Risk, capital and value measurement in financial institutions

Part II: The shareholder’s perspective

By John Drzik, Peter Nakada and Til Schuermann

Part I of this series described a framework for attributing economic capital which employed a debtholder’s view of risk. In this framework, an institution’s risk was expressed as a probability distribution of future net asset values, and capital was derived as the cushion necessary to protect debtholders to a given solvency standard, or probability of default.

While the debtholder’s primary concern is the link between risk and capital, shareholders are most concerned with the link between risk, return and value. Many of the same underlying risk measurements can be employed in the calculations of the value created for shareholders (at the transaction, relationship, or business activity level). However, the debtholder and shareholder views of risk are different, so some adjustments need to be made. This article will outline the elements of a robust conceptual approach for deriving risk-based value metrics and highlight some of the critical issues that need to be addressed to ensure successful implementation.

I. Conceptual framework

The shareholder’s conceptual framework needs to relate risk, return, and value. The relationship among these three measures is described in two parts: linking required return to risk, and deriving intrinsic value. This section describes a theoretical method for discounting any stream of risky cashflows, while the following sections address issues in applying this framework to decision-making within financial institutions.

- Linking required return to risk. Relating required return to risk has been one of the most important problems in finance. The most broadly accepted theoretical approach for addressing this issue is the Capital Asset Pricing Model (CAPM), or its more generalized version, the Arbitrage Pricing Theory (APT).

The CAPM states that shareholders will require a return in excess of the risk-free rate to compensate them for undiversifiable risk. CAPM formulates a simple linear relationship between required return and beta1 where beta is a function of the volatility of the firm’s equity value (\( \sigma \)) and its correlation with the market (\( p \)).

- Calculating present value. Once the required return (or discount rate) for a given activity is determined based on its risk profile, its intrinsic value can be calculated by discounting expected cashflows using the dividend discount (or discounted cashflow) model. Given that expressing business performance as a stream of future cash flows can be cumbersome, a num-

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1 The APT generalizes this single factor approach to allow for more than just the market to affect expected returns for the particular activity or investment. Specifically it states that expected return is a linear combination of a set of factors, where each factor has its own risk premium, and the expected return on a given equity will be a weighted average of the individual risk premia.
ber of shorthand approximations to the full dividend discount valuation model have been developed. Some of the more commonly used approximations are illustrated in table A (previous page).

**Common pitfalls in applying the conceptual framework**

The elements of the conceptual approach described above are referenced, in some form, by virtually every measurement methodology. However, there are some fairly common flaws in applying this abstract framework to practical value calculations within a financial institution.

- **Superficial treatment of risk.** The most egregious errors in value metrics for financial services businesses occur when risk is measured superficially. This frequently arises when methodologies developed for industrial firms are applied without alteration to financial institutions. Such methods often use discount rates that are constructed in a top-down, relatively simplistic way, relying on the betas of “pure play” analogs or historical analysis of the earnings volatility of business units.

  While this approach might be reasonable for modeling risk in a manufacturing firm, it will not work for financial institutions. As we will show, applying discount rates that are constructed in a top-down, relatively simplistic way, relying on the betas of “pure play” analogs or historical analysis of the earnings volatility of business units.

Consider the following examples:

- **Commercial lending:** A loan might add value if made to a customer with a BBB credit rating but destroy value if made to a customer with a BB rating. To measure true value creation, a value measure must reflect shifts in customer mix and credit underwriting standards at the point where the shifts are occurring.

- **Residential mortgages:** There is a vast difference in risk between a mortgage unit that underwrites conforming loans and fully hedges the rate risk in its servicing rights portfolio, versus one that underwrites whole loans to weak credit customers and takes open bets on interest rates in its servicing rights portfolio. Many proposed value metrics would not detect these differences, and yet the implications for shareholders are substantial.

- **Systematic versus total risk.** Shareholders can diversify away specific risk but not systematic risk. So from a shareholder’s perspective only systematic risk matters. However, debtholders care about total risk (systematic plus specific) because all risk impacts the probability of default.

  - **Standard deviation versus tail risk.** Shareholders are exposed to the

**B. Need to for hurdle rate definition**

<table>
<thead>
<tr>
<th>Equity hurdle rates</th>
<th>whole bank</th>
<th>private equity business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Equity hurdle</td>
<td>12.0%</td>
<td>18.0%*</td>
</tr>
<tr>
<td></td>
<td>* assume a risk-free rate of 6% and a market risk premium of 6%</td>
<td></td>
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</tbody>
</table>

**Assuming 70% economic capital requirement**

<table>
<thead>
<tr>
<th>Beta</th>
<th>Equity hurdle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naive use of single bank equity hurdle</td>
<td>12.0%</td>
</tr>
<tr>
<td>Appropriate levered equity hurdle</td>
<td>25.7%</td>
</tr>
</tbody>
</table>

*single hurdle rate in example 1 implies a levered beta for all activities equal to the bank’s average hurdle rate

Private equity investments made by banks are a clear example of a business activity for which differentiated hurdle rates are required. Assume that the beta of the bank is 1.0 while the unlevered beta of their higher-risk private equity portfolio is 2.0. Debtholder-style economic capital analysis suggests a 30% economic capital requirement. Then consider two approaches for estimating an equity hurdle: 1) naive use of a single hurdle rate equal to the bank’s average beta, 2) appropriate calculation of beta levered by the equity-to-assets ratio. Note that the equity hurdle calculated in 1) is less than half of the appropriate equity hurdle calculated in 2).
entirety of the value distribution, so they are concerned more with the “fat part” of the distribution than with the tails. Hence standard deviation ($\sigma$) is the more useful measure of value volatility, i.e. of risk. Debt-holders are exposed to the tail of the distribution – so an extremely high (e.g. 99.97%) confidence interval is the risk measure used to determine economic capital. Very simply, the tail event is not nearly as “special” for the shareholder as the debtholder.

For debtholder and shareholder risk to be proportional across activities, two conditions must hold: systematic risk and total risk must be proportional and $\sigma$ and EC must be proportional.

These considerations suggest that the adoption of uniform hurdle rates should be considered carefully, as there is an inherent accuracy vs simplicity tradeoff. For some firms the simplicity gained from a uniform hurdle rate will outweigh the potential increase in accuracy from a more involved analysis; in others, differentiated hurdle rates are clearly necessary to avoid misleading value measures (see table B on previous page).

- **Superficial treatment of return.** In calculating value, the expected return from a business is often set equal to prior period GAAP accounting earnings or a close modification thereof. For some firms the simplicity gained from a uniform hurdle rate will outweigh the potential increase in accuracy from a more involved analysis; in others, differentiated hurdle rates are clearly necessary to avoid misleading value measures (see table B on previous page).

- **Ex-post and ex-ante returns assumed to be equal.** For performance measurement applications, management seeks an ex-post answer, i.e. how much value was created last year? In decision support applications (e.g. resource allocation), management seeks an ex-ante answer, i.e. how much value will be created if the decision to allocate resources is taken?

Frequently, the rate of return measure used to answer the ex-post question (e.g. ROC) is simply plugged into a shorthand ex-ante valuation model (like those in Table A) as the expected future return. Instead, value estimates should explicitly focus on the relationship between historical and prospective profitability, e.g. the degree to which excess returns are sustainable in profitable businesses.

**III. Implementing a robust shareholder value approach**

This section describes a four-step approach to implementing a robust shareholder value analysis.

- **Define intrinsic value.** Before value added in any retrospective or prospective period can be measured, a method needs to be defined to calculate the intrinsic value (IV) of a transaction, relationship or business unit at a given point in time. This measure can take on different forms depending on the specific definition of intrinsic value.

At one extreme, intrinsic value could include the present value of all expected future cashflows (including the franchise value from future new business). In this case, intrinsic value is conceptually equivalent to market value. Alternatively, IV might only include the value of tangible assets and liabilities, effectively deferring the return from change in the value intangibles to the point at which they become tangible.

The choice of value recognition philosophy should reflect the materiality of intangibles to the return calculations and the degree of uncertainty in the intangible valuation.

- **Define ex-post shareholder return.** Return within a given period (in dollars, rather than percent) should be defined as:

$$ \text{Return} = \text{cash flow (in period)} + \text{change in intrinsic value (\Delta IV)} $$

This measure can take on different forms depending on the specific definition of intrinsic value as discussed in the prior section. In the first case, where IV is a proxy for market value, the ex-post return measure is akin to total return to shareholders. In some cases where IV represents tangible value, GAAP earnings do capture the majority of changes in intrinsic value, and therefore are a good approximation for return. However, this is the
exception rather than the rule.

Measure ex-post shareholder value added. The measure of ex-post return developed in the prior section does not include an adjustment for the return required for the risk taken. That is, the actual ex-post return must be compared to a required (or hurdle) rate of return to arrive at a measure of excess return to shareholders. There are two common measures of excess return:

- Shareholder value added (SVA) defined as total return minus required total return (or cost of risk) is the version of excess return consistent with the broadest definition of intrinsic value above;
- Annual value added (AVA) is an accrual version of SVA that allows SVA to be realized over the life of an activity, rather than at its inception. Over time cumulative AVA should equal cumulative SVA as unrealized gains become realized.

In either case, the required return (cost of risk) is determined via CAPM for each business (or transaction) based on a detailed, bottom-up analysis of its volatility and correlation characteristics.

Measure ex-ante marginal SVA. The intrinsic value measure discussed earlier places a value on a business plan, as IV embodies estimates for future returns, risk, and growth.

Management should also have a framework for evaluating potential changes to these plans resulting from incremental investment of resources.

In theory, all investments with a positive net present value should be allocated resources. In practice, scarce resources of one type or another usually force a ranking of possible investments based on their marginal value created per unit of the scarce resource.

IV. Applications of shareholder value metrics
The prior section described the basis for calculating three different value quantities: intrinsic value (IV), annual value added (AVA) and lifetime value added (SVA). This section describes how they can be used in combination to support different types of management decisions.

Resource allocation. As described earlier, resource allocation should be prioritized based on SVA per unit of scarce resource. Economic capital (EC), as defined in our prior article, is often the most critical scarce resource in financial services businesses. In these circumstances, the key quantity on which to rank activities is their marginal shareholder value added (SVA) per unit of EC.

However, in some businesses, capital is not the scarce resource. For example, in some businesses the scarce resource is time (of marketing officers, management, etc). Resource allocation within these businesses should be based on SVA per unit of time.

Performance measurement. AVA should be the starting point for performance measurement and compensation, as it reflects the degree to which management is willing to recognize unrealized gains in period-to-period performance.

In addition to AVA, however, performance should be benchmarked against competition, to adjust for the ease or difficulty of the market context. As performance measures are cascaded down in an organization, they might be set in terms of the AVA drivers controlled by that manager, rather than in full AVA terms.

Acquisition/divestiture. The intrinsic value (IV) of an activity can be compared to its market value (MV). If IV > MV, then either acquisitions in the area should be considered, or a shareholder education program should be undertaken to bring market value in line with intrinsic value. If IV < MV, divestiture might be an option.

V. Conclusion
Shareholder value metrics can be a valuable management tool. However, sound concepts are not always implemented in ways that will enhance decision-making. Financial firms should be careful to capture the unique risk and return dynamics of financial products to ensure that the shareholders interests are truly reflected.

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