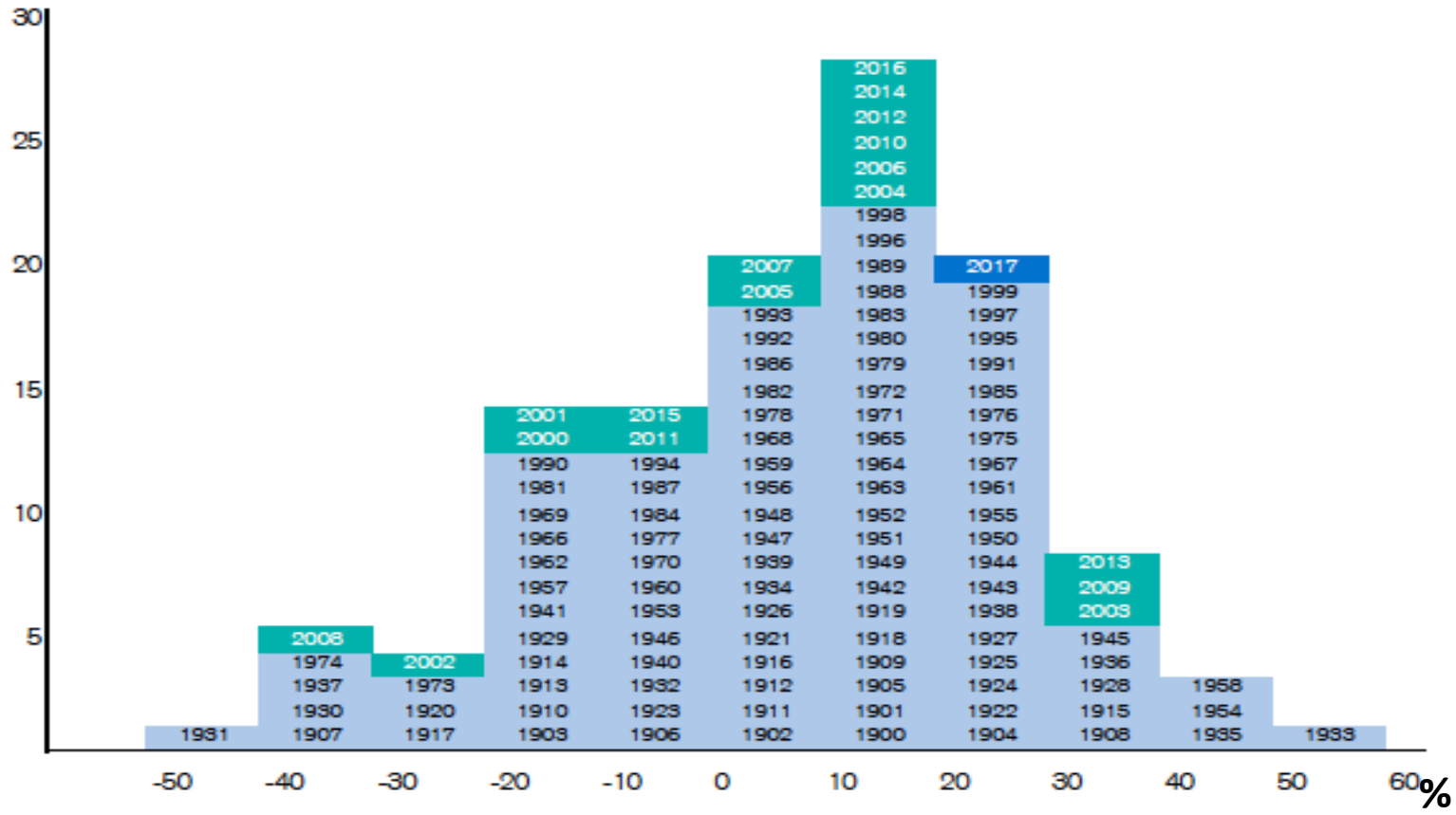
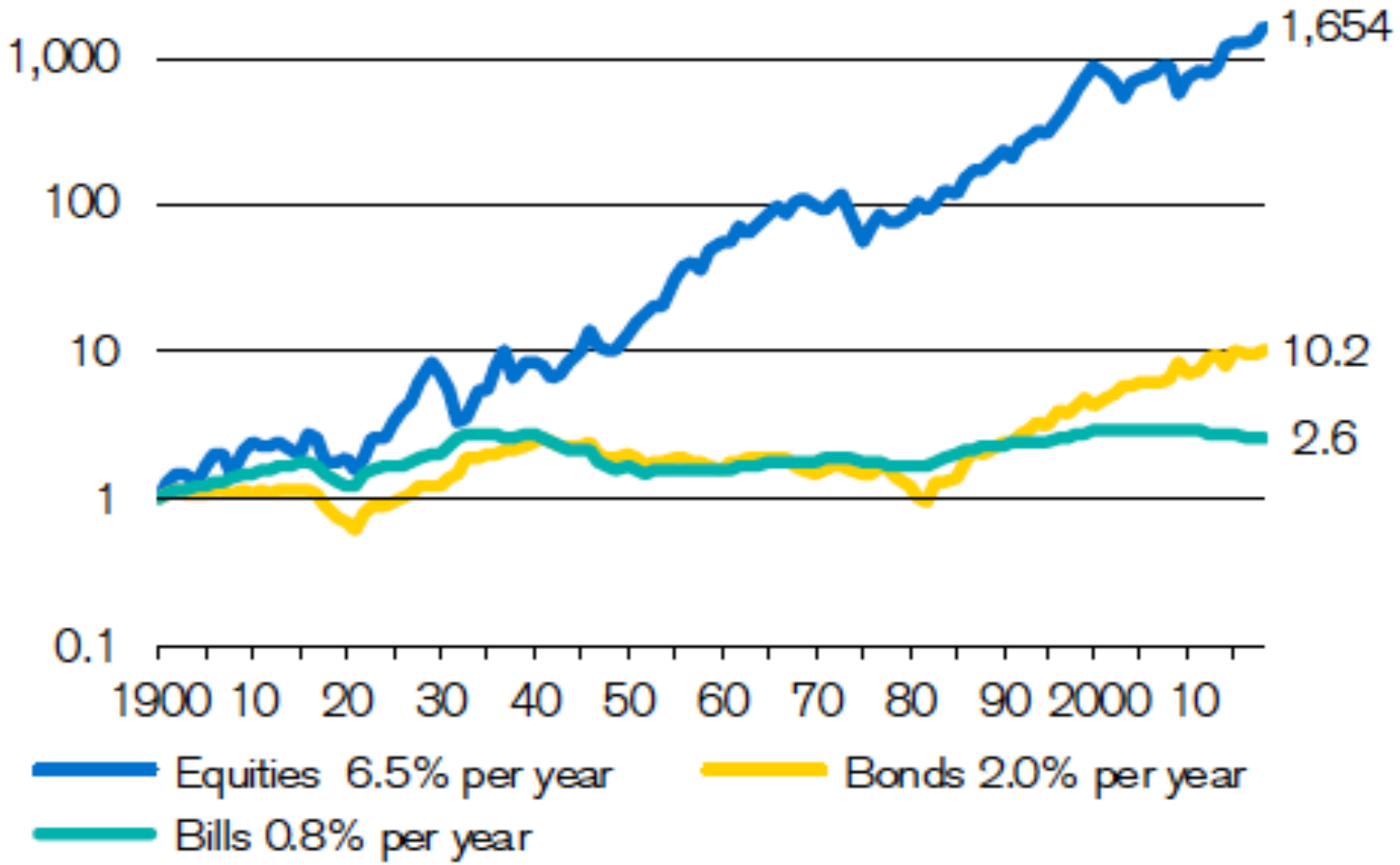
Topic 8: Balancing Risk & Reward (Investing Challenges)

- Remaining topics from before
  - Taking sensible risks
    - i.e. How much stock and other risky assets in our strategic portfolio?
  - What can we expect going forward?
  - Why do we get it wrong?
    - And what should we be doing to protect ourselves from these mistakes?

Annual US Equity Returns vs. Bills (1900-1917)



Cumulative Real Returns on US Assets (1900-2017)



Source: Dimson, Marsh & Staunton, Credit Suisse

Interpretation #1

Common with financial planners

- Return advantage of stocks overwhelms risk in the long-run
  - So buy stocks if your return horizon is long-enough
  - Get used to stock swings
  - Young should own more stock than old
  - Be careful not to own so much stock that you become a forced seller in bad times. (*i.e. don't buy high and then sell low*)
  - Consider Increasing allocation to stocks if your return needs are high

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- Examples
  - Common rules of thumb:
    - Old: 100 rule (stock % = 100 – your age)
    - New: 110 rule (stock % = 110- your age)
      (reflecting higher longevity and lower expected returns)
  - Life-cycle funds
    - Dianne Garnick's proposed adjustment for women
  - Common financial advice

Interpretation #2

Discussed in Kotlikoff book

- Merton-Samuelson Rule:
  - *Optimal portfolio combination does not change with age*

- Kotlikoff book:
  - *Has you investing in inflation-indexed bonds instead of stocks*

- How do they arrive at these conclusions?
  - Idea 1: Recursive thinking in a random walk world
  - Idea 2: Stocks must have hard-to-bear risks for people to demand such a high risk premium for their returns.
    - Kotlikoff: 90% fall over 1931+32;
      50% fall in 6 months in 2008, etc.

How Do We Reconcile These Differences?

- My general “take” on the different investment advice

- An approach to thinking about what is right for you

    1. Take a hard look at the Merton-Samuelson assumptions to see how our financial choices are different.

    2. Think hard about the nature of the investment risks you actually face.

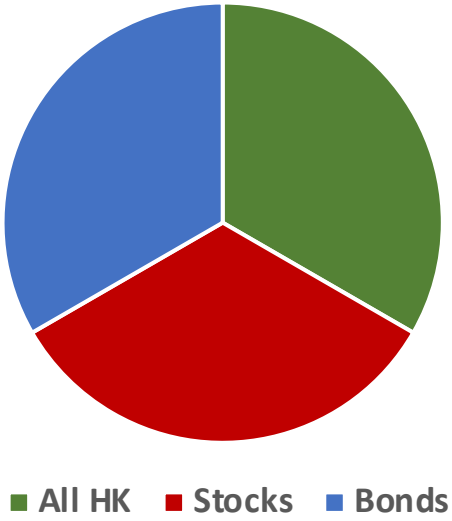
    3. Becoming familiar with investment volatility and risk

    4. Becoming aware of our investing biases and always asking
        - Why would markets demand this extra return?
        - How could I be wrong?

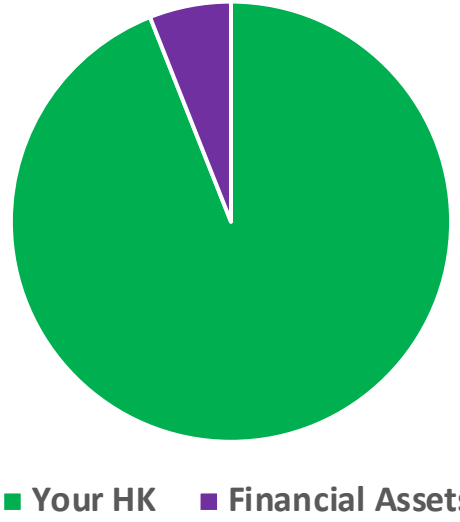
Issue 1: Fungibility of Human Capital

- Human capital as an asset
  - MS Assumption: You can easily sell some of your human capital to get to your optimal portfolio.
  - Real world: Very limited ability to buy/sell this asset

Assumed MS Optimal Portfolio

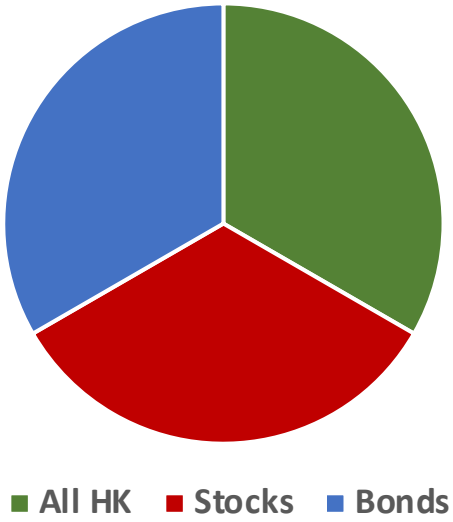


Young Person's Actual Portfolio



Issue 1: Fungibility of Human Capital - 2

Assumed MS Optimal Portfolio



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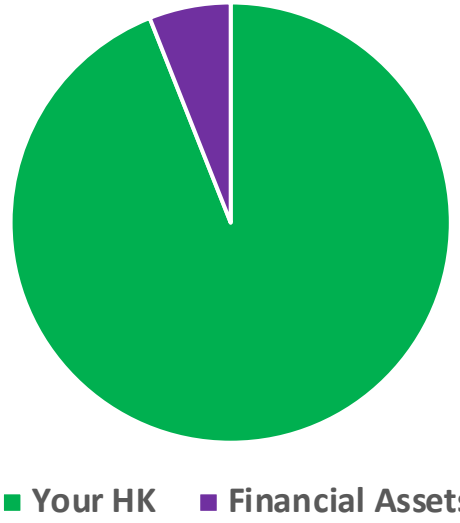
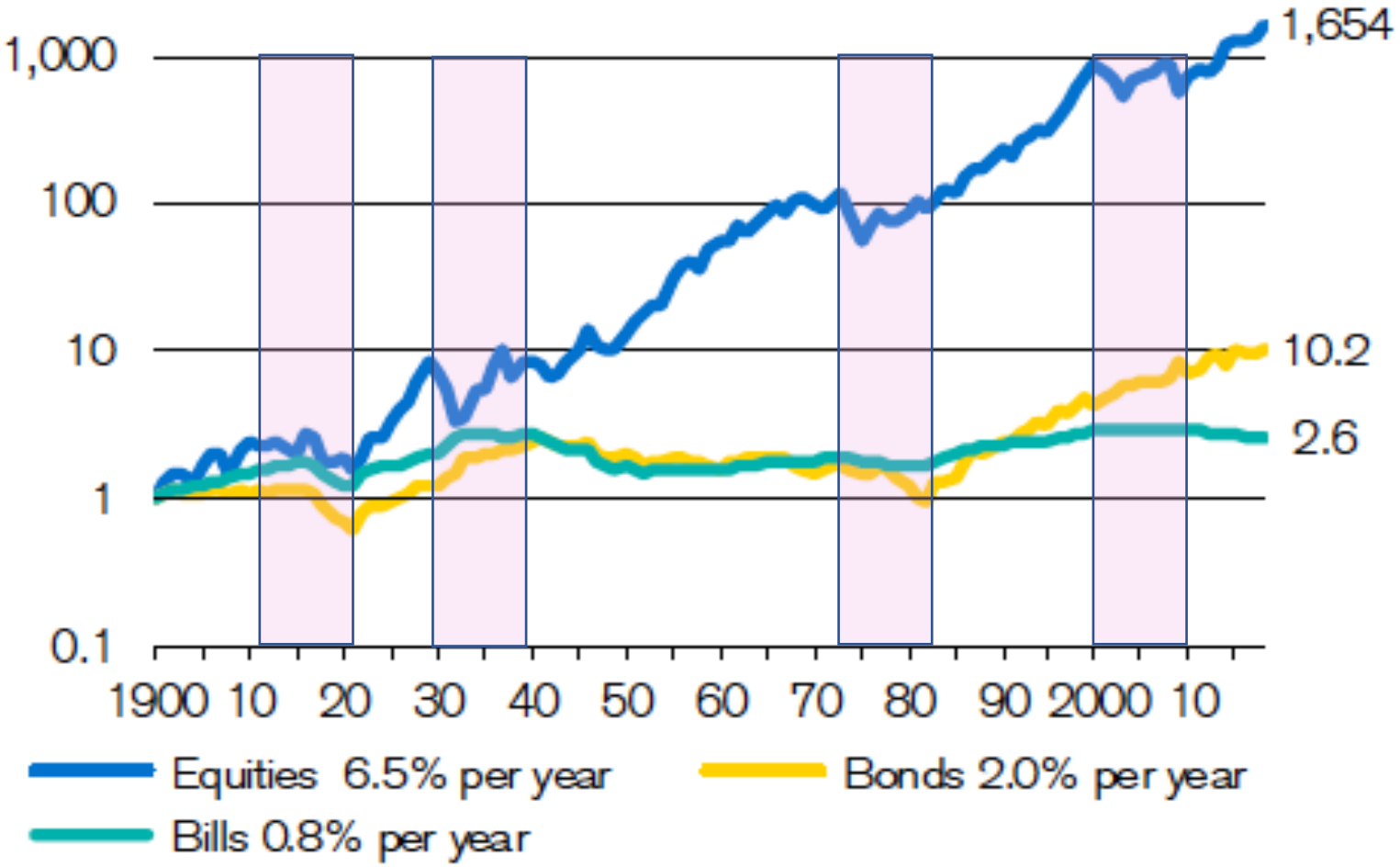


- Idea: Stocks may not be risky for young if they diversify your human capital risk. (*A good reason for the young to own stock*)
- Kotlikoff's question of whether you are a stock or a bond
  - If you are a civil servant
  - If you are a high paid investment banker
  - In general
  - *Note Kotlikoff and social security regarding investment strategy for the elderly*
- Digression on company stock

Issue 2: Investment Risk & Bad Decades

Cumulative Real Returns on US Assets (1900-2017)



Source: Dimson, Marsh & Staunton, Credit Suisse

The Importance of Bad Decades

- If you are spending some or all of your investment income
  - Especially if you are
    - Using your wealth as a buffer in bad times and
    - Find it hard to reduce spending once commitments have been made
  - Examples:
    - Pension funds
    - University endowments
    - Retirees
  - Results from work with former colleagues
    - Can run out of money if portfolio has too much stock or too much fixed income
    - The need to be able to adjust spending

The Importance of Bad Decades - 2

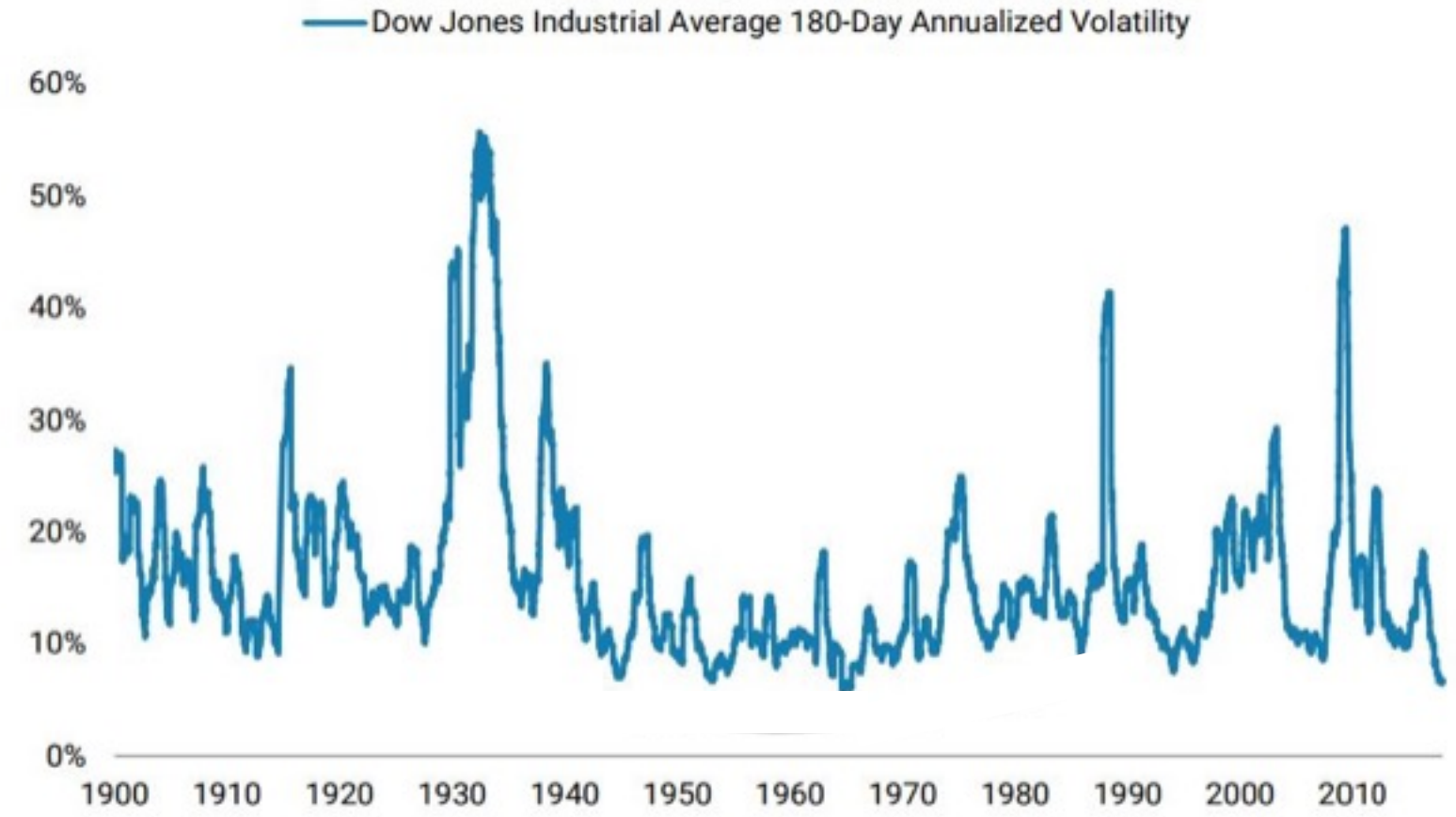
- What about the young in this case?
  - Currently in savings mode for retirement
  - But what about
    - Future spending such as down payments, kids education, etc.?
    - Precautionary saving?
    - Ability to stay the course if you experience a bad decade?
    - And still face the recursive issue if a true random walk
  - Issue: What is the nature of the risk we face?
    - Ability to stay the course: stress periods and big shocks
    - Mean reversion vs. random walk

Issue 3: Investing Risk In The "Real World"

- Volatile volatility
  - Normal vs. stress periods
- Large shocks
  - Happen more often than you think
- Bad decades
  - Will you be able to hold on?

Volatile Volatility

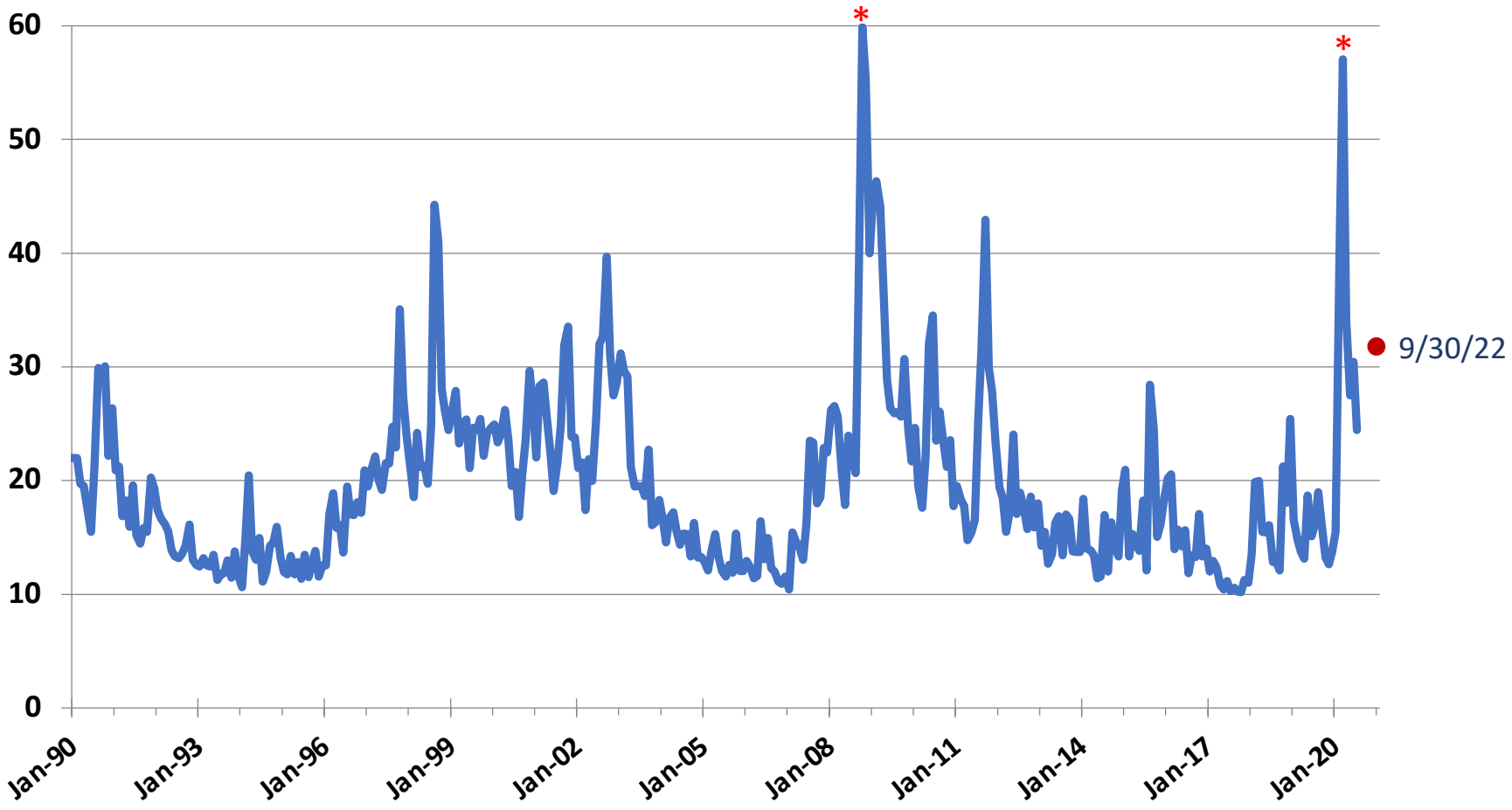
Historical Stock Market Volatility (1900-2017)



Source: Bloomberg, Morgan Stanley Research as of December 14, 2017.

Chart courtesy Morgan Stanley

Implied Volatility - VIX *(1/1990 – 7/2020)*



Source: Bloomberg, CBOE

**mid-month peaks exceeded 80!*

Normal vs. Stress Environments

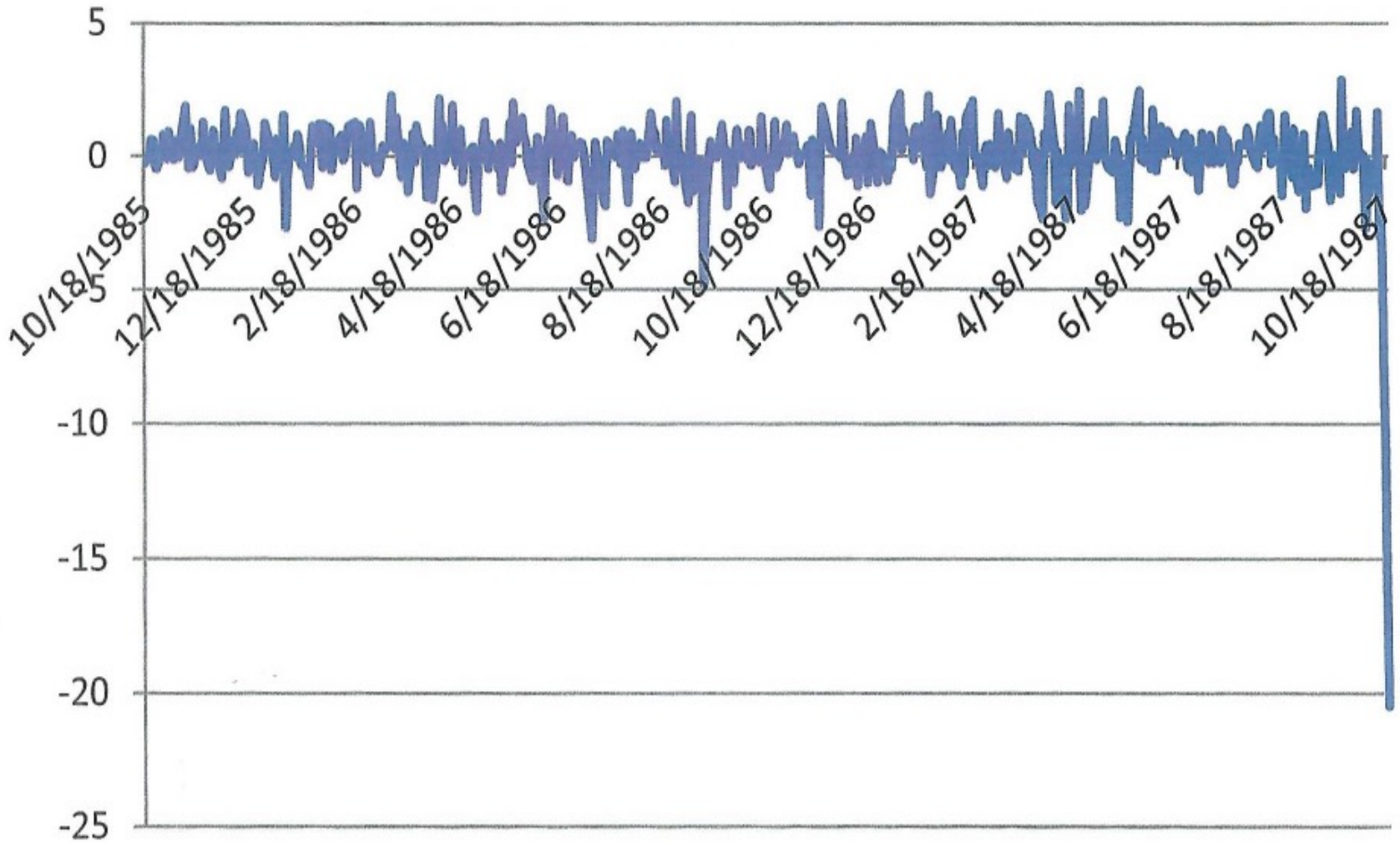
Key: You need to think about periods of financial stress when determining how much risk to take.

- Much higher volatility
- Less diversification
- Downward pressure on risky assets

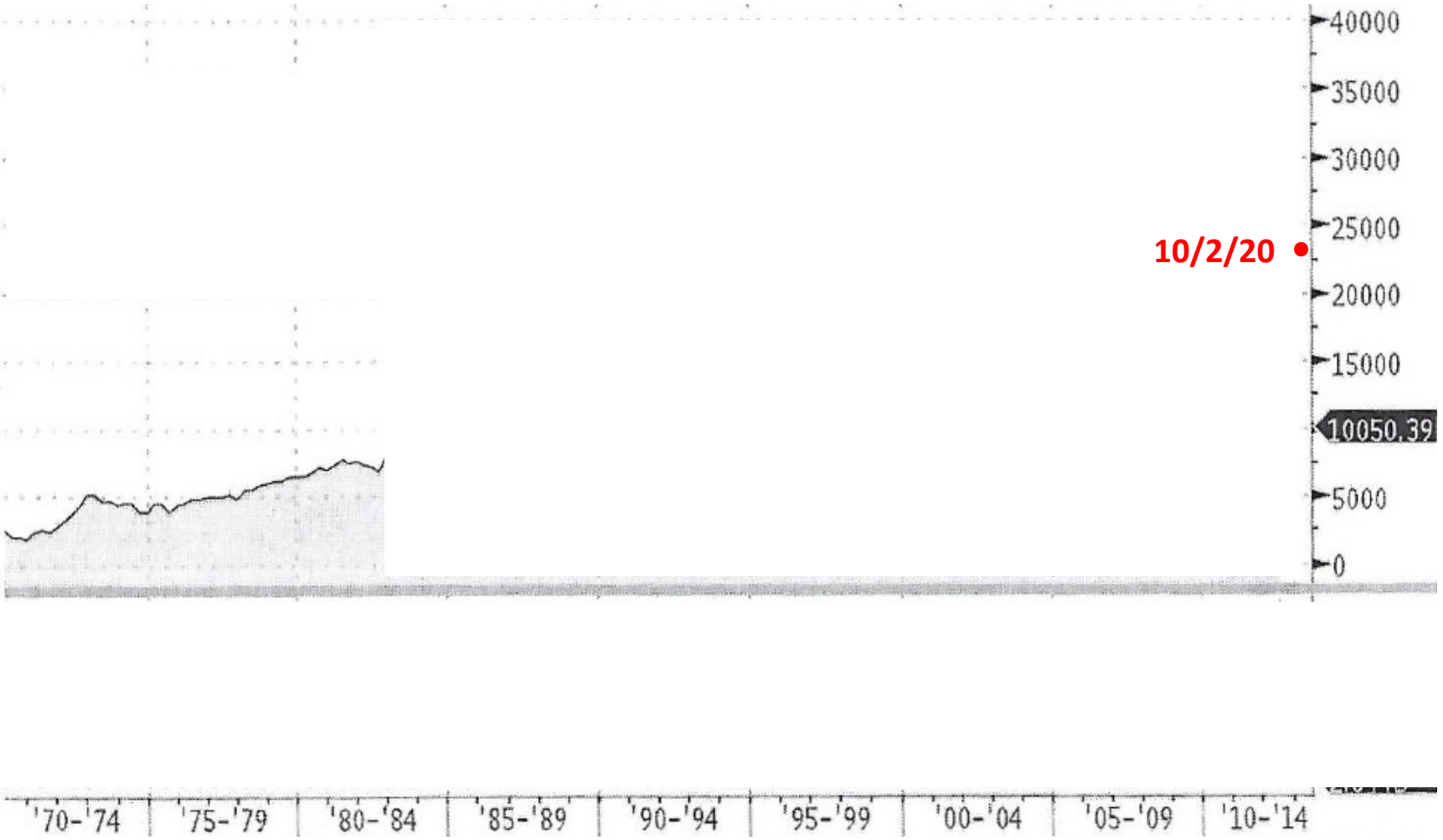
Issue: Emotional challenges, sustainability, and cost of forced sales in stress environments

- Have you done a simple thought experiment
  - That will help you anticipate how your portfolio will behave?
  - And how you will feel in tough times?
- Can you wear this risk?

S&P 500 Daily % Price Change



Japanese Nikkei (1970-2012)



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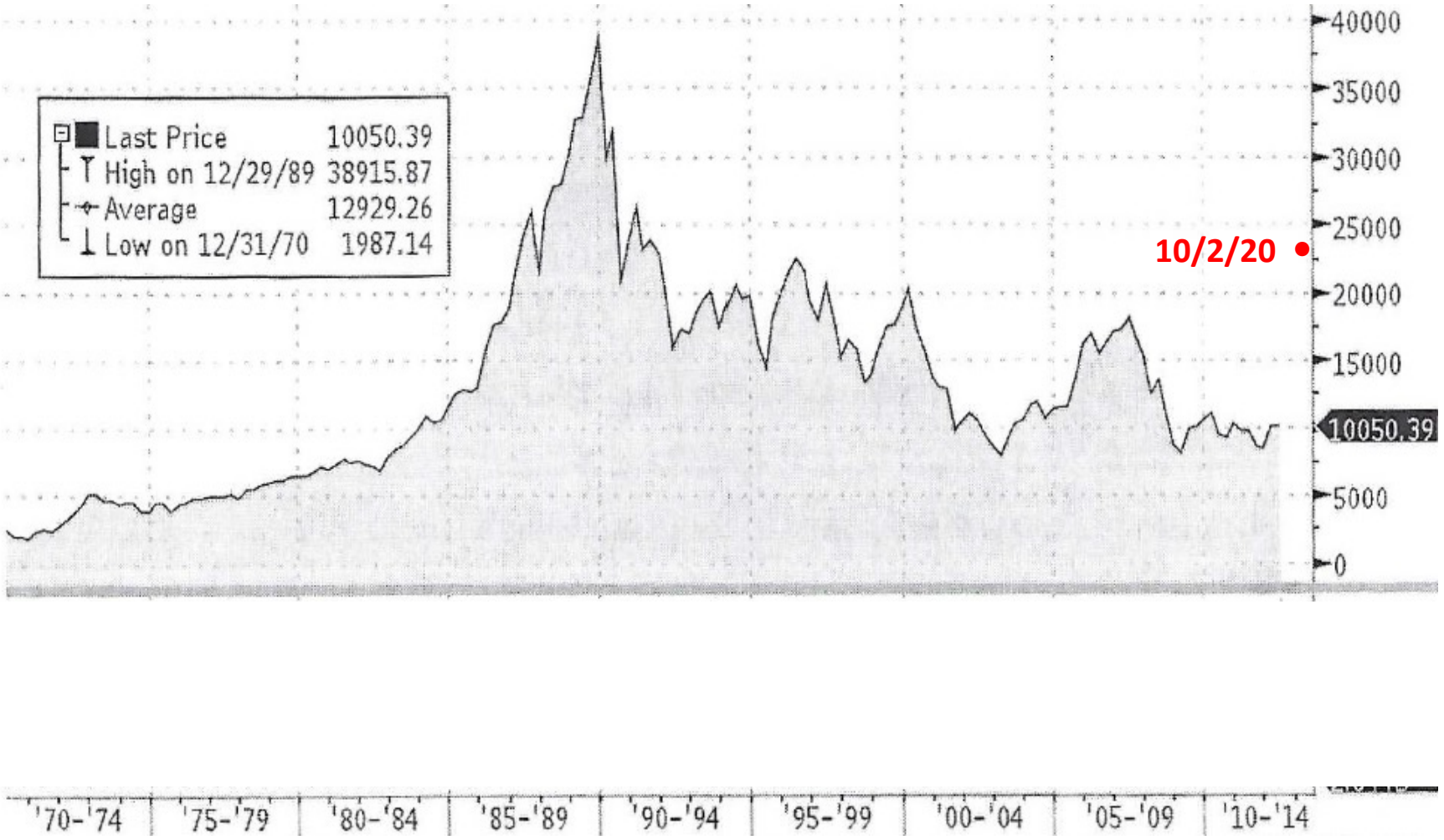


Challenges from Tail Risks

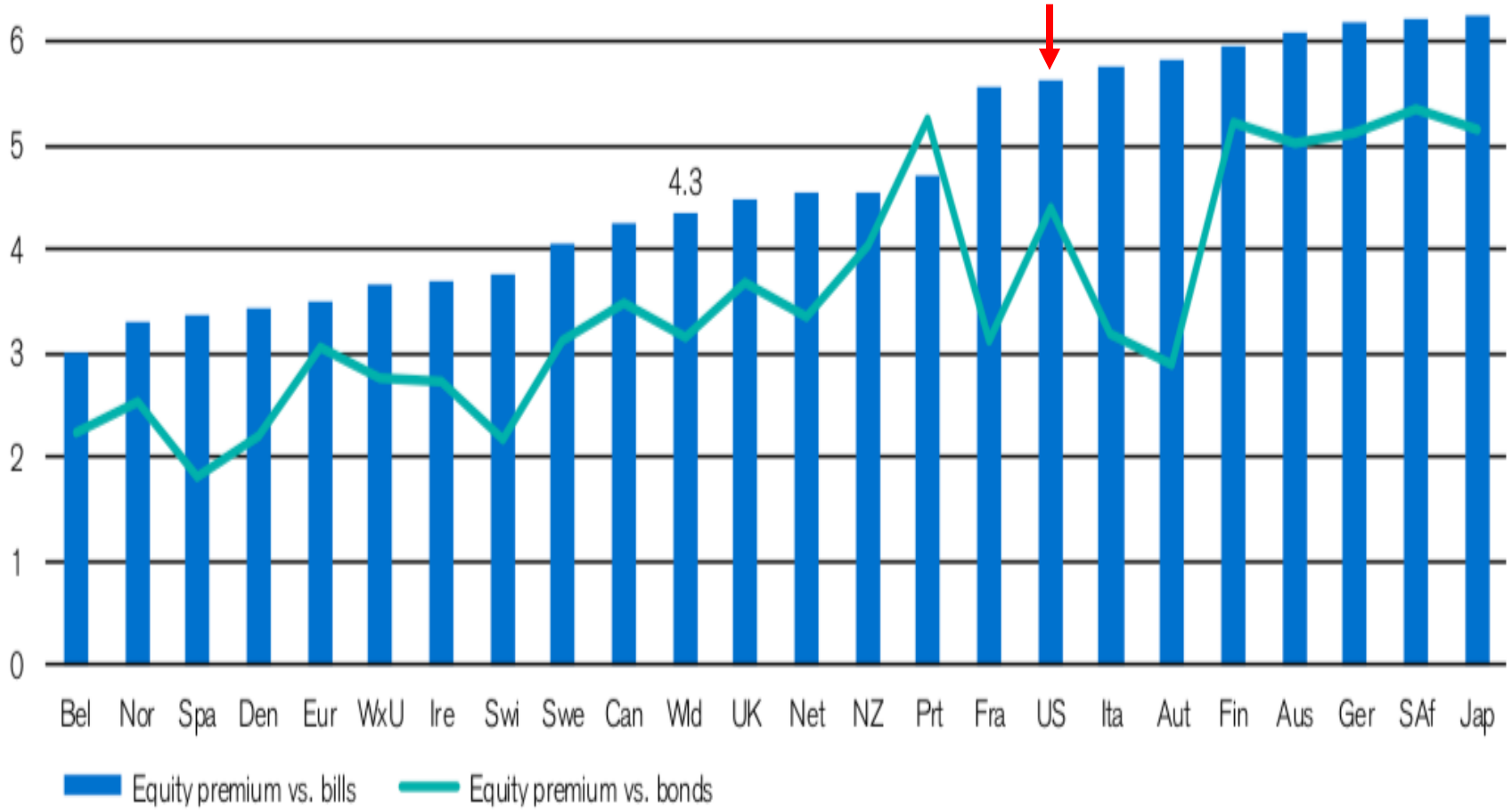
- Amount of data needed to measure them
- Our tendency to underestimate them (*TBD*)
- Risk of fake alpha
  - *”Roulette wheel” bets*
  - *And who gets rewarded before the big shock happens*

Issue 4: Long-Run Expected Returns

Issue: Can/should we rely on long-run averages for the US?

- International comparisons
- Long-run mean predictability (controversial)
- Issues:
  - Do you need to be making more conservative estimates?
  - And do you need to have a buffer?

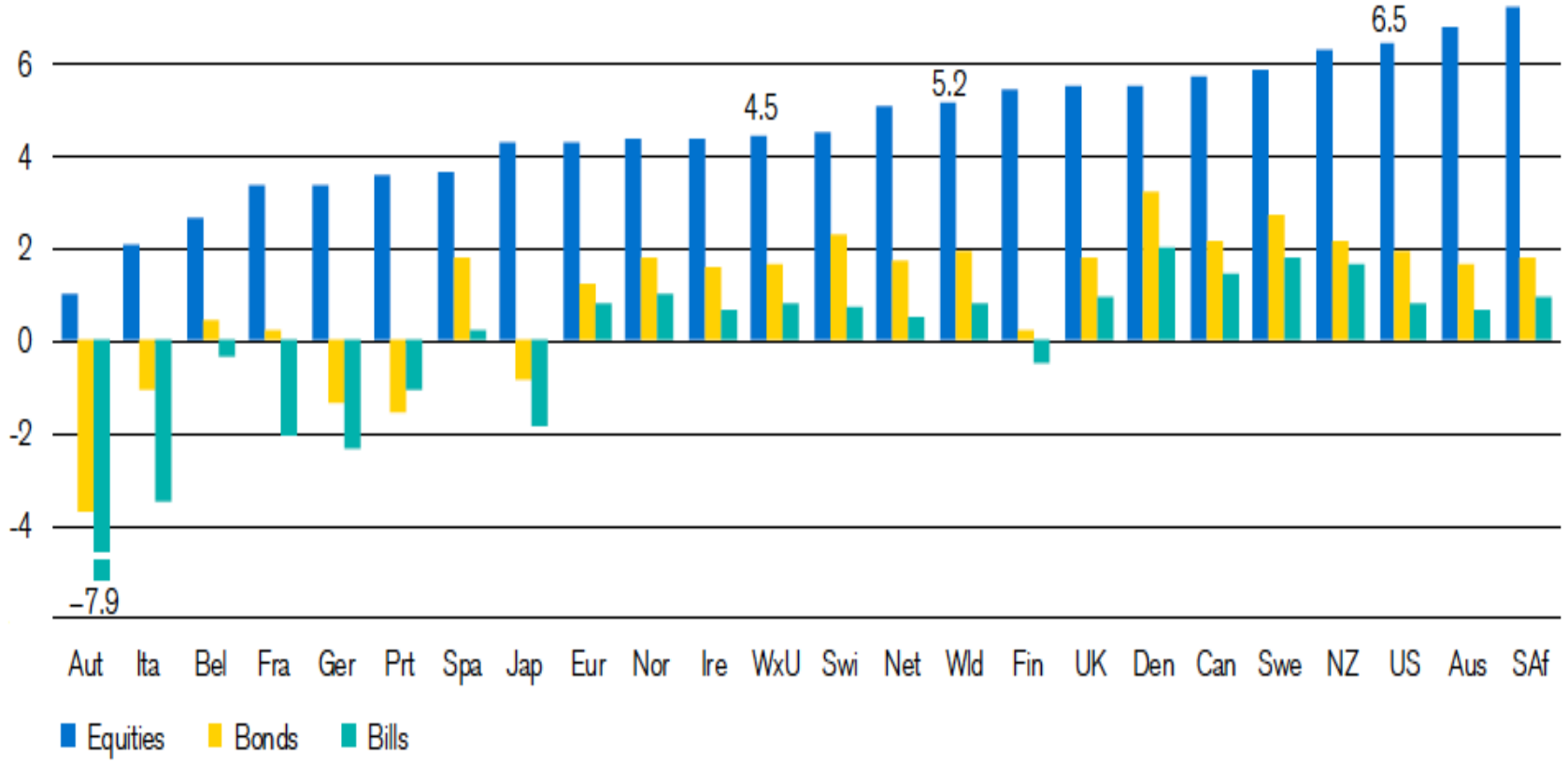
Equity Risk Premia: 1900-2017



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and subsequent research. Premiums for Austria and Germany are based on 116 years, excluding 1921–22 for Austria and 1922–23 for Germany.

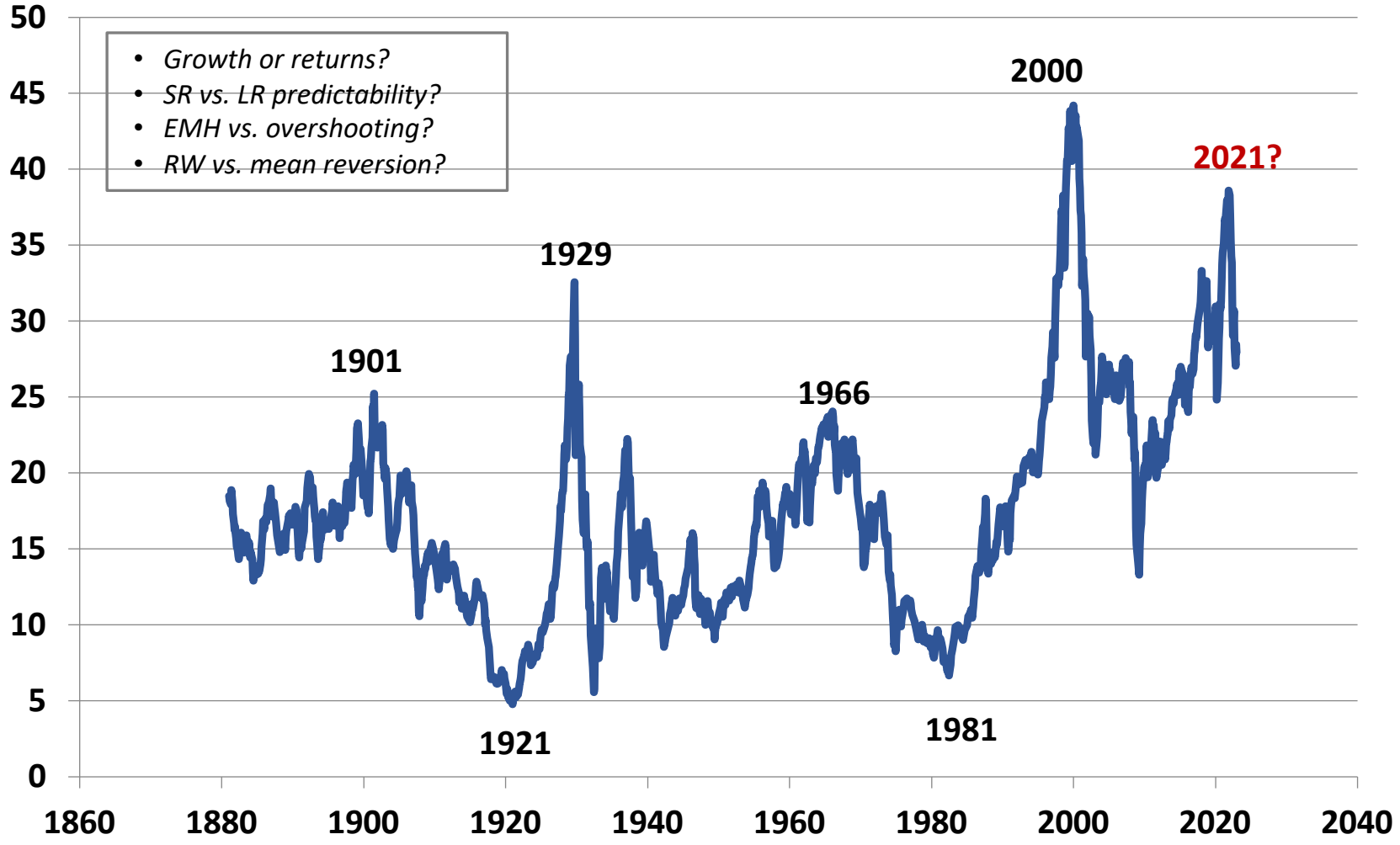
Source: Credit Suisse Investment Returns Yearbook: 2018

Real Annualized Returns (1900-2017)



Source: Dimson, Marsh & Staunton, Credit Suisse

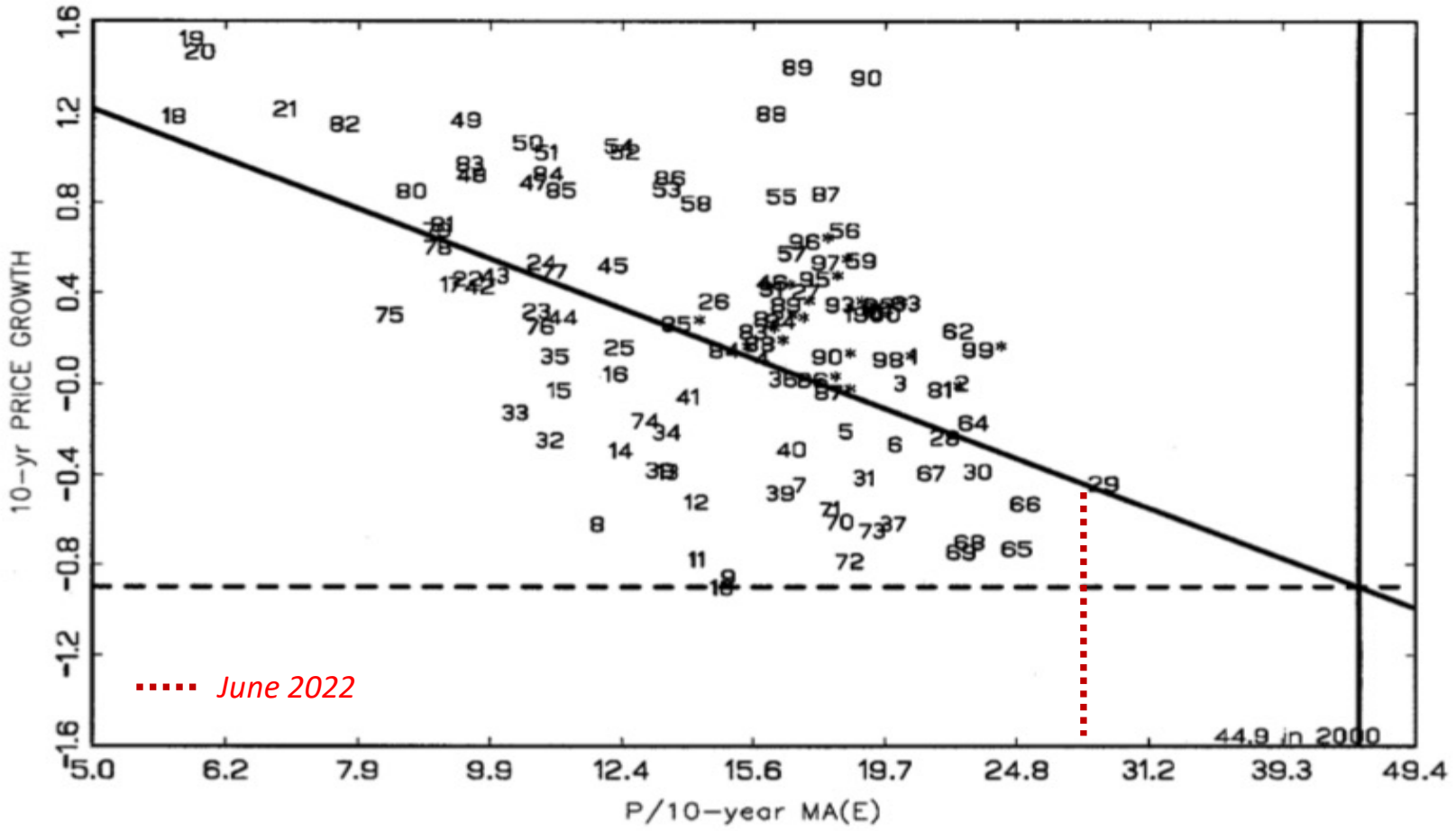
Shiller CAPE Ratio *(through Dec. 2022)*



Source: Robert Shiller Online Data Base

So What Can We Expect for the Future?

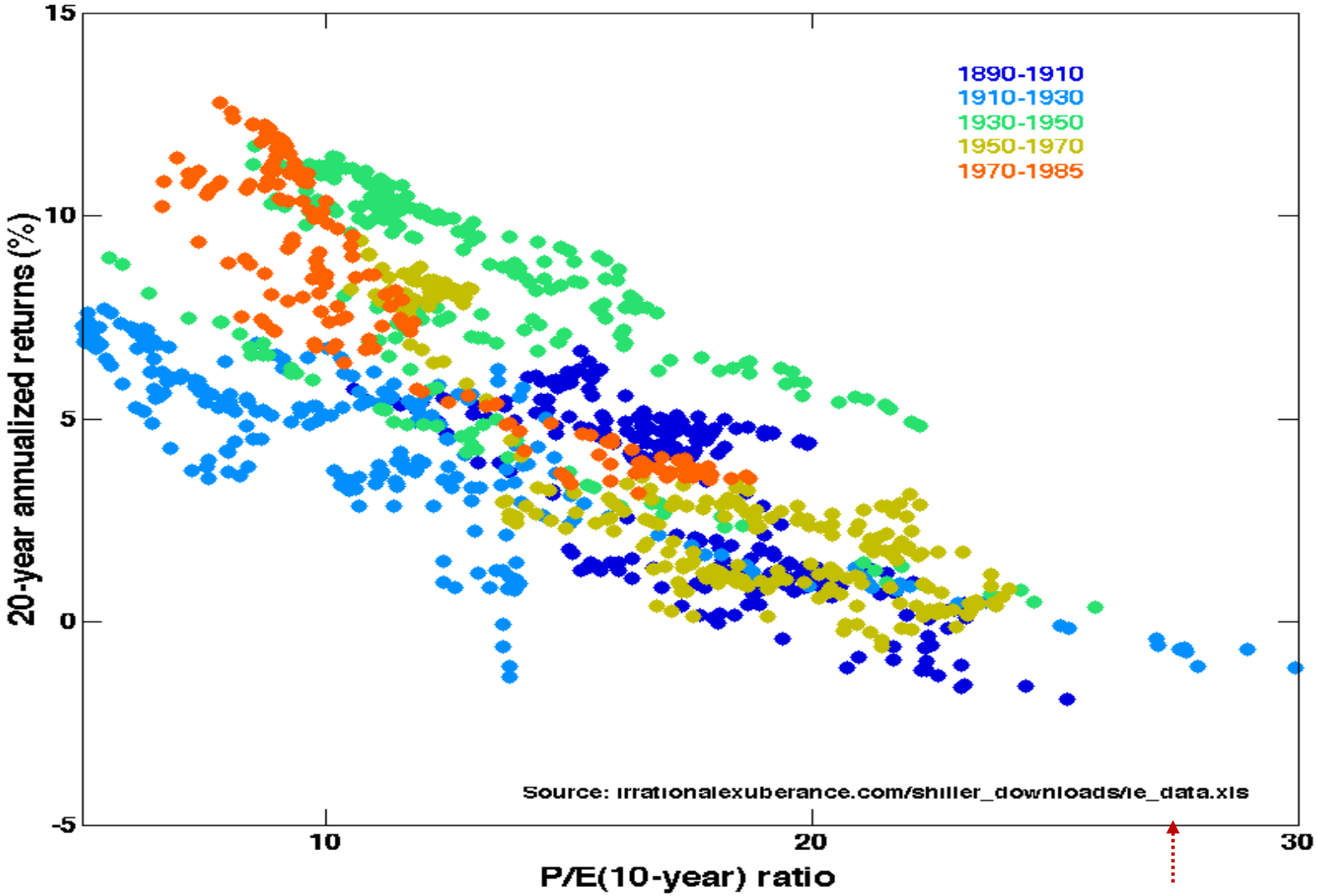
10-Year Price Growth vs 10-year MA of Earnings (Shiller CAPE)



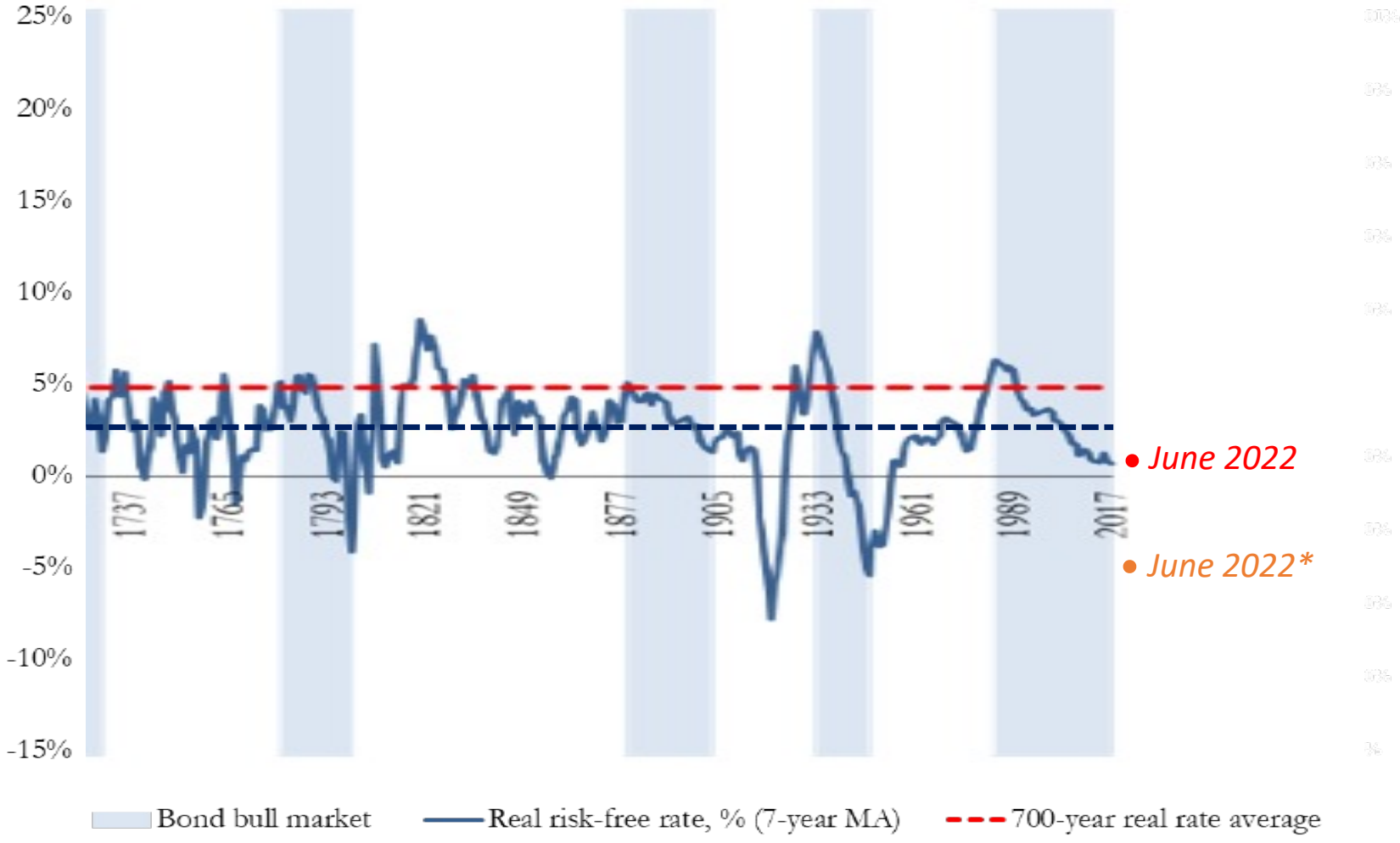
Source: Campbell & Shiller, Valuation Ratios and The Long-Run Market Outlook, NBER Working Paper #8221 (April, 2001)

So What Can We Expect for the Future?

20-Year Annualized Returns vs Shiller CAPE



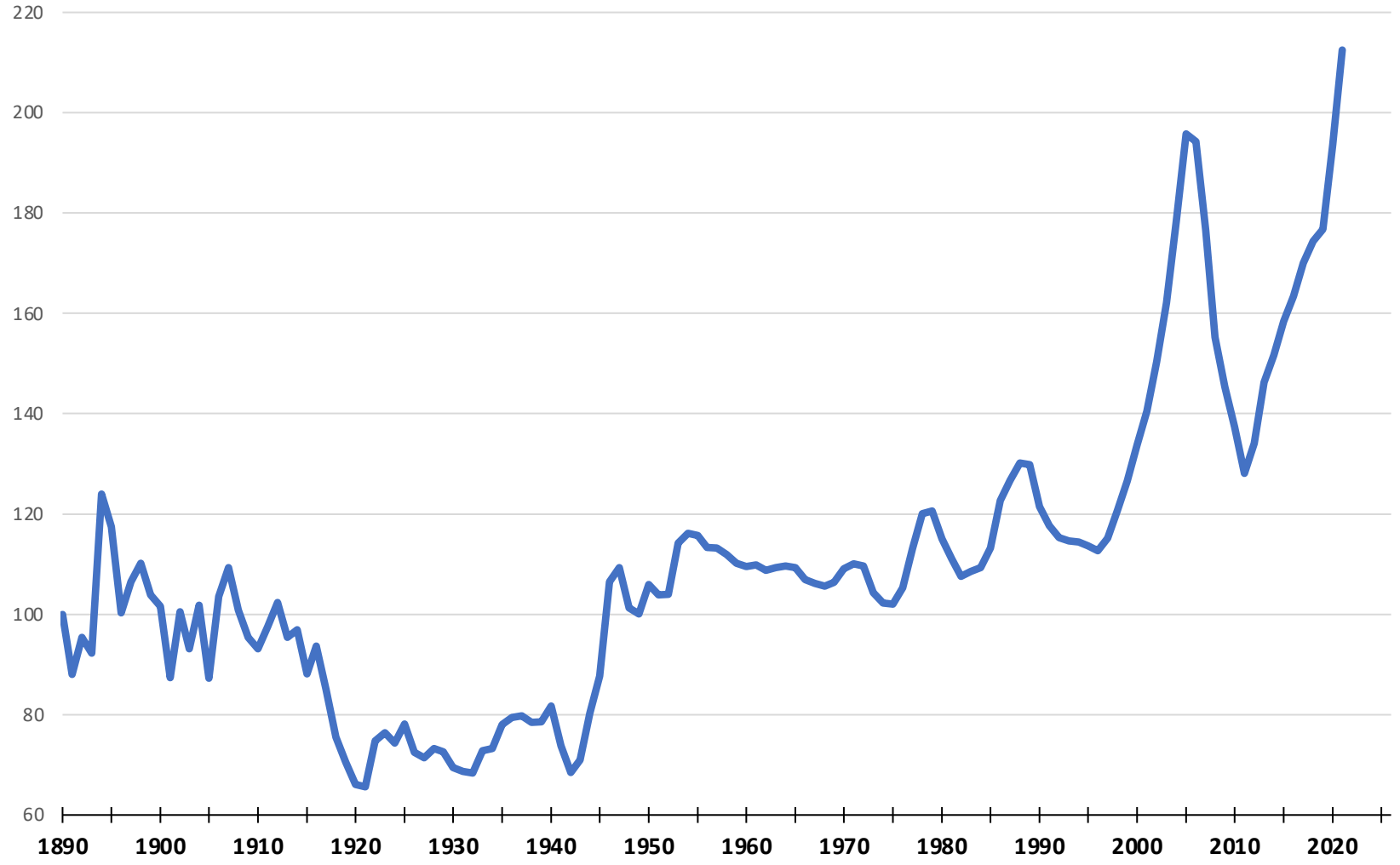
300 Years of Real Interest Rates



Paul Schmelzing, Bank of England Staff Working Paper #686

Case-Shiller Real Home Price Index

Through December 2021



Source: Robert Shiller Online Data Base

Issue 5: Protecting Yourself From Yourself

- Key ideas
  - We have behavioral biases in how we form expectations
  - And these bias tend to cut against the issue I have been talking about

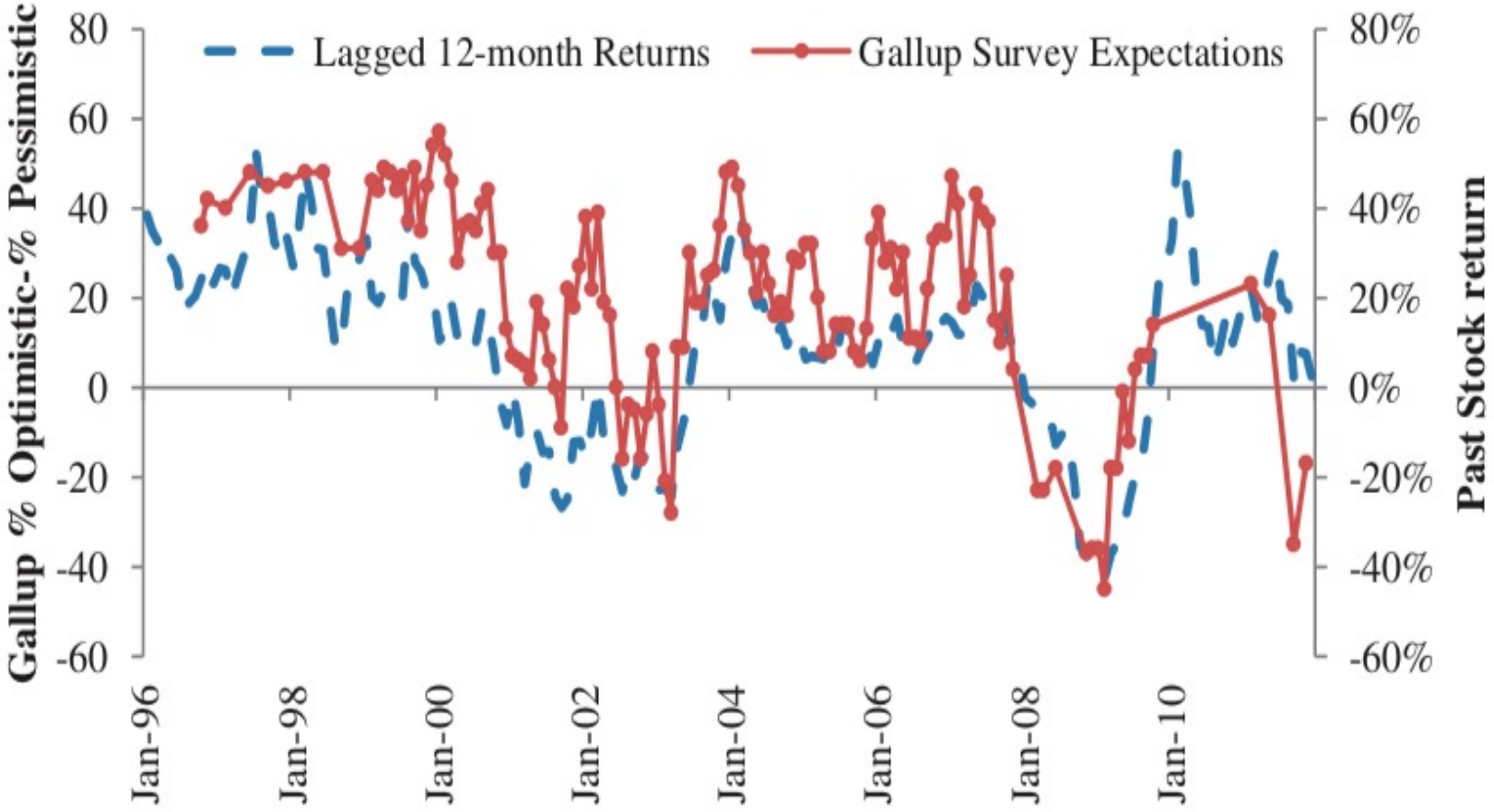
- Key biases vs. reality
  - The tendency towards overconfidence vs. EMH and the Iron Law of Active Management
  - The tendency towards extrapolation – both expected returns and risks – vs. a world of ST random walks and volatile volatility
  - The tendency towards over precision vs. a world with large shocks
  - The tendency towards small sample biases vs. large shocks & roulette wheel bests.

Overconfidence Examples

- Barber & Odeon (1990)
  - Data on 65,000 US investors
  - Average investor underperforms index by 1.5% per year
  - Returns of the 20% most active traders were 7% below those of buy-and-hold investors
    - 3 factor alphas for the most active investors were -10.4% annually
- Finland (Grinblatt & Keloharju - 1990)
  - Military service tests ability and perceptions of ability
  - Found significant link between overconfidence and trading activity.
- US Online Brokerage:
  - Trading frequency has been linked to over-placement
- Taiwan
  - Losses from active trading = 2.8% of total personal income, 2.2% of GDP
  - #1 cause of underperformance is perverse selection ability

Example of Extrapolation Bias

The Role of Past Stock Market Returns in Explaining Survey Expectations



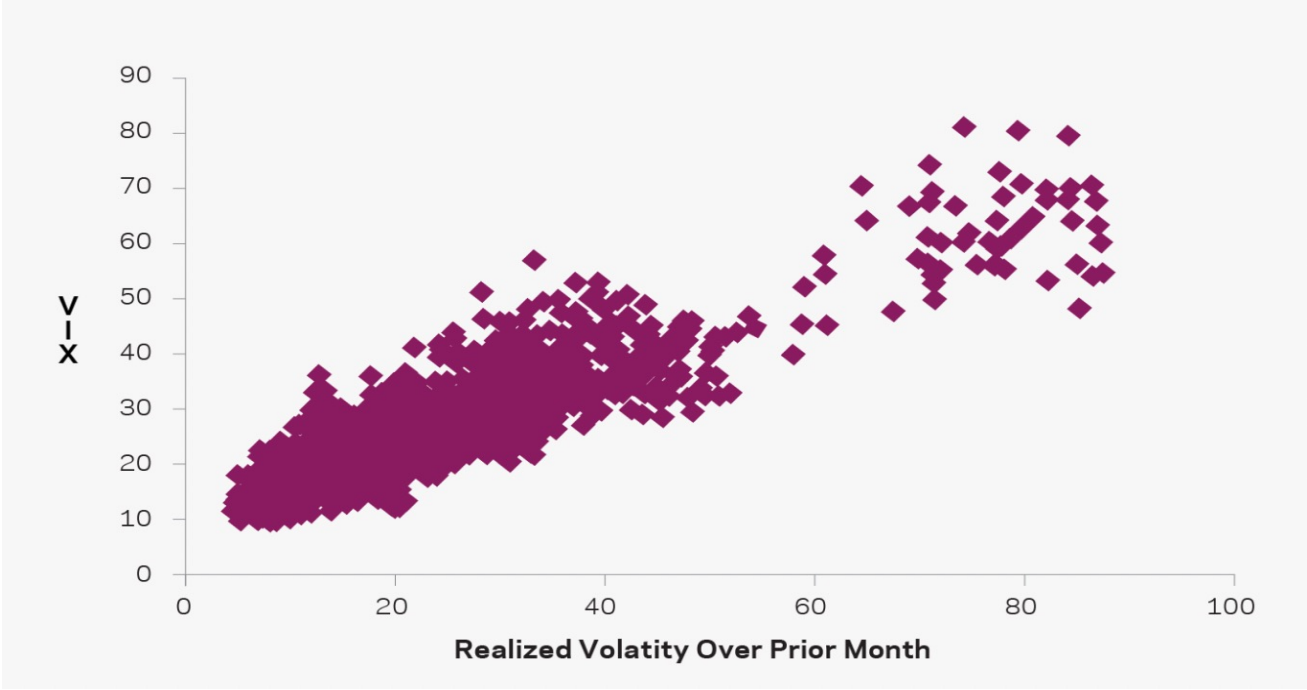
Source: R. Greenwood, A Shleifer, "Expectations of Returns & Expected Returns," The Review of Financial Studies, 2014

Extrapolation Bias and the VIX

The VIX measures expectations of future stock market volatility implied by option prices.

- Data indicate that recent experiences of past volatility impact expectations of future volatility.

VIX vs. Realized Volatility: 1/2/1990 – 7/27/2017



Source: Cliff Asness, "Please Stop Talking About the VIX So Much," AQR 7/2017

Typical Outcomes for Confidence Interval Tests

Indicate a tendency for us to underestimate the range of outcomes we face

1. 90% confidence intervals are generally correct **about 50% of the time.**
2. 98% confidence intervals are generally correct **about 60% of the time.**
3. Ranges people believe are certain to happen occur **about 80% of the time.**
4. Outcomes people deem as being impossible occur **about 20% of the time.**

This phenomena is called Over-precision

Risk Taking and Over-Precision

- We tend to underestimate the range of outcomes we actually face

- We tend to underestimate – and even ignore – infrequent risk of large losses even though this is a key feature of financial returns
  - Add small sample bias where we tend to be over-convinced by too-small samples (which likely don't include those rare shocks)

- And can end up with situations where rare but important risks of catastrophic loss may be neglected

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And Also Beware of

- Confirmation Bias
- Availability Bias

Risk Taking and Over-Precision

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- And can end up with situations where rare but important risks of catastrophic loss may be neglected

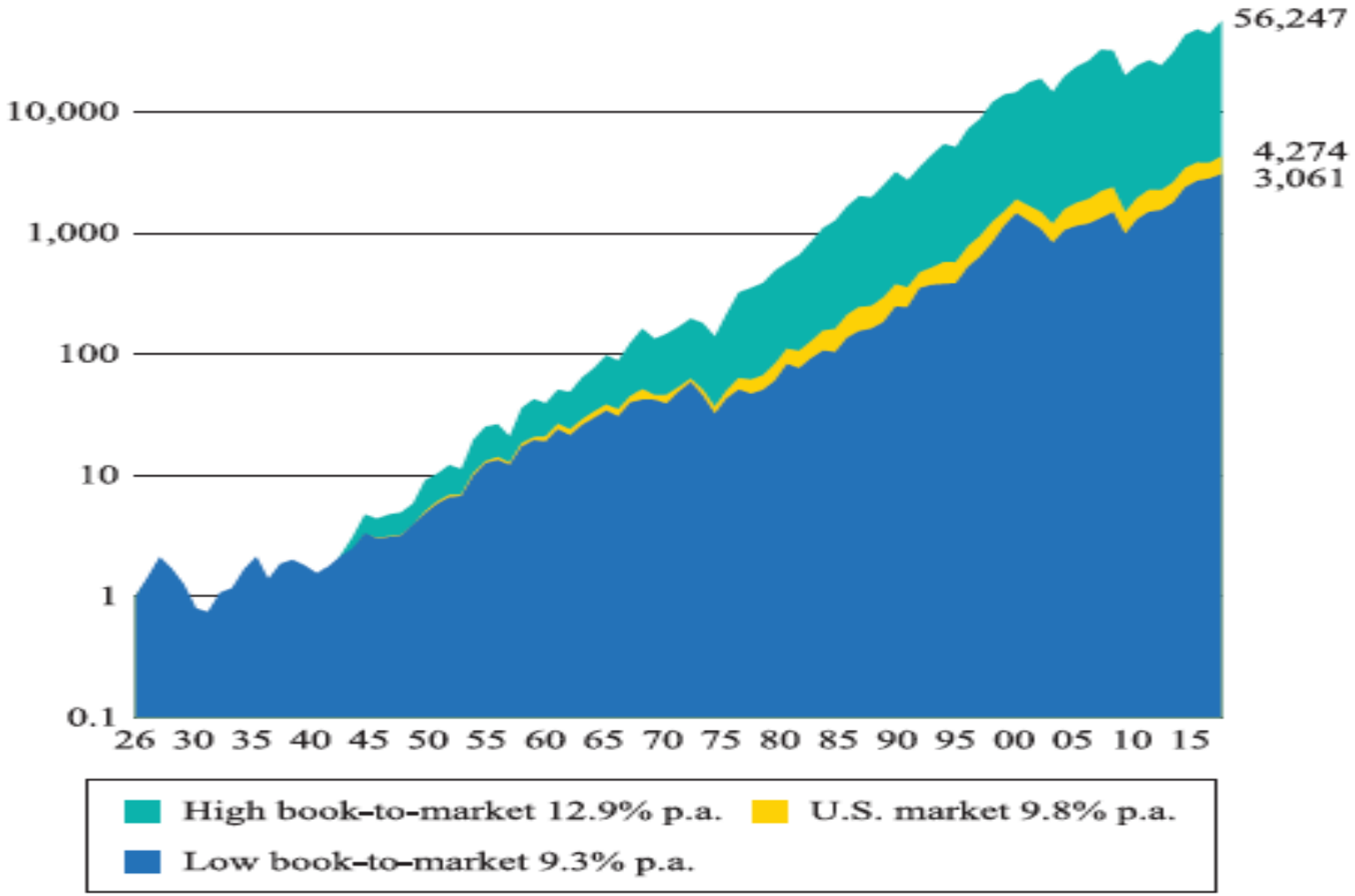
Some Take-Aways

- The expected return advantage of stocks, etc. is highly significant over long-enough time intervals
- But you need to be mindful of the risks that lay behind our demanding those extra returns
  - Bad decade risk (and tail shocks as a potential source of that risk)
  - How large shocks and stress periods will influence your ability to stay the course (since forced selling in tough times will be a losing strategy)
- Taking these risks is going to create a need for cautious assumptions and the creation of a buffer
- We are programmed to be bad investors, and you will need to ask yourself some questions to avoid major investing mistakes

Some Important Questions To Ask

- What is being priced by the market?
- Why isn't the "smart money" exploiting this opportunity
- Why is the market demanding these extra returns? (*i.e. Is it requiring compensation for a risk I haven't thought of?*)
- Am I simply extrapolating the recent past, and can I hold this position if the risk environment changes?
- What if I am wrong?

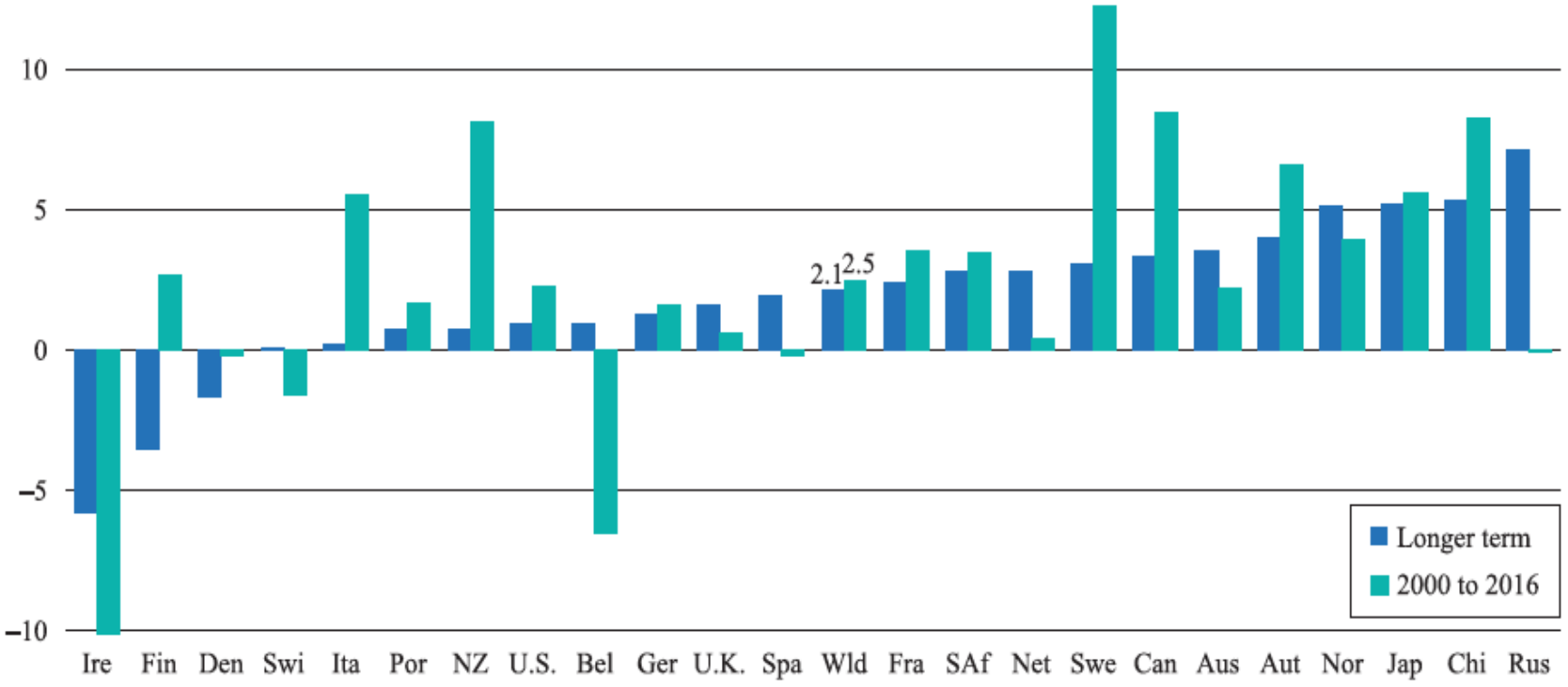
Performance of Value Factor (US: 1926-2016)



Source: Dimson, Marsh, and Staunton (2002 & subsequent updates)

Annualized Value Premium in 23 Countries

(1975-2016)



Source: MSCI Value and Growth indexes.

Source: Dimson, Marsh, and Staunton (2017)

Factor Performance – Rolling 10 Year Returns

Strategy represents the most attractive 10% of stocks in the category, weighted by market capitalization

Source: Ken French data