Overnight returns, daytime reversals, and future stock returns (202209)

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[2]Covering shorts. Journal of Financial and Quantitative Analysis. 2018.
[3]Capital structure, derivatives and equity market quality.Journal of Financial and Quantitative Analysis. 2016.

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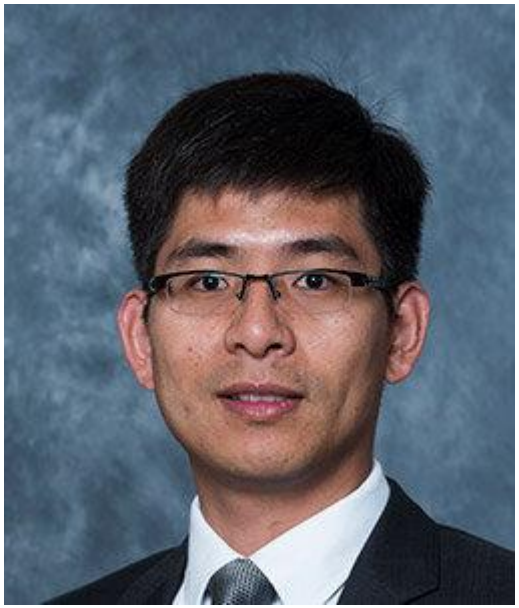

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[1]Indirect Insider Trading. Journal of Financial and Quantitative Analysis. Forthcoming.
[2]Insider Investment Horizon. Journal of Finance. 2020.
[3]Insider Trading and the Legal Expertise of Corporate Executives. Journal of Banking and Finance. 2021.

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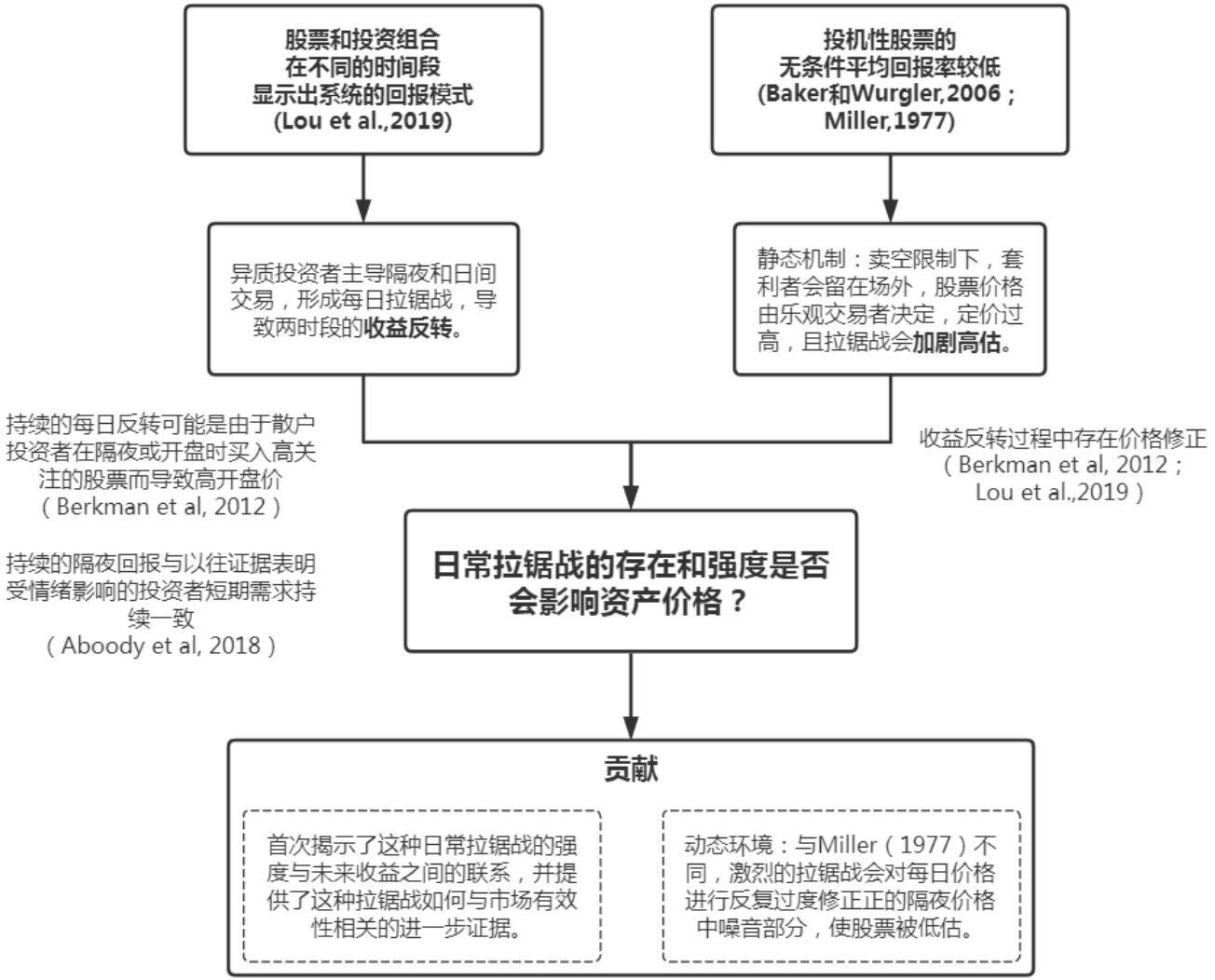
[1]Paying Attention: Overnight Returns and the Hidden Cost of Buying at the Open. Journal of Financial and Quantitative Analysis. 2012.

[2]Informed Trading through the Accounts of Children. Journal of Finance. 2014.

[3]Initial Margin Requirements and Market Efficiency. Journal of Financial and Quantitative Analysis. 2022.

Contents

1. 研究背景


股票和投资组合
在不同的时间段
显示出系统的回报模式
(Lou et al.,2019)
投机性股票的
无条件平均回报率较低
(Baker和Wurgler,2006；
Miller,1977)
异质投资者主导隔夜和日间交易，形成每日拉锯战，导致两时段的收益反转。
静态机制：卖空限制下，套利者会留在场外，股票价格由乐观交易者决定，定价过高，且拉锯战会加剧高估。
持续的每日反转可能是由于散户投资者在隔夜或开盘时买入高关注的股票而导致高开盘价
(Berkman et al, 2012)
持续的隔夜回报与以往证据表明受情绪影响的投资者短期需求持续一致
(Aboody et al, 2018)
收益反转过程中存在价格修正
(Berkman et al, 2012；
Lou et al.,2019)
日常拉锯战的存在和强度是否会影响资产价格？
贡献
首次揭示了这种日常拉锯战的强度与未来收益之间的联系，并提供了这种拉锯战如何与市场有效性相关的进一步证据。
动态环境：与Miller (1977) 不同，激烈的拉锯战会对每日价格进行反复过度修正正的隔夜价格中噪音部分，使股票被低估。

2. 主要发现

- 在高频的正隔夜收益且负日间收益反转情况下，日拉锯战的月度强度可以预测横截面上的未来收益，但高频率的负隔夜收益且正日间收益的反转中没有这种预测关系。
- 这种预测性是由t+1月的隔夜收益驱动的，而不是日间收益。
- 其背后的经济机制：高频率的正隔夜收益在下一个交易日被反转，可能表明日间的套利者忽略正面信息，抵消不知情的噪音交易者反复向上的隔夜价格压力，从而导致过度修正。

3. 数据、变量和样本统计

数据

- 1993年5月至2017年12月期间所有纽约证券交易所的普通股（股票代码10和11）（来自CRSP）
- 排除了金融和公用事业公司，并将样本限制在月末价格高于1美元的股票。

3. 数据、变量和样本统计

- **变量**
- 日度拉锯战强度-负（正）日间反转的异常频率
- 1）将每日股票收益分解为各自的隔夜和日间组成部分
- daytime return(open-to-close):

$$RET\_OC_{id} = \frac{P_{id}^{Close}}{P_{id}^{Open}} - 1$$

- overnight return(close-to-open):

$$RET\_CO_{id} = \frac{1 + RET_{id}}{1 + RET\_OC_{id}} - 1$$

- 2）负（正）的日间反转：正（负）的隔夜收益，次日为负（正）的日间收益。

3. 数据、变量和样本统计

- **变量**
- 日度拉锯战强度-负（正）日间反转的异常频率
- 3）计算负（正）日间反转天数与t月份总交易天数的比率，即NR_{it}（PR_{it}），其反映了拉锯战的激烈程度。
- 4）**负（正）日间反转的异常频率**AB_NR_{it}（AB_PR_{it}）：NR_{it}与过去12个月的平均NR_{it}（PR_{it}）计算得出。

- 各种公司特征变量：Appendix 1. Variable descriptions and construction

3. 数据、变量和样本统计

Table 1
Summary statistics for tug-of-war measures
This table presents summary statistics and correlations for our measures of the abnormal intensity of a daily tug of war (AB_NR and AB_PR). We also present analogous statistics for the level of intensity of a tug of war (NR and PR). NR is the ratio of the number of days with RET_CO>0 and RET_OC<0 (i.e., negative daytime reversals) to the total number of trading days in a given month, where RET_CO is the overnight return from the previous day's closing price to the opening price on the current day, and RET_OC is the daytime return from the opening price to the closing price on the current day. AB_NR is the ratio of NR to the average NR over the past 12 months. PR is the ratio of the number of days with RET_CO<0 and RET_OC>0 (i.e., positive daytime reversals) to the total number of trading days in a given month. AB_PR is the ratio of PR to the average PR over the past 12 months. LeadAB_NR, LeadNR, LeadAB_PR, and LeadPR represent AB_NR, NR, AB_PR, and PR in month $t+1$, respectively.
These statistics are computed as time series averages of the monthly cross-sectional statistics. In Panel B, Spearman correlations appear above the diagonal and Pearson correlations below the diagonal. The sample period covers 1993–2017.

第五种隔夜日间模式：日间或隔夜或两者均为零收益的日子，占所有交易日的9%

Panel A. Summary Statistics

	MEAN	STD	SKEW	KURT	MIN	P1	P5	P10	P25	MEDIAN	P75	P90	P95	P99	MAX
AB_NR	1.02	0.46	0.76	2.77	0.00	0.13	0.35	0.48	0.71	0.98	1.29	1.61	1.82	2.31	4.08
NR	0.25	0.11	0.38	0.17	0.00	0.03	0.09	0.12	0.18	0.25	0.32	0.40	0.44	0.53	0.70
AB_PR	1.03	0.48	0.70	1.36	0.00	0.11	0.33	0.46	0.69	0.98	1.31	1.64	1.87	2.38	3.79
PR	0.24	0.11	0.53	0.50	0.00	0.03	0.08	0.11	0.16	0.23	0.31	0.38	0.43	0.54	0.74

拉锯战强度的异常变化往往会蔓延到下一个月。

Panel B. Correlations

	AB_ NR	NR	AB_ PR	PR	Lead AB_ NR	Lead NR	Lead AB_ PR	Lead PR
AB_NR	1	0.89	−0.36	−0.32	0.09	0.08	−0.06	−0.06
NR	0.86	1	−0.32	−0.36	0.00	0.18	−0.02	−0.09
AB_PR	−0.36	−0.33	1	0.88	−0.07	−0.06	0.10	0.09
PR	−0.33	−0.38	0.85	1	−0.03	−0.09	0.01	0.20
LeadAB_NR	0.10	−0.01	−0.07	−0.03	1	0.89	−0.36	−0.32
LeadNR	0.08	0.20	−0.07	−0.10	0.86	1	−0.33	−0.36
LeadAB_PR	−0.07	−0.02	0.11	0.01	−0.36	−0.34	1	0.88
LeadPR	−0.06	−0.10	0.09	0.22	−0.33	−0.38	0.85	1

3. 数据、变量和样本统计

在未来3个月中，拉锯战的异常频率水平均存在显著的持续性，但是在不断的减弱。

Table 2

Persistence of the abnormal frequency of daytime reversals

This table presents evidence regarding the persistence of AB_NR and AB_PR, using Fama-MacBeth regression where the dependent variable is the future value of the abnormal frequency of negative or positive daytime reversals (AB_NR_{it+a} or AB_PR_{it+a} where $a = 1, 2,$ or 3 months ahead). For each forecast horizon, we estimate two versions of this model with or without the control variables in Table 4. All variables are described in Appendix 1. The sample period covers 1993–2017. The t-ratios (in parentheses) are based on Newey-West robust standard errors of the mean monthly coefficients, with 12 monthly lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Panel A. Persistence of negative daytime reversals (AB_NR)						
Dependent Variable:	(1) AB_NR_{it+1}	(2) AB_NR_{it+1}	(3) AB_NR_{it+2}	(4) AB_NR_{it+2}	(5) AB_NR_{it+3}	(6) AB_NR_{it+3}
AB_NR	0.118***	0.116***	0.075***	0.073***	0.058***	0.053***
	(16.20)	(17.49)	(10.86)	(12.63)	(13.48)	(14.14)
Controls	No	Yes	No	Yes	No	Yes
Adj. R^2	0.016	0.037	0.008	0.029	0.006	0.027
N	724,533	724,533	708,849	708,849	694,736	694,736
Panel B. Persistence of positive daytime reversals (AB_PR)						
Dependent Variable:	(1) AB_PR_{it+1}	(2) AB_PR_{it+1}	(3) AB_PR_{it+2}	(4) AB_PR_{it+2}	(5) AB_PR_{it+3}	(6) AB_PR_{it+3}
AB_PR	0.123***	0.119***	0.077***	0.075***	0.056***	0.053***
	(17.72)	(19.64)	(12.81)	(14.77)	(12.79)	(13.77)
Controls	No	Yes	No	Yes	No	Yes
Adj. R^2	0.017	0.036	0.008	0.028	0.007	0.027
N	724,533	724,533	708,849	708,849	694,736	694,736

Table 3

Summary statistics and correlations for main variables

This table presents time-series averages of monthly cross-sectional summary statistics (Panel A) and monthly cross-sectional correlations (Panel B) for various stock characteristics. The sample contains common stocks listed on the NYSE, AMEX, and NASDAQ from May 1993 to December 2017. We exclude the stocks of financial firms and utility firms, as well as stocks with a month end price of less than $1. NR is the ratio of the number of days with RET_CO>0 and RET_OC<0 (i.e., negative daytime reversals) to the total number of trading days in a given month, where RET_CO is the overnight return from the previous day's closing price to the opening price on the current day, and RET_OC is the daytime return from the opening price to the closing price on the current day. AB_NR is the ratio of NR to the average NR over the past 12 months. PR is the ratio of the number of days with RET_CO<0 and RET_OC>0 (i.e., positive daytime reversals) to the total number of trading days in a given month. AB_PR is the ratio of PR to the average PR over the past 12 months. RET is the contemporaneous monthly return from CRSP in month t, when AB_NR is measured. RET_CO_M is the compounded daily overnight return during month t. RET_OC_M is the compounded daily daytime return during month t. SIZE is the market value of equity calculated as the number of shares outstanding times the month-end share price. BM is the ratio of book value to market value of equity. RET_6M is the cumulative (momentum) return from month t - 6 to t - 1. GPA is the gross profitability from Novy-Marx (2013). ATGTH is the asset growth from Cooper et al. (2008). TURN_M is the turnover ratio measured as the number of shares traded divided by the number of shares outstanding in month t. STDRET_M is the volatility of daily returns during month t. ILLIQ_M is the Amihud (2002) measure of illiquidity in month t. IO is institutional ownership.

Panel A. Descriptive statistics

	MEAN	STD	MIN	P25	MEDIAN	P75	MAX
AB_NR	1.02	0.46	0.00	0.71	0.98	1.29	4.08
AB_PR	1.03	0.48	0.00	0.69	0.98	1.31	3.79
RET	0.01	0.16	−0.71	−0.07	0.00	0.08	1.94
RET_OC_M	0.01	0.18	−0.70	−0.07	0.01	0.08	2.72
RET_CO_M	0.01	0.14	−0.67	−0.04	0.00	0.05	2.05
SIZE	3.36	15.99	0.00	0.10	0.37	1.37	354.45
BM	0.71	1.15	0.00	0.28	0.49	0.84	33.28
RET_6M	0.09	0.45	−0.85	−0.15	0.03	0.23	6.91
GPA	0.35	0.33	−2.60	0.19	0.33	0.50	2.88
ATGTH	0.21	1.53	−0.81	−0.03	0.07	0.22	64.06
TURN_M	1.17	1.72	0.01	0.35	0.75	1.43	38.79
STDRET_M	0.03	0.02	0.00	0.02	0.03	0.04	0.35
ILLIQ_M	0.23	2.21	0.00	0.00	0.00	0.04	72.04
IO	0.51	0.29	0.00	0.27	0.56	0.76	1.00

Panel B. Correlations (Spearman above diagonal and Pearson below diagonal)

	AB_NR	AB_PR	RET	RETOC_M	RETCO_M	SIZE	BM	RET_6M	GPA	ATGTH	TURN_M	STDRET_M	ILLIQ_M	IO
AB_NR	1	−0.36	−0.16	−0.44	0.43	0.01	−0.03	0.05	0.00	−0.01	0.05	−0.01	−0.03	0.02
AB_PR	−0.36	1	0.17	0.44	−0.42	0.01	0.02	0.00	0.00	0.01	−0.03	−0.07	−0.01	−0.02
RET	−0.13	0.14	1	0.71	0.23	0.12	0.01	0.02	0.03	0.00	0.07	−0.03	−0.08	0.05
RETOC_M	−0.39	0.40	0.64	1	−0.39	0.04	0.05	0.02	0.06	−0.02	−0.07	−0.06	0.01	0.01
RETCO_M	0.36	−0.35	0.30	−0.43	1	0.06	−0.06	−0.01	−0.06	0.02	0.18	0.09	−0.09	0.02
SIZE	−0.01	−0.01	0.07	0.00	0.01	1	−0.29	0.19	0.00	0.16	0.47	−0.50	−0.95	0.65
BM	−0.02	0.03	0.02	0.06	−0.04	−0.26	1	0.00	−0.17	−0.18	−0.20	0.03	0.29	−0.08
RET_6M	0.05	0.00	0.01	0.00	−0.01	0.10	0.01	1	0.05	−0.05	0.07	−0.15	−0.18	0.07
GPA	0.00	0.00	0.02	0.05	−0.07	0.02	−0.06	0.02	1	0.02	−0.05	−0.09	0.00	0.06
ATGTH	−0.01	0.00	−0.02	−0.03	0.02	0.03	−0.07	−0.04	−0.06	1	0.13	−0.05	−0.16	0.11
TURN_M	0.04	−0.03	0.09	−0.08	0.17	0.41	−0.18	0.10	−0.04	0.06	1	0.09	−0.66	0.43
STDRET_M	0.01	−0.06	0.12	0.02	0.21	−0.42	0.02	−0.06	−0.10	0.02	0.14	1	0.47	−0.36
ILLIQ_M	−0.02	−0.01	−0.03	0.05	−0.05	−0.24	0.09	−0.06	0.02	−0.03	−0.21	0.19	1	−0.66
IO	0.01	−0.03	0.01	−0.03	−0.02	0.61	−0.07	0.00	0.08	−0.01	0.42	−0.33	−0.19	1

在隔夜收益较高，日间收益为负的月份，公司的累积月度回报率在隔夜较高，而在日间较低。

AB_NR与其他控制变量的相关性较低，表明AB_NR提供了关于公司的新信息，并不是其他公司属性所提供的。

4. 主要分析

4.1 Fama-MacBeth 回归方法

在表4中，t月份有较高的负日间反转异常频率（AB_NR）的公司，在t+1月份的收益显著更高。

相比之下， 正 日间 反 转异常频率（AB_PR）没有显著的意义。

这些证据共同表明了一种不对称的关系。这种不对称的发现指向一种解释，即在由隔夜正收益和日间负反转组成的更激烈的拉锯战中，白天的交易者会进行过度修正。

Table 4
Abnormal negative daytime reversals and future returns: Regression analysis
This table presents the Fama-MacBeth mean monthly coefficients for several regression specifications that include different subsets of the independent variables listed in Table 3. The dependent variable is the future stock return for firm i in month $t + 1$ (RET_{it+1}). The key variables of interest are the monthly abnormal frequencies of negative and positive daytime reversals, respectively (AB_NR and AB_PR). The intercept for each specification is not shown below, for brevity. All variables are described in Appendix 1. The sample period covers 1993–2017. The t-ratios (in parentheses) are based on Newey-West robust standard errors of the mean monthly coefficients, with 12 lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Dependent Variable:	(1) RET_{it+1}	(2) RET_{it+1}	(3) RET_{it+1}	(4) RET_{it+1}	(5) RET_{it+1}
AB_NR	0.506***	0.431***	0.403***	0.339**	
	(6.12)	(6.69)	(6.42)	(6.18)	
AB_PR	−0.101	−0.049	−0.038	−0.093	
	(−1.25)	(−0.57)	(−0.46)	(−1.19)	
RET_CO_M	−1.467***	−1.376***	−1.313***	−0.278	0.096
	(−2.68)	(−2.84)	(−2.75)	(−0.69)	(0.25)
RET_OC_M	−0.744	−1.207**	−1.392***	−1.102**	−1.492***
	(−1.54)	(−2.53)	(−2.95)	(−2.51)	(−3.67)
SIZE		−0.023	−0.018	−0.171***	−0.170***
		(−0.41)	(−0.32)	(−3.72)	(−3.62)
BM		0.229**	0.233**	0.197*	0.201*
		(1.97)	(1.99)	(1.89)	(1.92)
RET_6M		0.406	0.361	0.342	0.365
		(1.37)	(1.22)	(1.20)	(1.27)
GPA			0.588***	0.433**	0.440**
			(2.61)	(2.05)	(2.08)
ATGTH			−0.229***	−0.217***	−0.222***
			(−4.13)	(−3.80)	(−3.91)
TURN_M				0.222**	0.214**
				(2.08)	(1.99)
STDRET_M				−0.247***	−0.246***
				(−5.50)	(−5.53)
ILLIQ_M				0.225***	0.226***
				(3.83)	(3.85)
IO				−0.028	−0.002
				(−0.08)	(−0.00)
Adj. R^2	0.0109	0.0304	0.0354	0.0495	0.0487
N	749,430	749,430	749,430	749,430	749,430

4. 主要分析

4.2 投资组合方法：

每个月t，根据AB_NR将股票分为十组，并在下个月持有每个组合。

Table 5

Abnormal negative daytime reversals and future returns: Portfolio analysis

Panel A of this table presents the equal-weighted results from one-way sorting analysis. Each month t, we sort all stocks into deciles based on the abnormal frequency of negative daytime reversals, AB_NR. We then assume that each decile portfolio is held during month $t + 1$. In the top row of Panel A, we report the equal-weighted average raw returns for these decile portfolios in month $t + 1$, RET_{it+1}, along with the average raw return for the high minus low hedge portfolio (H - L) that is long stocks with a high value of AB_NR and short stocks with a low AB_NR. In the remaining rows of Panel A, we report the analogous results based on the 4-factor (Carhart, 1997) and 6-factor (Fama and French, 2018) alphas for each portfolio.

Panel B reports the analogous value-weighted results from one-way sorting analysis, while Panel C presents the analogous value-weighted results when we exclude the largest one percent of firms each month (in terms of market capitalization, SIZE). Panel D provides both the equal-weighted and value-weighted results from two-way dependent sorting analysis based on firm size and AB_NR. Specifically, each month t, we first sort all stocks into deciles based on the firm's market capitalization. Then, within each size decile, we sort stocks into quintiles based on AB_NR, resulting in 50 portfolios in this 10×5 sorting scheme. For each size decile, we only present the results for the high minus low hedge portfolio (H - L) that is long stocks with a high value of AB_NR and short stocks with a low AB_NR.

In Panel E, we replicate the one-way portfolio analysis in Panel A after decomposing the future one-month return for each firm into its cumulative overnight and daytime components. The sample period covers 1993–2017. The t-statistics are based on Newey-West robust standard errors with 12 lags.

* indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Panel A. Equal-weighted portfolio returns

AB_NR	Low	2	3	4	5	6	7	8	9	High	H - L
Raw Return	0.58	0.64	0.85	0.85	0.85	0.98	0.96	1.16	1.30	1.50	0.92***
	(1.60)	(1.71)	(2.24)	(2.33)	(2.21)	(2.51)	(2.51)	(3.22)	(3.36)	(3.90)	(5.19)
FF4 α	−0.23	−0.24	−0.03	−0.03	−0.03	0.07	0.03	0.25	0.38	0.58	0.81***
	(−1.87)	(−2.22)	(−0.21)	(−0.32)	(−0.24)	(0.60)	(0.28)	(2.08)	(2.34)	(3.37)	(4.84)
FF6 α	−0.24	−0.23	0.02	0.05	0.06	0.15	0.10	0.29	0.46	0.62	0.85***
	(−1.92)	(−2.12)	(0.16)	(0.48)	(0.44)	(1.29)	(0.79)	(2.16)	(2.71)	(3.52)	(5.04)

第二种不对称的体现。捕捉了日间投资者倾向于过度修正正隔夜收益的时期。

相反，异常频率低的负反转表明，日间交易者不太可能过度修正，因此回报的可预测性应该更弱。

AB_NR对冲投资组合的回报主要由多头驱动。

Panel B. Value-weighted portfolio returns

AB_NR	Low	2	3	4	5	6	7	8	9	High	H - L
Raw Return	0.75	0.79	0.96	0.96	0.74	0.98	1.04	0.88	0.98	0.95	0.20
	(3.08)	(3.45)	(3.61)	(2.76)	(2.37)	(3.08)	(3.22)	(2.76)	(2.96)	(2.91)	(1.01)
FF4 α	0.00	−0.05	0.16	0.15	−0.09	0.06	0.23	−0.04	0.11	0.08	0.09
	(−0.01)	(−0.55)	(1.45)	(1.07)	(−0.90)	(0.47)	(2.02)	(−0.36)	(1.23)	(0.72)	(0.46)
FF6 α	−0.12	−0.13	0.11	0.18	−0.18	0.07	0.21	−0.06	0.16	−0.03	0.09
	(−1.05)	(−1.28)	(1.00)	(1.22)	(−1.69)	(0.56)	(1.82)	(−0.59)	(1.83)	(−0.23)	(0.52)

Panel C. Value-weighted portfolio returns, excluding the 1% of largest firms each month

AB_NR	Low	2	3	4	5	6	7	8	9	High	H - L
Raw Return	0.73	0.89	0.94	0.99	0.79	0.91	0.98	0.94	1.10	1.22	0.49***
	(2.70)	(3.23)	(3.18)	(3.44)	(2.47)	(2.88)	(3.03)	(3.12)	(3.23)	(3.72)	(3.03)
FF4 α	−0.12	0.04	0.08	0.09	−0.13	0.00	0.08	−0.01	0.11	0.29	0.41**
	(−1.07)	(0.43)	(1.07)	(0.99)	(−1.29)	(0.04)	(0.78)	(−0.12)	(1.26)	(2.47)	(2.48)
FF6 α	−0.27	0.01	0.10	0.12	−0.13	0.00	0.05	−0.06	0.09	0.12	0.39**
	(−2.78)	(0.08)	(1.16)	(1.18)	(−1.31)	(−0.01)	(0.48)	(−0.75)	(0.89)	(0.98)	(2.37)

不显著

显著

Panel D. Hedge portfolio returns for the high minus low quintile portfolios based on AB_NR, within each decile portfolio based on firm size

		Hedge Portfolio Returns Based on AB_NR											
		Equal-Weighted						Value-Weighted					
		Raw Ret		FF4 α		FF6 α		Raw Ret		FF4 α		FF6 α	
		H-L	t	H-L	t	H-L	t	H-L	t	H-L	t	H-L	t
SIZE	L	0.68***	(3.17)	0.70***	(3.17)	0.88***	(3.90)	1.04***	(4.19)	1.00***	(3.86)	1.14***	(4.56)
	2	1.03***	(4.28)	0.93***	(3.51)	0.85***	(3.50)	1.00***	(3.89)	0.92***	(3.29)	0.87***	(3.30)
	3	1.13***	(3.83)	1.08***	(3.66)	1.14***	(3.65)	1.16***	(3.90)	1.09***	(3.68)	1.15***	(3.70)
	4	0.82***	(3.59)	0.66***	(2.93)	0.72***	(3.17)	0.81***	(3.63)	0.64***	(2.92)	0.71***	(3.19)
	5	0.74***	(4.81)	0.72***	(4.19)	0.83***	(4.69)	0.75***	(4.81)	0.73***	(4.14)	0.83***	(4.68)
	6	0.63***	(3.62)	0.58***	(3.27)	0.65***	(3.60)	0.61***	(3.56)	0.56***	(3.21)	0.62***	(3.51)
	7	0.48***	(2.72)	0.34**	(2.19)	0.37**	(2.51)	0.45**	(2.57)	0.30**	(1.99)	0.33**	(2.26)
	8	0.54***	(4.54)	0.49***	(3.79)	0.52***	(3.75)	0.51***	(4.21)	0.46***	(3.52)	0.51***	(3.56)
	9	0.49***	(2.97)	0.38***	(2.61)	0.34**	(2.15)	0.44**	(2.58)	0.32**	(2.07)	0.30*	(1.68)
	H	0.23*	(1.70)	0.13	(1.12)	0.11	(0.83)	0.15	(1.01)	0.07	(0.54)	0.12	(0.95)

根据size十等分股票，在每组中根据AB_NR再将股票五等分。

除了最大的十等分规模外，其他组均显著。

本文的结果并不局限于样本中有限的小型股票。

Table 5
(*continued*)

Panel E. Decomposing future monthly returns into overnight and daytime components											
AB_NR	Low	2	3	4	5	6	7	8	9	High	H - L
					Overnight Returns						
Raw Return	−1.49	0.10	0.65	1.14	1.49	1.77	2.07	2.39	2.62	3.16	4.65***
	(−4.06)	(0.36)	(2.39)	(4.05)	(4.65)	(5.17)	(5.96)	(6.04)	(6.25)	(5.67)	(7.16)
FF4 α	−1.83	−0.26	0.29	0.81	1.16	1.43	1.73	2.06	2.31	3.03	4.87***
	(−5.42)	(−0.98)	(1.16)	(2.91)	(3.67)	(4.11)	(4.91)	(5.02)	(5.16)	(4.51)	(6.46)
FF6 α	−1.75	−0.23	0.34	0.86	1.21	1.49	1.73	2.10	2.34	2.97	4.72***
	(−5.48)	(−0.90)	(1.34)	(3.10)	(3.78)	(4.15)	(4.95)	(4.99)	(5.26)	(4.74)	(6.91)
					Daytime Returns						
Raw Return	4.01	1.85	1.37	0.86	0.72	0.44	0.16	0.14	0.05	0.32	−3.69***
	(7.42)	(4.58)	(3.82)	(2.49)	(2.11)	(1.23)	(0.45)	(0.40)	(0.13)	(0.85)	(−8.38)
FF4 α	3.37	1.18	0.67	0.15	0.10	−0.27	−0.53	−0.57	−0.69	−0.44	−3.82***
	(6.55)	(3.31)	(2.29)	(0.58)	(0.28)	(−1.02)	(−1.95)	(−1.88)	(−2.46)	(−1.53)	(−8.29)
FF6 α	3.25	1.13	0.62	0.14	0.10	−0.28	−0.53	−0.64	−0.72	−0.48	−3.72***
	(6.53)	(3.22)	(2.14)	(0.54)	(0.28)	(−1.06)	(−2.00)	(−2.14)	(−2.53)	(−1.68)	(−8.22)

AB_NR与未来收益的正向预测关系是由未来月度收益的隔夜部分而非日间部分驱动的。

此外，还通过比较拉锯战的异常强度（AB_NR）和其他17个著名的资产定价异常现象的收益预测性，来评估我们结论的经济意义。结果表明AB_NR与大多数其他众所周知的异象相当，在统计上也更加显著。

4. 主要分析

4.3 投资组合方法：控制其他公司特征

Table 6
Controlling for firm characteristics
Panel A presents the average firm attributes for stocks in the different AB_NR groups. RET is the contemporaneous monthly return from CRSP in month t, when AB_NR is measured. SIZE is the market value of equity calculated as the number of shares outstanding times the month-end share price. STDRET_M is the volatility of daily returns in month t. ILLIQ_M is the Amihud (2002) measure of illiquidity in month t. ESPCT is the value-weighted percent effective spread. For each trade k, the percent effective spread is calculated as $2D_k(P_k-M_k)/M_k$, where $D_k = +1$ (-1) if the trade is a buy (sell) following Lee and Ready (1991), P_k is the price, and M_k is the midquote. The dollar value of shares traded is used as the weight applied to each trade. ANALYST is analyst coverage. TURN_M is turnover measured as the number of shares traded divided by the number of shares outstanding in month t. RET_6M is the cumulative (momentum) return from month t - 6 to t - 1. BM is the ratio of book value to market value of equity. GPA is gross profitability from Novy-Marx (2013). ATGTH is asset growth from Cooper et al. (2008).
Panel B presents results from two-way (5 × 3) sorting schemes, based on the abnormal frequency of negative daytime reversals, AB_NR, and the above firm attributes. In this analysis we independently sort the cross section of firms each month into quintiles by AB_NR and into terciles by each firm attribute. We then hold the resulting 15 portfolios in each 5 × 3 sorting scheme for one month. For each firm attribute, we only present the results for the high minus low hedge portfolio (H - L) that is long stocks with a high value of AB_NR and short stocks with a low AB_NR, within each tercile by the firm attribute. All variables are described in Appendix 1. The sample period covers 1993–2017. The t-statistics are based on Newey-West robust standard errors with 12 lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Panel A. The attributes of stocks in different AB_NR deciles

AB_NR	L	2	3	4	5	6	7	8	9	H	H_L	t-stat
RET	4.41	3.73	2.78	2.28	1.64	0.92	0.36	−0.37	−1.32	−2.68	−7.10***	(−11.80)
SIZE	3.06	3.28	3.51	3.47	3.50	3.35	3.45	3.38	3.50	3.10	0.04	(0.28)
STDRET_M	3.28	3.29	3.28	3.29	3.29	3.29	3.28	3.29	3.29	3.35	0.06	(1.07)
ILLIQ_M	0.45	0.26	0.22	0.20	0.16	0.18	0.18	0.21	0.20	0.25	−0.20***	(−5.37)
ESPCT	1.39	1.21	1.15	1.12	1.11	1.11	1.11	1.12	1.16	1.34	−0.05*	(−1.65)
ANALYST	6.83	7.37	7.55	7.61	7.67	7.64	7.60	7.57	7.49	6.92	0.09	(0.91)
TURN_M	0.98	1.11	1.14	1.20	1.21	1.22	1.22	1.23	1.21	1.14	0.16***	(5.51)
RET_6M	0.06	0.07	0.07	0.08	0.08	0.09	0.10	0.10	0.11	0.13	0.07***	(5.18)
BM	0.81	0.73	0.71	0.70	0.69	0.68	0.68	0.67	0.68	0.73	−0.08***	(−3.44)
GPA	0.36	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.36	0.00	(−0.74)
ATGTH	0.18	0.23	0.23	0.22	0.23	0.21	0.23	0.21	0.21	0.17	−0.02	(−1.46)

研究AB_NR与其他公司属性之间的关系：

公司规模（SIZE）、回报波动率（STDRET_M）、有效价差（ESPCT）、分析师覆盖率（ANALYST）、总利润率（GPA）和资产增长（ATGTH）不显著。

4. 主要分析

4.3 投资组合方法：控制其他公司特征

研究当我们逐一考虑上述公司属性时，AB_NR和未来收益之间的预测关系是否发生变化。

每个月t，将股票按AB_NR分为五等分，并按这些公司属性分为三等分。所有的投资组合都持有一个月(t+1)。

Panel B. Two-way sorting analysis

Hedge Portfolio Returns Based on AB_NR

				FF6 α		Raw Ret				FF4 α		FF6 α			
Firm Char		H-L	t	H-L	t	H-L	t	Firm Char		H-L	t	H-L	t	H-L	t
	L	0.81***	(5.05)	0.70***	(3.88)	0.77***	(3.93)		L	0.90***	(6.60)	0.86***	(5.97)	0.83***	(5.70)
RET	2	0.72***	(5.85)	0.67***	(5.85)	0.67***	(5.55)	TURN_M	2	0.74***	(6.09)	0.68***	(5.51)	0.70***	(6.08)
	H	0.68***	(3.94)	0.60***	(3.87)	0.68***	(4.07)		H	0.62***	(3.60)	0.53***	(3.22)	0.65***	(3.56)
	L	0.97***	(5.72)	0.93***	(5.33)	0.98***	(5.63)		L	1.04***	(5.38)	1.01***	(4.81)	1.09***	(5.06)
SIZE	2	0.75***	(5.84)	0.64***	(4.78)	0.73***	(5.35)	RET_6M	2	0.63***	(5.24)	0.64***	(5.27)	0.63***	(5.38)
	H	0.43***	(3.93)	0.34***	(3.87)	0.35***	(3.75)		H	0.65***	(4.28)	0.52***	(3.78)	0.57***	(3.81)
	L	0.66***	(5.28)	0.57***	(5.22)	0.56***	(5.40)		L	0.96***	(5.43)	0.87***	(4.93)	0.91***	(5.34)
STDRET_M	2	0.69***	(4.81)	0.58***	(4.56)	0.62***	(5.01)	BM	2	0.83***	(6.13)	0.78***	(5.86)	0.80***	(6.41)
	H	1.00***	(4.90)	0.97***	(4.28)	1.07***	(4.58)		H	0.77***	(4.88)	0.71***	(4.48)	0.74***	(4.40)
	L	0.38***	(3.11)	0.27***	(2.67)	0.28***	(2.60)		L	0.71***	(3.60)	0.63***	(3.15)	0.73***	(3.61)
ILLIQ_M	2	0.74***	(4.79)	0.65***	(3.79)	0.77***	(4.39)	GPA	2	0.77***	(8.30)	0.68***	(7.29)	0.68***	(6.73)
	H	0.96***	(6.42)	0.94***	(6.24)	0.96***	(6.48)		H	0.84***	(5.80)	0.79***	(5.06)	0.82***	(5.37)
	L	0.49***	(4.14)	0.40***	(3.90)	0.38***	(3.52)		L	0.64***	(3.58)	0.59***	(2.85)	0.58***	(2.90)
ESPCT	2	0.70***	(4.71)	0.56***	(3.85)	0.63***	(4.41)	ATGTH	2	0.83***	(5.41)	0.79***	(4.61)	0.85***	(4.91)
	H	1.06***	(5.73)	1.02***	(5.26)	1.10***	(5.45)		H	0.77***	(6.32)	0.65***	(5.98)	0.72***	(6.19)
	L	0.90***	(4.64)	0.77***	(3.96)	0.81***	(4.01)								
ANALYST	2	0.90***	(5.68)	0.83***	(4.82)	0.84***	(5.13)								
	H	0.50***	(3.91)	0.42***	(3.49)	0.47***	(3.89)								

在每个公司特征组合中，高AB_NR组的表现都优于低AB_NR组。

对于规模较小、波动性较大、非流动性较高、有效价差较大或分析师覆盖率较低的公司来说，AB_NR对冲基金的回报率较大。这些公司更加不透明，因此，日间套利者**更难区分**隔夜信息与噪音交易带来的价格压力，且更有可能将这些股票的连续正的隔夜回报归因于噪音交易，并进行**过度修正**，从而导致更强的预测关系。

5. 检验过度修正的额外影响

5.1 安慰剂检验：从日间到晚上的正向反转

- 考虑从一个负日间回报到一个正隔夜反转的替代序列。这种从日间到夜晚的正向反转（DOPR）序列与我们对负向反转（NR）的经济解释无关，日间到隔夜的正向反转（DOPR）的高频率不应反映一场持续的拉锯战，因此不会预测收益。按照获得AB_NR的方法来计算从日间到晚上正向反转的异常频率（AB_DOPR）。

Table 7

Placebo test: Negative daytime returns followed by positive overnight reversals

In this table, we conduct a placebo test by analyzing an alternative monthly measure of a potential daily tug of war, based on daytime-to-overnight positive reversals (DOPR). Here we consider the frequency of days in a month with a negative daytime return followed by a positive overnight return, rather than a positive overnight return followed by a negative daytime return, as in the case of AB_NR. We also measure the abnormal frequency of daytime-to-overnight positive reversals (AB_DOPR) as the ratio of DOPR to the average DOPR over the previous 12 months, following the same methodology used to obtain AB_NR. Panel A presents the summary statistics for DOPR and AB_DOPR, as well as their respective correlations with NR and AB_NR. Panel B presents results from monthly Fama-MacBeth regressions where we extend the analysis in Table 4, by including AB_DOPR as an additional independent variable. The dependent variable is the future stock return for firm i in month t+1 (RET_{it+1}). The intercept for each specification is not shown below, for brevity. All variables are described in Appendix 1. The sample period covers 1993–2017. The t-ratios (in parentheses) are based on Newey-West robust standard errors of the mean monthly coefficients, with 12 monthly lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Panel A. Descriptive statistics for daytime-to-overnight positive reversals (DOPR and AB_DOPR)

	MEAN	STD	MIN	P25	MEDIAN	P75	MAX
DOPR	0.23	0.11	0.00	0.16	0.22	0.30	0.72
AB_ DOPR	1.02	0.47	0.00	0.70	0.98	1.30	4.06

	CORRELATION SPEARMAN		PEARSON	
	NR	AB_NR	NR	AB_NR
DOPR	0.69	0.59	0.72	0.60
AB_ DOPR	0.59	0.66	0.60	0.69

5. 检验过度修正的额外影响

Panel B. Predicting future stock returns with both AB_NR and AB_DOPR

Dependent Variable:	(1) RET_{it+1}	(2) RET_{it+1}	(3) RET_{it+1}	(4) RET_{it+1}
AB_NR	0.546***	0.498***	0.468***	0.374***
	(6.53)	(6.55)	(6.31)	(5.81)
AB_ DOPR	0.015	-0.026	-0.031	0.030
	(0.23)	(-0.46)	(-0.53)	(0.54)
RET_CO_M	-1.466***	-1.429***	-1.361***	-0.334
	(-2.65)	(-2.91)	(-2.83)	(-0.79)
RET_OC_M	-0.723	-1.199**	-1.382***	-1.195***
	(-1.47)	(-2.44)	(-2.85)	(-2.66)
SIZE		-0.015	-0.012	-0.160***
		(-0.24)	(-0.20)	(-3.34)
BM		0.223*	0.227*	0.186*
		(1.92)	(1.94)	(1.80)
RET_6M		0.407	0.362	0.347
		(1.37)	(1.22)	(1.21)
GPA			0.587***	0.432**
			(2.60)	(2.03)
ATGTH			-0.226***	-0.212***
			(-4.11)	(-3.75)
TURN_M				0.205*
				(1.93)
STDRET_M				-0.243***
				(-5.01)
ILLIQ_M				0.296***
				(3.19)
IO				0.023
				(0.06)
Adj. R^2	0.012	0.034	0.040	0.055
N	711,067	711,067	711,067	711,067

只有由隔夜的正向收益和日间的负向反转组成的持续拉锯战（AB_NR）才与显著的收益预测性有关，反之则不然（AB_DOPR）。

这一证据进一步支持了本文的理论，即拉锯战涉及白天的套利者对隔夜散户的价格上涨压力作出反应。

5. 检验过度修正的额外影响

5.2 日间的负向反转、散户的买入和套利者的卖空

- 过度修正这个猜想是基于大量的隔夜交易是由散户造成的，而在持续的拉锯战中，隔夜散户交易的作用变得更加重要。

- 没有数据可以具体分析在隔夜非交易期间散户投资者的总交易活动。因此，我们分析了纽约证券交易所的零售执行报告（ReTrac）所提供的零售交易量数据。该报告仅限于2004-2013年期间纽约证券交易所大量股票的零售投资者的所有购买和销售的每日汇总数据。

- 遵循构建AB_NR的相同程序，用其自身在过去12个月的移动平均数来衡量这一指标，从而得到月度异常零售交易活动值。另外，还分别计算了异常零售购买和销售的类似值。

5. 检验过度修正的额外影响

Table 8

Abnormal negative daytime reversals, retail investor buying, and short selling

Panel A presents the results from Fama-MacBeth monthly regressions, which relate AB_NR to three different measures of abnormal retail investor trading activity ($RETAIL_{it}$), based on trades made by individual investors. Column (1) provides the results when the dependent variable is our measure of abnormal total retail investor trading activity for firm i in month t, based on both retail purchases and sales. Columns (2) and (3) provide the analogous results for abnormal retail purchases and sales, separately. The sample period for Panel A covers 2004–2013 due to the availability of retail trade data.

Panel B presents the Fama-MacBeth mean monthly coefficients from regressions that analyze abnormal short interest in firm i during month t ($SHORT_{it}$). Each model includes an intercept (not shown below). All variables are described in Appendix 1. The sample for Panel B covers the period 1993–2017. The t-statistics are based on Newey-West robust standard errors of the mean monthly regression coefficients, with 12 lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Panel A. Abnormal negative daytime reversals and retail investor trading

Dependent Variable:	(1) $RETAIL_{it}$ (Purchases + Sales)	(2) $RETAIL_{it}$ (Purchases)	(3) $RETAIL_{it}$ (Sales)
AB_NR	0.035**	0.131***	−0.016
	(2.09)	(6.72)	(−0.70)
RET_CO_M	0.204	−0.034	0.332*
	(1.31)	(−0.19)	(1.96)
RET_OC_M	0.147*	−0.402***	0.560***
	(1.90)	(−4.69)	(5.84)
SIZE	0.461	−0.209	−0.254
	(1.23)	(−0.40)	(−0.57)
BM	0.028**	0.012	0.042***
	(2.14)	(0.99)	(2.72)
RET_6M	−0.073***	−0.142***	−0.029
	(−3.32)	(−5.80)	(−0.98)
GPA	0.112***	0.106***	0.136***
	(3.62)	(2.67)	(4.06)
ATGTH	−0.017	−0.038***	−0.004
	(−1.62)	(−3.22)	(−0.33)
TURN_M	−6.008***	−7.489***	−7.867***
	(−4.42)	(−6.04)	(−4.81)
STDRET_M	6.350***	8.814***	5.196***
	(8.35)	(10.70)	(5.93)
ILLIQ_M	−58.075	−74.694	−60.090
	(−1.13)	(−1.46)	(−1.06)
IO	0.171***	0.223***	0.164***
	(8.55)	(6.17)	(7.70)
Adj. R^2	0.038	0.045	0.033
N	45,742	45,742	45,742

5. 检验过度修正的额外影响

Panel B. Abnormal negative daytime reversals and short selling

Dependent Variable:	(1) $SHORT_{it}$	(2) $SHORT_{it}$	(3) $SHORT_{it}$	(4) $SHORT_{it}$
AB_NR	0.181***	0.153***	0.152***	0.146***
	(5.73)	(5.39)	(5.33)	(5.12)
RET_CO_M	1.786***	1.815***	1.819***	1.321***
	(6.40)	(6.57)	(6.52)	(6.21)
RET_OC_M	1.348***	1.354***	1.348***	1.169***
	(6.58)	(6.83)	(6.78)	(6.93)
SIZE		−0.067***	−0.067***	−0.058***
		(−5.71)	(−5.75)	(−3.87)
BM		−0.019	−0.017	0.018
		(−0.80)	(−0.76)	(0.95)
RET_6M		0.555***	0.556***	0.488***
		(10.47)	(10.61)	(10.83)
GPA			0.011	0.059
			(0.22)	(1.08)
ATGTH			0.008	0.000
			(0.87)	(−0.03)
TURN_M				0.162***
				(5.37)
STDRET_M				0.041*
				(1.78)
ILLIQ_M				−0.011
				(−0.60)
IO				−0.357***
				(−3.31)
Adj. R^2	0.014	0.035	0.035	0.052
N	584,357	584,357	584,357	584,357

这一证据与基于日间反转过度修正的解释是一致的，日间套利者在更激烈的拉锯战中表现出更多的卖空活动。

5. 检验过度修正的额外影响

5.3 日间负向反转和同期的股票收益

AB_NR的系数显著为负，意味着股票在激烈的拉锯战中更容易被日间投资者过度修正，那么它们在同一个月的股票回报率可能会降低。

Table 9
Abnormal negative daytime reversals and contemporaneous stock returns
This table presents the Fama-MacBeth mean monthly coefficients from estimating a regression where the dependent variable is the contemporaneous monthly return (RET_{it}). Each model includes an intercept (not shown below). All variables are described in Appendix 1. The sample covers the period 1993–2017. The t-ratios (in parentheses) are based on Newey-West robust standard errors of the mean monthly coefficients, with 12 lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Dependent Variable:	(1) RET_{it}	(2) RET_{it}	(3) RET_{it}	(4) RET_{it}
AB_NR	−4.781***	−4.808***	−4.798***	−4.760***
	(−11.53)	(−12.27)	(−12.25)	(−12.23)
RET_CO_M	−0.626	−0.646	−0.606	0.134
	(−1.24)	(−1.46)	(−1.39)	(0.36)
RET_OC_M	−1.447***	−1.812***	−1.976***	−1.803***
	(−3.14)	(−3.92)	(−4.28)	(−4.18)
SIZE		−0.051	−0.045	−0.183***
		(−0.85)	(−0.77)	(−3.60)
BM		0.225*	0.228*	0.193*
		(1.93)	(1.93)	(1.85)
RET_6M		0.621**	0.572**	0.573**
		(2.15)	(1.98)	(2.03)
GPA			0.595***	0.455**
			(2.60)	(2.12)
ATGTH			−0.256***	−0.242***
			(−4.40)	(−4.05)
TURN_M				0.200*
				(1.88)
STDRET_M				−0.186***
				(−4.29)
ILLIQ_M				0.274***
				(4.15)
IO				0.221
				(0.61)
Adj. R^2	0.030	0.050	0.055	0.069
N	739,163	739,163	739,163	739,163

5. 检验过度修正的额外影响

5.4 套利者的日内策略交易、拉锯战和未来收益

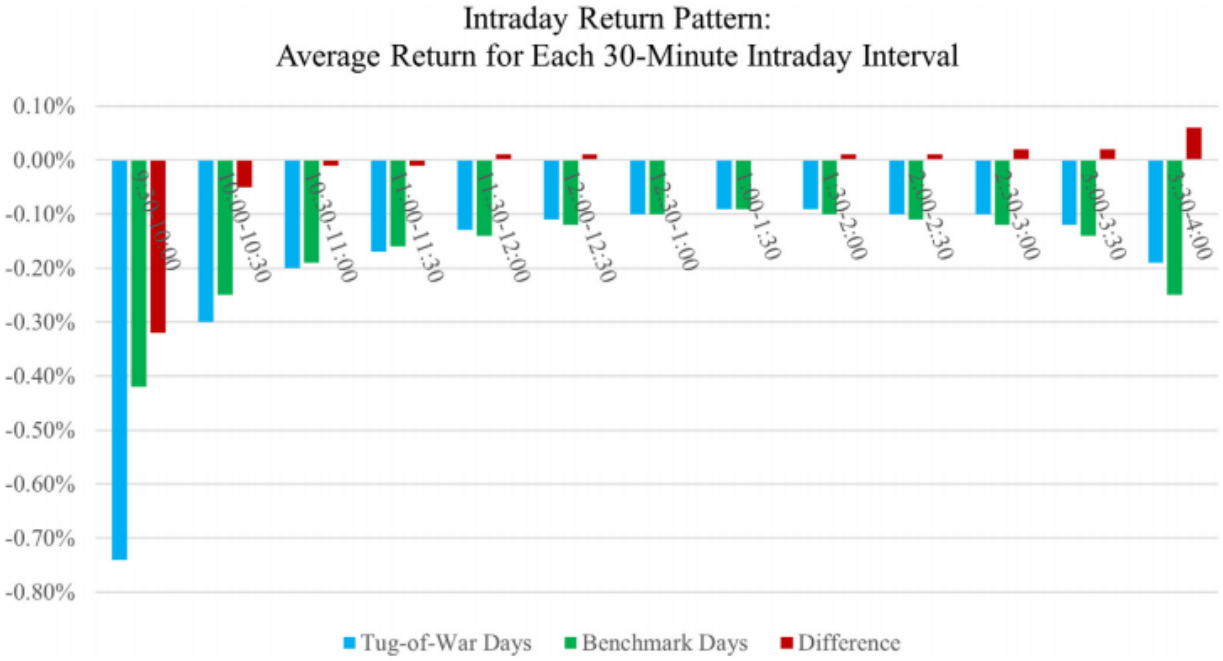


Fig. 1. Intra-day return patterns on tug-of-war days versus benchmark days with a negative return during both the overnight and trading day periods The blue bars in this figure present the average 30-min returns for each of the 13 30-min intervals during the trading day, from 9:30 to 16:00 EST, for the subset of tug-of-war days with a positive overnight return followed by a negative daytime reversal. These average returns are obtained as follows. First, for each trading day (d), we focus on the subset of stocks that have a positive overnight return and a negative trading day reversal. Then, we calculate the time series average of the cross-sectional daily mean returns for each of these 13 intraday periods. The green bars provide the analogous results for the alternative group of benchmark days with negative returns during both the overnight and trading day periods. Finally, the red bars plot the difference between the average returns across these two groups of tug-of-war days versus benchmark days, for each 30-min interval.

将整个交易日的回报率分解为开盘和收盘之间的13个30分钟间隔。

大额负回报幅度逐渐变小，直到接近收盘时才略微变大。

基准日：在隔夜和日间交易时段都为负收益

套利者在开盘前急于卖空这些股票，因为他们与隔夜交易员进行了拉锯战。此外，当天晚间较小的负面价格压力表明，一些套利者倾向于减缓他们的卖空活动，甚至在收盘前扭转他们的空头头寸。

5. 检验过度修正的额外影响

5.4 套利者的日内策略交易、拉锯战和未来收益

在一场长期的拉锯战中，一些日间套利者倾向于减缓他们的卖空活动或在交易日结束时回补他们的空头头寸，反复出现的隔夜价格压力的过度修正应该会消散。因此，AB_NR和未来收益之间的预测关系应该减弱，因为拉锯战日组显示了30分钟负收益的盘中模式，在当天收盘时减少或逆转。

创建两个虚拟变量：IL30>F30，如果这些拉锯战日的最后30分钟间隔的平均回报率大于（或小于负值）前30分钟间隔的平均回报率，则等于1，否则等于0。IL30>ALL赋值为1，即如果最后一个30分钟区间的平均收益率大于（或小于负值）交易日中其余30分钟区间的平均收益率，否则为0。

5. 检验过度修正的额外影响

5.4 套利者的日内策略交易、拉锯战和未来收益

Table 10
AB_NR and future stock returns, conditional on intraday return patterns
This table presents results from Fama-MacBeth regressions that relate our proxy for the intensity of a tug of war (AB_NR) to future stock returns, conditional on the nature of the firm's average intraday return pattern for the subset of tug-of-war days during the month. First, for each firm i in month t, we focus on the subset of tug-of-war days with a positive overnight return and a negative daytime reversal. We then assign the dummy variable, $I_{L30>F30}$, a value of one if the mean return for the last 30-min interval across the subset of tug-of-war days is larger (or smaller negative) than the mean return for the first 30-min interval, and zero otherwise. We also define an alternative dummy variable, $I_{L30>ALL}$, that takes a value of one if the mean return for the last 30-min interval across these tug-of-war days is larger (or smaller negative) than the mean return across all earlier 30-min intervals during the rest of the trading day, and zero otherwise. We then include either dummy variable in our main regression specification, along with its interaction with AB_NR. The dependent variable is the future stock return for firm i in month $t + 1$ (RET_{it+1}). The intercept and coefficients for the control variables are not shown below, for brevity. All variables are described in Appendix 1. The sample period covers 1993–2017. The t-ratios (in parentheses) are based on Newey-West robust standard errors of the mean monthly coefficients, with 12 lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Dependent Variable:	(1) RET_{it+1}	(2) RET_{it+1}	(3) RET_{it+1}	(4) RET_{it+1}
AB_NR	0.710***	0.458***	0.668***	0.430***
	(5.68)	(5.27)	(6.86)	(6.18)
$I_{L30>F30}$	0.102	0.126		
	(0.73)	(1.09)		
AB_ NR × $I_{L30>F30}$	−0.218**	−0.186*		
	(−2.09)	(−1.94)		
$I_{L30>ALL}$			0.029	0.012
			(0.29)	(0.12)
AB_ NR × $I_{L30>ALL}$			−0.216**	−0.193**
			(−2.44)	(−2.23)
Controls	No	Yes	No	Yes
Adj. R^2	0.002	0.049	0.001	0.049
N	737,851	737,851	737,851	737,851

AB_NR系数显著为正，交乘项系数显著为负。表明当一些参与拉锯战的套利者出现放缓卖空活动或在当天晚些时候补仓时，AB_NR与未来收益的关系就会明显减弱。总的来说，对拉锯战日内回报模式的分析表明，套利者的交易方式与我们的过度修正假说一致。

5. 检验过度修正的额外影响

5.5 日间负反转、盈利公告和盈利惊喜

本节研究每日拉锯战的强度是否传达了公司的基本价值的信息。

首先，我们研究拉锯战的异常强度（AB_NR）是否在有盈利公告的月份趋于聚集。

其次，我们探讨了对一个月内的拉锯战强度（AB_NR）是否预示了公司的下一个盈利惊喜。

Table 11

Abnormal negative daytime reversals and earnings announcements

In Panel A, we use Fama-MacBeth regression analysis to explore whether our measure for the intensity of a tug of war (AB_NR) tends to cluster in the month of or the month before earnings announcements. The dependent variable is the abnormal frequency of negative daytime reversals (AB_NR_{it}). We then include dummy variables that indicate whether an earnings announcement occurs in the same month as AB_NR_{it} or the month after. In particular, the dummy variable Month(0) takes a value of one if an earnings announcement occurs in month t (i.e., the same month that AB_NR_{it} is measured), while Month(1) takes a value of one if an earnings announcement occurs in month $t + 1$ (i.e., one month after AB_NR_{it} is measured).

Panel B presents the results from Fama-MacBeth regressions that relate the abnormal frequency of negative daytime reversals to the firm's next earnings surprise. We measure the next earnings surprise in two ways, including an accounting-based measure and a market-based measure. $SURPRISE_{1it}$ is the accounting-based standardized unexpected earnings (SUE) associated with earnings released by firm i in the next quarter (q) following month t, based on the definition of Bernard and Thomas (1990). It is calculated as $\frac{EPS_{i,q}-EPS_{i,q-4}-\mu_{q-7,\,q}}{\sigma_{q-7,\,q}}$, where EPS is earnings per share; $\mu_{q-7,\,q}$ and $\sigma_{q-7,\,q}$ are the mean and standard deviation of $(EPS_{i,q} - EPS_{i,q-4})$ across the past eight quarters, respectively. $SURPRISE_{2it}$ is our market-based measure of the earnings surprise, defined as the cumulative abnormal return over the three days around the next earnings announcement in quarter q: $CAR = \frac{1}{3}\sum_{d=-1}^{+1}(RET_{i,d} - VWRETD_d)$, where $RET_{i,d}$ is the stock return for firm i on day d; $VWRETD_d$ is the value-weighted market return; and $d = 0$ is the earnings announcement date. We include the most recent (lagged) quarterly earnings surprise as an independent variable in columns (2) and (4), along with the standard control variables in Table 4. All variables are described in Appendix 1. The sample period covers 1993–2017. The t-ratios (in parentheses) are based on Newey-West robust standard errors of the mean monthly coefficients, with 12 lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Panel A. Clustering of abnormal negative daytime reversals during months with an earnings announcement				
Dependent Variable:	(1) AB_NR_{it}	(2) AB_NR_{it}	(3) AB_NR_{it}	(4) AB_NR_{it}
Month(0)	0.013***	0.013***	0.013***	0.012***
	(5.57)	(6.43)	(4.75)	(5.08)
Month(1)			0.001	−0.001
			(0.35)	(−0.64)
Controls	No	Yes	No	Yes
Adj. R^2	0.005	0.026	0.005	0.026
N	724,533	724,533	724,533	724,533
Panel B. Abnormal negative daytime reversals and the next earnings surprise				
Dependent Variable:	(1) $SURPRISE_{1it}$	(2) $SURPRISE_{1it}$	(3) $SURPRISE_{2it}$	(4) $SURPRISE_{2it}$
AB_NR	0.031***	0.009*	0.043***	0.043***
	(6.06)	(1.81)	(3.91)	(3.89)
Lagged SURPRISE		0.319***		0.012***
		(43.02)		(3.19)
Controls	Yes	Yes	Yes	Yes
Adj. R^2	0.046	0.139	0.011	0.012
N	611,087	611,087	611,087	611,087

5. 检验过度修正的额外影响

5.6 负向反转是由交易日中出现的负面消息驱动的吗？

Table 12
Average sentiment of news that arrives overnight or during the daytime, for days with positive overnight returns and negative daytime reversals, versus other days
In this table we report the time series means of average daily measures of sentiment based on news items that arrive either overnight or during the daytime, for four subsets of firms each day that have respective (overnight, daytime) returns that are (positive, negative), (negative, positive), (positive, positive), or (negative, negative). The news data are taken from the Thomson Reuters Newsscope archive over the period 2003–2011. For any given firm i, we classify every news item as either negative, neutral, or positive, based on the news sentiment score provided by Thomson Reuters. We assign numerical values of +1 to all positive news items, zero to all neutral items, and −1 to all negative items. Then, every day (d), we compute the average news sentiment score across all news items pertaining to each firm i that arrive either overnight or during the day. Next, for each day d, we calculate the cross-sectional average of the overnight or daytime news sentiment scores across all firms i within each of the four subsets of firms with the different categories of (overnight, daytime) returns listed above. Finally, for each of these four categories of (overnight, daytime) returns, we compute the time series mean of these daily cross sectional average news sentiment measures across all days in the sample period. The t-ratios (in parentheses) are based on Newey-West robust standard errors of the time series mean daily news scores, with 12 daily lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Category	Average News Sentiment		Difference Between Each Category of Days and the (Negative, Negative) Group	
	Overnight	Day Time	Overnight	Day Time
(Positive, Negative)	0.15***	0.34***	0.07***	0.29***
(Negative, Positive)	0.10***	0.14***	0.04***	0.09***
(Positive, Positive)	0.19***	0.39***	0.12***	0.34***
(Negative, Negative)	0.07***	0.06***		

6. 其他潜在的解释

- 1）投资者的过度反应： 非理性的投资者可能会对利好消息作出过度反应，AB_NR与同月的股票收益率应呈正相关关系；这种错误定价应该在一段时间后被反转纠正
- 2）投资者分歧相关的风险溢价：意味着对称性的结果；高（AB_NR）（AB_DOPR）的反转频率，都应能捕捉到分歧并预测回报。
- 3）承担 "噪音交易者风险 "或 "隔夜风险 "的套利者的溢价：因为他们是风险厌恶者且资本有限，所以套利者在更长时间的拉锯战中应该避免与隔夜的噪音交易者进行交易；如果处于长期拉锯战的股票（即AB_NR高）在某种程度上风险更大，特别是在隔夜期间，那么白天的套利者应该更积极地在每日收盘前回补他们的空头头寸。
- 以上均不能解释我们的结论

7. 日间负向反转、市场情绪和未来的股票收益

$$Hedge \cdot Portfolio \cdot Return_t = \alpha + \beta Risk \cdot Factors_t + \gamma Sentiment_{t-1} + \varepsilon_t, \quad (1)$$

Table 14
Negative daytime reversals, future stock returns, and investor sentiment
This table examines the association between investor sentiment and the magnitude of the monthly hedge portfolio returns based on the abnormal frequency of negative daytime reversals (AB_NR). In each month t, we first sort stocks into deciles based on AB_NR. We next calculate monthly returns to the hedge portfolio that is long stocks with a high value of AB_NR and short stocks with a low AB_NR. We then estimate the time series regression model specified in Eq. (1), where we regress these hedge portfolio returns on the various risk factors in the Fama-French four-factor or six-factor model, along with the lagged value of the monthly sentiment measure from Baker and Wurgler (2006). In addition to this continuous monthly sentiment measure, we also analyze a high sentiment dummy variable that takes a value of one for the subset of months in which the continuous sentiment measure is above the median value taken over the entire sample period covering 1993–2015. Note that this sample ends in 2015 rather than 2017 due to the availability of Baker and Wurgler's sentiment measure. For brevity, we only present the coefficient of the continuous sentiment measure and the high sentiment dummy variable, respectively, for each model analyzed. The t-statistics are based on Newey-West robust standard errors with 12 lags. * indicates significance at the 0.10 level; ** at the 0.05 level; and *** at the 0.01 level.

Model	Continuous Sentiment Measure		High Sentiment Dummy	
	Coefficient	t-value	Coefficient	t-value
No risk factors	0.47*	(1.73)	0.64**	(2.22)
Fama-French 4-Factor	0.77***	(3.28)	0.88***	(2.79)
Fama-French 6-Factor	0.82***	(3.29)	0.91***	(2.83)

其中，因变量是对冲投资组合的回报，该组合在(t)月做多AB_NR值较高的十分之一的公司，做空AB_NR值较低的十分之一的公司。
当情绪高涨时，日间套利者更倾向于将这种隔夜的价格压力归结为噪音交易造成的，从而导致更大的过度修正和更强的预测关系。

8. 结论

- 更加激烈的拉锯战（更高的月度负日间反转异常频率），具有更高的未来回报。

- 这种预测关系是由于当拉锯战越激烈时，日间套利者越倾向于过度修正正的隔夜价格压力。

谢谢大家！

请各位老师和同学们批评指正！