CAPM test three steps

Why CAPM is not testable:

* Not able to borrow freely, not using true market portfolio, volatility in beta used in first pass.

Roll’s critique:

CAPM tests two things

Market portfolio

* Only thing testable is efficiency of market portfolio (mean-variance efficient)
* Linear relationship between return and risk is not independently testable
* Market portfolio not testable unless the exact composition is known
* Proxy may be inefficient or efficient regardless of market portfolio. Subject to benchmark error if using proxy

Labor Income Explanation:

* Return should reflect the risk of being correlated with labor income, but CAPM standard version omits the labor income index.
* This will cause estimated betas from first pass regression being overestimated—since labor income is highly correlated with market index.
* In second pass regression, by using overestimated beta, slope of SML will be flattened.

J&Wang

* Change in aggregate labor income is proxy for change in value of human capital
* Added State of economy and market value of equity which is firm size
* CAPM is rejected because showing negative coefficient

Chen RR – different model

* Conclusion same: market index not significant, only significant on industrial production, corporate bonds and unanticipated inflation.

FFF model

* SMB size, HML, High and low book-market ratio
* High b-t-m ratio is value versus low is growth firm. High Book indicates limited growth
* Evidence that SMB and HML indices capture risk in business cycle, correlated with future growth in macro economy.

Behavior explanation for glamor vs value return,

* Overestimate too good performance, thus decreases over time, reduce return for glamor firm
* Chen Karceski Lakonishok measured book-to-market value at beginning and end of 5 yr

P&Zhang

* Beta and risk premium vary over time, potentially co-vary
* Beta is shown to be countercyclical: - in good, + in down markets

**Equity Premium Puzzle: Historical risk premiums earn have been higher than suggested by theoretical models or reasonable risk aversion**

* CCAPM: return correlate with covariance with consumption
* Use expected return to explain instead of actual return
* Survival Biases: Excess return only measured in US stock market, which is more successful than others in the world; if including returns from international markets, may get returns more in line with model
* Narrow framing: investors evaluate risks they faces in isolation, ignore correlation with other wealth, thus requiring high risk premium
* Loss aversion: Investors tends to exaggerate pain going to greater length to avoid them, thus value firm and small firm requires higher return.

Here's my summary of CAPM's extensions on labor-income. I was always struggling with questions tested on this, and confused by when things are 'Overestimated' and 'Underestimated'.

The book talks about it in two places, BKM 9 and BKM 13. I also used Goldfarb as help to understand this.

BKM 9 focuses on conceptual/theoretic, while BKM 13 explains from the perspective of running 2-pass regression. Both reached the conclusion that "Missing labor income in CAPM model would FLATTEN the SML graph (which plots Expected return against Beta)"

CAPM E[Ri]= Beta \* E[Rm]

assumes that investors require a higher risk premium E[R] if the stock has a higher beta towards market risk premium. The beta describes the systematic risk, which tracks the sensitivity of stock's return to market return. However, in reality, if two stocks have the same sensitivity to market return, Stock A--compared to B--generally provides a higher return when investors' labor income is lower, then investors would be able to accept a lower return on Stock A. This means a negative correlation between labor income and return, aka, hedging ability.

How does that result in a flatter SML? (I prefer BKM 13's answer as I can see from the formula)

BKM 13 says, if you put only Market risk and exclude Labor income into 1-st regression, you would end up with a higher beta for market risk premium. Why is that true? Because labor income is usually positively correlated with market return. The Market risk beta will absorb the correlation with labor income. This beta will be used to generate estimate of slope of SML, which is smaller than it should be.

Golden rule:

Real beta against market return is smaller than predicted by CAPM with Beta >1 and larger than those predicted by CAPM with Beta <1. This gives a flatter SML line, resulting in a