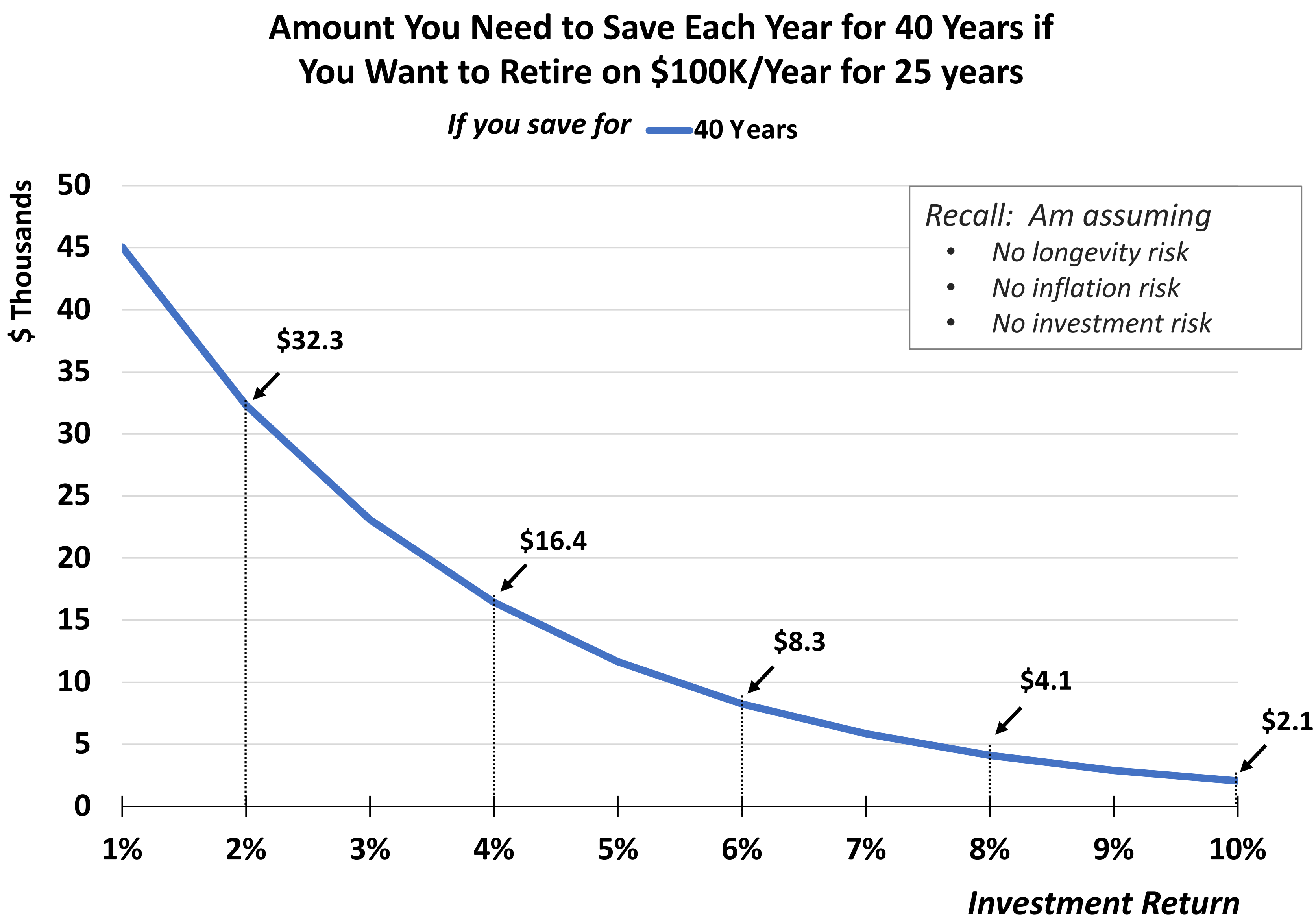
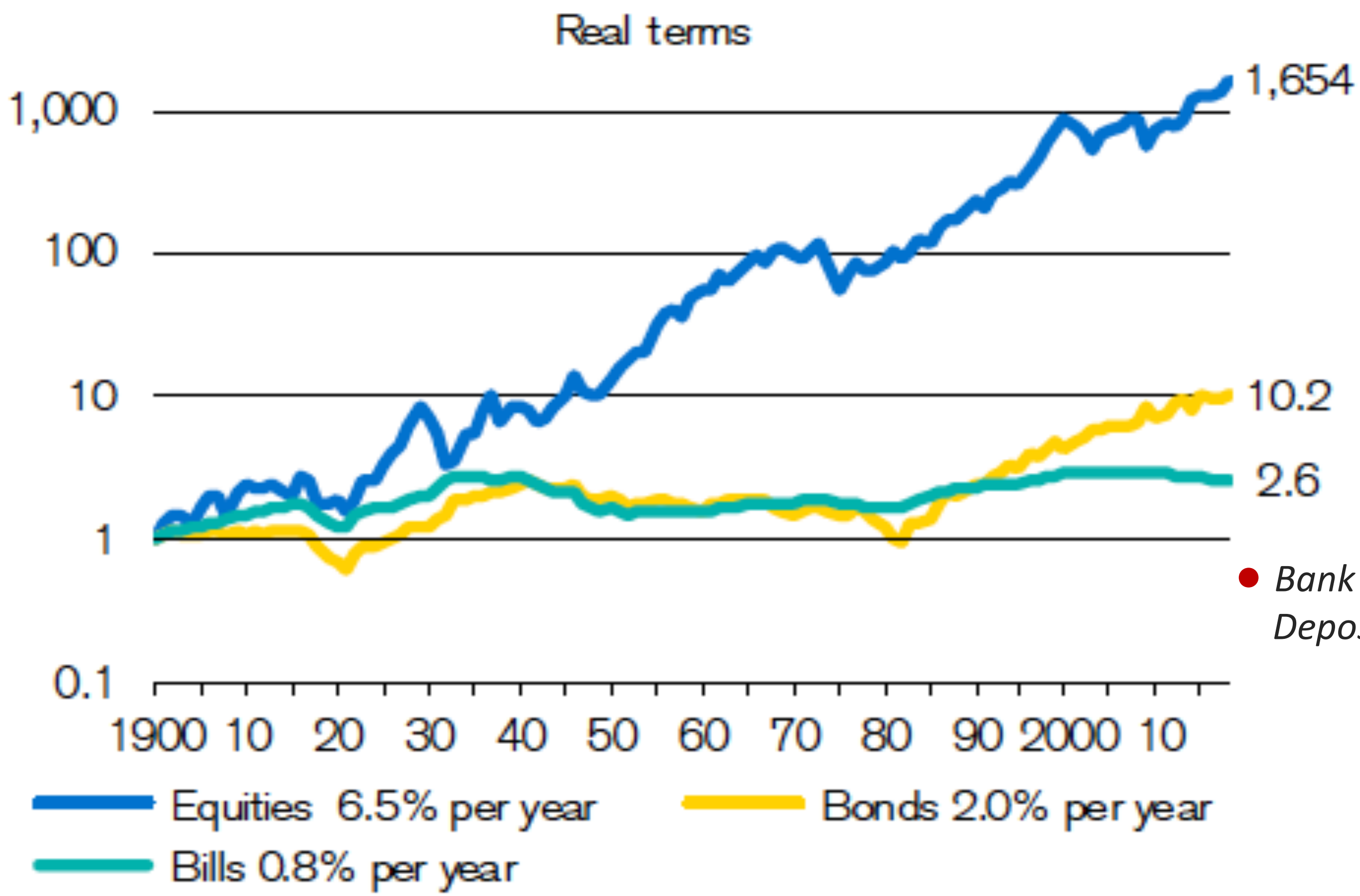
Simplified Sensitivity Analysis



Cumulative Returns on US Assets (1900-2017)



Bank Deposits

Source: Dimson, Marsh & Staunton, Credit Suisse

Some Issues

- What are these assets?
- What are their key features?
- How can we invest in them?
- How should we invest in them? (TBD)
- How do we get it wrong? (TBD)

Bank Account #1: Checking Account

- Sometimes called a demand deposit
  - Principal use: To make and receive payments
    - Same day access to entire balance
    - Can use it to access cash (*example ATMs*)
    - Or to direct bank to pay someone else on your behalf
  - Safe, liquid & convenient
    - FDIC insures your account(s) up to $250,000
    - Employer will often directly deposit your salary into your account

- Payment options
  - Check, debit card, electronic (internet banking, phone, etc.)
  - Direct debit
  - Wire transfer/Cashier check

- Low or no investment return
  - Key is to minimize/avoid fees
  - Probably best to start with the basic, no interest account
    - Will have lowest minimum balance

Key: Watch Out For Bank Fees

1. Minimum balance fee
   - Often waived if your paycheck is directly deposited into your account
   - Otherwise you need to watch your balances
   - Usually based on average monthly balance, but not always

2. ATM Fees
   - Usually free if you use your own bank's ATMs – *but check this*
   - But fees can be significant if you don't use your own bank

3. Returned check/Overdraft protection fees
   - Beware of standard O/D protection, will pay for each charge
     - Which can add up fast if you make a lot of small purchases with your debit card
   - Note there are delays in crediting deposits
   - Can you instead link your checking account to your savings account?
     - Perhaps by setting a minimum checking account balance?

Digression On Credit Card/Debit Card Fraud

Issue: *Suppose someone gets access to your credit card/debit card information and starts making fraudulent charges*.

Question: *What happens to you?*

US Credit Card

- Federal law limits your risk to $50, and is often waived.
- Which is why credit card company monitors your charges carefully and denies unusual charges
- So let them know if you plan to make a large charge or travel *(esp. internationally)*

US Debit Card

- Loss protection is less clear cut
  - Loss limited to $50 if you report problem within 48 hours of start of abuse
  - Loss limit then rises to $500
  - And is unlimited if you take 60 days or more to report problem
- So you are at risk if you are not daily monitoring your charges online

Protections can be significantly lower with a non-US card

Digression On Credit Card/Debit Card Fraud - 2

Implications, Why I:

- Use my credit card instead of my debit card to make purchases
    - And only use my debit card to withdraw money from my own bank's ATMS.

- Make sure I have back-up (*no fee*) credit cards

- Advise credit card company before travelling or making large or unusual purchases

- Never use my credit or debit cards at gas pumps or other places where scammers often install card readers.

- Often used some US credit cards instead of my UK cards when living in the UK
    - But only after making sure the US cards were on automatic direct debit
    - And had thoroughly checked out the FX fees.

Bank Account #2: Savings Account

- Ability to make direct payments to 3rd parties more limited
  - No checks but no restriction on withdrawals
  - Can instantly transfer funds to checking account
    - Some ability to make electronic payments

- Features
  - Safe pool of backup liquidity
    - FDIC insures your account(s) up to $250,000
  - Higher interest rates than on checking account
    - But usually can get higher returns on a money market fund (TBD)
  - Helps separate savings bucket from spending bucket
    - But often can link to savings account to prevent overdrafts

- Other versions
  - Bank Money Market Fund Account
    - Higher interest rate than savings but withdrawals limited to 6 per month
  - CDs (Certificates of deposit)
    - Longer maturities, higher rates, but have to hold to maturity
  - But expect Money Market Mutual Funds (TBD) to pay higher interest rates

Other Bank Services

- Safe Deposit Box
- Notary Services
- Loans
  - Kobliner says this is a good reason to get to know the bank manager
- Credit Card
- FX transactions
  - But watch out for implicit fees (i.e. big bid/ask spread)
  - Check out how they treat FX transactions abroad if you use their credit card or debit card.
- Investment Services
  - Be careful here, often a high cost, full service business

What About Internet Banks or Credit Unions?

Internet Banks:

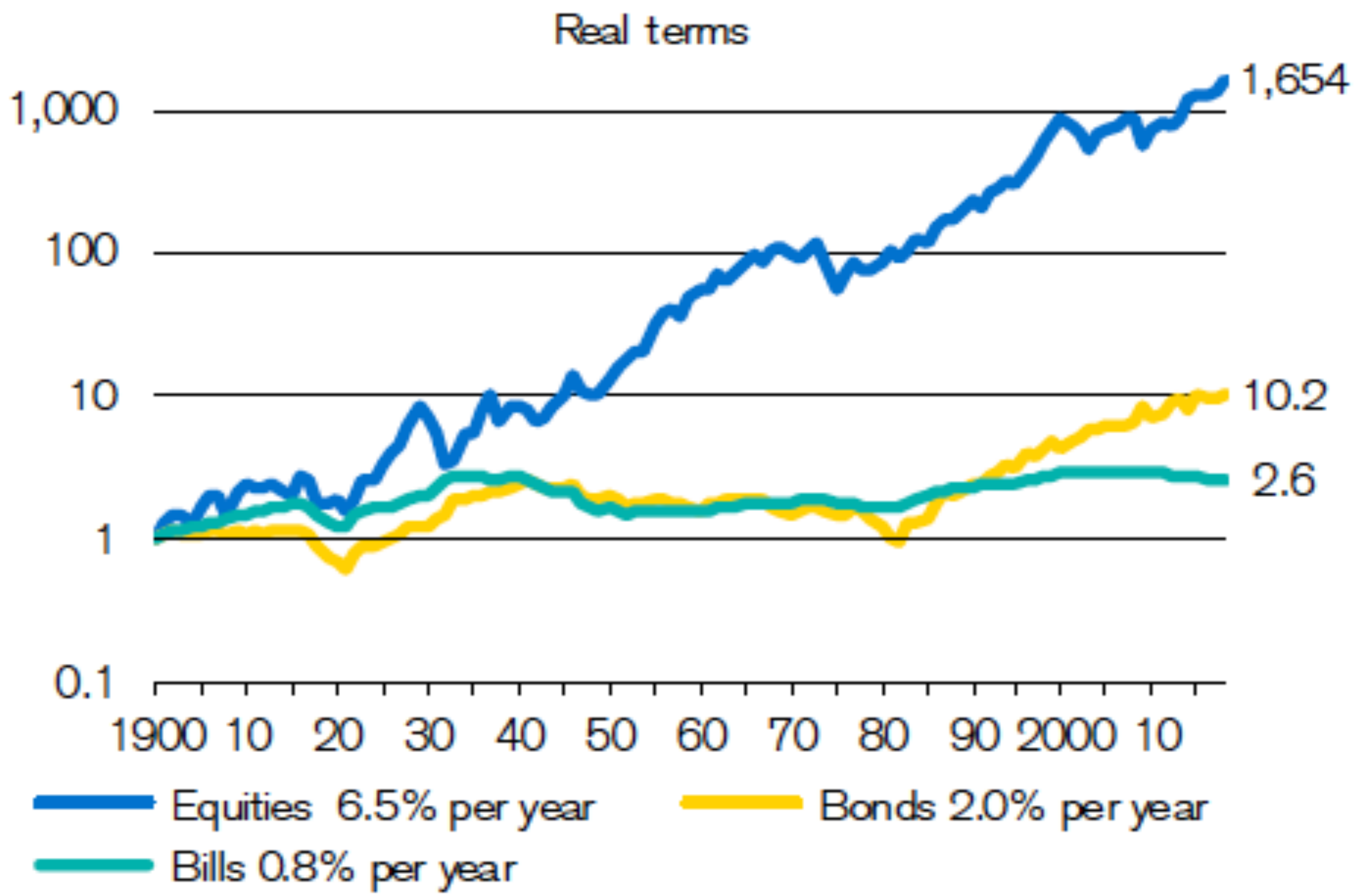
- Offer a digital relationship instead of having branches all over the place
- Result, lower cost of doing business
- Advantages
  - Lower costs means they usually offer higher interest rates on deposits
- Disadvantages
  - Limited ATMs
  - Can't go to a nearby branch to
    - Access a safety deposit box
    - Sort out problems if there has been a mistake
    - Apply for loan, and to get to know the manager before you apply.

Credit Union

- Like a bank but often linked to your employer, etc.
- Often has a lower loss record since people feel connected to it
- Result: often has easier loan terms, etc.
- But often limited ATMs, services etc. outside of your local area

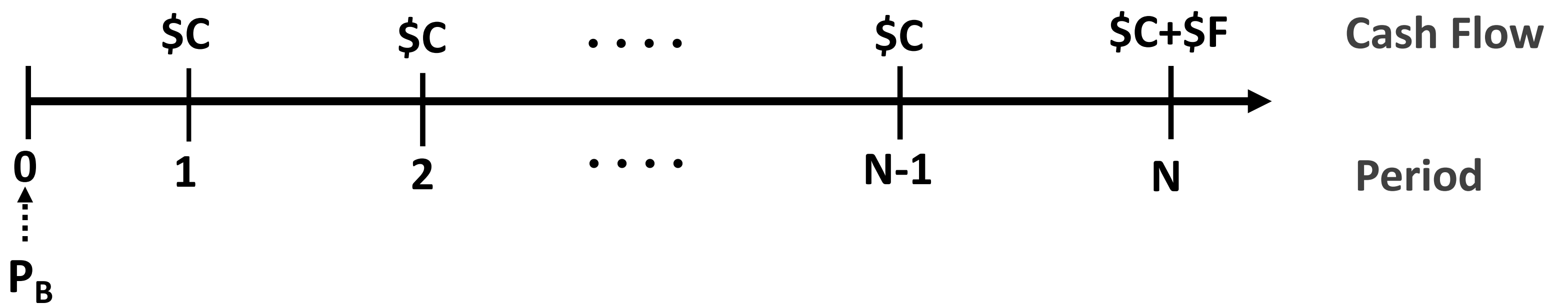
What About This Stuff?

Cumulative Returns on US Assets (1900-2017)



Source: Dimson, Marsh & Staunton, Credit Suisse

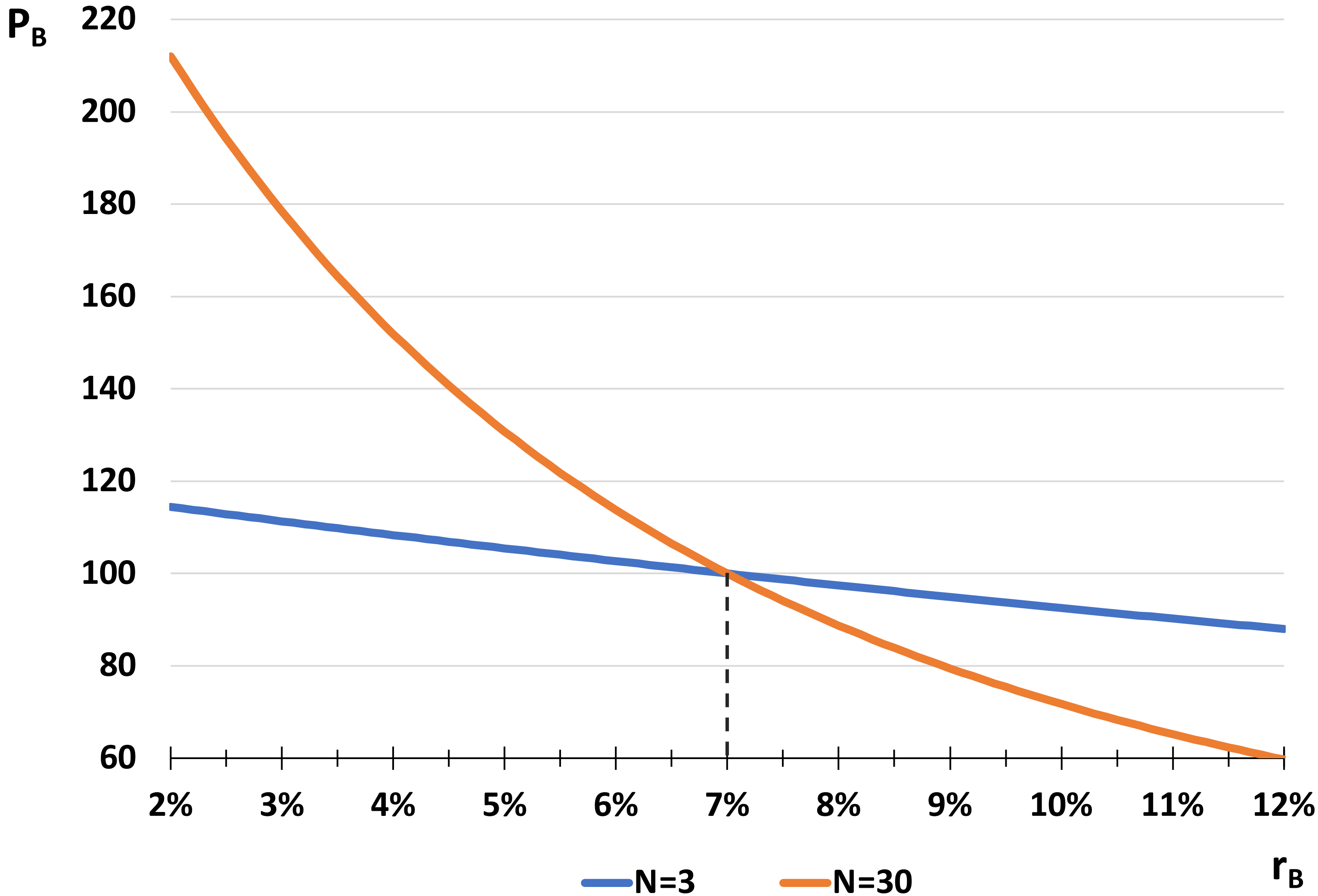
Fixed Income (Bills, Bonds, etc.)



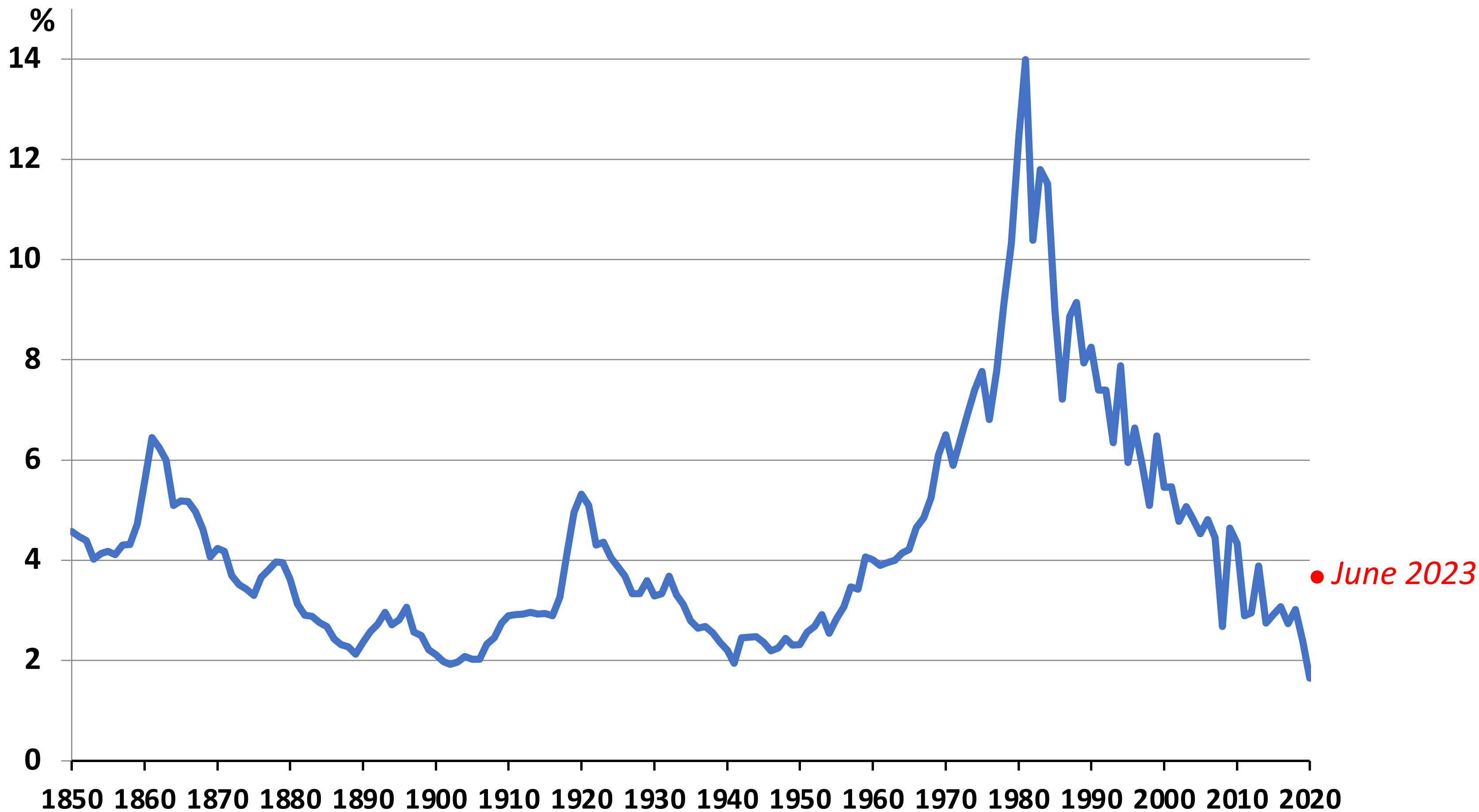
- General Features
  - Usually has a fixed maturity and pays a fixed interest rate (coupon)
  - Main risks: Interest rate risk, credit risk, inflation risk

- Distinctions
  - Maturity: Bills (*and Commercial Paper*) vs. Short/Intermediate/Long bonds
  - Credit: Gov't vs. Investment Grade vs. High Yield (*junk*) bonds

Price of 3-Year and 30-Year 7% Coupon Bonds

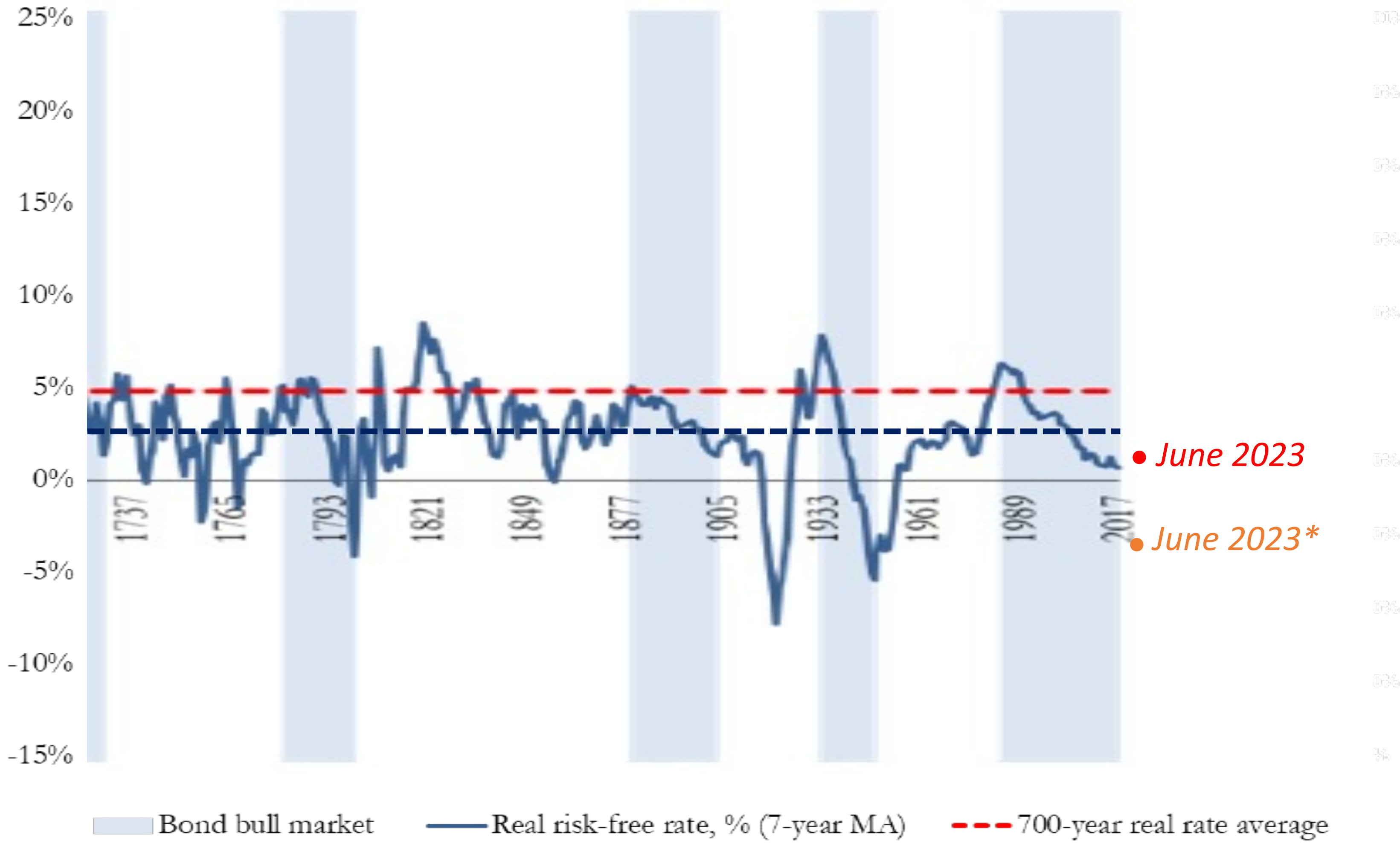


US Long Interest Rates



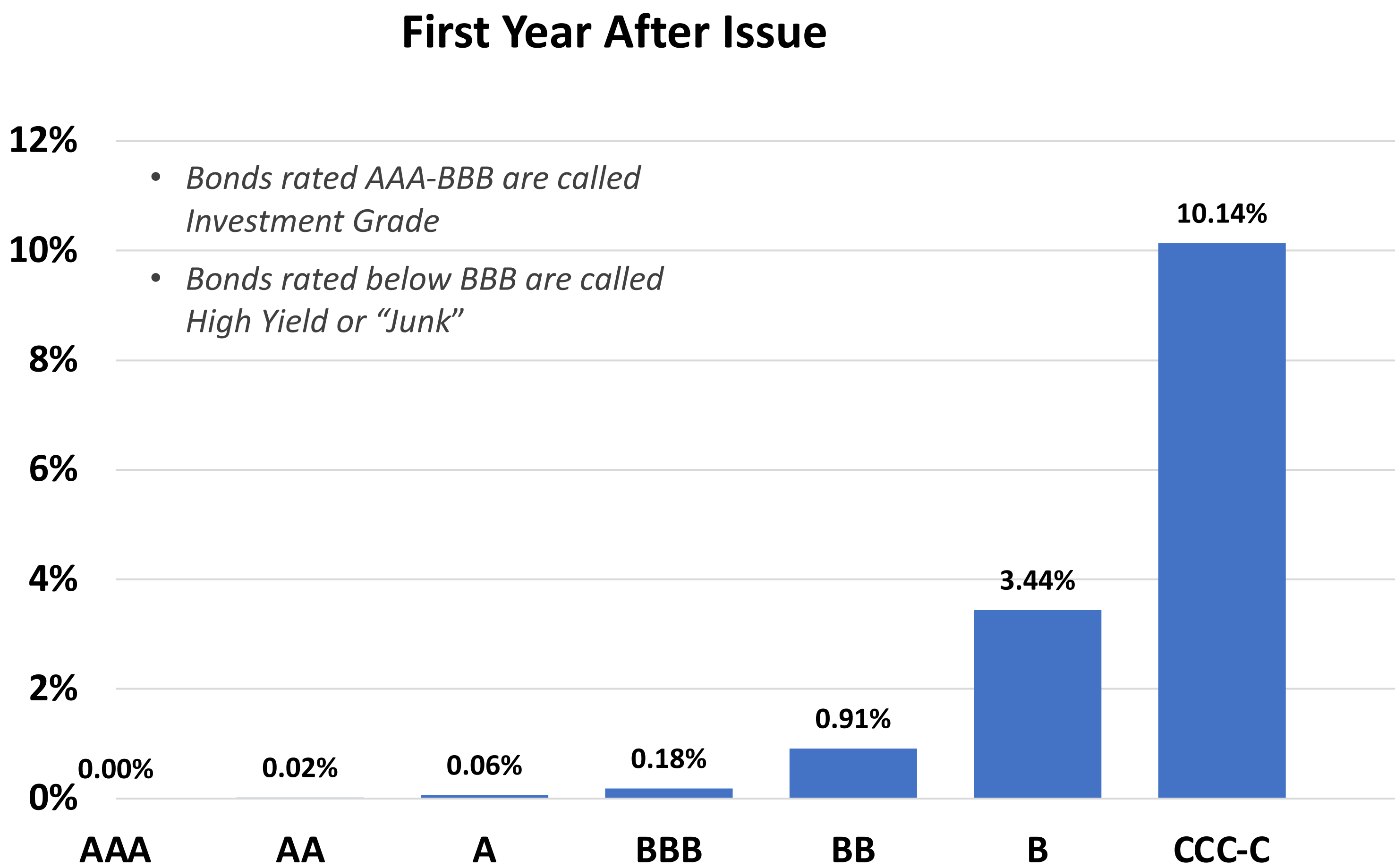
Source: Bloomberg, Homer & Sylla “History of Interest Rates”

300 Years of Real Interest Rates

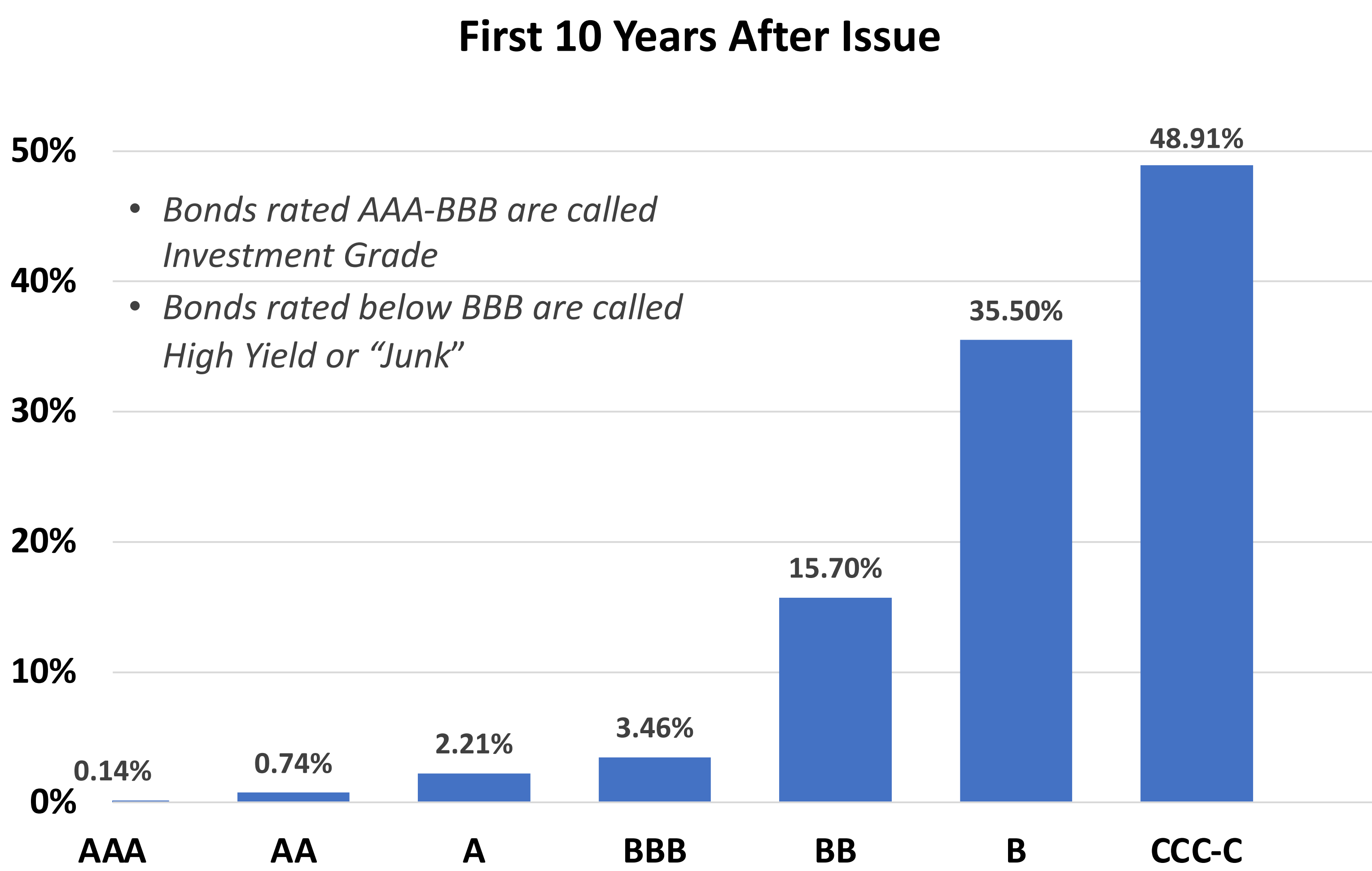


Paul Schmelzing, Bank of England Staff Working Paper #686

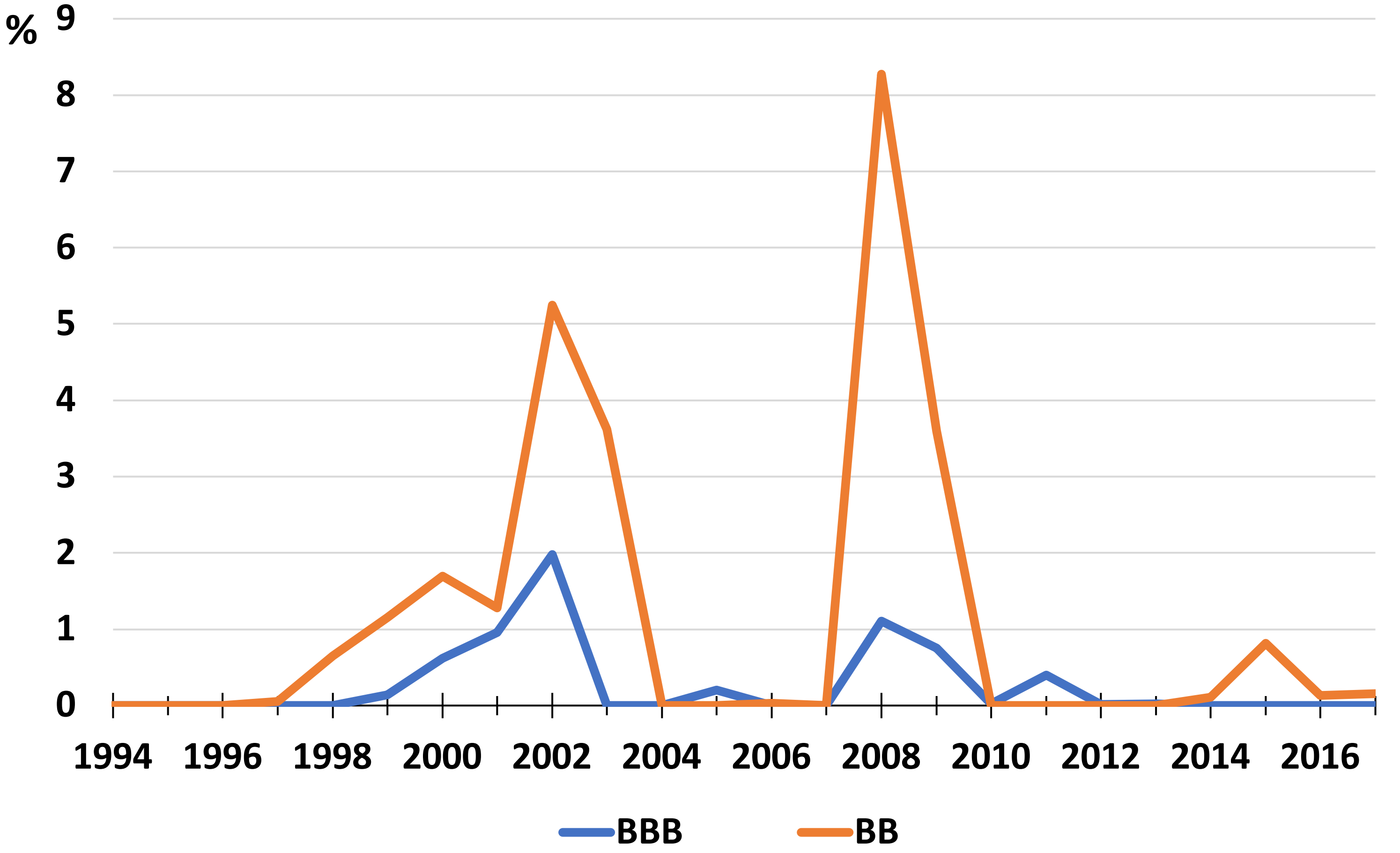
Corporate Bond Default Rates (1983-2017)



Cumulative Corporate Bond Default Rates (1983-2017)

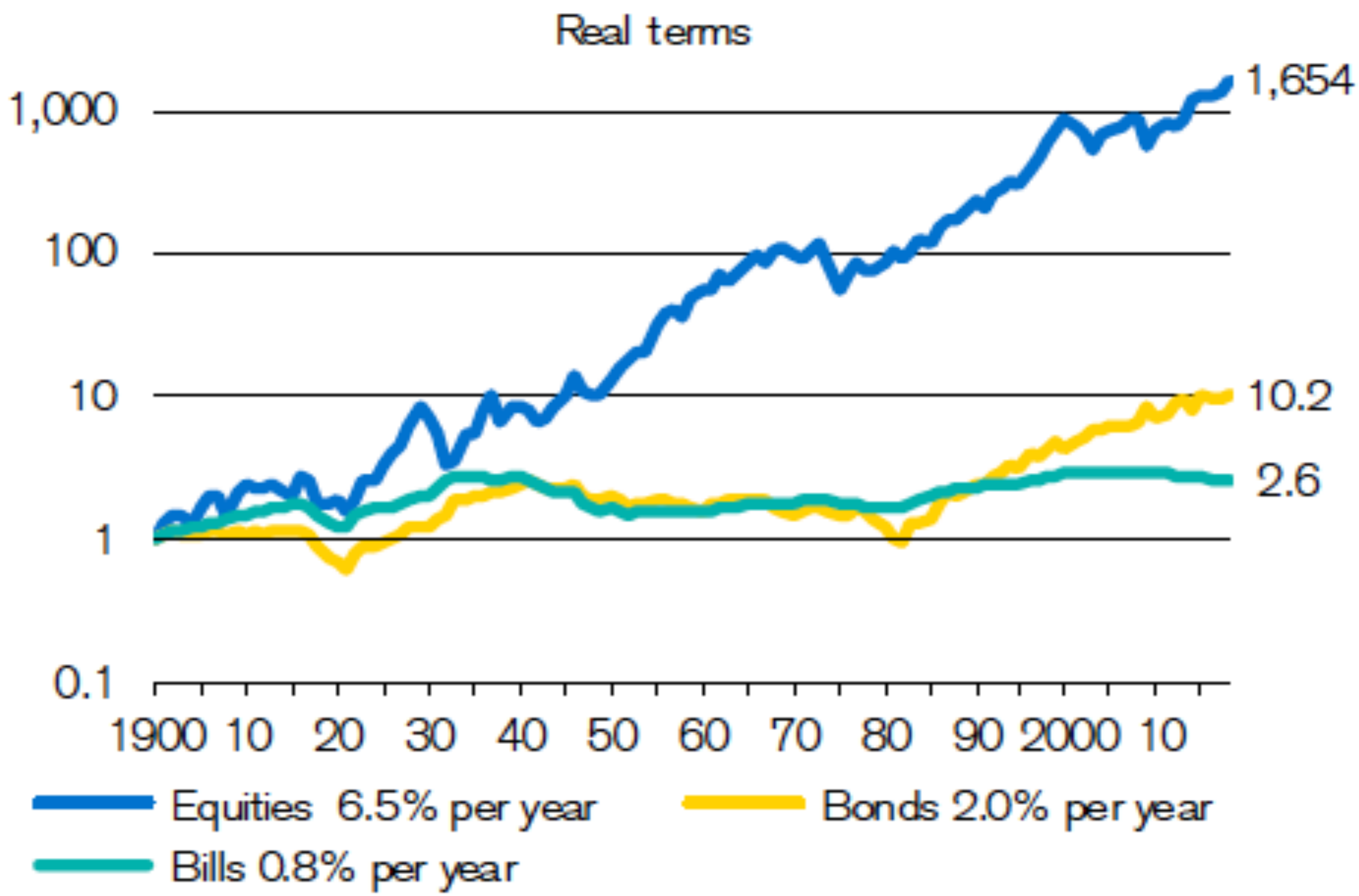


BB & BBB Default Rates: Corporate Bonds 1994-2017



Source: Moodys

Cumulative Returns on US Assets (1900-2017)



Source: Dimson, Marsh & Staunton, Credit Suisse

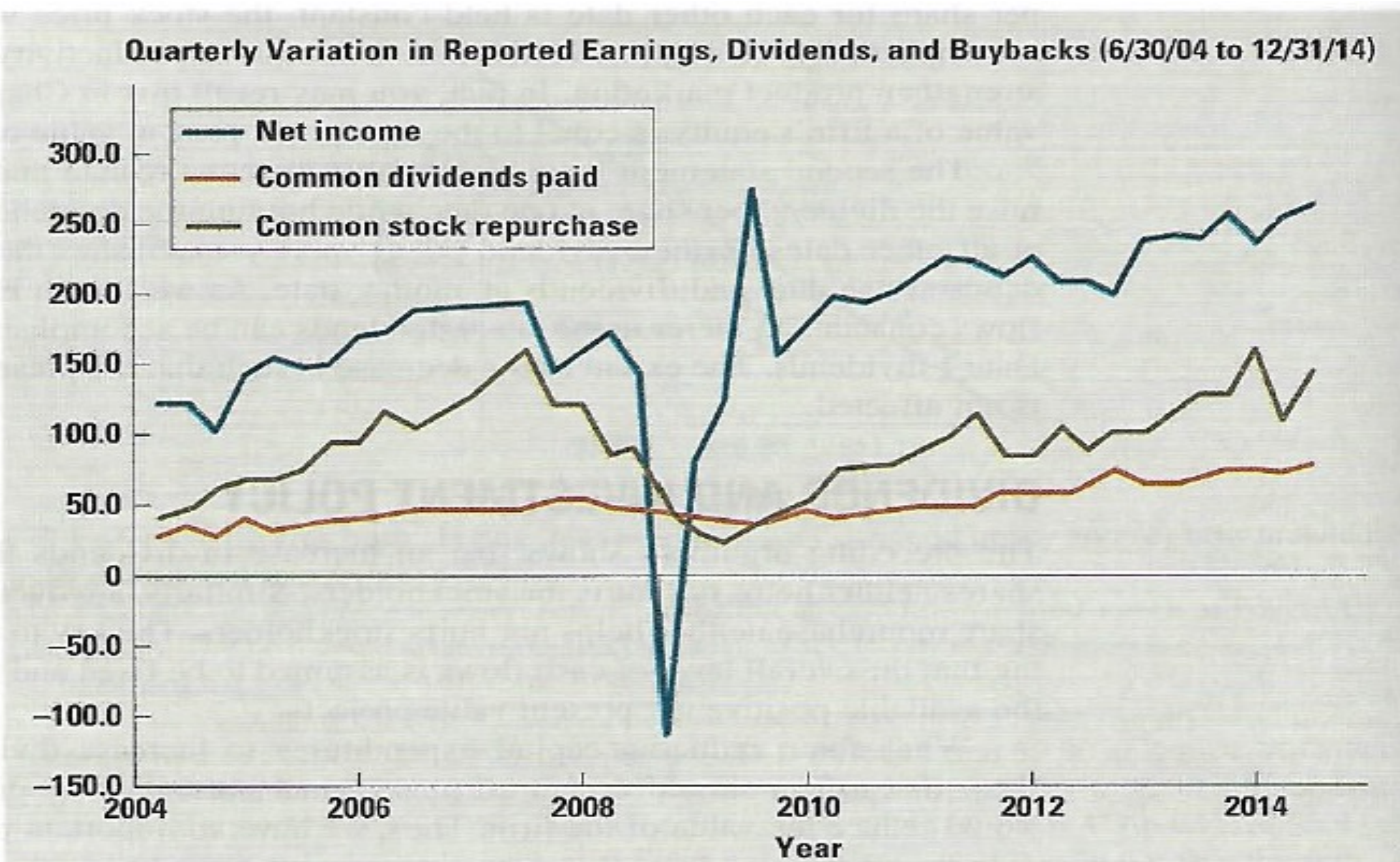
US Equity Returns vs. Bills (1900-2017)

Source: Dimson, Marsh & Staunton, Credit Suisse

Equities (Stocks)

- General Features
  - Represents an ownership interest in the company
    - Gets upside if company prospers
    - Bottom of the capital structure if company gets in trouble
    - But limited liability
  - Return sources
    - Dividends
    - Capital gains (price changes)
  - Higher return/higher risk asset
    - Volatile annual returns
    - But stable dividend income (as an asset class)

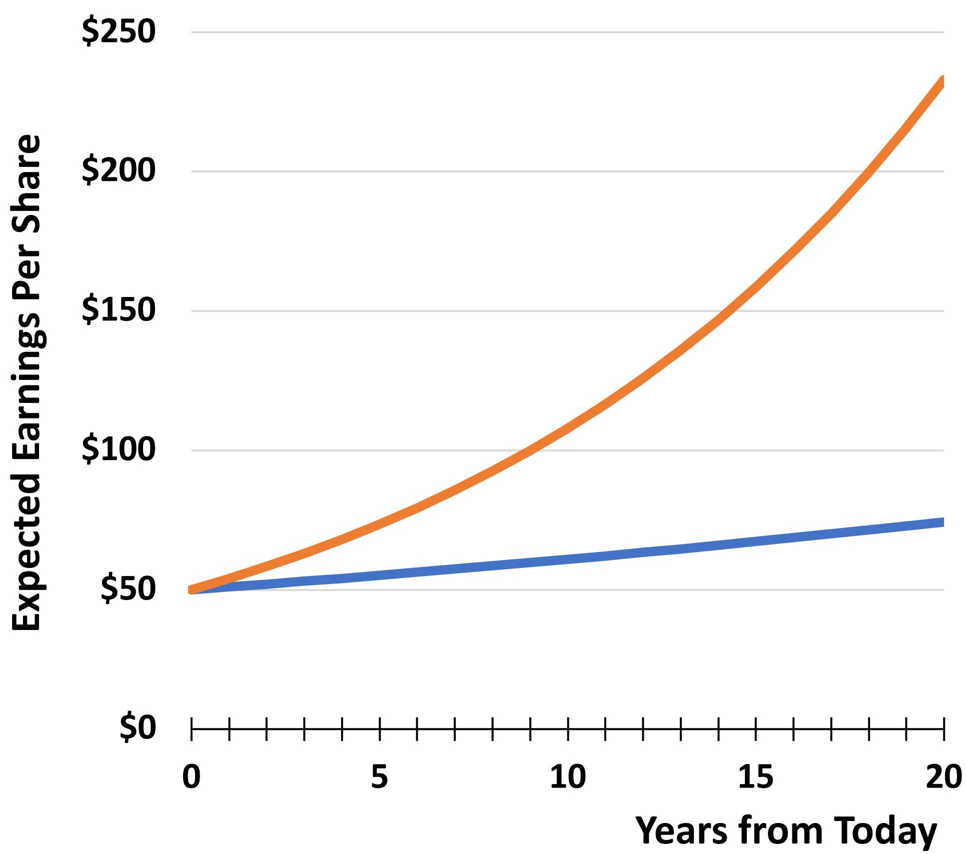
Cash Dividends On US Stocks



Source: Ross, Westerfield, Jaffe & Jordan, "Corporate Finance, 12th edition

Growth and the P/E Ratio

Suppose two companies today both have earnings of $50/share
Which stock would you pay more for?



Growth and the P/E Ratio

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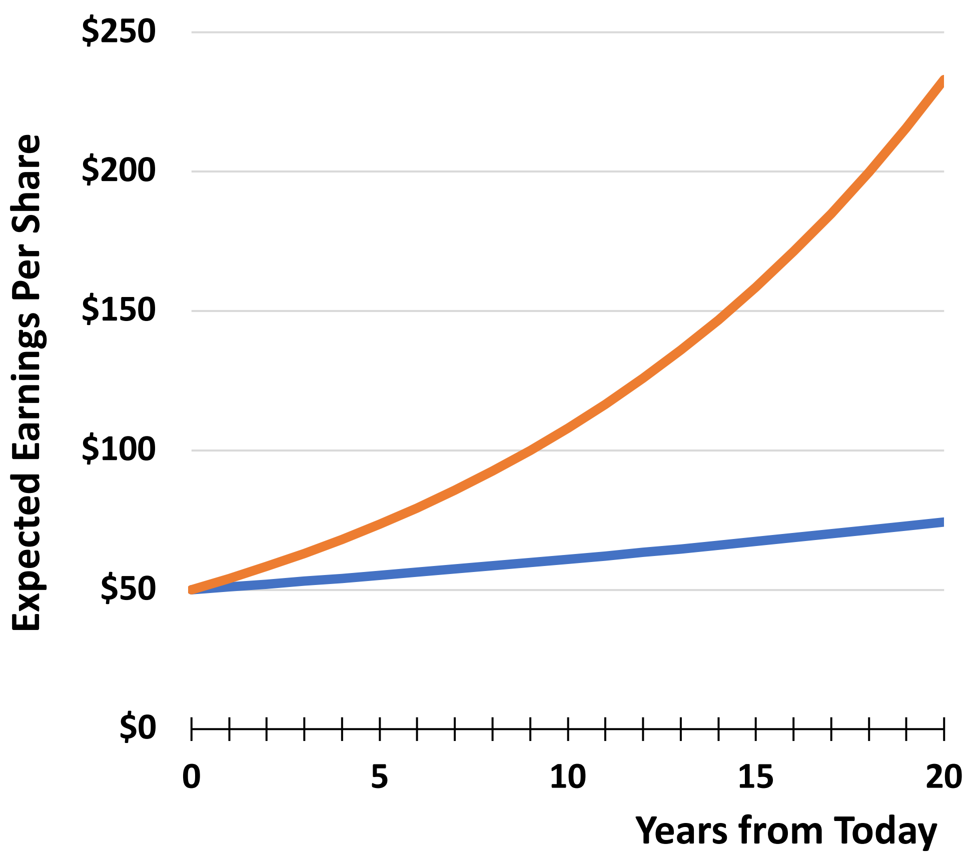

- Hence faster-growing companies tend to have high P/Es
- And slower growing (i.e. value) companies tend to have lower P/Es.

Growth and the P/E Ratio

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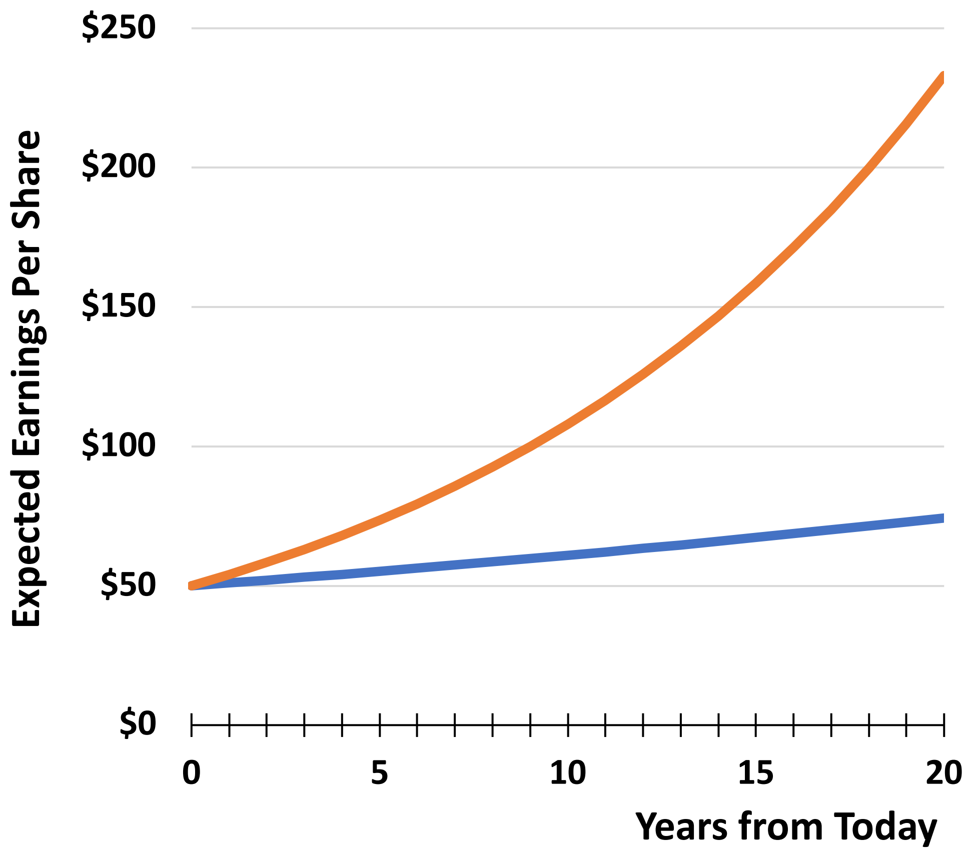
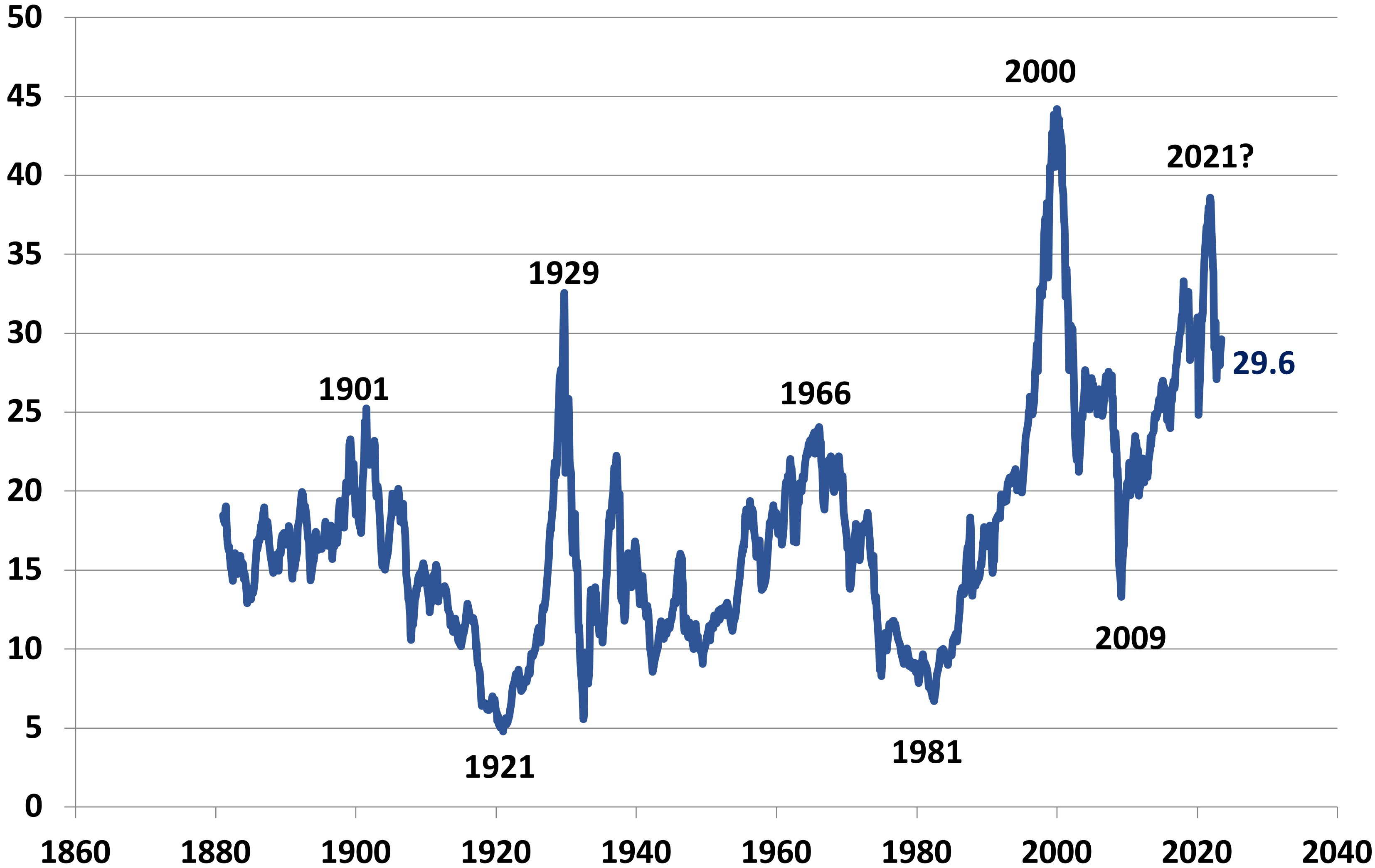


- Hence faster-growing companies tend to have high P/Es
- And slower growing (i.e. value) companies tend to have lower P/Es

- *Note 1: Growth expectations are already reflected in P/E & share price*
- *Note 2: Different P/Es could also reflect different required returns.*

Shiller CAPE Ratio *(through June 2023)*



Source: Robert Shiller Online Data Base

Buying Securities Directly

Need A Brokerage Account

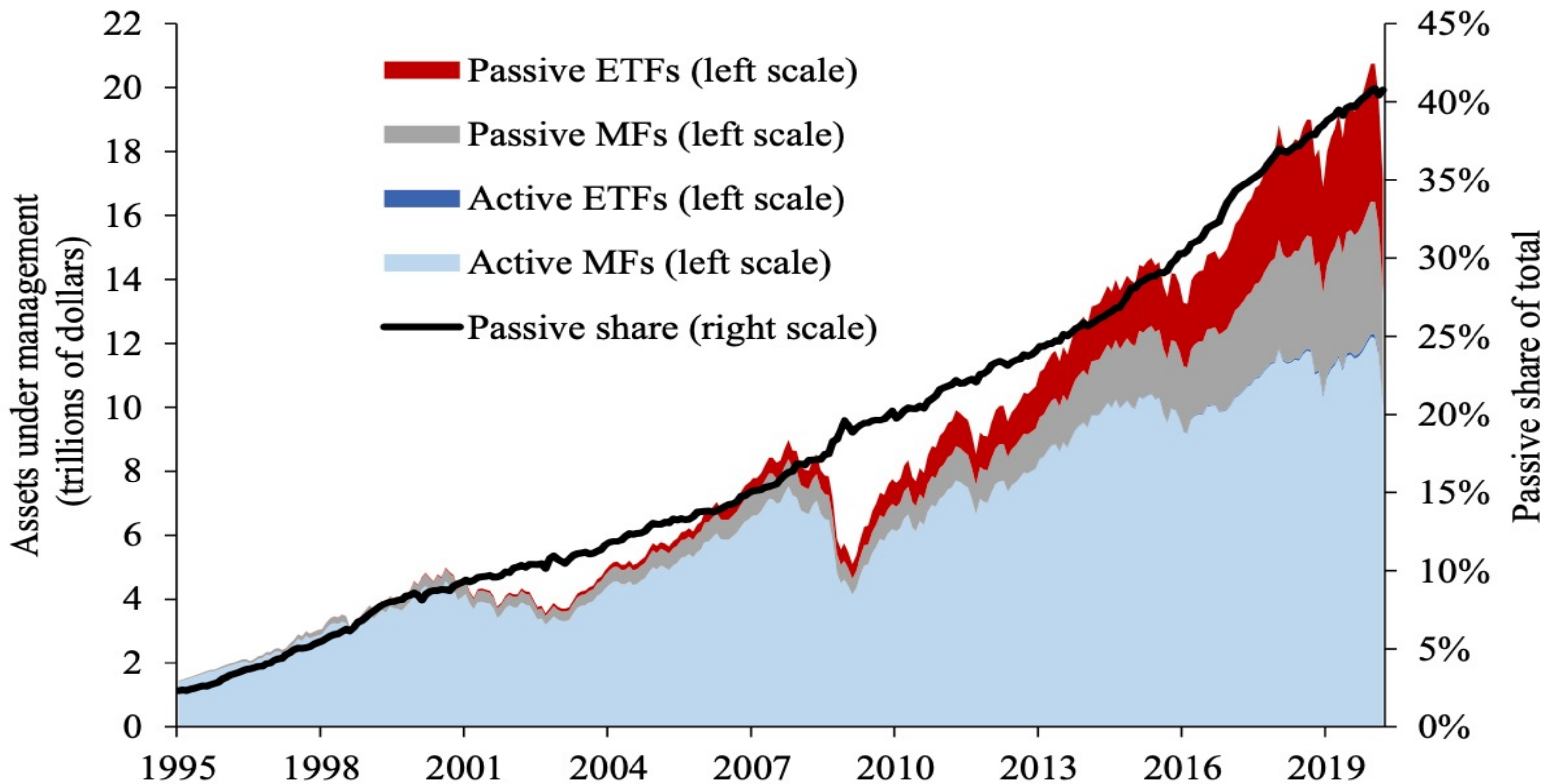
- Full Service (e.g. Merrill Lynch)
  - Higher transaction fees
  - Research & Advice (*but how useful?* - TBD)
  - Discretion
- Discount (e.g. Schwab, Vanguard)
  - Lower transaction fees
  - Still get access to data (*but how useful?* - TBD)

Some Issues

- Bid/Ask spreads (bonds, etc.)
- Transaction minimums
  - High for bonds *(hence need use bond funds)*
    - *$5 million+ for bills*
    - *$250,000 -$1 million for corporate/gov't bonds*
  - Lower for stocks, "round lot" = 100 shares
    - But still face diversification issues (TBD)
- Tax efficiency

Increasingly People Invest in Funds

US Assets Held By Funds (March 2020)



Source: FRB Boston Working Paper SRA 18-4, August 2018 (revised May 2020) Data from Morningstar

Fund Features

General set-up:

- Each fund is a distinct company that manages a portfolio of assets.
  - Hires a professional portfolio manager to manage the assets.
  - And issues shares in the fund that can be purchased by you
- When you purchase shares in a fund
  - You own a pro-rata share of those assets (*measured by NAV*)
    - Where NAV = net value of fund assets per fund share
  - And thus the return on those assets, minus any fees charged by the fund

Advantages

- Professional management
- Convenience
  - Minimum account balances in mutual fund usually small
  - Can even have a mutual fund set up automatic withdrawals/deposits to your bank account when you buy /sell fund shares.
- Diversification
  - A typical fund will have a hundred or more holdings (*can be thousands*)
  - Which can be an important source of risk reduction

Fund Features - Continued

But pay close attention to fees

- Best explanator of relative returns over long run

- Lots of sources of fees.
  - % of AUM (Assets Under Management)
    - Investment management fee
    - Administrative costs
    - 12b-1 fees
  - Loads

- Other important sources of costs (active funds)
  - Transaction costs
  - Taxes

Basic Fund Types

1. Active vs. Passive Funds
   - Passive Funds
     - Seek to replicate holdings and returns for a stated asset class
       - Sometimes called index funds since holdings are held within close tolerances of its benchmark index.
     - Known for very low fees
   - Active Funds
     - Seek to invest in a manner that will generate higher risk-adjusted performance that underlying benchmark.
     - Higher cost, higher fee method of investing
       - Fees can include loads, investment management fees, and 12b-1 fees
     - Have been losing market share to passive funds. (*see earlier chart*)
       - Issue: Have active funds delivered on their promise on an after-fee basis? (*to be discussed later*)

Increasingly People Invest in Funds

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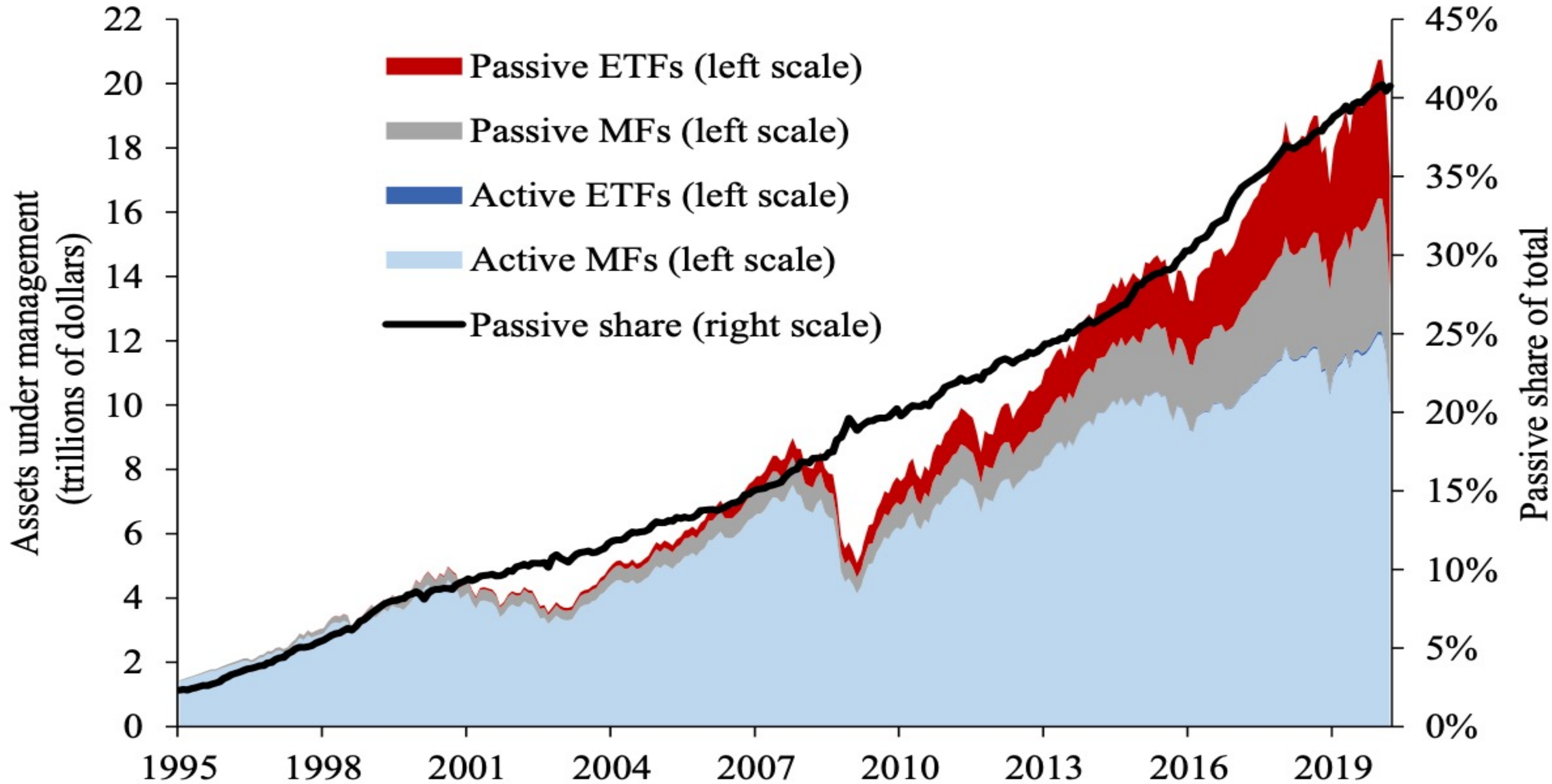

Source: FRB Boston Working Paper SRA 18-4, August 2018 (revised May 2020) Data from Morningstar

Basic Fund Asset Classes

1. Money Market Funds
    - Invests in short maturity, high quality fixed income assets (like bills)
    - Retail funds maintain a constant NAV of $1
    - Usually offer higher returns than a bank account
        - Government funds only invest in US gov’t or US gov’t backed assets
        - Prime funds will also invest in short term, high quality debt issued by corporations or banks
    - Relatively safe & liquid, but no government guarantee
        - Two prime funds have “broken the buck” since 1970
        - But other MMFs came under severe stress during the 2008 financial crisis.

Basic Fund Asset Classes (*Continued*)

2. Bond Funds
   - Invests in various kinds of debt with a maturity of 2 years or longer
   - Basic US bond fund types
     - Maturity: short-term vs. intermediate
       - Short maturity is typically 1-3 years
       - Intermediate maturity typically invests in all bonds
     - Credit Quality: investment grade vs. high yield
       - Core = US investment grade only
       - Core plus can also hold high yield and nonUS bonds
   - Risks
     - Inflation, interest rate, credit
     - Kobliner and I both recommend that you focus on intermediate maturity, investment grade funds.
   - Other types
     - Government, corporate, municipal, international, global, emerging, distressed, etc.

Basic Fund Asset Classes (*Continued*)

3. Equity, or Stock Funds (*continued*)

- US equity funds are often classified by company size and value measure
  - Company size:
    - Small cap: < $2 billion market value
    - Mid cap: $2 - $10 billion market value
    - Large cap: > $10 billion market value
  - Value measure (can vary but often linked to price/earning (P/E) ratio
    - Core: All stocks in asset class
    - Value: Stocks in the bottom half of P/E ratios (or other measure)
    - Growth: Stocks in the top half of P/E ratios (or other measure)
  - My recommendation: Start with large cap or all cap core.

- Other types
  - Sector focus, factor focus (including SRI or ESG investing)
  - Global, international, emerging, frontier etc.

Basic Fund Types (*Continued From Before*)

2. Mutual Funds vs. ETFs (Exchange-Traded Funds)
   - Mutual Fund
     - Buys and redeems shares at fund NAV
     - NAV used to set transaction price determined later
       - Often at 4PM
   - ETFs
     - Bought and sold over exchange like shares in any other company
       - So you need a brokerage account to buy/sell ETFs like you would to buy/sell shares in individual companies
     - Price you get is price of ETF share at moment of transaction
       - Can differ from close-of-day value
       - Can differ from NAV (*esp. in times of stress*)
       - But other companies are able to arbitrage ETF and underlying share prices to keep those values close in normal times
     - Issues:
       - Heavy use as a trading vehicle
         - Beware of using leveraged and inverse ETFs for long-term holdings
       - But potential use for tax management

Some Investing Cats and Dogs

None of these are a focus for this course

1. Municipal Bonds
   - Interest often tax-exempt
   - But lower interest rates usually reflect tax rates faced by higher income investors in higher tax brackets

2. Preferred Equity (*Type of Security*)
   - Unlike common stock
     - Not an ownership interest in the company
     - No participation in upside since (perpetual) dividend is fixed
     - Higher in capital structure than equity in event of bankruptcy
   - More like a risky bond
     - Company is not required to pay dividend.
     - Lower in capital structure than bond in event of bankruptcy
     - Tends to be illiquid in times of stress

Some Investing Cats and Dogs - 2

None of these are a focus for this course

3. Closed-End Fund (*Type of fund*)
   - Similar to ETF, bought and sold like a security
   - But no mechanism for pushing share price to NAV
   - And often managed to boost income rather than total return
   - Result, often trades at a large discount to NAV
     - Especially when underlying asset class is experiencing stress.
   - Pros trade the discount
     - So don’t mess with this unless you understand management approach, plus current discount vs. normal discount

Some Investing Cats and Dogs - 3

None of these are a focus for this course

4. Options
   - Gives you the right*, but not the obligation*, to purchase or sell a security at a set price (the exercise price) over a fixed period.
     - Call options give you the right to buy at that price
     - Put options give you the right to sell at that price
   - Complicated relationship between option and current share price, very dependent on volatility of underlying asset

Some Investing Cats and Dogs – 3 *(Continued)*

The Black-Scholes Formula (European Call Option, no Dividends)

$$C = P_S \bullet N(d_1) - E \bullet e^{-rt} \bullet N(d_2)$$

Where: $$d_1 = \frac{ln[P_S/E]}{\sigma\sqrt{t}} + \frac{(r+\frac{\sigma^2}{2})t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

Where:
- C = Price of Call
- P_S = Price of Stock
- E = Exercise, or strike price
- σ = std. deviation of stock price
- t = time to expiration
- r = continuous risk-free interest rate
- $N(d)$ = Probability $(x \leq d)$ if $x \sim$ Normal $(0,1)$

Don’t Be A Typical Investing Student !!!!