



Issue 1

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Risk Modeling Bulletin

The Enhanced NPV Model

This is the first in a series of bulletins designed to provide up-to-date information on developments related to the Enhanced Net Portfolio Value Model (NPV Model). If you wish to receive electronic notification of future issuances of this publication, please visit the "Web Site Subscription" section under the "News and Events" tab on the Office of the Thrift Supervision web site located at www.ots.treas.gov and check the "Risk Modeling Bulletin" field.

Recent Changes to the Interest Rate Risk Exposure Report

The Office of Thrift Supervision (OTS) is pleased to announce two recent additions to the Interest Rate Risk (IRR) Exposure Report. As you may have noticed, the September 2007 report was expanded to include +/- 50 basis point scenarios. Additionally, the December 2007 report now includes a convexity measure for each instrument type listed on the report.

These new additions to the report reflect some of the tangible benefits associated with switching to an "enhanced" version of the Net Portfolio Value (NPV) Model in September 2006 (see [CEO Memo 248](#) for more information).

Our decision to add +/- 50 basis point scenarios to the report was prompted by requests from several thrift executives for more "realistic" stress scenarios. Historically, the self-valued items on the Schedule CMR have prevented OTS from providing more comprehensive scenario analysis because institutions are only required to provide instrument valuations for the +/- 100, 200, and +300 basis point scenarios. Using the Enhanced NPV Model, however, OTS can now *estimate* the degree to which the value of self-valued instruments will change under alternative scenarios, including non-parallel shifts of the yield curve.

The addition of the convexity measure should be viewed as a complement to the effective duration estimate that has been on the IRR Exposure Report since its introduction in 1991. As documented in Section 2.C of the [OTS Net Portfolio Value Model Handbook](#), effective duration represents the *average* change in value resulting from a 100 basis point increase and decrease in interest rates. Very often, however, the market value profile of bonds with embedded options will display *asymmetry*. In other words, the absolute change

in value resulting from an increase in rates is different than that resulting from a decrease in rates.

When the absolute value of the price change resulting from an increase in rates is less than that resulting from a decrease in rates, an instrument is said to exhibit “positive convexity.” When the opposite is true (which is typically the case for most mortgages loans and securities) the instrument is said to exhibit “negative convexity.” An instrument with a convexity of -2.0 has a greater degree of interest rate risk than an instrument with a convexity of -1.0.

The convexity measure displayed in the IRR Exposure Report is based on a +/- 100 basis point change in rates. Specifically, the formula is as follows:

$$\text{Convexity} = \frac{\left[((PV_{+100} + PV_{-100}) - (2 * PV_{BC})) / ((PV_{BC}) * (.01)^2) \right]}{100}$$

Where PV_{+100} = Present Value from a 100 bps increase in rates

PV_{-100} = Present Value from a 100 bps decrease in rates

PV_{BC} = Present Value *Base Case*

If you have any questions regarding the IRR Exposure Report improvements or the Enhanced NPV Model in general, please contact the OTS Risk Modeling & Analysis Division in Washington, D.C., or the Regional Capital Markets Specialist noted on the bottom of your bank’s *Interest Rate Risk Report – Executive Summary*.