Suppose a student named Shylock, “Shy” for short, had won a lot of money in a heavy poker game, say $10,000 over the course of a long weekend. His plan is to make subprime loans to other students who would not qualify for such a loan at an established load institution. For purposes of illustration, we further assume that the loans are to be repaid in a lump sum, a balloon payment, in exactly one year.

First Shy must accurately assess the borrower’s likelihood of repaying the loans. Let $R_i$ be the risk that student $S_i$ will default on a loan, so the likelihood of repayment is then $1.0 - R_i$. If there is a 25% risk that a student will default, then the likelihood of repayment is 75%.

Shy knows that diversification is important for spreading the risk across several transactions, so, at this point he has made 3 loans to $S_1, S_2,$ and $S_3$, with risk factors of $R_1, R_2, and R_3$ of 30%, 40% and 20%, respectively, in the principal amounts $P_1, P_2,$ and $P_3$ of $1000, $3,000 and $2,500, respectively.

Now, calculate how Shy should structure these loan transactions so that he statistically covers the risk involved and then adds in a profit factor of 15%. First we take into account the risk by charging a statistical risk factor to compensate for the subprime quality of the loan.

1. Without any other considerations, what is the expected value of $L_1$, the loan issued to student $S_1$? This is straightforwardly seen as

\[
E(L_1) = (1 - R_1) \times P_1 = (1 - 0.30) \times $1,000 = $700
\]

With analogous calculations, it follows that,

\[
E(L_2) = (1 - R_2) \times P_2 = (1 - 0.40) \times $3,000 = $1,800
\]

and,

\[
E(L_3) = (1 - R_3) \times P_3 = (1 - 0.20) \times $2,500 = $2,000
\]

2. Now Shy decides that he wants to buy a car, so he goes to a dealer to look at used cars, where he expects to finance the car using his “loan portfolio” as collateral. How should be value of his portfolio of 3 loans be valuated? Although he has lent
Therefore, the car dealer will only consider his portfolio worth $4,500, not $6,000 of original principal in collateral value. This illustrates that he losing net worth unless he adjusts for the risk.

3. From the above we see that a risk terms of $RT_1 = $300, $RT_2 = $1,200, and $RT_3 = $500, are indicated, for $L_1, L_2$ and $L_3$, respectively, simply to compensate for the assumed risk that the loans might not be repaid. This is enough to “break even” statistically, so that we can assume that the expected value for $L_1$ is now $700 + $300 = $1,000, the original principal; for $L_2$, $1,800 + $1,200 = $3,000, the original principal; and for $L_3$, $2,000 + $500 = $2,500, the original principal.

4. Shy still has to include a 15% profit term in his loan structure, a figure which he assumes will also cover the mild affects of inflation today. Hence, additional terms service terms of $S_1 = $150, $S_2 = $450 and $S_3 = $375, need to be inserted in Loans $L_1, L_2$ and $L_3$, respectively. In view of the profit term, the loans will look like, $L_i = P_i + RT_i + S_i$.

5. To summarize all of the above,

   i. $L_1 = $1,000 + $300 + $150 = $1,450

   ii. $L_2 = $3,000 + $1,200 + $450 = $4,650

   iii. $L_3 = $2,500 + $500 + $375 = $3,375