

Lecture 9: Market Efficiency, risk arbitrage and event studies

Investments

- Market Efficiency is a concept that has recently come under attack.

↪ **Definition:** *An efficient market is one that incorporates all available information*

This means that we cannot predict future price paths based on information available today. Prices should adjust immediately to reflect all available information.

- ▶ **Weak Form Efficient**
Prices incorporate all information contained in past prices.
- ▶ **Semi-Strong Form Efficient**
Prices incorporate all *public* information.
- ▶ **Strong Form Efficient**
Prices incorporate all information, public and *private*.

- Market efficiency is related to no arbitrage: An inefficient market may lead to near-arbitrage opportunities.

Stock Prices as Random Walks

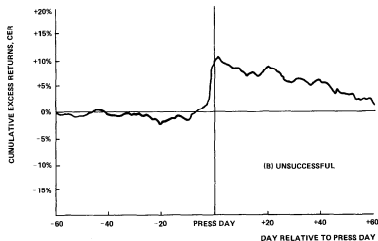
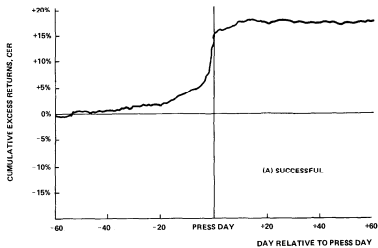
- The Efficient Markets Hypothesis (EMH), in its weak form, says that stock prices should follow random walks.
 - ↪ In his 1900 dissertation on “The Theory of Speculation”, Louis Bachelier searched for a “*formula that expresses the likelihood of a market fluctuation.*” He ended up with a mathematical formula that describes the *Brownian Motion*, or *random walk* as it came to be called in the finance world.
- Prices as random walks implies that price changes (i.e. returns) should be uncorrelated with past price changes, or equivalently should have *zero autocorrelation*
- Autocorrelation is an important concept in time-series analysis. It measures the *persistence* of time series data.

$$\rho = \text{corr}(R_t, R_{t-1})$$

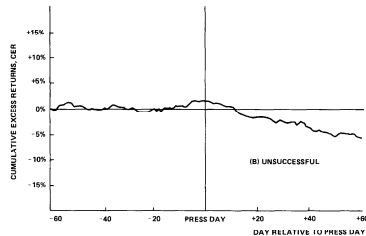
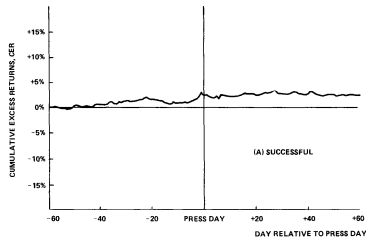
- Event studies look into the reaction of the market into informative events
- We saw an example earlier in class regarding earnings announcements
- Another popular subject is merger announcements
- In this case, you track the return of both the target and the acquiring firm

Market reaction at announcement day

Target firms

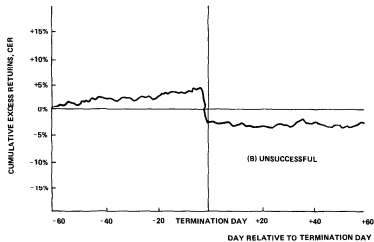
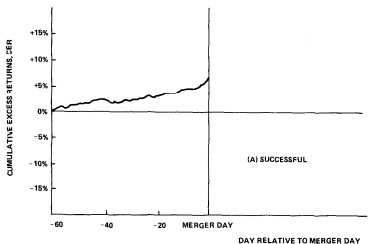


Acquirer firms

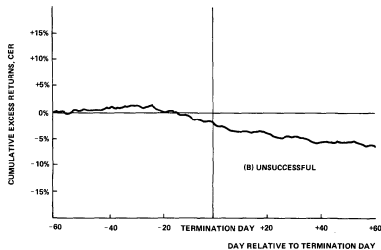
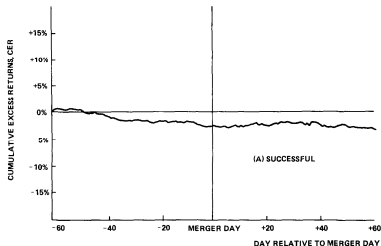


Market reaction until merger day

Target firms



Acquirer firms



Merger Arbitrage

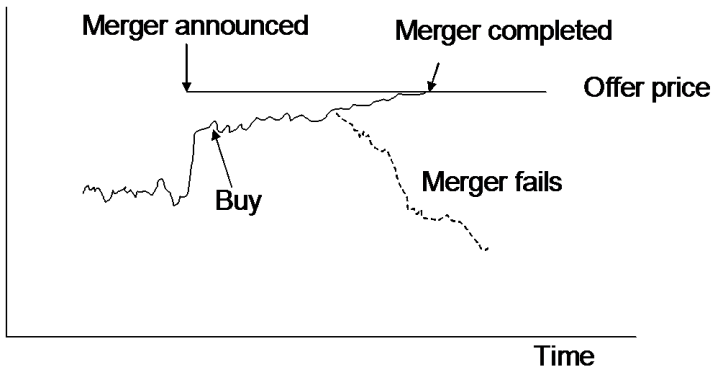
- In a merger, target is bought at a premium, say 20-30%.
- At announcement, target price increases to a value close to the offer value.
- But, there remains a “deal spread”, typically around 3-4%

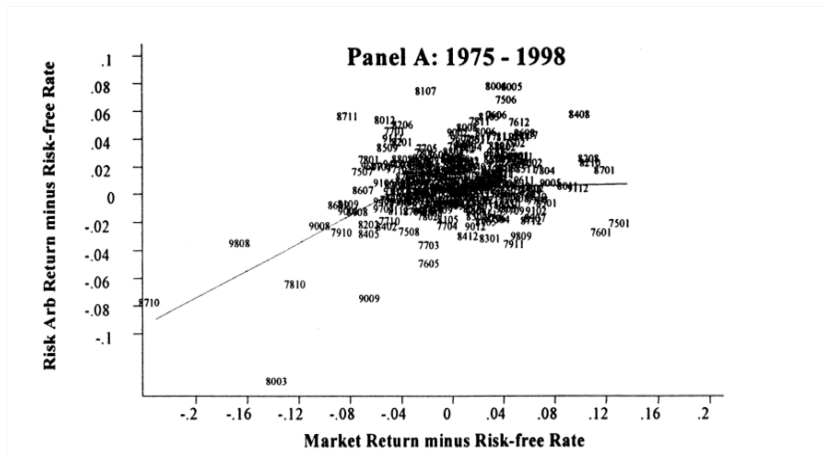
$$\text{deal spread} = \frac{\text{offer value} - \text{target price}}{\text{target price}}$$

- Why?
 - ↪ Risk of deal failure
 - ↪ Selling pressure: Mutual funds sell after announcement
- Value of the acquirer does not change

- Do a long-short strategy
 - ↪ Cash offer: Borrow, Buy Target.
 - ↪ Stock offer: Short Acquirer, Buy Target.
- Large chance of a small return if successful.
 - ↪ Use leverage to turn into a large return.
- Small chance of a large loss if unsuccessful.
- The strategy seems unrelated to the overall market, “beta zero”
 - ↪ Or is it?
 - ↪ Offer is more likely to be unsuccessful if the market falls!
 - ↪ Payoff is like an index put!

Merger arbitrage





- Source: Mark Mitchell and Todd Pulvino, Journal of Finance
- Line: like the payoff of writing index puts!

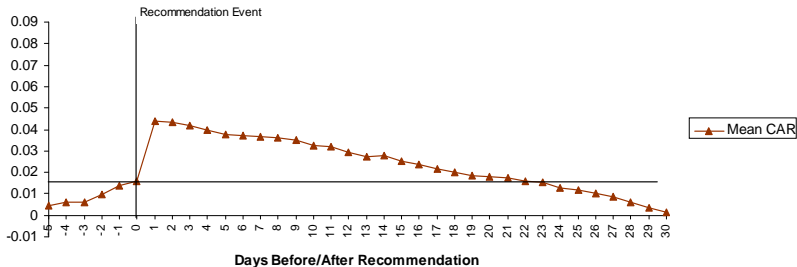
- Even though it's an all-equity strategy (no option positions) dynamic trading gives an option-like payoff.
- Not necessarily a bad thing! Writing index puts earns a premium. It provides “disaster insurance” to the market.
- But no need to pay 2+20 to write index puts!
- “Alpha”, “beta”, benchmark, performance evaluation should be relative to the strategy of writing index puts!
- (Mitchell and Pulvino are now running a merger-arb hedge fund, so at least they think such alpha is there.)

Can You Make Money From Jim Cramer's Picks?

- What is the role of analysts in informationally efficient markets?
- A large literature has found that analyst forecasts are biased, starting from Mastrapasqua and Bolten (1973) and Brown and Rozeff (1978).
- Analyst forecast are often found to contain no incremental information.
- Case Study: Can You Make Money From Jim Cramer's Picks?
 - ↪ Jim Cramer is the host of CNBC's Mad Money, with an average viewership of 400,000.
 - ↪ What role do analysts play in an conformationally efficient market?
 - ↪ 3 Kellogg Ph.D. Students asked that question. They looked at 246 recommendations made in July - October 2006.

Can You Make Money From Jim Cramer's Picks?

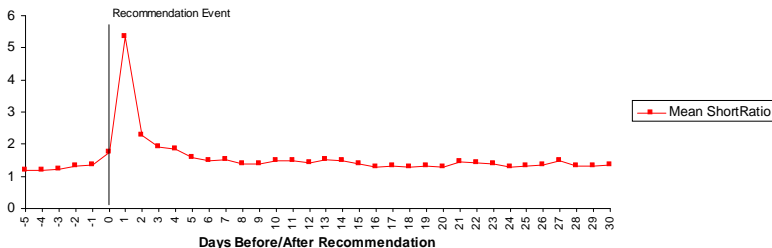
- Graph shows average deviation of stock price from “fundamental” values.



Can You Make Money From Jim Cramer's Picks?

- Some savvy investors are aware of this and are betting against it!

Figure 4: Mean ShortRatio around Recommendation Event



- Of course, the “efficiency” of markets may be a relative concept.
- It is possible that markets are efficient in the long-run, but in the short run it may take some time before information is diffused.
- Grossman-Stiglitz paradox
 - ↪ Grossman and Stiglitz (1980) argue that perfectly efficient markets are an impossibility, for then the return to gathering information would be zero.
 - ↪ If information gathering is costly, then no one would be gathering information.
 - ↪ How is then information impounded the prices?
- Nevertheless, one should not be making abnormal returns using only information that is freely available.

- At this point, let us reexamine the Efficient Markets Hypothesis.
 - ↪ Does predictability in returns really violate EMH?
- One of the implications of the random walk model, is that stock price changes are *unpredictable*. This means that the best forecast of tomorrow's return is the historical average return.
- But what if stock β change over time? Is the historical average return the best forecast then?
 - ↪ Not really! In fact, any variable that is positively correlated with the new β will appear to predict returns.

Return Predictability - Example

- Suppose the CAPM holds and markets are efficient.
- Company ABC had a historical β of 1.0, the market premium is 6.00%, the risk-free rate is 2%. ABC has zero debt. ABC's expected return is $2\% + 1 \times 6\% = 8\%$
- ABC decides to buy back half its shares and issue debt instead.
 1. ABC went from being 100% equity financed to being 50% equity 50% debt.
 2. ABC's leverage has increased but its asset β hasn't changed.

$$\text{Asset } \beta = 50\% \times \text{Equity } \beta + 50\% \times \text{Debt } \beta$$

3. Assuming β of debt is zero, new equity $\beta = 2$
- What are the expected returns on ABC going forward?
 - Now changes in leverage appear to forecast future stock returns!

- The bottom line is that return predictability *can* be consistent with efficient markets if it is caused by *changes in risk premia*.
- In the next lecture we will see how we can exploit this long-horizon predictability to build better portfolios.
- Who cares if markets are efficient?
 - ↪ Whatever the reason is, return predictability seems to be here, so we might as well exploit it.
- But it does matter...
 - ↪ If we exploit predictability are we taking on more risk or are we exploiting some inefficiency in the system.
 - ↪ And if markets are not efficient why isn't everyone rich?