

Stress Testing 2004-2005

Retail Originations

by Joseph L. Breeden

A few years back, lots of people used the words “stress testing,” but not many people knew how to stress test portfolios. Then came Basel II and a ready response to “Why stress test?” But more recently, we’ve come to see that there’s business value in stress testing, and this article offers both the rationale and the basics. Although stress testing is often discussed related to model stability or operational risks, the emphasis here is on macroeconomic stresses.

Retail lenders frequently hear the question, “What good is stress testing?” The current favorite answer is “To satisfy Basel II requirements.” But there are more bottom-line factors to consider than just regulatory compliance. While it’s true that Basel II requires stress testing as a check on capital adequacy, the *business value* of stress testing can be significant. Stress testing existing portfolio and pricing new loans against a range of possible future environments is a critical piece of strategic management information. It

answers the question, “Is my portfolio robust to any change?”

The response might still be, “Who cares? I can’t do anything about the environment!” Here, the rejoinder is that it’s necessary to take *fragility* into account.

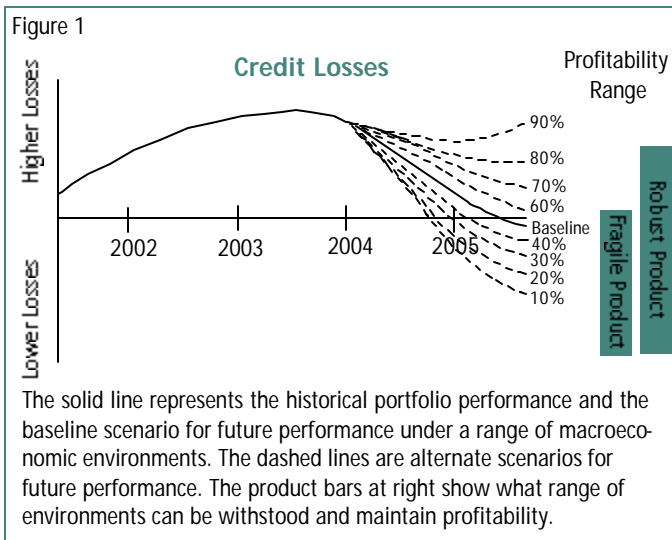
Forecasting is used today to set product pricing, features, and policies. The baseline forecast is created using a baseline economic scenario representing the midpoint of possible futures—the 50/50 scenario.

We assume that the product is properly priced relative to the baseline scenario. But what if the

future does not unfold as planned? We assume that better future environments are to our advantage, at least relative to losses, but what about the other 50%? How fragile is our product to macroeconomic futures that do not match our expectations? In some situations, even a small downturn in the economy can create troublesome situations for management.

Can we price our products to be profitable under all possible future environments and still be competitive in the market? This is the core question in product design and Basel II.

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Retail Stress Testing Basics

Stress testing for retail lending, although conceptually similar to commercial lending, is unique in its details. Stress testing is usually viewed as one of the following:

1. Stressing the structure (parameters) of forecast models.
2. Testing the impact of operational events.
3. Testing the impact of extreme macroeconomic environments.

Although the first two are important, the third type of stress testing, considering macroeconomic changes, gives us an opportunity to change product terms, pricing, and segment mix to make profitability more robust to the environment.

Stress testing starts with scenario-based forecasting. The point of introducing stresses is to see how future performance will be impacted. Thus, a forecasting model is required. To introduce the stresses, the forecasting model needs to be able to take these as inputs. Therefore, explicit scenario-based forecasting is

required. Creating a scenario-based forecasting model is where retail lending diverges from commercial lending.

Previous articles in *The RMA Journal* have focused on the details of creating such models. To summarize, all models either intuitively or explicitly incorporate three primary factors:

1. Quality of the loans booked.
 2. Maturation process for the risk/return characteristics.
 3. External (macroeconomic) impacts on loan performance.
- These factors can be incorporated into models of default risk, revenue generation, and expenses. Apparently, such models can be created with equal fidelity at either the account or vintage/segment level. The trade-off is greater processing speed for vintage models but greater dynamic drill-down capability for account-level models. For stress testing involving multiple scenarios, processing speed probably is more valuable.

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Controlling Product Fragility

Stress testing tends to be viewed as a regulatory checklist item because it is not connected to anything operational. However, if we know that a 5% deterioration in the macroeconomic environment can cause our loans to become unprofitable, immediate action should be taken. Portfolios fail during recessions because they were too fragile to macroeconomic changes.

So if we run our stress test and find, as in Figure 1, that our portfolio is fragile, how do we take corrective actions? Line-of-credit products tend to be more flexible than installment products. Credit lines can be adjusted, balance transfer programs altered, and interest rates changed. For both loans and lines, we often can change penalty fees and grace periods. In all cases, we must focus on the product terms and pricing at origination—where we have the most flexibility to make changes.

Although the above paragraph offered the usual list of control knobs for account originations and management, we also want to include the changing cost of funds, recovery rates, attrition, and prepayment. The point is that we need to look *beyond* setting product control knobs just to meet margin goals under a baseline scenario. As we consider making changes, we need to rerun the

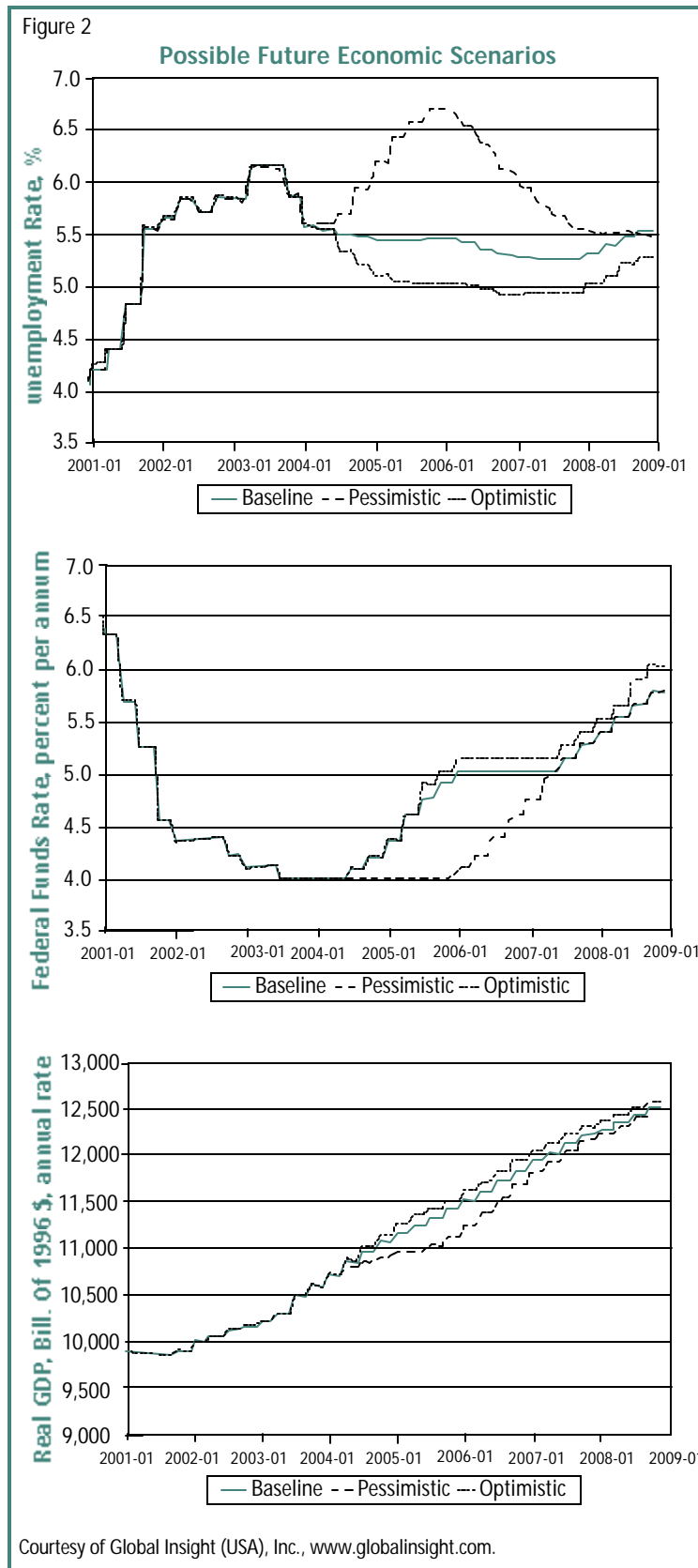
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stress test and ask how fragile a proposed pricing model will be to possible changes in the macroeconomic environment.

Looking Backward

Peering back into the past—say, January 2000—the baseline economic scenario was not set for recession. Some scenarios assumed flat growth and others were wildly optimistic about the death of the business cycle. A few lonely voices warned of a possible recession, but not many people noticed until the stock market declined.

Even after the recession set in, most retail loan portfolios continued to aggressively book loans. Credit scores continued to look reasonable during this period, but the 2000 vintage proved to be one of the highest-risk vintages in many years. One reason cited is adverse selection by consumers: the best consumers were startled by the stock market difficulties and started protecting their balance



sheets. Those willing to take on new debt may have known they were in trouble before it appeared in their credit scores.

The problem is that retail loans take time to mature. This is the second of three factors in retail loan modeling mentioned earlier. For most loan products, peak default risk occurs about two years after origination—in this case, around 2002. That put the worst vintage in years maturing during the worst environment in years.

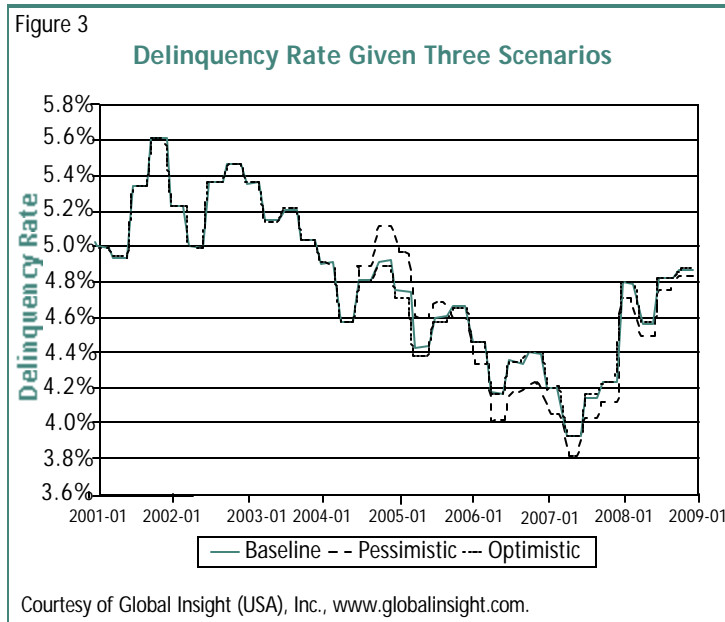
An unexpectedly bad vintage maturing in an unexpectedly bad environment caused trouble for many portfolios. Although many reported record profits because of the low cost of funds, others were not so fortunate. Again, the question is one of the product fragility. Some portfolio managers got lucky. Others planned ahead or reacted quickly.

Looking Forward

The relevant question now is this: What about 2004? The environment looks good. Everyone's baseline scenario is for continued steady improvement in the economy and therefore in default rates. But the loans booked today will be maturing in 2006 and 2007. Are we certain that the environment two

to three years from now will improve as much as we think? Pricing calibrated to an improving economy is equivalent to betting placing a bet on the economy.

Rather than placing a bet on the advice of your favorite economist, why not try a range of possibilities. See how robust those new bookings and the portfolio overall will be to possible deterioration in the economy. Most economic data vendors offer a range of scenarios for the future macroeconomic environment. Three primary U.S. macroeconomic scenarios are provided in Figure 2 for purposes of our discussion here.



The *baseline* scenario is the slow but steady growth that everyone is discussing. Interest rates start to rise by the end of this year and by 2007 industry delinquency levels reverse course.

The *optimistic* scenario differs in that inflation stays low so the Federal Reserve keeps interest rates low through 2005. This results in more economic growth before the brakes are applied.

The third scenario, labeled *pessimistic*, calls for a “growth recession” in 2005. This is not a true recession in the sense of negative GDP growth, but a burst of unemployment would have a negative impact on consumers.

So how will your portfolio perform under the pessimistic scenario? How much are you willing to pay in adjustments to your product pricing to buy insurance against such a downturn? If you have a scenario-based forecasting system in place, then you have the tools necessary to answer this question. If your portfolio struggles given just this moderately pessimistic scenario,

changes may be in order.

Viewing stress testing as just a regulatory requirement misses important business value. Stress testing is at the heart of managing a portfolio through the uncontrolled ups and downs of the future economic environment. □

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FOR MOST LOAN PRODUCTS, PEAK DEFAULT RISK OCCURS ABOUT TWO YEARS AFTER ORIGINATION—IN THIS CASE, AROUND 2002. THAT PUT THE WORST VINTAGE IN YEARS MATURING DURING THE WORST ENVIRONMENT IN YEARS.