

Mgmt 237M2 **Statistical Arbitrage**

Lecture 05: Alphas

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Alpha

- Source of expected return over and beyond what is explained by market beta
- Time-varying $\rightarrow (T \times n)$ matrix of alphas
 - T = number of days
 - n = number of stocks
- Cross-sectionally standardized every day:
 - Mean zero across all (active) stocks
 - Variance one across all (active) stocks

Winsorization

- Subtract robust estimate of the mean
- Divide by the standard deviation
- Every $\alpha > 3$ is brought down to 3
- Every $\alpha < -3$ is brought up to -3
- Reiterate a few times

Some Sources of Alpha

- 1) Value vs. Glamour
- 2) Long-term price momentum
- 3) High-volume premium
- 4) New issues puzzle
- 5) Post-earnings announcement drift

1) Value vs. Glamour

- Fama & French (1992): B/M Book-to-Market
- Basu (1983): E/P ratio: Earnings yield
- Kothari & Shanken (1997): D/P: Dividend Yield
- Lakonishok, Schleifer & Vishny (1994): C/P: Cash flow to price
- Etc...
- Long-term Contrarian bucket

General Structure of Value Alpha

- *<Fundamental>* divided by market price
- Not the other way around!
- Only market price is guaranteed to be > 0

Combining Alphas

- Let α_{ti}^1 be a standardized winsorized alpha for stock i on date t
- Let α_{ti}^2 be another alpha
- Aggregate Alpha:

$$\alpha_{ti} = w_1 \times \alpha_{ti}^1 + w_2 \times \alpha_{ti}^2$$

- Winsorize aggregate alpha

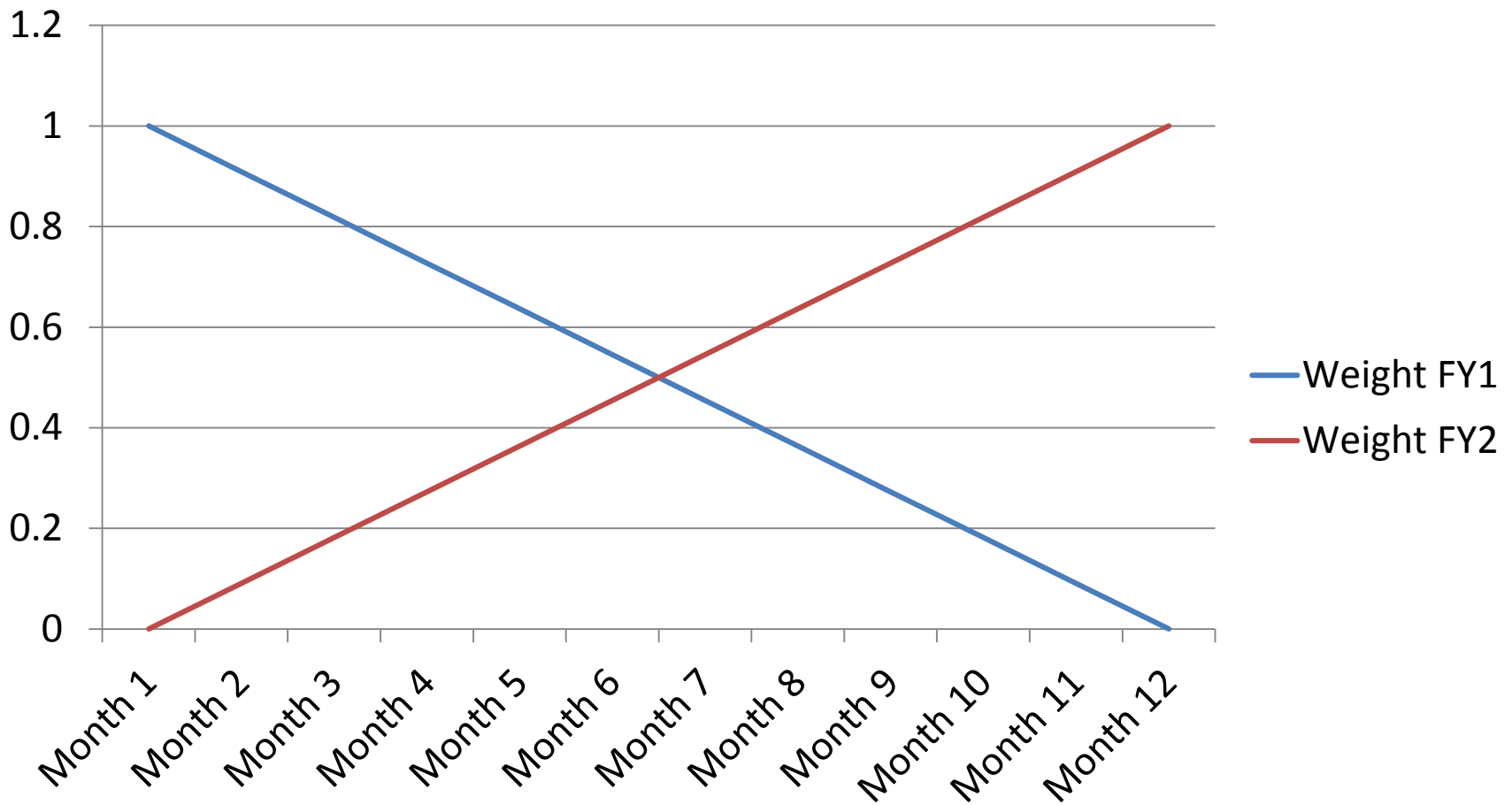
Generalization

- Combine many flavors of the value alpha to make better aggregate value alpha
- Numerator:
 1. Last reported book value of equity
 2. Trailing earnings
 3. Trailing sales
 4. Trailing dividends
 5. Trailing cash flow

Forward-looking

- Use consensus of analyst forecasts
- Numerator:
 6. Analyst forecast of future earnings
 7. Analyst forecast of future sales
 8. Analyst forecast of future dividends
 9. Analyst forecast of future cash flow
- Choose the weights: judgement
- If use backtest

Combine Next 2 Fiscal Years



Aggregate Value Alpha

- Combine several value alphas together
- Flow alphas balance stock alphas
- Backward-looking balance forward-looking alphas
- Choose optimal weights using judgement
- If using backtest: **beware of data-mining!**

Accounting-Based Valuation Models

- Ohlson (1995) “Earnings, book values, and dividends in security valuation” *Contemporary Accounting*
- Residual Income Model (RIM) / Economic Value Added (EVA)
- Gishan Dissanaik and Kim-Hwa Lim (2010) “The Sophisticated and the Simple” *European Financial Management* \Rightarrow C/P almost as good

2) Momentum

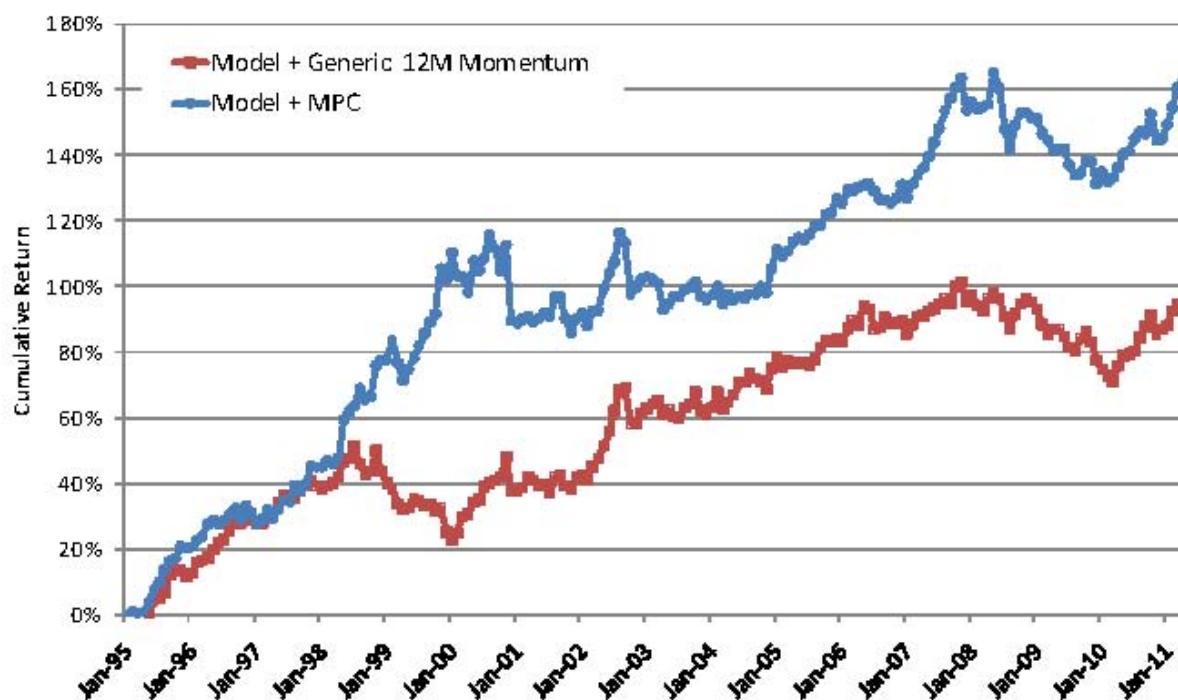
- a) Straight momentum
- b) Echo momentum
- c) Momentum Consistency
- d) Industry Momentum
- e) Style Momentum
- f) Momentum Acceleration

2a) Straight Momentum

- Jegadeesh and Titman (1993) “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency”
Journal of Finance
- Compute stock return from T-12 months to T-1 month
- If high → buy the stock
- If low → sell the stock

Deutsche Bank – July 2011

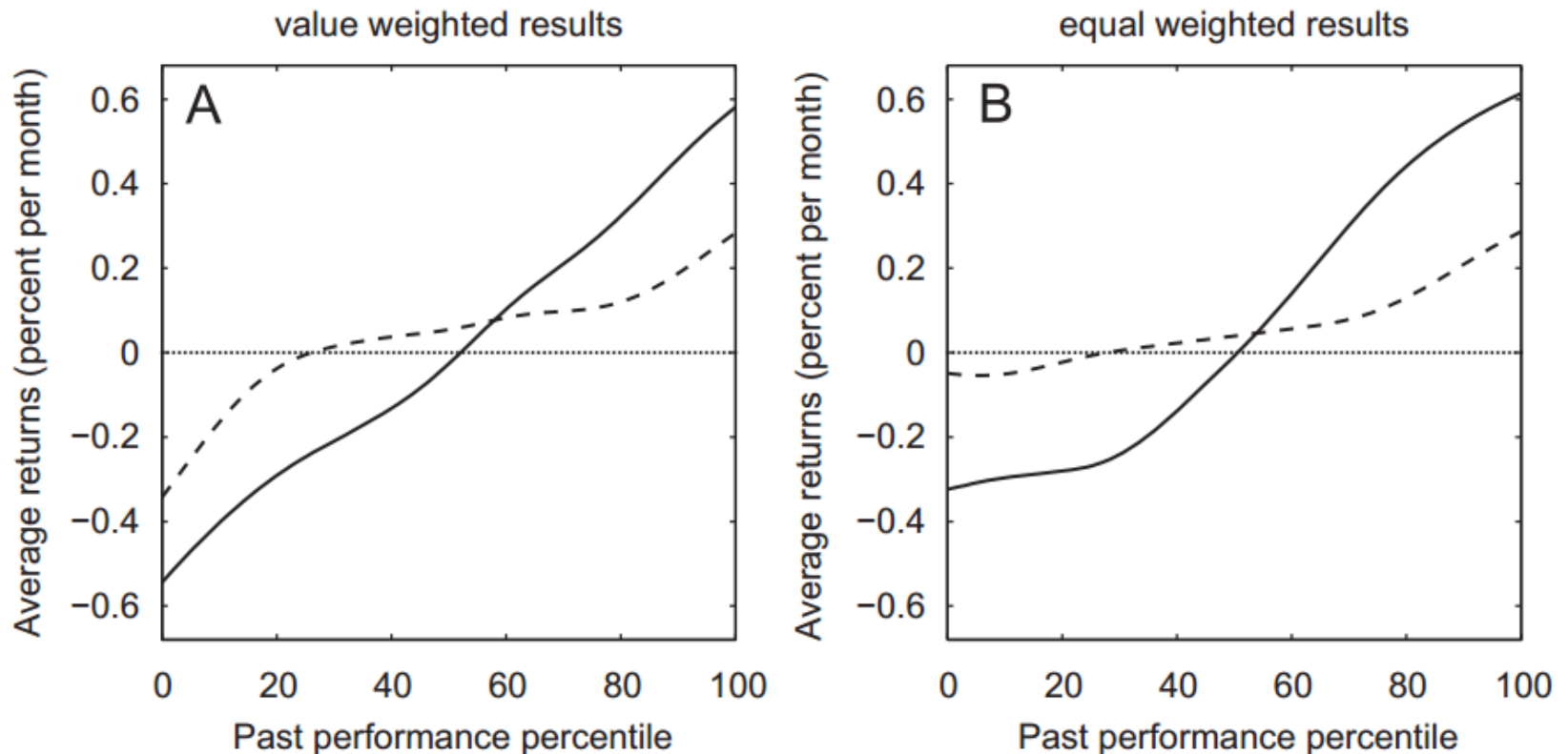
Figure 39: Cumulative performance



Source: Axioma, Compustat, Russell, IBES, Deutsche Bank

2b) Echo Momentum

- Momentum is primarily driven by firms' performance 12 to 7 months ago



Novy-Marx (JFE 2012)

Independent variable	Full sample	Half samples	
	Whole	Early	Late
$r_{12,7}$	1.07 [5.72]	1.21 [3.70]	0.93 [5.17]
$r_{6,2}$	0.49 [1.88]	0.62 [1.40]	0.36 [1.32]
$r_{1,0}$	-7.77 [-20.9]	-9.44 [-16.0]	-6.10 [-13.8]
log(ME)	-0.14 [-4.08]	-0.18 [-3.40]	-0.09 [-2.29]
log(BM)	0.26 [5.51]	0.22 [2.86]	0.31 [5.39]
$r_{12,7} - r_{6,2}$	0.58 [2.47]	0.60 [1.46]	0.57 [2.42]

2c) Momentum Consistency

- Achieving a high past return with a series of steady positive months generates larger expected return than a high past return achieved with just a few extraordinary months
- One-year winner (loser) consistency dummy is one if the monthly return of the stock was positive (negative) in at least eight of the one-year horizon's 11 months

Grinblatt and Moskowitz (JFE 2004)

Dependent variable:	<i>Cross-section of size, BE/ME, and industry hedged returns</i>			
Regressors:	All months	January	February–November	December
$r_{-1;-1}$	−0.0472 (−11.39)	−0.1002 (−4.44)	−0.0436 (−10.34)	−0.0431 (−3.54)
$r_{-1;-1}^L$	−0.0764 (−9.63)	−0.2189 (−6.79)	−0.0606 (−7.19)	−0.0921 (−4.20)
$D_{-1;-1}^{CW}$	0.0051 (8.79)	0.0097 (2.73)	0.0048 (8.62)	0.0060 (3.10)
$r_{-12;-2}$	0.0028 (2.50)	−0.0072 (−1.88)	0.0029 (2.38)	0.0075 (2.17)
$r_{-12;-2}^L$	0.0113 (2.97)	−0.0725 (−3.57)	0.0170 (4.62)	0.0440 (4.72)
$D_{-12;-2}^{CW}$	0.0046 (5.80)	0.0126 (2.61)	0.0042 (5.30)	0.0017 (0.67)
$D_{-12;-2}^{CL}$	−0.0007 (−0.76)	0.0044 (1.18)	−0.0014 (−1.29)	0.0011 (0.40)
$r_{-36;-13}$	−0.0015 (−3.47)	−0.0002 (−0.10)	−0.0021 (−4.28)	0.0023 (1.42)
$r_{-36;-13}^L$	−0.0052 (−2.04)	−0.0537 (−3.91)	−0.0025 (−1.02)	0.0159 (2.31)
$D_{-36;-13}^{CW}$	0.0014 (2.73)	0.0040 (1.93)	0.0011 (2.03)	0.0010 (0.63)
$D_{-36;-13}^{CL}$	−0.0007 (−0.80)	0.0108 (2.06)	−0.0015 (−1.78)	−0.0036 (−1.22)

2d) Industry Momentum

- Industry portfolios exhibit significant momentum, even after controlling for size, book-to-market equity (BE/ME), individual stock momentum, the cross-sectional dispersion in mean returns, and potential microstructure influences.
- Once returns are adjusted for industry effects, momentum profits from individual equities are significantly weaker and, for the most part, are statistically insignificant.

Moskowitz and Grinblatt (JF 1999)

- Industry momentum strategies are more profitable than individual stock momentum strategies.
- Industry momentum strategies are robust to various specifications and methodologies, and they appear to be profitable even among the largest, most liquid stocks.

2e) Style Momentum

1. Small-cap, growth
2. Small-cap, blend
3. Small-cap, value
4. Mid-cap, growth
5. Mid-cap, blend
6. Mid-cap, value
7. Large-cap, growth
8. Large-cap, blend
9. Large-cap, value
10. No-dividend

Chen and De Bondt (JEF 2004)

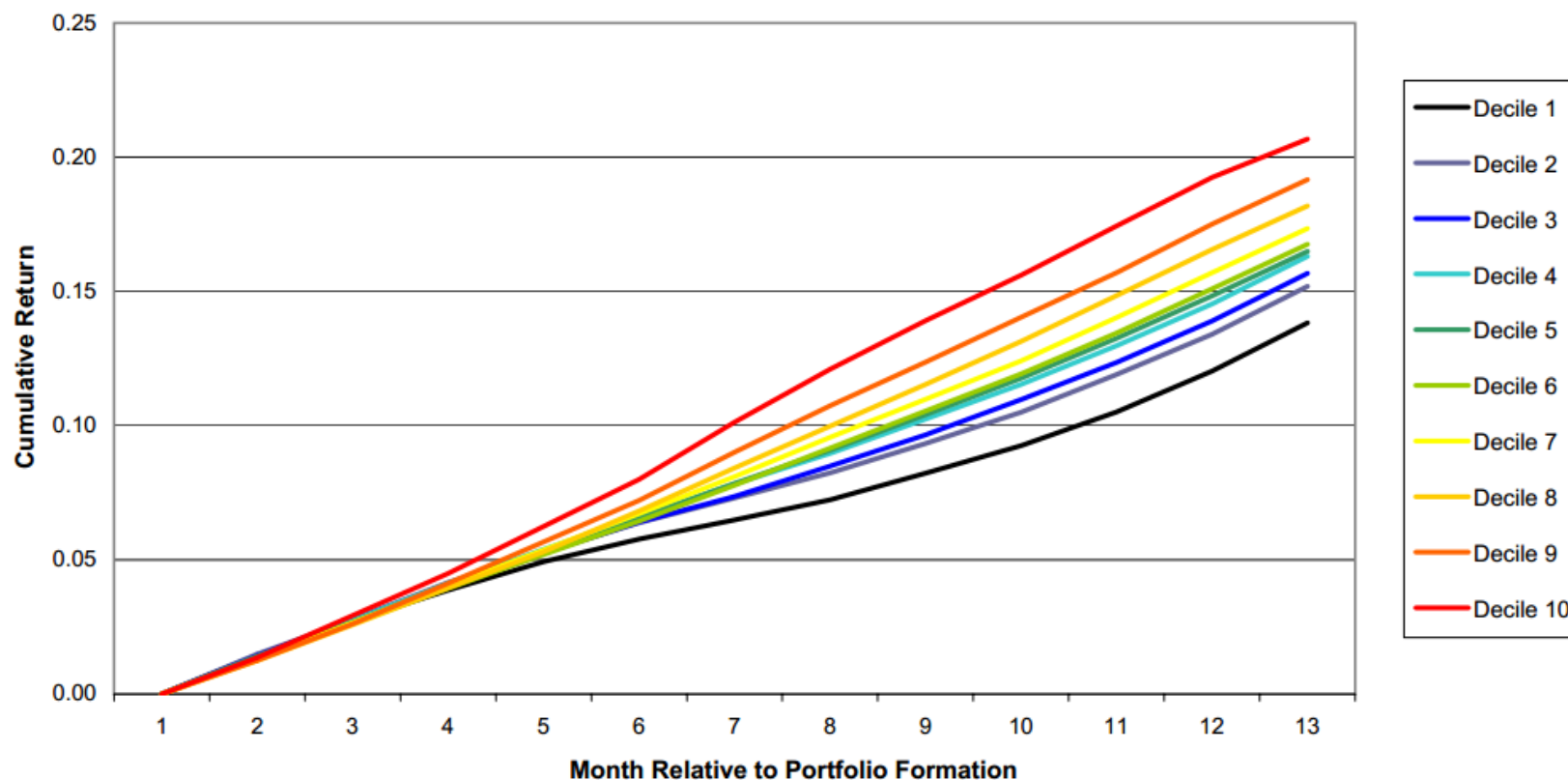
Table 3
The returns of style momentum portfolios

	Average monthly return during the test period					
	$K=3$	$K=6$	$K=9$	$K=12$	2nd Year	3rd Year
<i>Panel A</i>						
Arbitrage portfolio holds two style portfolios						
$J=3$						
1 Winner	1.61	1.58	1.62	1.63	1.47	1.45
1 Loser	1.48	1.48	1.43	1.39	1.37	1.41
Arbitrage	0.13 (0.65)	0.10 (0.70)	0.19 (1.73)	0.23 (2.07)	0.11 (1.00)	0.04 (0.36)
$J=6$						
1 Winner	1.54	1.65	1.68	1.68	1.41	1.47
1 Loser	1.42	1.48	1.38	1.36	1.37	1.43
Arbitrage	0.12 (0.59)	0.18 (1.21)	0.30 (2.07)	0.32 (2.41)	0.04 (0.36)	0.04 (0.36)
$J=12$						
1 Winner	1.75	1.80	1.78	1.71	1.48	1.40
1 Loser	1.27	1.30	1.32	1.28	1.39	1.38
Arbitrage	0.48 (2.24)	0.50 (2.63)	0.46 (2.69)	0.43 (2.49)	0.09 (0.61)	0.02 (0.21)

2f) Momentum Acceleration

- Acceleration is defined as the change in six-month momentum relative to the cross-section of other firms.
- Trading strategies based on acceleration offer significant abnormal profits of approximately 4.5% annually when controlled for other known regularities in equity returns.

Gettleman and Marks (2006)

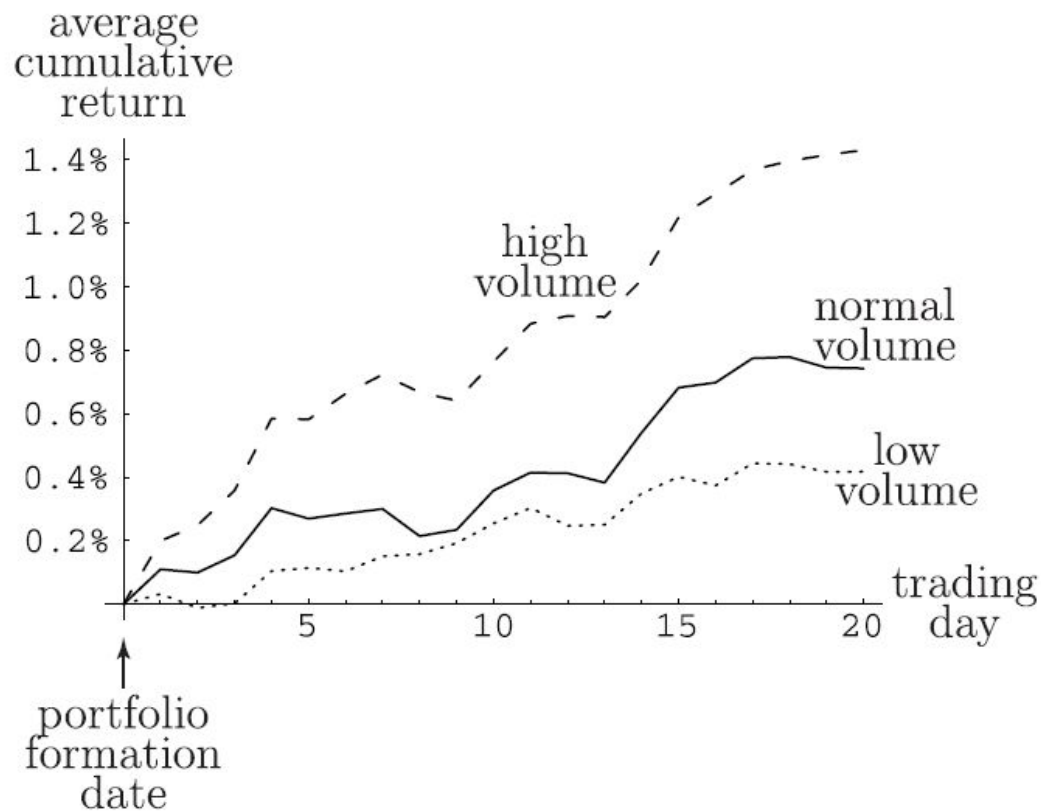


3) Volume

- Gervais, Kaniel and Mingelgrin (2001) “The high-volume return premium” *Journal of Finance*
- Stocks experiencing unusually high (low) volume over a day or a week tend to appreciate (depreciate) over the next month

Event Study

The Journal of Finance



Log Volume in Month $t-2$

- “Trading activity and expected stock returns”
- Chordia, Subrahmanyam & Anshuman
- Journal of Financial Economics (2001)
- If stocks had high volume 2 months ago then they tend to go down this month
- And vice-versa

Table 4

Panel A: Dollar trading volume			
	Excess returns	Returns adjusted using Fama-French factors	
		Raw	Purged
Intercept	0.718 (2.35)	− 0.002 (0.05)	− 0.022 (− 0.46)
SIZE	0.125 (2.06)	0.149 (3.61)	0.136 (3.29)
BM	0.222 (4.49)	0.099 (2.39)	0.093 (2.26)
PRICE	0.088 (0.81)	− 0.048 (− 0.50)	− 0.139 (− 1.47)
DVOL	− 0.183 (− 3.63)	− 0.219 (− 5.84)	− 0.231 (− 6.07)

4) New Issues Puzzle

- Loughran and Ritter (1995) “The New Issues Puzzle” *Journal of Finance*
- Companies that issue stock subsequently underperform over the next 5 years
- Worse for IPO’s than for Seasoned Equity Offerings
- Cannot winsorize!

5) Post-Earnings Announcement Drift

- Bernard and Thomas (1989) “Post-Earnings-Announcement Drift: Delayed Price Response or Risk Premium?” *Journal of Accounting Research*
- Stocks whose earnings are above (below) analyst consensus outperform (underperform) for two months afterwards
- Do not winsorize!

Cumulative Abnormal Return

POST-EARNINGS-ANNOUNCEMENT DRIFT

3

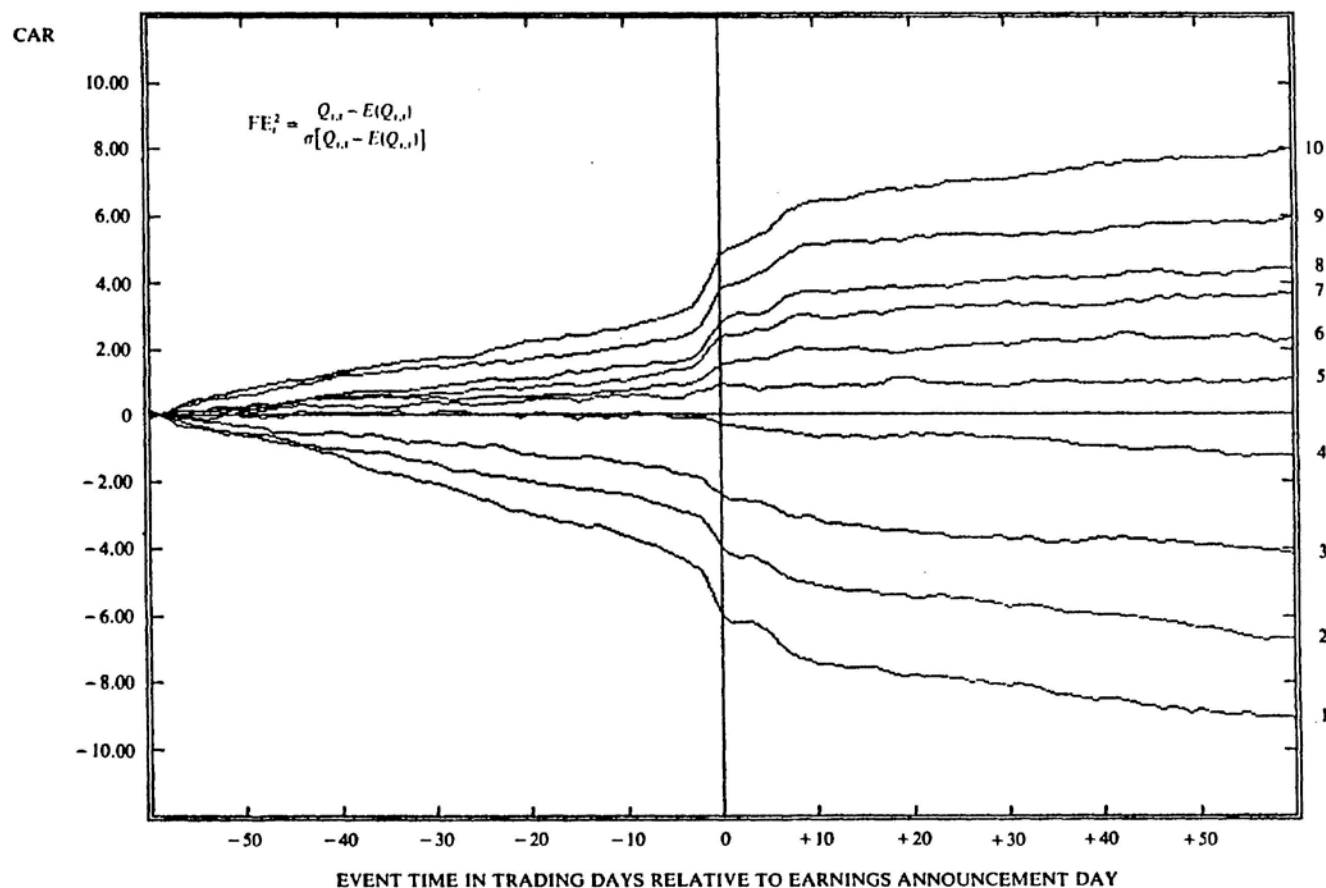
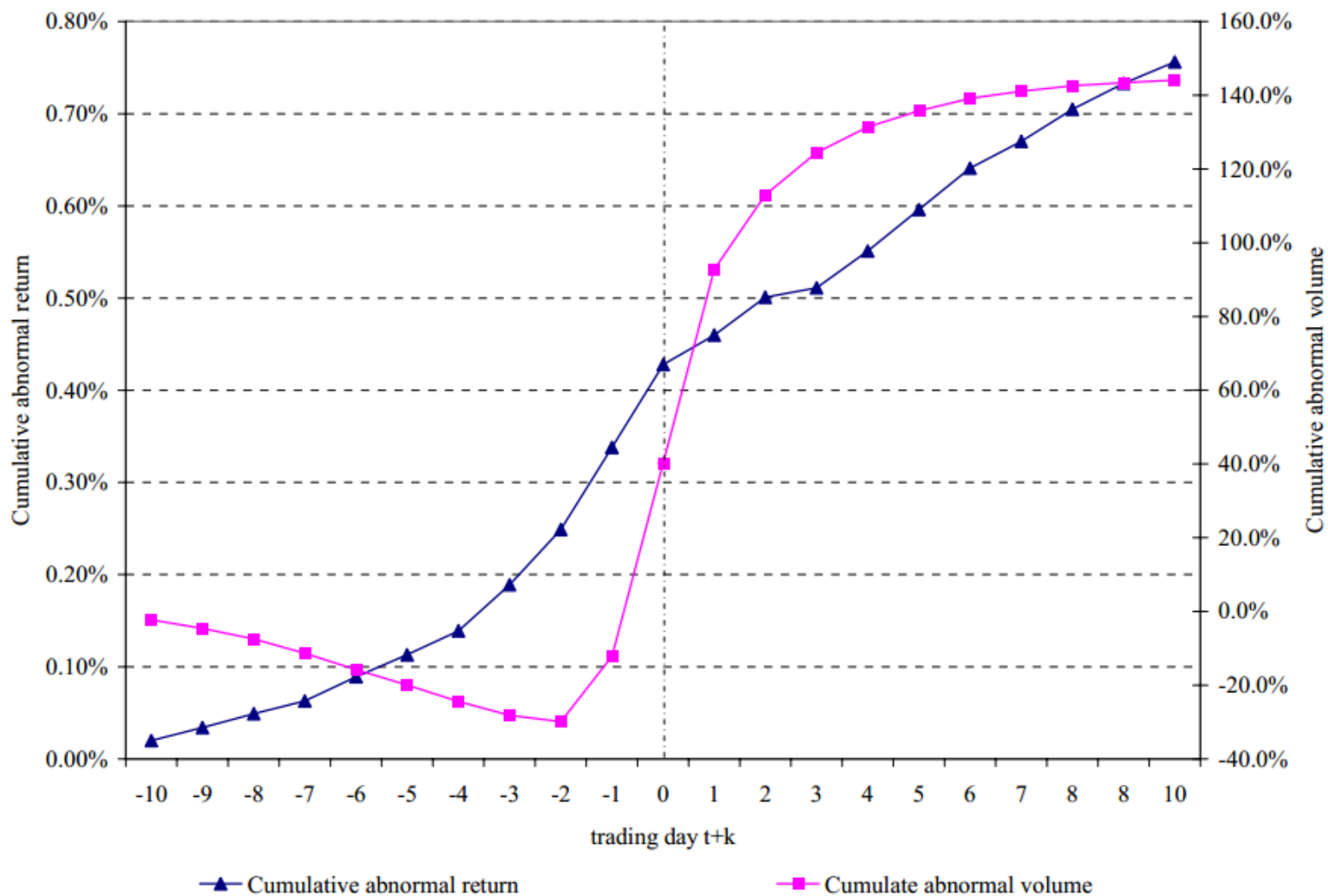


FIG. 1.—Cumulative abnormal returns for FOS earnings-based model (EBM) tests.

Earnings Announcement Premium

- On average, stock prices rise around scheduled earnings announcement dates.
- **Earnings announcement premium** is large, robust, and strongly related to the fact that volume surges around announcement dates.
- Stocks with high past announcement period volume earn the highest announcement premium, suggesting some common underlying cause for both volume and the premium.
- High premium stocks experience the highest levels of imputed small investor buying, suggesting that the premium is driven by buying by small investors when the announcement catches their attention.

Frazzini & Lamont (2006)



Alpha Aggregation

- Combine several alphas together
- Short-term alphas balance long-term alphas
- Technical alphas balance fundamental alphas
- Contrarian alphas balance momentum alphas
- Choose optimal weights using judgement
- If using backtest: **beware of data-mining!**

Assignment for Next Class

Go to:

- Social Science Research Network
 - Financial Economics Network
 - Subject Matter eJournals
 - Capital Markets
 - Market Efficiency

⇒ Find anomaly published in the past 12 months (*not explained in class today*)