Mainstream: Efficient Market Hypothesis (EMH)

A&D Ch.2

Mishkin Ch.7

Common Stock

- A ***common stock*** represents a share of ownership in a corporation. It is a security that claims on the earnings and assets of a corporation.
- Basic Principle of Finance

  Value of Investment = Present Value of Future Cash Flows.
- With uncertainty, fundamental value of a common stock can be evaluated from

  $$P_0 = \sum_{t=1}^{\infty} \frac{\mathrm{E}_t(D_t)}{(1+k_e)^t}.$$
- Investors need to form expectation about dividend payments in the future.

Adaptive Expectation

- Expectations are formed from past experience only.
- For example, expectations on inflation, π_t^e, are viewed as an average of past inflation rates, or

  $$\pi_t^e = (1-\gamma)\sum_{j=0}^{\infty}\gamma^j\pi_{t-j}$$

  where $0 < \gamma < 1$ is a constant, and π_{t-j} is inflation rate at time $t-j$.
- Changes in expectations will occur slowly over time as data changes.
- However, people use more than just past data to form their expectations and sometimes change their expectations quickly.

Rational Expectation

- **Rational expectation (RE)** Expectations will be identical to optimal forecast (the best guess of the future) using all available information.
- For example, suppose when Joe drives on a route when it is not rush hour, it takes an average of 30 mins. However, if Joe drives during rush hour, it takes him, on average, an additional 10 mins on the same route. Given that he leaves during rush hour, the best guess of the driving time – the optimal forecast – is 40 mins.
- Even though a rational expectation equals the optimal forecast using all available information, a prediction based on it may not always be perfectly accurate.
- From the above example, Joe may actually spend 45 mins during rush hour on a day. But if the average for the past whole year is just 40 mins, then his best forecast is at 40 mins.
- Rational expectations makes sense because it is costly not to have optimal forecast.

Rational expectations

From Wikipedia, the free encyclopedia

For other uses, see Rational.

This article includes a list of references, but **its sources remain unclear** because it has **insufficient inline citations**. Please help to improve this article by introducing more precise citations. *(November 2009)*

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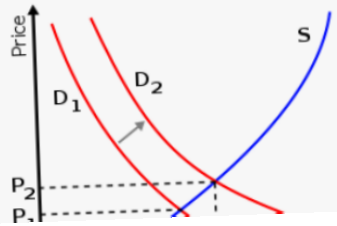
In economics, "**rational expectations**" are **model-consistent expectations**, in that agents inside the model are assumed to "know the model" and on average take the model's predictions as valid.[1] Rational expectations ensure internal consistency in models involving uncertainty. To obtain consistency within a model, the predictions of future values of economically relevant variables from the model are assumed to be the same as that of the decision-makers in the model, given their information set, the nature of the random processes involved, and model structure. The rational expectations assumption is used especially in many contemporary macroeconomic models.

Part of a series on

Economics



Another example,

- Consider the following table, what is your expectation for GDP growth in year t+1?

Year	t-2	t-1	t
GDP growth	4.2%	5.0%	5.4%

Another example,

- Now, suppose we get additional information below, What is your expectation for GDP growth in year t+1, this time?
- Is it the same as before? Why?

Year	t-2	t-1	t
GDP growth	4.2%	5.0%	5.4%

Period	6 months	
	t	t+1
Net exports	150,070	-12,051

Rational Expectation

- Rational expectations are the result of (1) rational behaviors (2) all available (and known) information (3) best models.
- Formal statement of rational expectation is

$$x^e = x^{of}$$

  where x^e is expectation of variable x, and x^{of} is the optimal forecast, using all available information.
- Implications of RE
  - If there is a change in the way a variable moves, the way in which expectations of the variable are formed will change as well

    e.g. Changes in the conduct of monetary policy (e.g. inflation targeting)
  - The forecast errors of expectations will, on average, be zero and cannot be predicted ahead of time.

Efficient Markets Hypothesis

- This is just an application of rational expectations to the pricing of securities.
- Core idea: ***Prices of securities in financial markets fully reflect all available information in the markets***.
- Eugene Fama:
  - The primary role of the capital market is allocation of ownership of the economy's capital stock. In general terms, the idea is a market in which prices provide accurate signals for resource allocation: that is, a market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time "fully reflect" available information is called "efficient".

Efficient Markets Hypothesis

- Recall that the rate of return from holding a stock for one year is:

$$R = \frac{(P_{t+1} + D_t) - P_t}{P_t}$$

- Since P_{t+1} is not known (assume that D_t is known), we need to form expectation about the variable, and the return becomes expected return

$$R^e = \frac{(P_{t+1}^e + D_t) - P_t}{P_t}$$

- EMH views expectations of future as equal to optimal forecasts, using all available information

$$P_{t+1}^e = P_{t+1}^{of}$$

which implies

$$R^e = R^{of}.$$

Efficient Markets Hypothesis

- Supply and Demand analysis states R^e will equal the equilibrium return R^*, so $R^{of} = R^*$.

  Current prices in a financial market will be set so that the optimal forecast of a security's return using all available information equals the security's equilibrium return.

- Why the Efficient Markets Hypothesis makes sense?

  Arbitrageurs eliminate unexploited profit opportunities

  If $R^{of} > R^* \rightarrow P_t \uparrow \rightarrow R^{of} \downarrow$

  If $R^{of} < R^* \rightarrow P_t \downarrow \rightarrow R^{of} \uparrow$

  until $R^{of} = R^*$.

- All unexploited profit opportunities eliminated.
- Efficient Market holds even if there are uninformed, irrational participants in the market.

Efficient Markets Hypothesis

- 3 versions of market efficiency
  - **Weak form:** prices reflect all the information contained in historical returns.
  - **Semi-strong form:** prices reflect all publicly available information, including past earnings and earning forecasts, everything in the publicly released financial statements (past and most recent), everything relevant appearing in the business press, and anything else considered relevant.
  - **Strong form:** prices even reflect information that is not publicly available, such as insiders' information.

Favorable Evidences on EMH

1. Investment analysts and mutual funds don’t beat the market.
2. Stock prices reflect publicly available information: anticipated announcements don’t affect stock price.
3. Stock price moves close to random walk. That is any return on a stock in excess of the risk-adjusted expected return is random and cannot be predicted.
4. Technical analysis does not outperform market. Often a passive investment strategy in which the goal is to track the market is recommended.

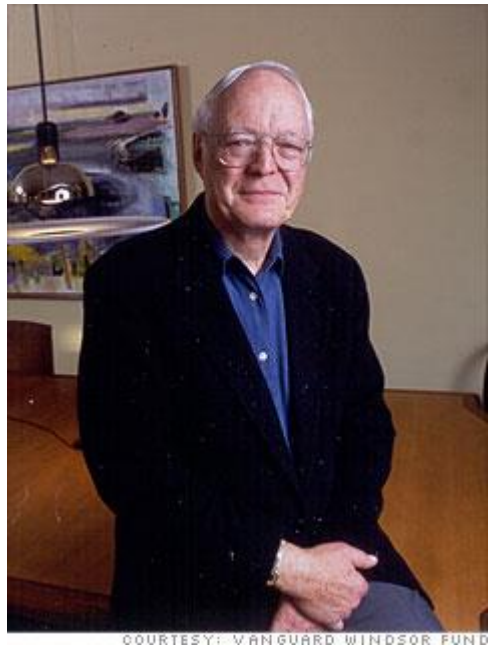
Joint Hypothesis Problem

- To test EMH, we need to define excess returns on investment.
- An excess return is a return that exceeds the return that both nets out all costs, but also one that would be considered fair given the level of risk of the investment.
- The measurement of excess returns requires a model of returns, e.g. CAPM.
- The **joint hypothesis problem** arises because the need to utilize a model to produce the required risk-adjusted returns. If a test rejects the EMH, we cannot say clearly whether EMH does not hold, or we did not properly measure excess returns.

Unfavorable Evidences on EMH

1. Small-firm effect: small firms have abnormally high returns
2. Market over-reaction and under-reaction
3. Excessive volatility
4. New information is not always immediately incorporated into stock prices.

John Neff



- John B. Neff (September 19, 1931 – June 4, 2019) was an American investor, mutual fund manager, and philanthropist.
- He was notable for his **contrarian** and **value investing** styles as well as for heading Vanguard's Windsor Fund.
- Windsor became the highest returning, and subsequently largest mutual fund in existence during Neff's management.
- Neff retired from Vanguard in 1995. During Neff's thirty-one-year tenure at Windsor (1964 to 1995), the fund returned 13.7% annually versus 10.6% for the S&P 500.
- Note: The early value opportunities identified by Graham and Dodd included stock in public companies trading at discounts to book value or tangible book value, those with high dividend yields, and those having low price-to-earning multiples, or low price-to-book ratios.

https://en.wikipedia.org/wiki/John_Neff