

The World's Largest Buyer of Volatility Returns

The reason that Implied and Realized USD rate Volatility is greater than the rate Volatility for all other G-7 countries is quite simple: We have a huge "at will pre-payable" Fixed-Rate Mortgage market.

The patriarch of this family of bonds is the 30-year MBS; it is effectively an Agency thirty-year non-call one twelfth, the most negatively convex bond created on a regular basis. Analytically, each time \$100mm of new MBS bonds are issued, the homeowners behind these bonds are effectively buying the Vega Equivalent of \$50mm 3yr-10yr straddles. Taken as a whole, the USD rate market, comprised of nearly 40% MBS bonds, has a core short convexity structure that creates substantial duration drift as rates vibrate. As such, Asset/Liability managers at Banks, Insurance companies, and Pensions must actively monitor their risk dynamics. To maintain a stable portfolio at the margin, managers must be net buyers of the market as prices rise and yields fall, and vice versa, as prices fall and rates increase. This is the primary source of the additional USD rate volatility over other currencies.

Today's RateLab proposes that there is a grand correlation between the net buying (or selling) of Volatility by US homeowners via the Fixed-rate MBS market and the level of Implied Volatility.

Moreover, this relationship will be maintained regardless of the buying or selling of Volatility by MBS Servicers, Agencies, Hedge Funds or other market participants. This is because the MBS issuance activity is the ultimate buyer or seller of options into the USD market and all other intra-market transactions just shift the risk between investors.

What follows is further support for our February 16, 2007 issue of **RateLab - "Professional Javelin Catching: This is the Bottom of Vega"**. To reiterate, we believe that Vega has bottomed and has much greater potential to rise than fall over the medium term.

The Analysis:

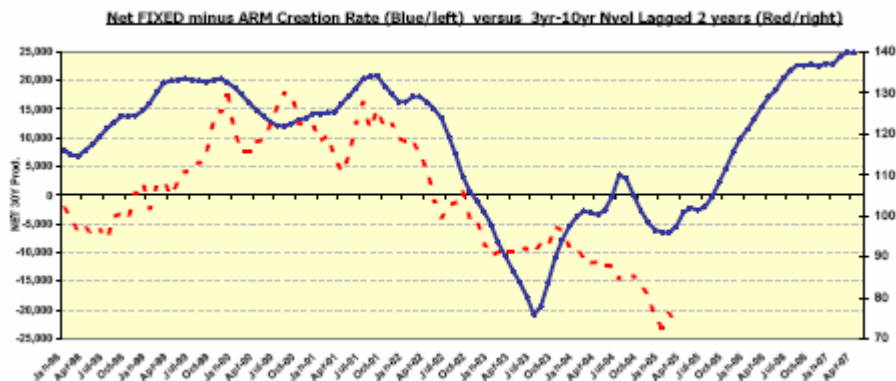
Although there is no “right” answer for how to conduct this analysis, there are a series of “better” answers. We wish to examine the Net Purchases of Volatility by the US homeowner. If he takes out a thirty-year fixed-rate mortgage, we will assume he wants to own the prepayment option and as such, is a net buyer of Volatility. If he takes out an ARM, he is a net seller of Volatility since he is willing to take rate risk in exchange for a lower initial rate. This creates the simple formula: Net Agency thirty-year MBS issuance minus Net Agency 3/1 and 5/1 ARM issuance.

We chose to use only thirty-year fixed rate MBS because not only are they most negatively convex, but also the fifteen-year market has a selection bias in favor of homeowners who desire to payoff their mortgages instead of utilizing the prepayment feature.

We chose to use only 3/1 and 5/1 ARMs because not only are they the least negatively convex, but also 7/1 and 10/1 ARMs are too similar to fixed-rate MBS once you accounted for the fact that that average homeowner moves every seven years.

Finally, this construction captures the broad sweep of homeowners who switch from Fixed-rate to ARMs and back.

The **-blue line-** below shows twelve-month moving average of our Net Issuance formula. The **-red line-** is the Implied Normal Volatility for 3yr-10yr a-t-m straddles, lagged by two years. The supporting data is included in the Appendix at the end of this RateLab.



Critical Observations:

- 1) From early 1998 to mid 2002, the MBS market averaged net issuance of about \$20 billion a month. This would be the Vega equivalent of homeowners purchasing about \$10 billion a month of 3yr-10yr straddles.
- 2) From mid 2002 to late 2003, Fixed-rate to ARM refinancing reduced the net issuance figure substantially. During the summer of 2003, the net issuance figure reached NEGATIVE \$20 billion a month. This had the impact of homeowners selling \$10 billion a month of 3yr-10yr.
- 3) Homeowners were basically NET SELLERS of Volatility for almost three years. This coincided with the dramatic drop in both Implied and Realized Volatility.
- 4) Since the middle of 2005, homeowners have again become net buyers of Volatility. In fact, they are now implicitly buying Volatility at the greatest rate ever. Our net issuance figure is now running at \$25 billion a month and has been over \$20 billion for the last twelve months. This is the Vega equivalent of homeowners buying \$12bn a month of 3yr-10yr straddles.

Caveats:

To some degree, we have manufactured the correlation we were looking for via our selection of inputs and the length of the lag used for the Implied Volatility measure. Nonetheless, the underlying logic is compelling and does produce a handy chart. The key driver is that the homeowner is a non-mark-to-market investor who does NOT delta hedge his optionality. This is what creates the non-linearity in the equation: USD Asset/Liability managers must hedge over the medium term to maintain some sort of stability while homeowners do not. What if we introduce a new class of investors who also do NOT mark-to-market and manage duration drift ?? These investors could offset the net Volatility impact of homeowners on the market. I am obviously alluding to Foreign Central Banks who have been the largest buyers of Fixed-rate MBS over the past few years. This is an uncertainty we are not prepared to address just yet.

Summary:

It is indisputable that US homeowners have been refinancing out of ARMs and into Fixed-rate mortgages as the reset date is reached. Current rates will reset most ARMs to about 7.5% while a new Fixed-rate mortgage can be had for roughly 6.25%. Moreover, this activity certainly adds not only a great deal of negative convexity, but also significant duration to the market. At some point, the giant US Mortgage Machine adding \$25 billion a month of Fixed-rate bonds has to have an impact.

Will we see Implied Volatility on 3yr-10yr reach 125 NVol as the chart implies...??? Nope !!! But I can assure you that this impact is real and today's current 73.5 NVol will be seen as a gift by early 2008.

The ML US Rates Strategy team urges you to purchase mid-tail Vega, specifically via our Volatility Swap structure as highlighted in our April 10, 2007 issue of **RateLab – “Building a Superior Volatility Mousetrap”**.

ML US Rates Strategy
May 15, 2007

Appendix

MONTH	3r1	5r1	30	NET 30s	12MO MA	3Y-10Y: 2y Lag
Apr-07	-1,479	3,531	28,912	26,860	24,803	
Mar-07	-1,299	5,081	29,656	25,874	24,914	
Feb-07	-938	4,384	34,349	30,903	24,066	
Jan-07	-1,042	9,074	28,869	20,837	22,773	
Dec-06	-1,129	1,900	27,802	27,031	22,909	
Nov-06	-575	3,378	23,848	21,045	22,481	
Oct-06	-969	4,776	28,523	24,736	22,768	
Sep-06	-512	4,526	29,744	25,730	22,603	
Aug-06	-1,351	3,422	27,918	25,847	22,654	
Jul-06	-1,196	4,244	26,181	23,133	21,642	
Jun-06	-1,262	2,771	26,294	24,785	20,332	
May-06	-1,447	1,726	21,138	20,859	18,302	
Apr-06	-972	1,114	28,329	28,187	17,093	
Mar-06	-1,135	1,938	16,504	15,701	15,397	
Feb-06	-620	5,963	20,725	15,382	13,269	
Jan-06	-172	7,976	30,271	22,467	11,481	
Dec-05	-446	3,437	24,885	21,894	9,830	
Nov-05	-1,078	3,298	26,716	24,496	7,553	
Oct-05	-1,048	1,352	23,053	22,749	4,687	
Sep-05	-367	7,593	33,578	26,352	2,159	
Aug-05	-1,192	2,945	15,448	13,695	-382	
Jul-05	-419	3,184	10,182	7,417	-2,103	
Jun-05	26	3,855	4,308	427	-2,612	
May-05	283	3,344	9,976	6,349	-2,196	
Apr-05	892	3,558	12,287	7,837	-3,043	73.52
Mar-05	472	2,401	-6,965	-8,838	-5,460	75.97
Feb-05	1,352	3,805	-921	-6,078	-6,513	73.06
Jan-05	2,301	4,783	9,746	2,662	-6,474	75.25
Dec-04	1,981	4,364	910	-5,435	-5,999	81.11
Nov-04	1,442	4,079	-4,370	-8,891	-4,616	83.00
Oct-04	1,748	3,705	-2,140	-7,593	-2,603	85.05
Sep-04	2,105	5,058	3,032	-4,131	45	85.64
Aug-04	1,734	4,487	-740	-6,961	2,833	84.72
Jul-04	2,453	4,780	8,536	1,303	3,555	87.68
Jun-04	2,940	4,262	12,622	5,420	-199	87.96
May-04	2,532	3,556	2,276	-3,812	-2,562	88.75
Apr-04	2,366	2,701	-16,097	-21,164	-3,420	88.47
Mar-04	2,028	1,873	-18,573	-22,474	-3,080	90.10
Feb-04	1,611	1,289	-2,712	-5,612	-2,765	91.80
Jan-04	2,704	3,200	14,269	8,365	-3,796	92.79
Dec-03	2,331	3,325	16,817	11,161	-5,391	96.22
Nov-03	1,974	3,757	19,995	14,264	-7,772	97.51
Oct-03	1,389	4,946	30,515	24,180	-10,813	92.79
Sep-03	1,443	6,026	36,798	29,329	-15,235	92.90
Aug-03	290	1,897	3,888	1,701	-19,340	91.12
Jul-03	744	2,453	-40,546	-43,743	-20,846	91.96
Jun-03	1,220	3,731	-17,983	-22,934	-17,579	92.11
May-03	1,216	4,342	-8,551	-14,109	-15,082	91.25
Apr-03	1,211	4,953	-10,919	-17,083	-13,038	91.34
Mar-03	1,622	3,789	-13,286	-18,697	-10,569	91.30
Feb-03	1,580	4,014	-12,396	-17,990	-8,355	90.23
Jan-03	1,390	4,811	-4,567	-10,768	-5,148	93.00
Dec-02	1,605	4,263	-11,543	-17,411	-2,851	98.91
Nov-02	1,301	3,249	-17,678	-22,228	-1,045	99.68
Oct-02	1,365	3,639	-23,885	-28,889	753	105.80
Sep-02	1,510	3,958	-14,465	-19,933	3,276	103.34
Aug-02	1,150	2,486	-12,735	-16,371	7,138	102.56
Jul-02	1,490	2,688	-362	-4,540	10,395	99.74
Jun-02	2,025	2,703	11,767	7,039	13,460	103.54
May-02	1,307	1,299	13,020	10,414	15,000	111.18
Apr-02	2,005	2,390	16,944	12,549	16,183	115.00
Mar-02	1,845	3,058	12,773	7,870	17,148	117.90
Feb-02	1,912	1,911	24,310	20,487	17,152	117.97
Jan-02	820	1,047	18,665	16,798	16,276	119.06

Dec-01	327	1,472	6,663	4,264	16,306	122.20
Nov-01	659	1,754	1,759	-654	17,738	121.52
Oct-01	208	164	1,760	1,388	19,024	125.87
Sep-01	652	1,307	28,376	26,417	20,814	121.30
Aug-01	612	806	24,126	22,708	20,653	127.43
Jul-01	550	2,214	35,001	32,237	20,266	122.68
Jun-01	30	1,373	26,930	25,527	18,662	114.28
May-01	-258	-319	24,026	24,603	17,268	110.65
Apr-01	-213	7	23,921	24,127	15,974	114.38
Mar-01	306	824	9,055	7,925	14,543	119.68
Feb-01	-225	41	9,784	9,968	14,360	118.12
Jan-01	-166	-104	16,897	17,167	14,222	121.54
Dec-00	254	1,920	23,616	21,442	14,244	122.17
Nov-00	637	3,439	18,653	14,777	13,403	122.65
Oct-00	-12	-33	22,825	22,870	13,176	129.32
Sep-00	350	101	24,941	24,490	12,516	129.85
Aug-00	96	766	18,526	18,064	11,997	126.71
Jul-00	-17	363	13,333	12,987	12,128	122.00
Jun-00	104	493	9,388	8,791	12,700	118.55
May-00	-31	-46	9,008	9,085	13,844	118.07
Apr-00	56	186	7,191	6,949	14,815	115.69
Mar-00	125	66	5,823	5,732	16,047	115.71
Feb-00	-28	-20	8,259	8,307	17,458	119.79
Jan-00	-19	-7	17,402	17,428	18,719	128.91
Dec-99	6	-21	11,338	11,353	19,545	125.41
Nov-99	274	313	12,647	12,060	20,274	122.96
Oct-99	148	334	15,422	14,940	20,091	115.97
Sep-99	302	231	18,803	18,270	19,748	112.94
Aug-99	89	13	19,741	19,639	19,962	111.08
Jul-99	1	-105	19,740	19,844	20,045	110.62
Jun-99	-5	-87	22,427	22,519	20,322	108.03
May-99	-3	291	21,030	20,742	20,127	104.96
Apr-99	-1	669	22,398	21,730	19,942	108.25
Mar-99	-17	92	22,744	22,669	19,541	106.85
Feb-99	-126	-214	23,090	23,430	17,935	101.93
Jan-99	-103	-225	27,010	27,338	16,011	107.94
Dec-98	-129	-68	19,505	20,102	14,691	105.46
Nov-98	-204	-233	9,434	9,871	13,818	99.81
Oct-98	-144	-153	10,530	10,827	13,792	100.62
Sep-98	107	404	21,344	20,833	13,775	99.72
Aug-98	-146	-112	20,379	20,637	12,613	94.42
Jul-98	-32	31	23,167	23,168	11,657	96.40
Jun-98	-51	-23	20,101	20,175	10,187	95.05
May-98	48	73	18,646	18,525	8,889	97.05
Apr-98	-117	442	17,237	16,912	7,894	96.23
Mar-98	93	292	3,791	3,406	6,842	99.04
Feb-98	10	550	892	332	6,372	101.74
Jan-98	124	279	11,907	11,504	7,835	105.70

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