Robert Young
(212) 816-8332
robert.young@ssmb.com

IO Hedge — Ten-Year or Current Coupon?

Investors have traditionally compared the performance of IOs with the ten-year Treasury. More recently, the current coupon has grown in importance as another benchmark for IOs. Perhaps this is just the result of the increased volatility in current coupon to ten-year spreads over the past year and a half. (In other words, prior to this recent period, spreads did not change enough to warrant worrying about the current coupon as a separate independent factor affecting IO prices.) Nonetheless, the current coupon is a sensible choice from a modeling point of view because it, rather than the ten-year, more directly drives the level of refinancings. So, which is a better hedge for IOs, the ten-year or the current coupon?

Correlations

Figure 30 shows correlations between the daily percentage price change of Freddie Mac PC 177 IO (backed by 7% collateral) with the daily change in the ten-year Treasury yield and the daily change in the current coupon yield. The correlations were computed for each quarter of the past two years. A good hedging instrument should be highly correlated with the IO. The data in the figure indicate that both the ten-year and the current coupon have been highly correlated with PC 177, although the correlations with the ten-year have been slightly higher. Although correlations are only an indirect measure of hedging effectiveness, they can be useful because they are relatively easy to compute (through Salomon Smith Barney's Yield Book™, for example).

Figure 30. Freddie Mac PC 177 IO: Percentage Price Change Correlations with Changes in the Ten-Year and Current Coupon Yields

Quarter	Correlations with	
	Ten-Year	Current Coupon
1Q 98	96 %	93 %
2Q 98	95	92
3Q 98	92	93
4Q 98	92	94
1Q 99	97	91
2Q 99	93	86
3Q 99	94	91
4Q 99	93	92

Source: Salomon Smith Barney.

Historical Hedge Performance

Looking at the past performance of a portfolio of IO and hedging instrument (either the ten-year or current coupon) takes another step in trying to evaluate hedging effectiveness. More precisely, the portfolio consists of $100 market value of IO and however much of the hedge instrument is needed to be effective duration neutral. The portfolio is rebalanced daily. So, for example, if the IO has a duration of -15 and price of 20 and is hedged with collateral whose duration is 5 and price is 100, then the portfolio consists of $500 face amount of IO and $300 face amount of collateral: $500*20*(-15) + 300*100*5 = 0$.

Changes in the value (in dollars) of this theoretical portfolio were calculated, and the standard deviations of these changes are shown by quarter in Figure 31 for Trust 240 and PC 177 IO (other IOs gave similar results). Note that a good hedging vehicle would result in small changes in value over time and, as a result, a small standard deviation of these changes.

The results of Figure 31 show the following:

➤ Hedging errors are larger when rates are low. This is because low rates mean bigger (more negative) IO durations, which are more difficult to hedge.

➤ In general, the Treasury hedge performs somewhat better (lower standard deviations) than the current coupon hedge. The last line of Figure 31 shows results for the entire period, 1996 to the present.

➤ The exception to Treasuries outperforming the current coupon occurred during the crisis of last year, more specifically, in September and October 1998. An additional line in Figure 31, labeled Sep-Oct 98, shows the results for these two months. During this period, Treasuries partially delinked from the rest of the fixed-income market, including mortgages, as they moved at times because of "flight to quality" issues.

Figure 31. Standard Deviations of IO + Hedge: Daily Changes in Value (Dollars)

	FN TR 240 IO		FHL PC 177 IO	
	Ten-Year	Current Coupon	Ten-Year	Current Coupon
1Q 96	0.38	0.55	—	—
2Q 96	0.28	0.29	—	—
3Q 96	0.17	0.19	0.15	0.19
4Q 96	0.25	0.30	0.22	0.26
1Q 97	0.22	0.27	0.22	0.29
2Q 97	0.19	0.23	0.19	0.23
3Q 97	0.28	0.40	0.26	0.41
4Q 97	0.36	0.39	0.31	0.43
1Q 98	0.69	0.88	0.55	0.79
2Q 98	0.55	0.74	0.56	0.79
3Q 98	0.98	1.14	1.27	1.27
4Q 98	1.84	1.67	1.88	1.88
Sep-Oct 98	2.28	2.16	2.45	2.37
1Q 99	0.68	0.82	0.67	0.95
2Q 99	0.46	0.68	0.55	0.80
3Q 99	0.34	0.45	0.39	0.48
4Q 99	0.28	0.30	0.26	0.27
All	0.66	0.71	0.73	0.81

Source: Salomon Smith Barney.

Although these results favor, to some extent, the ten-year over the current coupon as a single hedge for IOs, this study has not addressed the more difficult question of what is the "right" duration to use. It is possible that duration measures other than effective duration could improve the effectiveness of the current coupon as a hedge vehicle. Furthermore, perhaps a more relevent question is: what combination of the ten-year and current coupon best hedges IOs (rather than trying to find a good single hedge instrument)?[12] Another question for future study is whether there is some overall return benefit from hedging with a long position in current-coupon collateral, since mortgages tend to have higher yields than Treasuries.

---

[12] The current coupon could be used as part of a multivehicle hedge that attempts to account for multiple factors. In this case, the current coupon might be positioned specifically to hedge mortgage-Treasury spreads.