Taming the Bias Zoo

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The Bias "Zoo"

- Behavioral finance has made significant advancement over the last few decades

  – by offering sharp insights on a wide range of anomalies in financial markets

- A byproduct: multiple behavioral biases for each single anomaly

- The large set of behavioral biases we face is not satisfying

  – unlikely that all the biases are equally important

  – possible that certain biases would be subsumed by others

- To eventually arrive at a unified conceptual framework, it is important to consolidate the multiple explanations for each anomaly

Example: Excessive Trading Puzzle

- The puzzle: retail investors appear to be trading too much (Odean 1999; Barber and Odean 2000)
    1. before fees: return lower than the market index
    2. transaction cost makes performance even worse
    3. those who trade the most often perform the worst

- Many behavioral explanations have been proposed
    - overconfidence
    - realization utility
    - gambling preference
    - sensation seeking
    - social interaction
    - …
    - as well as various rational explanations

- Facing this myriad of explanations, we need to narrow down to the few that are most important

Challenges of Consolidation

- Many existing explanations, by design, share similar predictions on the targeted anomaly
  - may offer different predictions, but the power is constrained by the availability of observational data
  - it is even harder to run horse races among multiple explanations

- Recent literature has turned to survey-based approaches
  - elicit investors' own perspectives on the drivers of their investment decisions (e.g., Choi and Robertson 2020, and Chinco, Hartzmark and Sussman 2021)
  - advantages:
    - collect information for many mechanisms quickly
    - permit horse races among different explanations
  - concerns:
    - respondents may not truthfully report their answers
    - survey responses may not translate into real actions
    - question-specific biases may distort the relative importance among different biases

This Paper

- Adopt a new approach to consolidate the bias zoo: combining surveys with transactions
  - overcome the challenges faced by existing approaches
  - illustrate this approach using the excessive trading puzzle as an example

- A nation-wide survey among Chinese retail investors
  - more than 10,000 individuals randomized across provinces, brokerages, and branches
  - questions designed to measure an exhaustive list of trading motives

- Merge survey responses with account-level transaction data at the Shenzhen Stock Exchange
  - survey responses are largely consistent with trading behavior (e.g., gambling preference → buy lottery-like stocks)
  - justification to the use of surveys

- Two sets of exercises
  - a **horse race** among survey-based measures of trading motives
  - a **comparison** between survey-based and transaction-based measures

Main Findings

- Two trading motives stand out : *gambling preferences* and *perceived information advantage*

  – gambling preference: 21%; perceived information advantage: 24% (s.d. of turnover is 126%)

- Additional evidence further supports these two trading motives

  – gambling preference: trade smaller, high-beta, more volatile, and more positively skewed stocks

  – information advantage: no better returns → *overconfidence* about information advantage

- Certain explanations are indeed subsumed by others

  – e.g., sensation seeking is significant in univariate regressions, but not in multivariate regressions

- For a given bias with multiple forms, they don't have the same explanatory power

  – e.g., out of the three forms of overconfidence, overconfidence about having information advantage works well while miscalibration of uncertainty works poorly

Main Findings, cont'd

- We construct an alternative measure for gambling preference based on transactions
  - called "gambling *behavior*"—measured by the propensity to buy lotterylike stocks
  - *more* powerful in explaining turnover, but *correlated* with other trading motives

- A tradeoff between survey-based and transaction-based approaches
  - survey-based approach:
    - pros: a direct measure for each trading motive; allow for horse races
    - cons: subject to measurement noise at the individual level and are thus less powerful

  - transaction-based approach:
    - pros: more powerful in explaining trading volume
    - cons: simultaneously capture multiple trading motives; less reliable in isolating a single mechanism

The Survey

- Investor Education Center at the Shenzhen Stock Exchange (SZSE)
    - time: September 2018
    - randomized across branches of China's 10 largest brokers
    - 500 branches in total, each with a target size of 20 investors

- To boost response rate
    - logos of SZSE and Shenzhen Finance Institute
    - confidentiality agreement
    - monetary rewards

- Four parts
    1. Financial literacy
    2. Trading motives
    3. Demographics
    4. "Nudge" experiment: see the paper

More on Part 2: Trading Motives

- For each motive, we phrase the questions to map closely to the underlying concept
    - by going back to the original paper proposing that particular motive

- A motive may have different forms of representation
    - in such cases, we include at least one question for each form

- To ensure the quality of survey responses, we design all questions to be multiple-choice
    - qualitative questions
        - statement: "strongly agree", "agree", "neutral", "disagree", and "strongly disagree"
        - frequency: "always", "often", "sometimes", "rarely", and "never"
    - quantitative questions
        - each option covers a fixed range of value

- To facilitate the horse race, we encode all survey-based trading motives to dummy variables

Overview of Survey-based Trading Motives

Trading Motive	Measures
Overconfidence	• over-placement (performance and financial literacy) • mis-calibration of uncertainty
Neglect of trading cost	• underestimation of transaction fee • frequency of considering cost • lack of consideration for bid-ask spread
Gambling preference	• with probability weighting • without probability weighting
Sensation seeking	• novelty seeking • volatility seeking
Realization utility	• selling winners • holding losers
Extrapolation	• upward trend • downward trend
Information	• belief in having information advantage (*overconfidence* about own information) • fear for having information disadvantage (*dismissiveness* of others' information)
Social interaction	• family and friends • investment advisors
Others	liquidity needs, portfolio rebalancing needs, risk aversion, optimism/pessimism

Sample Characteristics

- Initial sample size: 12,856
    - drop obs. who spent < 3 min on the survey → 11,268

Gender	Survey	Population
Male	54.00%	71.70%
Female	46.00%	28.30%

Education	Survey	Population
Middle School or below	8.60%	7.30%
High School	15.60%	24.70%
Professional School	21.90%	26.00%
College	44.90%	23.60%
Graduate school and above	9.20%	3.40%

Age	Survey	Population
20 to 30	27.80%	21.30%
30 to 40	29.10%	27.40%
40 to 50	19.90%	24.50%
50 to 60	14.80%	15.10%
>60	8.50%	11.70%

Annual Income	Survey
<20K	3.80%
20K to 100K	17.20%
100K to 200K	29.50%
200K to 500K	29.50%
500K to 1M	12.60%
>1M to 2M	7.50%

Wealth	Survey
<20K	4.80%
20K to 100K	12.30%
100K to 500K	27.50%
500K to 1M	22.30%
1M to 2M	21.90%
2M to 10M	6.50%
10M and above	4.80%

- Bottom-line: a relatively well-educated, wealthy sample

Merging Survey Responses with Trading Data

- Merging process
  - demographic variables: name, date of birth, broker name, and branch name
  - sample size: 11,268 → 6,013
  - positive stock holding in the two-year window before the survey: 6,013 → 4,671

- Summary statistics in the post-survey period (2018:10 to 2019:06)

Panel A: Summary Statistics (monthly)						Panel B: Correlation Matrix		
	P25	Median	P75	Mean	S.D.		Turnover	Raw returns	Net returns
Turnover	12.1%	**46.6%**	121.6%	**94.20%**	**125.70%**	Turnover	1		
Raw returns	-1.8%	0.3%	2.2%	**-0.10%**	3.80%	Raw returns	**-0.07*****	1	
Net returns	-2.1%	0.1%	2.0%	**-0.30%**	3.80%	Net returns	**-0.16*****	0.99***	1

Validation: Gambling Preference

- Gambling *behavior*
    - measured as the tendency to buy lottery-like stocks
    - lottery-like: proxied by the number of upper price limit hits in the previous month

	Gambling Behavior (2018:01 to 2019:06)	
Gambling preference, with prob. weighting	0.112***	0.109***
	(3.875)	(3.768)
Male		-0.034
		(-1.164)
Controls	NO	YES
R2	0.004	0.023
N	4,145	4,145

    - results are robust to alternative specifications
- other validation tests
    - extrapolation, risk aversion, and return expectations

A Horse-race Among Various Trading Motives

Monthly Turnover in % (2018:10 to 2019:06)

	Univariate	Multivariate		Univariate	Multivariate
Actual performance in 2017	4.104***	4.198***	Realization utility, winner	7.188*	7.049*
	(5.332)	(5.219)		(1.874)	(1.848)
Over-placement, performance	15.695***	11.549**	Realization utility, loser	0.409	-2.321
	(2.760)	(2.063)		(0.093)	(-0.538)
Financial literacy score	11.922***	7.065*	Sensation seeking, novelty	10.184**	6.598
	(3.127)	(1.800)		(2.270)	(1.360)
Over-placement, financial literacy	1.729	-2.621	Sensation seeking, volatility	11.984***	3.632
	(0.400)	(-0.625)		(2.885)	(0.824)
Miscalibration	1.116	-2.989	Perceived information advantage	21.747***	15.660***
	(0.289)	(-0.764)		(4.254)	(2.988)
Underestimation of transaction cost	-3.549	-3.989	Dismissive of others' information	4.778	2.942
	(-0.980)	(-1.071)		(1.318)	(0.805)
Do not consider transaction cost	-2.143	-4.029	Affected by family and friends	-15.647***	-7.839
	(-0.548)	(-1.052)		(-3.317)	(-1.616)
Do not think bid-ask spread is a cost	-15.135***	-9.456***	Affected by investment advisors	-16.469**	-12.089*
	(-4.254)	(-2.650)		(-2.708)	(-1.943)
Extrapolation, up	4.379	-1.255			
	(1.110)	(-0.254)	Controls		YES
Extrapolation, down	3.810	-1.208			
	(1.005)	(-0.262)			
Gambling preference, with prob. weighting	10.924***	11.764***	Male		21.488***
	(2.878)	(2.920)			(6.124)
Gambling preference, without prob. weighting	2.750	-1.159	R2		0.089
	(0.684)	(-0.263)	N		4,648

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Gambling Preference: Magnitude

I aim to select those stocks whose prices would rise sharply in a short period time so that I can get rich quickly

Gambling preference	P10	P25	P75	P90	Median	Mean		Median	Mean
	Panel A: Monthly Turnover (2018:10 to 2019:06)							Panel B: Monthly Raw Returns (2018:10 to 2019:06)	
1. Strongly disagree	0%	4%	99%	206%	25%	74%		0.19%	0.15%
2. Disagree	0%	3%	100%	222%	31%	77%		0.00%	0.04%
3. Neutral	0%	5%	112%	238%	33%	84%		0.01%	0.11%
4. Agree	0%	7%	117%	248%	42%	90%		0.03%	-0.04%
5. Strongly agree	0%	5%	119%	274%	42%	95%		0.00%	-0.20%
DIFF (5−1)	0%	0%	20%	68%	17%**	21%**		-0.19%	-0.35%
Annual transaction fee	0.00%	0.00%	0.60%	1.96%	0.51%	0.63%	Net returns	0.00%	-0.40%

- trading behavior
  - trade smaller, high-beta, more volatile, and more positively skewed stocks

Information Advantage: Magnitude

How often do you believe that you know the stocks better than others?

Information Advantage	P10	P25	P75	P90	Median	Mean		Median	Mean
		Panel A: Monthly Turnover						Panel B: Monthly Raw Returns	
		(2018:10 to 2019:06)						(2018:10 to 2019:06)	
1. Never	0%	4%	102%	232%	30%	76%		0.10%	0.12%
2. Rarely	0%	3%	100%	218%	32%	76%		0.07%	0.06%
3. Sometimes	0%	5%	109%	244%	34%	86%		0.00%	0.08%
4. Often	0%	11%	139%	286%	46%	103%		0.00%	-0.13%
5. Always	0%	10%	139%	253%	44%	100%		0.00%	-0.01%
5−1	0%	6%	37%	21%	**14%****	**24%****		**-0.10%**	**-0.13%**
Annual transaction fee	0.00%	0.18%	1.11%	0.63%	**0.42%**	**0.72%**	**Net returns**	**0.00%**	**-0.19%**

- lack of better raw returns: *over*confidence about having information advantage

Observation

- So far, we have shown that gambling preferences and belief in information advantage are the main drivers for excess trading

- Still, there are other concerns associated with survey responses
  - survey responses could be noisy

Gambling Behavior		
	Around the survey (2018:01 to 2019:06)	
Gambling preference, with prob. weighting	0.112***	0.109***
	(3.875)	(3.768)
Male		-0.034
		(-1.164)
Controls	NO	YES
R2	0.004	0.023
N	4,145	4,145

- What if we use transaction-based measures directly?

Sorting Investors Based on Gambling Behavior

Gambling *Behavior*

	Monthly Turnover	
	Mean	Median
1(lowest)	60%	29%
2	81%	39%
3	72%	29%
4	93%	44%
5(highest)	157%	98%
DIFF (5−1)	**97%***	**69%***

Gambling *Preference*

	Monthly Turnover	
	Mean	Median
1(lowest)	25%	74%
2	31%	77%
3	33%	84%
4	42%	90%
5(highest)	42%	95%
DIFF (5−1)	**17%****	**21%****

Regressing Gambling Behavior on Survey Responses

Volume-weighted Past One-month Count of Up-limit Hits Based on Initial Buys (2018:01-2018:09)

Actual performance in 2017	-0.009**	Realization utility, winner	0.015
	(-2.533)		(0.843)
Over-placement, performance	0.002	Realization utility, loser	0.009
	(0.071)		-0.409
Financial literacy score	-0.031	Sensation seeking, novelty	-0.032
	(-1.478)		(-1.518)
Over-placement, financial literacy	-0.014	Sensation seeking, volatility	0.022
	(-0.633)		(1.030)
Miscalibration	0.017	Perceived information advantage	0.049**
	-0.942		(2.097)
Underestimation of transaction cost	-0.005	Dismissive of others' information	-0.001
	(-0.276)		(-0.031)
Do not consider transaction cost	0.040**	Affected by family and friends	-0.005
	-2.221		(-0.178)
Do not think bid-ask spread is a cost	-0.043**	Affected by investment advisors	0.025
	(-2.436)		-0.647
Extrapolation, up	0.003		
	-0.133	Controls	YES
Extrapolation, down	-0.001		
	(-0.045)		
Gambling preference, with prob. weighting	0.071***	Male	0.011
	(3.598)		(0.623)
Gambling preference, without prob. weighting	-0.011	R2	0.031
	(-0.482)	N	3,528

Conclusion

- We study why retail investors trade so much with a new approach

  – surveys + transactions

- We show that survey responses capture trading behaviour in significant ways

  – by merging survey data with transaction data

- Our empirical analysis shows that

  – overconfidence (about information advantage) and gambling preferences have significant explanatory power on turnover

  – popular arguments such as neglect of trading cost, low financial literacy, and social influence do not explain volume

- Our study sheds light on the pros and cons of survey- and transaction-based approaches