Waiting for the Gain to come: How Variance and Skewness shape Retail Investors' Selling Behavior

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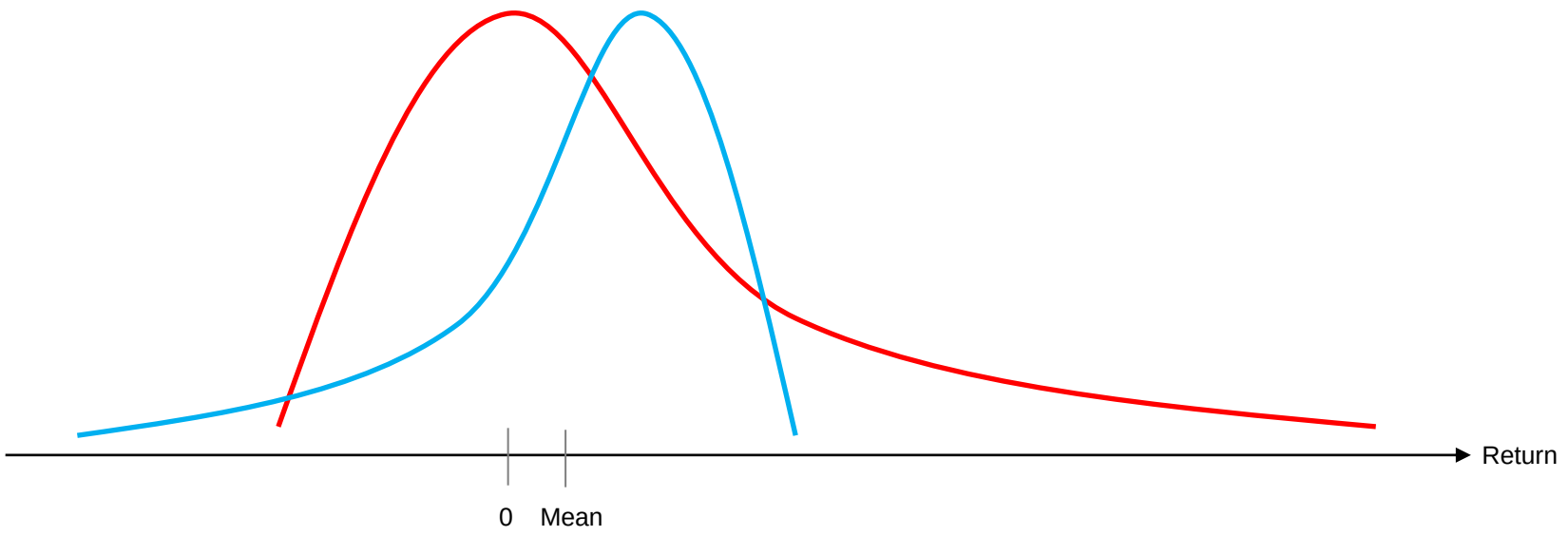
Motivation I



Illustrative only.

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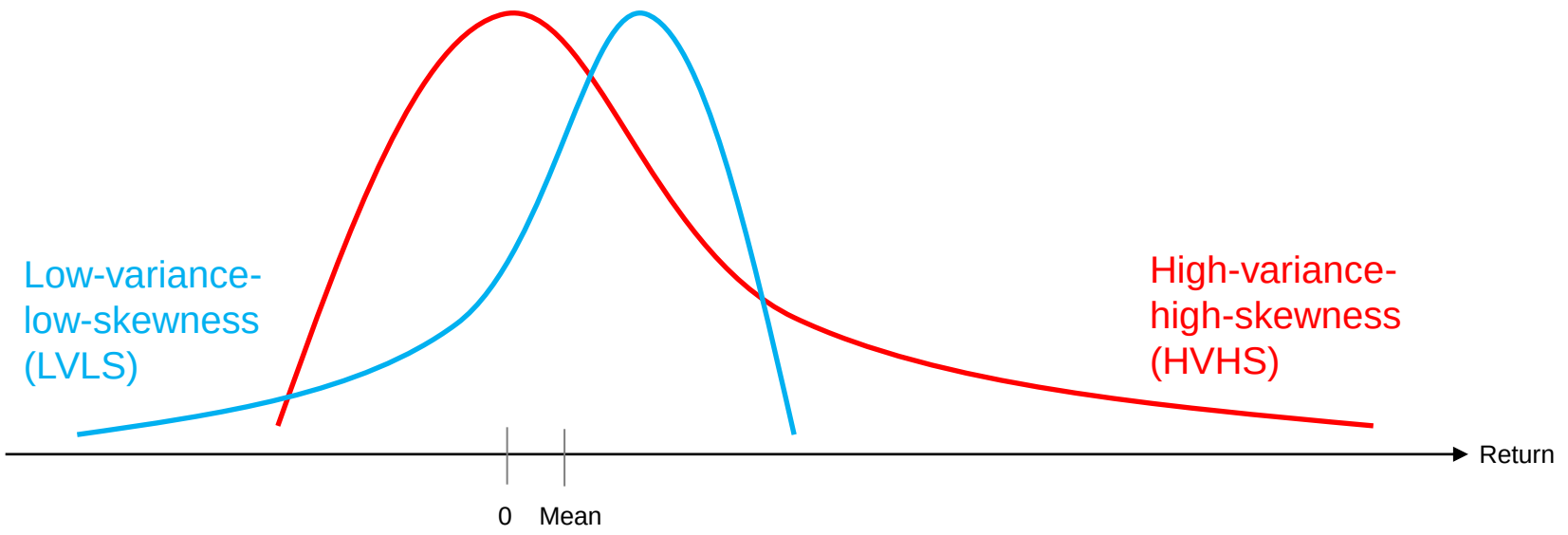

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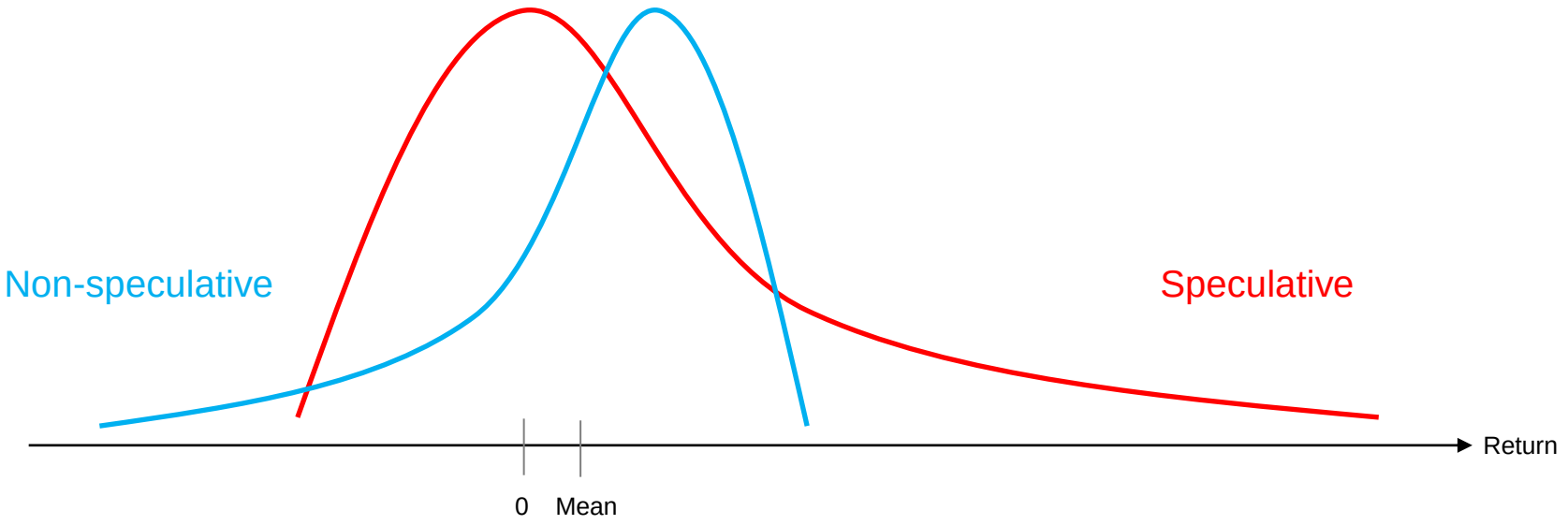
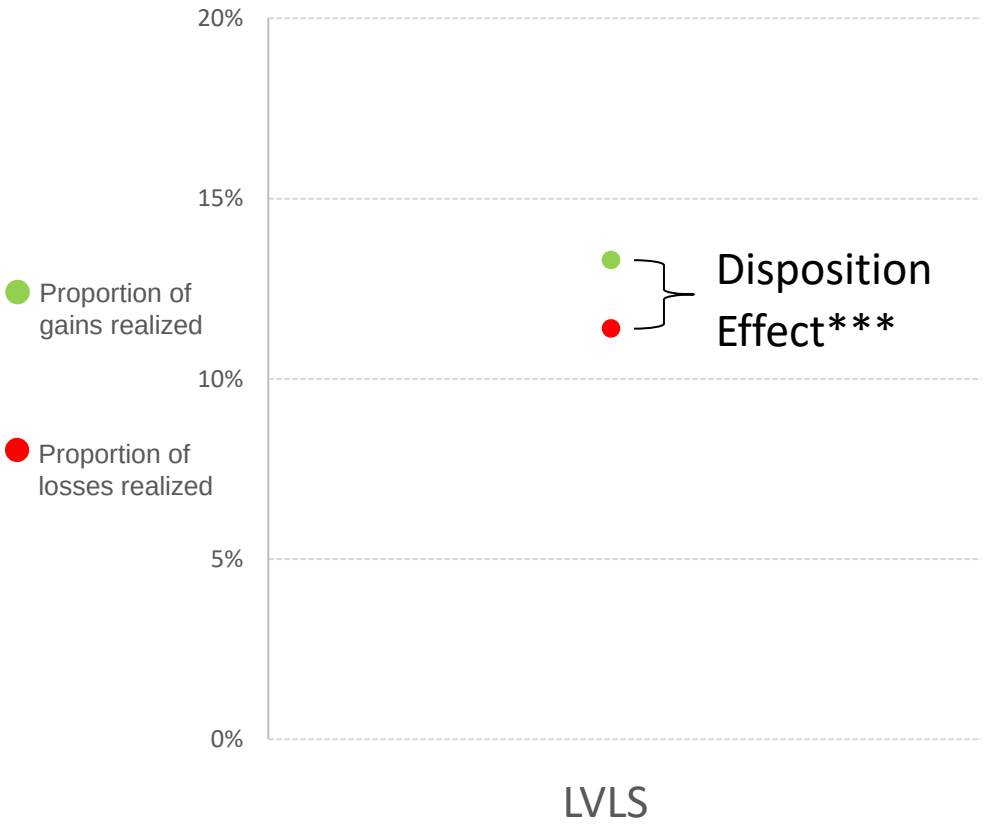


Illustrative only.

In a nutshell

- Link retail investors' selling behavior to assets' level of speculation
  - Proxy assets' degree of speculation by their level of variance and skewness over the past year
- Ex-ante hypotheses
  - Investors should be **more likely** to sell a **gain** in a speculative than in a non-speculative asset
  - Investors should be **less likely** to sell a **loss** in a speculative than in a non-speculative asset
  - Investors should have a **higher disposition effect** in a speculative than in a non-speculative asset
    - Disposition effect = Proportion of gains realized - Proportion of losses realized

Preview of Results



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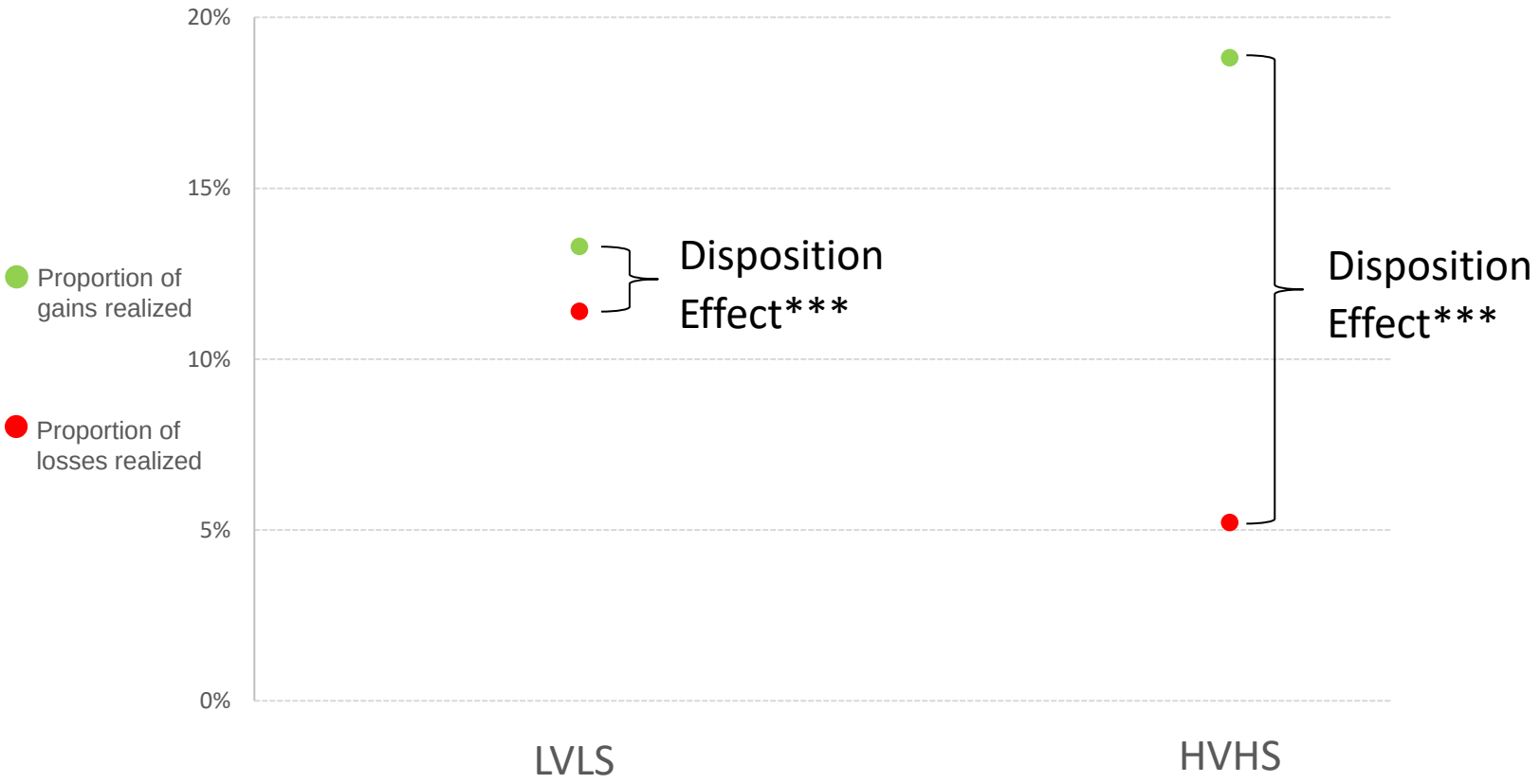


Retail Investor Data Set – Summary Statistics

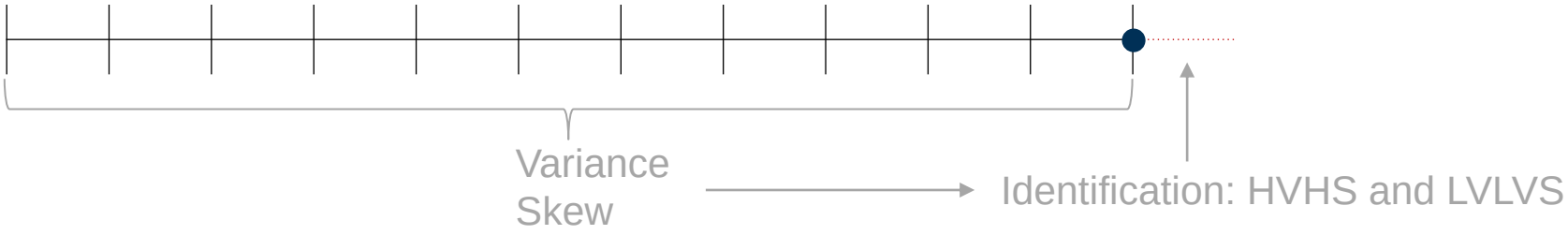
German retail investor trading data set (2010-2015)	
Sample	**Stock Investments**
Individuals	22,334
Number of observations	3,009,585
Portfolio	
Portfolio value	68,100 (26,220)
Herfindahl-Hirschman index (HHI)	42.5 (32.9)
Average # of trades (monthly)	3.25 (2.43)
Asset allocation (%)	48.1
Demographics	
Age (Year)	51 (50)
Gender (%)	
Male	85
Female	15
Education (%)	
PhD or Professor	8.25

Market Data

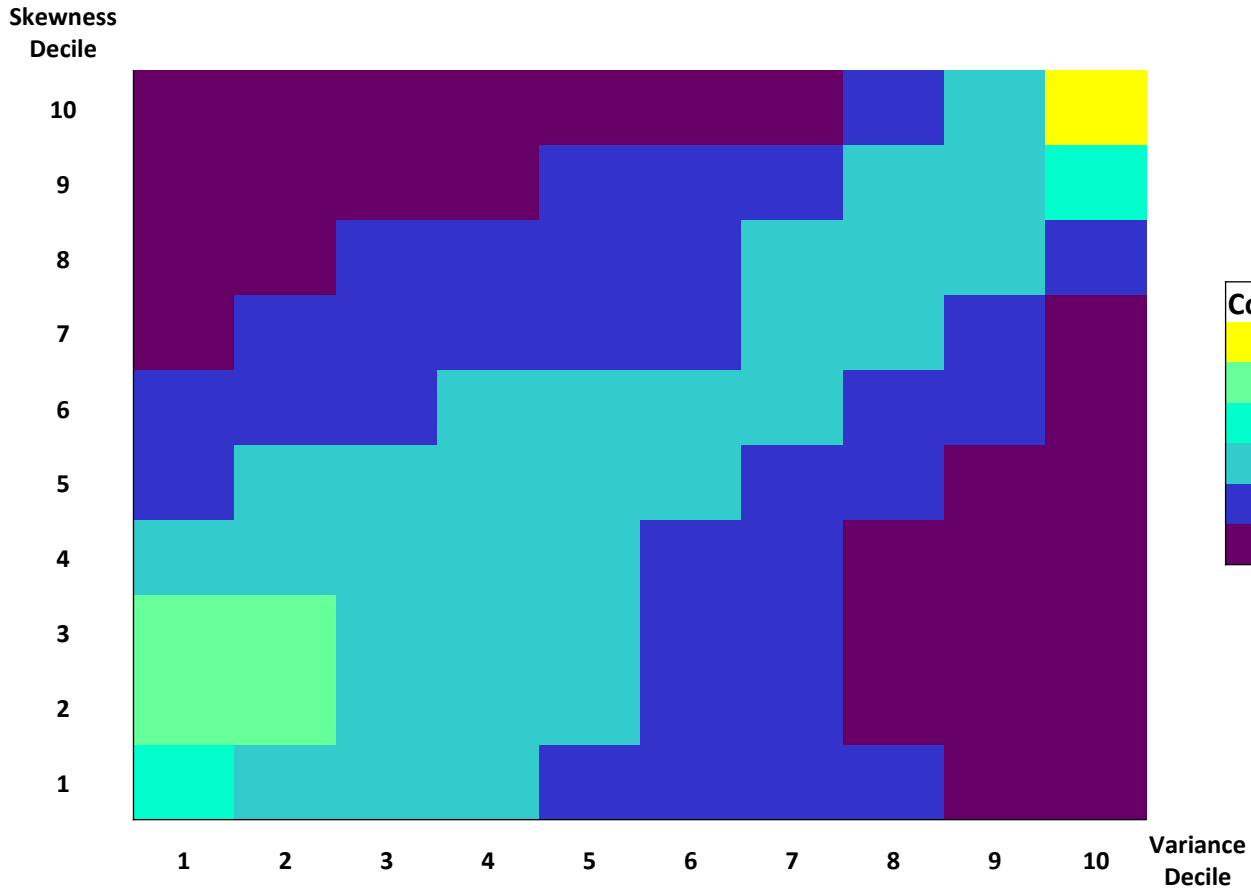
- Using a rolling window approach, we calculate an asset's variance and skewness over the last year using daily returns
- Identification of HVHS and LVLS assets (Kumar, 2009)
  - Each month, we sort stocks into skewness and variance deciles

Speculative (HVHS)	Non-speculative (LVLS)	Others
High Volatility (decile 10)	Low Volatility (decile 1)	Neither speculative nor non-speculative
High Skewness (decile 10)	Low Skewness (decile 1)	

- We then analyze investors' selling behavior over the next month



Market Data – Asset Distribution



Color	Mean	Min	Max
	251	220	380
	167	114	244
	143	64	280
	116	58	178
	75	30	129
	25	1	67

Methodology I

- Based Chang et al. (2016):
- $$Sale_{ijt} = \beta_0 + \beta_1 Gain_{ijt} + \beta_2 Speculative_{jt-1} + \beta_3 Gain_{ijt} \times Speculative_{jt-1} + X\beta' + \epsilon_{ijt}$$
  - Account(i)-stock(j)-month(t) triple
  - Sale = 1 if a sale in the investor's portfolio takes place
  - Gain = 1 if the value weighted average purchase price < current market price
  - Speculative = 1 if asset's variance and skewness falls into the top decile in previous month
  - X is a vector of control variables known to affect investors' selling propensities (Ben-David and Hirshleifer, 2012)

Methodology II

$$Sale_{ijt} = \beta_0 + \beta_1 Gain_{ijt} + \beta_2 Speculative_{jt-1} + \beta_3 Gain_{ijt} \times Speculative_{jt-1} + X\beta' + \epsilon_{ijt}$$

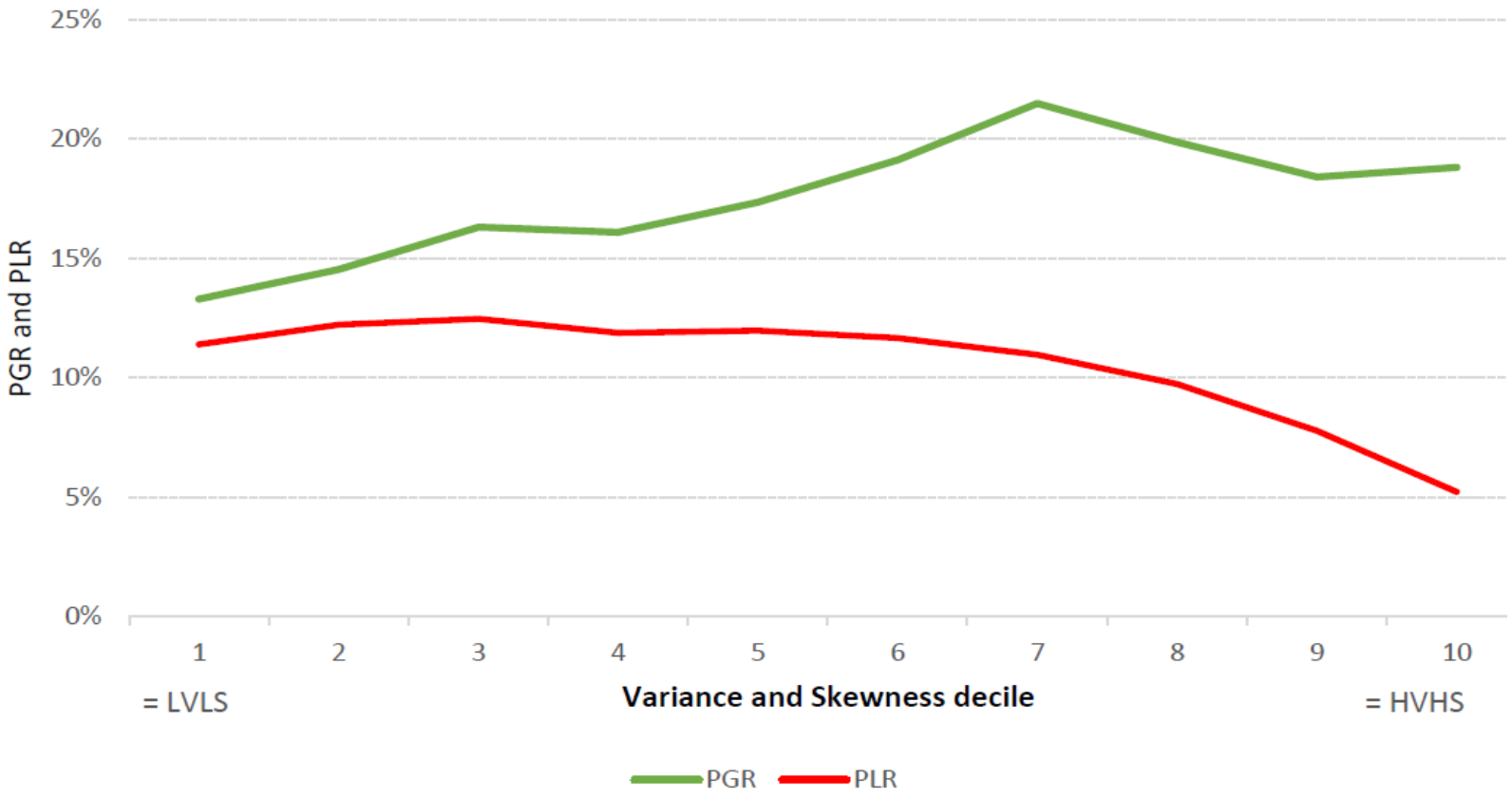
$$Disposition\ Effect = PGR - PLR$$

	Proportion of gains realized (PGR)	Proportion of losses realized (PLR)	Disposition Effect (DE)
Speculative	$\beta_0 + \beta_1 + \beta_2 + \beta_3$	$\beta_0 + \beta_2$	$\beta_1 + \beta_3$
Non-speculative	$\beta_0 + \beta_1$	β_0	β_1
Δ	$\beta_2 + \beta_3$	β_2	β_3

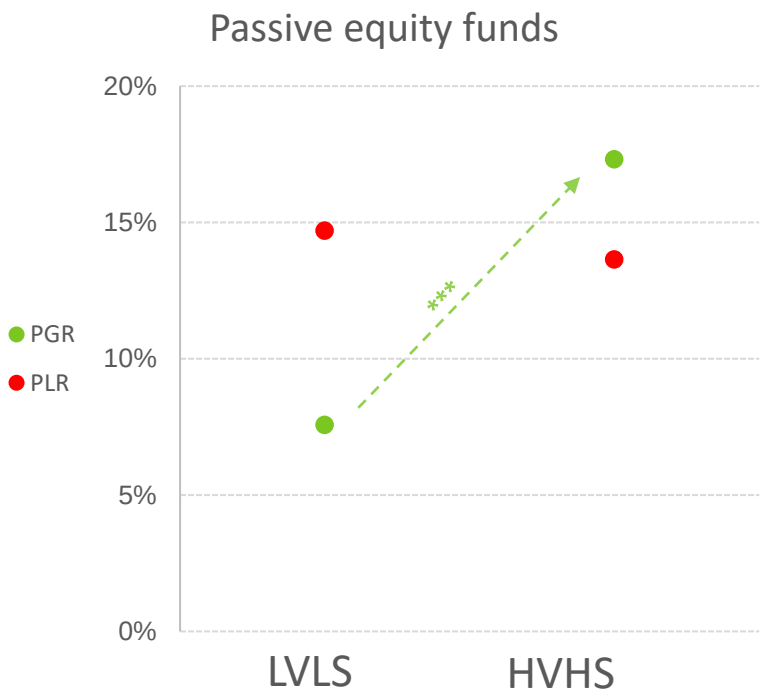
Main Result

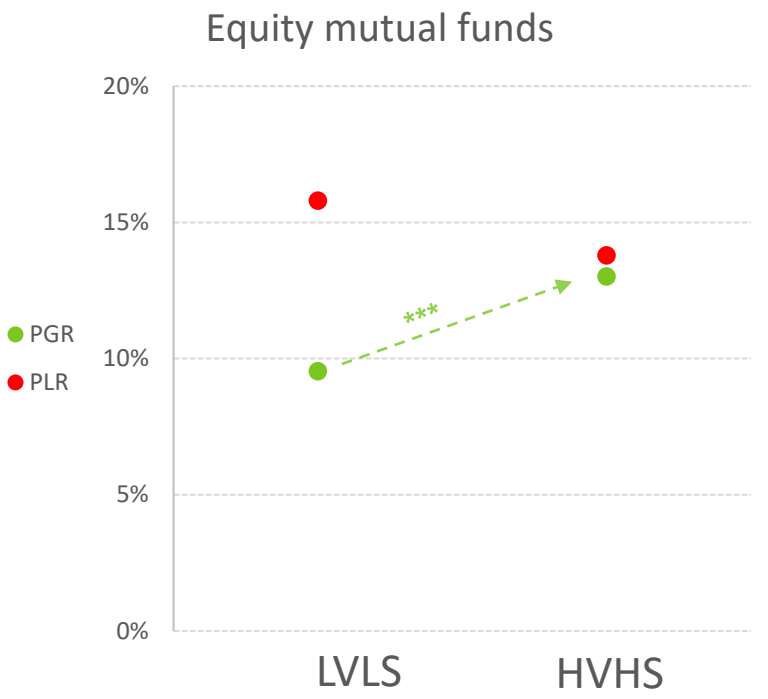
Dependent Variable: Sale	(1) Stocks	(2) Stocks	(3) FE Model 1	(4) FE Model 2	(5) FE Model 3
Gain	0.0430***	0.0190*	0.0264***	0.0490***	0.0427**
	(0.00449)	(0.0105)	(0.00906)	(0.0151)	(0.0183)
Speculative		-0.0618***	-0.0325***	0.0121	0.0123
		(0.0107)	(0.00811)	(0.00913)	(0.0105)
Gain × Speculative		0.117***	0.0807***	0.0543***	0.0807***
		(0.0157)	(0.0139)	(0.0149)	(0.0190)
Constant	0.114***	0.114***			
	(0.00357)	(0.0102)			
Observations	3,009,585	120,629	118,062	118,062	68,856
R-squared	0.004	0.012	0.184	0.186	0.505
Cluster individual-month	YES	YES	YES	YES	YES
Month FE			YES	YES	YES
Individual FE			YES	YES	YES
Controls as in BDH (2012)				YES	YES
Individual×Month FE					YES

PGR and PLR across Deciles



Variance and Skewness across Asset Classes





- Increasing the level of variance and skewness, investors PGR increases
- This finding holds *within* and *across* asset classes

What drives our findings? – Realization Utility

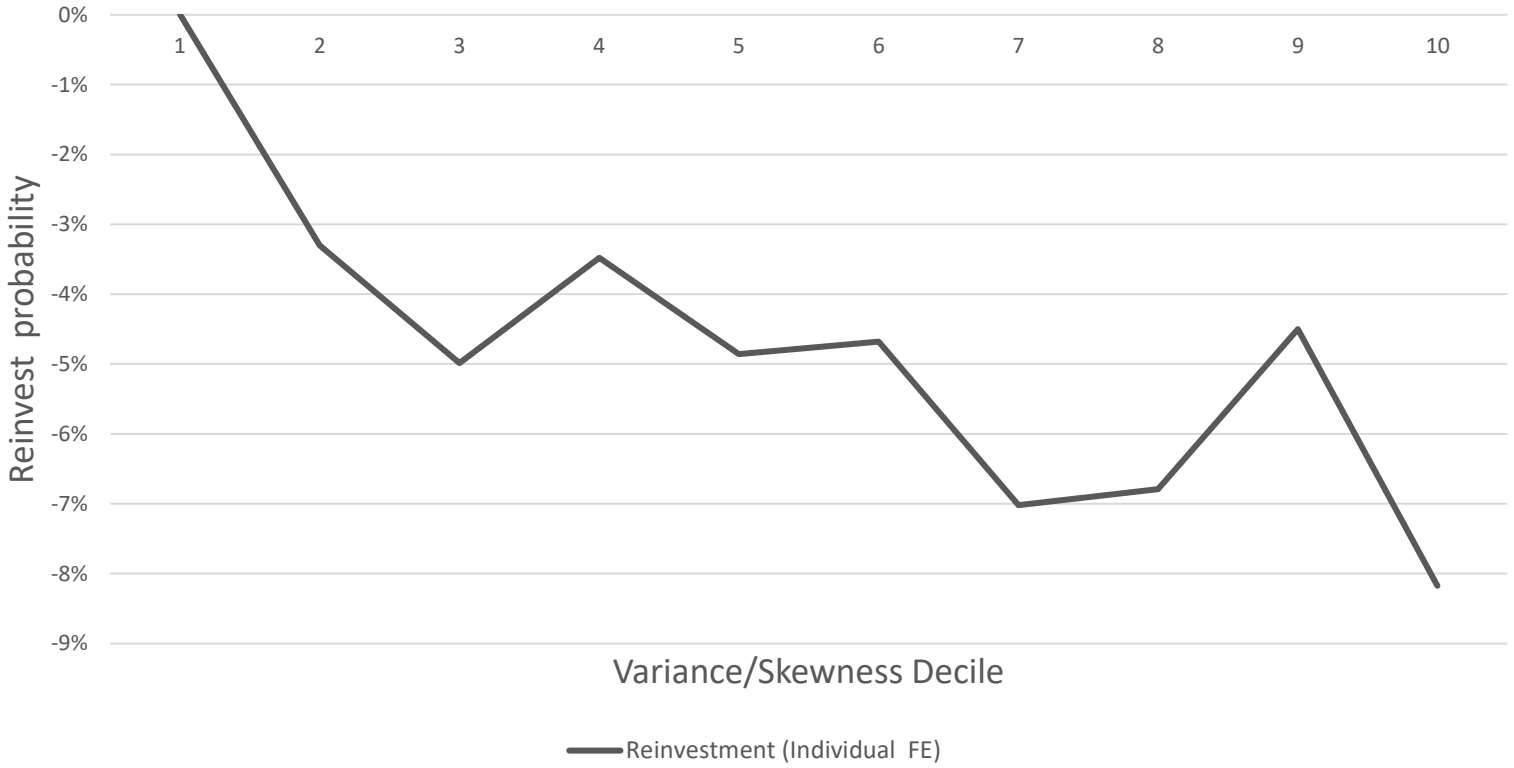
- At the moment of sale investors get an extra burst of positive or negative realization utility (Barberis and Xiong, 2012)
  - An investment period does not necessarily end with the sale of the asset as reinvestment (“rolling”) can preserves the previous mental account (Frydman, Hartzmark, and Solomon, 2018)
  - ➢ Then *reinvestment activity* should be lower after realizing a gain in a HVHS stock relative to realizing a gain in a LVLS stock

Realization Utility I: Reinvestment Behavior

- $Reinvestment_{ijt} = \beta_0 + \beta_1 Speculative_{j,t-1} + e_{ijt}$
  - Column (1) and column (3): Sale is followed by several (exactly one) purchases on the same day
  - Column (2) and column (4): Sale is followed by several (exactly one) purchases on the same day and proceeds from sale match amount invested

Dependent Variable: Reinvestment	(1)	(2)	(3)	(4)
Speculative	-0.0802*	-0.0671**	-0.0843**	-0.0550*
	(0.0458)	(0.0331)	(0.0404)	(0.0279)
Observations	3,388	2,607	3,074	2,560
R-squared	0.485	0.472	0.456	0.472
Cluster individual-month	YES	YES	YES	YES
Individual FE	YES	YES	YES	YES
Month FE	YES	YES	YES	YES

Realization Utility II: Reinvestment Behavior across Deciles



Conclusion

- Higher moments of return (i.e., variance and skewness) have a significant effect on investors' selling behavior
- This findings holds *within* and *across* asset classes and offers a more generic explanation about selling behavior than other theories in the literature about the disposition effect
- We find evidence for **realization utility** being an underlying driver for the observed trading behavior
- This selling behavior cannot fully be explained by
  - Rank effect
  - Attention effect
  - Cognitive Dissonance