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New Prepayment Model and Fixed-Volatility Assumptions: Impact on the Mortgage Index

As previously announced, a new prepayment model is scheduled to be released on the evening of May 16, 1997. In addition, historical volatilities used in fixed-volatility calculations for OAS and effective duration will change. The three-month Treasury yield volatility has been increased to 21% from 19.6%, the ten-year yield volatility has been increased to 15.5% from 13%, and the effective volatility for the three-month Treasury over the next 30 years remains at 10%. (Details of these changes were outlined in last week's issue of *Bond Market Roundup: Strategy*.) In Figure 1, we review the assumptions for the option-adjusted calculations used in the Salomon Brothers Broad Investment-Grade (BIG) Bond Index.^{SM5} These are the "official" assumptions used for option-adjusted values in all Index publications and reports. However, values using implied volatilities are available for the Mortgage Index on the *Yield Book*. Figure 2 outlines the impact of the model change for fixed-historical volatilities and market-implied volatilities. While the impact on the Index may be small, portfolio managers should re-examine their portfolio's sensitivity to prepayment and volatility changes within specific sectors.

Under fixed volatilities, the prepayment model change shows minimal impact on the projected long-term CPR for the overall Mortgage Index. However, the higher volatility assumptions lower the effective duration by 0.13 and the OAS by 11bp. The GNMA Index effective duration shortens by 0.25 while the OAS drops by 14bp. The effective duration for conventionals shortens approximately 0.10 and the OAS falls by 10bp. (Thirty-year GNMA's and 30-year conventionals show similar changes.) Fifteen-year GNMA's shorten by 0.06, while 15-year conventionals shorten by 0.12.

Under market-implied volatilities (which isolate the effects of the prepayment model change), the model change has little impact on effective duration and OAS for the Mortgage Index. However, the GNMA Index shortens by 0.14, while conventionals offset that change by lengthening approximately 0.04.

Figure 1. Broad Investment-Grade (BIG) Index: Calculation Assumptions

Yield Curve	Salomon Brothers Treasury Model (off-the-run) Curve
Volatility	Non-mortgages: 10% Single Volatility Mortgages : Fixed-Historical Volatilities (two-factor model)
Settlement Date	Monthly Calculations: Last Calendar Day Daily Calculations : Same Day (except the last business day of the month when settlement is last calendar day)
Price Adjustments	Mortgages: Carry-adjusted to reflect the difference between Index settlement dates and standard PSA settlement dates.

⁵ For further details please see, *Salomon Brothers Global Index Catalog*, Salomon Brothers Inc, January 1997.

Figure 2. Comparison of New Versus Old Models: Fixed-Historical Volatilities and Market-Implied Volatilities, 14 May 97

Sector Name	Effective Duration			OAS			Effective Convexity			Long Term CPR		
	New	Old	Diff	New	Old	Diff	New	Old	Diff	New	Old	Diff
Fixed-Historical Volatilities												
Mortgage	3.71	3.84	-0.13	32	43	-11	-0.86	-0.92	0.06	10.3	10.4	-0.1
GNMA	3.91	4.16	-0.25	31	45	-14	-1.04	-1.13	0.09	10.2	10.0	0.1
FHLM	3.76	3.86	-0.11	31	42	-11	-0.81	-0.87	0.05	9.9	10.0	-0.2
FNMA	3.75	3.84	-0.10	30	40	-10	-0.84	-0.91	0.07	10.0	10.2	-0.2
30-Year Mortgages	3.95	4.10	-0.15	31	45	-14	-1.01	-1.07	0.06	10.0	10.2	-0.2
Discount	4.76	4.91	-0.16	34	45	-11	-0.74	-0.72	-0.02	8.4	8.7	-0.3
Premium	3.24	3.39	-0.15	29	46	-17	-1.24	-1.39	0.14	11.6	11.6	-0.1
30-Year GNMA	3.95	4.22	-0.27	31	46	-15	-1.08	-1.17	0.09	10.2	10.1	0.2
GNMA New	4.63	4.86	-0.23	28	48	-20	-1.38	-1.29	-0.09	8.3	8.6	-0.3
GNMA Moderate	4.27	4.59	-0.32	32	44	-12	-1.06	-1.13	0.07	9.5	9.5	0.0
GNMA Seasoned	2.87	3.06	-0.19	27	45	-18	-1.00	-1.33	0.33	13.6	13.1	0.5
GNMA Super Seasoned	2.95	3.15	-0.20	37	52	-15	-0.78	-0.92	0.14	12.2	11.2	1.0
30-Year FHLM	3.97	4.08	-0.10	32	46	-14	-0.96	-1.01	0.04	9.8	10.2	-0.4
FHLM New	4.31	4.53	-0.22	29	44	-15	-1.12	-1.07	-0.05	8.6	8.7	-0.2
FHLM Moderate	4.10	4.14	-0.04	32	44	-12	-0.88	-0.95	0.07	9.5	10.0	-0.5
FHLM Seasoned	2.79	2.96	-0.18	32	52	-20	-1.08	-1.22	0.13	14.3	14.0	0.3
FHLM Super Seasoned	2.75	2.71	0.05	56	57	-1	-0.74	-0.81	0.08	12.9	14.5	-1.6
30-Year FNMA	3.94	4.03	-0.09	31	44	-13	-0.98	-1.04	0.06	10.0	10.3	-0.3
FNMA New	4.34	4.53	-0.19	28	44	-16	-1.12	-1.08	-0.04	8.7	8.9	-0.2
FNMA Moderate	4.08	4.12	-0.04	32	44	-12	-0.91	-0.99	0.09	9.6	10.1	-0.5
FNMA Seasoned	2.88	3.06	-0.18	26	46	-20	-1.14	-1.27	0.14	13.5	13.3	0.2
FNMA Super Seasoned	2.82	2.72	0.09	48	47	1	-0.66	-0.80	0.14	13.0	13.9	-0.9
15-Year Mtg	3.15	3.26	-0.12	27	29	-2	-0.41	-0.48	0.07	10.0	9.7	0.3
Discounts	3.49	3.64	-0.14	30	30	0	-0.23	-0.27	0.04	9.2	8.8	0.4
Premiums	2.67	2.75	-0.08	24	27	-3	-0.64	-0.75	0.11	11.1	11.0	0.2
15-Year GNMA	3.23	3.29	-0.06	25	27	-2	-0.46	-0.51	0.05	9.3	9.8	-0.5
15-Year FHLM	3.13	3.25	-0.12	29	30	-1	-0.39	-0.46	0.07	10.0	9.6	0.4
15-Year FNMA	3.14	3.27	-0.12	26	27	-1	-0.41	-0.48	0.08	10.1	9.7	0.4
Balloons	2.14	2.10	0.04	53	58	-5	-0.34	-0.37	0.02	15.7	16.6	-0.9
Market-Implied Volatilities												
Mortgage	3.75	3.75	-0.01	35	35	0	-0.87	-0.87	0.00	10.3	10.4	-0.1
GNMA	3.94	4.08	-0.14	35	36	-1	-1.07	-1.05	-0.02	10.2	10.0	0.1
FHLM	3.79	3.76	0.03	35	34	1	-0.82	-0.82	0.00	9.9	10.0	-0.2
FNMA	3.79	3.75	0.04	33	33	0	-0.85	-0.85	0.00	10.0	10.2	-0.2
30-Year Mortgages	4.00	4.01	-0.01	35	37	-2	-1.03	-1.00	-0.03	10.0	10.2	-0.2
Discount	4.82	4.77	0.05	37	38	-1	-0.76	-0.77	0.01	8.4	8.7	-0.3
Premium	3.27	3.33	-0.06	34	36	-2	-1.26	-1.20	-0.06	11.6	11.6	-0.1
30-Year GNMA	3.99	4.13	-0.15	35	37	-2	-1.11	-1.09	-0.02	10.2	10.1	0.2
GNMA New	4.68	4.73	-0.05	33	37	-4	-1.42	-1.22	-0.20	8.3	8.6	-0.3
GNMA Moderate	4.31	4.49	-0.18	36	36	0	-1.10	-1.09	0.00	9.5	9.5	0.0
GNMA Seasoned	2.88	3.05	-0.17	31	36	-5	-1.03	-1.15	0.12	13.6	13.1	0.5
GNMA Super Seasoned	2.96	3.10	-0.14	40	46	-6	-0.76	-0.79	0.03	12.2	11.2	1.0
30-Year FHLM	4.02	3.97	0.05	36	37	-1	-0.98	-0.94	-0.03	9.8	10.2	-0.4
FHLM New	4.36	4.38	-0.02	34	35	-1	-1.13	-1.01	-0.12	8.6	8.7	-0.2
FHLM Moderate	4.15	4.03	0.13	36	36	0	-0.89	-0.91	0.03	9.5	10.0	-0.5
FHLM Seasoned	2.80	2.94	-0.15	36	43	-7	-1.10	-1.02	-0.08	14.3	14.0	0.3
FHLM Super Seasoned	2.77	2.69	0.08	58	51	7	-0.73	-0.67	-0.06	12.9	14.5	-1.6
30-Year FNMA	3.98	3.93	0.06	35	36	-1	-1.00	-0.97	-0.03	10.0	10.3	-0.3
FNMA New	4.39	4.39	0.00	32	34	-2	-1.14	-1.01	-0.13	8.7	8.9	-0.2
FNMA Moderate	4.13	4.01	0.12	36	36	0	-0.92	-0.95	0.03	9.6	10.1	-0.5
FNMA Seasoned	2.90	3.03	-0.13	31	37	-6	-1.16	-1.08	-0.08	13.5	13.3	0.2
FNMA Super Seasoned	2.83	2.70	0.13	49	41	8	-0.64	-0.66	0.03	13.0	13.9	-0.9
15-Year Mtg	3.17	3.19	-0.02	29	24	5	-0.39	-0.47	0.08	10.0	9.7	0.3
Discounts	3.51	3.55	-0.04	31	26	5	-0.23	-0.32	0.10	9.2	8.8	0.4
Premiums	2.70	2.69	0.01	26	21	5	-0.62	-0.68	0.05	11.1	11.0	0.2
15-Year GNMA	3.25	3.22	0.03	27	22	5	-0.44	-0.50	0.06	9.3	9.8	-0.5
15-Year FHLM	3.15	3.18	-0.02	31	26	5	-0.38	-0.46	0.08	10.0	9.6	0.4
15-Year FNMA	3.17	3.19	-0.03	28	22	6	-0.40	-0.48	0.08	10.1	9.7	0.4
Balloons	2.16	2.08	0.08	55	56	-1	-0.32	-0.34	0.02	15.7	16.6	-0.9

Source: Salomon Brothers Inc.