While banks around the world may be motivated by different mixes of regulatory and business forces, they’re moving toward a similar objective: the ability to manage their portfolios based on risk-adjusted strategies. Moreover, as the recent credit crunch and resulting turmoil in financial markets demonstrates, banks must be able to not only set a risk-adjusted course for their portfolios, but ensure precise execution of these strategies and make agile, timely course corrections as economic conditions change.

This white paper discusses Fair Isaac’s thinking about how to provide Executive Committees with greater visibility, control and agility in strategic portfolio management. By extending the analytic infrastructure required under the Basel II mandate beyond the current focus on account-level decisioning and capital reserve calculations, we can help Executive Committees foresee and navigate the complex trade-offs involved in strategic decisions affecting multiple lines of business.

To improve the responsiveness of the portfolio to Executive Committee decisions, banks also need continuity across the chain of decisions leading to the account treatments that cumulatively move the portfolio along the desired trajectories. This paper presents Fair Isaac’s approach to creating such tight linkage by extending existing mechanisms for business unit level strategy development and execution up to the strategic portfolio level. Our approach establishes a two-tiered decision optimization process with shared methods of describing risk and reward, and balancing objectives and constraints.

The solutions Fair Isaac is exploring would provide mathematically optimized answers to such Executive Committee questions as:

» If we want to grow the portfolio by 3%, what is the best way to do it from a Return on Capital (ROC) perspective?

» How can we rebalance account bookings to maintain costs but increase Risk-Adjusted Return on Capital (RAROC)?

» Does the capital we’ve set aside to cover risk exposure for this portfolio segment generate a competitive return compared to alternative investment opportunities?

» In an economic downturn, how should we modify our strategic direction to achieve the desired result?
STARTING FROM BASEL II

One of the outcomes of the Basel II mandate is that banks now have a common language and standardized approach for addressing risk across lines of business. Another is that the Basel II requirements for calculating capital reserves have brought the treasury function closer to the credit risk function, an affinity that aids Executive Committee decision making. These developments provide a foundation for risk-adjusted strategic portfolio management.

However key pieces of the picture are missing:

» **Strategic-direction-to-account-decisions loop.** While many leading banks today have formulated risk-adjusted portfolio strategies that are conceptually quite sound, few have reliable execution across lines of business and the ability to accurately track results. Unlike line of business (LOB) strategies, which are coded into business rules and audited by bank compliance agents to ensure proper execution, Executive-level strategic direction tends not to be fully linked into the operational systems that drive day-to-day account decisions. Moreover, few banks have an automated, scientific means of absorbing complex, often conflicting, LOB-level objectives and constraints up into balanced, optimized portfolio-level decision making.

» **Reward side of risk.** To accomplish the above, Basel II estimations of Probability of Default (PD), Exposure at Default (EAD) and Losses Given Default (LGD) need to be augmented with corresponding estimates of the potential rewards associated with these forecasted risks. To support portfolio optimization, reward-side models should provide both marketing-oriented and profitability-oriented estimations.

» **Impact of economic change.** Banks have seen their portfolios rocked by the credit crisis and reverberating effects. Clearly one of the critical risk exposures that must be incorporated into risk-adjusted strategic portfolio management is that of economic change. Analytic predictions must be built right into portfolio-level decision modeling and optimization processes.

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**Figure 1: Basel II provides a starting place**

![Diagram showing the interaction between Executive Committee, Business Managers, Execution Teams, and Customers.](image-url)
Fair Isaac’s approach to risk-adjusted strategic portfolio management

Fair Isaac has undertaken to build strategic portfolio management capabilities from the foundation of Basel II analytics. Our approach establishes two tiers of decision optimization by extending our Strategy Science methodology upward to the Executive Committee and its portfolio management responsibilities.

Basel II risk predictions and corresponding reward-side predictions are integrated into the process at both tiers to enable linkage. In addition, optimization results from the LOB level can become constraints for optimization at the portfolio level. For example, the Executive Committee might ask: “Given the ranges of results we’re projecting under dozens of scenarios for each line of business, what is the single best overall strategy for improving RAROC?”

Ultimately, economic predictions will be among the possible inputs to decision modeling and optimization at both tiers. For example, the Executive Committee could ask: “How would the single best overall strategy change given an economic downturn?” Or “What strategies would produce a competitive return from our card portfolio and also hedge our auto portfolio?”

When we link Executive-level strategic portfolio management with LOB-level strategy development, we also by extension link it to account-level operational actions. As shown in Figure 2, LOB strategy optimization outputs, such as decision trees that assign targeted treatments to portfolio segments, can be implemented through business rules simultaneously across channels and into virtually any operational environment.

Figure 2: Two linked tiers of decision optimization
Initial steps

To turn this concept into reality requires analytic and software innovation, and progress in discrete steps.

Currently Fair Isaac is working with selected clients to adapt the Basel II PD, EAD and LGD models to capital allocation questions. The short-term goal is to increase RAROC by creating customer and product segments that result in improved ways of distributing capital.

To achieve this we will initially combine these forecasts of risk with revenues and receivables estimates to generate homogeneous risk pools that incorporate other performance dimensions. These multiple dimensions of account performance will then be compared against multiple dimensions of product and/or strategic customer segments. In this way we can account for complexities such as:

- Product lines having different returns on investment
- Some customers being more profitable than others
- Certain tactics working better for some segments than others

By generating these multidimensional risk pools, we can begin to affect RAROC by driving account-level decisions that:

- Book more/less new business
- Retain certain accounts longer/accelerate attrition of others
- Increase receivables on profitable revolving segments
- Reduce losses on high-risk revolving segments
- Increase revenues on marginal revolving segments

Further steps

Looking beyond these initial efforts, we see three important areas of longer term direction.

Reward-side modeling

Complex segmentation at both the strategic portfolio management and LOB levels will be significantly improved by extending Basel II predictive modeling so that risk forecasts are balanced by marketing and profitability counterparts:

<table>
<thead>
<tr>
<th>Predictive modeling for strategic portfolio management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk</strong></td>
</tr>
<tr>
<td>PD (Probability of Default)</td>
</tr>
<tr>
<td>EAD (Exposure at Default)</td>
</tr>
<tr>
<td>LGD (Loss Given Default)</td>
</tr>
<tr>
<td><strong>Marketing</strong></td>
</tr>
<tr>
<td>PR (Probability of Revolving)</td>
</tr>
<tr>
<td>IGR (Interest Given Revolving)</td>
</tr>
<tr>
<td>RID (Realized Interest at Default)</td>
</tr>
<tr>
<td>PA (Probability of attrition / pre-payment)</td>
</tr>
<tr>
<td><strong>Profitability</strong></td>
</tr>
<tr>
<td>Earnings estimates</td>
</tr>
<tr>
<td>Yields</td>
</tr>
<tr>
<td>NPV (Net Present Value)</td>
</tr>
<tr>
<td>ROA (Return on Assets)</td>
</tr>
<tr>
<td>RAROC (Risk-Adjusted Return on Capital)</td>
</tr>
</tbody>
</table>
At the same time, we need to include correlations between modeled dimensions of risk and reward. For example, the current approach to modeling the effect of correlation in the calculation of capital reserve requirements is either to fix the correlation or explicitly make it a function of PD. There is no accounting for the relationship between PD and other dimensions of risk such as EAD. The sub-prime banking crisis of 2007–2008 and aftereffects, for instance, raise the question of how carefully to model such relationships—and these questions should be asked about marketing and profitability correlations as well.

Fair Isaac is building this full range of portfolio performance forecasts into our Strategy Science decision modeling methodologies and tools. Our experience using Strategy Science in a wide range of decision areas—marketing, pricing, initial credit line assignment, credit line management, retention, fraud, collections—is helping us understand how to apply a complex combination of portfolio-level objectives and business-level constraints to strategies that drive customer decisions. Fair Isaac is also developing new techniques designed to add considerable speed to pooling and simulation calculations, which will allow analysts working on optimization at both tiers to rapidly adjust performance levers to run large numbers of highly complex “What if?” simulations.

**Economic impact built into optimization**

One of the cornerstones of Basel II is the stress-testing requirement, which involves simulating how models will perform under various economic conditions. Fair Isaac offers stress-testing capabilities, which model a range of economic scenarios, including extreme situations (e.g., Alan Greenspan’s “fear” element in economic cycles), which are costly but unlikely, on portfolio and segment performance. Clearly this type of simulation is necessary to help financial institutions understand and prepare for how a portfolio might react to various worst case scenarios, and we need to account for it in decision optimization at both the portfolio and LOB levels.

At the same time, Fair Isaac’s work in this area is providing more subtle and far-reaching insights into the sensitivity of portfolios to smaller but more likely economic variation. If we can get to the point where we better understand these “everyday” economic impacts, financial institutions will be able to make finer adjustments to policy and strategy levers to produce more refined and responsive portfolio performance and support broader objectives such as capital optimization.

One approach we are pursuing is to model the effects of economic conditions on behavior score components, such as balance and payment-to-balance ratio, then aggregate to the portfolio-level to predict shifts in score distribution. Early results are promising: Economic indicators, for example, were shown to have impacts on balance and utilization among other score components. We’ve also been able to capture dependencies between credit metrics; for example, empirical evidence shows that consumers with higher delinquency rates also have higher balances.

Additional Fair Isaac work on modeling economic impacts has focused on regional and local differences in score migration. Every consumer, of course, receives higher or lower scores over time, but how consistent are those migrations from one geographic market to another, and is there a difference in the degree of impact from changing economic conditions? We’re also exploring whether we can predict shifts in the odds-to-score relationship using economic data.
Strategic portfolio management across multiple markets

Strategic portfolio management methods and know-how currently used to support the Basel II mandate are a valuable asset banks will want to leverage as they expand their business and demands for transparency and compliance grow. Fair Isaac will lead in developing standardized modeling that can be applied across regions, countries and organizations while maintaining flexibility for customization and particularization. Flexibility is an important issue for organizations that cross internal and external boundaries or have products with varying levels of maturity. One way to provide it in a consistent fashion is to use hierarchical methodologies as the basis for our Basel models. With this approach, most variables are standard and inherited while necessary variations can be introduced with controlled specificity.

In emerging and high-growth markets banks may also face the challenge of limited data and short histories that present obstacles to applying both the Basel II fundamentals and the enhancements we’ve advocated in this paper. Nevertheless there are ways to model portfolio performance with analogous data from other markets. Fair Isaac has extensive experience using expert-based score engineering techniques that deliver reliable results.

Conclusion—beyond Basel II toward higher performing, more agile portfolios

Basel II established the foundations for modeling portfolio segment risk at a granular level and using these measures to make capital reserve decisions. By building on these foundations to help Executive Committees perform risk-adjusted strategic portfolio management—and tightening the links between strategic direction and LOB strategies and execution—banks can make the complex risk-reward tradeoffs necessary to achieve higher performance. They can also improve their ability to steer their portfolio safely through changing economic conditions.