

Benchmarking

(Welch, Chapter 09)

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Did you bring your calculator? Did you read these notes and the chapter ahead of time?

Maintained Assumptions

We mostly maintain the same assumptions:

- ▶ We assume **perfect markets**, so we assume four market features:
 1. No differences in opinion.
 2. No taxes.
 3. No transaction costs.
 4. No big sellers/buyers—we have infinitely many clones that can buy or sell.
- ▶ We already allow for unequal rates of returns in each period.
- ▶ We already allow for uncertainty. So, we do *not* know in advance what the rates of return on every project are.
- ▶ We do not lean heavily on the assumptions in this chapter. We will in the next.

We can now proceed to our main question:

What is your investors' opportunity cost of capital?

This opportunity cost of capital is the denominator in the present value formula that we use for valuing our corporation's projects.

What You Already Know

1. As a corporate manager, your task is to act on behalf of your investors. To compute NPV, what is the opportunity cost of capital for you (your investors). If they can do better elsewhere, you should return the money. You are the custodians of investors' (owners') cash.
2. You can't ask them. There are too many and often different investors. They also don't want to be bothered.

What assumptions should you make about them?

- ▶ Presumably, they are smart.
- ▶ Presumably, they compare your projects to others that are available elsewhere.
- ▶ Presumably, they are reasonably diversified.
- ▶ What (project characteristics) do they like?
 - ▶ Presumably, they could care less about your firm or you personally. They care about how your project investment choices impact their overall portfolio.
 - ▶ How would your new project contribute to their portfolios?
 - ▶ What are their investment opportunities elsewhere?

What are the most important project dimensions

Not 100% clear what investors [dis-]like. Most likely:

- ▶ When will the payment come?
- ▶ Is the project and payment risky or safe?
- ▶ (Is the market perfect? Is it liquid? Are there taxes, etc.?)

What are good benchmarks for term and risk?

- ▶ When will the payment come? → Treasury Yield Curve
- ▶ Is the project like corporate equity risk? → Equity Premium

Equity Premium

The equity premium (or market [risk] premium) is the difference between the expected rate of return on the stock market and some risk-free rate of return. It is a normalized way of quoting expected rate of return on the stock market.

Notes:

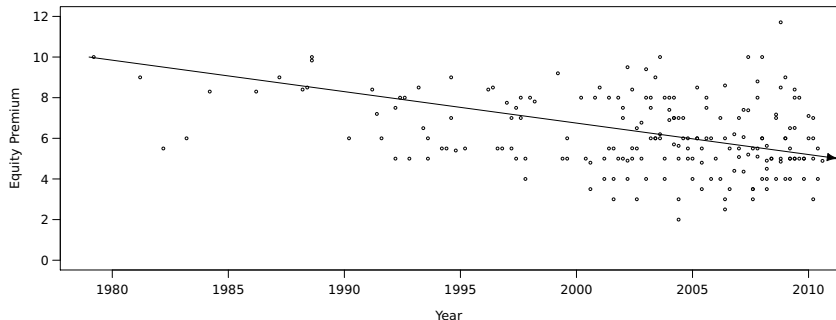
- ▶ You can always split your intermediate-risk project in one that looks safer and one that looks less safe—use leverage! Then compare safer and riskier components.
- ▶ Stocks pay off in the distant future. If you compare them to Treasury bills, you are convoluting term and risk.
- ▶ Instead of the Treasury yield curve, you could look at the corporate-bond yield curve. **But take out the default premium.**
- ▶ (Need to add back default premium to your own debt sales, too.)

Are there other contexts in which you care about the risk-free rate and the equity premium?

Where Do You Find the Benchmarks You Want?

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

Textbook authors

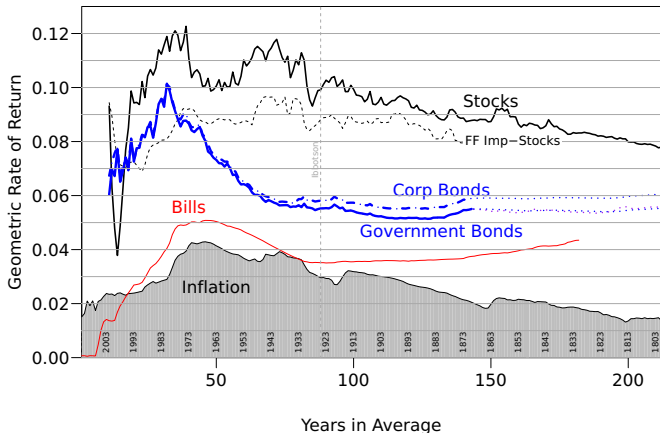


Source: Fernandez.

The equity premium also depends on how you quote it. Do you want geometric or arithmetic? How do you think of your expected cash flows in the numerator? Do you need a cost of capital for long-term projects or short-term projects?

M1: Historical Geometric Averages

Standing today, looking backwards for x years, how did stocks perform geometrically above bonds?



Term Premium for Equity? Not clear.

Reconciling Different Numbers

You may see different numbers used, so understand the context:

Arithmetic Equity Premium 1926 to 2015 vs. Short-Term Bonds	≈ 8%
Minus Later Sample Period 1970 to 2015	-2%
Minus Long-Term T-Bonds Instead of Short-Term T-Bills	-2%
Minus Use of Geometric Return	-2%
Minus Cross-Product of Above Three	-1%
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Geometric Equity Premium 1970-2015 vs. Long-Term Bonds	≈ 1%

Peso Problems

Question: What about rare shocks??

- ▶ Also called Peso problems or dark swans.
- ▶ Very important, not only in academia but also among practitioners.

Answer: At most 1-2% of historical equity premium. Not unimportant.
Insurable with index options.

But other long-run decline problems are harder to insure.

M2: Are high recent stock market returns indicative of higher or lower future stock market returns?

M3: Would high or low dividend yields predict higher future market rates of return? Theoretically? Practically? Today?

M4: What equity premium would it take to attract investors into the stock market, assuming no gifted horses?

M5 Couldn't we just ask others?

It is the blind leading the blind. Where do you think they get their opinions from?? PS: adjust for (1) geometric mean; and (2) risk-free benchmark duration.

- ▶ Ordinary investors. — Tend to follow recent experience. 15%/year in 2000.
- ▶ McKinsey Corporate Consulting. — 5% to 6%
- ▶ Social Security Admin. — 4%
- ▶ Professors of Finance. — 4% to 5.5%
- ▶ Me? i-san. 2%.
- ▶ WSJ, February 2005:

Name	Organization	Stocks	Gov. bonds	Corp. bonds
William Dudley	Goldman Sachs	5.0%	2.0%	2.5%
Jeremy Siegel	Wharton	6.0%	1.8%	2.3%
David Rosenberg	Merrill Lynch	4.0%	3.0%	4.0%
Ethan Harris	Lehman Brothers	4.0%	3.5%	2.5%
Robert Shiller	Yale	4.6%	2.2%	2.7%
Robert LaVorgna	Deutsche Bank	6.5%	4.0%	5.0%
Parul Jain	Nomura	4.5%	3.5%	4.0%
John Lonski	Moody's	4.0%	2.0%	3.0%
David Malpass	Bear Stearns	5.5%	3.5%	4.3%
Jim Glassman	J.P. Morgan	4.0%	2.5%	3.5%

Jeremy Siegel—ML book. Bob Shiller—always crash.

Shrugworthy? NO!

CalPERS pension fund will have to decide again whether their expected (geometric) rate of return of 7.5%—5% above the prevailing Treasury long bond—is optimistic. CalPERS also holds some non-public assets, but there is no reason to believe these assets are likely to outperform the stock market, either. If 7.5% seems unrealistic to you, it obviously is. But lowering this estimate would mean that California's politicians would have to set aside more money for their unfunded pension obligations today. Obviously, they would prefer to leave the optimistic estimate as is, and kick the can down the line to their successors.

0.25%/year difference on \$300 billion: \approx \$750 million. Can pay for a lot of political projects and hordes of equity premium consultants.

Time-Dependence? Does it vary?

- ▶ Many individuals give equity premium forecasts which depend on the forecasting interval.
Most likely, this is because investors believe the market is currently overvalued or undervalued, so that they can predict a correction.
- ▶ Expected value forecasts *should* not change dramatically from period to period. (They are determined by technology and utility functions. It is prices that should adjust rapidly, not expected rates of return.)
- ▶ Everyone agrees that the standard deviation is considerably higher than this expected rate of return, though—on the order of 15% to 20% per annum.
- ▶ Which equity premium is right?

Advice: Be reasonable. Be consistent. Pray.

M6: Accounting Models (RoR) and/or ICC

Asset Costs of Capital vs. Equity Costs of Capital

- ▶ You can always value-weight the debt and equity cost of capital.
- ▶ So, if your debt has a cost of capital of 5% and your equity has a cost of capital of 10%, and you have 80% debt and 20% equity, your cost of capital is 6%. $[E(R) = w_D \cdot E(R_D) + w_E \cdot E(R_E)]$
- ▶ Equity investors care about equity coc (statistics). Firms care about asset coc (statistics).
- ▶ If not too highly levered, well collateralized, and safe, corporate debt should have expected rates of returns only very modestly above the US Treasury.

NOTE: the coc is not the quoted yield, but the expected yield.

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