MODELING THE MORTGAGE-TREASURY SPREAD

LAURIE GOODMAN AND JEFFREY HO

One of our most useful tools for judging whether the spread between mortgages and Treasury securities is in line has been our perfect current-coupon projection model. We have developed applications of the model for each principal sector of the pass-through market: thirty-year GNMAs, thirty-year conventionals, fifteen-year GNMAs, fifteen-year conventionals, and seven- and five-year balloons. The model measures the richness or cheapness of the current-coupon mortgage as a function of the fundamental variables that influence mortgage pricing: the level of rates, the shape of the curve and volatility.

Mortgage investors repeatedly ask how this model has actually performed. Can we document that it has been a good signal?

While we were initially reluctant to undertake such a study, because we never intended the perfect current-coupon model to be used for automatic trading rules, repeated requests have changed our mind. In this article, we briefly discuss fundamentals underlying the thirty-year conventional perfect current-coupon model. We then discuss the advantages and disadvantages of this approach. Finally, we show how our model has performed through time.

I. THE MODEL

The starting off point for the model is the perfect current coupon for corporate settlement, which we define as the mortgage selling exactly at par for corporate settlement. We derive the corporate settlement price for all to be announced pass-throughs. To find the perfect current coupon, we adjust closing TBA prices to reflect corporate settlement.

LAURIE GOODMAN is a managing director and head of the Mortgage Strategy Group at Paine Webber, Inc. in New York.

JEFFREY HO is a first vice president in the Mortgage Strategy Group at Paine Webber, Inc. in New York.

We then interpolate between the price for the coupon class selling immediately above par and that selling immediately below par to find the coupon that would sell exactly at par. This is a perfect current-coupon pass-through. We then convert the coupon/yield on this security to a bond-equivalent yield.

For example, as of the close on February 8, 1996, the FNMA 6.5s were selling at 98.73 points for regular March settlement, or 98.83 points adjusted for corporate settlement; the FNMA 7.0s were selling at 100.72 points for regular March settlement and 100.84 points for corporate settlement. Thus, the perfect current coupon is a 6.79%, reflecting 41.88% of the 6.5% and 58.12% of the 7%. Its bond-equivalent yield is 6.81%, which takes into account payment delays on the mortgage pass-throughs as well as the fact that the mortgage coupon is received monthly.

In specifying our model, we assume that the yield on the perfect current-coupon mortgage is a function of fundamental factors: the level of Treasury rates, the shape of the yield curve, and volatility. We proxy the level of Treasury rates with the yield on the ten-year Treasury note; we proxy the shape of the curve by the spread between the two- and ten-year Treasury notes. Volatility enters as two variables: actual thirty-day yield volatility on the ten-year Treasury note, and the ratio of implied to historical volatility on bond futures.

Implied volatility is the volatility implied by the prices of at-the-money options on the bond futures contract. The specific options contracts used have expirations at least one, and no more than four, months prior to the delivery month on the futures contract.

For example, from May to July, we track the implied volatility of the September option (which expires in August) on the September bond futures. For the period from August to October, we will switch to the December option (which expires in November) on the December bond futures. We then run a simple linear regression in which the perfect current-coupon yield is dependent on the ten-year Treasury note yield, the yield spread between the two- and ten-year notes, and the two volatility variables.

Using the estimated coefficients of this model, we can calculate the predicted yield, given current market levels for our independent variables. Exhibit 1 details an example of this calculation for the perfect current-coupon thirty-year conventional. The estimated yield, as calculated from the coefficients, is 6.81%.

EXHIBIT 1 ■ How to Use the Current-Coupon Projection Model for Conventional 30-Year Mortgages

Term	Coefficient	Value	Value × Coeff.
Intercept	1.56534		1.5653
10-Year Yield	0.92372	5.66	5.2303
Historical Volatility	0.00511	14.45	0.0739
Implied/Historical Volatility	0.00095	122	0.1163
10yr-2yr bp Spread	−0.00228	76	−0.1739
Projected Yield from Current-Coupon Model			6.81
Actual Yield			6.81
Difference			0 bp rich

The actual yield on the perfect current-coupon mortgage is also 6.81%. We interpret this to mean that mortgages are exactly fair on the basis of our model.

We can also calculate projected and actual spreads to a benchmark Treasury yield. Exhibit 2 tracks the actual and projected spreads of thirty-year conventionals to the ten-year Treasury note. The heavy black line indicates the actual spread. The projected spread is shown as the dotted line, and the thinner lines on either side represent the projected yield plus or minus one standard error of the regression.

Note that the model is very well-behaved; actual spreads are usually within the one-standard error bands. When they go outside the bands, they usually come back in quickly. The two exceptions to this are in early 1994, when mortgages stayed below the bands (were rich) for a prolonged period of time, and in late 1995 when mortgages stayed above the bands (were cheap) for a prolonged period of time. In both cases, they did realign.

II. LIMITATIONS OF THE MODEL

We did not design this model to provide an automatic trading rule, but rather to serve as a starting point for looking at the mortgage/Treasury spread in a consistent fashion. We recognize that it has a number of limitations.

First, the model takes into account the fundamental factors that determine mortgage pricing: the shape of the curve, the level of rates, and volatility. It does not take account of the technical factors that also

influence mortgage pricing: the supply of pass-throughs, the CMO bid, and spreads on competing products such as corporate bonds. In addition, it does not account for investor sentiment toward mortgages.

For this reason, we tend to use the model as our jumping-off point, overlaying current technical and other factors we are aware of when we make our judgment. Thus, while the model says pass-throughs are simply fair — they are now in good shape technically — we would be comfortable recommending them. If the model says they are fair, but our technical outlook is more negative, we would suggest underweighting them.

An additional limitation of the model for trading purposes is that it identifies relative value as a function of the fundamental variables that *should* matter. It is possible, however, that pass-throughs could realign versus our model, but an actual trade might still not be profitable. That is, if the perfect current coupon changes significantly, or if the values of the dependent variables change significantly, the results of an actual trade can differ from the model results.

Let us consider more concretely how this might happen. In the model, the perfect current coupon is recalculated each day. If an investor sees that mortgages are cheap according to the model, purchases a coupon priced near par, and the market rallies, this pass-through would no longer be the current coupon. It is possible that the model performed very well in that the current coupon moved back within the bands, but the trade did not work because the actual coupon purchased, which quickly became a premium, performed poorly as it rose above par.

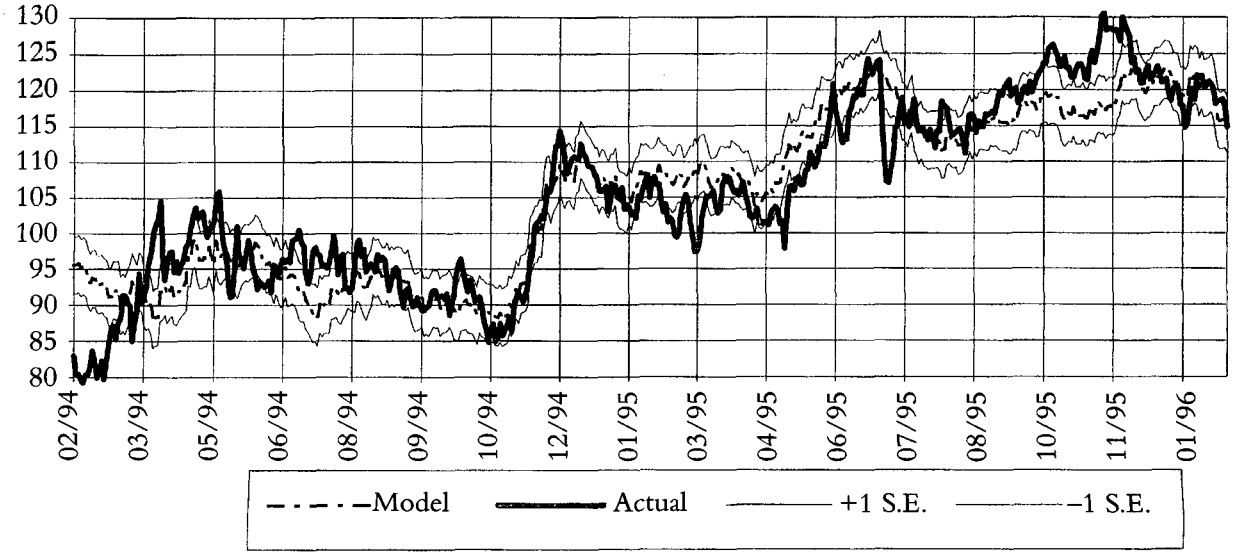
Investors using this model as a trading tool must bear this in mind, and, if they continue to hold the same coupon as the market moves, the hedge ratio or duration of the mortgage should be lowered.

A similar problem occurs if the curve flattens or volatility increases. In that case we would expect mortgage spreads to widen vis-à-vis the ten-year Treasury. If investors think mortgages are cheap, they would purchase the current-coupon mortgage and sell the ten-year note. If volatility were then to rise sharply, or the curve to flatten, it would raise the projected yield from the current-coupon model. Thus, against the model, the perfect current-coupon pass-through spread could come back within the bands (richen), but the trade would not make any money because mortgages did not outperform — the model value simply shifted.

III. HOW HAS THE MODEL PERFORMED?

With these limitations in mind, we were concerned about the validity of applying an automatic trading rule to test the model. Yet we came to believe a performance study was warranted. First, we went back and re-estimated the coefficients of the models as of mid-month (the trading day falling on or closest to the

EXHIBIT 2 ■ Conventional 30-Year Current-Coupon Spread — Actual Versus Model



fifteenth of the month) and the last trading day of the month, beginning with December 31, 1992. We then derived the rich/cheap amount that would have been reported on that date.

At each time we are using two years of historical data. In addition, in early 1994, we changed the model to add another variable, the ratio of implied to historical volatility. Accordingly, this variable is not reflected in the backtesting until the point we actually incorporate it in the model.*

We then apply a trading rule consistently, as follows. At each mid- and month-end point, we look at the rich/cheap amount and the standard error of the model. Where mortgages are more than one standard error cheap (rich), we purchase (sell) the mortgage with a coupon closest to the perfect current coupon and sell (purchase) Treasuries. Specifically, we sell (purchase) $1 million ten-year Treasury notes and purchase (sell) the duration-weighted amount of mortgages.

The duration-weighted amount is calculated using the four-week empirical hedge ratio and is not altered until the position is re-examined as of the next backtest date, roughly two weeks later. This can be seen in Exhibit 3, which shows the results of this procedure for 1993.

On April 30, 1993, the perfect current-coupon mortgage looked 7 basis points cheap in the model, representing a misalignment from the model of 1.1 standard error. On that date, this would have been a signal to buy mortgages, as the standard error was greater than 1.0.

Since the perfect current coupon in the model is

EXHIBIT 3 ■ 30-Year Conventional Current-Coupon Model Performance in 1993

						Rich				P&L with Carry						
			Cur		Std	(Cheap)		Mtg	Hist		Mtg/		Strategy 1		Strategy 2	
Ref	Date	Sprd	Cpn	10yr	Err	bp	s.e.	Cpn	H.R.	Mtg	H.R.	Tsy	Position*	P&L	Position*	P&L
1	12/31/1992	89	7.58	6.69	6.1	−17	−2.8	7.50	0.80	1.16	1.44	0.92	1	5,209.17	1	5,209.17
2	1/15/1993	80	7.39	6.58	6.2	−6	−0.9	7.50	0.74	0.91	1.22	1.63	2	−8,223.49	1	−4,111.74
3	1/29/1993	85	7.23	6.38	6.2	−7	−1.1	7.00	0.79	0.53	0.67	0.35	3	9,706.09	1	3,235.36
4	2/12/1993	81	7.16	6.35	6.1	1	0.2	7.00	0.81	1.34	1.67	2.49		0.00		0.00
5	2/26/1993	89	6.92	6.03	6.2	2	0.3	7.00	0.72	−0.78	−1.08	−0.88		0.00		0.00
6	3/15/1993	91	7.07	6.17	6.3	10	1.6	7.00	0.70	0.72	1.03	1.16	−1	1,300.39	−1	1,300.39
7	3/31/1993	91	6.93	6.03	6.4	11	1.8	7.00	0.75	1.25	1.67	1.32	−2	−7,026.14	−2	−7,026.14
8	4/15/1993	92	6.79	5.87	6.5	3	0.4	7.00	0.72	−0.44	−0.61	−1.08		0.00		0.00
9	4/30/1993	90	6.93	6.03	6.5	−7	−1.1	7.00	0.75	0.34	0.46	0.27	1	1,915.38	1	1,915.38
10	5/14/1993	86	6.88	6.01	6.4	−1	−0.2	7.00	0.68	−0.31	−0.46	−0.88		0.00		0.00
11	5/28/1993	81	6.96	6.15	6.4	3	0.5	7.00	0.59	1.34	2.28	1.69		0.00		0.00
12	6/15/1993	85	6.78	5.94	6.4	3	0.4	7.00	0.60	0.72	1.21	1.31		0.00		0.00
13	6/30/1993	80	6.58	5.78	6.2	4	0.7	6.50	0.76	0.88	1.15	0.70		0.00		0.00
14	7/15/1993	80	6.50	5.70	6.1	1	0.1	6.50	0.75	−0.44	−0.59	−0.76		0.00		0.00
15	7/30/1993	81	6.63	5.82	6.1	4	0.6	6.50	0.74	0.78	1.06	0.87		0.00		0.00
16	8/13/1993	78	6.49	5.71	6.2	7	1.2	6.50	0.75	1.28	1.71	2.12	−1	4,125.81	−1	4,125.81
17	8/31/1993	86	6.31	5.45	6.2	4	0.6	6.50	0.69	0.00	0.00	0.55		0.00		0.00
18	9/15/1993	93	6.32	5.39	6.2	3	0.6	6.50	0.64	0.09	0.15	0.02		0.00		0.00
19	9/30/1993	93	6.33	5.40	6.2	6	1.0	6.50	0.61	1.09	1.80	1.87	−1	735.06	−1	735.06
20	10/15/1993	94	6.11	5.17	6.2	6	1.0	6.00	0.75	−1.19	−1.58	−1.74	−2	−3,371.79	−1	−1,685.89
21	10/29/1993	95	6.36	5.41	6.1	−0	−0.0	6.50	0.58	−0.88	−1.51	−1.86		0.00		0.00
22	11/15/1993	94	6.61	5.67	5.7	2	0.3	6.50	0.59	−0.81	−1.38	−0.95		0.00		0.00
23	11/30/1993	100	6.81	5.81	5.5	−3	−0.6	7.00	0.49	0.31	0.63	0.11		0.00		0.00
24	12/15/1993	95	6.76	5.81	5.5	−2	−0.3	7.00	0.60	0.44	0.73	0.21		0.00		0.00
											Total 93			4,370.49		3,697.40

*Basis position in millions.

the 6.93%, we would have purchased FNMA 7s. The hedge ratio using pricing from the four weeks prior to April 30, 1993, is 0.75. Thus, we would sell $1 million ten-year Treasury notes and purchase 1/0.75 or $1.33 million FNMA 7s. We hold the mortgage/Treasury position for two weeks, without altering the hedge ratio. Results are shown in Exhibit 4 for 1994, and in Exhibit 5 for 1995 and the beginning of 1996.

At this point, we look at the position and make one of three decisions: Take the position off, hold it, or add to it. We apply these decisions using two different trading rules, indicated in Exhibits 3, 4, and 5 as Strategy 1 and Strategy 2.

Backtest Strategy 1 is more aggressive, as investors add to their positions as long as the current-coupon pass-through is cheap by more than 1.0 standard error. If it has realigned to within 0.75 of a standard error of fair value, we sell (buy) it and buy back (sell) the Treasuries. If the current coupon is within 0.75 and 1.0 standard error, we rebalance the position by moving into the then-current coupon or by altering the hedge ratio if we already own it.

If the current coupon is cheap (rich) by more than 1.0 standard error, we add one more unit to the position. We continue adding every two weeks as long as mortgages are more than 1.0 standard deviation rich or cheap until the realignment occurs.

In the case of our April 30, 1993, trade, shown in Exhibit 3, the mortgages realigned by our next examination on May 14; they were 1-basis point cheap, corresponding to 0.2 standard error. The trade was taken off. The P&L on the mortgage position was

EXHIBIT 4 ■ 30-Year Conventional Current-Coupon Model Performance in 1994

						Rich				P&L with Carry						
			Cur		Std	(Cheap)		Mtg	Hist		Mtg/		Strategy 1		Strategy 2	
Ref	Date	Sprd	Cpn	10yr	Err	bp	s.e.	Cpn	H.R.	Mtg	H.R.	Tsy	Position*	P&L	Position*	P&L
1	12/31/1993	90	6.70	5.80	5.4	2	0.3	6.50	0.71	0.66	0.92	0.53		0.00		0.00
2	1/14/1994	85	6.59	5.74	5.5	10	1.8	6.50	0.65	0.84	1.31	0.82	−1	−4,882.85	−1	−4,882.85
3	1/31/1994	80	6.45	5.65	5.7	13	2.3	6.50	0.63	−1.00	−1.60	−1.63	−2	−577.11	−2	−577.11
4	2/15/1994	79	6.67	5.88	5.9	13	2.1	6.50	0.69	−1.59	−2.30	−1.91	−3	11,722.93	−2	7,815.29
5	2/28/1994	82	6.98	6.15	6.0	5	0.9	7.00	0.63	−1.94	−3.07	−2.18	−3	26,670.32	−2	17,780.21
6	3/15/1994	90	7.37	6.47	6.0	−4	−0.6	7.50	0.49	−1.97	−4.05	−2.16		0.00		0.00
7	3/31/1994	101	7.80	6.79	5.9	−13	−2.3	8.00	0.50	−0.44	−0.88	−1.11	1	2,219.97	1	2,219.97
8	4/15/1994	94	7.90	6.96	5.8	2	0.4	8.00	0.68	−0.59	−0.88	−0.49		0.00		0.00
9	4/29/1994	103	8.07	7.05	5.4	−2	−0.4	8.00	0.69	−0.62	−0.91	−1.54		0.00		0.00
10	5/13/1994	99	8.27	7.29	5.3	5	1.0	8.50	0.53	0.62	1.18	0.97	−1	−2,109.13	−1	−2,109.13
11	5/31/1994	99	8.15	7.16	5.3	−1	−0.2	8.00	0.68	0.59	0.88	0.65		0.00		0.00
12	6/15/1994	96	8.04	7.09	5.3	−2	−0.4	8.00	0.80	−1.19	−1.49	−1.63		0.00		0.00
13	6/30/1994	100	8.34	7.34	5.3	−9	−1.8	8.50	0.67	0.75	1.12	0.79	1	3,288.45	1	3,288.45
14	7/15/1994	95	8.20	7.24	5.3	−6	−1.2	8.00	0.71	0.91	1.27	1.10	2	3,429.25	1	1,714.62
15	7/29/1994	92	8.03	7.10	5.1	−2	−0.4	8.00	0.77	−0.88	−1.14	−1.22		0.00		0.00
16	8/15/1994	96	8.25	7.29	4.9	−2	−0.4	8.50	0.64	0.75	1.16	0.94		0.00		0.00
17	8/31/1994	95	8.12	7.18	4.3	−3	−0.7	8.00	0.67	−0.56	−0.84	−1.13		0.00		0.00
18	9/15/1994	89	8.25	7.35	4.0	1	0.3	8.00	0.69	−1.31	−1.90	−1.66		0.00		0.00
19	9/30/1994	92	8.52	7.61	3.9	0	0.1	8.50	0.65	0.06	0.10	0.16		0.00		0.00
20	10/14/1994	92	8.52	7.60	3.7	1	0.2	8.50	0.70	−0.66	−0.94	−1.27		0.00		0.00
21	10/31/1994	87	8.68	7.80	3.6	3	0.9	8.50	0.74	−0.72	−0.97	−0.61		0.00		0.00
22	11/15/1994	91	8.82	7.91	3.7	1	0.2	9.00	0.55	−0.31	−0.57	0.19		0.00		0.00
23	11/30/1994	102	8.91	7.89	3.6	−5	−1.5	9.00	0.64	0.28	0.44	0.78	1	−3,406.45	1	−3,406.45
24	12/15/1994	110	8.89	7.79	3.8	−9	−2.3	9.00	0.67	−0.09	−0.14	−0.22	2	1,694.30	2	1,694.30
												Total 94		38,049.67		23,537.30

*Basis position in millions.

$0.46; the P&L on the Treasury position was $0.27. Thus, the trade netted $0.19 per $100 par, or $1,915 per million.

Under Strategy 2, we permit the same actions: Take off the trade, hold the position, or add to it. The trading rule to take off the trade is the same as under Strategy 1: If mortgages have realigned to within 0.75 of a standard deviation of fair value, we sell (buy) the mortgages and buy (sell) the Treasuries. If mortgages are rich or cheap by the same amount, or the trade has begun to work (as measured by the standard error of the rich/cheap amount), the position size is held constant, and the position is rebalanced by moving into the then-current coupon and altering the hedge ratio. If the trade has moved against the investor, the investor adds to the trade.

For example, in late 1995, mortgages stayed cheap for a long period of time. We first would have put on the trade on August 15, 1995. Under Strategy 1, we would have added every two weeks until the trade began to work at the end of November. This is shown in Exhibit 5. Under Strategy 2, we add to the trade only once, on September 15, 1995. Thus our terminal position is only twice the initial position, rather than eight times the initial position.

There are several strict assumptions in this

EXHIBIT 5 ■ 30-Year Conventional Current-Coupon Model Performance in 1995 and 1996

						Rich				P&L with Carry						
			Cur		Std	(Cheap)		Mtg	Hist		Mtg/		Strategy 1		Strategy 2	
Ref	Date	Sprd	Cpn	10yr	Err	bp	s.e.	Cpn	H.R.	Mtg	H.R.	Tsy	Position*	P&L	Position*	P&L
1	12/30/1994	110	8.93	7.84	3.8	−4	−1.1	9.00	0.64	1.12	1.75	1.08	3	20,006.50	2	13,337.67
2	1/13/1995	103	8.72	7.69	3.8	−1	−0.3	8.50	0.68	0.56	0.83	0.68		0.00		0.00
3	1/31/1995	103	8.63	7.60	3.8	−0	−0.0	8.50	0.68	0.59	0.87	1.13		0.00		0.00
4	2/15/1995	107	8.52	7.45	3.8	−3	−0.8	8.50	0.63	1.34	2.14	1.69		0.00		0.00
5	2/28/1995	99	8.21	7.22	3.7	3	0.7	8.00	0.73	0.50	0.69	0.96		0.00		0.00
6	3/15/1995	102	8.11	7.09	3.7	−0	−0.1	8.00	0.73	−0.62	−0.86	−0.74		0.00		0.00
7	3/31/1995	108	8.28	7.20	3.8	−6	−1.5	8.50	0.56	0.81	1.46	1.41	1	449.63	1	449.63
8	4/13/1995	102	8.03	7.01	3.8	−2	−0.6	8.00	0.67	−0.09	−0.14	−0.26		0.00		0.00
9	4/28/1995	103	8.09	7.05	3.7	−4	−1.1	8.00	0.71	1.53	2.16	3.14	1	−9,834.57	1	−9,834.57
10	5/15/1995	108	7.70	6.63	3.5	−2	−0.5	7.50	0.63	1.19	1.89	2.45		0.00		0.00
11	5/31/1995	112	7.41	6.29	3.4	−1	−0.4	7.50	0.62	0.38	0.60	0.93		0.00		0.00
12	6/15/1995	117	7.34	6.17	3.4	−2	−0.7	7.50	0.52	−0.28	−0.54	−0.25		0.00		0.00
13	6/30/1995	123	7.44	6.21	3.4	−4	−1.2	7.50	0.50	0.69	1.38	0.48	1	8,971.12	1	8,971.12
14	7/14/1995	115	7.29	6.15	3.3	−1	−0.2	7.50	0.57	−1.06	−1.88	−2.10		0.00		0.00
15	7/31/1995	114	7.58	6.44	3.3	−3	−1.0	7.50	0.65	−0.56	−0.87	−0.98		0.00		0.00
16	8/15/1995	118	7.75	6.58	3.4	−8	−2.4	8.00	0.49	1.06	2.17	2.21	1	−420.34	1	−420.34
17	8/31/1995	116	7.44	6.28	3.5	−8	−2.2	7.50	0.61	0.66	1.08	1.29	2	−4,084.99	1	−2,042.49
18	9/15/1995	118	7.29	6.11	3.6	−10	−2.9	7.50	0.60	−0.16	−0.26	−0.38	3	3,594.74	2	2,396.49
19	9/29/1995	119	7.35	6.17	3.9	−6	−1.6	7.50	0.56	0.66	1.18	1.62	4	−17,918.35	2	−8,959.18
20	10/13/1995	123	7.18	5.95	4.1	−9	−2.3	7.00	0.59	−0.19	−0.32	−0.43	5	5,628.83	2	2,251.53
21	10/31/1995	123	7.24	6.01	4.4	−10	−2.3	7.00	0.55	0.19	0.34	0.33	6	758.33	2	252.78
22	11/15/1995	124	7.21	5.97	4.6	−10	−2.1	7.00	0.51	0.72	1.41	1.62	7	−15,168.24	2	−4,333.78
23	11/30/1995	128	7.03	5.76	4.8	−9	−1.9	7.00	0.47	0.31	0.66	0.03	8	50,268.88	2	12,567.22
24	12/15/1995	121	6.96	5.75	4.8	−1	−0.3	7.00	0.43	0.69	1.60	1.27		0.00		0.00
												Total 95		42,251.54		14,636.08
1	12/29/1995	121	6.80	5.59	4.8	1	0.3	7.00	0.47	−0.31	−0.67	−1.20		0.00		0.00
2	1/12/1996	115	6.90	5.75	4.8	4	0.8	7.00	0.51	0.56	1.11	0.61		0.00		0.00
3	1/31/1996	118	6.77	5.59	4.6	1	0.2	7.00	0.48							

* Basis position in millions.

methodology that bias the results against the model. First, we assume investors have the opportunity to rebalance only at the middle and the end of the month. Second, we assume investors are not allowed to rebalance the hedge ratios in the interim. These assumptions are far more rigid than most investors would use in their trading.

So, for example, as is shown in Exhibit 5, on April 28, 1995, mortgages looked cheap, and, under the backtest rules, an investor would have purchased the then-current coupon, the 8s. The position would not be rebalanced until May 15, 1995; with the 42-basis point rally in the ten-year, a loss results on this trade.

When we look at the results for the last three years in Exhibits 3, 4, and 5, the overall performance of the model appears to have been quite good. Under the prescribed trading rules of both strategies, the model has performed well every single year. In 1993, under Strategy 1, the model made $4,370. It made $38,050 in 1994 and $42,252 in 1995. The less-aggressive Strategy 2 also did well, making $3,697 in 1993, $23,537 in 1994, and $14,636 in 1995. The difference in the P&L stems from the much smaller positions taken under Strategy 2.

This confirms to us the value of our perfect current-coupon projection model as a tool for analyzing the mortgage/Treasury spread.

ENDNOTE

*We are often asked about the stability of the coefficients of the regression. In fact, the coefficients do change very slowly over time, as each day we add and drop an observation. Looked at over a longer period of time, there is some movement in the coefficients. Most of the movement is due to multicollinearity between the independent variables.

For example, in 1995, the coefficient on the ten-year yield declined from 1.001 to 0.931. Meanwhile the coefficient on the shape of the curve had become much higher in absolute value, moving from –0.0012 to –0.0024. This occurs because, as curve shape becomes more volatile, the curve shape coefficient picks up some of the effects on the level of rates.