

Benchmarking and Equity Premium

(Welch, Chapter 09)

Ivo Welch

Mon Jun 20 12:53:17 2022

1: Maintained Assumptions

Perfect Markets

1. No differences in opinion.
2. No taxes.
3. No transaction costs.
4. No big sellers/buyers—infininitely many clones that can buy or sell.

With risk and risk aversion

- ▶ this chapter does not lean heavily on assumptions.

2: Corporate Key Question

- ▶ **What is your investors' cost of capital?**
- ▶ We need the **opportunity cost of capital**
 - ▶ to serve as the $E(r)$ in the PV formula.

3: Prerequisite Objective

- ▶ As a corporate manager, your task is to act on behalf of your investors.
- ▶ Are you the custodian of your owners' cash.
 - ▶ If not, who do you serve?
- ▶ To compute NPV, what is your investors' opportunity cost of capital?
 - ▶ Return their money if they can do better elsewhere!

4: Skype Your Investors and Ask?

- ▶ In public companies, there are often too many investors — different and diffuse.
 - ▶ Most have little investment in your company.
 - ▶ Most don't want to become informed.
 - ▶ Most just don't want to be bothered.
 - ▶ Often hard to even get them to vote *on-line*.

5: Reasonable Presumptions?

- ▶ What are good presumptions about them?
 - ▶ They are smart.
 - ▶ They are reasonably diversified — most holding something close to the overall stock market.
 - ▶ They want you to compare your projects to others that they could invest in elsewhere.

6: Preferences?

- ▶ What (project characteristics) do they like?
 - ▶ Do they care about your firm?
 - ▶ Do they care about you?
 - ▶ Do they care about employees?
 - ▶ Do they care about society?
 - ▶ Do they care about abortion? (which side?)
 - ▶ Do they care about politics?
 - ▶ Do they care about pollution?

7: Specific Preferences?

- ▶ Not 100% clear what investors (dis-)like.
- ▶ Most likely, we think they care about:
 - ▶ When will the payment come?
 - ▶ Is the project and payment risky or safe?
 - ▶ Is the market perfect? Is it liquid? Can they sell easily? Can they withdraw easily? How bad are their taxes?

8: Risk or Co-Risk?

- ▶ Do they care about how your project investment choices impact their overall portfolio?
 - ▶ If so, then how should you assess how a new project contributes to their portfolios?

9: Specific Term and Risk Preferences

- ▶ What are good benchmarks for your project's term and risk premia?
- ▶ When will the payments come?
 - ▶ → Treasury Yield Curve
- ▶ Is your project “default-risky” like corporate equity?
 - ▶ → Equity Premium

10: Equity Premium

$$\text{EQP} \equiv E(r_M) - r_F.$$

- ▶ The **equity premium** (or market risk premium):
 - ▶ the difference between the *expected* RoR on the stock market and some risk-free RoR.
 - ▶ View it as a *normalized* way of quoting the expected RoR on the stock market.

11: Risk-Free vs Risky Components

- ▶ Use leverage to split your (intermediate-risk) project into one project that is safer and one that is less safe.
- ▶ Then benchmark your safer and riskier components separately.
- ▶ Stocks pay off in the distant future.
- ▶ Bonds pay off in the future.
- ▶ Bills pay off soon.

12: Perhaps Better: A Corp Yield Curve?

- ▶ Should we compare our corporate projects to U.S. Treasuries??
- ▶ Maybe look at an equivalent corporate-bond yield curve instead of Treasury yield curve?
 - ▶ **But take out the default premium.** Do not work with quoted numbers.
 - ▶ Your investors will not earn default premium *on average*.
 - ▶ Probably expected corp bond RoR is not super-greatly higher than that of U.S. Treasuries.

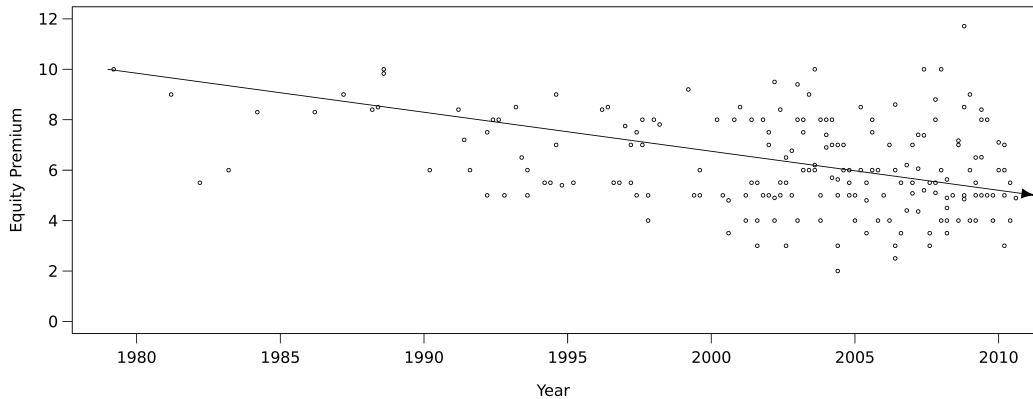
13: Equity vs Risk-free?

- ▶ Are there non-corporate contexts in which you care about the difference between the equity expected rate of return and the risk-free rate?

14: Good Project Benchmark?

- ▶ Where do you read off the risk-free rate?
- ▶ What is it today?
- ▶ Where do you read off the equity premium?
- ▶ What is it today?

15: Graph: Textbook Authors



{wid

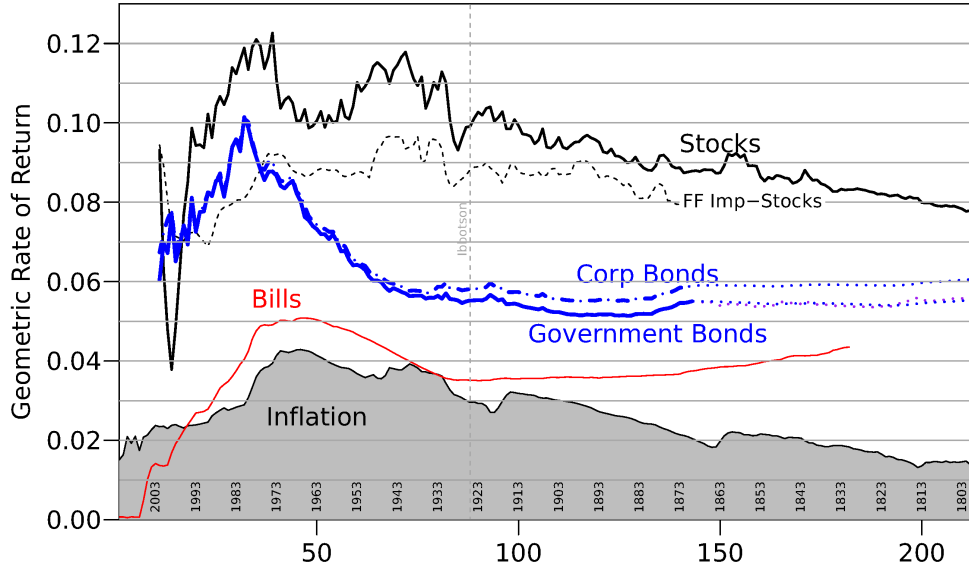
16: Comparability

- ▶ Benchmark returns (such as the equity premium) also depend on how you quote them.
 - ▶ Do investors care more about geometric or arithmetic rates of return?
 - ▶ Are cost-of-capital estimates more important for long-term projects or short-term projects?
 - ▶ **Watch out:** get $E(CF)$ in the PV numerator right! Do not apply $E(R)$ to *promised* cash flows.

17: M1: Historical Geometric Averages

- ▶ Standing today, looking backwards for x years, how did stocks perform geometrically above bonds (and bills and inflation)?
- ▶ Is there a term premium for equity?
 - ▶ A: Not clear.

18: Graph: Historical Geometric RoRs



19: Reconciling Historical Equity Premia

- ▶ Arithmetic Equity Premium vs Short-Term Bonds **1926 to 2020**: $\approx 8.6\%$
- ▶ Minus Later Sample Period, starting **1970**: -1%
- ▶ Minus Long-Term T-Bonds Instead of Short-Term T-Bills: -4%
- ▶ Minus Use of Geometric Return: -1%

- ▶ Highest quotable historical equity premium: 8.6%
- ▶ Lowest quotable historical equity premium: 2.4%

- ▶ All numbers are consistent. Just different.
- ▶ Historical, not necessarily expected.

20: *Peso Problem (Black Swans / Tail Events)*

Question: What about rare shocks??

- ▶ **Peso Problem** (Academics), or
- ▶ **Black Swan** (Nassim Taleb).

(important in *academia and practice!*)

21: Peso Answer

- ▶ Peso problem can explain at most 1-2% of historical equity premium.
- ▶ Peso problem is not unimportant, but it was and is **insurable with index options**.
- ▶ The remaining risk (long-run unforeseen stagnation) is harder to insure.

22: M2: History Implication?

- ▶ Are high historical stock market returns indicative of higher or lower future stock market returns?

23: M3: Predicting EQP?

- ▶ Would high or low dividend yields predict higher future market RoRs? Theoretically? Practically? Today?
 - ▶ Theoretically, higher.
 - ▶ But not (strongly) according to empirical evidence.
 - ▶ Recently, D/P predicted negative equity premia!

24: M4: Equity Premium

- ▶ What equity premium would it take to attract investors into the stock market, assuming no gifted horses?
 - ▶ 1-2% per annum would seem reasonable.
 - ▶ 3% means ending up with twice as much money for an investment over 25 years. This seems ridiculously high.

25: M5: Couldn't We Just Ask Experts?

- ▶ It is *The blind leading the blind*.
- ▶ Where do you think they got their opinions from?

26: Big Survey of Educated Guesses

- ▶ PS: you need to adjust how different answers have quoted the equity premium.
 - ▶ Ordinary investors. — Tend to follow recent experience. 15%/year in 2000, maybe also in 2021.
 - ▶ McKinsey Corporate Consulting. — 5%
 - ▶ Social Security Admin. — 4%
 - ▶ CalPers — 5% (7% for stock market)
 - ▶ Professors of Finance. — 4% to 5.5%
 - ▶ Me? Ivo-san. 2%.
 - ▶ I have been badly wrong (too pessimistic) from 2014 to 2021!

27: CalPERS: Shrugworthy?

- ▶ CalPERS has to decide what their expected (geometric) RoR should be.
 - ▶ they used a geo market premium of 7% in 2019.
 - ▶ which was then 5% above prevailing Treasury bond!
 - ▶ If this seems unrealistic to you—to me, too.
 - ▶ But lowering this estimate meant California would have had to set aside money for unfunded pension obligations *today*.
 - ▶ Politicians prefer to leave optimistic estimates as is, and kick the can down the line to their successors.

28: CalPERS: Problem Dimension

- ▶ 0.25%/year difference on \$300 billion:
- ▶ \approx \$750 million.

- ▶ Can pay for a lot of political projects
 - ▶ ...and hordes of equity-premium consultants!
 - ▶ me, me, me, me ...

29: Time Variation?

- ▶ Many individuals give equity premium forecasts which depend on the forecasting interval.
 - ▶ like a belief that market is over- or under-valued, and they can predict the market.
- ▶ Expected value forecasts *should* not change dramatically from year to year.
 - ▶ based on technology, competition, preferences.
 - ▶ P should adjust rapidly, but *not* $E(R)$!

30: M6: ROR/ICC

Accounting Models (RoR) and/or ICC.

31: Time-Dependence

- ▶ Everyone agrees/knows that the $SD(R)$ is much higher than the $E(R)$ for market and most other equity.
 - ▶ $SD(R)$ on the order of 15% to 20% per annum.
 - ▶ But which mean equity premium $E(R)$ is right?
 - ▶ 1%? 3%? 6%? (per annum)

- ▶ Be reasonable. Be consistent. Pray.

32: Combining Assets and Claims

- ▶ The following are very general aspects.
 - ▶ They will also hold in the next chapter with more specific models.

33: Firm Is “Debt Plus Equity”

- ▶ The profits generated by the firm’s assets are distributed to its debt and equity holders.
- ▶ You can think of a firm’s assets as consisting of a portfolio of debt and equity.
 - ▶ DT: dollar value of the firm’s debt.
 - ▶ EQ: dollar value of the firm’s equity.
 - ▶ FM: dollar value of the firm’s total assets.
 - ▶ PS: simplification, this omits non-financial liabilities, which here were rolled into financial debt.

$$FM \equiv DT + EQ$$

$$w_{DT} = \left(\frac{DT}{DT + EQ} \right), w_{EQ} = \left(\frac{EQ}{DT + EQ} \right)$$

$$w_{FM} = w_{EQ} + w_{DT} = 1$$

$$r_{FM} = w_{DT} \cdot r_{DT} + w_{EQ} \cdot r_{EQ}$$

34: Linear Functions

- ▶ A linear function $f()$ means

$$f(a + b) = f(a) + f(b) .$$

- ▶ For us, the following is important:
 - ▶ Portfolios are linear combinations: $r_P = w_A \cdot r_A + w_B \cdot r_B$
 - ▶ Firms consist of debt and equity $FM = DT + EQ$.
 - ▶ (Firms are linear combinations of non-linear contracts.)
 - ▶ Expectations are linear functions: $E(r_A) + E(r_B) = E(r_{A+B})$.
- ▶ Variance and standard deviation are not linear.

35: Asset Debt Costs of Capital

- ▶ Fortunately, firms care about (luckily easier-to-assess) *asset* cost of capital, not just the *equity* cost of capital.

$$E(R_{FM}) = w_{DT} \cdot E(R_{DT}) + w_{EQ} \cdot E(R_{EQ})$$

- ▶ If not too highly levered, well-collateralized, *safe* corporate debt should have $E(R)$ only modestly above the US Treasury or other corporate debt.
- ▶ Of course, $E(R_{DT})$ must be *expected* yield, not *quoted*.

- ▶ Firms can value-weight their debt and equity cost of capital. So, if...
 - ▶ cost of capital of similar **Debt**: 5% (perhaps 6% quoted),
 - ▶ cost of capital of similar **Equity**: 10%,
 - ▶ and their project is 80% debt and 20% equity,
 - ▶ then their cost of capital is $\approx 6\%$.

$$E(R) \approx 80\% \cdot 5\% + 20\% \cdot 10\% = 6\%.$$

36: See also NPV Applications

- ▶ You can average costs of capital,
- ▶ but you cannot assume that one applies to the other.
 - ▶ especially important in acquisitions and vastly different projects!
 - ▶ E.g., investing in a US Treasury bond requires a different cost of capital than investing in an equity option.

37: Pricing a Condo?

- ▶ If you want to price a condominium, which risk-free rate and equity premium should you use?

38: Common Sense

- ▶ Don't be stupid!
- ▶ First use common sense (appropriate tools), not formulas (hammers)!

- ▶ To price a condo, use other condos and not the stock market.
- ▶ If many other Xs have been bought and sold (at arms length), in a highly-liquid market, then Xs are better benchmarks.
- ▶ Find the best benchmarks!