Lecture 7 : Market Efficiency and the Behavioral Critique

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Refresher

- Recall our last lectures suggested a number of failures of the CAPM (small cap, value, momentum)
- One response has been the advent of factor models

- Characteristics of stocks which generate alpha can be better represented as factor exposures
  - i.e. small stocks returns driven by factor sensitivity and the SMB risk premium

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Anomalies: risks or opportunities?

- Note the theme:
  - Shares are generally correctly priced
  - Risk-premia paid on assets represent exposure to risk facors
  - Otherwise, “arbitrageurs” will quickly drive prices to equilibrium
- *No free lunch* $\longrightarrow$ high-returns = high risk

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Market Efficiency

- These ideas are closely associated with the efficient market hypothesis (EMH)
  - Specifically, EMH posits that prices reflect all available information
- The EMH comes in three flavors:
  1. Weak form: all available information is limited to historical prices
  2. Semi-strong form: all available data refers to all publicly available data
  3. Strong form: all available information includes insider information

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Examples (weak form)

- Weak form: all available information is limited to historical prices
- Empirical evidence shows that using historical data, we can predict:
  1. Short-run reversals
  2. medium momentum
  3. long-term reversals
- More recently evidence on return seasonals (Heston Sadka 2008)
- In the longer run, there is definitely return predictability…but that doesn't necessarily imply markets are inefficient

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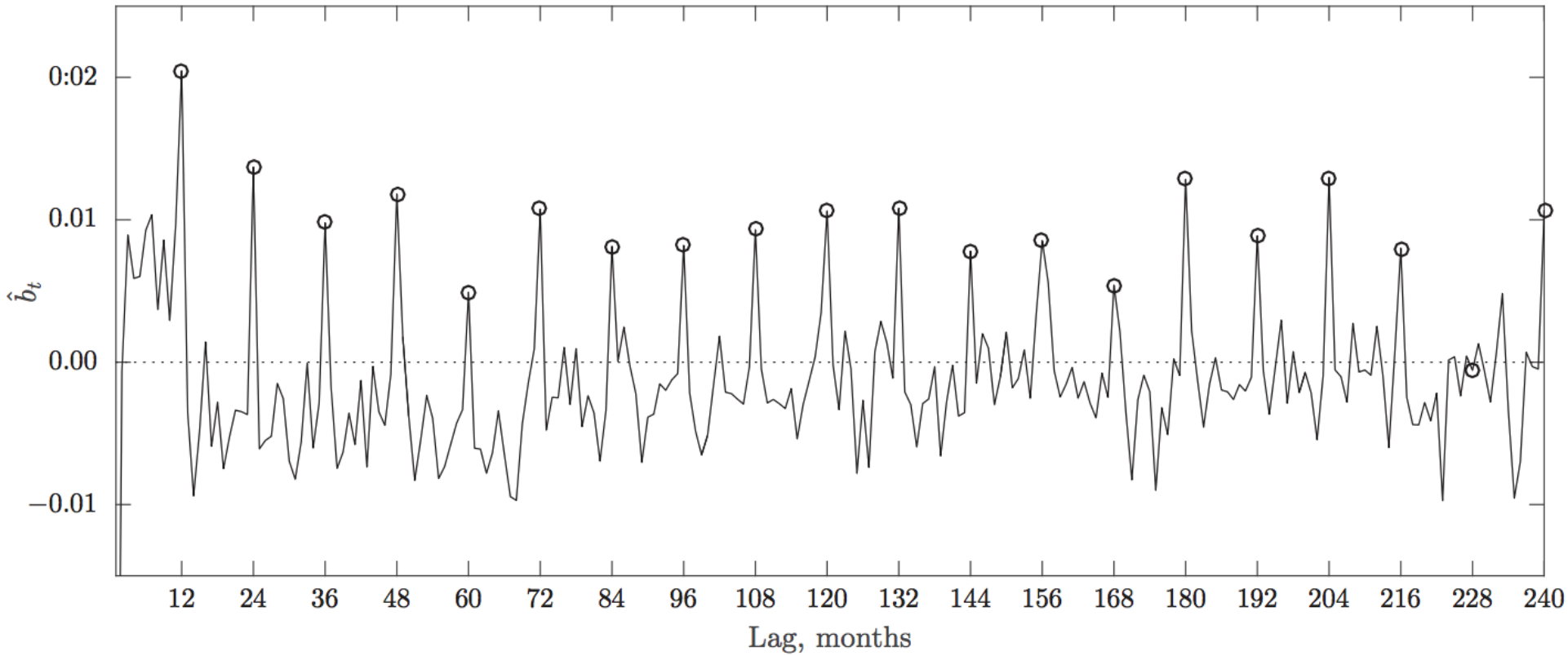
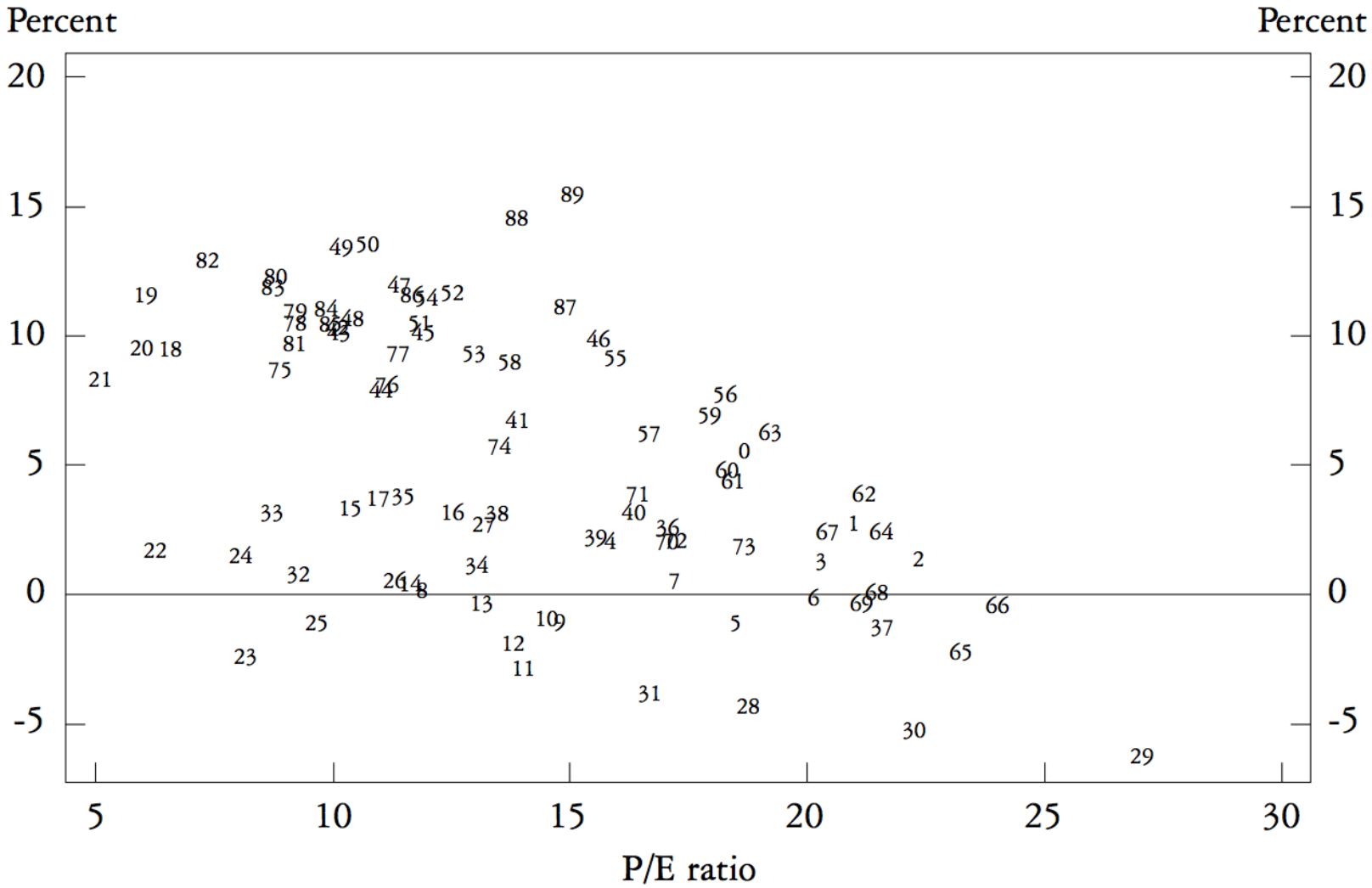


Figure 1. Seasonalities in individual stock returns. This figure plots slope coefficients from univariate Fama and MacBeth (1973) regressions of month t returns against month $t-k$ returns, $r_{i,t} = a_t + b_t\, r_{i,t-k} + e_{i,t}$, with k ranging from 1 to 240 months. The circles denote estimates at annual lags. The regressions use monthly data from January 1963 through December 2011 for NYSE, Amex, and NASDAQ stocks.

Chart 2

P/E RATIO AND STOCK PRICE GROWTH IN THE FOLLOWING 10 YEARS

Annual stock price growth



Examples (semi-strong)

- Da, Engelberg, and Gao (2010 and 2011) showed that it took time for markets to recognize value in new public information produced by Google trends
- Google search volume based on products predicted earnings better than both analyst forecasts and earnings announcement returns

- Search volume also proxied for retail investor interest:
  - An increase predicts higher stock prices in the next 2 weeks and an eventual price reversal within the year.
  - It also contributes to the large first-day return and long-run underperformance of IPO stocks.

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Examples (strong)

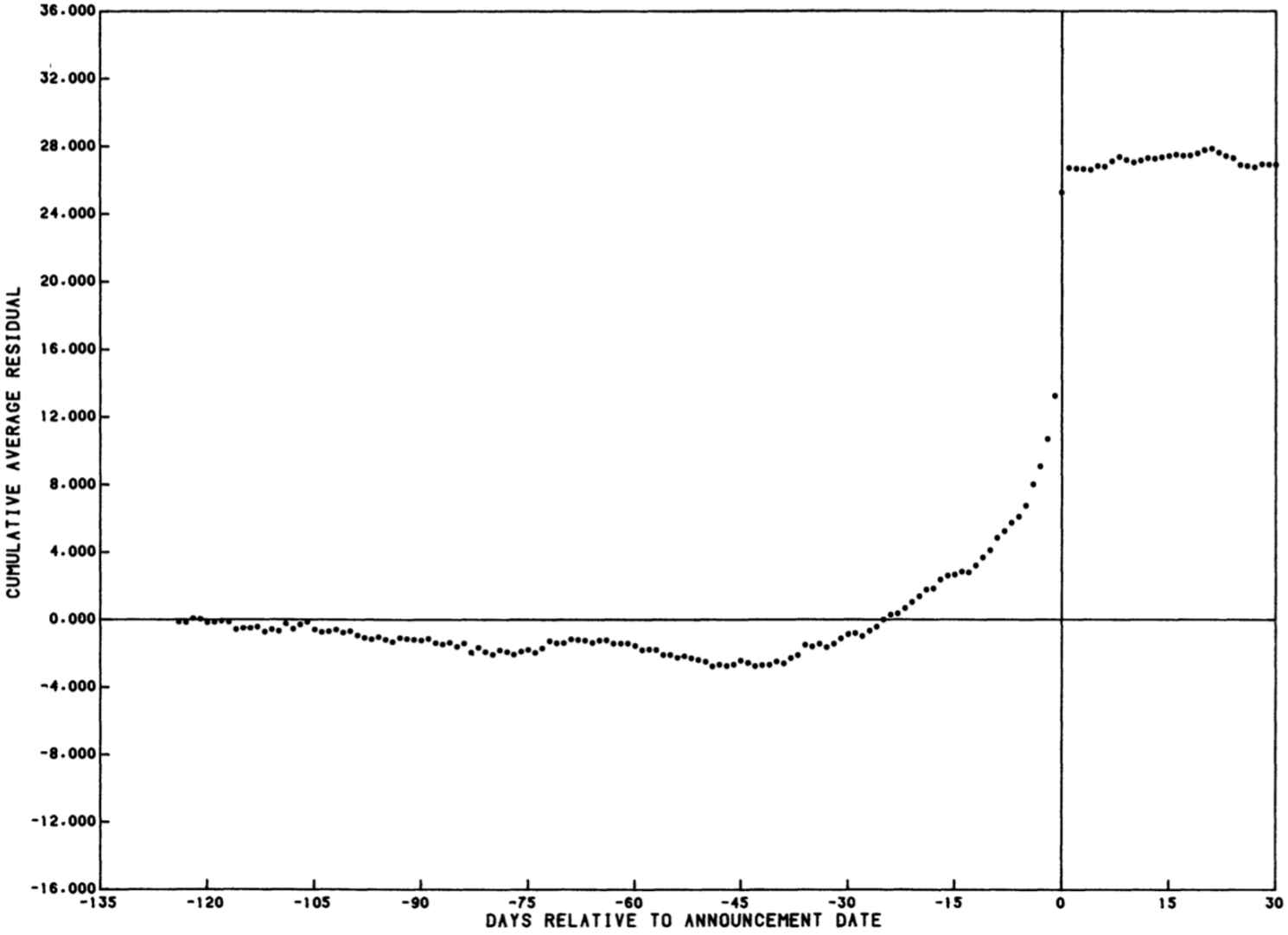

Figure 1. Cumulative Average Residuals–Market Model–Entire Sample

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The Behavioral Critique

- In contrast to the EMH, behavioral view suggests prices may be wrong
- Two departures from the EMH:
  1. Irrational investors
  2. Limits to arbitrage
- This leads to investors who make systematic errors in pricing securities, and ensures that attempts to exploit/correct mispricings are risky or costly

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The Behavioral Critique

- Let's begin with "investor irrationality"
- Some key ideas about how investors may behave irrationally
  - Overconfidence
  - Representativeness
  - Inattention

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Overconfidence

- Two types:
  1. Overprecision
     - People are too confident in the accuracy of their beliefs
     - 90% confidence intervals contain correct answers less than 50% of the time
  2. Overplacement
     - Overly rosy views of their abilities
     - In surveys, 90% believe themselves to be above the median on various dimensions

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Overconfidence: Applications

- View in finance research: excessive trading by individual (retail) investors
- Barber and Odean (2002) show male traders trade more and do worse
  - Psychological studies suggest men more prone to overconfidence

- Grinblatt and Keloharju (2009) combine trading data with psychological tests of overconfidence
  - Overconfidence linked to intensity of trading activity

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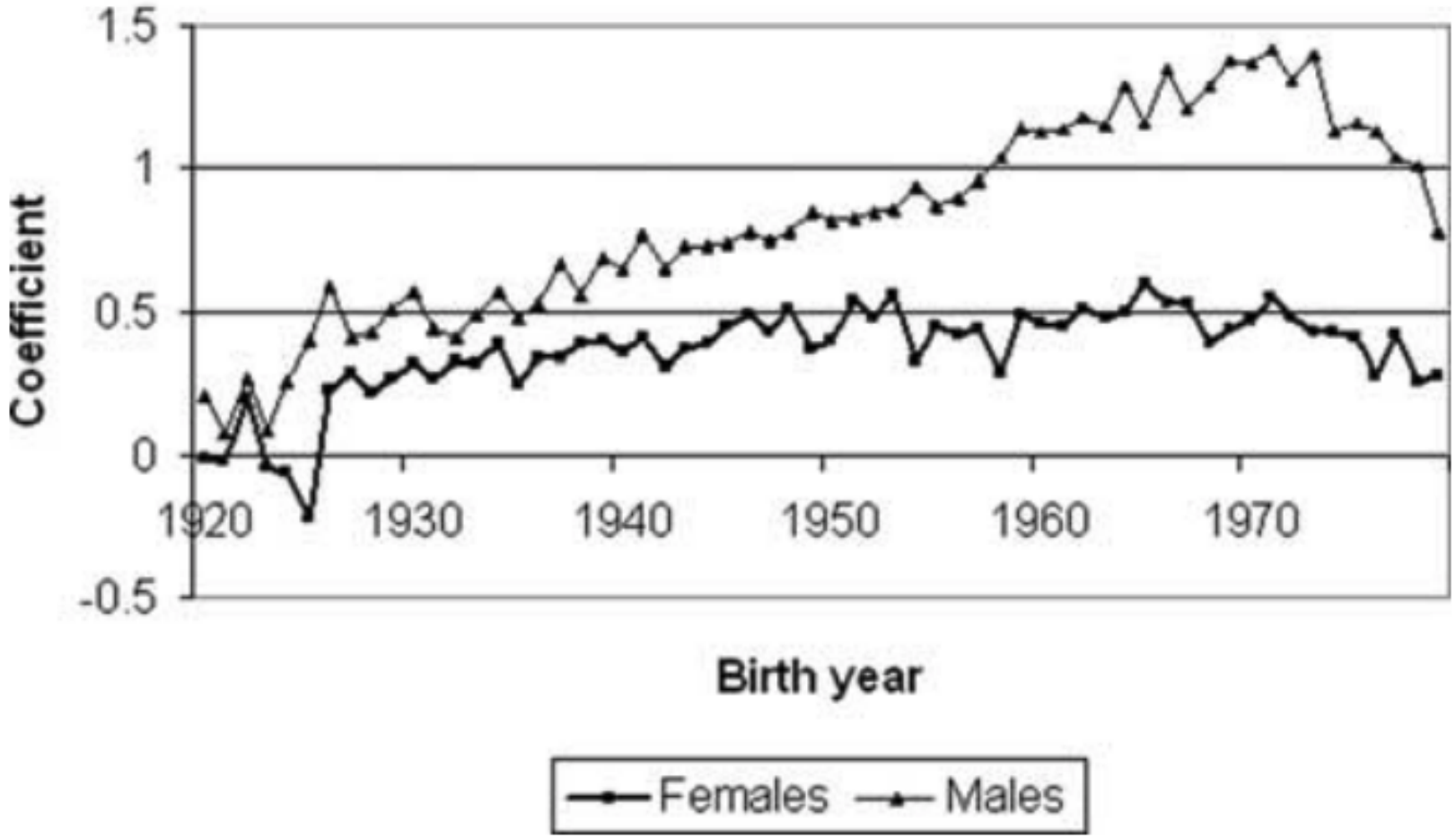
Panel B. Marginal Effects of Gender and Birth Year on Average Number of Trades with Effects of Control Variables Taken Out



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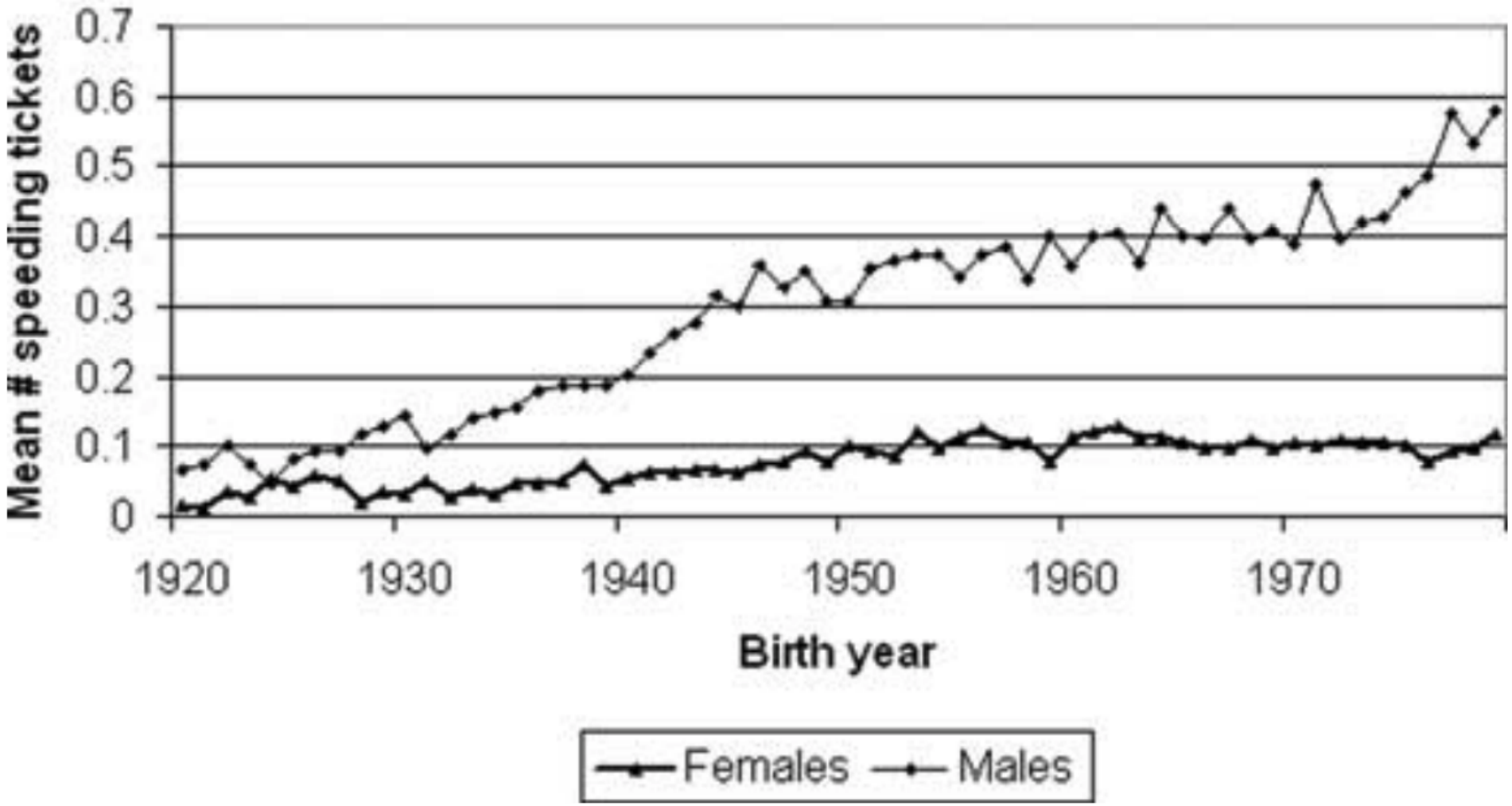
Panel C. Speeding Convictions as a Function of Gender and Birth Year



Representativeness

- People extrapolate past trends too far into the future
- Just because a firm has seen high growth for past five years does not necessarily mean it will continue

- In revising their beliefs, individuals tend to overweight recent information and underweight prior (or base rate) data.
  - "The predicted value is selected so that the standing of the case in the distribution of outcomes matches its standing in the distribution of impressions" (Kahnemann and Tversky)

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Representativeness: Applications

- Representativeness predicts long–run mean reversion in stock returns (De Bondt and Thaler (1985)):
- Exercise:
  1. Take a three year period and rank stocks on their performance over that period
  2. Form a “losers” (“winners”) portfolio of the 30 worst-performing (best-performing) stocks, and hold for three years
  3. Repeat process three years later
- Result: past winners do poorly, past losers rebound
  - Note: observe short term momentum, but long–run reversals

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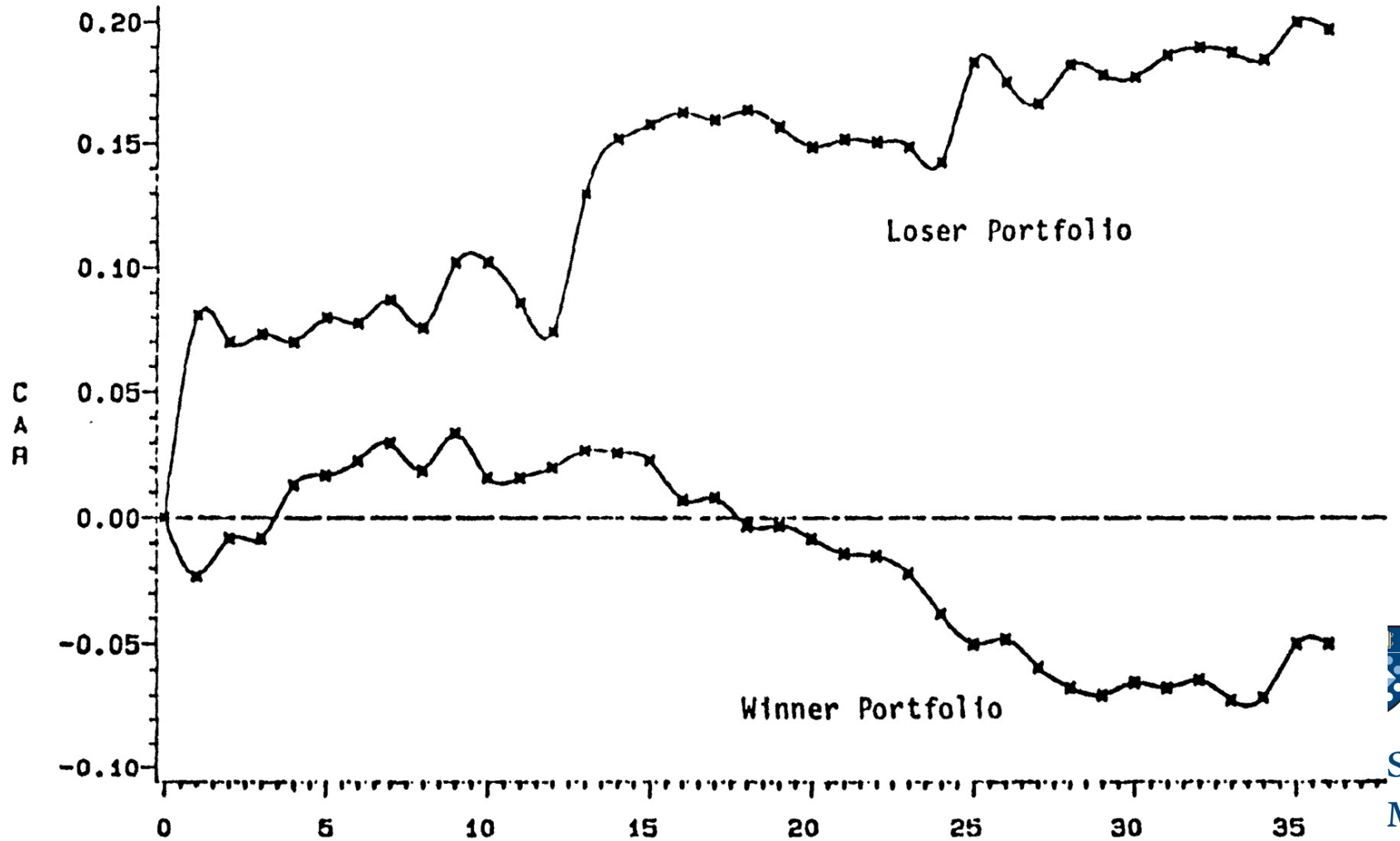
Average of 16 Three-Year Test Periods
Between January 1933 and December 1980
Length of Formation Period: Three Years



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Other examples of over-extrapolation

- Value premium may reflect over–extrapolation about future growth rates
- Low book–to–market firms priced based on expectations that recent growth will continue
- Growth stocks tend to disappoint in earnings announcements
- Earnings disappointments more severe for growth stocks

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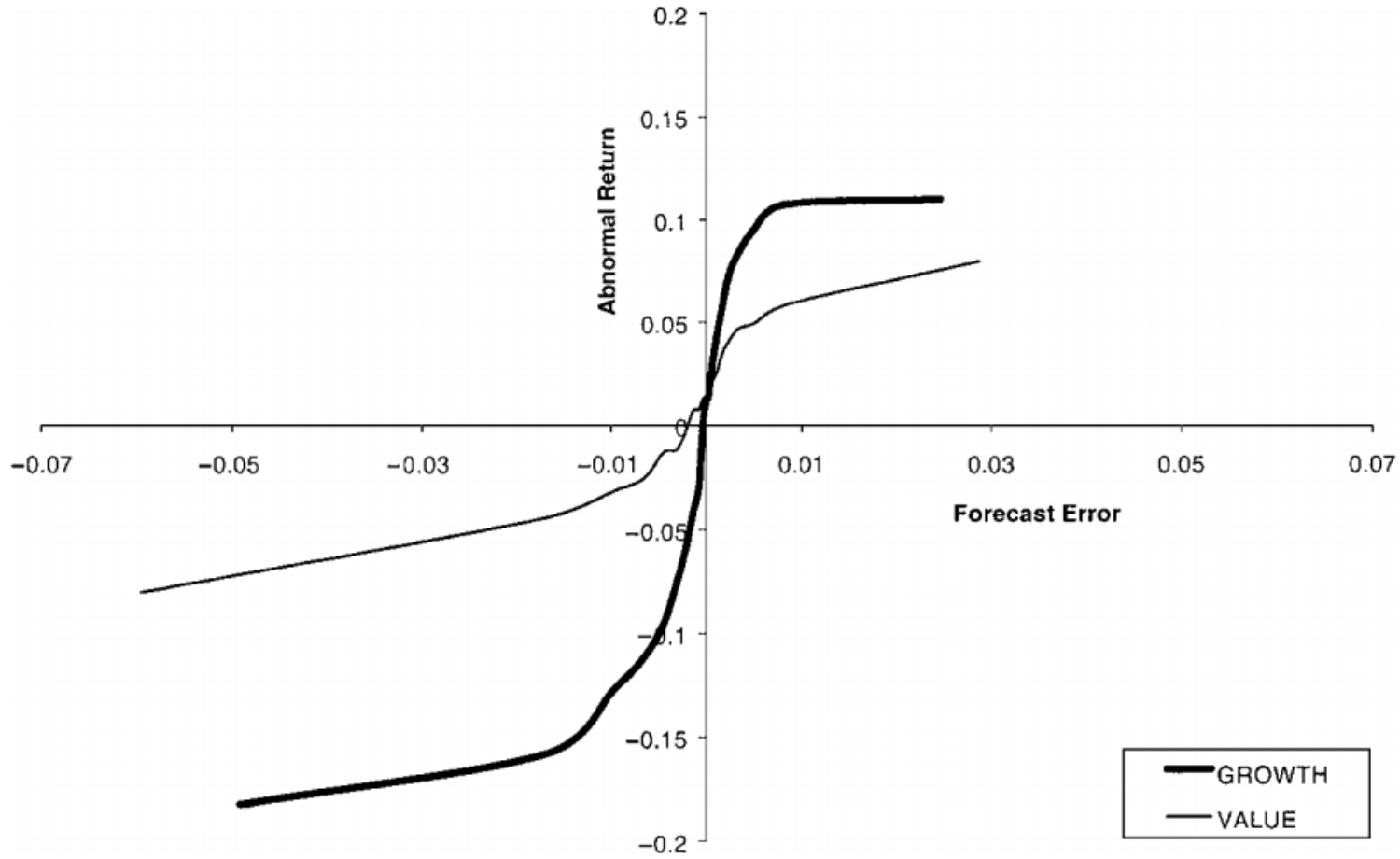

Figure 4. Earnings surprise response functions for value and growth stocks. This graph plots the quarterly abnormal returns for value and growth stocks respectively as a function of the magnitude of the quarterly earnings forecast error. Each plot is formed by dividing the stocks into 20 portfolios based on the magnitude of the forecast error, and then plotting the mean portfolio abnormal returns and forecast errors. The resulting points are joined using smoothed lines.

Inattention

- People have limited capacity for gathering and processing information
  - Application: Post–earnings announcement drift
  - After earnings surprises, returns drift for as long as 60 days
    - Larger for Friday announcements
    - Larger for firms announcing at same time as other firms
- See also Niessner (2014), Cohen Frazzini (2008)

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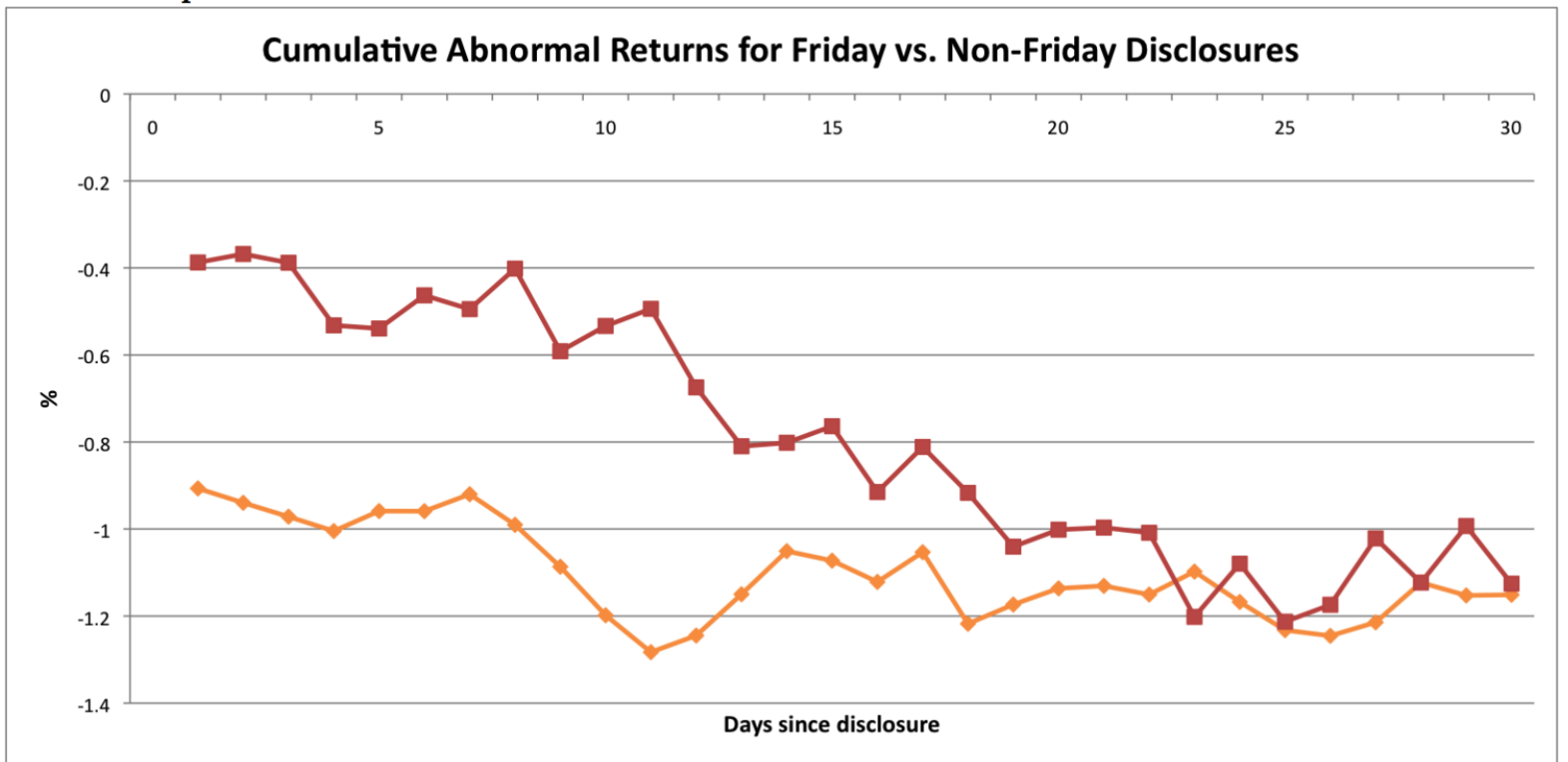
Niessner (2014)

Small Companies:



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Cohen Frazzini (2008)

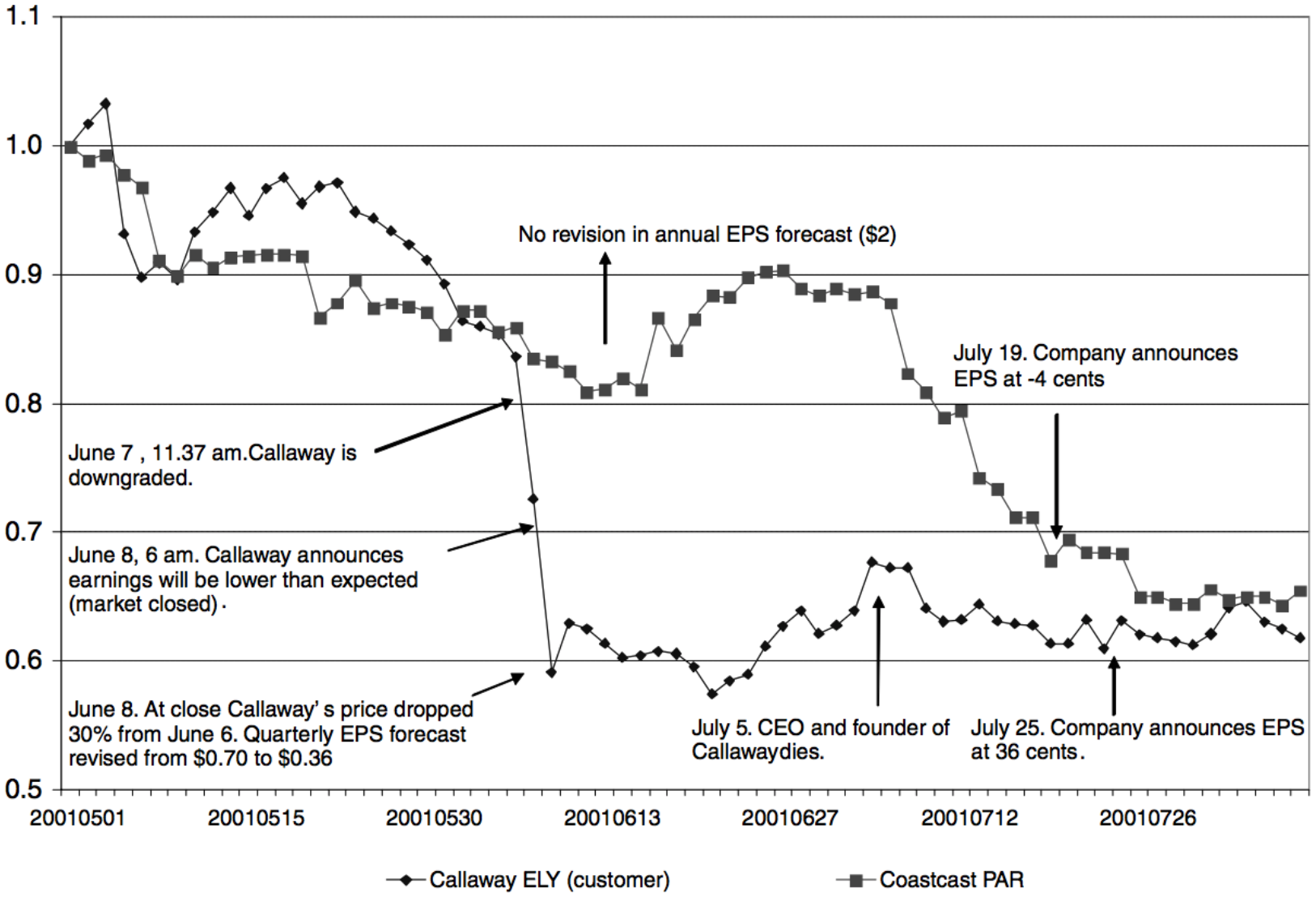

Figure 1. Coastcast Corporation and Callaway Golf Corporation. This figure plots the

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Question: Why don't "arbitrageurs" exploit mispricing?

- The second piece of the behavioral framework
  - "limits to arbitrage"
  - Recall our willingness to take active positions is driven by not just opportunity, but by the idiosyncratic risk associated with the reward
  - E.g. Treynor-black:

$$w_i^0 = \frac{\alpha_i/\sigma_i^2(\epsilon)}{\sum_j \alpha_j/\sigma_j^2(\epsilon)}$$

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Why don't "arbitrageurs" exploit mispricing?

- Royal Dutch and Shell Transport merge interests, but continue to trade separately in the Netherlands and the UK

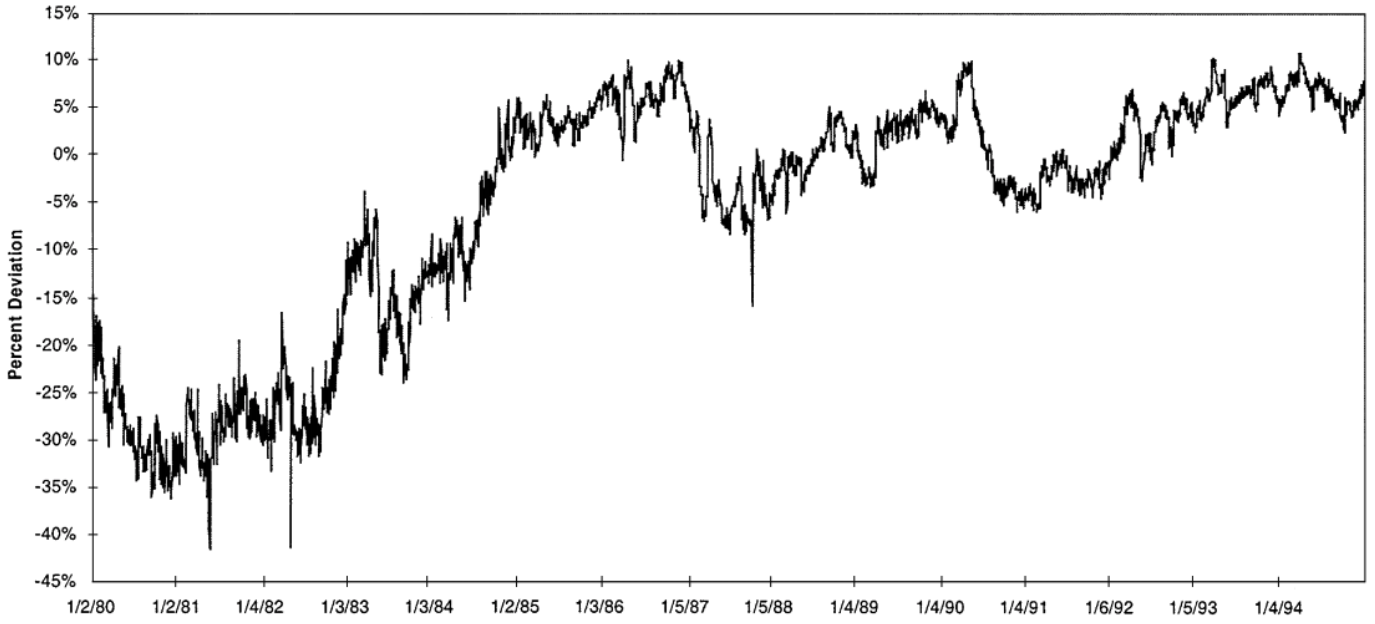

Fig. 1. Log deviations from Royal Dutch/Shell parity. Note: This figure shows on a percentage basis the deviations from theoretical parity of Royal Dutch and Shell shares and ADRs traded on the NYSE. Data are from the Center for Research in Security Pricing (CRSP).

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Behavioral Finance and the EMH

- Anomalies reflect a failure in the efficient markets / rational investor model
- Behavioral finance may provides answers, based on known biases from cognitive psychology

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