WHM CAPITAL ADVISORS

A.Q.U.A. ® Credit Analytics

Loan Portfolio Management Solutions Using Quantitative Data

By: William H. McAfee, Jr. and Matthew A. Morley

June, 2011

Developers of:

A.Q.U.A.®
A FLUID LOOK AT ILLIQUID ASSETS

Post Office Box 7426 • Columbia, SC 29202 • (803) 799-1301 • www.whmca.com

Preface

WHM Capital Advisors and its related technology company, A.Q.U.A. ® Capital Technologies, have been developing methodologies for determining risk in capital markets over the last decade. Over the last 12 months, our research team has been working on using the proprietary company-specific risk algorithm and industry best practices risk management frameworks to better measure credit risks of the commercial banking industry. A.Q.U.A. ® Calculated Risk provides an objective and quantitative method to examine bank risk at the individual credit and the portfolio levels

Our original white paper on the topic, *A New Paradigm in Commercial Credit Underwriting*, introduced the A.Q.U.A. ® platform, the proprietary algorithm that is used to determine Company Specific Risk Premium (CSRP), and the uses in commercial bank credit environments. This current release is a further look at the topic and the development of the framework based on our results from working directly with commercial bankers on credit analysis of loan portfolios.

As has been found in other public and private capital markets, the A.Q.U.A. ® platform accurately and objectively quantifies the forward looking risks of the individual company allowing users to identify risks that more subjective analysis typically overlooks. For banks and bank investors, this ability to accurately measure and manage risks within the portfolio has significant implications for determining likely non-performing assets before they become non-performing and their effect on portfolio risk.

A.Q.U.A. ® Credit Analytics Process

A.Q.U.A. ® Calculated Risk incorporates economic, industry, and size risk, alleviating the need for comparables-based assessments of credit risk. Because the algorithm is based solely on the financial statement data of the primary source of repayment, A.Q.U.A. ® eliminates the subjectivity inherent in employing market-derived data.

The system is based on the relationship between Expected Loss, Probability of Default, and Loss Given Default, as demonstrated in the following Equation.

Expected Loss% = Probability of Default x Loss Given Default%

The formula above is the basis for Pillar I of the New Basel Capital Accord (Basel II)[1]. While not all banks are required to adhere to Basel II, the relationship between the three credit risk components is straight-forward and reduces complexity, providing banks with a logical presentation of credit portfolio risk. The system begins by determining the fundamental Probability of Default.

[1] http://www.bis.org/bcbs/history.htm

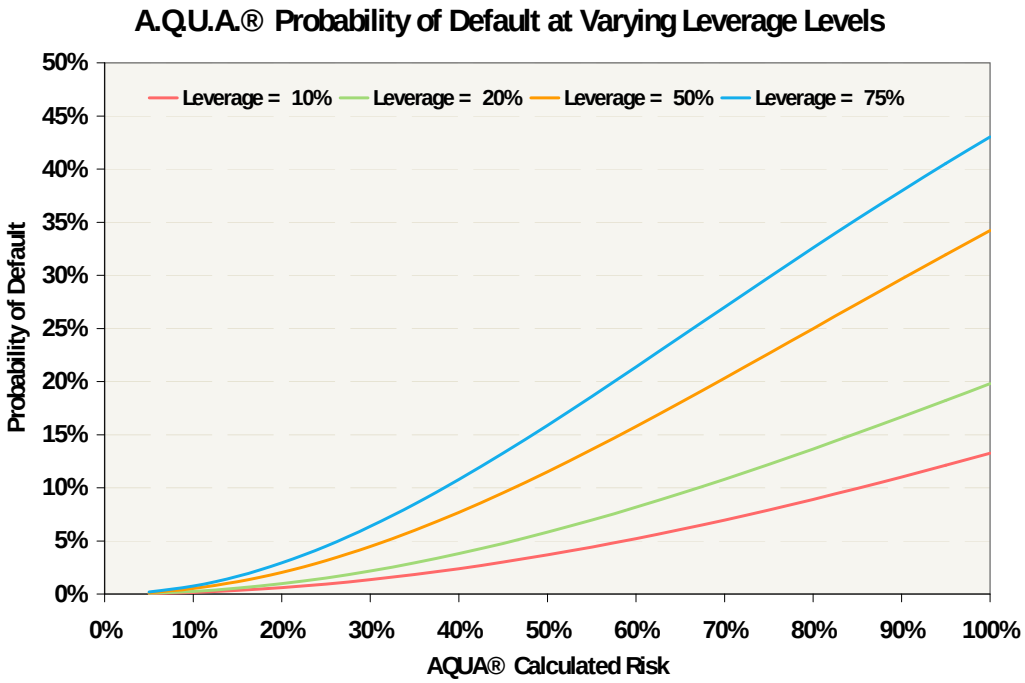
Fundamental Probability of Default

The A.Q.U.A. ® measurement for Probability of Default (A.Q.U.A. ® PD), is a modified version of Merton's Distance to Default measure; an approach that is well-documented and is used extensively by the finance community. The model assumes that default occurs when the value of the debtor's underlying Assets declines below the value of its Liabilities.
The distance to default is essentially the number of standard deviations required for the value of the Assets to fall below the value of Debt. A simplified version of the measurement includes Debt/Total Capital and Calculated Risk, such that:

$$\text{Distance to Default} = \frac{\log(\text{Leverage})}{(\text{Leverage \%} - 1)} \times \frac{1}{\text{Calculated Risk}}$$

Because A.Q.U.A. ® Calculated Risk measures variance in the shareholder returns of the debtor company, it is a proxy for uncertainty in repayment source.

The chart below demonstrates the resulting A.Q.U.A. ® calculated Probability of Default levels at varying levels of Calculated Risk and Leverage. As expected, higher Calculated Risk will result in higher probability of default. (For more information on the mathematical reasoning of the equation please see endnote [A])



Implied Loss Given Default

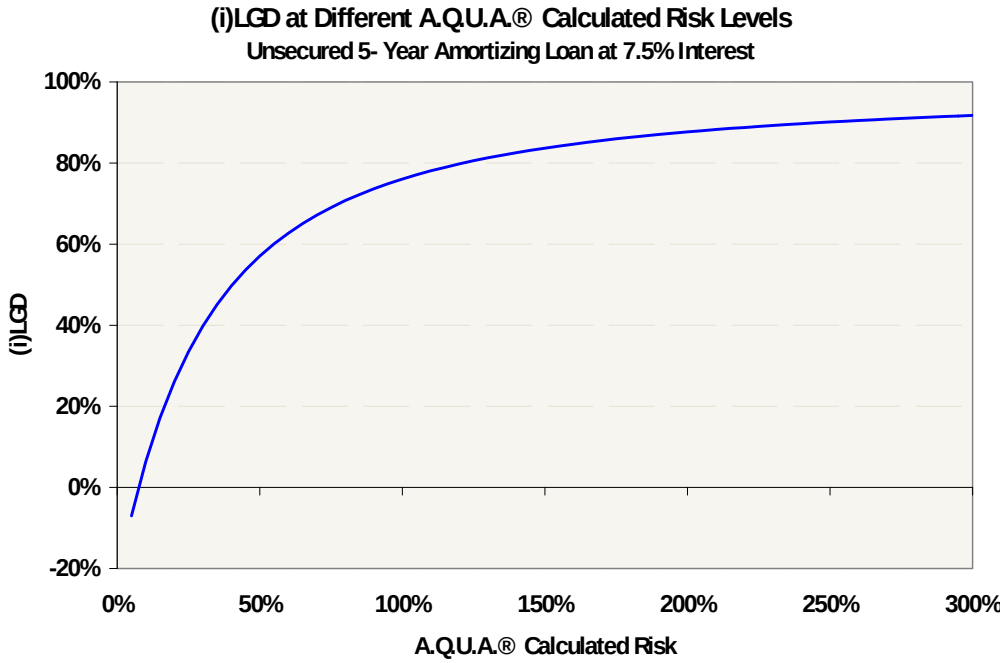
Loss Given Default (LGD) is a measure of the percentage of exposure that will be lost given default. LGD is determined in one of three ways:

- Market LGD – Rate is Market-Data Derived from defaulted bonds (post event).
- Implied Market LGD – Rate is Market-Data Derived from bonds close to default (pre event).
- Workout LGD – Discounted Cash Flow (Discount Rate can be market derived, or determined internally).

A.Q.U.A. ® employs the Workout LGD method, formulated below to obtain implied loss given default, or (i)LGD:

$$\text{(i)LGD} = 1 - \left[\left(\sum \frac{CF_n}{(1+\text{Calculated Risk})^n} + \text{Collateral FMV}^2 \right) / \text{Principal Balance} \right]$$

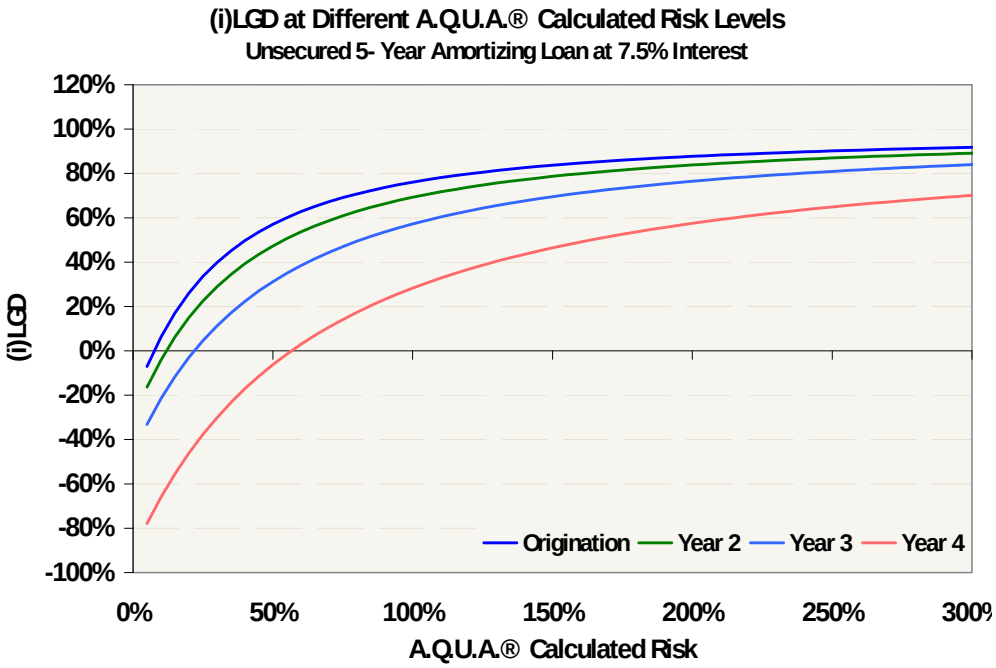
By employing A.Q.U.A.® Calculated Risk as the discount rate, the remaining cash flows of the loan are discounted to reflect the level of return that a capital provider would require to own the Company. A higher discount rate results in a lower value of the remaining cash flows of the loan. The chart below demonstrates (i)LGD, given an unsecured loan at 7.5% interest, amortizing over 5 years.



[2] Note that we include Collateral fair market value, meaning the collateral's value given the fact that non-cash collateral should be valued at some discount for lack of liquidity. The default calculation is with Collateral FMV at $0, which provides the most conservative estimate of Loss Given Default.

Calculated Risk Updating Over Life of Loan

In addition to objectively calculating a Loss Given Default value at *origination*, the A.Q.U.A. ® methodology is most useful in uncovering changes in the Loss Given Default *throughout* the life of the loan. Assuming Calculated Risk stays the same, Loss Given Default will decline as the loan amortizes. In this way, a debtor's payment history is inherently incorporated in the calculation, rather than being subjectively weighted as a single factor in a multi-factor risk score.

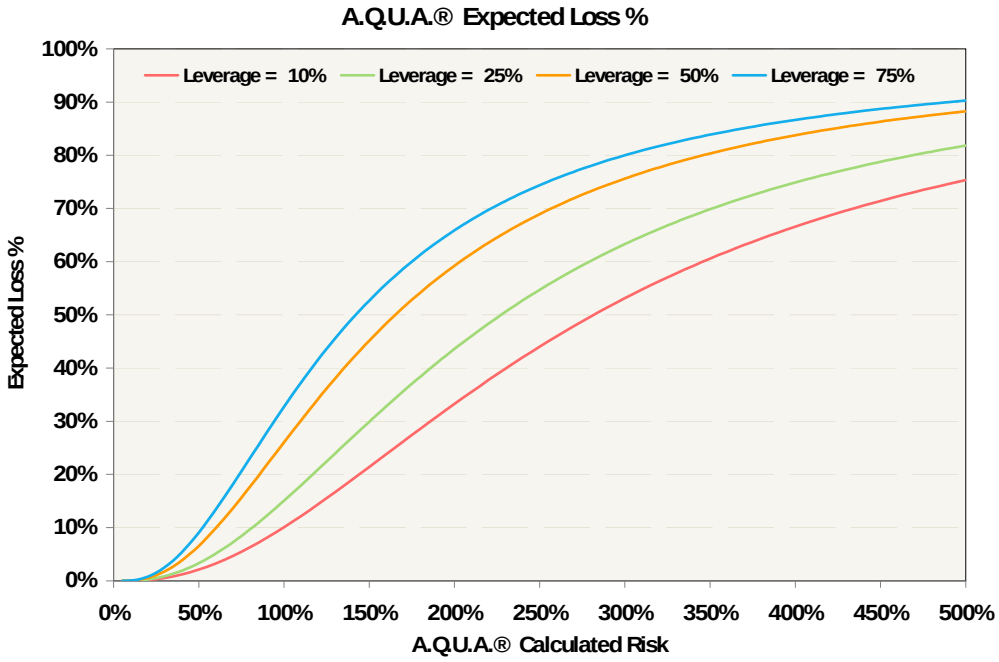


Getting to Expected Loss

A.Q.U.A. ® Credit Analytics employs the Pillar I formula to derive Expected Loss % for all of the loans in a portfolio, and for the portfolio of loans in aggregate as:

Expected Loss% = Probability of Default x Loss Given Default%

Having calculated both Probability of Default, and Loss Given Default, A.Q.U.A. ® calculates Expected Loss as A.Q.U.A. ® Probability of Default x (i)LGD. Combining the figures depicted in the first two charts, we have included a chart of Expected Loss% at different levels of A.Q.U.A. ® Calculated Risk and Leverage for a $500,000 5-Year amortizing loan at an interest rate of 7.5% at origination. Again, the ability to update these metrics with updated financial data over the life of the loan provides a sense of increasing or decreasing risk profile at those interim points in time. By viewing this data for a group of credits on a combined basis, bankers can have a better idea of the metrics for various portfolio segments or for the complete loan portfolio.



Given the increased regulatory scrutiny in the commercial banking industry, A.Q.U.A. ® Credit Analytics provides bank management, directors, regulators and prospective investors an objective way to examine bank risk at the individual credit and the portfolio levels. By using the A.Q.U.A.® framework to quantify the factors associated with default risk, interested parties can better measure and manage risk over the life of the loan and as changes are made to the portfolio in real-time as soon as data is updated. Instead of waiting for a default event to occur, banks can identify problem credits and take action to mitigate losses in a more timely fashion in order to preserve capital as well as identify problem credits objectively in the underwriting process.

For further information on the background of the A.Q.U.A. ® platform or how it works in credit market and other settings, please contact us or visit our website, www.aquacaptec.com.

WHM Capital Advisors is a financial advisory firm providing research, analysis and advice to a diversified global client base that includes institutions, corporations and high-net-worth individuals. Founded in 2002, the firm's areas of expertise are valuation consulting, succession planning, mergers and acquisitions advice and investment management. In addition, the firm has a related technology company, A.Q.U.A. ® Capital Technologies that designs applications to analyze complex financial issues for clients.

The opinions expressed, solely those of WHM Capital Advisors, are our present opinions only and represent fundamental analysis of information compiled from sources believed to be reliable. WHM Capital Advisors does not guarantee the completeness of any information and is not responsible for any errors or omissions or for the results obtained from the use of such information.

[A] In order to transform the Distance to Default to the Probability of Default, we employ one-tailed Chebyshev's Inequality, which states that the probability of a variable reaching and exceeding "k" number of standard deviations below the mean is equivalent to $P[(\mu-X)>k] < 1/(1+k^2)$. The advantage of using this inequality is that it does not assume a normal distribution. The mathematical disadvantage is that if returns are normally distributed, A.Q.U.A.® PD will result in more Type I Errors. However, for the purposes of risk management, it is preferable to err on the side of caution and employ a conservative measure of probability of default rather than introduce unnecessary modeling risk and assume all asset returns are perfectly normally distributed.