

Merrill Lynch

October 14, 1992

Mr. Robert L. Citron
Orange County Treasurer
630 N. Broadway, Room 209
Santa Ana, CA 92702

Dear Bob:

As we discussed, an analysis of the Orange County portfolio was recently conducted. The purpose of this analysis was to help determine with more precision the volatility characteristics of the portfolio. While the extensive use of leverage in a positively shaped yield curve has resulted in enhanced returns, leverage increases overall portfolio volatility. In this analysis, we took a look at the effects of both reverse repos and inverse floaters on the price volatility of the portfolio.

It is important to note that the analyses are based on the portfolio and the yield curve environment at one particular point in time. The analysis is based on information available to us in mid-July, and, therefore, does not account for bond purchases or sales after that date or bonds purchased from other dealers. These estimates of duration and coupon sensitivities were derived through a detailed analysis of a few "typical" bond structures that was then generalized to apply to the portfolio as a whole.

First, we estimated the modified duration of the portfolio. Modified duration is simply the percentage increase (decrease) in price of a 100 b.p. decrease (increase) in interest rates. Although a fixed-coupon bond portfolio with an average maturity of 1.4 years such as yours would be expected to have a modified duration of about one year, the Orange County portfolio has a modified duration of approximately seven years. The duration indicates substantially more price volatility than would be expected from a portfolio with such a short average maturity. Two characteristics of the portfolio account for this result:

- (1) the coupons on more than half the bonds decrease when US LIBOR rises; and
- (2) reverse repurchase agreements increases the leverage of the portfolio.

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The inverse floaters and the bonds with coupons that adjust with the difference between Swiss Franc and US LIBOR can increase the price sensitivity of your portfolio relative to a fixed-rate portfolio of the same average maturity. The average coupon on the portfolio could decline by about 100 basis points if US LIBOR rises by 100 basis points. (A decline in Swiss Franc LIBOR could produce another 75 basis point reduction in the portfolio average coupon). If rates increase by 100 b.p., one would expect the price of a 1.4 year maturity fixed-rate bond to decline by about 1%. However, an inverse floater will decrease by a higher percentage since its coupon declines as market coupons rise. If US LIBOR continues to decline, the inverse floater price should increase more than a fixed-rate bond of the same maturity.

The use of reverse repos to enhance yield also increases the duration of the portfolio. Reverse repurchase agreements allow the County to leverage its funds: approximately \$6 billion of bonds were purchased with a \$3.5 billion investment. Thus, as rates move, the change in portfolio value for each dollar invested is greater than it would be without the use of the reverse repos. To put it simply, a \$1 million decrease in the value of the portfolio is a bigger percentage of \$3.5 billion than it is of \$6 billion.

For many years now, Orange County has enhanced the yield on its fund with reverse repurchase agreements. More recently the use of inverse floaters in a declining interest rate environment has contributed as well. Although this has enabled you to limit the average maturity of the portfolio well below the maximum average maturity of five years, it has also made maturity a less reliable indicator of the price sensitivity of the portfolios. We suggest that Orange County constantly review the volatility in the existing portfolio and review incorporating some measure of duration as an additional portfolio guideline. As always, Merrill Lynch is happy to assist in any effort to measure or manage the mix of floating, fixed, and internally leveraged bonds.

Sincerely,

Michael G. Stamenson
Director
Municipality Unit