Creating a Return/Risk Profile for an Equity Investment

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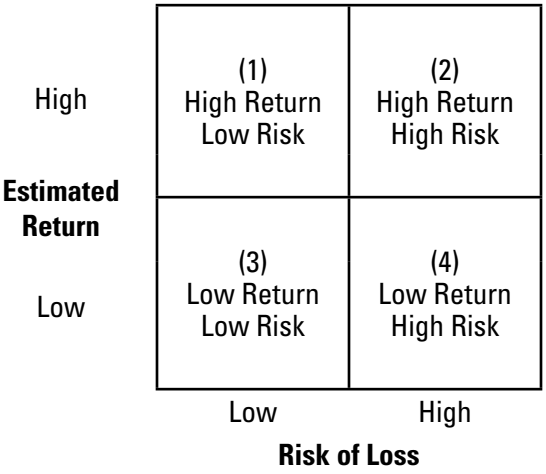
Successful investing requires a careful assessment of the investment's potential returns and its risk of loss. **Return** is defined as returning an amount greater than the original investment. For example, the magnitude of returning an amount equal to three times the original investment is stronger than an amount equal to two times your investment.

The **risk** of loss means the chances that the investment will fail. For example, the chance of failure of an investment might be one chance in three. In this situation, the probability of failure is 33%. If the chance of failure is only one chance in five (20%), the return/risk profile is much stronger.

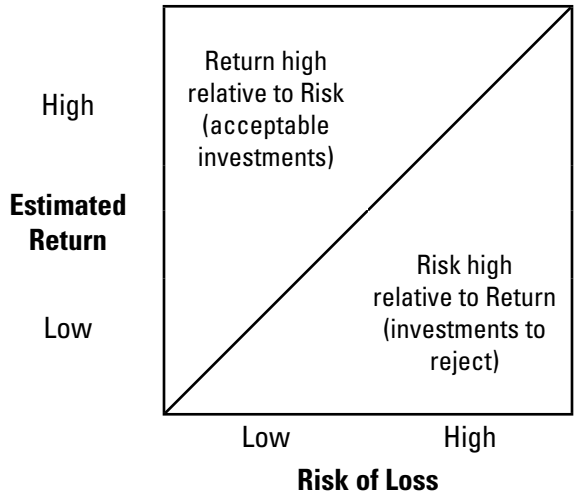
Comparing the estimated return to the risk of loss provides the return/risk profile of the investment. As shown in Figure 1, return/risk profiles can be categorized into four quadrants. The first quadrant contains profiles with high estimated returns and low risk of loss. Conversely, quadrant four contains profiles with low estimated returns and high risk of loss. Quadrants two and three contain profiles with high returns with high risk and low returns with low risk, respectively.

Figure 1. Classification of Investment Opportunities by Estimated Level of Return and Risk of Loss



A further clarification of a return/risk profile is presented in Figure 2. A diagonal line running from the lower left-hand corner to the upper right-hand corner of the figure divides the profiles into those in which the estimated return is high relative to the risk of loss from those in which the risk of loss is high relative to the estimated return.

Figure 2. Relationship between Estimated Level of Return and Risk of Loss



Based on the return/risk profile, investments to the left and above the diagonal line in Figure 2 may be considered as acceptable investments and those to the right and below the diagonal line may be considered as unacceptable investments. Furthermore, movement to the upper left-hand corner of Figure 2 results in a stronger return/risk ratio. Conversely, movement to the lower right-hand corner of Figure 2 results in a weaker return/risk ratio.

Computing the Expected Return of an Investment

Based on the concepts above, an analytical method can be used for determining the profitability of an investment. Computing the **expected return** of an investment involves the estimated level of

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return and the risk of loss concepts discussed. The **expected return** analysis can be used to decide whether to pursue an investment or to choose among alternative investments. Below are the steps in the process:

1. Identify the primary alternative outcomes of the investment.
2. Estimate the *magnitude* of outcome of each outcome.
3. Estimate the probability of occurrence of each outcome.
4. Compute the expected return from each outcome by multiplying the *magnitude of outcome* by the *probability of occurrence*.
5. Compute the *expected return* from the investment by adding together the expected returns from the outcomes into one composite for the investment.

The first step is to identify and list all the possible outcomes from the investment. Methods for identifying the major outcomes from an investment are discussed below. After each outcome, list the expected *magnitude of outcome* based on the multiple of the returns from the outcome compared to the amount originally invested. For example, a *2× magnitude of outcome* means that two dollars are received over the life of the investment for every one dollar invested. A *1× magnitude of outcome* means that the investment only returns the amount originally invested. A *0× magnitude of outcome* means that the investment failed and no returns are forthcoming.

Next, assign a *probability of occurrence* to each outcome reflecting the chances that the outcome will materialize. The *probability of occurrence* of each outcome is expressed as a percentage. For example, a *magnitude of outcome of* 2× may have an estimated *probability of occurrence* of 20% (one chance in five). The sum of the percentages of all of the *probabilities of occurrence* must total 100%.

Then multiply the *magnitude of outcome* of each outcome by its *probability of occurrence* to compute the **expected return** of each outcome. For example, an outcome with a *magnitude of outcome* of 2× and a *probability of occurrence* of 20% will have an **expected return** coefficient of .4 (2 × 20% = .4). The **expected returns** for all of the outcomes are then totaled to compute an **expected return** for the investment.

In Example 1, an investor has determined that there is a reasonable possibility that the investment could return an amount equal to 3× its original investment and the probability of this occurring is estimated at 30%. Likewise the investor believes it is possible that the investment could return two times the original investment and the probability of this is also 30%. There is a 20% chance that the investment will return just the original investment, a 10% change that the investment will return half of the original investment, and a 10% chance the investment will fail and return nothing.

Next, the expected return for each outcome is computed by multiplying the magnitude of outcome by the probability of occurrence. Finally, the expected return for the investment is computed by summing the expected returns of all of the individual outcomes.

In Example 1, the expected return of the investment is 1.75. This means that the expected return per dollar of investment is $1.75. The range of outcomes is from $0 to $3.00 per dollar of investment. Examined from another perspective, there is a 60% probability the investment will be profitable, a 20% probability the investment will return just the original investment, and a 20% probability the investment will result in a loss of part or all of the original investment.

Example 1. Expected Return on Investment

Outcome	Magnitude of Outcome	Probability of Occurrence	Expected Return
1	3×	30%	.90
2	2×	30%	.60
3	1×	20%	.20
4	.5×	10%	.05
5	0×	10%	.00
Total		100%	1.75

- Expected return of $1.75 per $1.00 invested.
- Range of returns of $0 to $3.00 per $1.00 invested.
- 60% chance that more than the original investment will be returned.
- 20% chance that just the original investment will be returned.
- 20% chance the return will be less than the original investment or the investment will be lost.

Example 2 shows a situation where the *expected return* of the investment is less than the original investment. In other words, for every dollar of investment the expected return is only 80 cents. Although there is a chance that the investment will be profitable (return greater than the investment), it is likely that the investment will return less than the original investment.

Example 2. Expected Return on Investment

Outcome	Magnitude of Outcome	Probability of Occurrence	Expected Return
1	3×	10%	.30
2	2×	10%	.20
3	1×	20%	.20
4	.5×	20%	.10
5	0×	30%	.00
Total		100%	.80

- Expected return of $.80 per $1.00 invested.
- Range of returns of $0 to $3.00 per $1.00 invested.
- 20% chance that more than the original investment will be returned.
- 20% chance that just the original investment will be returned.
- 50% chance the return will be less than the original investment or the investment will be lost.

Although the investment with the highest *expected return* is often the preferred investment, other factors may impact an investor's decision. Some investors are willing to accept a low potential return in exchange for a low probability of loss. Likewise, some investors are willing to accept a high probability of loss in exchange for a high potential for return.

These differences are outlined in Examples 3 and 4. Both examples have the same expected return of 1.5. However, a risk-averse investor may prefer the investment in Example 3. Although the highest possible return is only three times the size of the original investment, the risk of loss is only one chance in 10 (10%). Conversely, a risk preference investor may prefer the potential for high returns (five times the original investment) in exchange for a high probability of loss (three chances in 10 or 30%) as shown in Example 4.

Example 3. Expected Return on Investment

Outcome	Magnitude of Outcome	Probability of Occurrence	Expected Return
1	3×	10%	.30
2	2×	40%	.80
3	1×	40%	.40
4	0×	10%	.00
Total		100%	1.50

- Expected return of $1.50 per $1.00 invested.
- Range of returns of $0 to $3.00 per $1.00 invested.
- 50% chance the return will be more than the original investment.
- 40% chance that just the original investment will be returned.
- 10% chance the investment will be lost.

Example 4. Expected Return on Investment

Outcome	Magnitude of Outcome	Probability of Occurrence	Expected Return
1	5×	10%	.50
2	2×	40%	.80
3	1×	20%	.20
4	0×	30%	.00
Total		100%	1.50

- Expected return of $1.50 per $1.00 invested.
- Range of returns of $0 to $5.00 per $1.00 invested.
- 50% chance that more than the original investment will be returned.
- 20% chance that just the original investment will be returned.
- 30% chance the investment will be lost.

Putting These Methods into Practice

Identifying the various outcomes and the probabilities to attach to each outcome is not an easy exercise. However, just the process of thinking about alternative potential outcomes and their chances of occurrence, regardless of how crudely done, is a step forward in assessing an investment. It is better than just a black or white assessment focused on the simple decision of deciding whether the investment will succeed or fail.

To improve the analysis, there is an array of economic and financial methods to help assess the viability of an investment. Pro-forma financial statements such as balance sheets, income statements, and cash flow budgets provide an assessment of investment viability. Capital budgeting procedures are another method of determining viability. Alternative outcomes can be determined by identifying best case and worst case scenario analysis. In addition, sensitivity analysis can be conducted on major revenue and cost factors. These procedures are discussed in companion publications.

For more information on business development, visit the Ag Decision Maker website, www.extension.iastate.edu/agdm/vdanalysis.html.

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