GFLEC
GLOBAL FINANCIAL LITERACY
EXCELLENCE CENTER

Planning for Retirement

Lecture 5

Saving and planning

There are a number of events for which consumers save.

- For a child's college education.
- For the down payment on a home.
- For a new car.
- For retirement.
- For emergencies.

To meet large long-term savings goals, it helps to set aside a little bit each year (or month).

- Making a regular, fixed contribution can become a habit.
- With proper planning, you can be confident you will have the money when you need it, and can avoid incurring in unwanted debt.
- By starting now you can take advantage of the power of interest compounding and reach your goal!

Example: At 39, he won Super Bowl!

Peyton Manning

2016, Super Bowl 50

Example: A career in football

Should he retire? What we do we need to know to advise him?

Is planning important?

What happens to a lot of football players after they retire?

Evidence from research

- Collected data from all NFL players drafted from 1996 to 2003 and followed them over time.
- Median level of earnings is 3.2 million (in $2000).
- Careers are normally short, many players stopped playing before they reach the age of 30.
- As soon as they retire, players start going bankrupt;12 years into retirement, more than 15% if players had declared bankruptcy.
- Going bankrupt does not depend on income or length of career.

Source: "Bankruptcy Rates among NFL Players with Short-Lived Income Spikes" (Carlson, Kim, Lusardi, and Camerer, 2015).

Meeting a Savings Goal

Saving for a college education

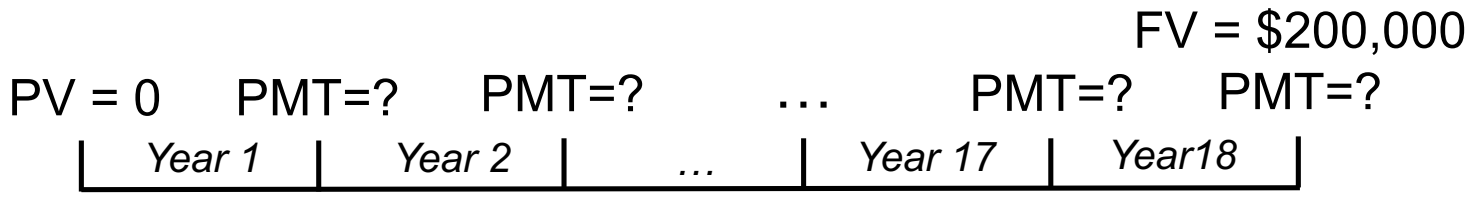
A child's college education can be a significant expense. To ensure that you're able to meet the expense, plan ahead.

- In the first lecture, we demonstrated the power of interest compounding. To save for your child's $200,000 private college education, you can set aside about $80,000 when they are born.
- But for many, it is hard to come up with $80,000 at any given moment (especially with all the other expenses new children bring!). It is more manageable to save a little bit each year.
- If you invest in a combination of stock and bonds that you expect to earn, say, 5% each year, you could save for your child's education by saving **$7,109 at the end of each year**.
- Or, if you'd prefer to start today, you can save **$6,771 at the beginning of each year**, starting today.

Saving for a college education

Let's see how to compute the necessary end-of-year contributions.

This problem has the following cash flow structure:



Interest Rate = 5%, Frequency = 1

Where the payment can be solved for using a financial calculator:

Time Value of Money	
P/Y	1
PV	$0
N	18
FV	$200,000
I/Y	5%
PMT=	-$7,109.24

Saving for a college education

Now let's see how to the required contributions when they are made at the **beginning of the year**.

This problem has the following cash flow structure:

Interest Rate = 5%, Frequency = 1

This does not fit the TVM structure that we are used to! In order to use the TVM function as we have used it, the payments must occur at the *end* of each period.

Fortunately, there is a way to change the timing of the periodic payment on your financial calculator…

Saving for a college education

Now let's see how to calculate the required contributions when they are made at the **beginning of the year**.

With your financial calculator set to **beginning-of-period** payments, you can solve for the required annual contribution:

Time Value of Money	
BGN	BGN
P/Y	1
PV	$0
N	18
FV	$200,000
I/Y	5%
PMT=	-$6,770.71

It only costs $6,771 per year instead of $7,109 if you contribute at the beginning of each year. This is because, when you contribute earlier, each contribution gets an extra year's interest!

Saving for a down payment

Even with a mortgage, homebuyers may still need to accumulate savings to meet their down payment, and this may require several years worth of savings.

- To make a 20% down payment on a $400,000 house, a homebuyer will need $0.20 * \$400{,}000 = \$80{,}000$.
- If the homebuyer sets aside $1,250 each month in a savings account earning 3%, it will take about five years to accumulate the necessary savings.
- Or, if the homebuyer wants to have enough to make the down payment in 3 years, he must set aside $2,121 a month for three years.

Saving for a down payment

These values can be found using a financial calculator (remember to change back to end-of-period payments after the last problem):

Time Value of Money	
P/Y	12
FV	$80,000
PV	$0
PMT	-$1,250
I/Y	3%
N=	59.30
N	36
PMT=	-$2,121.19

Note that some planners might ignore the effect of interest and plan to set aside $\frac{\$80{,}000}{36} = \$2{,}222$ per month for 36 months. This is incorrect and we see that even with a small interest rate of 3% over a relatively short period of three years, our future home buyer can save $100 per month.

Living Off Savings

Living off of savings

There are several reasons consumers might wish to live off their savings over a long period of time.

- They are retired.
- They worked in a field where they earn a lot of wealth early in their career, and retire early.
- They want to take a decade off from work and write the next great American novel…

How long accumulated wealth will last, or how much a consumer may withdraw each year over a set time period, can be calculated with a financial calculator.

Living off savings

Consider the following example.

- Bob is a 60 year-old train conductor. This year, he decides to retire to spend more time with his grandchildren and pursue his hobby of model train collecting.
- He has saved up $800,000 that he would like to last him the rest of his life. Based on the average life expectancy, he plans as if he will live another 30 years.
- Because his investment horizon is medium-term, he elects to invest in a combination of stocks and bonds from which he expects an average return of 6% per year.
- Under these circumstances, Bob may withdraw $54,829 at the beginning of each year for the next 30 years.
- He instead elects to have an additional $100,000 at the end of 30 years – partly in case he lives to be older than 90 and partly because he'd like to leave something for his grandchildren. He may still withdraw $53,636; only about $1,193 less per year!

Living off savings

Both of these cases may be quickly calculated using a financial calculator.

Time Value of Money	
BGN	BGN
P/Y	1
PV	-$800,000
N	30
FV	$0
I/Y	6%
PMT=	$54,829
FV	$100,000.00
PMT=	$53,636

The reason the difference between the two is **the power of interest compounding**. Setting aside $1,193 per year for 30 years in an investment returning 6% will turn into $100,000!

Monitoring your savings

Things do not always work out as you plan. Your savings may not earn the rate of return you assumed, or you may not make the contributions/withdrawals you intended. That's okay, just monitor your savings and adjust accordingly!

- Five years into his retirement, Bob has learned that budgeting is hard work! He has often withdrawn more than the $53,636 he planned for.
- Further, he suspects that his investments haven't performed quite as well as he had forecasted.
- His wealth now stands at about $670,000 and he wants to make sure he has enough to meet his goals. But if he continues to withdraw $53,636 per year, he will run out of wealth at age 86 (in 21 years), assuming a 6% return.
- To be safe, he assumes a return of 5% a year going forward, and vows to reduce his withdrawals to $43,500 per year and he will still have around $90,000 when he is 90 years old.

Monitoring your savings

If things had gone as planned, Bob **should have had $750,000** at this point in his retirement.

Time Value of Money	
BGN	BGN
P/Y	1
PV	-$800,000
N	5
PMT	$53,636
I/Y	6%
FV	$750,088

Time Value of Money	
BGN	BGN
P/Y	1
PV	-$670,000
PMT	$53,636
FV	$0
I/Y	6%
N=	21.07

Instead, he only has $670,000. If he continues to withdraw $53,636 per year, he will **run out of money in 21 years**.

Knowing this, he **reevaluates** his assumptions and **adjusts** his withdrawals. He will now only withdraw $43,500 per year.

Time Value of Money	
BGN	BGN
P/Y	1
PV	-$670,000
PMT	$43,500
N	25
I/Y	5%
FV=	$88,922.57

Retirement Planning

Retirement planning

The biggest investment programs most consumers will undertake during their lifetime is their **retirement plan**. Retirement planning requires two distinct stages:

- First, a consumer must decide on their target income in retirement and **determine the amount of savings they will need to accumulate** to sustain such withdrawals.
- Second, the consumer must determine **how much needs to be saved each year** to reach that target balance come retirement.
- Both calculations can be easily performed using a financial calculator.

Retirement planning

If retirees are willing to amortize their savings, instead of insisting on living off interest payments alone, they can reduce the level of savings necessary to maintain a given standard of living in retirement.

- A couple earns a combined salary of $70,000 per year. They plan to retire in 35 years at age 65, at which point they hope to maintain their current standard of living by withdrawing $70,000 per year. During retirement, their account will earn 3.5% per year in interest.
- If the couple lives **entirely off interest**, they must save $2,000,000 by the time they reach retirement: $\$2{,}000{,}000 * 0.035 = \$70{,}000$.
- If they are instead willing to **amortize their savings over 30 years** (implicitly assuming neither will live past 95 years old), they need only save $1,287,000 by retirement.
- The risk is that they may live longer than 95 and run out of savings. If they instead saved enough to **last them 50 years**, they would need $1,642,000. This is still much less than $2,000,000.

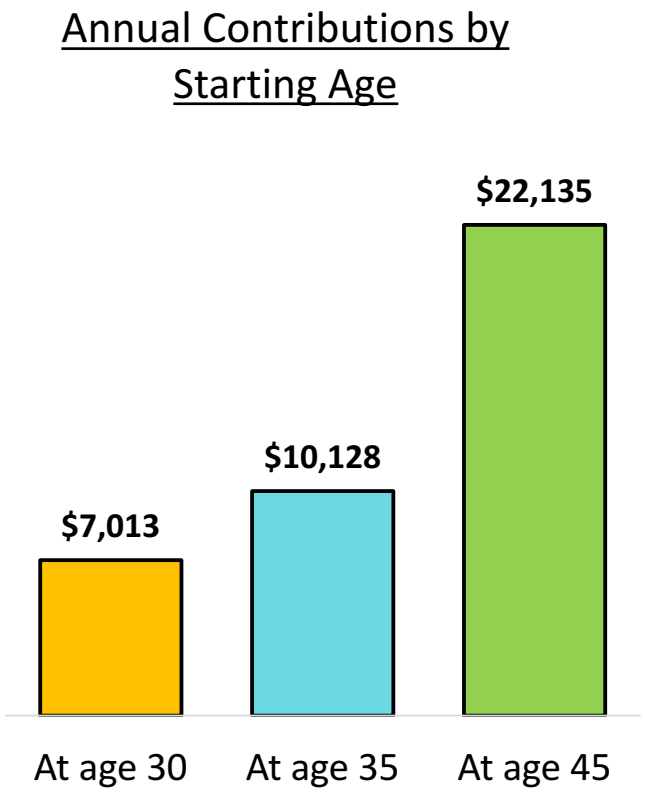
Retirement planning

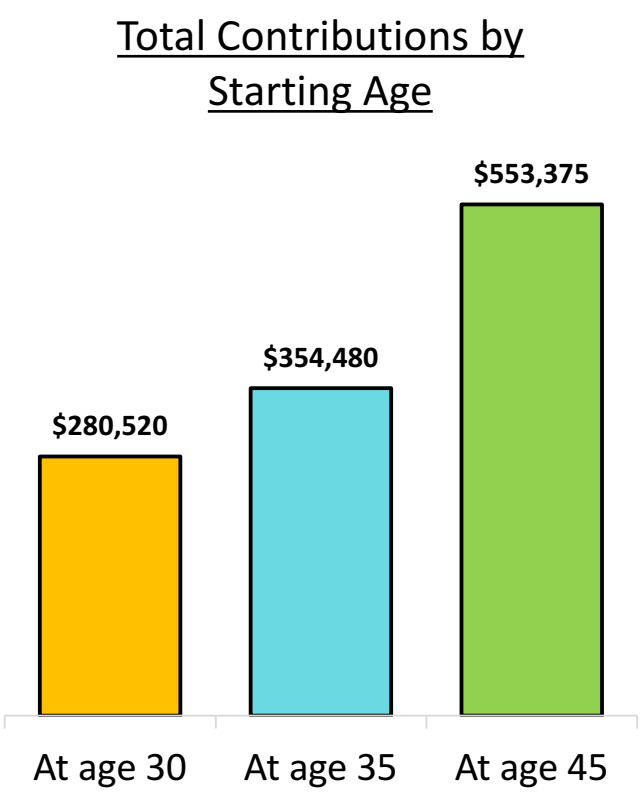
Once retirees know the savings they need to reach a certain balance, they should start saving for it as soon as possible. If they wait too long, it will take larger annual contributions to reach that balance.

- The couple in the last example decides on a target balance of $1,400,000 by retirement. They estimate they can earn an average return of 7% in their investment account over the next 35 years until retirement.
- If the couple starts today, they need only set aside $10,128 at the end of each year for the 35 years. In total, they must contribute $35 * \$10{,}128 = \$354{,}480$.
- If instead, they wait another ten years to start saving, they must make annual contributions of $22,135 for 25 years, or $553,375 in total. If they had started saving five years ago, it would have taken 40 contributions of only $7,013, or $280,520 total.

Retirement planning

When starting to save for retirement, don't delay, and do start early!





Retirement planning

Retirement savings can be calculated using a financial calculator in two steps.

Step 1: Target balance

The couple wants $70,000 per year in retirement. They are willing to amortize their savings over 30 years and expect 3.5% annual returns on their savings while in retirement. They must save $1.3M.

Time Value of Money	
P/Y	1
PMT	$70,000
FV	$0
N	30
I/Y	3.5%
PV=	-$1,287,443

Time Value of Money	
P/Y	1
PV	$0
FV	$1,400,000
N	35
I/Y	7.0%
PMT=	-$10,127.54

Step 2: Contribution

The couple decides on a target balance of $1.4M to be safe. The have 35 years to save and expect their retirement account to earn 7% per year while they save for retirement. They must contribute $10,128 each year.

Risk and Retirement Planning

Financial risk in retirement planning

When we considered retirement planning in the previous example, we ignored a couple of important factors. First, we ignored **financial risk**:

- **Financial risk** is the risk that a security, such as a stock or a bond, does not provide the return an investor anticipates.
- In our example, we assumed a certain 3.5% return on the couple's retirement fund during retirement, and a 7% return while the couple saved for retirement.
- In reality, while these might be fine numbers to plan with, the actual return a couple realizes might be less, and it's important to understand the effect of lower-than-expected returns on retirement income.

Financial risk in retirement planning

Assume a 3.5% interest rate on a couple's savings during a couple's retirement, and a target income of $70,000 per year during retirement. Assume a 7% return on their account for 35 years while saving for retirement. We can find that the couple will need to accumulate $1,287,443, and do so by making annual contributions of $9,313:

Target balance

Time Value of Money	
P/Y	1
PMT	$70,000
FV	$0
N	30
I/Y	3.5%
PV=	-$1,287,443

Annual contributions

Time Value of Money	
P/Y	1
PV	$0
FV	$1,287,443
N	35
I/Y	7.0%
PV=	-$9,313

Financial risk in retirement planning

However, if the couple only earns 5% on their retirement investments and 1.5% interest on their savings account during retirement, they will only accumulate $841,153 by the time they reach retirement, and may only live off of $35,025 a year for 30 years:

Realized balance

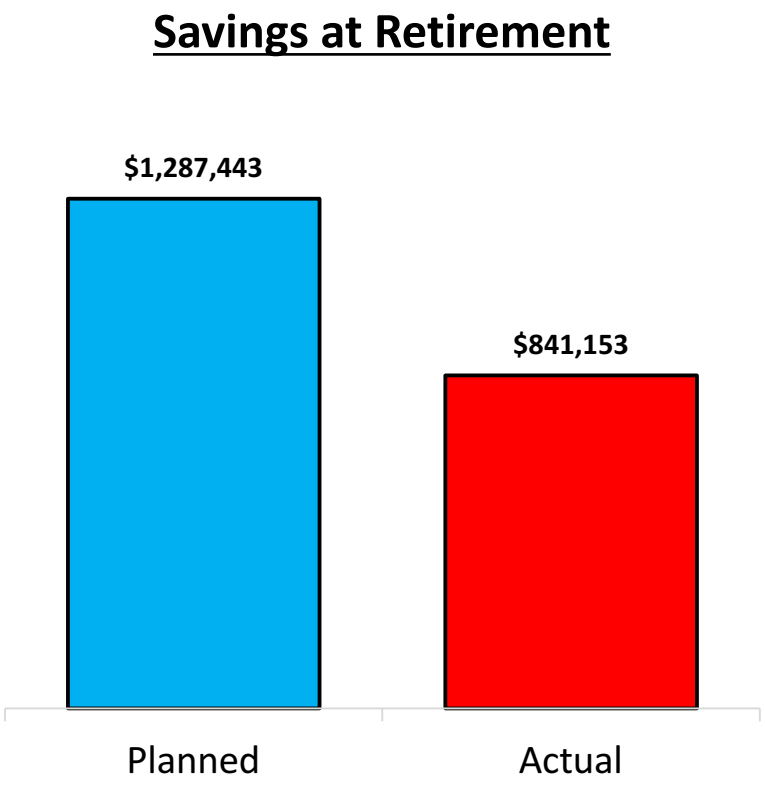
Time Value of Money	
P/Y	1
PV	$0
PMT	-$9,313
N	35
I/Y	5.0%
FV=	$841,153

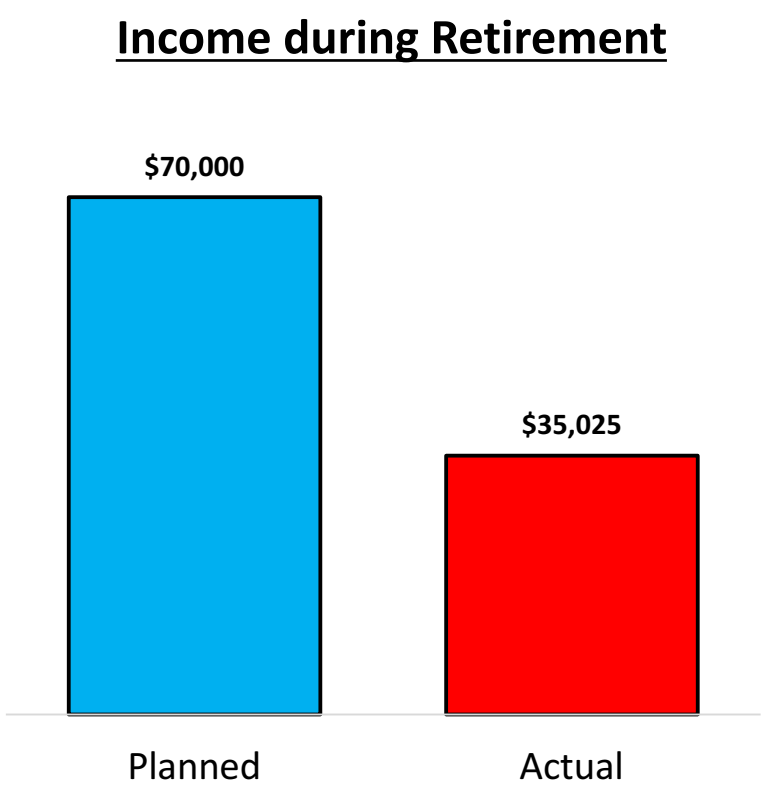
Retirement income

Time Value of Money	
P/Y	1
PV	-$841,153
FV	$0
N	30
I/Y	1.5%
PV=	$35,025

Financial risk in retirement planning

If a consumer experiences poor investment returns and then a low-interest rate during retirement, he or she may find much less income in retirement than was planned for:





Financial risk in retirement planning

One strategy to cope with financial risk is to simply save more.

- If the couple from the example above instead saved $12,000 a year instead of $9,000, then the could still withdraw $45,000 a year in retirement even if their investments performed more poorly than expected.

And another strategy is to monitor your retirement account regularly, and adjust the annual contribution as necessary.

- If the couple above began making $9,000 contributions as planned, but made a habit of evaluating their portfolio performance (every few years, for example), they could recalculate and increase their annual contribution rate if the realized return was lower than the 7% they expected.
- Or, they could begin by making the $12,000 contributions, just to be safe, and gradually decrease their contributions if their portfolio performs as expected. (But should be careful not to decrease their contributions too much after a period of high returns – if a market reversal occurs, they may quickly go from exceeding their goal to coming short of it.)
- We will discuss financial risk more thoroughly in future lectures.

Retirement planning and inflation

Another important factor that we ignored was **inflation**:

- When planning, our couple **assumed they could maintain their standard of living by living off of their current income** of $70,000 throughout retirement.
- In most economies, however, **the prices of goods rise steadily but slowly over time** and so consumers cannot maintain the same standard of living off a constant income.
- This is known as **inflation**, and in the long term its effect is large and so it must be considered during long-term planning.

In future lectures we will discuss inflation. We will return to this same problem and demonstrate that inflation can be incorporated by making only one slight adjustment to our methodology.

Social Security and risk

Earlier, we analyzed the implicit return on Social Security. While the return is lower than what is offered on other financial products, Social Security provides the following additional benefits:

- Social Security provides a guaranteed stream of cash flows, unlike other, higher-yielding investment products (i.e., Social Security benefits are not subject to **financial risk**).
- Social Security benefits are **adjusted for inflation**, so automatically adjust for increases in the cost of living.
- Social Security provides payments for as long as the beneficiary lives, so contains an element of **insurance against unexpected longevity**. While a savings account might run out if a retiree lives longer than planned, Social Security will not.

Saving for Early Retirement

The savings rate and retirement

In this section, we discuss the effect of the savings on retirement planning.

- The **retirement savings rate** is the percentage of a consumer's annual (after-tax) income that they save for retirement.
- As a rule of thumb, many financial advisors recommend that people save 10% of their income for retirement.
- Generally, this should be enough for a person to retire around age 65, which is a common retirement age.
- But if a person increases their savings rate above 10%, they can retire earlier, and if they save aggressively, may even achieve complete financial freedom at a young age.

10% retirement savings rate

The following shows that a **10% savings rate** allows a couple to retire at age 67.

Ex 1. John and Martha, who are each 20 years old, have a combined annual (after-tax) income of $100,000.

Each year, they save $10,000, or 10%, of their income for retirement, and live off the remaining $90,000. At retirement, they hope to maintain the same standard of living by withdrawing $90,000 from their retirement account each year.

If John and Martha expect to earn 5% on their account in retirement and plan to live entirely off of interest, dividends, and capital gains, they must save $1.8M before they retire:

$$0.05 * \$1{,}800{,}000 = \$90{,}000$$

10% retirement savings rate

Ex 1. (continued)

If they earn an average of 5% on their investments while saving for retirement, they'll be able to retire in 47 years (or at age 67).

Time Value of Money	
P/Y	1
PV	$0
PMT	-$10,000
FV	$1,800,000
I/Y	5%
N=	47.19

Therefore, the 10% savings rate is sufficient for John and Martha to retire at age 67.

50% retirement savings rate

The following shows a **50% savings rate** allows a couple to achieve financial freedom very early.

Ex 2. John's brother, Scott, and his wife, Alice, also earn a combined annual (after-tax) income of $100,000.

Unlike John and Martha, however, Scott and Alice do not base their savings rate on the common rule of thumb that they should save 10% of their income for retirement. Instead, **they establish a budget and find that they can live comfortably off $50,000 per year and decide to save the remaining $50,000** (for a 50% savings rate).

Instead of spending their excess income, Scott and Alice like to think of their savings as "buying their financial freedom". When they reach the point where they can live off of their investments, they know they'll be able to quit their 9-5 jobs and pursue their passions, hobbies, or dream jobs, even if doing so doesn't provide much income.

50% retirement savings rate

Ex 2. (continued)

Because they're perfectly comfortable with $50,000 per year, Scott and Alice need to accumulate only $1,000,000, assuming a 5% return on their investments:

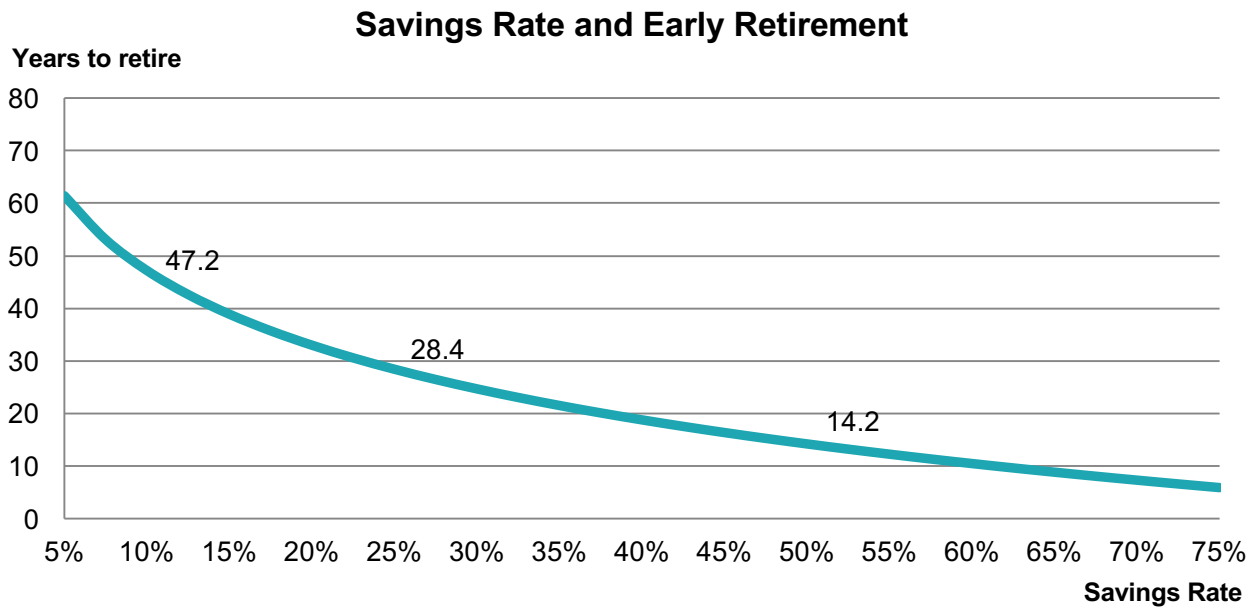
$$0.05 * \$1{,}000{,}000 = \$50{,}000$$

And if they receive 5% on their investments, they'll save this amount in a little over 14 years. With their 50% savings rate, Scott and Alice can achieve complete financial freedom before age 35!

Time Value of Money	
P/Y	1
PV	$0
PMT	-$50,000
FV	$1,000,000
I/Y	5%
N=	14.21

The savings rate and early retirement

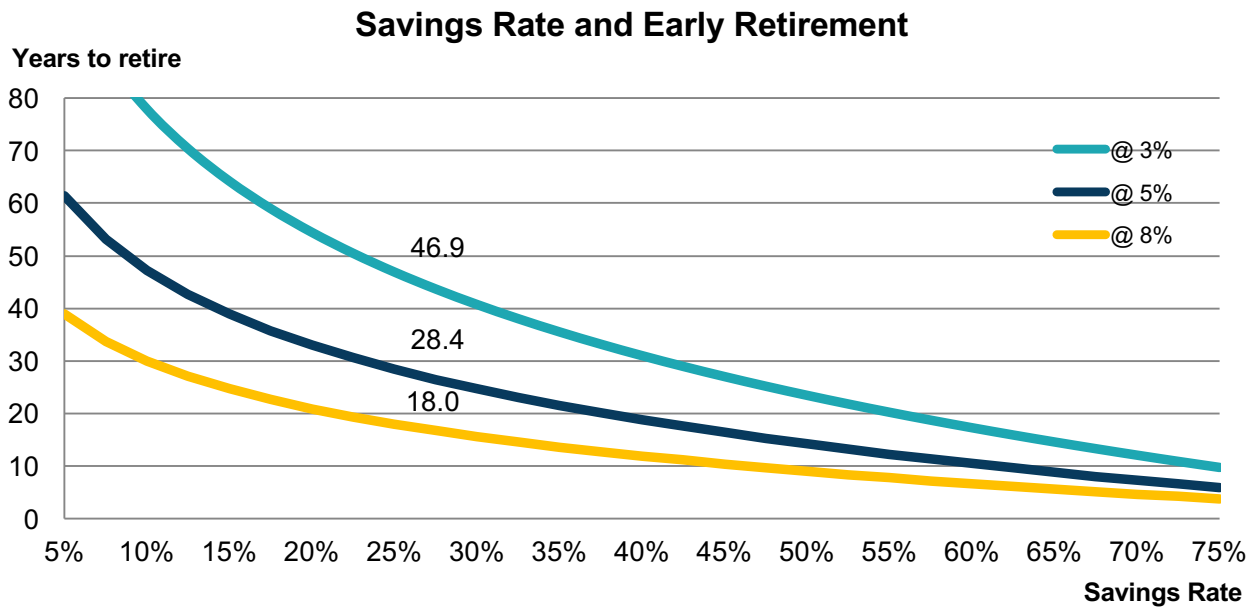
The following chart shows the effect of the savings rate on retirement planning.



Note: Assumes 5% return and no amortization of principal balance.

The savings rate and early retirement

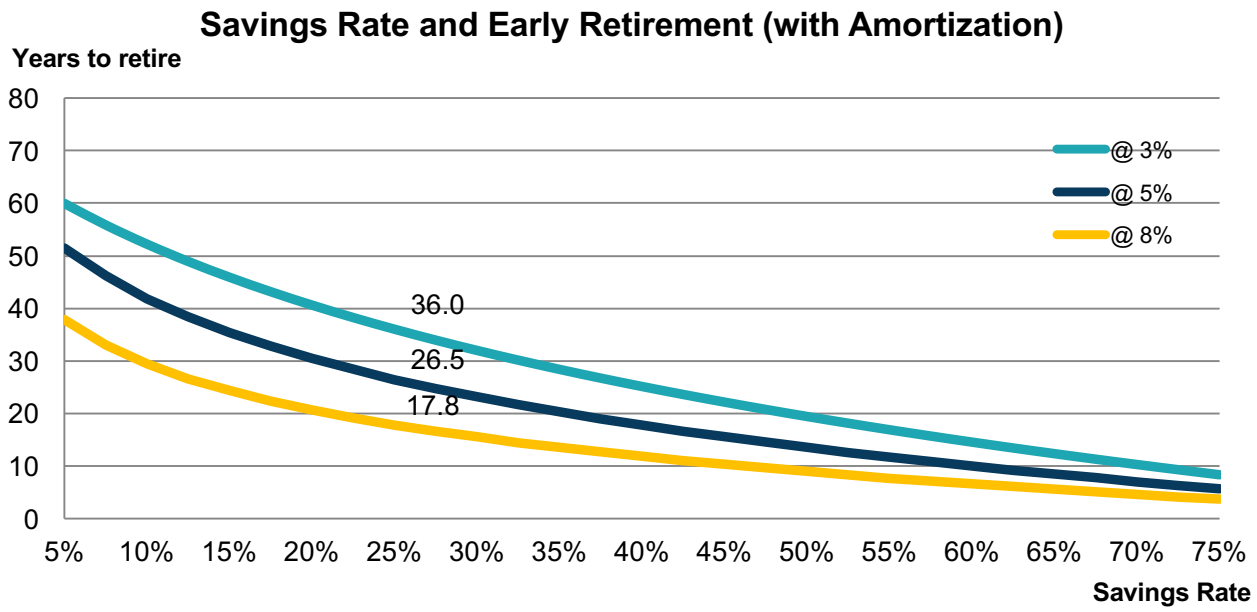
And the following chart considers the same for different assumed returns.



Note: Assumes no amortization of principal balance.

The savings rate and early retirement

And if a retiree is willing to draw from principal, they may retire even earlier for any given level of savings.



Note: Assumes amortization of principal until 70 years from starting date. For example, a couple saving 25% of their income beginning at age 20 and earning a return of 5% may retire in 26.5 years and will be able to live off their savings until age 90.

Collecting Social Security Early

Social Security and early retirement

The Social Security administration gives participants the option to collect their benefits as early as age 62, instead of the normal retirement age of 66. However, doing so reduces the amount of the monthly benefit by 25%. This has the following effects:

- The amount of each benefit decreases, and this decreases the value of Social Security.
- The number of years over which benefits are received increases, and this increases the value of Social Security.
- Because benefits are collected sooner, they are worth more by the time value of money, and this increases the value.

The following example takes these considerations into account and analyzes the financial value of collecting early.

Social Security and early retirement

Ex 1. As was discussed in an earlier lecture, a worker who earns $50,000 a year during his/her career can expect annual benefits of approximately $22,000 per year from Social Security. If such worker chooses to collect early, these benefits will decline by 25% to $16,500.

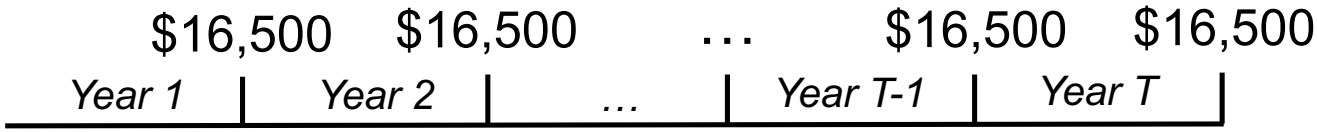
Consider the following case:

- Mr. Johnson decides to retire today at age 62 and is considering whether to begin collecting Social Security now or to defer collecting benefits until he reaches 66 years old.
- If he collects early, he will receive $16,500 for the rest of his life, starting this year.
- If he defers collecting benefits, he will receive nothing for the following four years, and $22,000 each year thereafter.

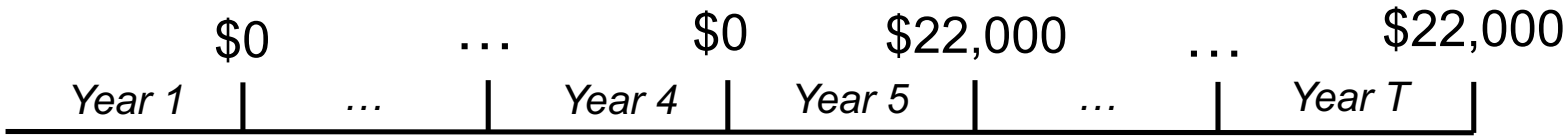
Social Security and early retirement

Ex 1. (continued)

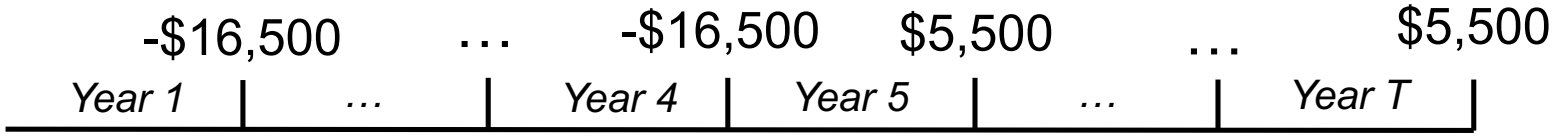
If he collects early (and lives T more years):



Or, if he defers collection until he reaches age 66:

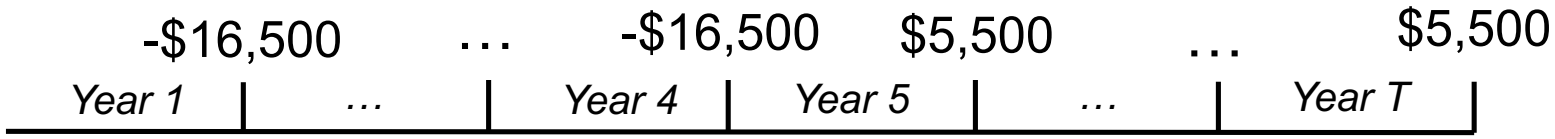


In other words, by deferring, he gives up $16,500 per year for four years, but receives an additional $5,500 per year thereafter. The incremental cash flows from deferring are:



Social Security and early retirement

Ex 1. (continued)



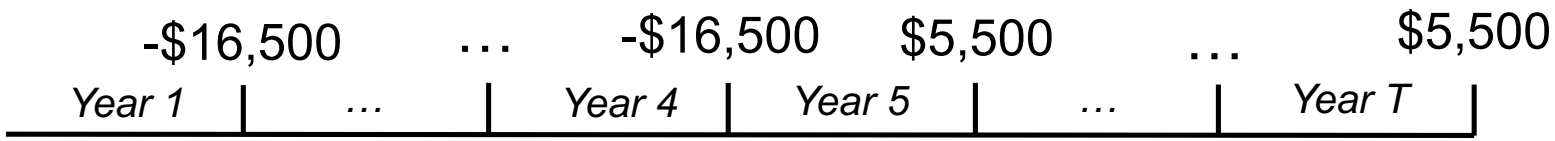
The NPV of deferring is then:

$$PV = \sum_{t=1}^{4} \frac{-\$16{,}500}{(1+r)^t} + \sum_{t=5}^{T} \frac{\$5{,}500}{(1+r)^t}$$

Where *T* is the number of additional years Mr. Johnson lives, and *r* is his discount rate. The financial value of deferring can be evaluated using the IRR methodology for a variety of life expectancies…

Social Security and early retirement

Ex 1. (continued)



For example, if Mr. Johnson lives through age 85, the implied return on deferring will be:

Cash Flow Worksheet	
CF_0	$0
C01	-$16,500
F01	4
C02	$5,500
F02	20
IRR=	4.63%

Social Security and early retirement

Ex 1. (continued)

The following table lists the IRR Mr. Johnson will realize by deferring collection if he lives until 75, 85, 95, 105:

Age of Death	IRR	Total Benefits Early Collection	Total Benefits Deferred Collection
75	-2.53%	$231,000	$220,000
85	4.63%	$396,000	$440,000
95	6.40%	$561,000	$660,000
105	7.00%	$726,000	$880,000

Intuitively, the “return” on deferring increases with a retiree’s longevity.

But if the retiree does not live long, deferring collection will actually *destroy* value.

Social Security and early retirement

Remember that the IRR is a **benchmark** return. If alternative but comparable investments are expected to yield a higher return, it is better to invest in the alternative.

Ex 2. The table above showed that the IRR for collecting early for Mr. Johnson collecting Social Security early is 4.63% if he lives until age 85. This rate should be compared to the rate he can earn on his savings to determine whether he should collect early.

Determine whether Mr. Johnson should collect early (a) if he can earn a return of 5% on his savings and (b) if he can earn a return of only 4% on his savings.

(Note that Mr. Johnson has savings that he can live off over the next four years if he defers collection.)

Social Security and early retirement

Ans.

(a) To compare deferring to collecting early, assume that Mr. Johnson collects early and instead invests the early payments. If his savings rate is 5%, then at age 66 he will have:

Time Value of Money	
P/Y	1
PV	$0
PMT	-$16,500
N	4
I/Y	5%
FV=	$71,117

Social Security and early retirement

Ans. (continued)

Then, between the ages of 66 and 85, he can make annual withdrawals of:

Time Value of Money	
P/Y	1
PV	-$71,117
FV	$0
N	20
I/Y	5%
PMT=	$5,707

Added to his $16,500 benefits payments, this implies that Mr. Johnson will effectively receive $5,707 + $16,500 = $22,207 per year between the ages of 66 and 85 from collecting early.

Because this is greater than the $22,000 he would receive if he deferred, it would be better to just collect early and invest the first four early payments!

Social Security and early retirement

Ans.

(b) On the other hand, if his savings rate is only 4%, and Mr. Johnson collects early and invests those payments, then at age 66 he will have:

Time Value of Money	
P/Y	1
PV	$0
PMT	-$16,500
N	4
I/Y	4%
FV=	$70,067

Social Security and early retirement

Ans. (continued)

Then, between the ages of 66 and 85, he can make annual withdrawals of:

Time Value of Money	
P/Y	1
PV	-$70,067
FV	$0
N	20
I/Y	4%
PMT=	$5,156

Added to his $16,500 benefits payments, this implies that Mr. Johnson will effectively receive $5,156 + $16,500 = $21,656 per year between the ages of 66 and 85 from collecting early.

Because this is **less** than the $22,000 he would receive if he deferred, it would be better to defer collection!

Social Security and early retirement

Ans. (continued)

When Mr. Johnson is able to earn a return on his savings that exceeds the 4.63% return from deferring collection, it is best to collect early. When the 4.63% return from deferring collection exceeds the return on his savings, it is best to defer collection and earn this implicit return.

This example depended on Mr. Johnson deciding to retire today, regardless of whether he collects or not. It also assumed he has sufficient savings to fund his retirement for the next four years if he decides to defer collection. Different assumptions will change the analysis.

Furthermore, in reality, Mr. Johnson may be uncertain about how long he will live, or the exact return his investments might earn through retirement. One benefit of Social Security is the certainty of its payouts…

Employer Matching

Employer matching

Video about the importance of employer matching

“How an Employer Match Boosts Savings”

http://gflec.org/education/educational-videos/

Employer matching

In work-sponsored retirement plans, employers often offer to match employee's contributions up to a certain amount.

When employers match the contribution 100%, this is equivalent to an automatic return of 100% for that contribution during the period – a return that's hard to match in the financial markets.

The following examples demonstrate the effects of employer matching on the employee's retirement funds.

Employer matching

Ex 1. A simple two-period example can be used to illustrate how to calculate the effects of employer matching. Assume that **an employee invests $5,000 at the beginning of each year for two years and the employer matches this contribution with another $5,000**. Assume the investment **returns 8% each year**.

What would the final value of the retirement plan be without the match?

What is the final value with the match?

What is the implied rate of return on the employee's contributions with the match?

Employer matching

Ans. With no match, the final balance is computed as follows:

$$B = \$5{,}000(1.08)^2 + \$5{,}000(1.08) = \$11{,}232$$

With an employer match, each contribution is doubled, and so the final balance is doubled:

$$B = \$10{,}000(1.08)^2 + \$10{,}000(1.08) = \$22{,}464$$

The implied rate of return on the employee's contribution, satisfies the following equation:

$$B = \$5{,}000(1+r)^2 + \$5{,}000(1+r) = \$22{,}464$$
$$\rightarrow r = 68\%$$

The employer matching exactly doubled the employee's ending balance and increased the average return from 8% to 68%!

Employer matching

Ex 2. Although the math is more complex, a 40-year example provides a more realistic illustration of the effect of employer matching on the implied average return. In this case, the final balances can be found using a financial calculator:

Time Value of Money	
BGN	BGN
P/Y	1
PV	$0
PMT	-$5,000
N	40
I/Y	8%
FV=	$1,398,905

The employer contribution will double this amount to $2,797,810.

Employer matching

Ex 2. (continued)

Given the employer match, the implied rate of return on the employee's contributions is:

Time Value of Money	
BGN	BGN
P/Y	1
PV	$0
PMT	-$5,000
N	40
FV	$2,797,810
I/Y=	10.49%

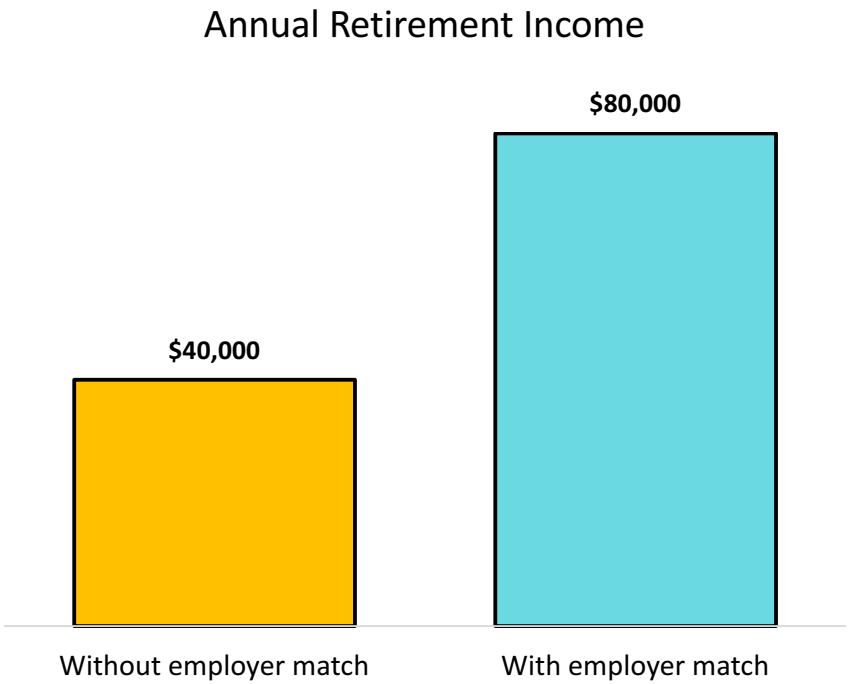
The employer matching increases the average annualized return by 2.5 percentage points.

Although the 2.5% increase appears less dramatic than the 60% increase in the previous example, the 2.5% increase has a huge effect when compounded over 40 years: **ending wealth is doubled.**

Employer matching

Employer matching doubles each contribution and, therefore, doubles ending wealth.

Taking advantage of employer matching, for example, could mean the difference between living of $40,000 per year or $80,000 per year in retirement!



Today we learned…

- ✓ Meeting savings goals (continued)
- ✓ Living off savings
- ✓ Retirement planning
- ✓ Risk and retirement planning
- ✓ Saving for early retirement
- ✓ Collecting Social Security early
- ✓ Employer matching