

Consulting Corner

A Virtuous Portfolio

by Andrew Davidson

Over the past few months there has been much focus on the question of the appropriate size of the retained portfolios at the Government Sponsored Enterprises: Fannie Mae, Freddie Mac and the Home Loan Banks.

Just as Congress is now facing the issue of the size of the GSE portfolios, all financial institutions face similar issues in deciding how much to invest in various market sectors. Some of the same ideas could be used to address the question in both arenas.

A very large concentrated portfolio exposes an institution (or the taxpayers) to the risks of that particular market. Even if the portfolio is well hedged, there are still risks that cannot be fully eliminated through hedging and risk management. In the mortgage market, the uncertainty of prepayments is one of those risks. Even with the best models, there is a risk that borrower behavior will change or otherwise not be as expected.

On the other hand, a portfolio that is too small may constrain an institution from achieving its business (or societal) objectives. For example, a firm that is unable or unwilling to put loans in a portfolio may find that it becomes uncompetitive in other business areas since it may not be able to originate loans that its customers desire. In addition, they may find that they cannot securitize loans effectively if they are not able or willing to accumulate sufficient assets to securitize efficiently. A firm may also find that a larger portfolio provides a stable source of earnings that diversifies some of the cyclical risks of the mortgage market. The growth retained loan portfolios in Sub-Prime REITs is an example of this. Many firms have concluded that developing a portfolio that provides income in the form of net interest margin may be beneficial in offsetting some of the uncertainty associated with the timing of loan production and loan sale margins.

In comparing the relative merits of smaller and larger portfolios, Aristotle's ideas about virtue may provide a useful analogy. He wrote:

Virtue, then, is a state of character concerned with choice, lying in a mean, i.e. the mean relative to us, this being determined by a rational principle, and by that principle by which the man of practical wisdom would determine it. Now it is a mean between two vices, that which depends on excess and that which depends on defect; and again it is a mean because the vices respectively fall short of or exceed what is right in both passions and actions, while virtue both finds and chooses that which is intermediate. Hence in respect of its substance and the definition which states its essence virtue is a mean, with regard to what is best and right an extreme.

Likewise, most everyone would agree that a portfolio could be too large or too small and the best portfolio would be somewhere in between. But what is the appropriate "rational principle" to determine the mean and how should that balance be maintained? One solution is to impose a numerical limit on

the size of the portfolio, or a limit on the percentage allocation to the product within a larger portfolio. These types of strict limits are likely to be counterproductive, leading to excessive investment at times and inadequate investment at the time of greatest opportunity.

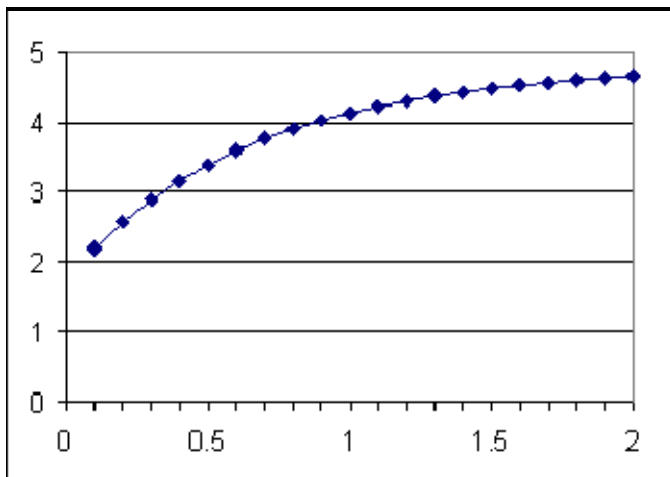
One solution to the problem is capital. Capital allocation provides the mechanism to allow a portfolio to achieve its desired objectives. By allocating capital to a portfolio, developing risk management requirements and establishing a required return on equity, a portfolio can naturally find its appropriate size. When opportunities are greater, the portfolio can grow to take advantage of those opportunities, when opportunities are not present, or are greater elsewhere, the portfolio will shrink.

The appropriate amount of capital can be determined by considering the overall contribution of the risk of the portfolio to the overall risk of the firm. Marginal VaR (Value at Risk) provides an indication of the amount of capital required. (Other considerations may lead a firm to deviate from the amount indicated by this theory, nevertheless the theory is instructive.)

Suppose a firm has a \$100 billion position in an asset that has a standard deviation risk of 5%. Suppose the firm has the opportunity to grow a portfolio of a second asset. The second asset has the same standard deviation of risk of 5%. Suppose the second asset has an 80% correlation to the first asset. What is the marginal increase in standard deviation of the portfolio per \$10 billion increase in portfolio of the second asset?

Figure 1 shows the results. In the figure the x-axis represents the size of the new portfolio relative to the existing portfolio. At a level of 1, the new and existing portfolios have equal size. We can see in the chart that for the first \$10 billion investment (or 10% of the original portfolio size), the standard deviation increase is just over 2% of the asset increase. As the size of the second portfolio reaches \$100 billion the incremental standard deviation is just over 4%. As the size of the second portfolio is significantly greater than the first portfolio, the incremental risk approaches the asset standard deviation of 5%. Thus as a firm increases the size of a new asset class relative to its existing business, that asset class should face an increasing capital requirement. Likewise it might be appropriate to place a higher capital requirement on GSE portfolios as they represent a larger segment of the market.

Figure 1

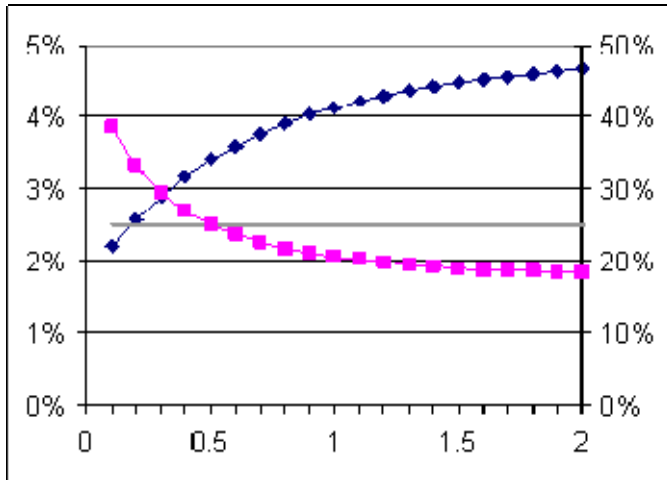


Such an increasing capital requirement will serve as a limitation on portfolio size. As portfolio size grows the capital requirement will start to exceed the capital requirement for that asset for other more diversified firms. Since return on equity represents the ratio of income to equity higher required equity

levels will lead to lower returns. The firm with the higher capital requirement will find it can no longer achieve a desired return on equity and will choose to maintain a smaller portfolio.

This is shown graphically in Figure 2. The figure shows the return on equity assuming a constant level return on assets as the declining line linked to the right axis. The flat line at 25% represents the required return on equity. The portfolio size would be 0.5 of the original portfolio at the assumed level of earnings and required return on equity. At higher earnings or lower required ROE the portfolio could be larger.

Figure 2



Normally, we are used to the scenario where adding a new asset decreases risk through diversification. In that analysis we are generally looking at asset allocation, and increasing one asset results in the decrease in another. In this case we are looking at the incremental risk from the new activity, holding the original portfolio constant. In this case risk grows as the new activity becomes larger and the marginal risk is increasing.

There are, of course, many reasons why this theory is applicable to financial institutions and many reasons why it is not. Likewise, there are many reasons why such a theory might be applicable to GSE's role in the economy and many reasons why it might not. While this theory does not provide a definitive answer to the question of portfolio size, a variable capital requirement that increases as the portfolio grows large based on the risk created by the portfolio, may be helpful in finding Aristotle's "rational principle" for determining the appropriate size of a portfolio.

