DECISIONS: GAMBLING, BORROWING, & INVESTING MONEY

How to make the best decisions to become wealthier, have partner happiness, and be a valued employee.

DECISION MAKING

- We all make countless decisions every day
- On the important ones, do we make the best decisions – ones that will likely end up with a favorable outcome?
- Or do we decide and simply hope it will be all right?
- How can we improve our chances that the decision we make has a favorable outcome?

DECISION SCIENCE – A WAY OF MAKING BETTER DECISIONS

- Decision Science is taught in University MBA programs to help new leaders make or influence key decision-makers like company Presidents & CEOs to make better decisions
- It is a structured decision-making process with ways to show relationships, alternatives & potential outcomes
- Uses concept of "expected value"
- Improves chance of a good outcome

Its principles are useful for all of us to make better decisions

EXERCISE #1

Who wants to make a bet?

I have a normal die with six sides having 1,2,3,4,5, and 6 dots)



It costs \$1 to play and if you pick the right number of dots, I will pay you \$2

Any body interested in playing?

EXPECTED VALUE

Expected value is the value a decision outcome would average if the same decision was made repeatedly with the same assumptions. So, let's see what that means....

A six-sided unloaded die will end up with a specific number of dots only one in 6 times <u>on average</u> or stated differently only 16.7% of the time. <u>16.7%</u> is the probability of a favorable outcome

If you bet \$1 to possibly get \$2 your expected value each time you play would be \$2 x 0.167 -1 or you should expect to lose 67 cents every time you play.

-\$0.67 is the expected value of this game. 🛞

GOOD DECISIONS AND GOOD OUTCOMES

- Was the decision to play a good or poor decision from a financial standpoint and why?
- What payoff would have neutral decision to play?
 i.e. an expected value = 0
- If a person played the game with a smaller than a neutral payoff and won money, would that have been a good decision to play?
- What minimum payoff would have been a good decision to play? If a person played the game with a positive expected value and lost their money, would it have been a bad decision to play?

EXPECTED VALUE AND DECISION MAKING

- To the extent you can afford to make a decision whose outcome has a positive expected value, it will be a good decision. Keep in mind that you can still have a bad outcome. On average, you should have a favorable outcome.
- You could have a good outcome even though the expected value is negative, but it would be a bad decision and you will likely lose money on average.
- Investing long term in a diversified portfolio of stocks & bonds would be an example of a good decision based on a positive expected value.
- Going to a casino, playing the lotto/buying scratchoffs, or on-line sports betting would be examples of bad decisions due to a negative expected value

EXPECTED VALUE SUMMARY

- Expected value is the probabalized outcome
- Making a decision that has a positive expected value is good
- Making a decision that has a negative expected value is bad.
- It is possible to have a bad outcome with a positive expected value and a good outcome a negative expected value.
- Casinos, sports betting, and lotteries count on a positive outcome to excite you play more reinforcing bad decision-making so they can make money in the long haul while you lose money!

POSSIBLE FUTURE DECISION SCIENCE CLASS TOPICS

- Decision traps that can cause you to make a poor decisions
- Framing the problem or opportunity
- Alternative development and evaluation
- Gaining better understanding and getting decisionmaker(s) and stakeholder(s) buy-in using Decision Science tools like...
 - Decision trees
 - Intangibles analysis
 - Dealing with uncertainty
 - Monte Carlo Simulations

SPENDING, BORROWING, AND INVESTING TOPICS

- In the previous Into to Decision Science slides, we see that making decisions that have negative expected value will likely cause you to lose money
- You will likely need to borrow money many times in your lifetime...what are considerations that are important so you don't waste money?
- What are investing (saving) considerations that increase your wealth and how do they differ?

BORROWING CONSIDERATIONS THAT ARE IMPORTANT SO YOU DON'T WASTE MONEY

- The biggest considerations to minimize the long-term cost to you are:
 - Is what you are borrowing for a likely appreciable asset with resale capability (e.g. a home), a depreciable asset with resale capability (e.g. car), or items that depreciate at a very high rate with limited resale capability
 - What is the likely appreciation or depreciation rate?
 - What is the borrowing interest rate?
 - Are the intangibles (non-financial benefits)significantly better than the alternatives?
 - Will you be able pay all the required payments when due? If not, it can hurt your credit score... increasing your costs and you may lose the thing you purchased.)
 - Credit cards Will you be able to pay off the card each month?

BORROWING FOR A HOME

You buy a home that costs \$300K and you put 20% down financing \$240K for 30 years at 3.5% interest.

| Balance | \$ | 240,000 | | | | |
|-----------------------------|-----------|-----------|--------|-----------|----------------------|------|
| Interest rate | | 3.5% | /yr | | 0.292% | /mo. |
| Periods | | 30 | yrs. | | 360 | mos. |
| Monthly payme | nt | | | | (\$1,078) | |
| | | | | | (\$387 <i>,</i> 975) | |
| | | | | | (\$60,000) | |
| Over 30 years, | your \$30 | 0K home | will o | cost*: | (\$447,975) | |
| Changing the interest rate | e to: | 6.5% | /yr | | 0.542% | /mo. |
| Monthly payme | nt : | | | | (\$1,517) | |
| Over 30 years, | your \$30 | 0K home | will | cost*: | (\$546,107) | |
| | | | | | (\$60,000) | |
| | | | | | (\$606,107) | |
| Total cost excludes excludi | ng mainte | enance ta | YAS I | ıtilities | and insurance | |

In the 35 years from '82 to '17 the house appreciated \$28K

The asking price today is \$227K higher than the original price 42 years go suggesting a \$162K appreciation over 30 years

At times, the value of the home was less than the purchase price!

BORROWING FOR A CAR

You buy an auto that costs \$30K and you put \$1k down financing \$29K for 5 years at 12% interest.

| | Balance | \$ 29,000 | | | | | | | | |
|--|---------------------------|--------------------|----------------|-----------|------|--|--|--|--|--|
| | Interest rate | 12% | /yr | 1% | /mo. | | | | | |
| | Periods | 5 | yrs. | 60 | mos. | | | | | |
| | Monthly payment | | | (\$645) | | | | | | |
| | | | | (\$1,000) | | | | | | |
| Over 5 years, your \$30K car will cost*: (\$39,705) | | | | | | | | | | |
| | | | | | | | | | | |
| Assuming 10%/yr straig | t line depreciation after | 5 years your \$30k | K car is worth | \$ 15,000 | | | | | | |
| You have lost nearly \$25,000 in 5 years which amounts to ~ \$3/hr working full time | | | | | | | | | | |

CREDIT CARD DEBT

- Having a credit card that pays you 1 1.5% and you pay off the balance each month is a good thing. You get free money!
- Having a credit card where you carry an unpaid balance on is bad due to the very high interest rate!

| | Month 1 | Month 2 | Month 3 | Month 4 | Month 5 | Month 6 | Month 7 | Month 8 | Month 9 | Month 10 | Month 11 | Month 12 |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|
| Credit limit: | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 | \$3,000 |
| Monthly balance: | \$1,000 | \$1,000 | \$999 | \$999 | \$998 | \$998 | \$998 | \$997 | \$997 | \$996 | \$996 | \$996 |
| Minimum payment required | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 |
| Interest on balance | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 | \$20 |
| Cumulative interest paid | \$20 | \$39 | \$59 | \$78 | \$98 | \$117 | \$137 | \$157 | \$176 | \$196 | \$215 | \$235 |

In the above example, a \$1000 purchase has cost you \$1235 and you still owe \$996!

INVESTING IN A FIXED INCOME INVESTMENT

Beginning at age 18 and saving \$3/day @ 5% interest, you will have:

| By age: | 19 | 20 | 25 | 30 | 40 | 50 | 60 | 70 |
|---------------|---------|---------|---------|----------|----------|----------|-----------|-----------|
| Future value: | \$1,095 | \$2,245 | \$8,915 | \$17,429 | \$42,163 | \$82,452 | \$148,079 | \$254,978 |

The key is starting to save early in life, be consistent in saving, and not touching the savings unless it is really, really important!

I-BONDS

- Inflation will eat away your savings in terms of what your dollar can buy
- Things that the government might do to curb inflation can hurt stock prices
- There are some investments you can make, like government i-bonds that pay a little interest over the inflation rate making them another good investment

INVESTING IN STOCKS -THE S&P 500

Investing \$3/day in the S&P 500 and getting the same average return as it has produced over the last 150 years you would have \$1.17M by age 70!!!

| By age: | 19 | 20 | 25 | 30 | 40 | 50 | 60 | 70 |
|--------------|---------|---------|----------|----------|----------|-----------|-----------|-------------|
| Future value | \$1,095 | \$2,291 | \$10,155 | \$22,399 | \$71,150 | \$189,344 | \$475,898 | \$1,170,632 |

Today you and buy ETFs that track the S&P 500 and companies like Schwab allow you to buy fractional shares

The key is starting to save early in life, be consistent in saving, and not touching the savings unless it is really, really important!

BALANCING YOUR INVESTMENTS

While you may be tempted to only invest in a top performers like the S&P 500, due to the risks associated with the stock market over short term horizons and the fact you may need \$ when markets are down, you should work towards having a diversified portfolio of investments including stocks, bonds, i-bonds, CDs, and money market savings

SUMMARY TAKE-AWAYS

- Doing things like buying lottery tickets & scratch-offs, sports betting, betting in casinos, etc. that have a negative expected value is not good from a wealth standpoint
- Consider the considerations previously listed when thinking about borrowing money
- Payoff credit card balances each month!!!
- Start saving some portion of your money as soon as possible, be consistent in your savings, and keep them for truly important things!
- Work toward diversification in your savings

Questions?