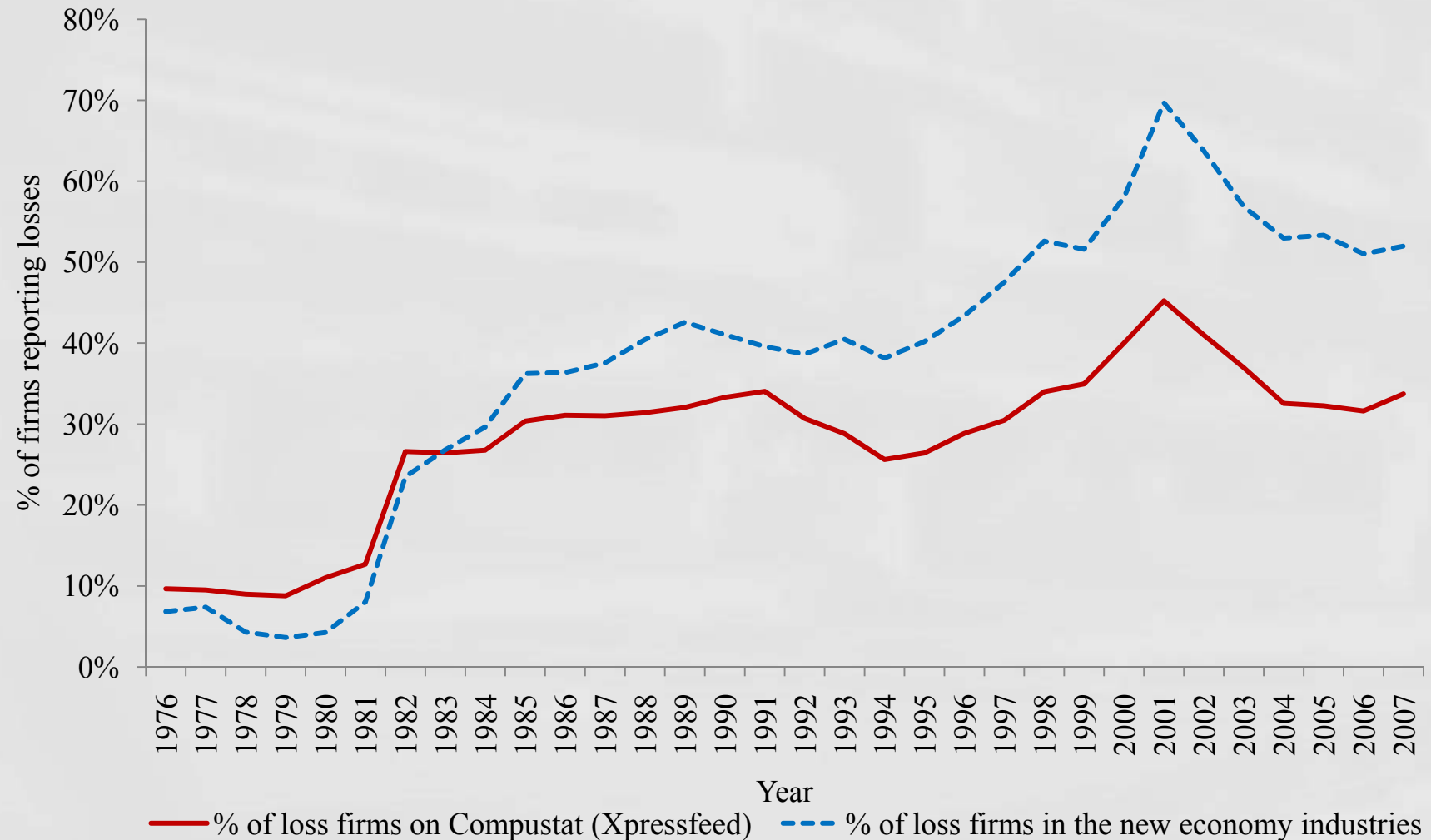# How Well Do Investors Understand Loss Persistence?

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Figure 1: Why is loss an important subject?

# Motivation and research question

- Large heterogeneity in loss persistence:
  - General Motors: went bankrupt after four years of loss
  - Amazon: reported first profit in 2003 after 5 years of consecutive loss since its IPO in 1998
  - Exelixis: has not reported profits since its IPO in 2000

- Investors are optimistic about loss firms' future performance:
  - Earnings surprises of loss firms are significantly larger in magnitude than profit firms (Brown, 2001)
  - Anecdotal evidence suggests investors are optimistic about loss firms' future prospects:
    - "The future for automakers is so murky that even deeply wounded GM could enter the next decade in control……"
      - ---"*Can General Motors come back?*" MSN.com July 18, 2008

- **Research question**: can investors correctly anticipate the persistence of losses?

Figure 2: Losses are less persistent than profits

Distribution of earnings changes from quarter t to t+1, scaled by total assets at the end of quarter t
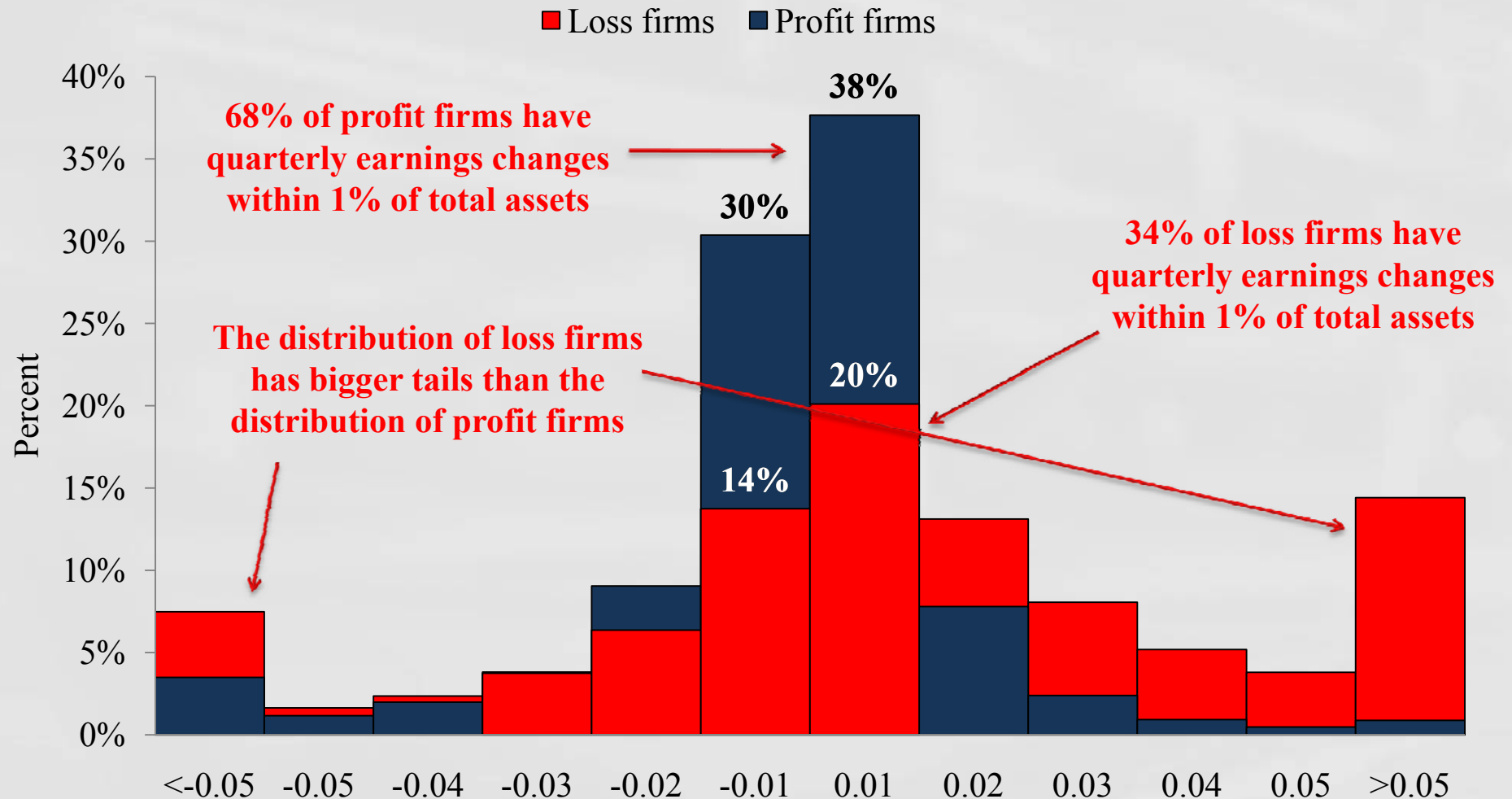
Predicting the persistence of losses based on Joos and Plesko (2005)

$$\begin{array}{ccccc}
 & + & + & + & ? & + \\
\end{array}$$

$$EARN_{t+1} = \alpha + \beta_1 EARN_t + \beta_2 EARN_{t-3} + \beta_3 SIZE_t + \beta_4 SALESG_t + \beta_5 FIRSTLOSS_t$$

$$+ \beta_6 LOSS\_SEQ_t + \beta_7 DIVDUM_t + \beta_8 SPI_t + \beta_9 SPI_{t-3} + \beta_{10} Q3_t + \beta_{11} Q4_t + \varepsilon_{t+1}$$

$$\begin{array}{cccccc}
 - & & + & - & - & - & + \\
\end{array}$$

- Forecast earnings ($FEARN_t$): multiply the mean of quarterly estimated coefficients of the model from quarter t-4 to t-1 with the independent variables measured in quarter t.

- **Predicted persistent losses** are loss observations with $FEARN_t$ in the first (lowest) quintile of the quarterly distribution.

- **Predicted transitory losses** are loss observations with $FEARN_t$ in the fifth (highest) quintile of the quarterly distribution.

Hypotheses

- H1(a): The earnings expectations embedded in loss firms' stock prices fail to fully reflect the different persistence of losses.

- H1(b): Future abnormal returns are negative for firms with predicted persistent losses and close to zero for firms with predicted transitory losses.

- H2: The abnormal stock returns predicted in H1(b) are clustered around future earnings announcement dates.

- H3: The abnormal stock returns predicted in H1(b) are smaller in magnitude for loss firms with analyst coverage.

Table 2 Panel A: Regression results of the earnings forecasting model

Variable	Predicted sign	Fama -MacBeth regression (No. of regressions: 96)		
		Coefficient	t-statistic	p value
$EARN_t$	+	0.500	37.35	0.000
$EARN_{t-3}$	+	0.324	25.86	0.000
$SIZE_t$	+	0.001	3.00	0.004
$SALESG_t$	?	0.001	0.89	0.376
$FIRSTLOSS_t$	+	0.002	2.09	0.039
$LOSS\_SEQ_t$	-	-0.001	-3.66	0.000
$DIVDUM_t$	+	0.006	10.93	0.000
SPI_t	-	-0.604	-27.93	0.000
SPI_{t-3}	-	-0.344	-11.33	0.000
$Q3_t$	-	-0.014	-14.16	0.000
$Q4_t$	+	0.009	13.69	0.000
INTERCEPT		-0.011	-8.08	0.000
Adjusted R-square		0.455		

Figure 3: Time-series plots of mean earnings

Legend: Predicted transitory loss (blue dashed line); Predicted persistent loss (red solid line)

X-axis: Quarter relative to portfolio formation (t-4, t-3, t-2, t-1, t, t+1, t+2, t+3, t+4)

Y-axis: Mean earnings (0.04 to -0.14)
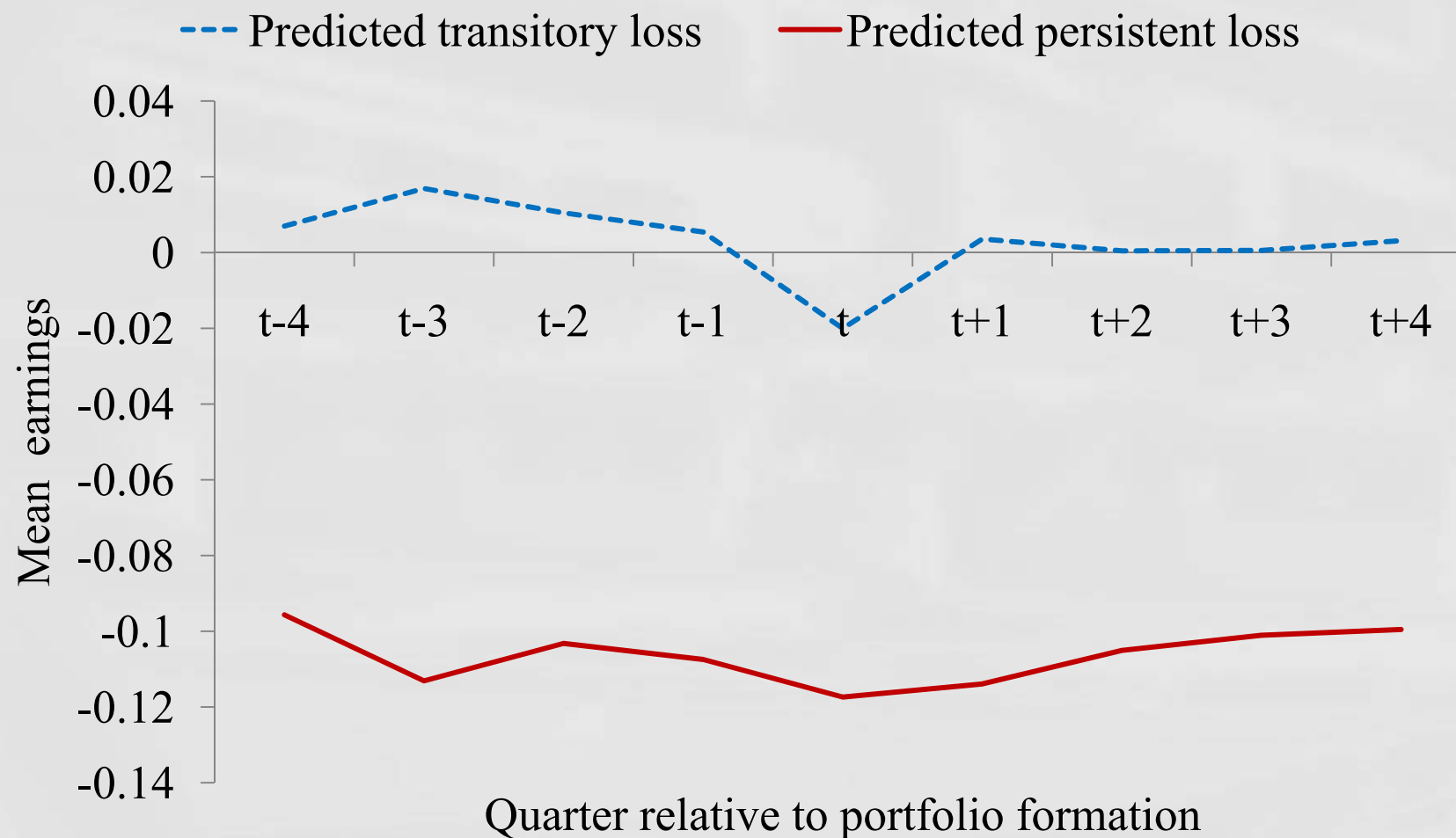
Examine investors' expectation of loss persistence

Mishkin (1983) framework:

Forecast equation:
$$EARN_{t+1} = \alpha_0 + \alpha_1 EARN_t + \delta_{t+1}$$

Pricing equation:
$$BHAR_{t+1} = \beta(EARN_{t+1} - \alpha_0 - \alpha_1^* EARN_t) + \mu_{t+1}$$

- Correctly anticipate loss persistence: $\alpha_1 = \alpha_1^*$
- Underestimate loss persistence: $\alpha_1 > \alpha_1^*$
- Treat the losses as transitory and irrelevant to future earnings: α_1^* is statistically insignificant
- Results are robust to:
  - Different measurement windows of $BHAR_{t+1}$
  - Controls for factors identified by Kraft, Leone, and Wasley (2007) and additional lags of earnings.

Table 4: Investors' expectation of loss persistence

Predicted persistent losses (N=12,438)

	Forecast equation			*Pricing equation*	
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	**0.409**	**42.38**	α_1^*	**0.020**	**0.16**
			β	0.349	8.45

Test of investors' expectations of loss persistence:

Null hypothesis	Likelihood ratio statistic	Marginal significance level
$\alpha_1 = \alpha_1^*$	11.14	0.001

Predicted transitory losses (N=12,454)

	Forecast equation			*Pricing equation*	
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.007	0.69	α_1^*	0.034	0.49
			β	1.056	15.87

Test of investors' expectations of loss persistence:

Null hypothesis	Likelihood ratio statistic	Marginal significance level
$\alpha_1 = \alpha_1^*$	0.15	0.700

Table 5 Panel A: Size-adjusted portfolio returns formed on $FEARN_t$

Portfolio ranking on $FEARN_t$	Equal-weighted size-adjusted returns		
	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$
Predicted persistent loss	**-0.031*****	**-0.064*****	**-0.120*****
	(-2.82)	**(-4.15)**	**(-5.15)**
2	-0.031***	-0.052***	-0.073***
	(-3.78)	(-4.35)	(-3.45)
3	-0.028***	-0.048***	-0.060***
	(-5.75)	(-5.83)	(-5.18)
4	-0.017***	-0.039***	-0.042***
	(-4.40)	(-6.57)	(-4.93)
Predicted transitory loss	-0.009**	-0.020***	-0.015*
	(-2.55)	(-3.59)	(-1.81)
Transitory-Persistent	**0.022***	**0.044****	**0.104*****
	(1.77)	**(2.52)**	**(4.15)**

Table 6: Announcement period and non-announcement period portfolio returns

Portfolio ranking on FEARN$_t$	Equal-weighted size-adjusted returns		
	Total period return (BHAR365$_{t+1}$)	Announcement period return	Non-announcement period return
Predicted persistent loss	**-0.120*****	**-0.027*****	**-0.094*****
	(-5.15)	**(-9.50)**	**(-4.20)**
2	-0.073***	-0.004	-0.070***
	(-3.45)	(-1.26)	(-3.44)
3	-0.060***	0.004*	-0.065***
	(-5.18)	(1.89)	(-5.97)
4	-0.042***	0.008***	-0.049***
	(-4.93)	(3.86)	(-5.94)
Predicted transitory loss	-0.015*	0.011***	-0.026***
	(-1.81)	(5.38)	(-3.25)
Transitory-Persistent	**0.104*****	**0.038*****	**0.068*****
	(4.15)	**(10.39)**	**(2.85)**

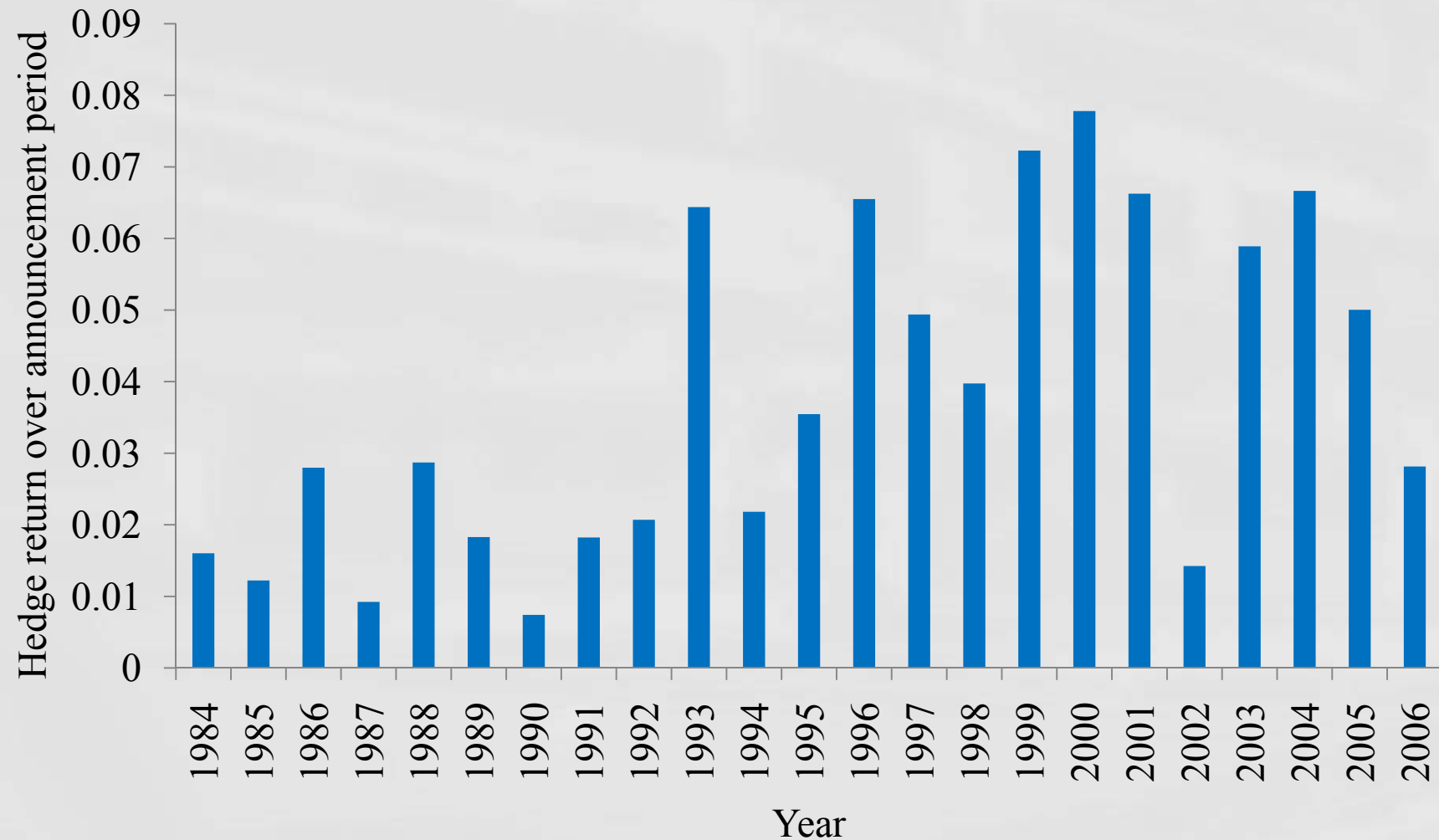# Figure 5: Hedge returns in the announcement period

Table 7 Panel A: Equal-weighted portfolio returns for loss firms with and without analyst coverage

Portfolio ranking on FEARN$_t$	% with analyst coverage	NUMEST$_t$ T1 N=11,474	NUMEST$_t$ T2 N=10,378	NUMEST$_t$ T3 N=10,536	No analyst coverage N=29,982
Predicted persistent loss	**46%**	**-0.089****	**-0.061****	**-0.059***	**-0.171*****
		(-2.30)	**(-1.98)**	**(-1.67)**	**(-7.62)**
2	51%	-0.046*	-0.043	-0.017	-0.110***
		(-1.66)	(-1.40)	(-0.54)	(-5.67)
3	50%	-0.048**	-0.067***	-0.032	-0.083***
		(-2.41)	(-3.26)	(-1.16)	(-6.13)
4	52%	-0.059***	-0.063***	0.002	-0.064***
		(-3.90)	(-2.84)	(0.08)	(-4.37)
Predicted transitory loss	61%	-0.012	-0.006	-0.011	-0.035***
		(-0.77)	(-0.38)	(-0.66)	(-3.00)
Transitory-Persistent		**0.067***	**0.055**	**0.052**	**0.136*****
		(1.82)	**(1.61)**	**(1.46)**	**(4.82)**

Analysts' expectation on loss persistence

Fundamental regression:

$$EPS_{t+1} = \alpha_0 + \alpha_1 EPS_t + \tau_{t+1}$$

Analyst forecast regression:

$$FEPS_t = \alpha_0^* + \alpha_1^* EPS_t + \omega_t$$

$FEPS_t$: Analyst consensus forecast for earnings of quarter t+1

α_1^* : Analysts' expectation of loss persistence

Table 7 Panel B: Analysts' expectation of loss persistence

Predicted persistent loss and pro forma $EPS_t<0$ (N=5,399)

	Fundamental regression			*Analyst forecast regression*	
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.743	81.96	α_1^*	0.726	77.71

Test of analysts' expectation of loss persistence:

Null hypothesis	Likelihood ratio statistic	Marginal significance level
$\alpha_1=\alpha_1^*$	3.71	0.054

Predicted transitory loss and pro forma $EPS_t<0$ (N=3,453)

	Fundamental regression			*Analyst forecast regression*	
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.012	0.71	α_1^*	-0.052	-3.05

Test of analysts' expectation of loss persistence:

Null hypothesis	Likelihood ratio statistic	Marginal significance level
$\alpha_1=\alpha_1^*$	22.61	0.000

Abnormal returns based on $FEARN_t$ after controlling for other return predictors

- Commonly known return predictors:
  - **Book-to-market ratio** (BTM_t): Fama and French (1992);
  - **Accruals** (ACC_t): Sloan (1996), Richardson et al. (2005);
  - **Price momentum** (MOM_t): Jegadeesh and Titman (1993), Chan et al. (1996), Lee and Swaminathan (2000);
  - **Return volatility** (VOL_t): Ang et al. (2006);
  - **Standardized unexpected earnings** (SUE_t): Bernard and Thomas (1990), Ball and Bartov (1996), Rangan and Sloan (1998), Narayanamoorthy (2006);
  - **Earnings-to-price ratio** (ETP_t): Basu (1977), Basu (1983), Lakonishok et al. (1994);
  - **Return on assets** ($EARN_t$): Balakrishnan et al. (2010);

- Regression framework:

$$BHAR365_{t+1} = \gamma_0 + \gamma_1 FEARN_t + \gamma_2 EARN_t + \gamma_3 ETP_t + \gamma_4 SUE_t + \gamma_5 BTM_t$$
$$+ \gamma_6 ACC_t + \gamma_7 MOM_t + \gamma_8 VOL_t + \eta_{t+1}$$

Table 8: Abnormal returns based on *FEARN$_t$* after controlling for other return predictors

Variable	Predicted Sign	Equal-weighted BHAR365$_{t+1}$				
		Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT		-0.065***	-0.065***	-0.065***	-0.064***	-0.065***
		(-4.28)	(-4.29)	(-4.24)	(-4.24)	(-4.24)
FEARN$_t$	**+**	**0.104*** **		**0.084*** **		**0.074*** **
		(2.72)		**(2.83)**		**(2.98)**
Control variables						
EARN$_t$	+		0.087***		0.052	0.033
			(2.63)		(1.59)	(0.87)
ETP$_t$	+			-0.015	-0.027	-0.032
				(-0.89)	(-0.86)	(-1.03)
SUE$_t$	+			0.081***	0.060***	0.078***
				(4.02)	(2.75)	(3.57)
BTM$_t$	+			0.074***	0.070***	0.063***
				(3.00)	(2.82)	(2.63)
ACC$_t$	-			-0.067***	-0.069***	-0.067***
				(-5.64)	(-5.79)	(-5.69)
MOM$_t$	+			0.009	0.013	0.010
				(0.34)	(0.49)	(0.39)
VOL$_t$	-			-0.047*	-0.057**	-0.044
				(-1.67)	(-1.97)	(-1.62)
Firm clustering		*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Quarter clustering		*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Adjusted R-square		0.002	0.002	0.006	0.006	0.006

Table 9: The overvaluation of predicted persistent losses in firms with positive short interest

Portfolio ranking on FEARN$_t$	N	Mean SIR$_t$	Equal-weighted BHAR365$_{t+1}$			
			SIR$_t$ Q1 N=7,642	SIR$_t$ Q2 N= 7,677	SIR$_t$ Q3 N=7,692	SIR$_t$ Q4 N=7,658
Predicted persistent loss	**6,238**	**6.28%**	**-0.043** **(-0.83)**	**-0.047** **(-0.91)**	**-0.099***** **(-2.96)**	**-0.111***** **(-2.66)**
2	6,237	5.66%	0.009 (0.23)	-0.006 (-0.17)	-0.030 (-0.89)	-0.077*** (-2.67)
3	5,937	5.82%	-0.034* (-1.66)	0.009 (0.28)	-0.009 (-0.33)	-0.063** (-2.49)
4	5,989	5.50%	-0.012 (-0.57)	0.014 (0.53)	-0.021 (-1.11)	-0.031 (-1.59)
Predicted transitory loss	6,268	5.30%	-0.027 (-1.46)	0.029 (1.43)	0.036 (1.49)	-0.002 (-0.01)
Transitory-Persistent			**0.016** **(0.28)**	**0.076** **(1.57)**	**0.135***** **(3.48)**	**0.109***** **(2.72)**

Conclusions and contributions

- This study identifies an area where stock prices might be inefficient.
    - Stock prices act as if investors naïvely treat all losses as transitory and irrelevant to future earnings.
    - Stock prices of firms with predicted persistent losses reflect optimistic expectations of loss persistence and hence are overvalued.

- This study offers a new explanation of the lower association between negative earnings and stock returns.
    - The smaller market reaction to losses can be partially due to investors underestimating loss persistence.