A Lottery-Demand-Based Explanation of the Beta Anomaly

Turan G. Bali, Stephen J. Brown, Scott Murray, and Yi Tang
Journal of Financial and Quantitative Analysis
2017 12

王念硕

Outline

1. Introduction
   - Background
   - Motivation
   - Research question
   - Related researches
   - Research contents
   - Contribution
   - Framework
2. Research design
   - Variable
   - Data
   - Method
3. Empirical result
   - The Beta Anomaly and Lottery Anomaly
   - Relation between the Beta and Lottery
4. Conclusion

1. Introduction

Background

1. The positive (negative) abnormal returns of portfolios composed of low-beta (high-beta) stocks, which we refer to as the beta anomaly, is one of the most persistent and widely studied anomalies in empirical research of security returns.
2. Lottery investors generate demand for stocks with high probabilities of large short-term up moves in the stock price. Such up moves are partially generated by a stock's sensitivity to the overall market: market beta.

1. Introduction

Motivation

1. There is no research on the relationship between beta anomaly and lottery anomaly.

Research question

1. Is lottery anomaly the cause of beta anomaly?

Yes

1. Introduction

Research Contents

1. We demonstrate that the returns associated with the beta anomaly are no longer apparent after controlling for lottery demand.

2. FM regressions indicate a positive and significant relation between beta and stock returns when MAX is included in the regression specification.

3. We then generate a factor, FMAX, designed to capture the returns associated with lottery demand. The abnormal returns of the high–low beta portfolio are insignificant when FMAX is included in the factor model.

1. Introduction

Related researches

1. As discussed by Kumar (2009) and Bali et al. (2011) lottery investors generate demand for stocks with high probabilities of large short-term up moves in the stock price.

2. Kumar and Lee (2006) and Han and Kumar (2013) supported by our results, the lottery demand phenomenon is attributable to individual, not institutional, investors.

1. Introduction

Contribution

1. In this article, we propose that demand for lottery-like stocks plays an important role in explaining the beta anomaly and enrich the research on investor behavior.

2. Research design: Variable

Market beta (β): the slope coefficient from a regression of excess stock returns on excess market returns using daily returns from the 12-month period up to and including month t.

MAX: the average of the 5 highest daily returns of the stock during the given month t.

2. Research design: Data and method

Data Source：Compustat、CRSP、Thomson Reuters Institutional Holdings

Period： 1963.06 to 2012.12.

Sample: All New York Stock Exchange (NYSE), American Stock Exchange (Amex), and Nasdaq. We exclude stocks with a share price below $5.

Method:

Univariate portfolio analysis

Bivariate portfolio analysis

Fama-MacBeth regressions

3.1 Empirical result: Beta Anomaly and Lottery Anomaly

Value	Low β 1	β 2	β 3	β 4	β 5	β 6	β 7	β 8	β 9	High β 10	High–Low β
Panel A. β and Returns											
β	−0.00	0.25	0.42	0.56	0.70	0.84	1.00	1.19	1.46	2.02	
R	0.69	0.78	0.78	0.77	0.81	0.73	0.71	0.65	0.51	0.35	−0.35
	(3.74)	(3.90)	(3.74)	(3.54)	(3.42)	(2.90)	(2.66)	(2.26)	(1.58)	(0.89)	(−1.13)
FFC4 α	0.22	0.24	0.16	0.11	0.10	−0.02	−0.05	−0.11	−0.18	−0.29	−0.51
	(2.22)	(2.77)	(2.31)	(1.59)	(1.69)	(−0.30)	(−0.80)	(−1.83)	(−2.20)	(−2.22)	(−2.50)
FFC4+PS α	0.23	0.24	0.16	0.10	0.09	−0.03	−0.07	−0.10	−0.18	−0.26	−0.49
	(2.12)	(2.51)	(2.09)	(1.34)	(1.36)	(−0.48)	(−1.04)	(−1.76)	(−2.18)	(−1.91)	(−2.26)

This result indicates that the beta anomaly is both economically strong and statistically significant in our sample.

3.1 Empirical result: Beta Anomaly and Lottery Anomaly

Value	MAX 1 (Low)	MAX 2	MAX 3	MAX 4	MAX 5	MAX 6	MAX 7	MAX 8	MAX 9	MAX 10 (High)	High–Low MAX
MAX	0.66	1.25	1.69	2.09	2.49	2.91	3.41	4.04	4.98	7.62	
R	0.74 (4.07)	1.00 (4.95)	0.96 (4.59)	0.94 (4.25)	0.90 (3.84)	0.82 (3.29)	0.80 (2.93)	0.67 (2.29)	0.36 (1.10)	−0.40 (−1.11)	−1.15 (−4.41)
FFC4 α	0.27 (3.01)	0.42 (5.90)	0.35 (5.89)	0.30 (5.18)	0.23 (3.95)	0.12 (2.20)	0.08 (1.53)	−0.07 (−1.50)	−0.38 (−6.05)	−1.14 (−10.43)	−1.40 (−8.95)
FFC4+PS α	0.24 (2.37)	0.43 (5.36)	0.35 (5.29)	0.29 (4.60)	0.23 (3.56)	0.13 (2.06)	0.08 (1.42)	−0.07 (−1.41)	−0.37 (−5.48)	−1.15 (−9.65)	−1.38 (−8.09)

The average monthly return of the high–low MAX portfolio is both economically large and highly statistically significant.

3.2 Empirical result: Relation between the Beta and Lottery

Panel A. Control for MAX

	MAX 1	MAX 2	MAX 3	MAX 4	MAX 5	MAX 6	MAX 7	MAX 8	MAX 9	MAX 10	MAX Avg.
β 1 (Low)	0.52	0.95	0.91	0.99	0.91	0.86	0.94	0.73	0.51	−0.30	0.70
β 2	0.62	1.02	0.92	0.93	0.83	1.02	0.84	0.76	0.37	−0.42	0.69
β 3	0.60	0.84	1.00	0.92	0.84	0.79	0.68	0.75	0.46	−0.19	0.67
β 4	0.60	0.99	0.96	0.87	1.07	0.74	0.78	0.55	0.48	−0.23	0.68
β 5	0.65	0.92	0.95	1.07	0.87	0.73	0.80	0.63	0.25	−0.18	0.67
β 6	0.71	0.94	0.93	1.00	0.98	0.86	0.82	0.61	0.48	−0.37	0.70
β 7	0.84	0.97	0.96	0.94	0.84	0.90	0.88	0.58	0.25	−0.55	0.66
β 8	0.80	1.16	0.97	0.82	0.87	0.76	0.81	0.59	0.22	−0.50	0.65
β 9	1.02	1.13	1.01	0.83	0.91	0.75	0.78	0.72	0.39	−0.56	0.70
β 10 (High)	1.11	1.10	1.05	1.02	0.83	0.79	0.68	0.75	0.16	−0.72	0.68
High–Low β Portfolios											
R	0.59	0.16	0.14	0.04	−0.08	−0.06	−0.25	0.02	−0.35	−0.42	−0.02
	(3.03)	(0.87)	(0.71)	(0.16)	(−0.34)	(−0.23)	(−0.82)	0.06	(−1.04)	(−1.01)	(−0.10)
FFC4 α	0.27	−0.09	−0.10	−0.17	−0.27	−0.16	−0.33	−0.06	−0.28	−0.24	**(−0.14)**
	(1.78)	(−0.56)	(−0.54)	(−0.89)	(−1.30)	(−0.69)	(−1.36)	(−0.22)	(−1.00)	(−0.74)	**(−0.85)**
FFC4+PS α	0.22	−0.11	−0.08	−0.11	−0.26	−0.15	−0.31	0.02	−0.25	−0.27	**−0.13**
	(1.32)	(−0.60)	(−0.41)	(−0.54)	(−1.18)	(−0.63)	(−1.19)	(0.06)	(−0.81)	(−0.72)	**(−0.72)**

This is our preliminary evidence of the important role that lottery demand plays in generating the beta anomaly, the main result of this article.

3.2 Empirical result: Relation between the Beta and Lottery

	β 1	β 2	β 3	β 4	β 5	β 6	β 7	β 8	β 9	β 10	β Avg.
MAX 1 (Low)	0.35	0.47	0.71	0.90	0.98	1.06	1.08	1.04	0.98	1.04	0.86
MAX 2	0.75	0.85	0.93	1.07	1.02	0.95	0.90	0.93	0.99	0.86	0.93
MAX 3	0.73	0.95	0.93	0.92	0.93	0.95	0.83	0.86	0.77	0.82	0.87
MAX 4	0.85	1.03	0.91	0.89	1.11	0.93	0.97	0.79	0.73	0.77	0.90
MAX 5	0.95	1.03	0.95	0.91	1.02	0.99	0.86	0.87	0.76	0.69	0.90
MAX 6	0.97	0.83	0.93	1.02	0.89	0.87	0.91	0.87	0.59	0.46	0.83
MAX 7	1.03	0.89	0.93	0.86	0.79	0.75	0.79	0.64	0.44	0.15	0.73
MAX 8	0.91	0.80	0.77	0.59	0.72	0.59	0.63	0.58	0.42	0.06	0.61
MAX 9	0.46	0.80	0.69	0.59	0.61	0.48	0.38	0.36	0.13	−0.31	0.42
MAX 10 (High)	−0.01	0.19	0.03	−0.03	0.01	−0.33	−0.23	−0.46	−0.71	−1.07	−0.26
High–Low MAX Portfolios											
R	−0.36	−0.28	−0.68	−0.93	−0.97	−1.39	−1.31	−1.50	−1.69	−2.11	−1.12
	(−1.45)	(−1.66)	(−3.50)	(−5.21)	(−4.56)	(−6.75)	(−4.82)	(−6.87)	(−5.86)	(−7.48)	(−6.61)
FFC4 α	−0.83	−0.59	−0.88	−1.21	−1.18	−1.64	−1.54	−1.66	−1.97	−2.14	−1.36
	(−4.14)	(−3.88)	(−5.23)	(−7.76)	(−6.49)	(−8.69)	(−7.81)	(−7.77)	(−8.37)	(−8.59)	(−11.28)
FFC4+PS α	−0.81	−0.59	−0.92	−1.18	−1.12	−1.62	−1.52	−1.60	−1.91	−2.15	−1.34
	(−3.61)	(−3.80)	(−4.92)	(−6.86)	(−5.60)	(−7.80)	(−7.27)	(−6.62)	(−7.38)	(−7.77)	(−9.94)

The lottery demand phenomenon remains strong after controlling for market beta.

3.2 Empirical result: Relation between the Beta and Lottery

	Panel A. Regressions without MAX			*Panel B. Regressions with MAX*		
Variable	1	2	3	4	5	6
β	0.060 (0.44)	0.174 (0.97)	0.263 (1.08)	**0.265** **(1.93)**	**0.427** **(2.34)**	**0.470** **(1.90)**
MAX				−0.355 (−8.43)	−0.358 (−8.49)	−0.223 (−6.16)
SIZE	−0.176 (−4.51)	−0.180 (−4.70)	−0.101 (−2.57)	−0.165 (−4.26)	−0.168 (−4.41)	−0.102 (−2.70)
BM	0.176 (3.00)	0.176 (3.03)	0.181 (2.81)	0.189 (3.20)	0.186 (3.17)	0.173 (2.71)
MOM	0.008 (5.89)	0.008 (6.21)	0.007 (5.87)	0.008 (5.52)	0.008 (5.80)	0.007 (5.11)
ILLIQ	−0.011 (−0.64)	−0.011 (−0.64)	−0.012 (−1.13)	−0.010 (−0.60)	−0.011 (−0.64)	−0.009 (−0.79)

When the regression specification does not include MAX, the average coefficient on β is statistically indistinguishable from 0.
After controlling for MAX, there is a positive and statistically significant relation between beta and expected stock returns.

3.3 Empirical result: Lottery Demand Factor

At the end of each month t, we sort all stocks into 2 groups based on market capitalization, and independently sort all stocks in our sample into 3 groups based on an ascending sort of MAX. The intersections of the 2 market capitalization-based groups and the 3 MAX groups generate 6 portfolios.

3.3 Empirical result: Lottery Demand Factor

Value	β 1 (Low)	β 2	β 3	β 4	β 5	β 6	β 7	β 8	β 9	β 10 (High)	High–Low β
FFC4 α	0.22	0.24	0.16	0.11	0.10	−0.02	−0.05	−0.11	−0.18	−0.29	−0.51
	(2.22)	(2.77)	(2.31)	(1.59)	(1.69)	(−0.30)	(−0.80)	(−1.83)	(−2.20)	(−2.22)	(−2.50)
FFC4+PS α	0.23	0.24	0.16	0.10	0.09	−0.03	−0.07	−0.10	−0.18	−0.26	−0.49
	(2.12)	(2.51)	(2.09)	(1.34)	(1.36)	(−0.48)	(−1.04)	(−1.76)	(−2.18)	(−1.91)	(−2.26)
FFC4+FMAX α	**0.08**	0.06	−0.04	−0.09	−0.05	−0.15	−0.12	−0.10	−0.01	**0.14**	**0.06**
	(0.85)	(0.83)	(−0.66)	(−1.64)	(−0.92)	(−2.56)	(−2.01)	(−1.69)	(−0.17)	**(1.37)**	**(0.35)**
FFC4+PS+FMAX α	**0.10**	0.07	−0.03	−0.09	−0.06	−0.16	−0.15	−0.11	−0.03	**0.14**	**0.04**
	(0.92)	(0.86)	(−0.55)	(−1.64)	(−1.14)	(−2.66)	(−2.26)	(−1.71)	(−0.36)	**(1.23)**	**(0.22)**

When the FMAX factor is added to the FFC4 and FFC4+PS factor models, neither the low-β nor high-β portfolio generates abnormal returns that are statistically distinguishable from 0.

3.3 Empirical result: Lottery Demand Factor

Panel A. Factor Sensitivities of the BAB Factor

Specification	α	β_{MKTRF}	β_{SMB}	β_{HML}	β_{UMD}	β_{PS}	β_{FMAX}	M	Adj. R^2
FFC4	0.54	0.05	−0.01	0.51	0.18			584	21.03%
	(3.38)	(1.06)	(−0.09)	(5.01)	(2.87)				
FFC4+PS	0.57	0.06	0.02	0.53	0.20	0.06		531	23.44%
	(3.34)	(1.23)	(0.30)	(5.18)	(3.13)	(0.96)			
FFC4+FMAX	**0.17**	0.29	0.31	0.21	0.17		−0.55	584	46.95%
	(1.23)	(8.22)	(5.46)	(3.49)	(4.39)		(−11.84)		
FFC4+PS+FMAX	**0.22**	0.29	0.32	0.24	0.19	0.03	−0.54	531	47.38%
	(1.39)	(7.96)	(5.29)	(3.72)	(4.43)	(0.63)	(−11.11)		

Panel B. Factor Sensitivities of the FMAX Factor

Specification	α	β_{MKTRF}	β_{SMB}	β_{HML}	β_{UMD}	β_{PS}	β_{BAB}	M	Adj. R^2
FFC4	−0.67	0.43	0.58	−0.53	−0.01			584	62.24%
	(−5.12)	(8.36)	(6.39)	(−4.59)	(−0.19)				
FFC4+PS	−0.65	0.42	0.56	−0.54	−0.03	−0.06		540	62.36%
	(−4.60)	(8.17)	(5.51)	(−4.72)	(−0.41)	(−1.00)			
FFC4+BAB	−0.35	0.46	0.58	−0.23	0.09		−0.60	584	74.64%
	(−2.88)	(13.06)	(8.22)	(−3.09)	(1.67)		(−11.44)		
FFC4+PS+BAB	−0.32	0.46	0.57	−0.24	0.09	−0.02	−0.59	531	74.20%
	(−2.32)	(12.66)	(7.35)	(−3.11)	(1.46)	(−0.55)	(−10.90)		

The BAB factor return is then taken to be the excess return of the low-beta portfolio minus the excess return of the high-beta portfolio.

When the FMAX factor is included in the model, the BAB factor no longer generates statistically positive abnormal returns.

The returns generated by the FMAX factor are not explained by the BAB factor.

3.5 Empirical result: Correlation between β and MAX

Value	High–Low β
$\rho_{\beta,\mathrm{MAX}}$: *High* β	
R	−0.68 (−1.34)
FFC4 α	−0.72 (−2.86)
FFC4+PS α	−0.72 (−2.61)
FFC4+FMAX α	0.09 (0.54)
FFC4+PS+FMAX α	0.04 (0.20)

$\rho_{\beta,\mathrm{MAX}}$: *Low* β	
R	−0.01 (−0.02)
FFC4 α	−0.26 (−0.86)
FFC4+PS α	−0.20 (−0.61)
FFC4+FMAX α	0.07 (0.26)
FFC4+PS+FMAX α	0.10 (0.35)

High-lottery-demand stocks are also predominantly high-beta stocks.
the beta anomaly is strong in months in which the cross-sectional relation between MAX and β is high.

3.5 Empirical result: Institutional Holdings and the Beta Anomaly

	INST 1	INST 2	INST 3	INST 4	INST 5	INST 6	INST 7	INST 8	INST 9	INST 10
Panel A. Portfolios Sorted on INST Then β										
High–Low β Portfolios										
R	−1.61	−1.80	−1.29	−1.13	−0.91	−0.64	−0.18	−0.05	0.12	0.43
	(−4.42)	(−4.10)	(−2.87)	(−2.44)	(−1.98)	(−1.43)	(−0.43)	(−0.12)	(0.29)	(1.02)
FFC4 α	−1.91	−1.91	−1.31	−1.22	−1.01	−0.75	−0.18	−0.03	0.11	0.41
	(−6.88)	(−6.00)	(−3.59)	(−3.15)	(−3.07)	(−2.77)	(−0.64)	(−0.10)	(0.31)	(1.17)
FFC4+PS α	−1.90	−1.85	−1.21	−1.12	−0.90	−0.72	−0.16	−0.04	0.15	0.45
	(−6.78)	(−5.84)	(−3.49)	(−3.15)	(−3.01)	(−2.62)	(−0.55)	(−0.12)	(0.45)	(1.27)

If the beta anomaly is in fact driven by lottery demand, the alpha of the high–low β portfolio is expected to be concentrated in stocks with low institutional ownership and to be weaker in stocks predominantly owned by institutions.

The results support the above argument.

4. Conclusion

1. Demand for lottery-like assets plays an important role in generating the beta anomaly.
2. Market beta and lottery demand have a high positive cross-sectional correlation, when this correlation is low (high), the beta anomaly is not detected (is strong).
3. The beta anomaly is concentrated among stocks that have low institutional ownership.

Lottery-Related Anomalies: The Role of Reference-Dependent Preferences

Li An, Huijun Wang, Jian Wang, Jianfeng Yu
Management Science
2020 12

王念硕

Outline

1. Introduction
   - Background
   - Motivation
   - Research question
   - Related researches
   - Research contents
   - Contribution
   - Framework
2. Research design
   - Variable
   - Data
   - Method
3. Empirical result
   - CGO anomaly
   - CGO and lottery
   - Possible Explanations
4. Conclusion

1. Introduction

Background

1. Grinblatt and Han (2005) separate stocks with capital gains from those with capital losses by calculating the capital gains overhang (CGO) for individual stocks. CGO is essentially stock returns relative to a reference price, with positive CGO indicating capital gains relative to the reference price and vice versa.

1. Introduction

Motivation

1. There is no research on the relationship between lottery anomaly and CGO.

Research question

1. Can CGO explain lottery anomalies?

Yes

1. Introduction

Research Contents

1. We sort all individual stocks into portfolios based on lagged CGO and the five measures of lottery features in the literature. The evidence for lottery-related anomalies is very strong and robust among stocks with capital losses (negative CGO). In contrast, the evidence for lottery-related anomalies among stocks with large capital gains (i.e., large and positive CGO) is either very weak or even reversed.

1. Introduction

Contribution

1. In this article, we propose that CGO plays an important role in explaining the lottery anomaly.

2. Research design: Variable

CGO is the return of a stock relative to a reference price.

$$RP_t^{GH} = k^{-1} \sum_{n=1}^{T} \left(V_{t-n} \prod_{\tau}^{n-1} (1 - V_{t-n+\tau}) \right) P_{t-n}$$

where V_t is turnover in week t, T is 260, the number of weeks in the previous five years, P_t is the stock price at the end of week t, and k is a constant that makes the weights on past prices sum to one.

$$CGO_t^{GH} = \frac{P_{t-1} - RP_t^{GH}}{P_{t-1}}$$

2. Research design: Data and method

Data Source：Compustat、CRSP、Thomson Reuters Institutional Holdings

Period： 1962.01 to 2014.12.

Sample: All New York Stock Exchange (NYSE), American Stock Exchange (Amex), and Nasdaq. We exclude stocks with a share price below $5 or negative book equity.

Method:

Univariate portfolio analysis

Bivariate portfolio analysis

Fama-MacBeth regressions

3.1 Empirical result: CGO anomaly

Table 1. Summary Statistics

	Panel A: VW ex		
	Ret^e	α_{FF3}	CGO
CGO of Grinblatt and Han (2005)			
CGO1	0.49	−0.14	−0.63
CGO2	0.41	−0.16	−0.20
CGO3	0.48	−0.04	−0.04
CGO4	0.49	0.00	0.08
CGO5	0.67	0.23	0.25
P5 − P1	0.18	0.37	0.87
t-Statistic	(1.01)	(2.06)	(14.77)
CGO of Frazzini (2006)			
CGO1	0.80	−0.09	−0.66
CGO2	0.59	−0.15	−0.15
CGO3	0.66	−0.02	0.02
CGO4	0.61	−0.02	0.15
CGO5	0.88	0.30	0.36
P5 − P1	0.08	0.39	1.01
t-Statistic	(0.38)	(1.99)	(16.43)

Stocks with capital gains (high CGO) outperform stocks with capital losses (low CGO) in the following month.

3.2 Empirical result: CGO and lottery

Table 2. Double-Sorted Portfolio Returns by the CGO of Grinblatt and Han (2005) and Lottery Proxies

Panel A: Excess return

	Maxret				*Jackpotp*				*Skewexp*			
Proxy	CGO1	CGO3	CGO5	C5 – C1	CGO1	CGO3	CGO5	C5 – C1	CGO1	CGO3	CGO5	C5 – C1
P1	1.04	0.64	0.51		0.80	0.59	0.60		0.77	0.77	0.94	
P3	0.59	0.48	0.81		0.58	0.41	1.13		0.58	0.64	0.96	
P5	–0.34	0.12	1.05		–0.37	–0.12	1.29		–0.03	–0.19	0.89	
P5 – P1	–1.38	–0.52	0.54	1.92	–1.16	–0.71	0.69	1.86	–0.80	–0.96	–0.05	0.75
t-Statistic	(–5.35)	(–2.31)	(2.30)	(7.50)	(–4.15)	(–2.16)	(2.30)	(7.36)	(–2.29)	(–2.74)	(–0.22)	(2.23)

	Deathp				*Oscorep*			
Proxy	CGO1	CGO3	CGO5	C5 – C1	CGO1	CGO3	CGO5	C5 – C1
P1	0.89	0.53	0.78		0.66	0.48	0.63	
P3	0.79	0.53	0.81		0.58	0.40	0.71	
P5	–0.04	0.57	1.02		0.04	0.40	1.16	
P5 – P1	–0.93	0.04	0.24	1.16	–0.62	–0.08	0.53	1.15
t-Statistic	(–3.04)	(0.16)	(0.85)	(3.77)	(–2.81)	(–0.48)	(2.99)	(4.70)

In contrast to low-CGO firms, the lottery-like assets do not underperform the non-lottery-like assets among high-CGO firms.

3.2 Empirical result: CGO and lottery

Table 6. Fama–MacBeth Regressions Using the CGO of Grinblatt and Han (2005)

	Benchmark	*Proxy = Maxret*		
	(0)	(1)	(2)	(3)
CGO	0.004	−0.013	−0.015	−0.014
	(4.07)	(−9.42)	(−10.71)	(−8.29)
Proxy		0.010	0.026	−0.007
		(0.78)	(1.97)	(−0.41)
Proxy × *CGO*		0.284	0.322	0.301
		(12.84)	(13.15)	(10.56)
Proxy × $Ret_{-12,-2}$			−0.054	
			(−2.35)	
Proxy × *VNSP*				0.197
				(2.44)
Ret_{-1}	−0.060	−0.060	−0.060	−0.063
	(−15.25)	(−14.49)	(−14.61)	(−15.18)
$Ret_{-12,-2}$	0.009	0.009	0.012	0.007
	(6.46)	(6.33)	(7.11)	(4.86)
$Ret_{-36,-13}$	−0.001	−0.001	−0.001	−0.001
	(−1.61)	(−1.35)	(−1.43)	(−1.97)

The coefficient estimate of the interaction term is positive and significant. It suggests that lottery-like stocks with negative CGO have lower returns than lottery-like stocks with positive CGO.

3.3 Empirical result: Possible Explanations

The break-even effect can induce investors in losses to take gambles that they otherwise would not have taken. In this case, assets with high skewness seem especially attractive because they provide a better chance to break even.
Investors' demand for lottery-like stocks should be stronger in the loss region than in the gain region.

Using probit regressions, we estimate the propensity to sell lottery-like stocks for individual investors.

3.3 Empirical result: Possible Explanations

Table 11. Propensity to Sell Lottery Stocks, Individu

Proxy	*Maxret*	*Jackpotp*
Ret^+	0.0007	0.0005
	(4.90)	(4.60)
Ret^-	−0.0028	−0.0012
	(−16.97)	(−8.04)
Proxy	0.0088	−0.0400
	(14.14)	(−6.51)
$Ret^+ \times Proxy$	0.0038	0.0615
	(2.10)	(5.38)
$Ret^- \times Proxy$	0.0367	0.0924
	(18.93)	(7.59)

Table 12. Propensity to Sell Lottery Stocks, Mutual Funds

Proxy	*Maxret*	*Jackpotp*
Ret^+	0.2730	0.2828
	(42.45)	(44.30)
Ret^-	−0.1913	−0.1872
	(−22.76)	(−21.79)
Proxy	−0.1407	−2.6514
	(−3.78)	(−6.17)
$Ret^+ \times Proxy$	0.1531	−1.4538
	(1.79)	(−1.83)
$Ret^- \times Proxy$	0.6025	1.7634
	(8.33)	(3.49)

The coefficients for the interaction terms are usually positive and significant. This finding implies that investors' preference for lottery-like assets over non-lottery-like assets is significantly stronger in the loss region compared than in the gain region.

3.3 Empirical result: Possible Explanations

Table 6. (Continued)

	Proxy = Skewexp			
	(1)	(2)	(3)	(4)
CGO	−0.007	−0.005	−0.010	−0.008
	(−3.09)	(−2.38)	(−3.61)	(−3.08)
Proxy	−0.002	−0.002	−0.004	−0.004
	(−1.42)	(−1.85)	(−2.25)	(−2.27)
Proxy × *CGO*	0.016	0.013	0.017	0.014
	(6.65)	(5.16)	(5.85)	(4.92)
Proxy × $Ret_{-12,-2}$		0.005		0.006
		(2.19)		(2.50)
Proxy × *VNSP*			0.006	0.003
			(0.90)	(0.40)

The V-shaped net selling propensity (VNSP), a more precise measure of mispricing, subsumes the return predictive power of CGO. The coefficient estimate of Proxy × VNSP is significant only for three of the five lottery proxies. It suggests that the mispricing effect may have played a role in some of the lottery anomalies but not all of them.

4. Conclusion

1. The previously documented underperformance of lottery-like assets is significantly stronger among firms with prior capital losses. Among firms where investors face large prior capital gains in these investments, the underperformance of lottery-like assets is either weak or even reversed.

4. Comment & Inspiration

1. It is not very common to explain one anomaly to another. There are few researches on lottery anomalies in China, and there is no research on the causes of lottery anomalies. It is worthy of further study. However, there is a lack of data on individual investors in China, which restricts the research in this area.