10-30 Class 10: Market efficiency

Investors and Alpha and Beta

Problems with CAPM

Variation in the price of risk

Variation in alpha.

Your portfolios

Lessons from CAPM

- Future stock returns are predicted by
- (1) the riskless return
- (2) the amount of systematic risk in a security times the price of risk
- So if model is right you can "make" money (earn above the risk free rate) only if you bear risk
- If model is wrong by taking advantage of its anomalies.

Staying with the model

- Chasing β
  - The return to bearing risk is positive
  - And possibly large
  - But there are down sides
- Works if you can be patient
- Attractive when the price of the riskless asset is low
- So Fed pushes down interest rates => bearing risk more attractive

Annualized Monthly Returns of the S&P-500 (R_M)net of 3 year TBill return (R_F)
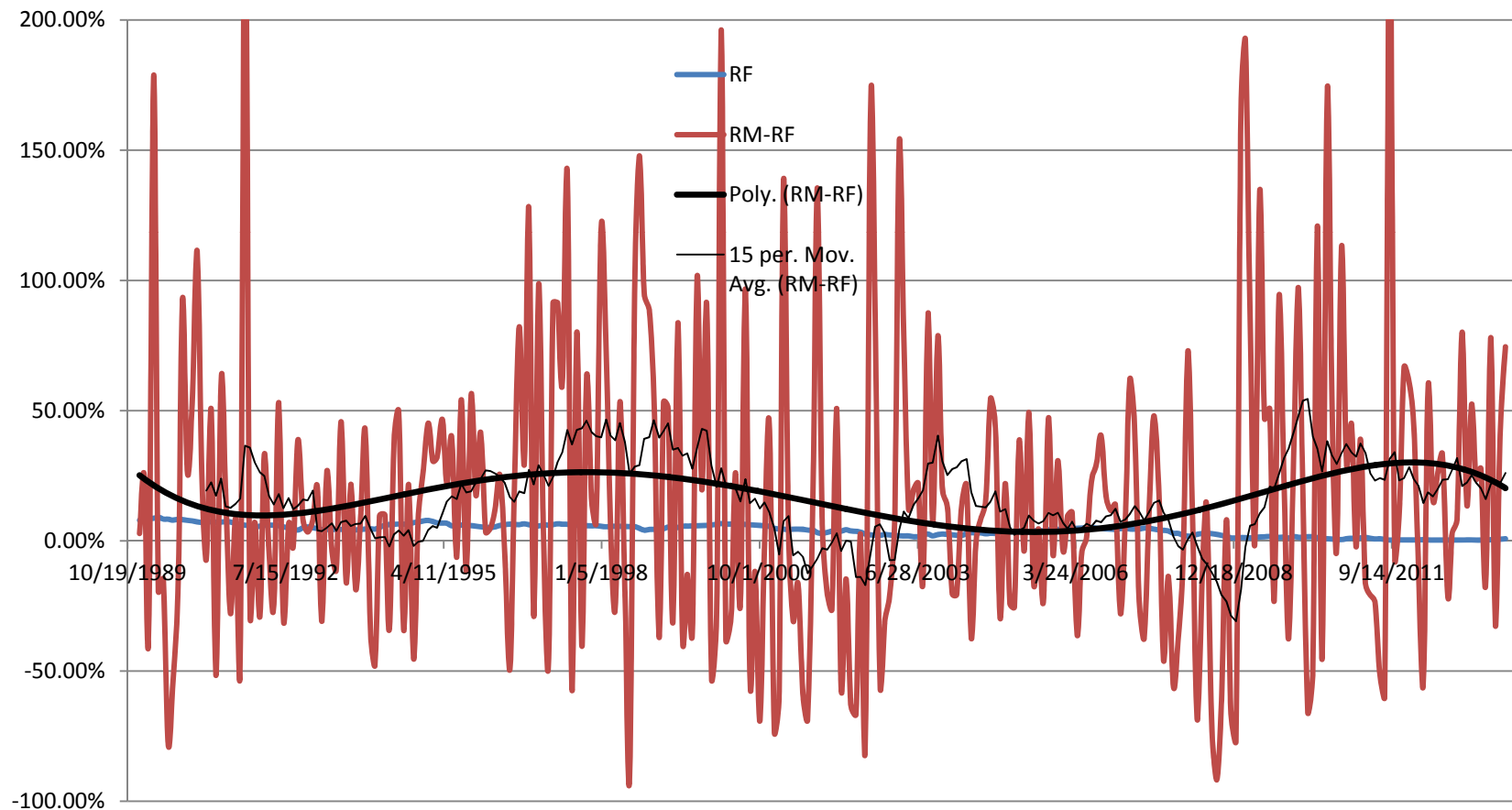
From Previous slide

- Clearly see moments when the price of risk is low

- And when it is high.

- Look at moving average

- Also note the choice of the riskless rate is pretty irrelevant

High β vs low β
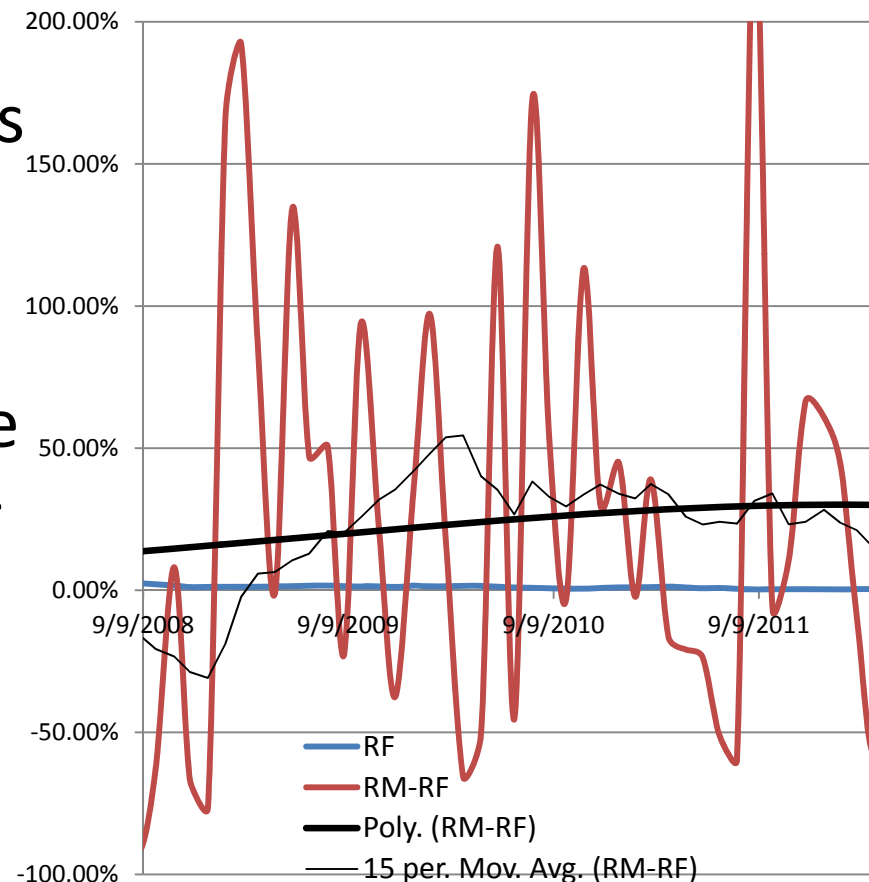
- Two interpretations
- From Investor
  - If β is high, firm is very exposed to systematic risk
  - You have to pay the investor to bear that risk
  - If β is low, investor wants a smaller share of the total return per dollar he or she spends
- From Firm
  - High β cost of equity is high
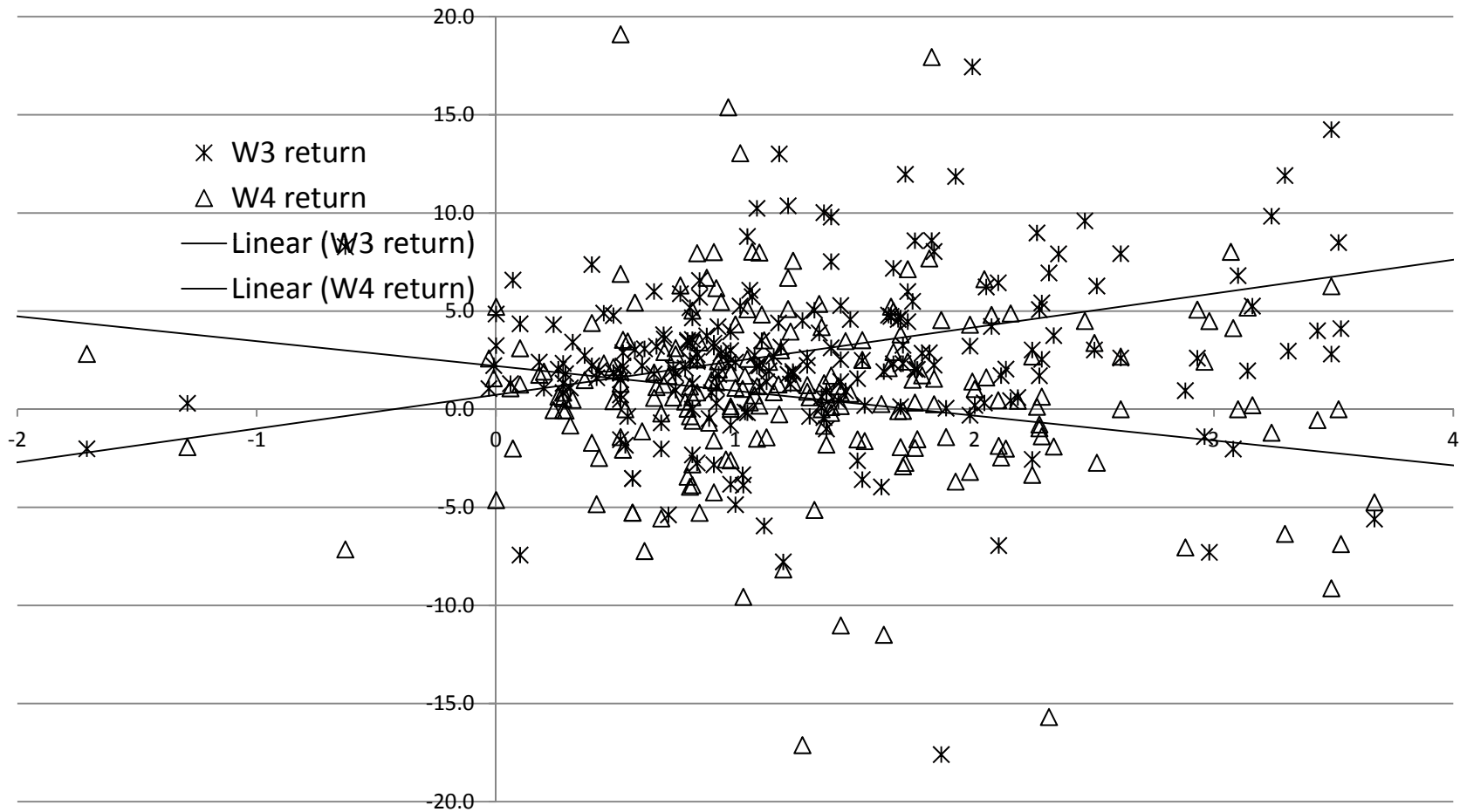 - Low β cost of equity is low

Distribution of β in your firms
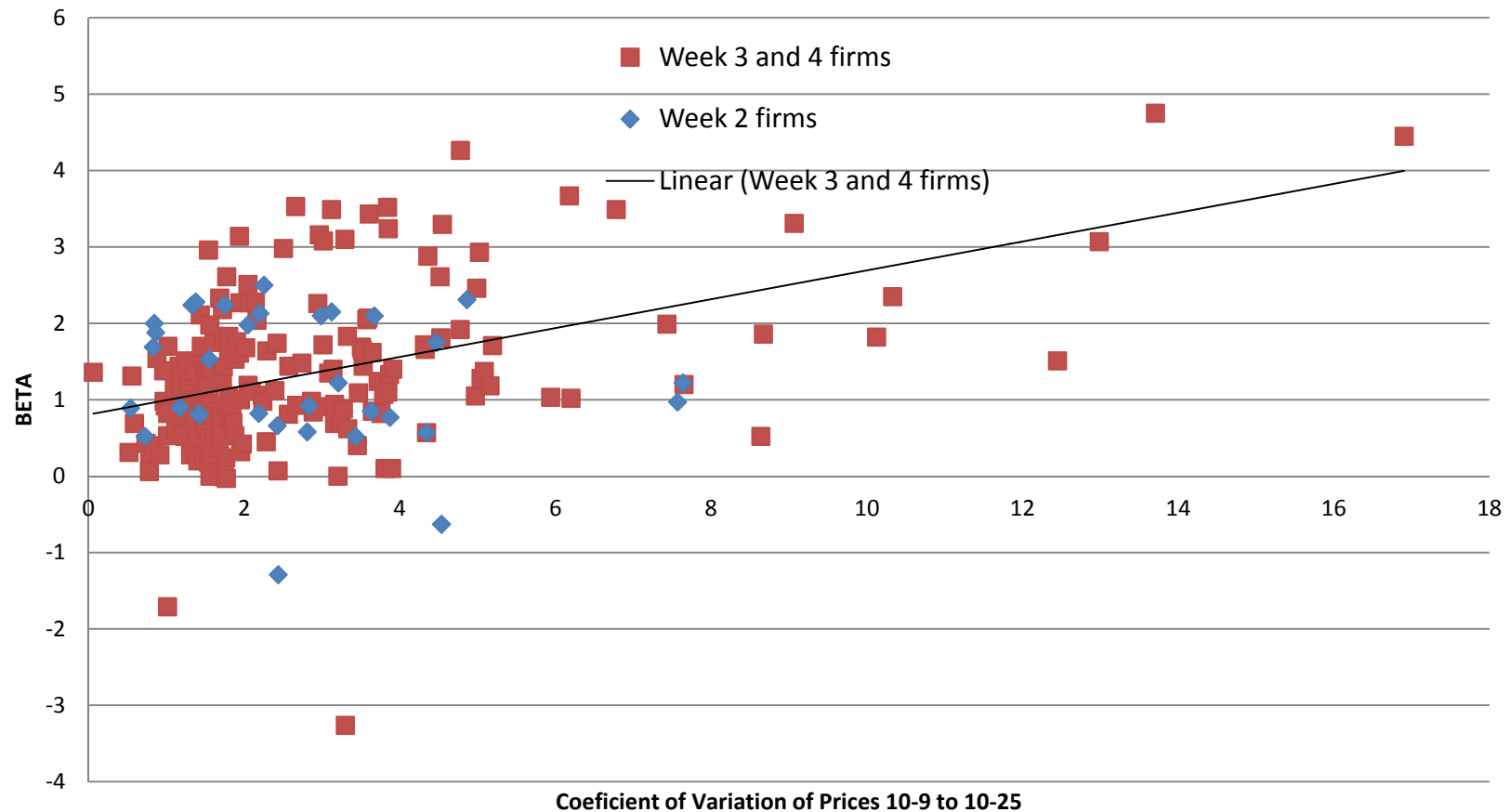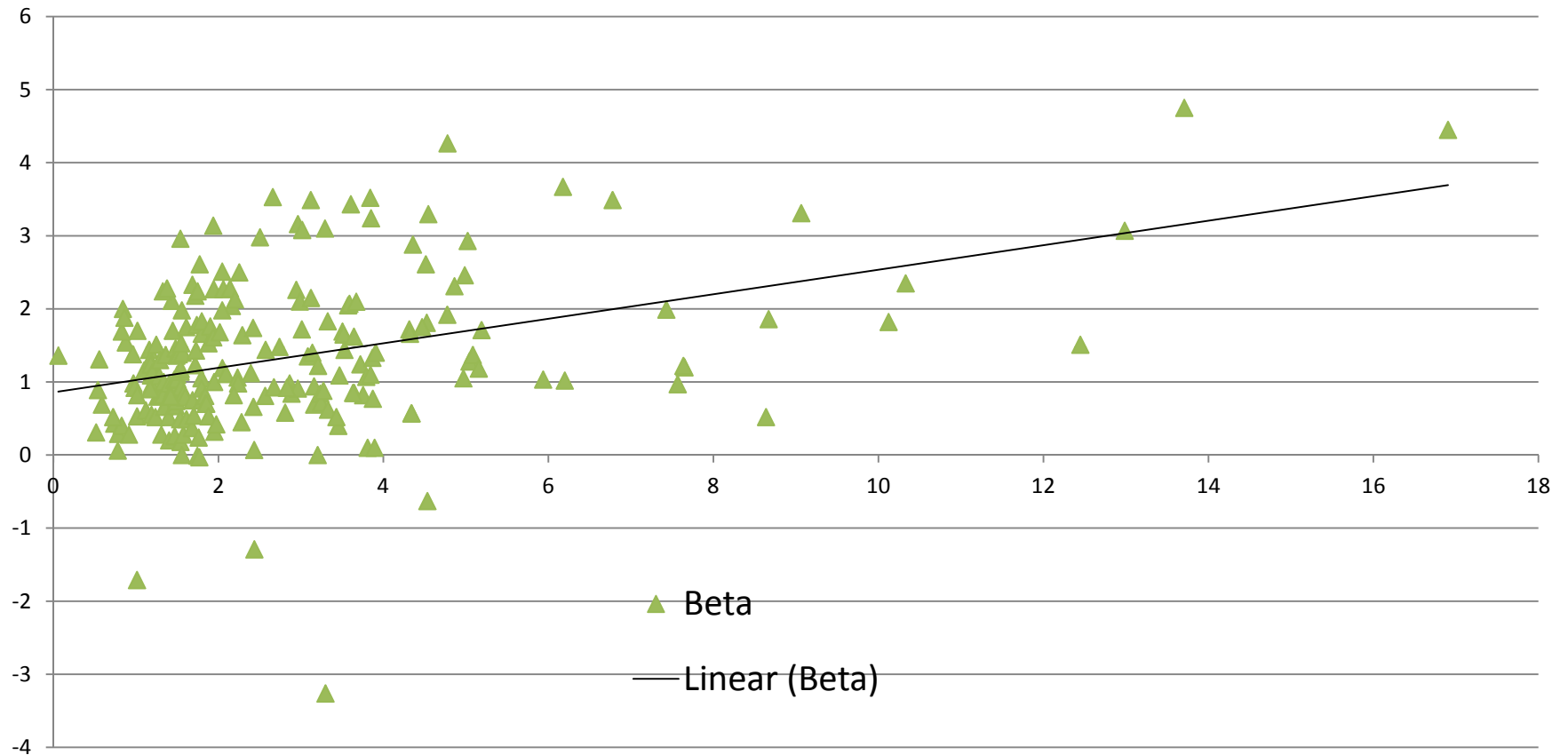
# Are β correlated with firm returns
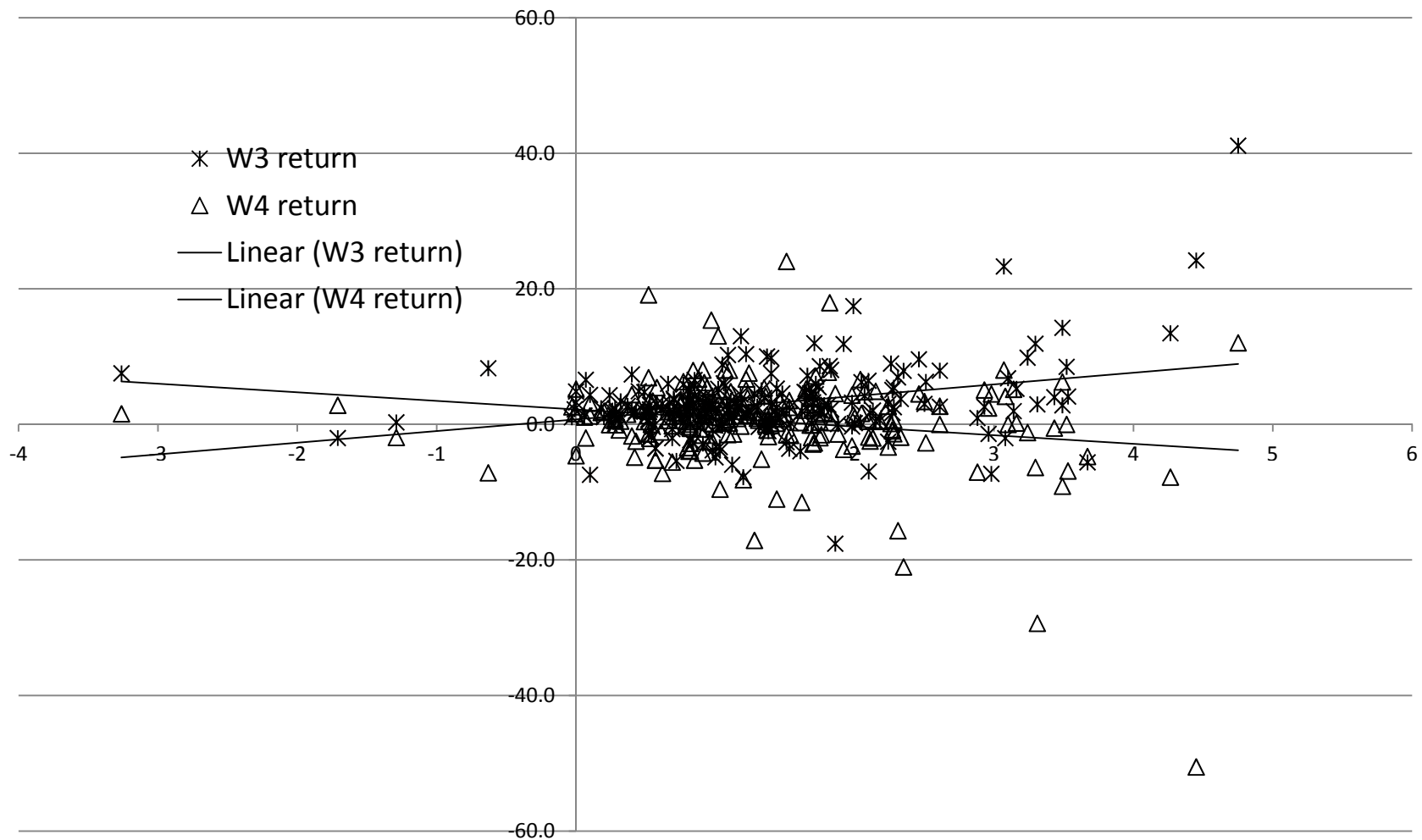
Short run result!

In the short run

- It's the noise (ε) that dominates
- You cannot estimate β off of two weeks
- But these have statistical power over the longer term

Beta correlated with short term variation?

Horizontal axis is the coefficient of variation (st. deviation/average) of price. Vertical axis is β reported by Yahoo finance. Some firms have no reported β.

Beta correlated with short term variation?
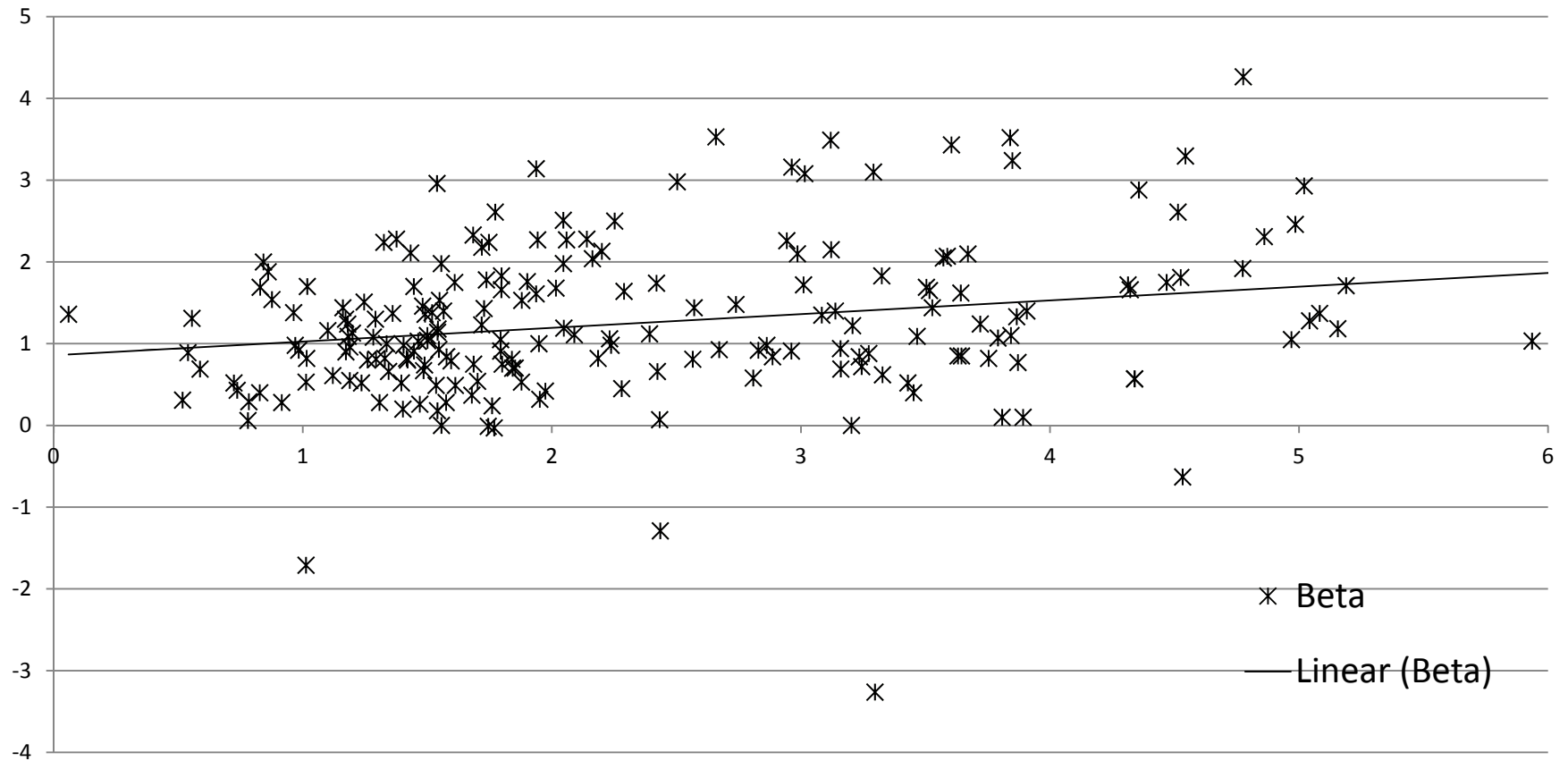
Notice large number of firms with very similar β and very different σ.

If not β then α?

- Recall from last class that we estimate the following relationship

$$(r_i - r_F) = \alpha_i + \beta_{iM}(r_M - r_F) + \varepsilon_i$$

- B is fine, but you have to bear risk.

- Why not pick high α firms?

- These are firm where returns above the risk free rate are larger than CAPM would predict

- Expect these firms to get bid up (α should disappear)

- Problem is that α estimate are very sensitive to sample and period.

Beyond our data

- Problems with CAPM

$$(r_i - r_F) = \alpha_i + \beta_{iM}(r_M - r_F) + \varepsilon_i$$

- The model work if and only if no other variable enters the regression (because of the need for everyone to hold the market portfolio)

- In other words the model works if the market is efficient (prices are all you need)

Fama and French 2006

- Value (high book to market value B/M) Vs growth (low book to market value) stocks

- "When we form portfolios on size, B/M, and β, we find that variation in β related to size and B/M is compensated in average returns for 1928 to 1963, but variation in β unrelated to size and B/M goes unrewarded the sample period (1929-2004). […] We conclude that it is size and B/M, or risks related to them, and not β, that are rewarded in average returns."

Fama and French 2006 (cont)

- What does matter beyond β?
- Small firms have 0.2% return per month over large firms
- Value (high book to market) have a 0.35% return premium over growth firms
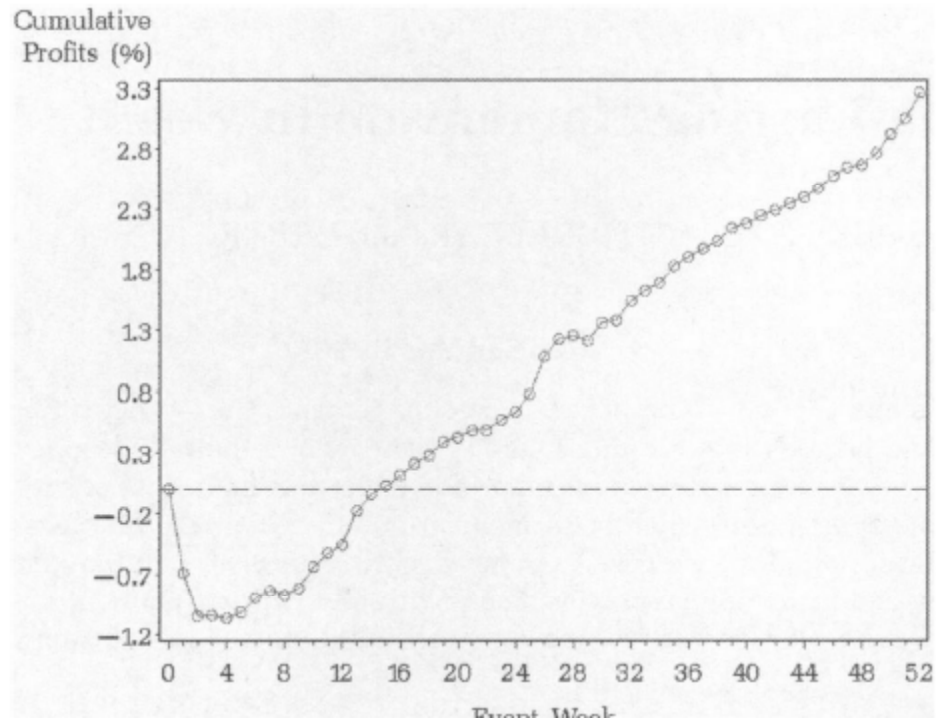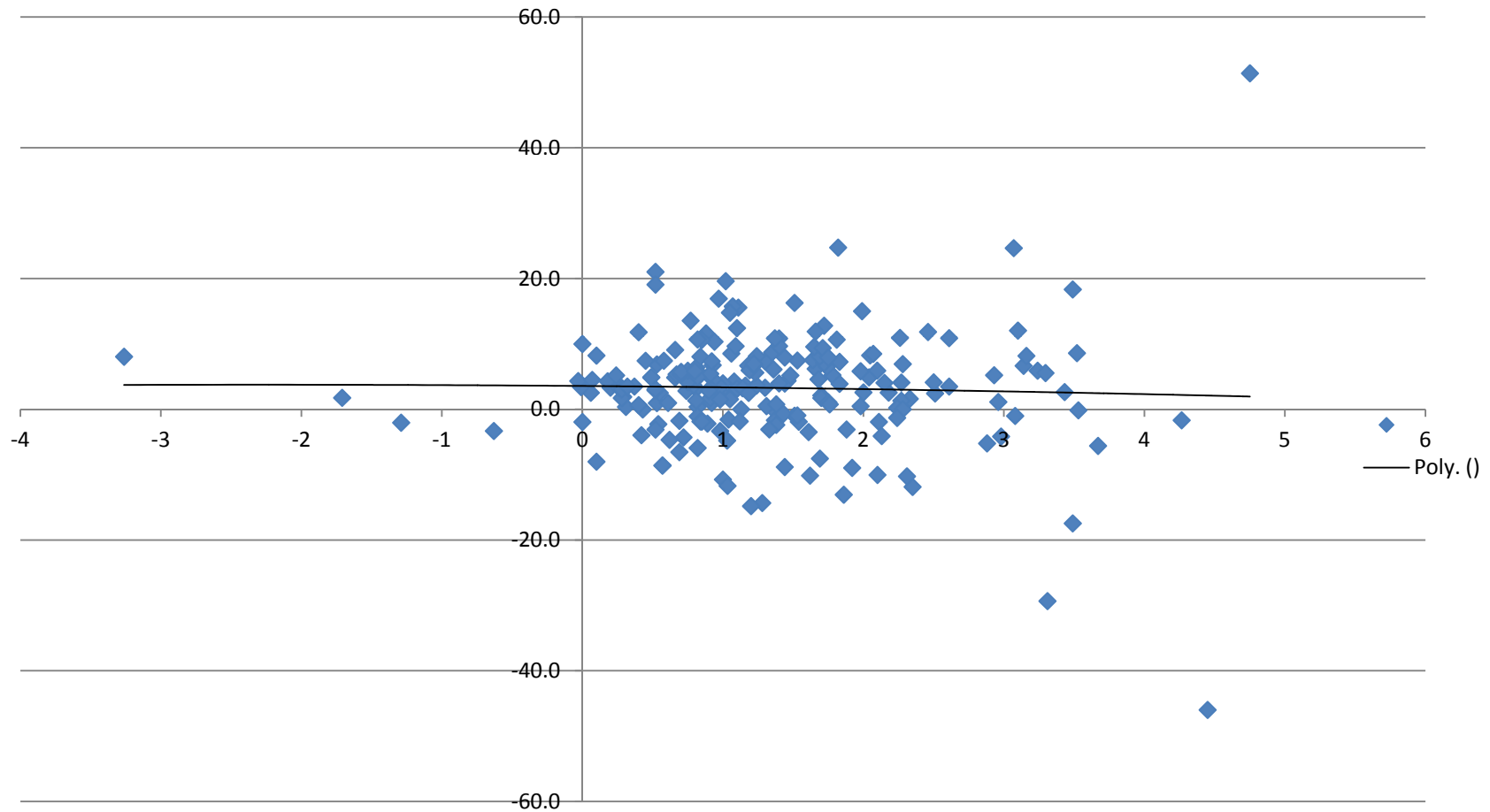- Momentum

Figure 1. Each week from 1983 to 2003, we rank stocks based on their returns over the prior week and form a portfolio comprised of a long position in the top decile of stocks (winners) and a short position in the bottom decile (losers). Gutierrez and Kelley JOURNAL OF FINANCE VOL. FEB. 2008

Replace CAPM with an empirical model

- Add as many factors as you like
- In their case
  - β (more is good)
  - Book to market value (higher is better)
  - Size (large is bad)
  - Momentum (past increase lingers)
- Then as you use these factors in choosing weights you bid up the stocks with higher returns and return the world to a 'pure" CAPM model
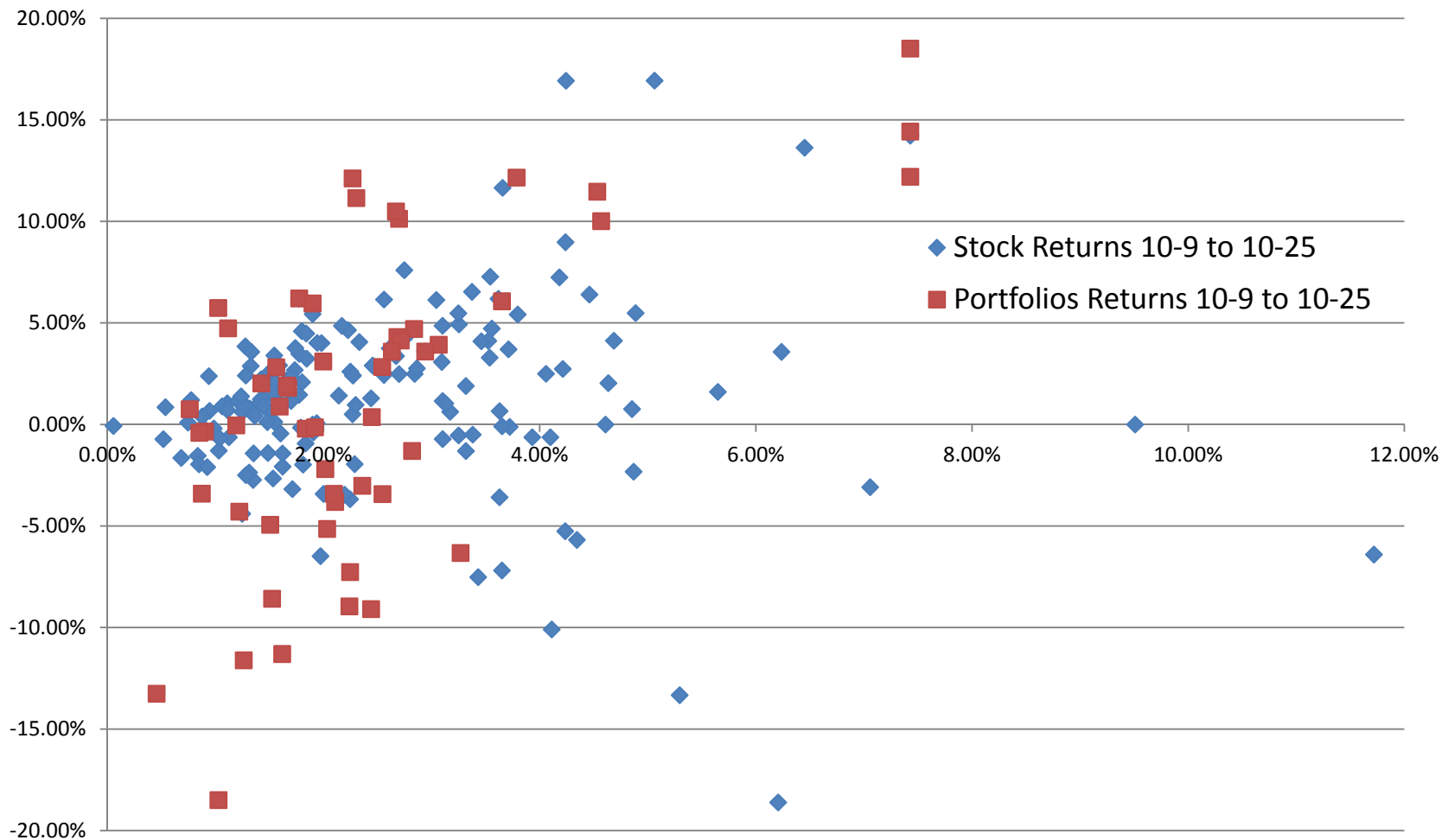- Except you may never get there.

Some evidence of efficiency

Return to your stocks from Week 1 to Week 2

Returns of your portfolios (above S&P 500)
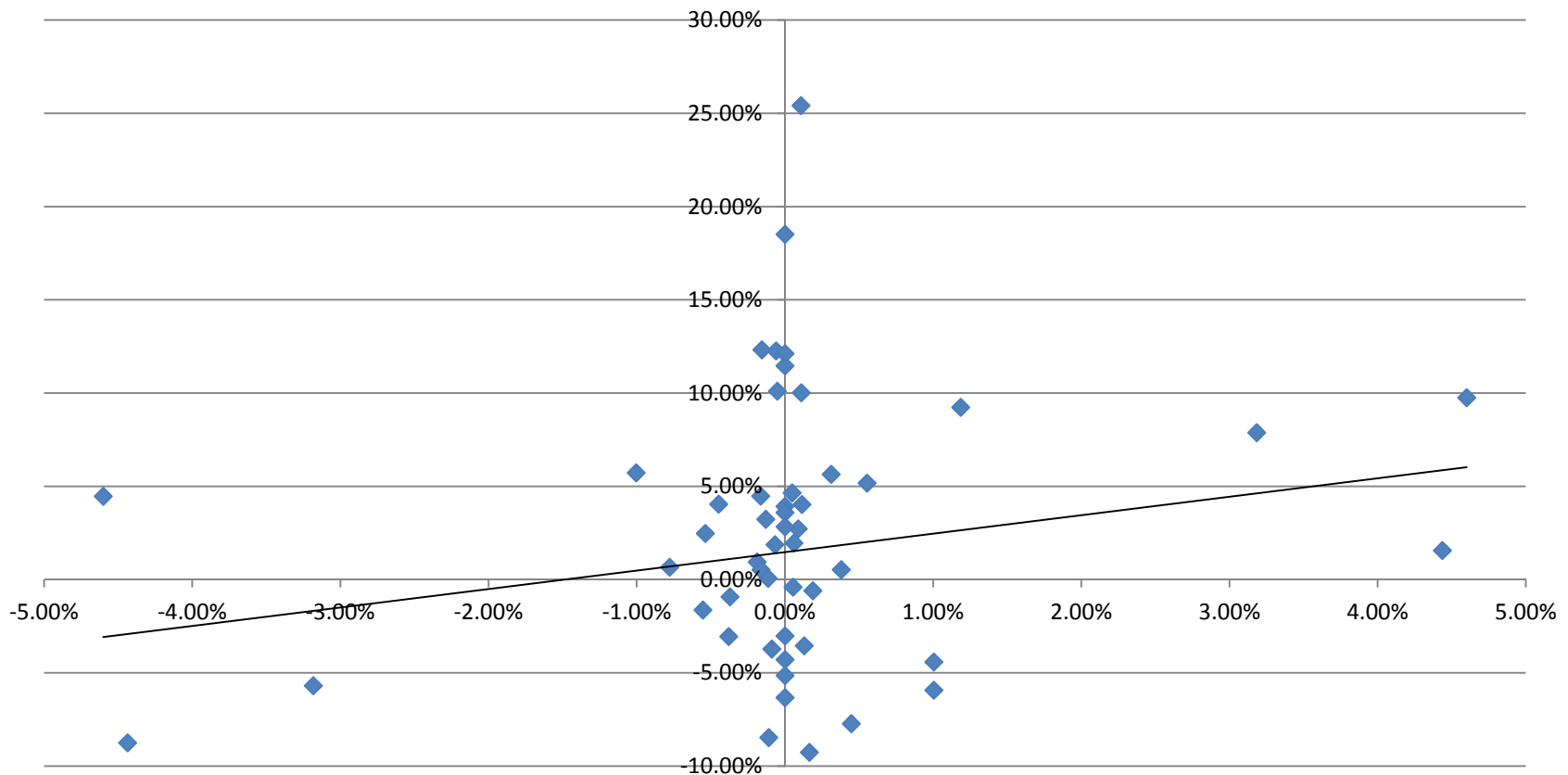
Here we seem to have a classic momentum effect driven by a small number of portfolios. (most did just about the same week 1 as the S&P)

Are portfolio's useful?

Not if you want to win the investment derby when you can only go long on stocks.

- Notice portfolios are left leaning
- Offer similar returns but lower variance
- Could go and find set of stock with similar expected returns as week 1
- But also a lot of dominated portfolios
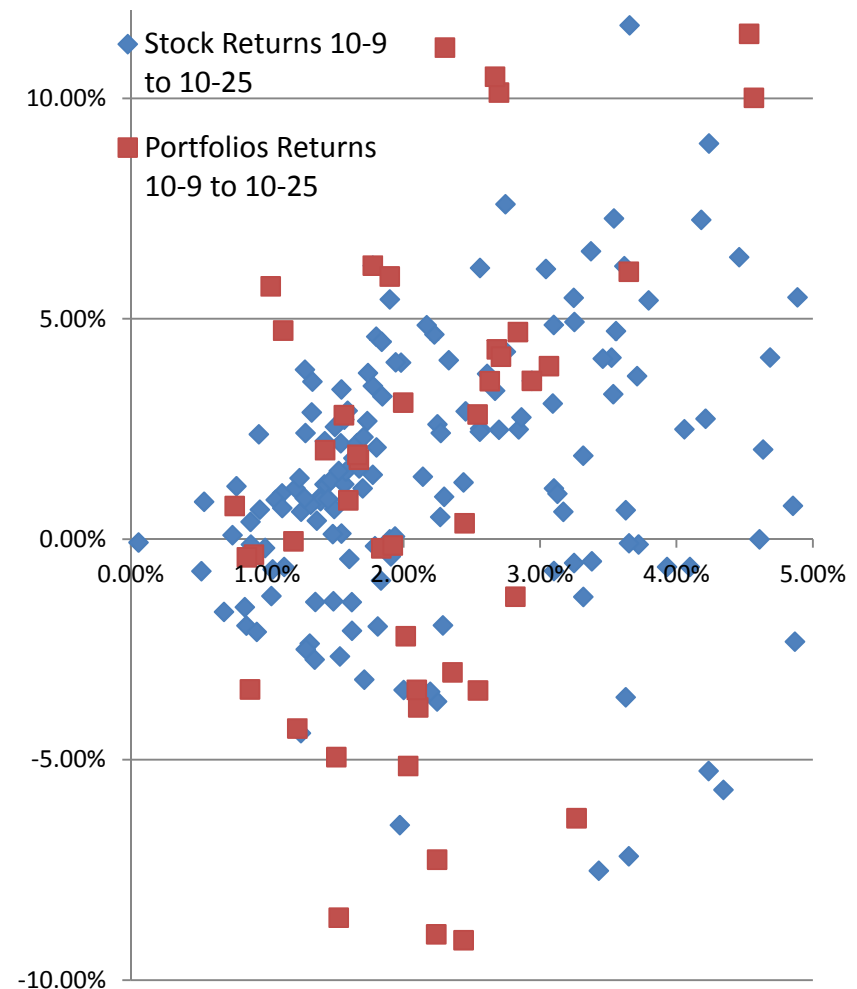
Did you beat the market?

- Make a random pick
- Your chance of beating the market are 50-50
  - 29% of week 2 stocks beat the market week 3
  - 41% portfolios the market week 3 41%
  - 50% of week 2 stocks beat the market week 4
  - 61% portfolios beat the market week 4
- Make two consecutive picks 25%(LL) 50%(LW or WL) and 25% (WW)
  - 28% LL stocks 65% LW-WL and 7%WW
  - 22% LL portfolios, 52%WL-LW and 26% WW

11-04 Class 11: Intermediaries and assets

- **Intermediaries Definition**
- **There are still spreads**
- **creating new assets: Transformation; Bundling;**
- **Unbundling;**
- **Taking positions**
- **Leverage**