

# Capital & Market Risk Insights

Published by the Federal Reserve Bank of Chicago

2005/Number 1

## HEDGING AGAINST INFLATION WITH ECONOMIC DERIVATIVES

### Whither Inflation?

Inflation – has it become, like corded telephones, Members Only jackets, or Roseanne Barr, a nuisance that, at one time, was a regrettable part of our lives but has now seemingly been eradicated forever? If one has been studying the fixed income markets and their associated yield curves lately that sort of thinking has indeed emerged. Much like a trained lion tamer is able to neutralize his beast, the markets have been signaling to anyone paying attention that inflationary forces may be dead, thanks in no small measure to the efforts of the Federal Reserve Board and über tamer Chairman Greenspan. But there are rumblings afoot, possibly heralding the re-emergence of this pesky economic scenario, and so details of its death may be greatly exaggerated. How will financial markets cope with the impending tyrant? Here's a TIP...read on.

Over the past year or so, US debt markets have thumbed their noses at rising commodity and energy prices, events that, in times past, were potent enough to drag the inflationary tiger out of its lair. Investor confidence in the Fed's ability to contain inflation, despite such prevailing conditions, has been manifested in a relatively flat yield curve and issuers, particularly high yield players more accustomed to issuing much north of prevailing levels, have benefited greatly from

it. Note how the spread between short and intermediate term rates has narrowed; after the Fed rate hike in March, the 3 month rate was 2.75% compared to 1% last year, and the 5 year Treasury note was 3.7% compared 3.12%. That gap differential, at less than 100 basis points, was significantly tight compared to a 200 basis point spread the prior year.<sup>1</sup>

The curve has been flat in part because investors have perceived the possibility of a decoupling of the inflation rate and its once traditional portends. Consider oil, a high profile, hugely consumptive resource which has lately been trading near its all time highs of \$58 per barrel. Still, inflation remains benign, with investors at the long end of the curve continuing to demand much less of a risk premium than in past periods. One reason, notes Avery Shenfeld, senior economist at CIBC World Markets, lies in an understanding of the relationship between higher energy costs and inflation. Inflation was high in the late 70's and early 80's because, as oil prices escalated so did wages, rising alongside at an 8% rate.<sup>2</sup> Today that same relative level and magnitude of wage increase is lacking, though signs are emerging that wages are beginning to trend upward.

So, evidence of curve steepening and the potential re-emergence of inflation are

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gaining presence in the marketplace. The above-noted yield curve gap has widened somewhat since the March rate announcement. The Chairman has remarked that "pressures on inflation have picked up in recent months, and pricing power is more evident".<sup>3</sup> The markets' biggest fear, of course, is that

inflation will suddenly climb higher than anticipated and, correspondingly, the Fed's actions will have proven too little too late. Should such an ominous seed become instilled in a market, it almost always spells trouble. Markets (and traders for that matter) have long been compared to a kindergarten class, notoriously prone to overreaction, and this time would likely prove no exception. Volatility would inevitably ensue (in and of itself not a bad thing for exchange locals) and rates would rise, forcing high grade issuers out of the market and deteriorating overall market quality and liquidity.

### Practical Applications for Dealing with Inflation

Risk managers often divide their universe of risks into two categories: those that can be hedged (unsystematic risks), and those that cannot (systematic risks). Economic release numbers such as Non-Farm Payroll, CPI, GDP, Retail Sales, or Initial Jobless Claims have, traditionally, been dropped into the systematic pile. While no hedge can directly protect a portfolio against, say, an unfavorable Non-Farm Payroll number (if, indeed, an unfavorable number will negatively affect one's portfolio), relatively new classes of derivative products reconsider the "unhedgeable" risk of economic release numbers. Risk managers can now insure against losses caused by the announcement of an unfavorable (or favorable) macroeconomic number or indicator. In principle, then, sensitivities to GDP, CPI, Retail Sales and Trade Balances become "hedgeable" risks using tools that allow the risk manager to decide how much "release risk" to bear.

Debt market participants have begun preparing for an accelerated inflationary scenario through a growing interest in inflation protection securities and associated derivatives. Treasury inflation protected securities or TIPS, issued since 1997, provide government guaranteed protection against inflation, adjusting the value of a bond to the inflation rate as measured by the CPI. Actually, US TIPS are somewhat behind the curve relative

to the UK, which began issuing inflation linked bonds in 1982. France began issuing similar bonds in 1999, and other countries like Italy and Greece have since joined in.<sup>4</sup> TIPS have fixed coupon payments established at issuance. The Treasury adjusts the principal balance for inflation based on the CPI, and the fixed interest rate is paid semiannually on the inflation adjusted balance. At maturity, even if deflation has decreased the value of the security, investors receive no less than the original principal. US corporates will likely begin to offer similar type structures as inflation concerns build.

In addition to inflation linked bonds, markets exist for inflation swaps, swaptions, and inflation options, more so in Europe but likewise gaining prominence in the US. Yildiray Yildirim, an assistant professor of finance at Syracuse University, was instrumental in the development of the pricing model for TIPS in 1997, and today is able to use that model to price other derivative structures.<sup>5</sup> Inflation swaps allow firms that issue or invest in the cash bond market to hedge their exposure. Counterparties exchange inflation indexed payments (based on, for instance, a compound annual inflation rate) for nominal cash payments. The swap can synthetically create a protected bond, insofar as an investor that is long a fixed coupon bond and receives inflation on the swap has created an inflation linked bond.<sup>6</sup> These products are beginning to pave the way for a market that will allow inflation risk to be traded much the same way as interest rate, currency, and credit risk is traded today.<sup>7</sup>

Goldman Sachs (<http://www.gs.com/economic-derivatives/>) and Deutsche Bank have partnered to introduce a new generation of economic derivative (ED) contracts whose payout depends on the level of an economic release number such as GDP or Retail Sales. The first, options on the Non-Farm Payroll number, was rolled out in October of 2002<sup>8</sup>. Encouraged by the success of that product, Goldman and Deutsche have subsequently rolled out EDs whose payouts are based on the following release numbers: International

Trade Balance; U.S. GDP; ISM Purchasing Managers Index<sup>9</sup>; U.S. Initial Jobless Claims; Retail Sales (less autos); and Eurozone HICP (Harmonized Index of Consumer Prices). The ED product concept is not entirely new: the Coffee, Sugar and Cocoa Exchange introduced a CPI futures contract in the early 1980's, but it was ultimately withdrawn when it failed to draw sufficient market participation<sup>10</sup>. The Goldman/Deutsche product suite has also been enriched during the past three years by the introduction of numerous contracts to supplement initial vanilla put and call options.

The underlying variable from which a contract derives its value is the economic release number. While buyers and sellers of the contracts certainly do not know in advance what the release number will be, they are cognizant of the relationship between the value of the release number and the contract's payout. Knowledge of that relationship gives the contract its strength as a hedge. Each contract offers unique payout characteristics designed to address particular risk management needs; contracts available include forwards, standard calls and puts, and digital ("all or nothing") calls and puts. For convenience, the Goldman/Deutsche electronic platform also supports markets in various risk management strategies<sup>11</sup> using spreads, ranges, strangles, straddles, and risk reversals. EDs address the needs of a variety of market participants, such as retailers insuring their cash flow against the bad news carried in a poor Retail Sales number, manufacturers hedging against a disappointing Trade Balance number, or equity and bond portfolio managers looking to hedge against potentially inflationary numbers.

Designers of this market combined two ancient market mechanisms to create a platform for EDs. Buyers and sellers participate anonymously online in a Dutch-style auction for a one-hour period on the day prior to the release of the economic numbers. All successful orders are filled at the same final price, which is determined by the auction process via a pari-mutuel algorithm<sup>12</sup>. At the end of

the process, risk has been mutualized: when the underlying economic number is announced, the pool of cash paid in by the market participants is just sufficient to pay the winners.

The structure of the Goldman/Deutsche market has much to do with the success of the ED product. Given that all successful bids for a particular contract are filled at the same price, there is no need to individually match buyers and sellers. For counterparty purposes, either Goldman Sachs or Deutsche Bank takes the other side of each transaction. ICAP acts as the inter-dealer broker for the auction (<http://www.icapecoederivatives.com/>). In addition, the sufficiency of the mutual cash pool acts to relieve the credit anxieties of the bidders. That said, at the highest level, the risk manager should examine his or her sensitivity assumptions as to the quantitative level of the firm's exposure to the next economic release to determine optimal hedging strategies. Despite the efficiency of the product trading platform, sufficient and robust risk management programs must exist to support these activities, and institutions utilizing EDs to mitigate risk must establish the controls that are standard in any capital markets environment.

The CME introduced a CPI futures contract in 2004, the first product launched by the Exchange that is linked to a major economic indicator.<sup>13</sup> (This contract is similar to the failed contract from another

exchange, noted earlier.) The contract represents the inflation rate on \$1 million notional for a 3 month period (the same time frame used to adjust principal payments on TIPS) and (conventionally similar to the Eurodollar futures contract) is priced at 100 minus the contracted inflation rate.<sup>14</sup> One can potentially use the contract to hedge the nominal interest rate risk in an inflation linked bond position.<sup>15</sup> One who is long TIPS can go long CPI futures to hedge against losses. In addition, in the same vein as the earlier swap example, an investor who is long non-TIPS bonds can short the CPI futures contract, creating synthetic inflation protection. Remember the price of the contract increases as inflation decreases (the contract can trade above 100 if changes in the inflation rate become negative)<sup>16</sup> so, as inflation decreases, a long position in the contract would serve to hedge against a long TIPS position that would not benefit from such an environment. Likewise, as inflation increases, declines in value on conventional corporates or Treasuries are offset by a short position in the CPI contract.

– *Joseph Cilia and Art Porton*

#### Footnotes

- 1 O'Leary, Christopher, "The Tamed Beast", *Investment Dealers' Digest*, April 4, 2005, p. 27
- 2 Ibid.
- 3 Ibid.

4 "Search for Safety Feeds Inflation Derivatives Market", *The Banker*, February 3, 2004

5 Wood, Duncan, "Are Inflation Protected Bonds Becoming a More Flexible and Broader Market?", *Financial Engineering News*, January/February 2005, p. 8

6 Ibid.

7 Ibid.

8 Thind, S., "Economic Derivatives Debut", *Risk*, November, 2002.

9 The ISM (Institute for Supply Management) was formerly known as the NAPM (National Association of Purchasing Managers).

10 Mbemap, M., "Letter from the Editor", *Journal of Derivatives Accounting*, Vol 1, No. 2 (2004) pg. v-viii.

11 A "strategy" in this context is a transaction that combines two or more of the fundamental contracts. These strategies are defined in standard texts on option markets.

12 *Pari-mutuel* is a term derived from two French words meaning "wagering among ourselves". The relative price of one contract versus any other contract accurately reflects the relative degree of bidder interest in each.

13 Wood, p.8

14 Srinivasan, Sayee and Richard Co, "Hedging Inflation Risk with CPI Futures", *Bank Asset Liability Management*, February, 2004

15 *Op cit.*, p.8

16 *Op cit.*

## KNOW YOUR DEPOSITOR: IDEAS FOR IMPROVING KNOWLEDGE OF CORE DEPOSIT BEHAVIOR

### Overview

Knowing what drives deposit volume and depositor loyalty will help a banker build and maintain a stable and cost effective core deposit base. Core deposits remain a primary funding tool for many banks<sup>1</sup>. Their characteristics are often one of the most significant input assumptions in an interest rate risk (IRR) or liquidity model, yet, relatively few banks devote sufficient time and effort to understanding the behavior of their depositors. The size and stability of a bank's core deposit base has considerable influence on a bank's interest rate risk profile for earnings at risk and economic value, as well as liquidity risk. While much guidance is available on core deposit modeling, few institutions implement its primary tenet; namely, to base core deposit assumptions on customized bank information. This article will explore some of the reasons why a bank could benefit from more information about its depositor base and will discuss some simple yet important methods for improving core deposit analysis.

### Interest Rates versus Other Influences

A stable deposit base is important in any economic environment, and current conditions are no exception. With heavy loan competition and a flattening yield curve, stable low cost funding could be critical to maintaining margin. In the past couple of years, many banks have felt relatively flush with liquidity due to deposit increases and/or stable to low loan demand. Even if deposits were difficult to raise, wholesale sources including brokered deposits, have been plentiful and inexpensive, thus core deposit gathering was not a primary concern. More recently,

however, many banks are exhibiting renewed focus on liquidity and gaining market share in deposits.<sup>2</sup> This could be the result of rising short term rates, increases in loan demand or other market factors. Banks of all sizes are once again focused on gathering deposits, with competition heating up in many regions of the country. They are using branching to attract customers with the hope of gaining additional deposits. Deposit specials are common with CD specials on 6 to 24 month certificates paying increasingly higher rates. Money market accounts are now offering rates not seen for several years. Bankers today must assess how much of the increased deposit volume amassed over the last three years is temporary, and what it will cost to retain these funds.

Bankers should know which deposits they have to pay to keep and how much they need to pay. If only a certain percentage of depositors are highly rate sensitive, banks could save money by identifying that population and segregating their deposits into new products or simply decide to hold firm on rates and accept the impact of deposit runoff. In some cases it may be more cost effective to lose a small percentage of deposits, and make up the difference in wholesale funding, than to pay unnecessarily high rates on the entire class of deposits. With respect to depositors that are less rate sensitive, bank management should understand what influences them and what incentives are needed for those deposits to remain. Are higher rates always the answer to keeping or growing deposits or is there some better way to ensure depositor loyalty? A further question is how many customers, previously lured in by rate specials, will remain once offer rates return to average?

While the rate paid on some deposits is tied to a specific market index, most interest payments on deposits are administered rates determined by the bank rather than by market forces. In theory, banks have flexibility in determining the rate paid on various deposits as well as in deciding when and by how much those rates will change. Market rates and a variety of other factors including competition, balance sheet composition and liquidity considerations will influence a bank's decision with respect to administered rates paid on deposits. Conventional wisdom holds that in pricing deposits, banks are able to lag market rates during increasing rate environments and follow market rates closely in declining rate environments. Yet, as mentioned above, there are exceptions and conditions to this generally accepted rule; for instance, the timing and degree of market rate changes plays a role in determining how much or for how long a bank can lag market rate increases. Additionally, competitive pressures play a significant role in many banks' pricing decisions. Add to this the fact that customers (as well as banks) are motivated by factors other than interest rates and you have the makings of a conundrum.

Thus, in questioning whether the benefits of increased deposit analysis will pay off, the answer is resoundingly yes. While gaining an understanding of core deposit behavior can be a challenge, core deposits play such a critical role in most IRR models and asset funding plans that bankers would be remiss in not making better efforts toward understanding their behavior. In this regard, some knowledge is almost certainly better than none, and some degree of customization based on a

particular customer base is better than defaulting to standardized models.<sup>3</sup>

### The Right Equipment for the Job

What investments do bankers need to make to gain a better understanding of their deposits?

To begin with, a well constructed data system is critical to gathering good information. Management should ensure that customer identification numbers and account tracking capabilities are properly utilized. Each customer should be identifiable by a single number that will tie in all accounts, loan and deposit, open and closed. Likewise, the treasury department should be in regular communication with those responsible for deposit generation and retention, as individuals in the bank dealing with customers on a regular basis can add tremendous insight to customer behavior.

Once an institution's data systems are properly set up and effective communication is established among business units, a bank is prepared to dig deeper into its deposit structure. There has been much talk in recent years about disintermediation and the effect of competing products on bank deposits. The equity markets are often cited as an alternative to bank deposits. Indeed, many commentators have noted an inverse correlation between deposit growth and equity movements. A recent article reported the results of a study indicating that equity movements explain almost 50% of deposit movements.<sup>4</sup> These results bring to mind another much talked about quandary known as "parked funds"; that is, how much of recent deposit influx is a result of a temporary retreat from the equity markets or other investment alternatives? Interestingly, while bankers have feared an exodus of these parked funds ever since the Dow Jones Index began trending up in 2003, few have experienced a dramatic reduction in deposits, prompting questions as to why.

In order to make informed decisions about how to price deposits, and how to retain them, it is important for bankers

to determine what motivates different groups of depositors. Is it performance of the Dow, interest rates, safety, convenience, service, or a combination of all of these factors? With these questions in mind, the next section presents some ideas on how to improve the understanding of a given depositor base.

### Mining the Field of Depositors

Those hoping to understand the relationship between market rates and administered rates often start by reviewing historical information on bank and market rates. While a good beginning, simply looking back over time and assigning a beta factor based upon the average rate changes on administered rates versus market rates could lead to some incorrect assumptions about depositor behavior in relation to market rates. For a more accurate picture of depositor behavior, a bank's analysis should include:

- **Tracking changes in volume in addition to rate.** In addition to changes in bank offered rates versus market rates, one needs to track changes in volume, understanding how deposit volume fluctuates when offered rates are changed in conjunction with market rates or, conversely, offered rates are not changed for a given change in market rates. Simply because the bank did not change certain deposit rates in conjunction with a move in market rates, does not mean that customers are insensitive to rate changes. Bank management should be able to track changes in volume within deposit categories in order to gauge depositor reaction.
- **Maintaining accurate customer records.** In order to understand what volume changes signify, deposit systems should enable management to identify new accounts, transfers within the bank and customers who left the bank. Most banks experience growth year over year. If deposit duration is based purely upon an overall stable or growing level of deposits, this could lead to erroneous assumptions about deposit life. Knowing the level and rate of deposit turnover is key to accurate assumptions about average life or duration.
- **Keeping a record of changes in offered rates and documenting the reasons for these changes.** Administered rates on deposits are not always driven by market rates. Just like the customer may be responding to different needs, so is the bank. Perhaps the decision not to raise rates was determined by the lack of need for additional deposits. Or rates were moved more (or less) than market rates due to a need for a specific type of deposit (i.e. a balance sheet adjustment).
- **Stratifying deposit categories.** Depositor behavior may be different among deposit categories and even within a single category. While in general large balance deposits will be more rate sensitive than small balance deposits, other factors might be influencing deposit levels. Too many banks use one-size-fits-all models; in actuality, a bank may require different strategies for different markets of customers within the same account type. Suggestions for additional broad stratification include:
  - Account usage
  - Minimum balance requirements – zero minimum balance, low minimum balance, high minimum balance
  - Balance ranges beyond the over under \$100M
- **Identifying common characteristics.** Once accounts are broken down into more refined categories, one should identify common characteristics within those subsets such as:
  - How many have checking accounts?
  - How many have loans or other banking products?
  - Are there other tie-ins such as direct deposit, auto debit, etc? and
  - Where did the money come from; was it new money, or account transfer?
 Those customers who have multiple products are probably more likely to exhibit the stable characteristics traditionally associated with core deposits and might be less rate sensitive. Those customers with single accounts in high rate products are likely the most rate sensitive.

The issues discussed in this article should serve as a launching pad for discussions with bankers about how to improve management's knowledge of their deposit customer base. Greater analysis of depositor behavior will lead to better model results and better decisions about market and liquidity risk management.

– **Kristin Dolan**

### Footnotes

<sup>1</sup> Core deposits in this context refer to regulatory definitions in the Condition of Income (CALL) reports and include commercial and personal demand deposits, money market demand accounts, negotiable order of withdrawal accounts, regular savings accounts and certificates of deposit under \$100M.

<sup>2</sup> Chicago and Washington DC are both seeing heavy branching activity as reported in The Economist "Survey on

International Banking" May x, 2005 and in The Washington Post "Area Gets an All-Day Bank Fight," June 2, 2005.

<sup>3</sup> Many bank models will base core deposit slotting assumptions on one of several common approaches including the bar bell approach, lumping all deposits into one or two categories, or using assumptions developed by regulators (OTS or FDICIA 305)

<sup>4</sup> Banc Investment Group (BIG), March 1, 2005

## VALIDATING THE INTERNAL RATINGS BASED APPROACH

### Introduction

With respect to the Basel II Framework, a significant challenge for banks and supervisors is the need to validate the systems used to generate input parameters for the internal ratings-based (IRB) approach to credit risk. To that end, the Basel Committee on Bank Supervision established the Accord Implementation Group (AIG), a forum for national supervisors to foster communication and promote consistency in the global supervisory implementation of the Basel II Framework. As validation under the Framework is a fundamental aspect of the IRB approach, the AIG established a Validation Subgroup to examine associated issues. This article will present activities that banks can undertake in order to validate their IRB systems, and describe principles that the Validation Subgroup believes will be useful for banks and supervisors to observe in validating IRB systems.

### The Concept of Validation

On a basic level, all credit risk measurement model or systems accept inputs and produce output used in the management of credit risk. Validation consists of activ-

ities conducted to instill sufficient confidence that the output derived from a model or system is what was originally intended when the model or system was developed. This definition can be made more specific in the context of an IRB system, where the outputs are wholesale ratings and retail segmentation for obligor default and loss severity, and the corresponding risk parameters of probability of default (PD) and loss given default (LGD), as well as the exposure at default (EAD) risk parameter.

Despite its importance as a requirement for the IRB approach, the Basel Framework does not explicitly define validation. In the context of rating systems, the term validation encompasses a range of processes and activities that contribute to an assessment of whether wholesale ratings and retail segmentation adequately differentiate risk, and whether estimates of risk components (such as PD, LGD, or EAD) appropriately characterize the relevant aspects of risk.

### Validation Activities

Validation, then, is an ongoing process applied to internally and externally devel-

oped risk rating and segmentation systems, models, and quantification processes. When validating a process, the following tools may be used to provide assurances of accuracy:

- Developmental evidence — the evaluation of the conceptual soundness and internal logic of the approach;
- Ongoing monitoring — process verification and comparison to other sources of data or estimates (benchmarking);
- Outcomes analysis — comparisons of actual outcomes to estimates by back-testing and other methods.

### Developmental Evidence

Developmental evidence evaluates the effectiveness of an IRB system, if implemented as originally designed. The developmental evidence for risk rating, segmentation, and quantification should include documentation and empirical evidence supporting the methods used, and the variables selected, in the design and quantification of the IRB system.

Steps taken in establishing developmental evidence depend on the particulars of how exposures are assigned to ratings or segments, and how risk parameters are quantified. For example, developmental evidence in support of a statistical rating model should include information on the logic that supports the model, and an analysis of the statistical model building techniques. In contrast, developmental evidence in support of a constrained judgment rating system, where subjective judgment is employed to rate credits using established guidance ratios, might include a description of the logic and evidence relating the ratios to past default and loss outcomes. Regardless of the type of rating system used, developmental evidence should include empirical evidence. For instance, statistical models chosen to maximize fit to outcomes in the development sample should be supported by evidence that they work well across reference data sets. Thus, the use of a “hold-out” sample is a good practice to ensure that the model is not merely a statistical quirk of the particular data set used to build the model.

### Ongoing Monitoring: Process Verification and Benchmarking

Further support for the soundness of an IRB system is represented in ongoing analyses confirming that processes were implemented appropriately and performing as intended. Such analyses involve process verification and benchmarking. Process verification activities address the extent to which rating, segmentation and quantification processes are used as designed, and include substantiation of data input accuracy. Verification activities depend upon the risk rating and segmentation systems in place, the quantification approaches employed, and the specific guidelines surrounding them.

For models-based rating and segmentation, verification requires evaluation of automated assignment processes, such as verification of the correct computer coding for the model, and data inputs. For expert judgment and constrained judgment risk rating systems, verification

includes an assessment of the expert’s evaluation of the rating policy and criteria given the information available, and documentation of how the decisions were made.

Benchmarking uses alternative tools to draw inferences about the correctness of ratings, segments, or parameter estimates before outcomes are actually known, often involving comparisons of alternative methodologies or data. For example, a bank could establish a process whereby a representative sample of its internal ratings or portfolio segmentation is compared to alternate results for the same exposures. Examples of other benchmarking sources include independent internal loan reviews, external rating agencies, alternative internal retail credit risk models (“challenger models”), or retail credit bureau models. Risk parameters can be benchmarked by comparing PD, LGD, and EAD parameters to estimates derived from different internal and external reference data sources using the same estimation methods, or parameters can be compared to estimates derived from the same reference data sources but utilizing different estimation methods.

Benchmarking can be a valuable diagnostic tool when checking for potential weaknesses in a bank’s IRB system; however, differences observed in a benchmarking exercise do not necessarily indicate that the internal rating, segmentation, or risk parameter estimate is in error. The benchmark represents an alternative prediction, and the difference may be due to incongruent data or methods. It is incumbent upon the analyst to determine whether, in fact, the difference is appropriate or not.

### Outcomes Analysis

The third component of the validation process is outcomes analysis, or the comparison of risk parameter estimates with actual outcomes. Backtesting represents the statistical comparison of estimates to realized future outcomes. Banks can backtest their risk parameter estimates by regularly comparing actual portfolio or

rating grade/segment-level default rates, loss severities, and exposure-at-default experience with the PD, LGD, and EAD estimates upon which capital calculations are based. Backtesting addresses the combined effectiveness of the assignment of exposures to ratings or retail segments, and the calibration of the risk parameters (PD, LGD, and EAD) attached to those ratings or segments. Backtesting typically does not identify specific reasons for discrepancies between expectations and outcomes; rather it will indicate only that further investigation is necessary.

### Supervisory Validation Principles<sup>1</sup>

The principles summarized below underlie the concept of validation and lay the groundwork for the future work of the Validation Subgroup:

**Principle 1: Validation is fundamentally about assessing the predictive ability of a bank’s risk estimates and the use of ratings in credit processes.** A bank’s IRB estimates are intended to be predictive; while grounded in historical experience, they should also be forward looking. Rating systems should effectively and consistently discriminate (i.e. credits with worse ratings should have a higher risk of loss) and calibrate (i.e. they should accurately quantify the risk of loss) risk. If the processes used in assigning risk estimates are not accurate, the risk estimates may not be sufficiently predictive and could potentially understate or overstate required regulatory capital. Consequently, validation should focus on assessing the forward looking accuracy of a bank’s risk estimates, the processes for assigning those estimates, and the oversight and control procedures in place to ensure that these estimates are preserved. As a general rule the validation process should prompt a reassessment of the IRB parameters when actual outcomes diverge materially from the expected results.

**Principle 2: The bank has primary responsibility for validation.** Supervisors do not have the primary responsibility for validating bank rating systems. The bank must validate its own rating sys-

tems to demonstrate how it arrived at its risk estimates. In turn, the bank should confirm that its processes for assigning risk estimates will continue to perform as expected. Supervisors review the bank's validation processes and outcomes, and may rely upon additional processes of their own design, and/or those of third parties, in order to achieve their required level of supervisory comfort or assurance.

**Principle 3: Validation is an iterative process.** Validation is an ongoing, iterative process in which banks and supervisors periodically refine attendant tools in response to changing market and operating conditions. To reinforce the concept of validation, banks and supervisors should engage in mutually beneficial dialogue on the strengths and weaknesses of particular rating systems.

**Principle 4: There is no single appropriate validation method.** While some validation tools (e.g. backtesting, benchmarking, replication, etc.) may prove especially useful in certain situations, no one universal tool exists that can be used for all portfolios in all banks. Backtesting, for example, may prove difficult for portfolios with a low level of

historical defaults. Validation techniques may converge over time but, in practice, differences will likely occur with validation techniques across portfolios (e.g. retail vs. wholesale credit) and across markets. In addition, the underlying philosophy of the rating system must be well understood, and properly taken into account, when determining which validation tools and techniques should be applied in assessing the accuracy and stability of a rating system, as well as the appropriateness of applied stress tests.

**Principle 5: Validation should encompass both quantitative and qualitative elements.** While one may view validation as a purely technical/mathematical exercise in which outcomes are compared to estimates using statistical techniques (indeed technical tools often play a critical role in such assessments), it is inadequate to base conclusions solely on the comparison of predictions and outcomes. In assessing the overall performance of a rating system, it is important to scrutinize the components of the rating system (data, models, etc.) as well as the structures and processes around the rating system, including controls and independence, documentation, internal use, and

other relevant qualitative factors.

**Principle 6: Validation processes and outcomes should be subject to independent review.** It is imperative that a bank's validation processes and results be reviewed for integrity by parties independent of those accountable for the design and implementation of the validation process. An independent review may be accomplished using a variety of structural forms; review process activities may be distributed across multiple units or housed within one unit, depending on the management and oversight framework of the bank. Internal audit could likewise be charged with undertaking the review process using internal or outside technical experts independent from those responsible for building and validating the bank's rating system. Regardless of the control structure, internal audit maintains an oversight responsibility to ensure that validation processes are implemented as designed and are effective.

– Paul Huck

#### Footnotes

<sup>1</sup> The Basel Committee Newsletter No. 4 (January 2005) is available at [www.bis.org](http://www.bis.org)