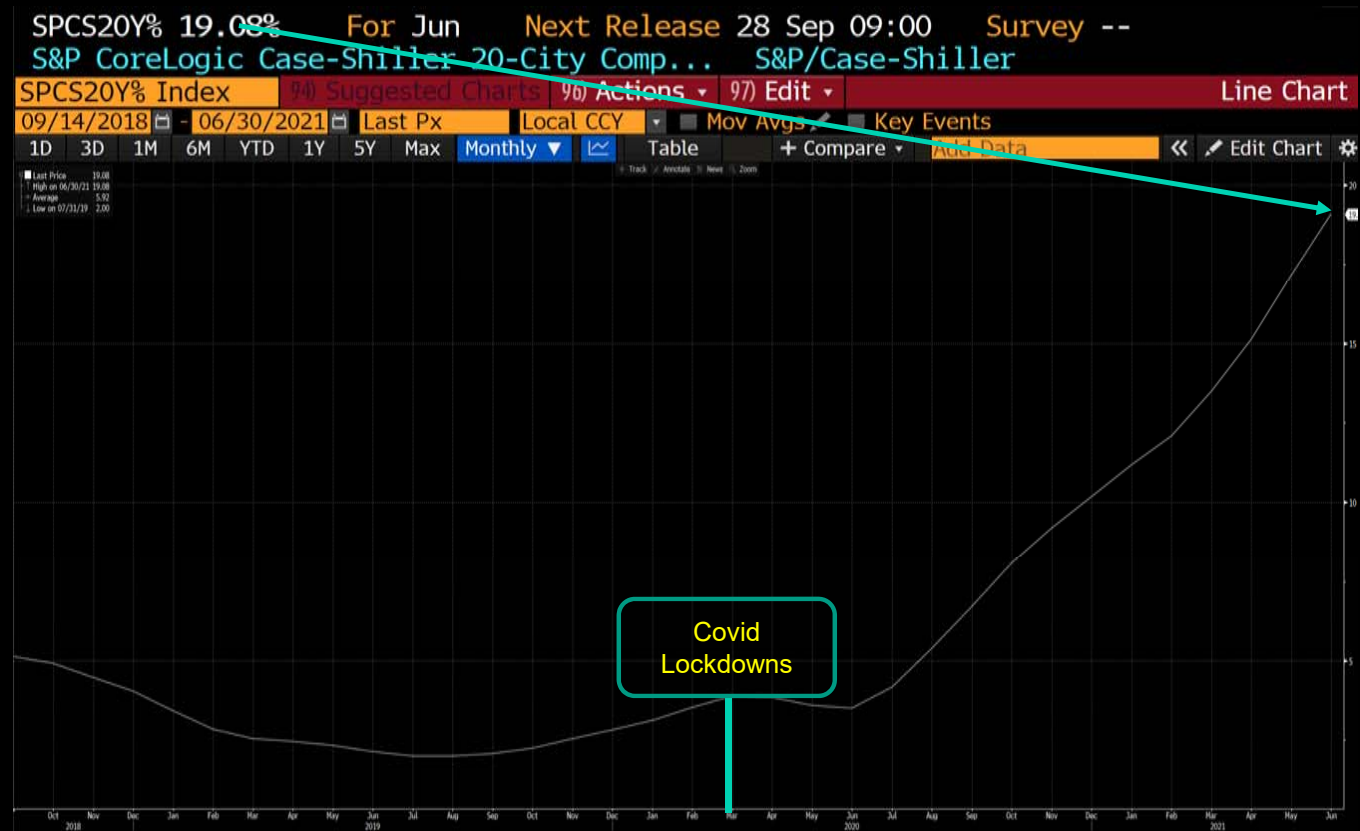
Dials – CMP Template HPA Scenario.

- Chose a high LTV Pool to exaggerated HPA Effect

- Ran BASE+20 which takes BAM Base HPA and adds a cumulative increase of 20% over 4 years

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Dials – GSE Limit to Investor Props- Scale Refi Mult by Occupancy

Amendments made in January were set to limit sales at the Cash Window and cap combined percentage of investor and second homes at 7%:

- Policy was starting to impact speeds on investor and second homes

CMP Solutions:
Scale the Refi Mult sub-component for Investor occupancy.

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PRESS RELEASES

Treasury Department and FHFA Amend Terms of Preferred Stock Purchase Agreements for Fannie Mae and Freddie Mac

○ The GSEs will limit the acquisition of single-family mortgage loans secured by second homes and investment properties to 7% of single-family acquisitions — aligned with their current levels — over the preceding 52-week period.

January 14, 2021

WASHINGTON – The U.S. Department of the Treasury (Treasury) and the Federal Housing Finance Agency

September 14, 2021, 5:43 pm | **Treasury removes restrictions on investment properties**

Suspension of recent PSPA amendments restricting Fannie Mae and Freddie Mac is in line with administration's goal to boost housing supply

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Dials – CMP Template Investor Propety Ex.

- Model Version Set to newest Test V1.42.2
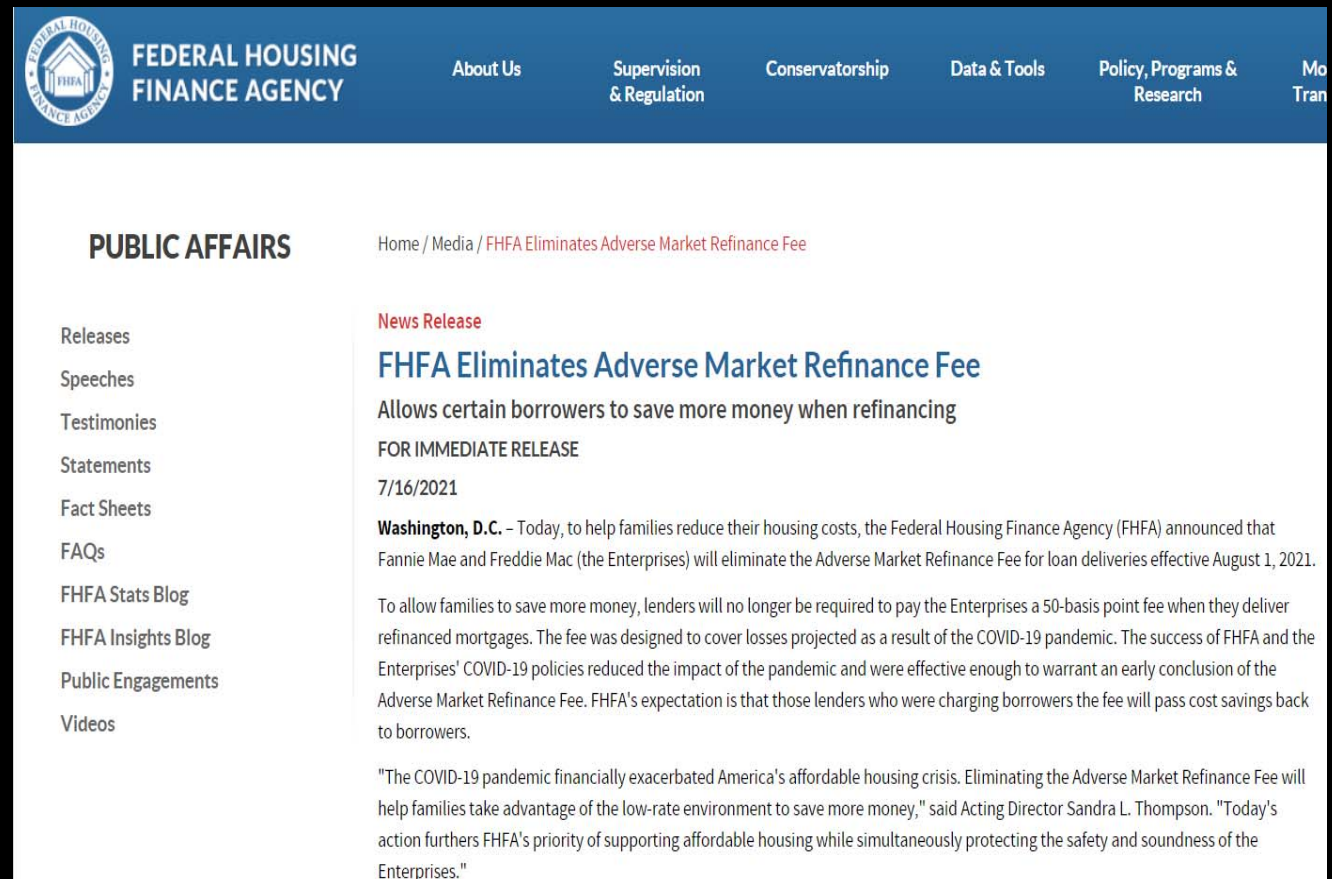
- Refi sub-component dialed down to 75% of model

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Dials – Changes in Refi Incentives -Elbow Shift

- The removal of the AMRF eliminates the 50BPs "Covid Fee:

- Calculated over the average life of as an example a 2% coupon mortgage – this is the equivalent of a 12.5bps elbow shift

- Effects should start showing up in October speeds

CMP Solution:
- Set a -12.5 bps elbow shift for factor date >10/2021

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PUBLIC AFFAIRS

Home / Media / FHFA Eliminates Adverse Market Refinance Fee

Releases
Speeches
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Statements
Fact Sheets
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FHFA Stats Blog
FHFA Insights Blog
Public Engagements
Videos

News Release

FHFA Eliminates Adverse Market Refinance Fee
Allows certain borrowers to save more money when refinancing

FOR IMMEDIATE RELEASE

7/16/2021

Washington, D.C. – Today, to help families reduce their housing costs, the Federal Housing Finance Agency (FHFA) announced that Fannie Mae and Freddie Mac (the Enterprises) will eliminate the Adverse Market Refinance Fee for loan deliveries effective August 1, 2021.

To allow families to save more money, lenders will no longer be required to pay the Enterprises a 50-basis point fee when they deliver refinanced mortgages. The fee was designed to cover losses projected as a result of the COVID-19 pandemic. The success of FHFA and the Enterprises' COVID-19 policies reduced the impact of the pandemic and were effective enough to warrant an early conclusion of the Adverse Market Refinance Fee. FHFA's expectation is that those lenders who were charging borrowers the fee will pass cost savings back to borrowers.

"The COVID-19 pandemic financially exacerbated America's affordable housing crisis. Eliminating the Adverse Market Refinance Fee will help families take advantage of the low-rate environment to save more money," said Acting Director Sandra L. Thompson. "Today's action furthers FHFA's priority of supporting affordable housing while simultaneously protecting the safety and soundness of the Enterprises."

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Dials – Changes in Refi Incentives -Elbow Shift

- Model Version Set to newest Test V1.42.2

- Elbow Shift -12.5 BPs

- Results in an approximately ½ year drop in OAD

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Multiple Security Calculator – CMP Template

The Multiple Security Calculator provides the same full access to the BAM model and dials, but on a portfolio, list or BWIC.

- Can be used to analyze a list for yield and spreads or filter for collateral attributes

- Analytics are consistent with those in TOMS and across the Bloomberg platform

Multiple Security Analysis

> Display Panels

Display Panels		ID	Security	Input Value	TBA Bench Ovr	Pricing Speed	Prepay Speed	Default Rate	Default Type	Trade Date	Settle Date	Factor Date	Preference	BAM Model Version
> Run Information							**Basic Inputs**							
Inputs		1	FN CA4979	T+1-01			100 BAM			Realtime			INVESTOR	V1.42.2
Basic Inputs	Adv Inputs	2	FR RA1870	105-26			100 BAM			Realtime			INVESTOR	V1.42.2
Settings	TBA Bench	3	FNCL 2 10/21	101-3+			100 BAM			Realtime				V1.42.2
Derived		4	G2 MA7311	102-2			100 BAM			Realtime				V1.42.2
Analytics		5	G2 MA7533	102-2			100 BAM			Realtime				V1.42.2
OAS	Static	6	FNR 2019-81 FA	100-28			100 BAM			Realtime				V1.42.2
ZV	Durations	7	FN MA4325	101-7			100 BAM			Realtime		AMRF		V1.42.2
KRD	Projections	8	FN MA4208	101-8			100 BAM			Realtime		AMRF		V1.42.2
Model Fits		9	FG MA0197	118-21			100 BAM			Realtime				V1.42.2
Collateral Info		10	FG MA0197	118-21			100 BAM			Realtime				V1.42.2
Basic	LTV / LS	11	FHR 5138 NA	102-18			100 BAM			Realtime				V1.42.2
Occ / Purp	Chan / Vint	12												

Multiple Security Calculator – Yield and OAS Analytics

The Multiple Security Calculator provides the same full access to the BAM model and dials, but on a portfolio, list or BWIC.

- Full OAS and yield analysis to both constant and forward curves

ID	Security	Input Value	BA Bench O	Pricing Speed	Prepay Speed	Default Rate	Default Type	Trade Date	Settle Date	Factor Date	Preference	Model Ver	Price	OAS	OAD	OAC	OASD	OASC	N-Sprd	I-Sprd	Z-Sprd	Yield	WAL	Spread	Yield	WAL	Opt Cost
													OAS Analytics						**Static Analytics**					**ZV Analytics**			
1	FN CA4979	T+1-01		100 BAM				Realtime			INVESTOR	V1.42.2	105.86	9.2	2.60	-2.93	4.27	0.43	59.8	72.7	27.0	1.34	3.86	44.8	1.63	4.81	35.6
2	FR RA1870	105-26		100 BAM				Realtime			INVESTOR	V1.42.2	105.81	10.9	2.60	-3.04	4.27	0.43	61.8	74.8	29.0	1.37	3.91	45.6	1.64	4.80	34.7
3	FNCL 2 10/21	101-3+		100 BAM				Realtime				V1.42.2	101.11	6.3	5.02	-3.75	5.49	0.58	77.2	85.4	62.6	1.77	5.62	53.6	1.82	7.40	47.3
4	G2 MA7311	102-2		100 BAM				Realtime				V1.42.2	102.06	-1.6	4.11	-3.48	4.72	0.44	61.7	71.2	44.5	1.55	5.09	41.5	1.61	5.94	43.1
5	G2 MA7533	102-2		100 BAM				Realtime				V1.42.2	102.06	-2.5	4.31	-3.30	4.89	0.46	61.0	69.9	45.9	1.57	5.30	42.5	1.63	6.24	45.0
6	FNR 2019-81 FA	100-28		100 BAM				Realtime				V1.42.2	100.88	21.1	0.68	1.80	3.74	0.34	-36.8	-24.0	-73.8	0.34	3.73	14.9	1.26	3.97	-6.2
7	FN MA4325	101-7		100 BAM				Realtime			AMRF	V1.42.2	101.22	70.0	10.51	3.88	9.75	1.53	37.7	27.3	21.3	1.91	16.62	51.5	1.82	8.19	-18.5
8	FN MA4208	101-8		100 BAM				Realtime				V1.42.2	101.25	1.7	4.46	-4.16	5.02	0.52	79.6	89.4	61.6	1.70	4.92	51.2	1.78	6.80	49.4
9	FG MA0197	118-21		100 BAM				Realtime				V1.42.2	118.66	70.3	4.30	-0.36	5.33	0.57	89.7	97.3	69.5	1.92	5.87	80.3	2.03	6.11	10.1
10	FHR 5138 NA	102-18		100 BAM				Realtime				V1.42.2	102.56	-7.6	2.55	-3.41	4.66	0.35	53.0	63.3	49.3	1.41	4.76	39.8	1.51	5.81	47.4

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Multiple Security Calculator – KRD

The Multiple Security Calculator provides the same full access to the BAM model and dials, but on a portfolio, list or BWIC.

- The KRD's are customizable and shown in duration units on the template, but I modified the sheet
- to show them as $KRD 01

- This enables you to see the same $KRD as shown in TOMs

ID	Security	Position	Factor	Input Value	BA Bench Ov	Pricing Spee	Prepay Spee	Default Rate	Default Type	Trade Date	Settle Date	Factor Date	Preference M	Model Ver	6M	2Y	5Y	10Y	20Y	30Y
			MTG_FACTOR	Basic Inputs											Key Rate $					
1	FN CA4979	3,000,000	0.63011588	T+1-01		100 BAM			Realtime				INVESTOR	V1.42.2	41.89	63.74	119.31	183.89	93.43	-10.59
2	FR RA1870	5,000,000	0.61123642	105-26		100 BAM			Realtime				INVESTOR	V1.42.2	68.25	101.90	188.97	297.92	153.85	-17.44
3	FNCL 2 10/21	10,000,000	1	101-3+		100 BAM			Realtime					V1.42.2	92.39	565.43	1214.65	1855.51	1232.12	102.26
4	G2 MA7311	1,500,000	0.97363914	102-2		100 BAM			Realtime					V1.42.2	12.69	98.86	178.47	209.21	104.15	3.74
5	G2 MA7533	32,500,000	0.99726571	102-2		100 BAM			Realtime					V1.42.2	276.00	2213.80	4169.15	4881.79	2392.94	136.39
6	FNR 2019-81 FA	5,000,000	0.66547615	100-28		100 BAM			Realtime					V1.42.2	3.55	52.71	20.64	63.26	45.46	1.32
7	FN MA4325	4,000,000	0.97691027	101-7		100 BAM			Realtime				AMRF	V1.42.2	-9.66	93.29	482.10	1134.39	1733.68	686.24
8	FN MA4208	5,000,000	0.91949714	101-8		100 BAM			Realtime					V1.42.2	57.33	245.62	501.12	760.15	481.83	21.83
9	FG MA0197	7,500,000	0.50718784	118-21		100 BAM			Realtime					V1.42.2	44.71	218.08	418.13	592.48	333.92	29.63
10	FHR 5138 NA	1,000,000	0.99600949	102-18		100 BAM			Realtime					V1.42.2	21.91	55.37	98.13	130.05	-30.20	-23.14

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Multiple Security Calculator – Collateral

The Calculator also functions as a collateral aggregation tool

- Can be used to filter/analyze for collateral attributes.

- This example highlights Servicer and Geography

Multiple Security Analysis

> Display Panels

Display Panels			Basic Inputs	Servicer					Source	Pool				Geography										
> Run Information	ID	Security	Input Value	Top	%	2nd	%	3rd	%	4th	%	5th	%	Top	%	2nd	%	3rd	%	4th	%	5th	%
Inputs	1	FN CA4979	T+1-01	LESS THAN 1%	17.2	NEW RESIDENTIAL	13.9	UNITED WHOLESA	12.0	LAKEVIEW LOAN S	9.9	BANK OF THE WES	6.8	CA	55.9	WA	8.1	HI	5.2	TX	5.1	OR	4.5
Basic Inputs / Adv Inputs	2	FR RA1870	105-26	LESS THAN 1%	15.8	PINGORA LOAN S	11.0	AMERIHOME MOR	6.9	BROKER SOLUTION	4.8	UNITED WHOLESA	4.7	CA	40.8	CO	7.9	WA	6.0	NJ	5.5	UT	5.1
Settings / TBA Bench	3	FNCL 2 10/21	101-3+	LESS THAN 1%	22.5	UNITED WHOLESA	8.9	ROCKET MORTGA(	8.5	WELLS FARGO BAI	6.0	JPMORGAN CHAS	5.3	CA	23.6	FL	7.1	TX	4.9	WA	4.6	CO	4.2
Derived	4	G2 MA7311	102-2	Dba Freedom Hor	24.3	Pennymac Loan S	12.6	Rocket Mortgage,	8.8	Lakeview Loan Se	6.4	Caliber Home Loa	2.9	CA	14.0	TX	7.8	FL	7.8	VA	7.3	MD	4.3
Security Info	5	G2 MA7533	102-2	Dba Freedom Hor	18.4	Pennymac Loan S	12.2	Rocket Mortgage,	9.5	United Wholesale	6.4	Lakeview Loan Se	4.5	CA	14.8	FL	7.8	VA	7.4	TX	7.3	CO	4.4
Basic / Bond	6	FNR 2019-81 FA	100-28	U.S. BANK NATIO	100.0	--		--	--		--	--		--	FL	100.0	--	--	--	--	--	--	--	--
Coupon / Cohort / Grp	7	FN MA4325	101-7	LESS THAN 1%	34.7	ROCKET MORTGA(	11.8	UNITED WHOLESA	7.1	LOANDEPOT.COM	4.9	HOME POINT FIN/	4.3	CA	28.7	TX	5.4	WA	5.0	CO	4.9	VA	3.6
Payment	8	FN MA4208	101-8	LESS THAN 1%	34.7	ROCKET MORTGA(	15.3	UNITED WHOLESA	12.5	PODIUM MORTGA	7.7	PENNYMAC CORP	3.6	CA	32.7	WA	5.6	CO	5.4	AZ	3.9	MA	3.4
Collateral Info	9	FG MA0197	118-21	LoanCare Servicin	35.1	Specialized Loan S	18.6	<1%	10.3	U.S. Bank Nationa	7.1	Statebridge Comp	4.5	NY	7.8	CA	7.3	IL	6.6	MD	6.0	OH	5.6
Basic / LTV / LS	10	FHR 5138 NA	102-18	NATIONSTAR MOI	38.1	CITIMORTGAGE, II	26.9	WELLS FARGO BAI	15.6	GUARANTEED RAT	11.3	UNITED WHOLESA	7.8	CA	57.2	VA	10.2	NY	9.3	NJ	7.9	WA	4.9
Occ / Purp / Chan / Vint	11																						
Servicer / Geography	12																						

CMP Template – Non-Agency W/ BTM

Same basic functionality as the Agency template

- Can be used on legacy, Jumbo 2.0 and CRT

Multiple Security Analysis

> Toggle Side Pane

Display Panels		ID	Security	Input Value	Prepay Rate	Trade Date	Settle Date	Factor Date	Price	Yield	WAL	Mod. Dur	DM	E Spread	I Spread	N Spread	Z Spread	ZV Spread	ZV Duration	ZV Con
				Deal Inputs		**Analytics**														
> Run Information																				
Deal Inputs		1	JPMAC 2007-CH3 M2	101.0000	100 BTM	09/21/2021	09/23/2021	202108	101.00	1.43	8.71	8.33	29.06	18.16	19.21	16.19	20.03	18.04	-0.14	
Collateral Inputs		2	JPMMT 2021-5 A3	101-21	100 BTM	09/21/2021	09/23/2021	202108	101.66	2.29	9.90	8.24	--	91.03	97.11	95.37	81.99	90.20	8.38	
Collateral Inputs Adv		3	ACE 2006-HE1 M1	75.0000	100 BTM	09/21/2021	09/23/2021	202108	75.00	4.66	10.76	8.89	341.72	339.02	329.45	327.74	335.61	333.98	11.40	
Modification Inputs		4	STACR 2018-DNA1 M2	80.0000	100 BTM	09/21/2021	09/23/2021	202108	80.00	18.46	1.55	1.23	1745.20	1832.84	1830.37	1820.53	1843.61	1750.33	6.71	
Advanced Inputs		5	CAS 2020-SBT1 B1AH	100-1	100 BTM	09/21/2021	09/23/2021	202108	100.03	-4.25	15.67	16.41	--	-586.69	-584.26	-577.14	-601.05	-590.78	5.36	
Settings		6																		
Bond Info		7																		
Ratings		8																		
Collateral		9																		
Performance		10																		
Hist Performance		11																		
Analytics		12																		
Collateral Analytics		13																		
Key Rate Durations		14																		
Projections		15																		
Model Fits		16																		

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Appendix - New Extended TW CalcRt Fields

AR620	Prepay Dur		AR573	ZV Spread Dur
AR621	Mtge Rt Dur		AR574	ZV WAL
AR622	OASD		AR575	ZV Yield
AR623	PSA Dur		AR576	ZV Dn 25bps px
AR624	Mtge Refi Dur		AR577	ZV Up 25bps px
AR625	Cur Cpn Dur		AR578	ZV 12mo CPR
AR562	OAS		AR579	ZV 36mo CPR
AR563	Dn 25bps px		AR580	ZV Life CPR
AR564	Up 25bps px		AR581	12mo CPR
AR565	OAC		AR582	36mo CPR
AR566	OASC		AR583	Life CPR
AR567	OAD		AR584	Yield
AR568	OASD		AR585	WAL
AR569	Pure Vega		AR586	Modified Dur
AR570	ZV Spread		AR587	Yield Spread
AR571	ZV Duration		AR588	Cashflow Spread
AR572	ZV Convexity		AR589	Risk Comp Time

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