Streaks in earnings surprises and the cross-section of stock returns

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Trends

- The gambler's fallacy in Rabin (2002) shows that trends can bias investor expectations. Investors underreact to trends because they expect trends to reverse.
  - Classic e.g., gamblers at a roulette mistakenly think black is more likely to occur after a series of reds.
  - Or, "Dow has been on a five-day losing streak, likely bargain hunting tomorrow."
- In contrast, Barberis, Shleifer,and Vishny (BSV 1998) model representativeness where investors incorrectly expect a continuation in trends and overreact to trends.
- Despite their disparate predictions, both quasi-Bayesian theories imply that trends can predict stock returns.

Trend definition and tests

- Our main definition of a trend is a streak of at least two consecutive same-sign earnings surprises: e.g. +,+,+ is a positive trend
- Similarly, a reversal is the end of a streak of at least two: e.g. −, −, + is a positive reversal.

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Predictions for cross-section of stock returns

1. Rabin's Gambler's fallacy predicts that the stock return drift after streaks is larger than that after reversals.
2. The representativeness bias in BSV predicts that drift after streaks is smaller than that after reversals.

Relation to prior literature

- Durham, Hertzel, & Martin, 2005 examine representativeness & conservatism using college football wagers and Asparouhova, Hertzel, & Lemmon (2009) use experimental subjects. They find support for Rabin.
- Shanthikumar (2009), and Frieder (2008) examine order imbalances of different investor groups following streaks.
- The accounting literature examines trends in the level of accounting variables (e.g. Barth, Elliot, & Finn, 1999; Myers, Myers, & Skinner, 2007; Chan, Frankel, & Kothari, 2004). Most focus on contemporaneous implications of trends and in-sample regressions.

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What we do

1. We believe we are the first to examine the contrasting predictions of Rabin and BSV using earnings surprises.
2. We examine whether earnings surprises based on analysts' forecasts can predict future stock returns in calendar-time strategies.
3. We also test whether trends provide a partial explanation for PEAD.

Summary of results

- The stock return drift after streaks is strong and significant—a four-factor alpha of 0.838% per month while the drift after reversals is a negligible 0.044% per month.
- This difference cannot be explained by the autocorrelation of earnings surprises, and survives a battery of controls and robustness tests.
- We find similar results with a more general definition of trends that relies on consistency rather than on streaks.
- We show that in the time-series, about 50% of PEAD is explained by a "trend factor".
- The underreaction of investors to trends supports the gambler's fallacy in Rabin (2002).

Data and variables

- I/B/E/S 1984-2009. Earnings surprise SURP is $\frac{Actual - Consensus}{Price}$.
- Each month $t-1$, we sort stocks into streak or reversal portfolios based on past realized SURP signs.

Table 1A	# Firm-months	Size ($m)	# Trends	% Trends
Overall	702,906	3,245	408,293	60.6%

Table 2A	SURP signs	
Streak length	Negative	Positive
2	72760	74533
3	43477	44507
4	26750	27677
5	17398	18905
6	11592	12898
7	7584	8917
8	5017	5992
9	3363	4273
$\geq$ 10	8326	11255
All Streaks	196267	208957

Streak signs strategy

- Buy stocks with positive streaks and sell stocks with negative streaks, holding for six months. This simple approach ignores magnitude of surprises.
- Streaks predict future returns but reversals do not. Consistent with gambler's fallacy but inconsistent with representativeness.

	Table 3 Panel A: SURP Signs		
	Negative	Positive	Spread
Four-factor alphas			
Streaks	-0.280***	0.322***	0.603***
	(-3.78)	(4.32)	(8.12)
Reversals	0.081	0.080	-0.001
	(1.14)	(1.21)	(-0.01)
Difference	-0.362***	0.242***	0.603***
	(-6.34)	(3.97)	(5.66)

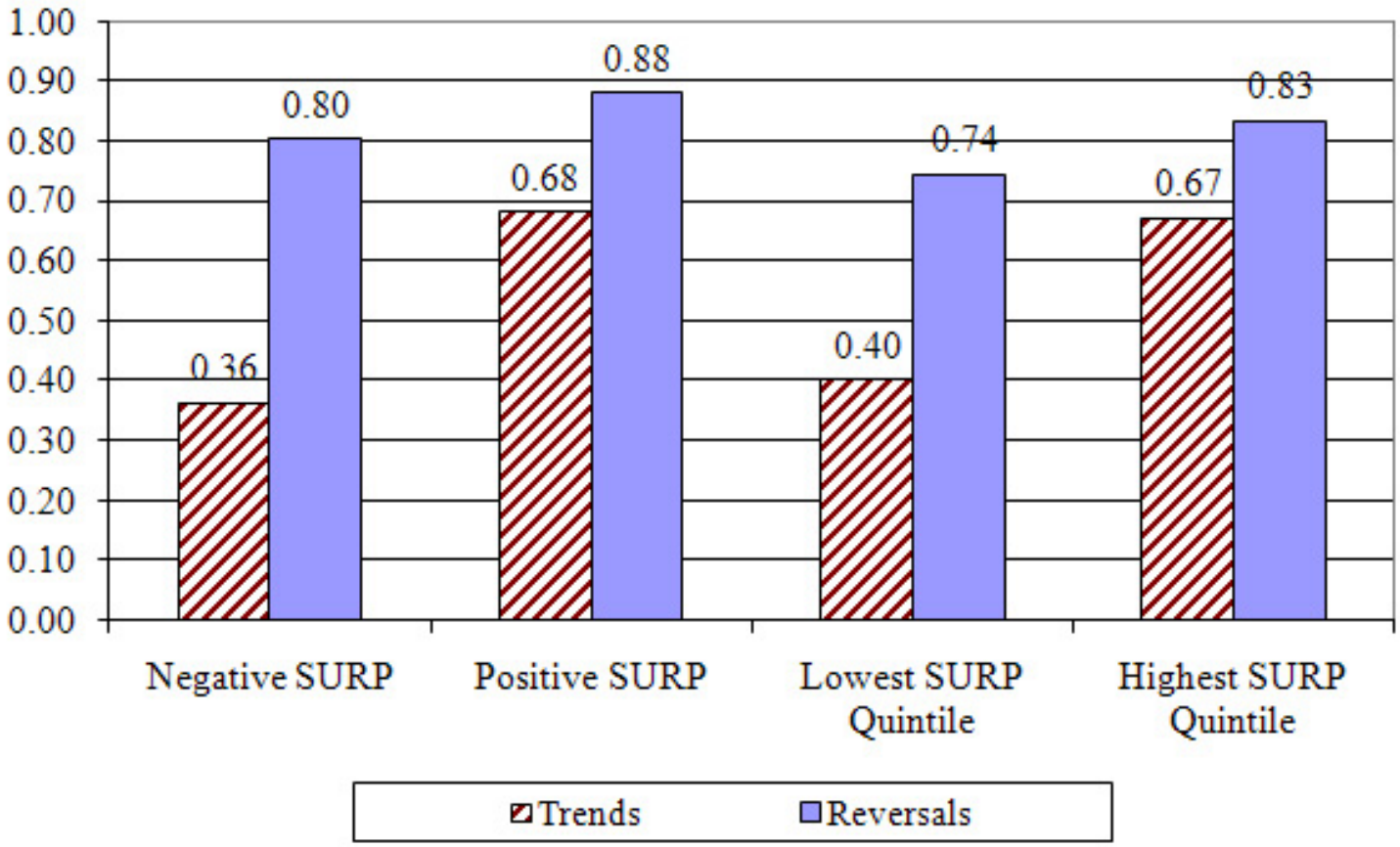
Streaks controlling for SURP magnitude

- Buy stocks with positive streaks and sell stocks with negative streaks within SURP quintiles, holding for six months.
- SURP quintiles contain stocks sorted every month based on most recent SURP.
- Streaks have drift in all quintiles except the middle one but reversals do not. Supports gambler's fallacy.

Table 3 Panel B: SURP quintiles

	Smallest	2	3	4	Largest	Spread
Four-factor alphas						
Streaks	-0.444***	-0.157*	0.071	0.263***	0.438***	0.882***
	(-5.23)	(-1.79)	(0.88)	(2.95)	(5.41)	(8.92)
Reversals	0.056	0.097	0.118	0.068	0.101	0.044
	(0.72)	(1.20)	(1.28)	(0.78)	(1.19)	(0.48)
Difference	-0.500***	-0.254***	-0.047	0.194**	0.337***	0.838***
	(-5.83)	(-3.66)	(-0.86)	(2.57)	(3.99)	(5.75)

Fig 1: Underreaction coefficients: Fraction of SURP infomation occuring on event date



Consistency definition of trends

- $\overbrace{+\,+\,-\,+\,+\,+\,+\,+\,-\,+\,+}^{\text{Positive Imbalance}} \quad \underbrace{+}_{\text{Most Recent}} \quad \longrightarrow$ Positive Trend
- We compare the consistency of the sign of the current SURP with sign of the majority of past SURPs as a more general definition of trends. Consistency classifies all stocks into either trends or reversals.
- Note that the streak definition is a special case of consistency which requires prior imbalance to be 100% similar.

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Table 6 Panel C: SURP quintiles

	Smallest	2	3	4	Largest	Spread
Four-factor alphas of consistency portfolios, past 3 year SURP imbalances						
Trends	-0.474***	-0.046	0.115	0.271***	0.355***	0.828***
	(-4.98)	(-0.41)	(1.36)	(3.00)	(3.96)	(7.56)
Reversals	0.067	0.126	0.139	0.170	0.133	0.066
	(0.68)	(1.48)	(1.43)	(1.54)	(1.34)	(0.66)
Difference	-0.541***	-0.172*	-0.024	0.101	0.221**	0.762***
	(-5.79)	(-1.86)	(-0.36)	(1.08)	(2.31)	(5.42)

Streak factor explaining time-series of PEAD returns

- To explain PEAD (SURP Q5–Q1), we construct a streak factor based on a strategy that longs positive streaks and shorts negative streaks.
- We also orthogonalize the streak factor against a control group SURP-sign strategy that longs all other stocks with positive SURPs and shorts negative SURPs.
- Streak factor explains 70% of PEAD returns. The purged streak factor explains 54%.

Table 5 Panel B: PEAD time-series regressions

Model	Four-factor alpha	% reduction in alpha	Streak factor	SURP-sign factor	Purged streak factor
1	0.648***	NA			
	(9.35)				
2	0.196***	70%	0.751***		
	(4.25)		(22.18)		
3	0.567***	13%		0.579***	
	(8.21)			(4.70)	
4	0.154***	76%	0.731***	0.383***	
	(3.44)		(22.45)	(5.22)	
5	0.298***	54%			0.677***
	(5.76)				(17.41)

Four-factor coefficients are estimated but not reported here

Robustness tests

- We estimate Fama-Macbeth regressions with four characteristics, SURP, a streak variable, plus controls.
  - The Streak variable $= +1$ for positive streaks, $= -1$ for negative streaks, and 0 otherwise.
  - We control for lagSURP, lag2SURP, and sum of all lag SURPs, $SURP^2$, idiosyncractic volatility, institutional ownership, illiquidity, turnover, dispersion, and analyst coverage.
  - After kitchen sink of controls, coefficient of streak variable remains robust at $0.76 (t = 4.62)$. SURP no longer significant.

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  - After kitchen sink of controls, coefficient of streak variable remains robust at $0.76 (t = 4.62)$. SURP no longer significant.
- We split the sample in firms with autocorrelated or independent past SURPs (based on runs test or AR4 model). Streaks predicts returns better than reversals in both samples.
  - Consistent with Rabin and Vayanos (2010) that gambler's fallacy can occur in non i.i.d. cases.
  - Not consistent with Bernard and Thomas (1990) that PEAD is explained by investors underestimating autocorrelation in earnings.

Does return predictability increase with streak length?

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	SURP Quintiles					
	Smallest	2	3	4	Largest	Spread
Abnormal returns based on streak length						
Streaks of 2 to 3	-0.325***	-0.095	0.105	0.197**	0.454***	0.780***
	(-3.70)	(-1.06)	(1.22)	(2.28)	(5.91)	(8.53)
Streaks of 4 to 5	-0.537***	-0.302***	-0.026	0.254**	0.383***	0.920***
	(-4.93)	(-2.74)	(-0.26)	(2.38)	(3.51)	(6.29)
Streaks of 6 to 9	-0.760***	-0.190	0.053	0.358***	0.426***	1.186***
	(-5.62)	(-1.35)	(0.50)	(2.67)	(2.86)	(5.58)
Streaks $\geq$ 10	-0.670***	-0.274	0.127	0.654***	0.450*	1.120***
	(-2.99)	(-1.36)	(0.85)	(3.22)	(1.76)	(3.49)
Reversals	0.056	0.098	0.118	0.068	0.101	0.044
	(0.72)	(1.21)	(1.28)	(0.78)	(1.19)	(0.48)

- However, in high uncertainty stocks (high earnings variability or forecast dispersion), we find that return predictability of long streaks is weaker. Abnormal return of streaks $\geq$10 is 0.69%($t = 1.58$).

Conclusion

- We test the conflicting predictions of the gambler's fallacy (Rabin) and representativeness bias (BSV) using patterns in past earnings surprises.
- We find support for the gambler's fallacy. Investors underreact to streaks in earnings surprises but not to reversals.
- This finding is not due to the autocorrelation in past earnings surprises and survives a battery of controls.
- We estimate that at least half of the post-earnings announcement drift anomaly is due to the underreaction to trends.