

The Worst, The Best, Ignoring All the Rest: The Rank Effect and Trading Behavior

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CHICAGO **BOOTH**



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Motivation

How do investors form and trade portfolios?

- Normative: Optimal portfolios
 - Combine many assets into portfolios e.g. mean/variance optimization [Markowitz 1952](#)
- Positive: Naïve approach to stock selection
 - Hold too few assets, under-diversified [Goetzmann and Kumar 2008](#)
 - Consider assets stock-by stock [Narrow Framing]:
 - Attention grabbing [Barber and Odean 2008](#)
 - Gain/loss [Odean 1998](#)
- What are investors *actually* doing in a portfolio setting?

Disagreement and the Portfolio

- Do investors evaluate a given stock differently based on what else is in their portfolio?
- Performance measured relative to other holdings in portfolio
 - Simplest way - ordering of returns in portfolio
- Potential source of disagreement and trade
 - Investors with the same stock respond differently to the same piece of information due to other holdings in their portfolio

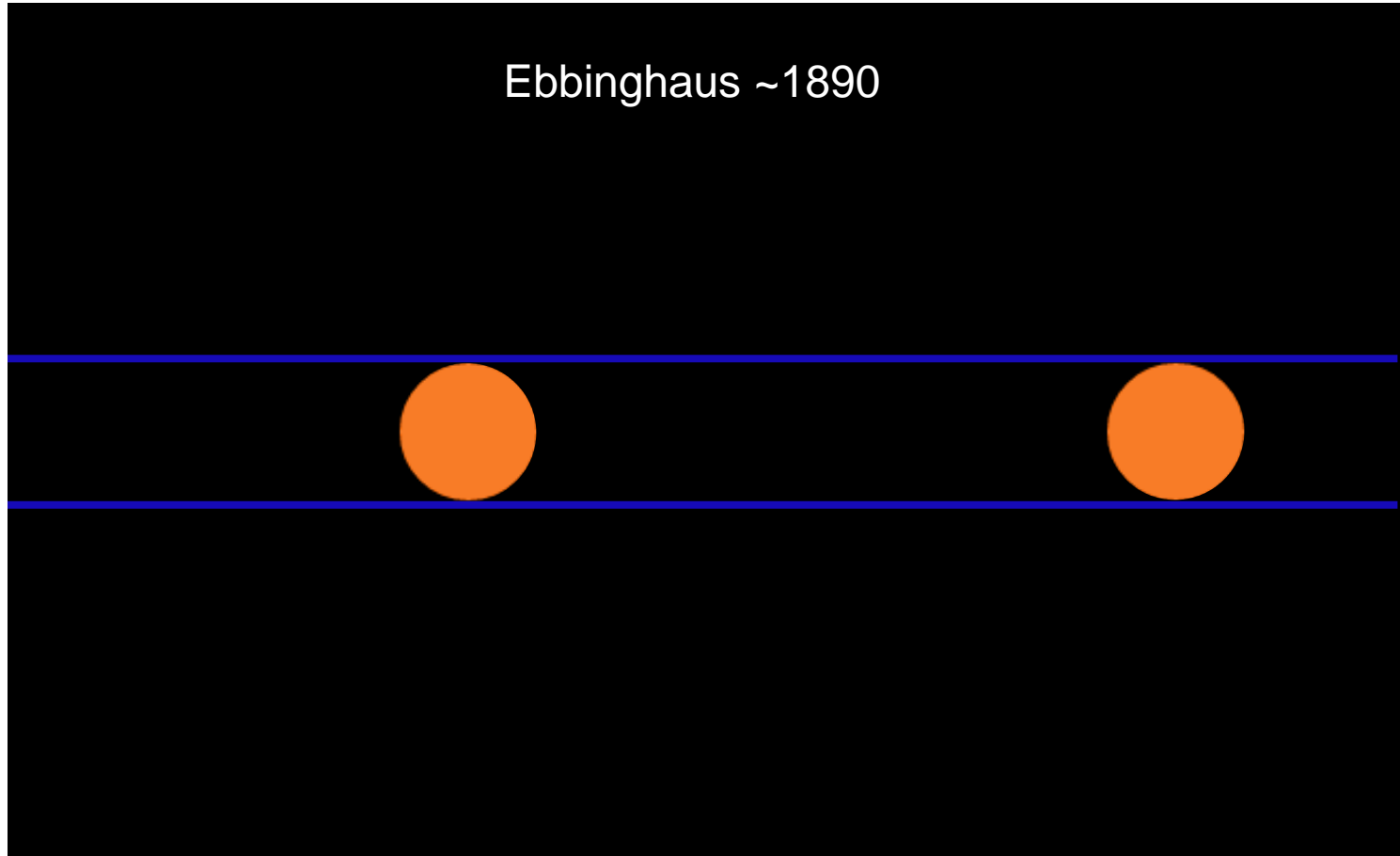
Relative Evaluation in the Portfolio

- Relative Evaluation: People judge attributes partially by comparing to nearby alternatives
 - Joint vs. Separate evaluation
 - Perceived differences heightened when options evaluated jointly
Hsee, Loewenstein, Blount and Bazerman 1999; List 2002
- What is the impact of relative evaluation in a portfolio?
 - Ordering - extreme positions receive the most attention
 - Individuals utilize rank in decision making *Diecidue and Wakker 2001*
 - Tendency to focus on extremes *Tversky and Kahneman 1992*
 - Relative size
 - Attributes can seem large or small based on nearby comparisons
Kahneman 2003

Relative Evaluation – In Pictures

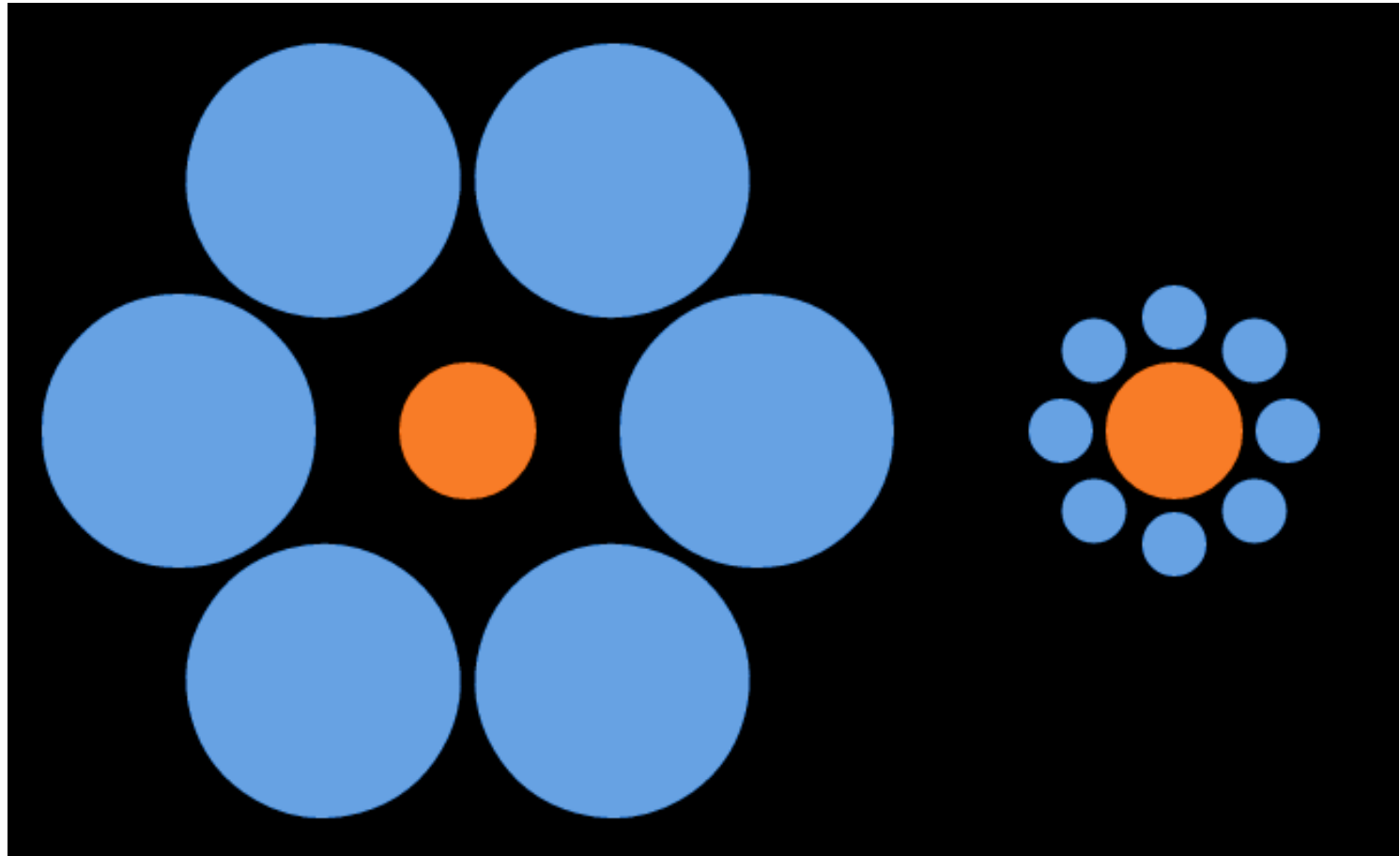
Which orange circle looks bigger?

They are exactly the same size



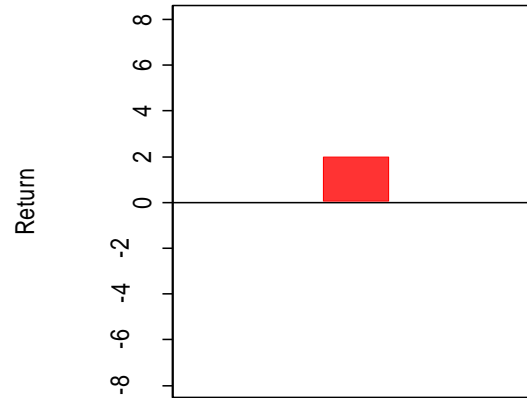
Relative Evaluation – In Pictures

Which orange circle looks bigger?



Relative Evaluation – In Portfolios

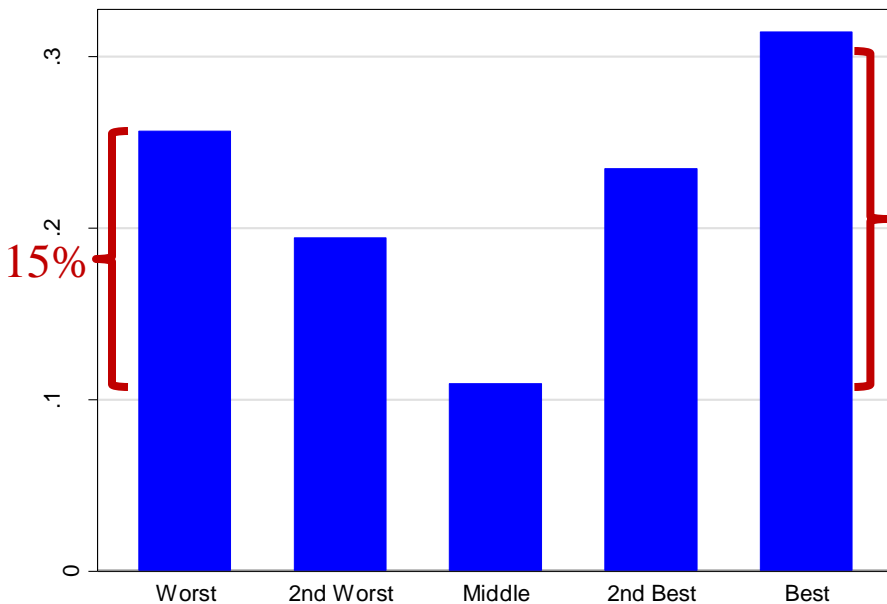
Buy?
Hold?
Sell?



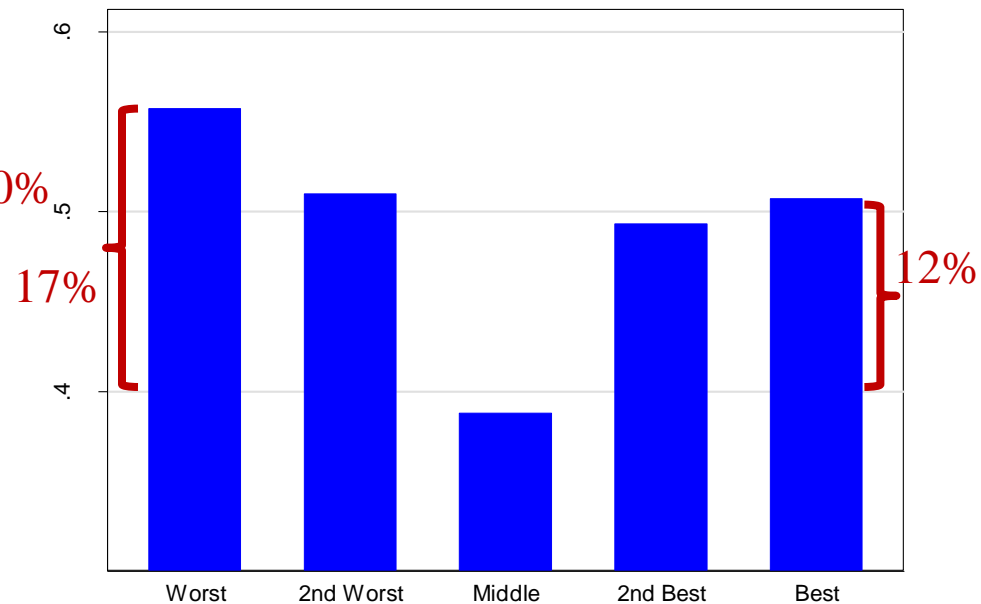
The Paper in Two Pictures

Probability of Sale with Controls

Individual Investor



Mutual Fund



This Paper

- The rank effect
 - New stylized fact
 - More likely to sell best and worst positions
 - Different sophistication levels: Individuals and Mutual Funds
- Relative performance within the portfolio
 - Rule out: Firm-specific information; Simple rebalancing; Performance since purchase; Tax based trade
- Salience of extreme positions for individual investors
- Economic impact of rank based selling by funds
 - Worst: 160 bp per month; Best 40 bp per month

Roadmap

1. Document the rank effect
 - Investors more likely to sell extreme ranked positions
2. Explanations
 - Firm-Specific Factors
 - Portfolio rebalancing, Information
 - Performance Since Purchase
 - Gain/Loss, Past returns
 - Tax
 - Saliency
 - What makes extreme positions salient?
3. Price Effects
4. Matching

Data

- Investors at large discount brokerage
 - January 1991 to November 1996
 - 10,619 accounts, 94,671 sell days, 1,051,160 observations
 - 12% sold, 9.6% liquidated
- Mutual Fund Reporting
 - 1990-2010
 - 15.6 million observations, 4,730 funds (WFICN)
 - 38.9% of holdings sold, 15.1% of holdings liquidated

Rank Effect [Univariate]

- Are investors more likely to sell extreme positions on days that they sell some asset?
 - Individual Investors
 - Day of sale
 - Hold 5 or more stocks
 - Mutual fund
 - Sale between report dates
 - Hold 20 or more stocks

$$\textit{Proportion Best Sold} = \frac{\textit{Best Sold}}{\textit{Best Sold} + \textit{Best Not Sold}}$$

$$\textit{Proportion Worst Sold} = \frac{\textit{Worst Sold}}{\textit{Worst Sold} + \textit{Worst Not Sold}}$$

Rank Effect [Univariate]

- How large is the effect?
 - Disposition Effect: $1.67\% = 0.575 * 0.029$
 - Rank Effect [univariate]: $2.23\% = 0.09 * (0.163 + 0.085)$
 - Rank Effect [with controls]: $3.17\% = 0.09 * (0.205 + 0.147)$

Worst-Middle	0.085 (15.20)	0.191 (20.97)
Best-Middle	0.163 (28.36)	0.119 (15.36)
Observations	1,053,065	15,604,501

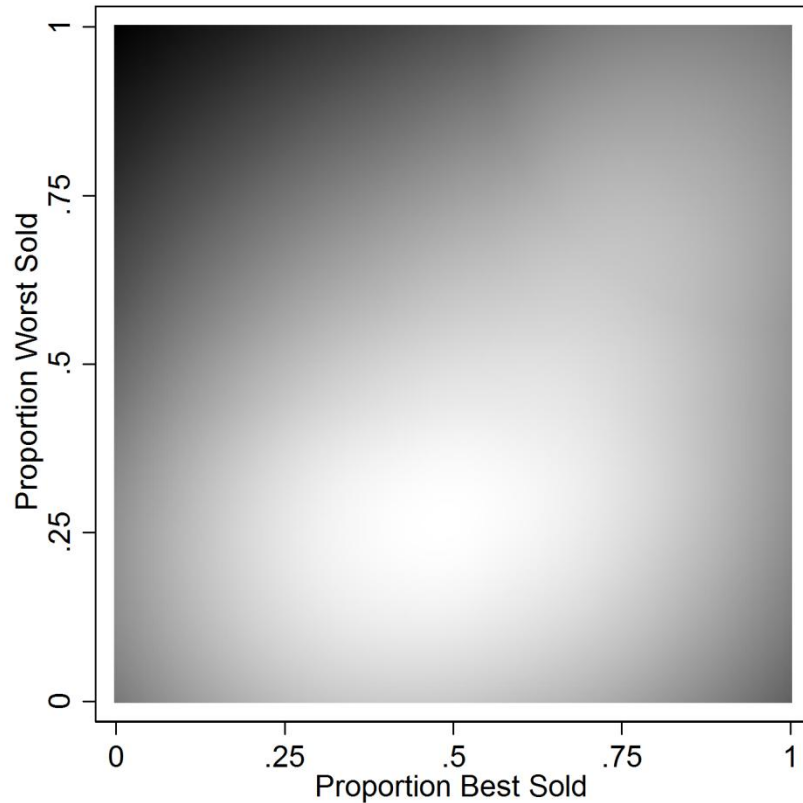
$$Best = \frac{Best\ Sold}{Best\ Sold + Best\ Not\ Sold}; Worst = \frac{Worst\ Sold}{Worst\ Sold + Worst\ Not\ Sold}$$

“Best or Worst” or “Best and Worst”?

- Are some traders selling only best (worst)?
 - Extrapolative beliefs
 - Buy best and sell worst
 - Mean reverting beliefs
 - Buy worst and sell best
- Or do traders sell best and worst?

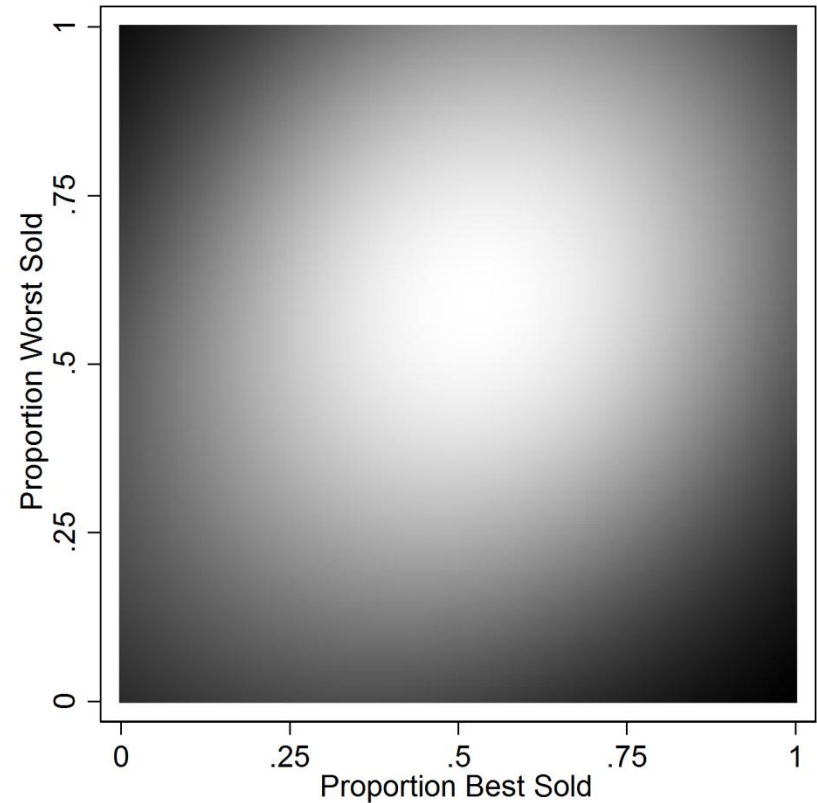
“Best or Worst” or “Best and Worst”?

Individual Investor



$$0.37 = \text{Corr}(\text{Best}_i, \text{Worst}_i)$$

Mutual Fund



$$0.41 = \text{Corr}(\text{Best}_i, \text{Worst}_i)$$

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Firm-Specific Factors

- Is it driven by simple rebalancing?
 - Selling worst ranked suggests not
 - Similar effect examining liquidations alone
- Is it driven by publicly available information?
 - Rational:
 - Update beliefs about means, variances, covariances
 - See appendix for explicit controls
 - Behavioral:
 - Attention grabbing characteristics
 - Recent returns, In the news

Same Stock on Same Day

- Same stock on day it is extreme ranked for one investor and not extreme ranked for another
 - Different rank, identical public information

$$Best - Not Best = \frac{1}{(\# Pairs)} \sum_{t=1}^T \sum_{j(t)=1}^{J(t)} (Sell_{j(t),t}^{Best} - Sell_{j(t),t}^{Not Best})$$

- Alternatively: Identify on this variation using stock by day fixed effects

$$sell_{it} = \beta_1(Best) + \beta_2(Worst) + \delta_{it}$$

Same Stock: Taking Differences

	Individual Investor	Mutual Fund
Best - Not Best	0.102 (20.77) 37,374	0.074 (25.45) 48,079
Worst - Not Worst	0.063 (16.94) 30,219	0.126 (30.64) 46,260

Same Stock: Stock by Day Fixed Effects

	<u>Individual Investor</u>	<u>Mutual Fund</u>
Best	0.094 (15.81)	0.075 (15.09)
Worst	0.064 (11.36)	0.125 (12.69)
Stock by Date FE	X	X
Observations	1,048,549	15,603,394
R ²	0.111	0.053

Same Stock, Sell Day and Holding Period

- Is it driven by public information over holding period?
 - Focus on information occurring while holding the stock
 - Rank influenced by holding period
- Examine same stock held for similar amount of time
 - On day it is extreme ranked for one investor and not extreme ranked for another
- Stock by day by holding period fixed effects
 - Decile of holding period for individual investors and funds
 - Exact match of report days for funds

$$sell_{it} = \beta_1(Best) + \beta_2(Worst) + \delta_{it}$$

Same Stock, Sell Day and Holding Period

Panel C: Stock by Day by Holding Period Fixed Effects

	Individual Investor	Mutual Fund	
Best	0.094 (8.15)	0.068 (10.93)	0.067 (11.77)
Worst	0.070 (5.91)	0.097 (12.12)	0.088 (10.23)
Stock x Date x Holding Period Decile	X	X	
Stock x Date x Purchase Date			X
Observations	1,048,549	15,603,394	15,603,394
R ²	0.275	0.085	0.101

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Trading on past performance

- Narrow frame on stock
 - For example: stock vs. portfolio Barberis and Huang 2001
 - Disposition effect theories
- Trade based on gain/loss
 - Disposition effect
 - Robust empirical finding: individual investors (Odean 1998, Feng and Seasholes (2005), Kaustia (2010)), mutual fund managers (Wermers (2003), Frazzini (2006)), futures traders (Locke and Mann (2005)) and prediction markets (Hartzmark and Solomon (2012))
- Trade based on magnitude of gain/loss
 - Ben-David and Hirshleifer (2012)

Magnitude of Gain/Loss

- Is it driven by trading on magnitude of returns?
- Ben-David and Hirshleifer (2012)
 - Size of gain and loss drives disposition effect

$$\begin{aligned} \text{sell} = & \beta_1(\text{Best}) + \beta_2(\text{Worst}) + \beta_3(2^{\text{nd}} \text{ Best}) + \beta_4(2^{\text{nd}} \text{ Worst}) \\ & + \gamma_1(\text{Return} * \text{Gain}) + \gamma_2(\text{Return} * \text{Loss}) + \gamma_3(\text{Gain}) \\ & + \gamma_4(\text{Return} * \text{Gain} * \sqrt{\text{Holding Days}}) \\ & + \gamma_5(\text{Return} * \text{Loss} * \sqrt{\text{Holding Days}}) + \gamma_6(\sqrt{\text{Holding Days}}) \\ & + \gamma_7(\text{Gain} * \text{Variance}) + \gamma_8(\text{Loss} * \text{Variance}) \end{aligned}$$

- Control for:
 - Gain/loss and size of gain or loss
 - Holding days and volatility

Rank Effect [Controls for Magnitude]

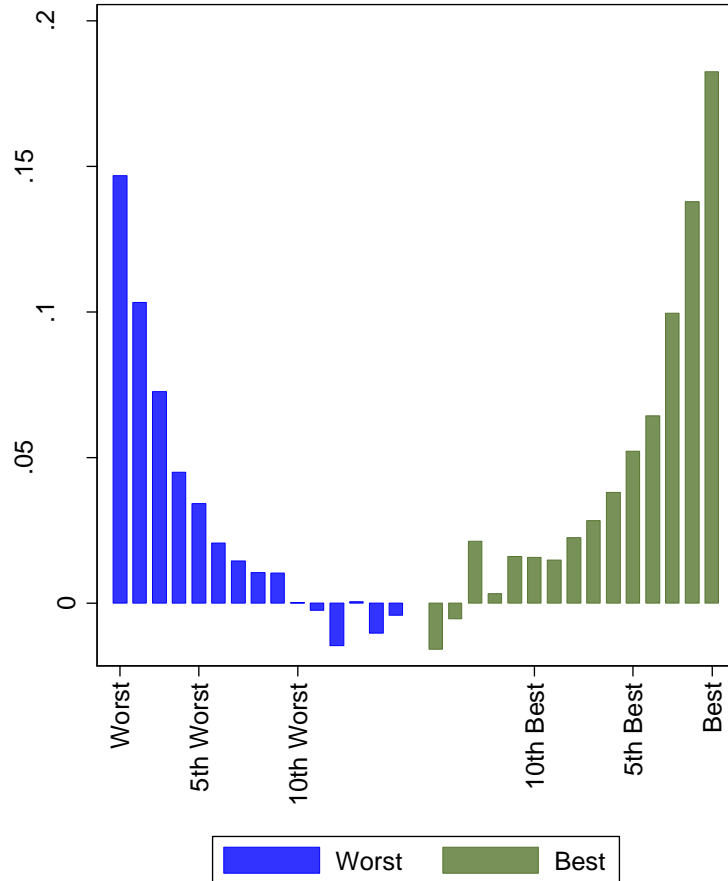
	Individual Investor			Mutual Fund		
	[1]	[2]	[3]	[4]	[5]	[6]
Best		0.157 (20.15)	0.205 (21.10)		0.109 (11.61)	0.119 (12.01)
Worst		0.107 (19.93)	0.147 (20.06)		0.163 (12.17)	0.169 (12.25)
2nd Best			0.125 (16.51)			0.105 (12.61)
2nd Worst			0.085 (14.37)			0.122 (10.40)
Return*Gain	0.045 (4.55)	-0.002 (-0.28)	-0.019 (-2.58)	0.034 (6.93)	0.024 (4.57)	0.017 (3.15)
Return*Loss	-0.155 (-7.47)	-0.036 (-1.84)	0.004 (0.19)	-0.272 (-12.39)	-0.242 (-11.21)	-0.222 (-10.27)
Gain	0.037 (9.60)	0.029 (8.31)	0.026 (8.00)	-0.013 (-3.92)	-0.014 (-4.24)	-0.014 (-4.29)
Observations	1,048,549	1,048,549	1,048,549	15,603,394	15,603,394	15,603,394
R ²	0.010	0.032	0.047	0.005	0.006	0.007

Beyond the most extreme ranks

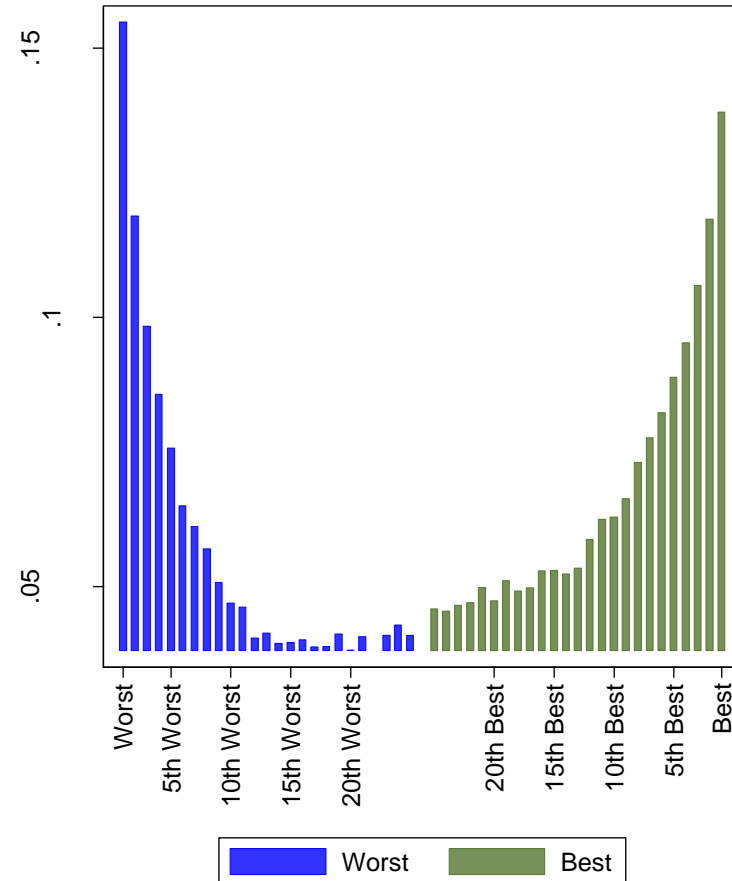
- Why focus on top two ranks?
 - Demonstrates relative evaluation in portfolio
 - Data limitations due to small portfolios
 - Psychology suggests this should be the largest effect
- Examine ranks beyond the top two
 - Effect should be largest for the most extreme ranks and be present (to a lesser extent) for less extreme
 - Regressions extending the rank dummies past two ranks

Beyond the most extreme ranks

Individual Investor

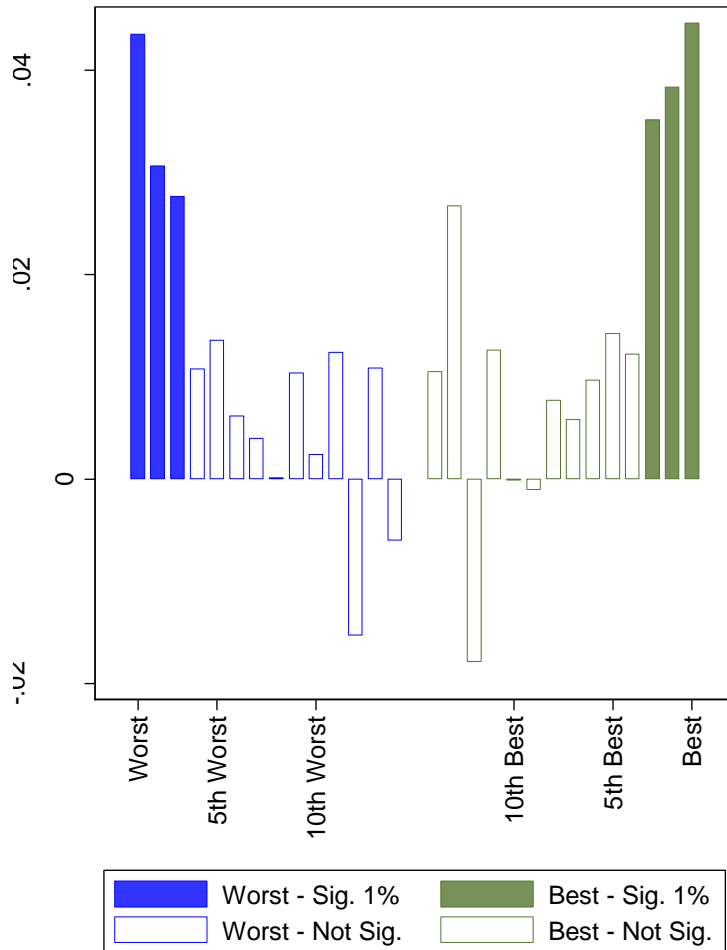


Mutual Fund

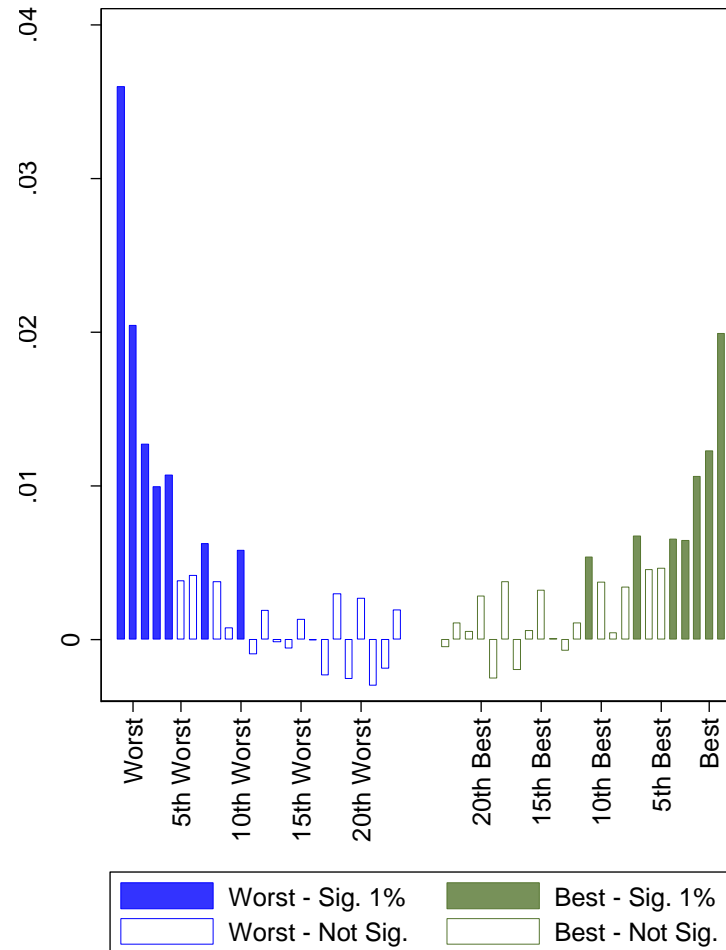


Rank Gradient

Individual Investor



Mutual Fund



Everything at a Gain or Loss

- Sample where each position is at a gain or loss
 - Rules out simple disposition effect
 - i.e. more likely to sell a gain than a loss
 - Rules out simple fixed cutoff strategy
 - Everything at a gain → worst ranked is above low cutoff
 - Everything at a loss → best ranked is below high cutoff
 - Rules out trade based on return level
 - Difficult for narrow framing theories
 - Need reference point based on portfolio
 - Ingersoll and Jin (2012)

Everything at a Gain or Loss

	All Gain	All Loss
Best	0.117 (8.31)	0.045 (2.09)
Worst	0.062 (5.29)	0.058 (3.10)
2nd Best	0.073 (7.19)	0.007 (0.41)
2nd Worst	0.040 (3.88)	0.025 (1.64)
Return	0.001 (0.04)	0.119 (1.35)
Observations	23,679	8,898
R ²	0.013	0.012

Controlling For it All Together

- Control for:
 - Firm-specific factors
 - Stock by day fixed effects
 - Performance since purchase
 - Returns, gain/loss, volatility, holding period
 - Add investor specific effects
 - Investor by day fixed effects

Individual Investor with Fixed Effects

	[1]	[2]	[3]
Best	0.141 (23.24)	0.118 (27.52)	0.079 (10.74)
Worst	0.104 (17.83)	0.060 (14.45)	0.051 (6.80)
2nd Best	0.092 (19.16)	0.057 (21.63)	0.044 (7.82)
2nd Worst	0.058 (12.70)	0.019 (7.45)	0.014 (2.59)
Return*Gain	-0.050 (-4.58)	0.013 (1.78)	-0.017 (-1.26)
Return*Loss	0.183 (5.30)	-0.032 (-1.40)	0.089 (1.94)
Gain	0.037 (8.20)	0.031 (7.99)	0.045 (7.58)
Additional Controls	X	X	X
Stock x Date FE	X		X
Account x Date FE		X	X
Observations	1,048,549	1,048,549	1,048,549
R ²	0.677	0.128	0.769

Mutual Fund with Fixed Effects

	[1]	[2]	[3]
Best	0.094 (11.69)	0.041 (10.46)	0.037 (10.97)
Worst	0.123 (12.25)	0.110 (21.45)	0.077 (17.22)
2nd Best	0.080 (12.51)	0.039 (14.26)	0.034 (13.38)
2nd Worst	0.088 (10.78)	0.073 (18.86)	0.051 (15.20)
Return*Gain	0.005 (1.05)	0.034 (10.34)	0.029 (9.51)
Return*Loss	-0.160 (-5.11)	-0.226 (-12.72)	-0.143 (-11.56)
Gain	-0.016 (-6.15)	-0.007 (-3.78)	-0.009 (-6.29)
Additional Controls	X	X	X
Stock x Date FE	X		X
Account x Date FE		X	X
Observations	15,603,394	15,603,394	15,603,394
R ²	0.108	0.326	0.389

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Tax

- Tax motivations can impact profitability of realizing gains or losses
- Capital gains or losses in a tax year
 - Realized net gain for portfolio in tax year
 - Realizing losses decreases tax
- 22% of accounts are tax deferred
 - Lack this incentive
- Examine taxable and tax deferred accounts separately

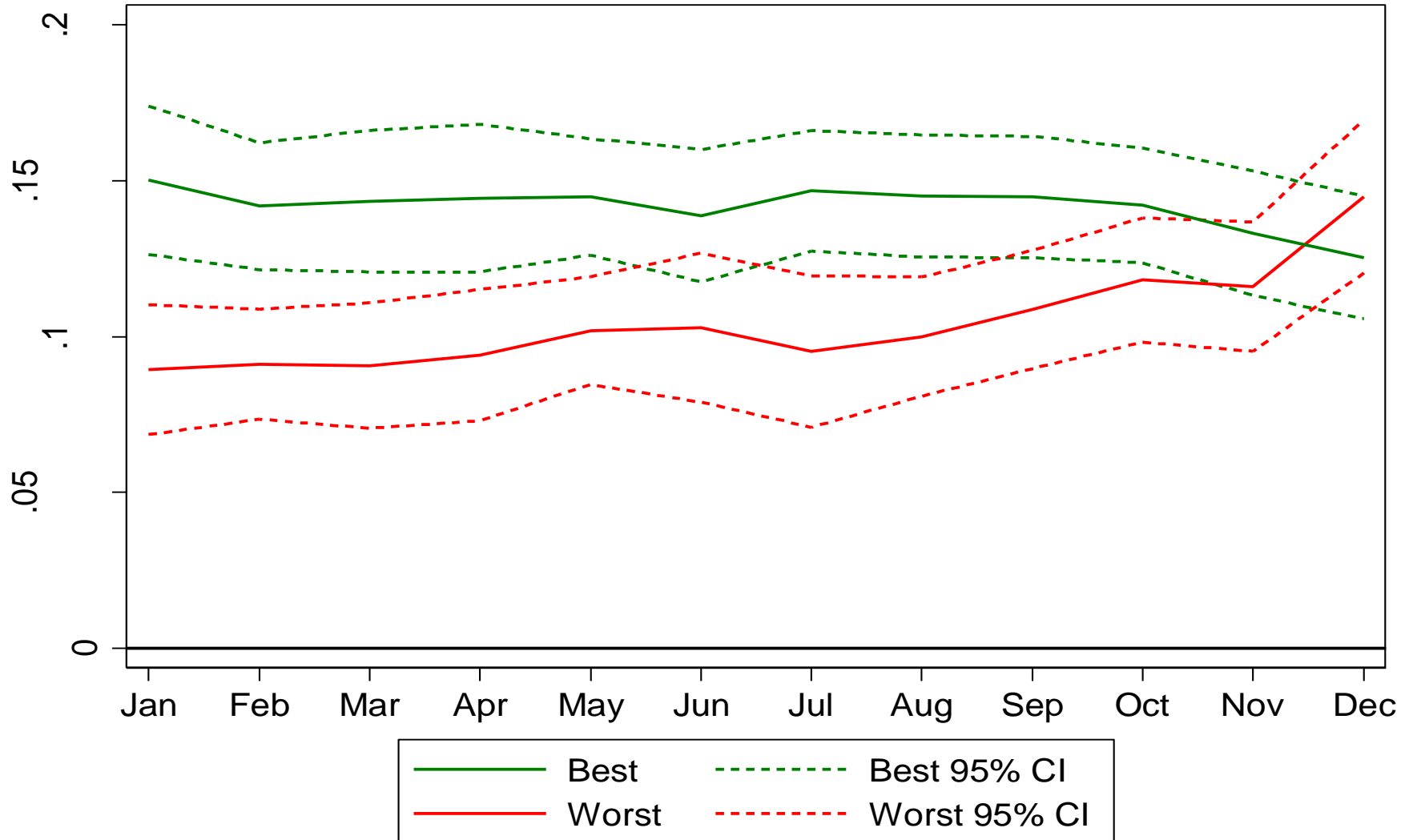
Tax

	Deferred Tax Account	Taxable Account
	[1]	[2]
Best	0.194 (17.16)	0.205 (17.90)
Worst	0.141 (12.90)	0.147 (17.42)
2nd Best	0.124 (20.29)	0.125 (13.72)
2nd Worst	0.084 (13.03)	0.083 (12.04)
Return*Gain	-0.001 (-0.04)	-0.027 (-3.43)
Return*Loss	-0.038 (-0.65)	0.015 (0.84)
Gain	0.026 (4.63)	0.025 (6.66)
Additional Controls	X	X
Observations	225,770	808,442
R ²	0.039	0.049

Tax

- End of year tax selling
 - Incentives to sell losses not constant throughout the year
 - Analyze each month separately

Tax



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Salience

- Investors are more likely to trade attention grabbing stocks [Barber and Odean 2008](#)
- Portfolio specific saliience predictions
 1. Saliience predicts both buys and sells more likely
 2. Ordering
 - Rank induces saliience [Tversky and Kahneman 1992](#)
 3. Relative Performance
 - Difference from average induces saliience [Bordalo, Shleifer and Gennaioli 2012](#)
 - Difference from next closest return induces saliience [Payne 1976](#)
 4. Interactions with other salient attributes

Buying

	Summary	Regression	
	Statistics	[2]	[3]
	[1]		
Best	0.006 (2.20)	0.017 (6.24)	0.022 (6.51)
Worst	0.038 (13.91)	0.021 (9.80)	0.030 (9.57)
2nd Best	0.009 (3.37)		0.017 (6.27)
2nd Worst	0.032 (12.22)		0.022 (8.42)
Return*Gain		-0.015 (-5.61)	-0.017 (-6.46)
Return*Loss		-0.062 (-7.35)	-0.051 (-6.20)
Gain		-0.010 (-8.87)	-0.009 (-7.98)
Observations		1,440,981	1,440,981
R ²		0.041	0.046

Alternative Ordering

- Alternative salient ordering
 - Salient, portfolio specific, orthogonal to economic variables
 - Order of positions when viewed together
 - Alphabetical by company name
- Clean test that rank *can* have psychological effect
 - Underscores salience of extremes and joint evaluation within portfolio
 - Behavioral and rational trading models do not include
- Control for firm-specific probability of sale
 - Company name by day fixed effect

Alphabetical Order

Selling			
Last and Second			
	First and Second	to Last	All Names
	Name Only	Name Only	All Names
	[1]	[2]	[3]
First Name	0.026 (3.80)		0.061 (10.69)
Last Name		0.029 (3.52)	0.061 (11.02)
Stock x Date FE	X	X	X
Observations	185,253	185,145	1,016,954
Buying			
	[4]	[5]	[6]
First Name	0.008 (2.31)		0.017 (6.43)
Last Name		0.008 (2.22)	0.017 (6.53)
Stock x Date FE	X	X	X
Observations	237,293	237,200	1,396,848

Rank Interacting with other salient factors

- Other factors make a position salient
 - Portfolio Specific: Alphabetical order, Portfolio Share
 - Market-wide: Extreme recent return, Extreme Volume
 - Barber and Odean 2008
- Rank should interact with other salient characteristics
 - Example: A position that is best ranked AND first name in a portfolio should be more likely to be traded than:
 - Best Ranked Only
 - First Name Only

Rank Interacting with other salient factors

$$\begin{aligned} \text{sell} = & \beta_1(\text{Best} * \text{First}) + \beta_2(\text{Best}) + \beta_3(\text{First}) \\ & + \gamma_1(\text{Other Interactions}) + \gamma_2(\text{Other Controls}) \end{aligned}$$

- Test that best ranked AND first name more likely to be sold than best ranked only:
 - $\beta_1 > \beta_2$
- Test that best ranked AND first name more likely to be sold than first name only:
 - $\beta_1 > \beta_3$
- Test predictions for other salience inducing characteristics

Rank and Alphabetical Order

Panel A: Alphabetical Order

[1]: Best Rank & First Name	0.182 (14.51)	[4]: Worst Rank & First Name	0.129 (10.33)	[6]: Best Rank & Last Name	0.180 (13.72)	[8]: Worst Rank & Last Name	0.135 (11.76)
[2]: Best Rank & Middle Name	0.131 (20.52)	[5]: Worst Rank & Middle Name	0.098 (15.74)				
[3]: Middle Rank & First Name	0.034 (6.62)			[7]: Middle Rank & Last Name	0.041 (7.59)		
Test: [1]=[2]	0.0000	Test: [4]=[5]	0.0022	Test: [6]=[2]	0.0000	Test: [8]=[5]	0.0001
Test: [1]=[3]	0.0000	Test: [4]=[3]	0.0000	Test: [6]=[7]	0.0000	Test: [8]=[7]	0.0000

- Similar effect examining positions with large portfolio shares

Rank and Extreme Returns

[1]: Best Rank & Extreme Return	0.277 (33.30)	[4]: Worst Rank & Extreme Return	0.146 (24.79)
[2]: Best Rank & Regular Return	0.166 (29.12)	[5]: Worst Rank & Regular Return	0.111 (27.39)
[3]: Middle Rank & Extreme Return	0.038 (14.95)		
Test: [1]=[2]	0.0000	Test: [4]=[5]	0.0000
Test: [1]=[3]	0.0000	Test: [4]=[3]	0.0000

- Similar effect examining high volume

Rank and the Decision to Pay Any Attention

- Before assessing rank an investor must look at the portfolio
- Salience literature examining how many people are paying attention to the market
 - Ex. Fewer people pay attention to the market on a Friday
Dellavigna and Pollet 2009
- Rank only matters once an investor glances at a portfolio
- Rank should be treated the same on a Friday as other days of the week
 - Even if fewer investors are paying attention to the market

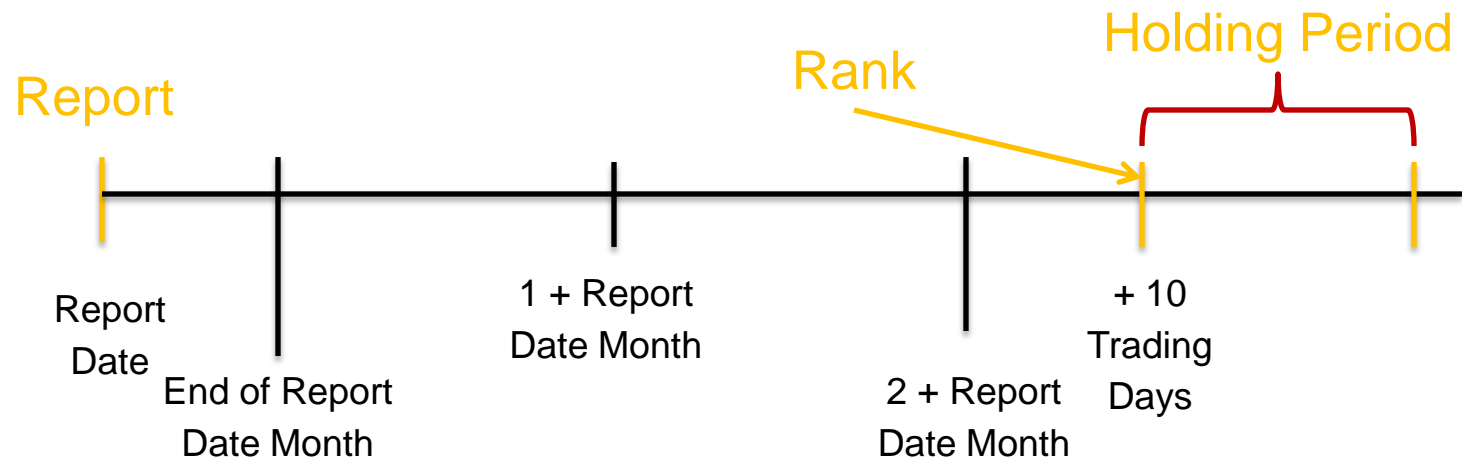
Rank and Friday

[1]: Best Rank & Friday	0.177 (25.36)	[4]: Worst Rank & Friday	0.105 (14.66)
[2]: Best Rank & Not Friday	0.175 (29.40)	[5]: Worst Rank & Not Friday	0.112 (25.29)
[3]: Middle Rank & Friday	-0.001 (-0.79)		
Test: [1]=[2]	0.5609	Test: [4]=[5]	0.3258
Test: [1]=[3]	0.0000	Test: [4]=[3]	0.0000

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Does rank based trade impact returns?



- Funds sell best and worst more heavily, especially worst
 - Worst **23.7%** more likely to be liquidated than middle sold position
- Reports public within 71 days **Schwarz and Potter (2012)**
- Predict excess selling of best and worst ranked positions
 - High returns as prices revert
- Long stocks ranked worst (best) in at least one fund

Price Effect Predictions

	Momentum	Reversal	Rank
Best Portfolio	Positive Return	Negative Return	Positive Return
Worst Portfolio	Negative Return	Positive Return	Positive Return

Price Effects

	Worst				Best			
α (%)	0.669 (1.65)	0.407 (1.10)	1.366 (4.96)	1.612 (5.11)	0.355 (1.90)	0.448 (2.69)	0.199 (1.26)	0.357 (1.98)
MKT	1.741 (21.09)	1.629 (20.06)	1.234 (19.15)	1.252 (19.18)	1.074 (28.22)	0.958 (26.20)	1.061 (28.78)	1.073 (28.75)
SMB		0.833 (6.66)	0.895 (9.89)	0.900 (9.97)		0.306 (5.43)	0.290 (5.59)	0.293 (5.67)
HML		0.594 (5.14)	0.108 (1.21)	0.088 (0.98)		-0.234 (-4.49)	-0.108 (-2.10)	-0.121 (-2.34)
UMD			-0.846 (-14.89)	-0.865 (-14.94)			0.220 (6.76)	0.208 (6.27)
ST_REV				-0.102 (-1.58)				-0.066 (-1.77)

Price Effects: Weighting

	Worst				Best			
	Number of Funds where Stock is Ranked Worst		Fraction of Marketcap That is Worst		Number of Funds where Stock is Ranked Best		Fraction of Marketcap That is Best	
α (%)	1.816 (4.57)	1.632 (3.57)	2.110 (4.10)	2.223 (3.75)	0.330 (1.39)	0.646 (2.39)	0.209 (1.22)	0.418 (2.15)
MKT	1.170 (12.58)	1.156 (12.22)	1.280 (10.63)	1.288 (10.51)	1.182 (21.29)	1.205 (21.57)	1.121 (28.06)	1.136 (28.21)
SMB	0.877 (6.71)	0.874 (6.68)	1.391 (8.22)	1.393 (8.21)	0.228 (2.93)	0.234 (3.02)	0.174 (3.09)	0.177 (3.18)
HML	0.097 (0.75)	0.112 (0.86)	0.509 (3.03)	0.500 (2.94)	-0.164 (-2.11)	-0.189 (-2.44)	-0.204 (-3.66)	-0.221 (-3.96)
UMD	-1.096 (-13.37)	-1.082 (-12.89)	-1.015 (-9.56)	-1.024 (-9.41)	0.337 (6.89)	0.313 (6.31)	0.269 (7.65)	0.253 (7.09)
ST_REV		0.077 (0.82)		-0.047 (-0.39)		-0.131 (-2.37)		-0.087 (-2.18)

Price Effects: Fama-Macbeth

	[1]	[2]	[3]	[3 cont]
Best	0.065 (0.30)	0.253 (2.04)	0.257 (2.22)	High Volume 0.353 (4.57)
Worst	0.843 (2.16)	0.743 (2.64)	0.941 (3.82)	Low Volume -0.503 (-6.72)
Momentum		0.290 (1.32)	0.270 (1.28)	Earnings 0.574 (7.45)
Lag Return		-1.846 (-3.08)	-2.063 (-3.53)	Predicted Dividend 0.217 (2.44)
Log(Market Cap)		-0.107 (-1.79)	-0.162 (-3.59)	Idiosyncratic Volatility -4.740 (-0.89)
Log(Book/Market)		0.141 (1.29)	0.067 (0.74)	Share Issuance -1.267 (-5.65)
Constant	1.106 (2.85)	2.328 (2.46)	3.032 (4.46)	
Observations	722,157	658,662	631,518	

Roadmap

1. Document the rank effect
 - Investors more likely to sell extreme ranked positions
2. Explanations
 - Firm-Specific Factors
 - Portfolio rebalancing, Information
 - Performance Since Purchase
 - Gain/Loss, Past returns
 - Tax
 - Salience
 - What makes extreme positions salient?
3. Price Effects
4. Matching

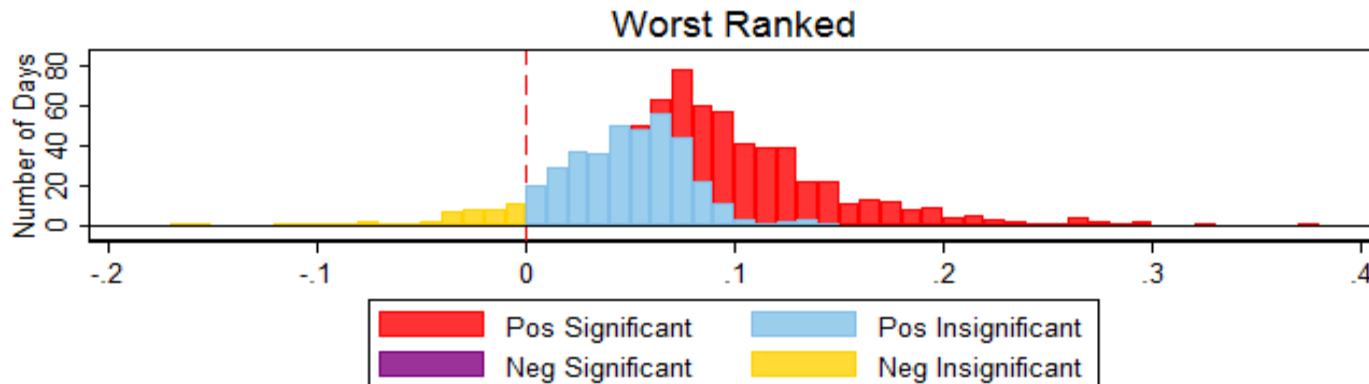
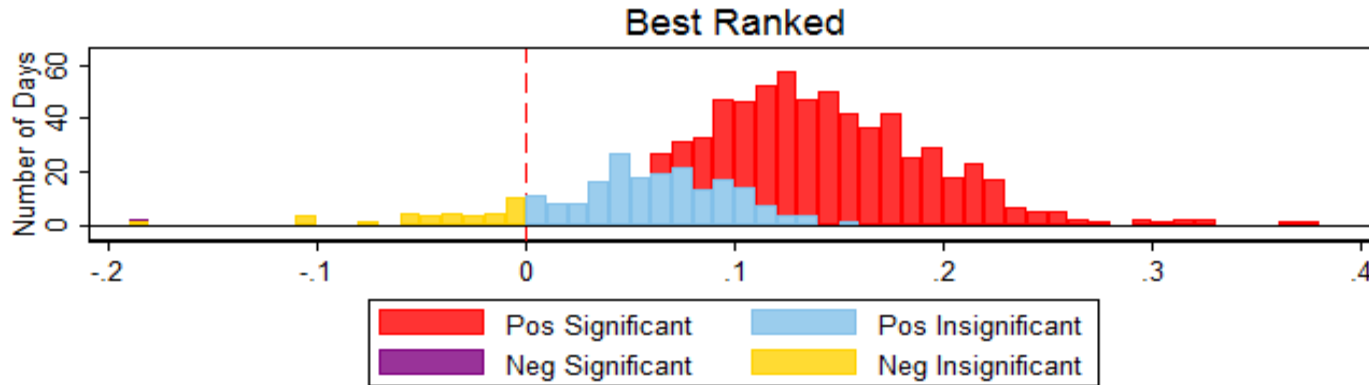
Entropy Balancing

- Does lack of covariate balance influence result?
 - Entropy balancing [Hainmueller \(2012\)](#)
 - Directly match on covariates
 - Return, variance, $\sqrt{\text{holding days}}$, $\text{return} * (\sqrt{\text{holding days}})$
 - Weights minimize change from original s.t. matching moments

$$\min_{w_i} \sum w_i \log(w_i / q_i)$$

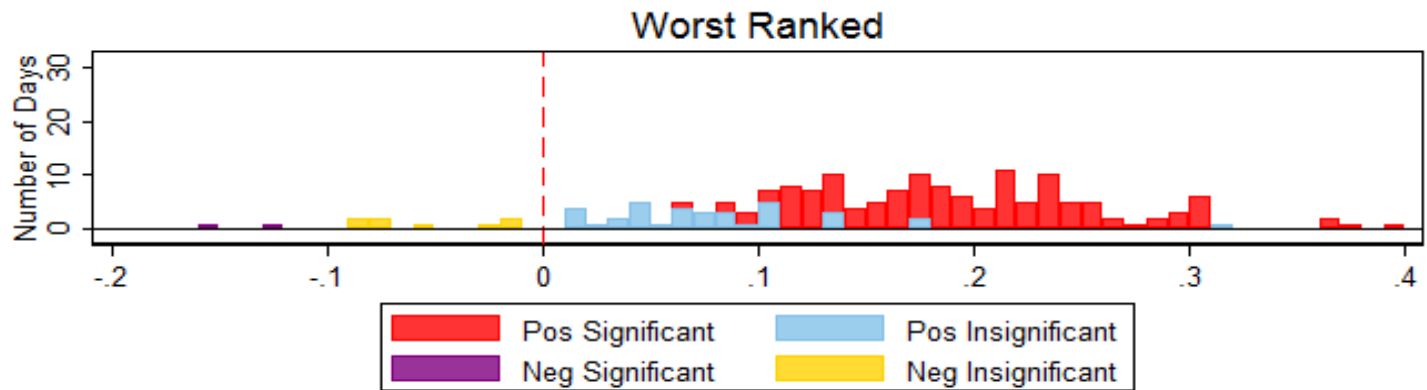
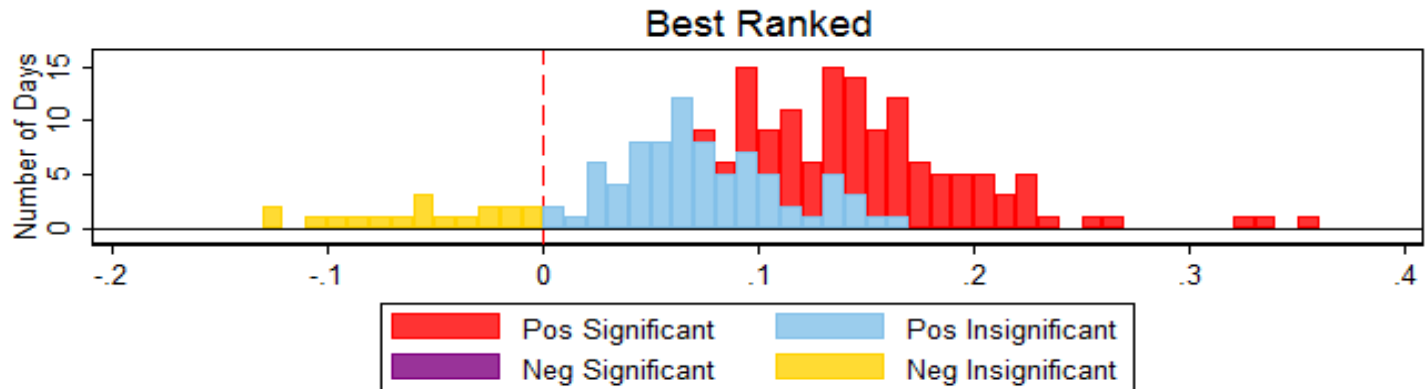
- Improvement over using estimated probability of treatment
- Treatment: Best or Worst
- Control: Not Best or Not Worst

Entropy: Individual Investors



	Entropy			Entropy	
	Unweighted	Balanced		Unweighted	Balanced
Best - Not Best	0.120 (19.74)	0.128 (21.36)	Worst - Not Worst	0.059 (9.15)	0.084 (18.85)

Entropy: Mutual Fund



	Unweighted	Entropy Balanced		Unweighted	Entropy Balanced
Best - Not Best	0.116	0.116	Worst - Not Worst	0.188	0.165
	(15.12)	(12.40)		(20.74)	(10.03)

Conclusion

- The Rank Effect
 - Individual investor: 20% best and 15% worst
 - Mutual Fund: 12% best and 17% worst
 - Evaluation of stock depends on what else investor holds
- Induces a significant anomaly
 - 160 worst and 40 best b.p. per month
- Narrow framing theories of trade are incomplete
- Portfolio-Specific Saliience
 - What is considered is important for trade