File C5-94
June 2013
www.extension.iastate.edu/agdm

Ag Decision Maker

Understanding the Components of an Interest Rate

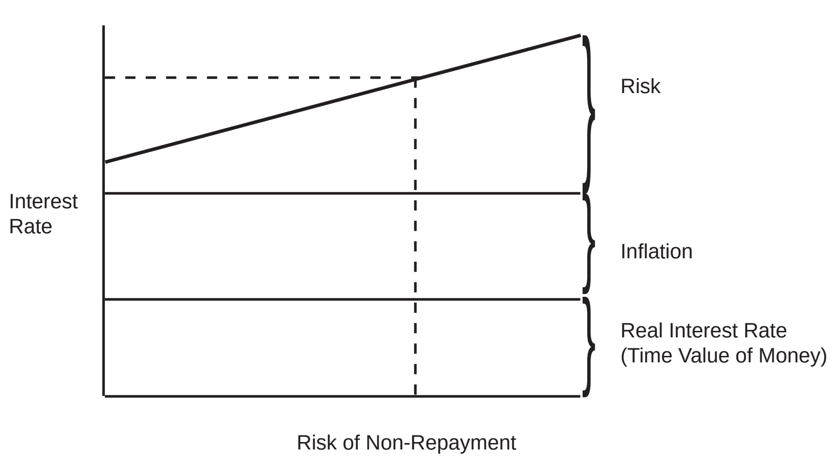
Interest can be thought of as rent for the use of money. If you want to use another person's money (e.g., the bank's), you, as the borrower, will be required to pay the other person (bank) a fee for the use of the money. The size of the rental rate or user fee is the interest rate. If the interest rate is 10 percent per year, then the rental rate for using $1,000 for the year is $100. The size of the fee (interest rate) is dependent on three factors, which are outlined in Figure 1.

The first factor is the "real" interest rate or the amount of return the lender wants to receive in exchange for letting the borrower use the money. This is related to the "time value of money" as discussed in other files in this section. Over the long-term, the real interest rate tends to average around 4 percent per year but can vary greatly. It represents the lender's potential return from investing the funds elsewhere instead of loaning them out.

The second factor is the compensation needed to offset the devaluation of money due to inflation. For example, if the price of everything you buy goes up by an average of 10 percent, the inflation rate is 10 percent. This means that it will take $110 or 10 percent more at the end of the year to purchase the same items that would have required only $100 to purchase at the beginning of the year. The increase in prices is actually a devaluation of money (loss in purchasing power) because a dollar will buy fewer goods and services than it did at the beginning of the year. To compensate for inflation over the time period, the lender will require to be repaid with more money at the end of the period than provided at the beginning of the period. If the inflation rate is 10 percent, the lender will require to be repaid 10 percent more money than provided at the beginning of the year (e.g., lend $100 and be repaid $110). If the inflation rate is 5 percent, the lender will require to be repaid 5 percent more money at the end of the year (e.g., lend $100 and be repaid $105).

The third factor is risk. The lender may be concerned about being repaid. So a risk factor (often called the risk premium) will be added to the interest rate. For a simple mathematical example, if lenders believe there is a 5 percent chance that they will not be repaid (one chance out of 20), then they may add a 5 percent risk factor to the interest rate (if collateral is provided to secure the loan, the risk premium will be less). If lenders believe there is a 10 percent chance that they will not be repaid (one chance out of 10), then they may add a 10 percent risk factor to the interest rate to compensate for the risk. So there is a direct correlation between the probability of non-repayment and the size of the risk premium.

Figure 1. Impact of the Time Value of Money, Inflation and the Risk of Non-repayment on Interest Rates



Generally, the interest rate is the sum of these three factors. If the real interest rate is 4 percent, inflation is 5 percent, and the risk of non-repayment is 2 percent,

Don Hofstrand
retired extension agriculture specialist
agdm@iastate.edu

Iowa State University
Extension and Outreach

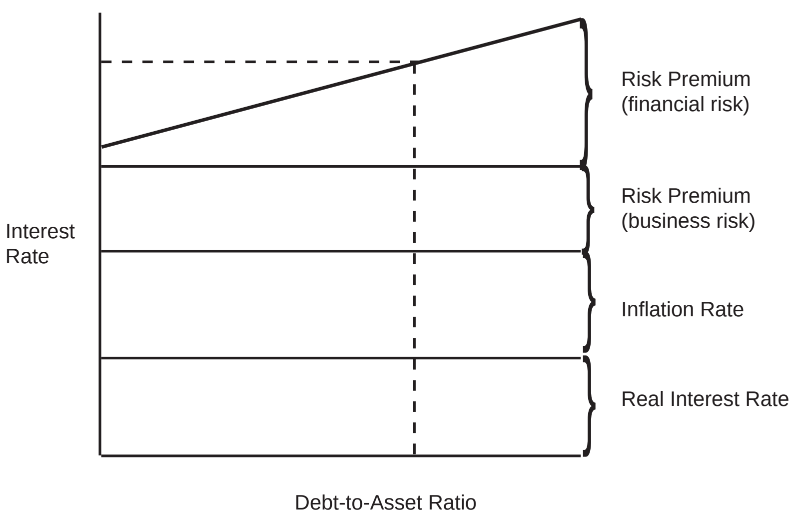
then the total interest rate is 11 percent (4% + 5% + 2% = 11%). If the risk of non-repayment is 8 percent rather than 2 percent, then the total interest rate is 17 percent (4% + 5% + 8% = 17%). If the real interest rate is 4 percent, inflation is 2 percent, and there is no concern of non-repayment, then the total interest rate is 6 percent (4% + 2% + 0% = 6%).

As shown in Figure 2, risk can be divided into two categories – business risk and financial risk. Business risk covers a wide variety of risk factors inherent in the business. Examples are marketing risk (e.g., nobody will buy your product), production risk (the production process will not work), management risk (e.g., managers will make poor decisions), and many other types of risk.

The financial risk of a business is often directly related to the solvency of the business. A measure of solvency is the debt-to-asset ratio. This ratio defines how the value of the business assets is divided between debt financing and equity financing. For example, a 20 percent ratio means that 20 percent of the financing comes from debt and the remaining 80 percent is from equity. An 80 percent ratio means that 80 percent of the financing comes from debt and the remaining 20 percent is from equity.

Because a business loss reduces equity before impacting debt, the amount of equity in a business entity defines the amount of loss the business can incur before there is a threat of non-repayment of the debt (loan). A large (small) buffer of equity means that the risk of non-repayment of the loan is reduced (increased). So, the financial risk premium of the interest rate is directly related to the debt-to-asset ratio. The larger the amount of debt per dollar of assets, the smaller the amount of equity per dollar of assets, the higher the risk of non-repayment, and the higher the interest rate financial risk premium. Although there are other measures of financial risk such as liquidity, the debt-to-asset ratio is an important determinant.

Figure 2. Impact of Business and Financial Risk on Interest Rates



Issued in furtherance of Cooperative Extension work, Acts of May 8 and November 30, 1914, in cooperation with the U.S. Department of Agriculture. Cathann A. Kress, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.