UNIVERSITY OF CALGARY
HASKAYNE SCHOOL OF BUSINESS

Investments & Portfolio Management

Behavioural Finance and Security Returns

René Wells

March 5, 2020

The assumption of perfect rationality

Rationality of agents (e.g. investors) in economics and finance is a practical concept.

- Agents 'adopt the best actions to achieve their goals' (i.e. maximization of utility);
- Agents are logically consistent within their preferences and beliefs;
- Agents make full use of information and have accurate beliefs.

It is often assumed in economics and finance that agents are perfectly rational.

- Sustain the assumption that an equilibrium (and only one) shall exist;
- Allow to develop tractable models (the math works and provides closed-form solutions);
- A strong and idealized assumption, but an extremely convenient assumption.

This has been the subject of much criticism and derision (see: 'Homo economicus').

- Simon (1955) proposes 'bounded rationality', which is admittedly more realistic, recognizing that there are limits to the time and effort to be spent on each decision.
- Simon (1956) proposes the concept of 'satisficing', i.e. that a satisfactory (good enough) solution for the real world might be as good as an optimum solution for a simplified world.

Following on Simon fundamental insights, 'behaviorists' have identified various cognitive biases which could potentially, and even likely, lead investors into making sub-optimal decisions.

Key information processing errors

- Forecasting errors (memory bias and over-extrapolation), overconfidence, conservatism, representativeness, information cascades and hyperbolic discounting.

Key systematic behavioral biases

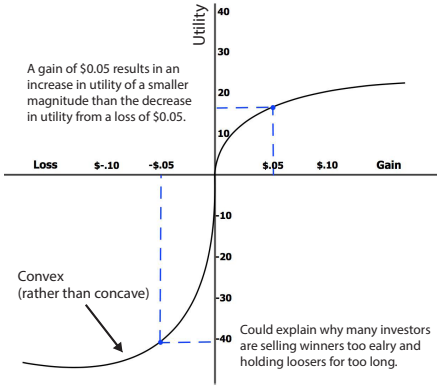
- Loss aversion, herding, narrow framing, mental accounting, and regret avoidance.

The behavioral finance insights

- Financial decisions by individuals can be significantly biased, and therefore sub-optimal.
- What is known now as the 'Nudge theory' was developed and implemented to counterbalance sub-optimal decision making by individuals (with short-term successes).
- No proof that markets are not efficient on average because of investors' behavioral biases.

Under the utility theory a $1,000 gain is equal in magnitude to the dis-utility of a $1,000 loss.

But Kahneman and Tversky (1979) presents empirical evidence that investors experience a greater dis-utility from losses than utility from gains of the same magnitude, a 'loss aversion' as an asymmetric form of risk aversion. The authors then develop the prospect theory.



Model to be tested

$$Er_i = r_f + \beta_i \left(Er_M - r_f\right)$$

First-pass regression using N stocks to get as many $\hat{\beta}_i$ ($i = 1, ..., N$), N has to be large.

$$r_{it} - r_{ft} = \hat{\alpha}_i + \hat{\beta}_i \left(r_{Mt} - r_{ft}\right) + \epsilon_{it}$$

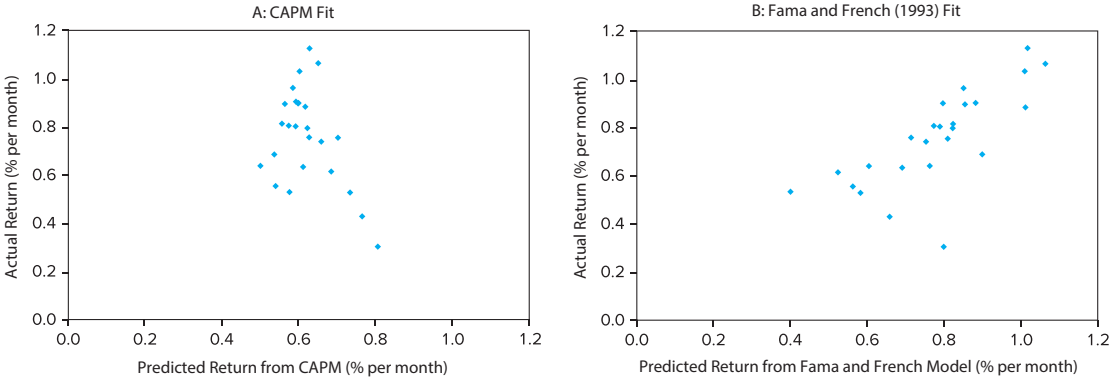
Second pass regression to test if the model 'works' as expected.

$$\overline{r_i - r_f} = \gamma_0 + \gamma_1 \hat{\beta}_i + \gamma_2 \sigma^2 \left(\epsilon_i\right)$$

Model 'work' if $\gamma_0 = 0$, $\gamma_1 = \overline{r_i - r_f}$ (datapoints are on the SML as expected), and $\gamma_2 = 0$ (there is no compensation for unsystematic risk).

What is found: $\gamma_0 \neq 0$, $\gamma_1 \neq \overline{r_i - r_f}$, and $\gamma_2 \neq 0$. But this might result from using the wrong M index and/or the $\hat{\beta}_i$ being too noisy. Redo with portfolios, still does not work. All that is inconclusive.

Testing the Fama-French three-factor model with 25 portfolios



Source: Goyal (2012)

There is no relationship between the predicted and the realized returns for the CAPM, but there is some for the FF3F.

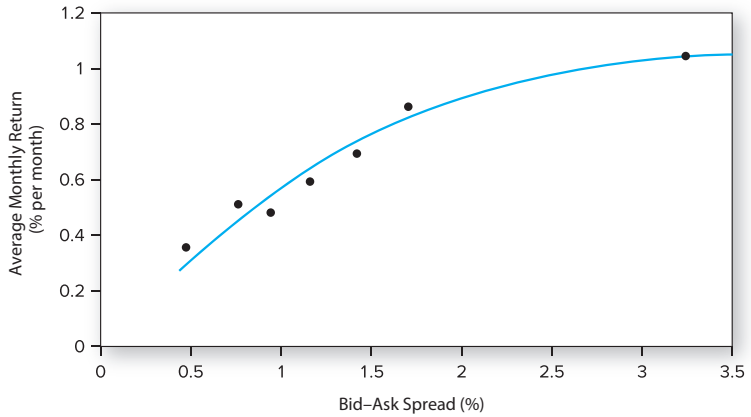
Asset pricing models like CAPM assumes that all investors hold the market portfolio (i.e. identical portfolios), so there is not much need to trade securities. Such models assume transaction costs do not exist or are small enough to have no impact on securities returns.

In reality, trading volumes are large, probably induced by investors having heterogeneous beliefs.

- Liquidity is the ability to easily and quickly trade at fair market value.
- Transactions costs will be made of administrative commissions, the bid-ask spread and the price impact (i.e. deviation from fair market value for large trades).
- Conversely illiquidity could be measured as the discount (premium) from fair market value a seller (buyer) must accept for a trade (especially a large volume executed quickly).

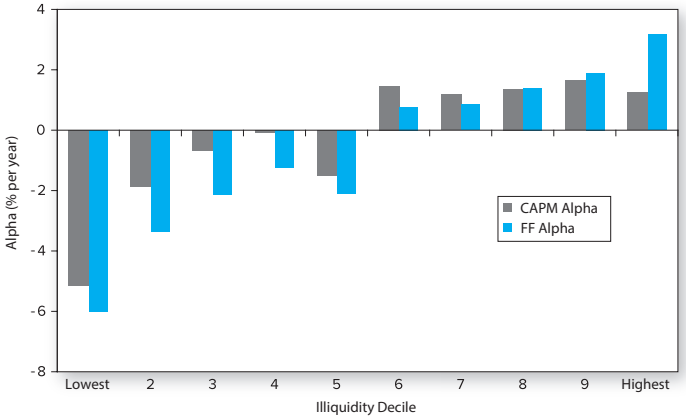
Investors require extra returns to cover the **cost component** and to bear the **risk component**.

- Securities that have lower liquidity than average will have to provide an additional return in compensation for additional trading costs, and vice versa.
- It has been observed that liquidity vary through time affecting all securities, so securities with low liquidity to start with are more at risk of seeing their liquidity dry-out first, and therefore will have to provide an additional return in compensation for such additional risk.



Source: Amihud and Mendelson (1986)

The extra return for the least liquid stocks (large spread) over the most liquid stocks (small spread) is about 0.7% a month.



Source: Pastor and Stambaugh (2003)

The extra return for the most illiquid stocks over the most liquid stocks is about 6% to 9% a year.

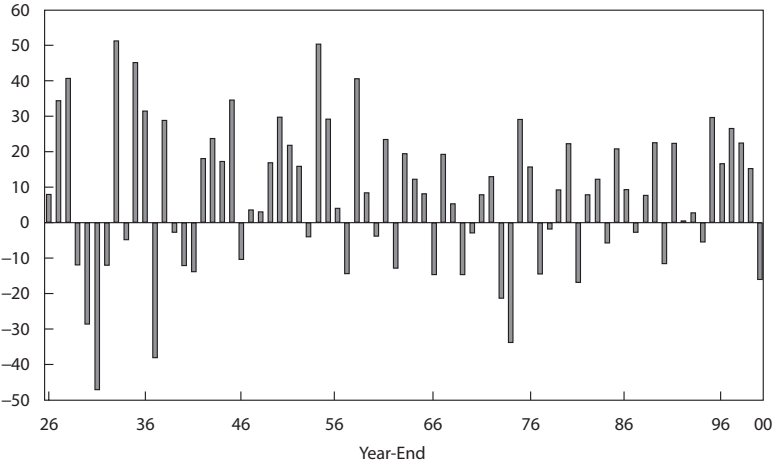
Mehra and Prescott (1985) find that the risk market premium for U.S. equity over the 20th century is about 7%. They suggest this is just too large to be consistent with standard neoclassical economic theory or would require an unreasonable level of risk aversion. Per the title of the article, this has been referred to as the 'Equity Premium Puzzle'.

A large number of possible explanations have been proposed, none quite satisfactorily.

- Model might be mis-specified (e.g. utility function is too simplistic);
- Rare event disaster risk (small probability of large drop in consumption);
- Data issues (e.g. survivorship bias, think of U.S. versus Russia stock market);
- Incomplete markets and market imperfections (e.g. borrowing constraints make equity priced by middle-aged investors rather than young investors).

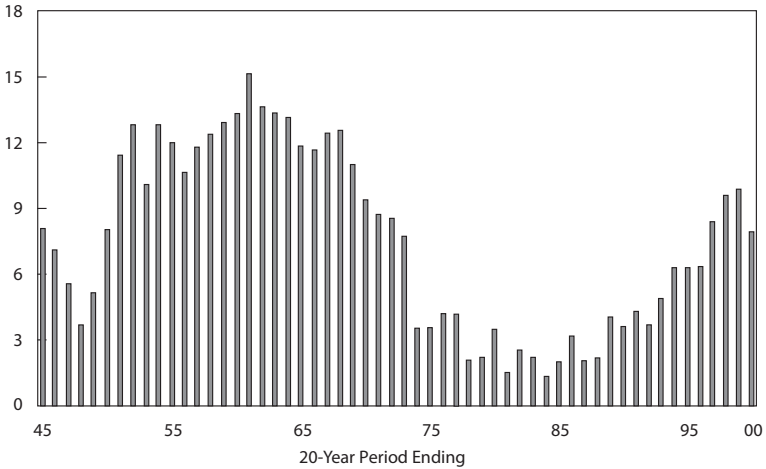
Per following slides, the realized average return on U.S. equity is quite volatile one year to the next and, even over a 20-year period, cumulative returns are very period dependent. High levels of excess equity returns over the risk free rate have been observed across many countries.

U.S. Equity Risk Premium (annual)



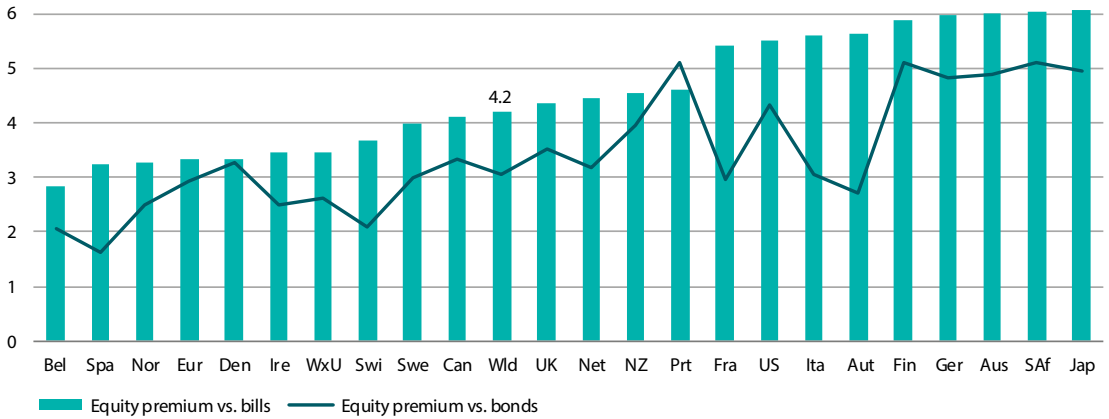
Source: Ibbotson (2001)

U.S. Equity Risk Premium (average for 20-year rolling periods)



Source: Ibbotson (2001)

Annualized Equity Risk Premium (1900-2018)



Source: Credit Suisse (2019)

Applications in the chapters 12 and 13 of the textbook

Concept checks

- Chapter 12: concept checks 1 and 2 (solutions provided at the end of the chapter).
- Chapter 13: concept checks 1 to 3 (solutions provided at the end of the chapter).

Exercises

- Chapter 12: suggest to find answers to 12-2 to 12-9.
- Chapter 13: suggest to think about 13-14.