# The Basics of Investing for Retirement

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FSU | ECONOMICS

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# What is a stock?



- A **Stock** represents ownership in a company
  - If a firm has a total of 100 stocks (AKA **Shares**) and you have one then you own 1% of that firm
- **Shareholders** earn money from payments made to owners proportional to their ownership, called **Dividends**
  - If a firm profits $100,000 dollars then you get $1,000 of it
  - So stocks have *intrinsic* value
- Stocks also earn money as the price goes up, called **Capital Gains**
  - If people expect future dividends to increase then the price will increase to reflect that
  - Stock prices are forward-looking
- Thus the total gain (AKA **Return**) from a stock are its dividends plus capital gains

See chapter 4 of freefinancebook.com for more related information.

# How fast can money grow?

- Money grows exponentially and so you should invest ASAP

$$\textit{Value In One Year} = \textit{Value Today} \times (1 + \textit{Return This Year})$$

- Suppose Apple (AAPL) is \$200 today has a return of 10% this year

$$\textit{Apple's Price In One Year} = \$200 \times (1 + .1) = \$220$$

- What if it has the same return the following day?

$$\textit{Apple's Price In Two Years} = \$220 \times (1 + .1) = \$242$$

- Notice the stock grew 10% each time, but 10% was \$2 more the second year
  - This is because the 10% growth the second year is not only based on the initial \$200, but also the \$20 of growth in the first year. This is called **Compound Interest**.

- We can solve for the (expected) value in two years with what we know today

$$\begin{aligned} \textit{Price In Two Years} &= \textit{Price Today} \times (1 + \textit{Return This Year}) \times (1 + \textit{Return Next Year}) \\ &= \underbrace{\$200 \times (1 + .1)}_{=\$220} \times (1 + .1) \\ &= \$200 \times (1 + .1)^2 \\ &= \$242 \end{aligned}$$

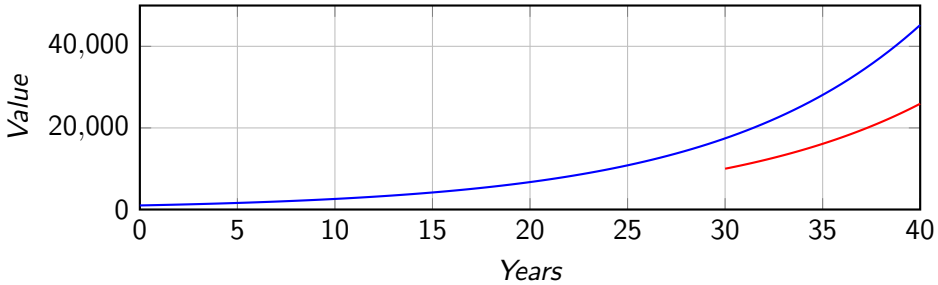
- If we expect return to be the same in all future periods (as we do here), we can rewrite this

$$\underbrace{\textit{Price In n Periods}}_{\textit{Future Value}} = \underbrace{\textit{Price Today}}_{\textit{Present Value}} \times (1 + \textit{Expected Return})^n$$

- This will allow us to solve for much larger time horizons

See chapter 2 of freefinancebook.com for more related information.

# Why invest now?




- Blue: Invest \$1,000 now (age 20) and expect a 10% return per year until you retire at 60

$$Value\ At\ 60 = \$1,000 \times (1.1)^{40} = \$45,259.26$$

- Red: Invest \$10,000 in 30 years (age 50) and expect a 10% return per year until you retire at 60

$$Value\ At\ 60 = \$10,000 \times (1.1)^{10} = \$25,937.42$$

Play around with investment scenarios at one of many online calculators here


- Returns follow a "random walk"
  - Returns follow a general trend upwards over time
  - In each given year, returns are almost random
- Returns are not constant each year, but over long time periods returns are predictable

# Time is Your Friend

| Time Horizon | Probability of Positive Return |
|---|---|
| 1 Day | 53.1% |
| 1 Month | 62.8% |
| 1 Year | 74.7% |
| 5 Years | 87.5% |
| 10 Years | 94.1% |
| 20 Years | 100% |

- If you save for a short time you may lose money
- If you save over a long enough time, you guarantee positive returns

Per CRSP data on S&P 500 from 1926-2023.

# How do I pick what to invest in?

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- Stock market as a whole has averaged a 10% annual return over past 100 years
- Many people "pick" stocks to try to outperform the market, called **Active Investors**
- 2 types of active investors
  - DIY
    - Do you *really* know why you should pick a certain stock/company?
    - Why that specific company and not one of the thousands (∼6,000) of others? Do you know all of the possible companies to invest in?
  - **Mutual Funds**: Actively managed funds, stocks are chosen by the fund manager
    - Fees, fees, and more fees!
- Others invest in the entire market and earn the average, called **Passive Investors**
- Over 10 years, 80-90% of professional active investors under-perform the market (and thus passive investors), on average

See chapter 6 of freefinancebook.com for more related information.

# Index Funds: The Convenient Solution

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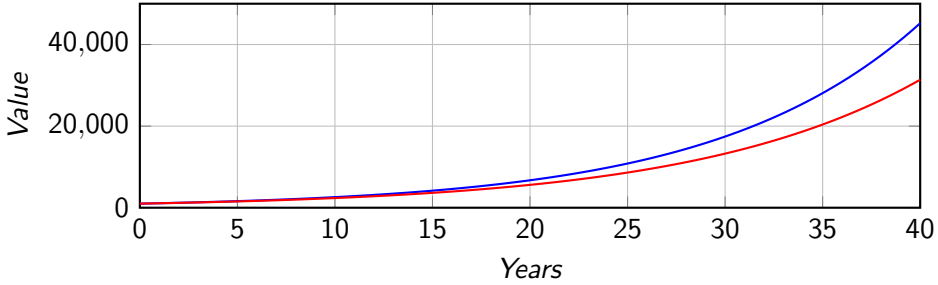
- It would be too much to keep track of ∼6,000 companies' stock at once
- **Index Funds** track the performance of many stocks based on rules set forth when it was created
  - Often track many stocks (500+)
  - Very low fees
  - Easy, simple, and straight forward
- SP500 or total stock market index funds match the performance of the market, have the lowest fees, and are the easiest to set up
  - Good options include VTI, VTSAX, FZROX, FXAIX, and many others

See chapter 7 of freefinancebook.com for more related information.

- **Expense Ratios** are the most common fee and they reduce your annual return by the amount of the expense ratio
- Suppose I have 10% return in a year in an index or mutual fund with a 1% expense ratio, then I have a net return of 9%

$$\begin{aligned} \textit{Net Return} &= \textit{Nominal Return} - \textit{Expense Ratio} \\ &= 10\% - 1\% \\ &= 9\% \end{aligned}$$

- But how important can 1% really be?




- Blue: Invest \$1,000 now, average 10% return, no expense ratio

$$\textit{Value At } 60 = \$1,000 \times (1 + 0.10)^{40} = \$45,259.26$$

- Red: Invest \$1,000 now, average 10% return, 1% expense ratio

$$\textit{Value At } 60 = \$1,000 \times (1 + 0.10 - \underbrace{0.01}_{\textit{Fee}})^{40} = \$1,000 \times (1.09)^{40} = \$31,409.42$$

- With no expense ratio, you have $\sim$50% more money when you retire!
- A low expense ratio is $\leq 0.1\%$

# Some of FSU's Retirement Options

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| Ticker | Name | Expense Ratio |
|---|---|---|
| FXAIX | Fidelity 500 Index Fund | 0.02% |
| FSKAX | Fidelity Total Market Index Fund | 0.02% |
| VIIIX | Vanguard Institutional Index Fund Institutional Plus Shares | 0.02% |
| HLIEX | JPMorgan Equity Income Fund | 0.45% |
| ACMVX | American Century Mid Cap Value Fund | 0.63% |
| LSSNX | Loomis Sayles Small Cap Growth Fund | 0.82% |
| MDIJX | MFS International Diversification Fund | 0.74% |
| TRMIX | T. Row Price Mid-Cap Value I | 0.72% |

- Good options are SP500 or total market index funds with low expense ratios
- Anything different from these are worse

# Target Date Funds: The Even More Convenient Option

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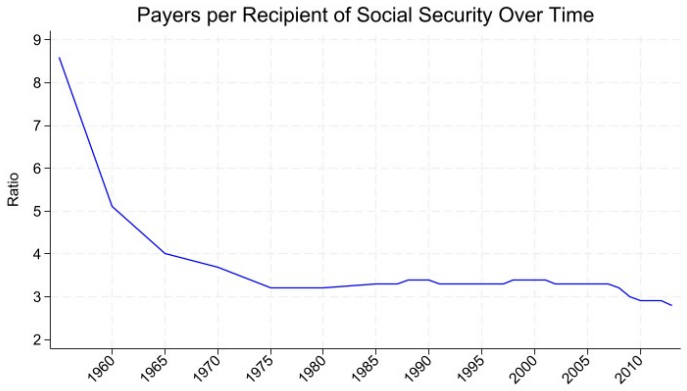
- As you get close to retirement you will want to transition to bonds
- A common strategy is to "invest your age in bonds"
  - Terrible strategy when young, but useful when old
- Target Date Funds do this for you
  - As you get closer to the **Target Date** the fund will automatically change to have more and more bonds
  - No work
  - Low fees ($\sim$0.1%)
  - See VTTSX, VLXVX, and VSVNX which "target" 2060, 2065, and 2070, respectively

See chapter 7 of freefinancebook.com for more related information.

# More Motivation to Invest for Retirement




- People are living longer and social security is "drying up"
- Do not plan on receiving Social Security or a pension
  - This was an option for our parents, but not us

Per Social Security Administration

# What can you do now?

- Open a taxable account and invest
  - Similar to a bank account but with higher return
  - Can take your money out whenever and however much you want
  - No protection from taxes
- Open a (Roth) Individual Retirement Account (IRA)
  - You have control over where your money goes
  - Reduce the taxes you pay on gains
  - Limits on withdraws
    - If Roth, you can withdraw your contributions whenever you want
    - Otherwise cannot withdraw until you are 59.5
  - Cannot contribute more than your income
- Open either with Fidelity, Vanguard, or another large company

See chapters 11 and 12 of freefinancebook.com for more related information.

# What can you do in the future?

- Avoid taxes, don't evade taxes
- Look into employer-sponsored retirement plans
  - 401k, 457b, 403b
- Consider healthcare related accounts
  - HSA
- Knowing what to do is the *easier* part, but must have the self-control to do it
  - Although I showed everything based on expected returns, *actual* returns vary

See chapters 13-15.5 of freefinancebook.com for more related information.

# Summary

- Don't count on Social Security or a pension
- Invest as early and often as possible
  - Make this a monthly thing so you are consistent
- Invest passively in total market or target date index funds
  - Active investors lose out over time
- Minimize expense ratios
  - Want below 0.1%
- Avoid (not evade) taxes as much as possible
  - Take advantage of tax shelters such as IRA, 401k, 457b, 403b, and HSA

# Further Topics

- Taxes: Income tax, capital gains taxes, and tax avoidance
  - Ch 3, 10, and 22
- Portfolio Management and Tax Shelters: Bonds, IRA, 401k, and HSA
  - Ch 9, 11-13, and 15
- Credit Cards and Credit Scores: Payment floats, annual fees, and buying a house
  - Ch 19-21
- Happiness
  - Ch 24

All chapters are in reference to freefinancebook.com.

# Additional Resources

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- freefinancebook.com: Free and intuitive personal finance book
- JL Collins Stock Series: Casual blog about personal finance
- ChooseFI Podcast: Personal finance podcast