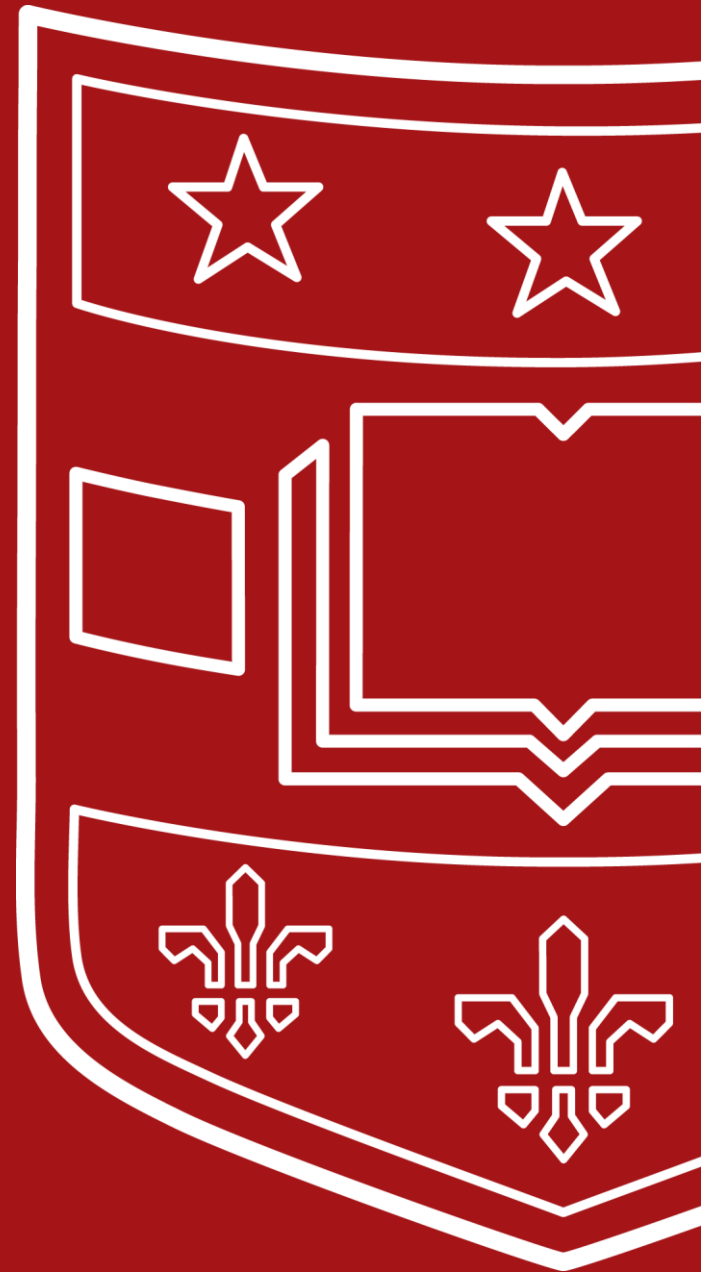


# Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?

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# I. Introduction

## ❖ Market inefficiency:

3. How to exploit the inefficiency?

2. What is the neglected information?

People are too “fixate” on reported earnings and neglect the information contained in **accrual and cash flow components** of earnings.

Information content of these components is **systematically different**, but that stock prices do not reflect the information fully **until it impacts future earnings**.

4. When to implement the strategy?

1. What is the difference?



## II. Development of Hypotheses

**H1:** What's the difference?

The **persistence** of current earning performance is **decreasing** in the magnitude of the accrual component of earnings and **increasing** in the magnitude of cash flow component.

**H2(i):** What is the neglected information?

The earnings expectations embedded in stock prices fail to reflect fully the higher earnings persistence attributable to the cash flow component of earnings and the lower earnings persistence attributable to the accrual component of earnings.



## II. Development of Hypotheses (cont.)

**H2(ii):** How to exploit the inefficiency?

A trading strategy taking a long position in the stock of firms reporting relatively low levels of accruals and a short position in the stock of firms reporting relatively high levels of accruals generates positive abnormal stock returns.

**H2(iii):** When to implement the strategy?

The abnormal stock returns predicted in H2(ii) are clustered around future earnings announcement dates.



## III. Sample Formation and Variable Measurement

- **Sample**
  - ✓ 40,679 firm-year observations
  - ✓ 1962 - 1991
  - ✓ Compustat / CRSP merged database



### III. Sample Formation and Variable Measurement(cont.)

- **Variables**

- ✓ Earnings: Income from continuing Operations
- ✓ Accrual Component

$$\text{Accruals} = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep$$

$\Delta CA$  = change in current assets

$\Delta Cash$  = change in cash/cash equivalents

$\Delta CL$  = change in current liabilities

$\Delta STD$  = change in debt included in current liabilities

$\Delta TP$  = change in income taxes payable

$Dep$  = Depreciation and amortization expense

- ✓ Cash Flow Component = Earnings – Accrual Component

- **Variable Measurement Standardized by size**

- ✓ Divided by average total assets



### III. Sample Formation and Variable Measurement(cont.)

- **Abnormal Returns**

- ✓ Size-Adjusted Return

Measure the buy-hold return in excess of the buy-hold return on a value weighted portfolio of firms having similar market values

- ✓ Jensen's Alpha

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \epsilon_{pt}$$

$R_{pt}$  = equal-weighted return on portfolio p in year t

$R_{mt}$  = market return in year t

$R_{ft}$  = risk free rate in year t

# IV. Empirical Analysis: Descriptive Statistics



**TABLE 1**  
**Mean (median) Values of Selected Characteristics for Ten Portfolios of Firms Formed**  
**Annually by Assigning Firms to Deciles Based on the Magnitude of Accruals.**  
**Sample Consists of 40,679 Firm-years between 1962 and 1991<sup>a</sup>**

- Accruals increase
  - ✓ Earnings increase
  - ✓ Cash Flows decrease
- U-shaped beta: extreme portfolios contain smaller and more risky stocks

	<i>Portfolio Accrual Ranking</i>									
	<i>Lowest</i>	2	3	4	5	6	7	8	9	<i>Highest</i>
<i>Panel A: Components of Earnings</i>										
	<b>increasing</b>									
Accruals	-0.15 (-0.15)	-0.09 (-0.09)	-0.07 (-0.06)	-0.05 (-0.05)	-0.03 (-0.03)	-0.02 (-0.02)	-0.00 (0.00)	0.02 (0.02)	0.05 (0.05)	0.15 (0.12)
Cash Flows	0.22 (0.23)	0.18 (0.18)	0.16 (0.16)	0.15 (0.15)	0.13 (0.13)	0.12 (0.13)	0.12 (0.11)	0.10 (0.10)	0.08 (0.07)	0.00 (0.00)
Earnings	0.07 (0.07)	0.09 (0.09)	0.10 (0.09)	0.11 (0.10)	0.11 (0.10)	0.11 (0.11)	0.12 (0.11)	0.13 (0.12)	0.13 (0.13)	0.15 (0.13)
<i>Panel B: Risk Proxies</i>										
Portfolio Beta	1.25	0.94	0.95	0.86	0.91	0.94	0.93	0.93	1.06	1.23
Size	3.80 (3.54)	4.57 (4.38)	4.93 (4.84)	4.97 (4.93)	4.94 (4.86)	4.90 (4.84)	4.77 (4.65)	4.62 (4.53)	4.32 (4.20)	3.99 (3.86)



# IV. Empirical Analysis: Descriptive Statistics



**TABLE 1**  
**Mean (median) Values of Selected Characteristics for Ten Portfolios of Firms Formed Annually by Assigning Firms to Deciles Based on the Magnitude of Accruals. Sample Consists of 40,679 Firm-years between 1962 and 1991<sup>a</sup>**

	<i>Portfolio Accrual Ranking</i>									
	<i>Lowest</i>	2	3	4	5	6	7	8	9	<i>Highest</i>
<i>Panel C: Components of Accruals</i>										
Current Asset	-0.08 (-0.06)	-0.01 (-0.01)	0.01 (0.01)	0.02 (0.01)	0.03 (0.02)	0.04 (0.03)	0.05 (0.05)	0.07 (0.07)	0.11 (0.10)	0.21 (0.19)
Current Liability	-0.03 (-0.02)	-0.02 (-0.02)	-0.02 (-0.01)	-0.02 (-0.01)	-0.02 (-0.01)	-0.02 (-0.01)	-0.02 (-0.01)	-0.02 (-0.02)	-0.02 (-0.02)	-0.03 (-0.03)
Depreciation Expense	-0.06 (-0.05)	-0.06 (-0.05)	-0.05 (-0.05)	-0.05 (-0.05)	-0.04 (-0.04)	-0.04 (-0.04)	-0.04 (-0.03)	-0.03 (-0.03)	-0.03 (-0.03)	-0.03 (-0.03)

$$\text{Accruals} = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep$$

**Current Asset**
**Current Liability**
**Depreciation**

Majority of variation in accruals is attributable to variation in current asset component.

## IV. Empirical Analysis: Tests of H1



H1: The **persistence** of current earning performance is **decreasing** in the magnitude of the accrual component of earnings and **increasing** in the magnitude of cash flow component.

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + v_{t+1}$$
$$Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash Flows_t + v_{t+1}$$

## IV. Empirical Analysis: Tests of H1



H1: The **persistence** of current earning performance is **decreasing** in the magnitude of the accrual component of earnings and **increasing** in the magnitude of cash flow component.

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + v_{t+1}$$

*Panel A: Regressions using actual values*

	<i>Pooled</i>	<i>Industry Level</i>			
		<i>Mean</i>	<i>Q1</i>	<i>Median</i>	<i>Q3</i>
$\alpha_0$	0.015 (32.57)**	0.021	0.014	0.019	0.027
$\alpha_1$	0.841 (303.98)**	0.773	0.708	0.774	0.863

# IV. Empirical Analysis: Tests of H1



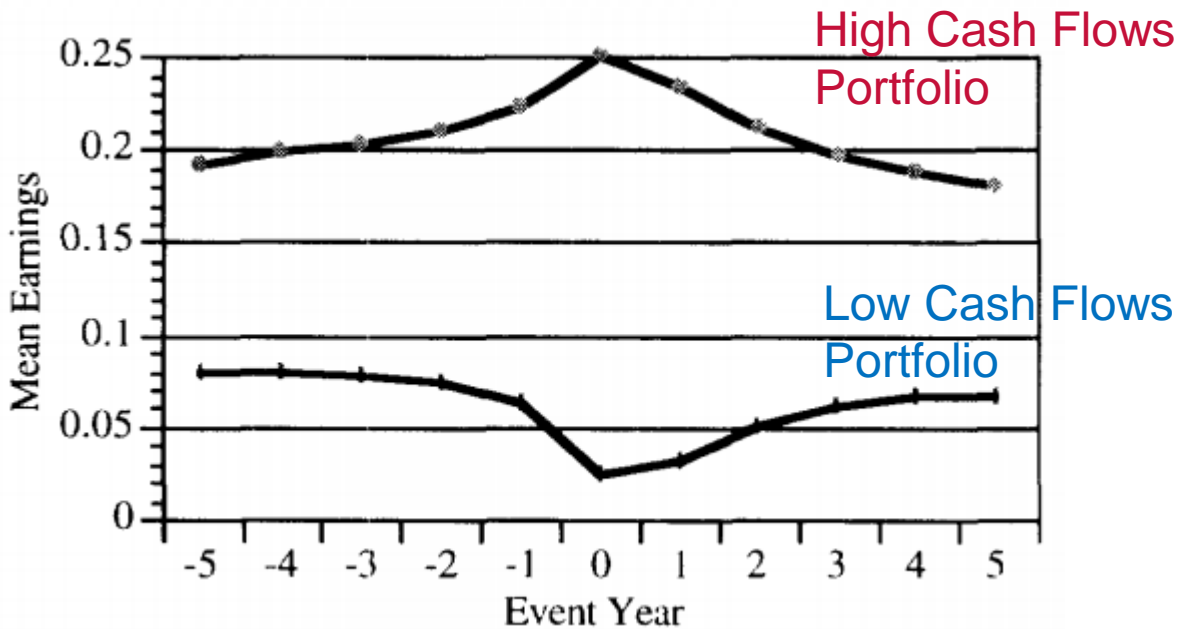
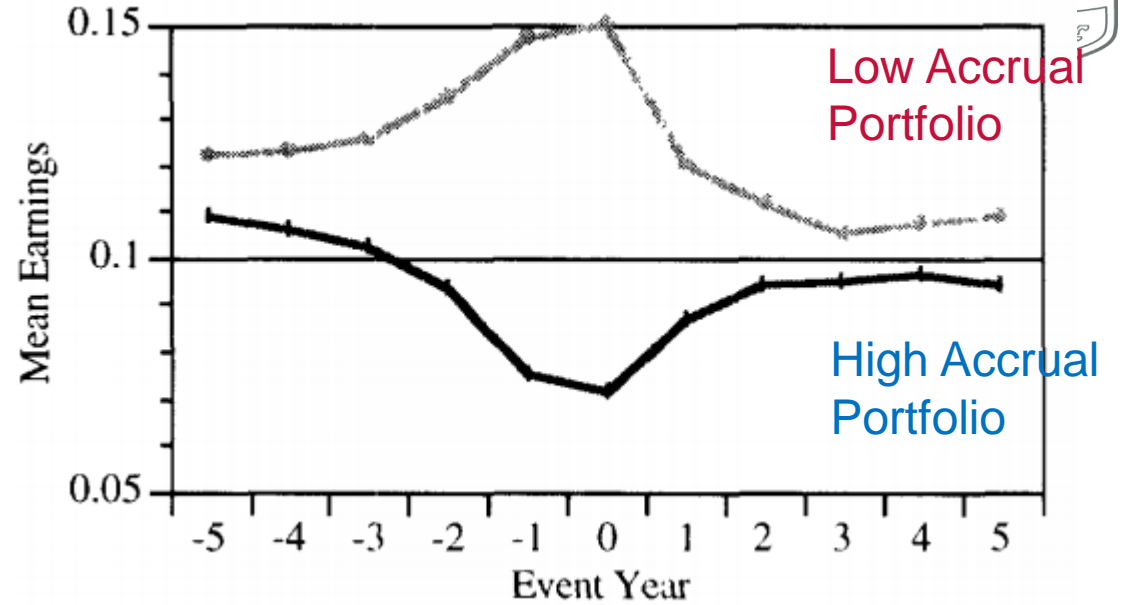
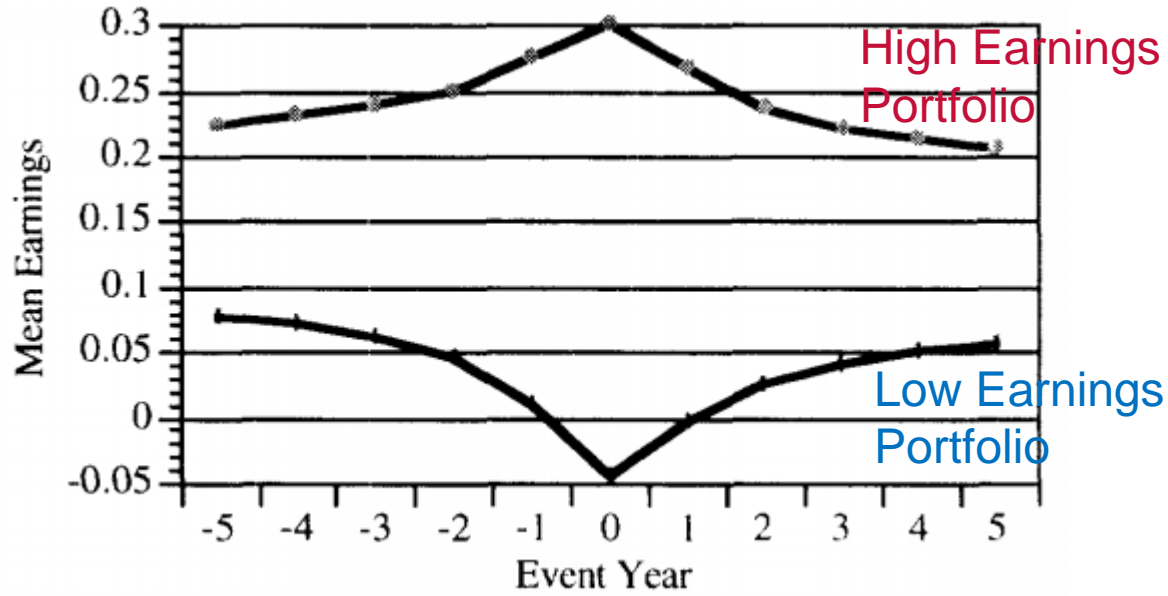
H1: The **persistence** of current earning performance is **decreasing** in the magnitude of the accrual component of earnings and **increasing** in the magnitude of cash flow component.

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Panel A: Regressions using actual values

	<i>Pooled</i>	<i>Industry Level</i>			
		<i>Mean</i>	<i>Q1</i>	<i>Median</i>	<i>Q3</i>
$\gamma_0$	0.011 (24.05)**	0.019	0.009	0.016	0.022
$\gamma_1$	0.765 (186.53)**	0.721	0.635	0.703	0.780
$\gamma_2$	0.855 (304.56)**	0.781	0.733	0.777	0.873
F-test of $\gamma_1 = \gamma_2$ : 614.01 <sup>b</sup>		Proportion of cases in which $\gamma_1 < \gamma_2$ : 86% <sup>c</sup>			

# IV. Empirical Analysis: Tests of H1 (Opt.)



Longer mean reverting process for cash flow portfolios

## IV. Empirical Analysis: Tests of H2(i)



**H2(i):** The earnings expectations embedded in stock prices fail to reflect fully the higher earnings persistence attributable to the cash flow component of earnings and the lower earnings persistence attributable to the accrual component of earnings.

- Efficient Market: abnormal returns are zero in expectation

$$E(r_{t+1} - r_{t+1}^e | \phi_t) = 0$$

where

$\phi_t$  = the set of information available to the market at the end of period t,

$E(\dots | \phi_t)$  = the objective expectation conditional on  $\phi_t$ ,

$r_{t+1}$  = the return to holding a security during period t+1, and

$r_{t+1}^e$  = the market's subjective expectation of the normal return for period t+1.

- A model that satisfies the efficient-markets condition

$$(r_{t+1} - r_{t+1}^e | \phi_t) = \beta(X_{t+1} - X_{t+1}^e) + \varepsilon_{t+1}$$

where

$\varepsilon_t$  = a disturbance with the property that  $E(\varepsilon_{t+1} | \phi_t) = 0$ ,

$X_t$  = a variable relevant to the pricing of the security in period t,

$X_{t+1}^e$  = the rational forecast of  $X_{t+1}$  at time t [i.e.,  $X_{t+1}^e = E(X_{t+1} | \phi_t)$ ],

$\beta$  = a valuation multiplier.

## IV. Empirical Analysis: Tests of H2(i)



- A model that satisfies the efficient-markets condition

$$(r_{t+1} - r_{t+1} | \phi_t) = \beta(X_{t+1} - X_{t+1}^e) + \varepsilon_{t+1} \quad (7)$$

- Combining the Earnings forecasting model

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + v_{t+1}, \quad (8)$$

$$(r_{t+1} - r_{t+1} | \phi_t) = \beta(Earnings_{t+1} - \alpha_0 - \alpha_1^* Earnings_t) + \varepsilon_{t+1}. \quad (9)$$

- Combining the expanded Earnings forecasting model

$$Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\ flows_t + v_{t+1}, \quad (10)$$

$$(r_{t+1} - r_{t+1} | \phi_t) = \beta(Earnings_{t+1} - \gamma_0 - \gamma_1^* Accruals_t - \gamma_2^* Cash\ flows_t) + \varepsilon_{t+1}. \quad (11)$$

## IV. Empirical Analysis: Tests of H2(i)



- Test Statistics:

Market efficiency is tested using a likelihood ratio statistic which is distributed asymptotically  $\chi^2(q)$

$$2n \log (SSR^c/SSR^u) \quad (12)$$

where

$q$  = the number of constraints imposed by market efficiency,

$n$  = the number of observations,

$SSR^c$  = the sum of squared residuals from the constrained weighted system, and

$SSR^u$  = the sum of squared residuals from the unconstrained weighted system.



# IV. Empirical Analysis: Tests of H2(i)



- $\alpha_1 = \alpha_1^*$
- Stock price correctly reflect the implications of current annual earnings for future annual earnings

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + v_{t+1}$$

$$Abnormal\ Return_{t+1} = \beta(Earnings_{t+1} - \alpha_0 - \alpha_1^* Earnings_t) + \epsilon_{t+1}$$

Panel A: Regressions using actual values of financial statement variables

Parameter	Estimate	Asymptotic standard error
$\alpha_1$	0.841	0.003
$\alpha_1^*$	0.840	0.009
$\beta$	1.920	0.032
Test of market efficiency:	$\alpha_1 = \alpha_1^*$	
Likelihood ratio statistic	0.007	
Marginal significance level	0.933	

# IV. Empirical Analysis: Tests of H2(i)



- $\gamma_1 < \gamma_1^*, \gamma_2 > \gamma_2^*$
- Stock price do not anticipate rationally the lower(higher) persistence of earnings performances attributable to accrual(cash flow) components of earnings

$$Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\ Flows_t + v_{t+1}$$

$$Abnormal\ Return_{t+1} = \beta (Earnings_{t+1} - \gamma_0 - \gamma_1^* Accruals_t - \gamma_2^* Cash\ Flows_t) + e_{t+1}$$

Panel A: Regressions using actual values of financial statement variables

Parameter	Estimate	Asymptotic Standard Error
$\gamma_1$	0.765	0.004
$\gamma_1^*$	0.911	0.014
$\gamma_2$	0.855	0.003
$\gamma_2^*$	0.826	0.010
$\beta$	1.894	0.032

Test of market efficiency:

$$\gamma_1 = \gamma_1^* \text{ and } \gamma_2 = \gamma_2^*$$

Likelihood ratio statistic

180.91

Marginal significance level

0.000

## IV. Empirical Analysis: Tests of H2(ii)

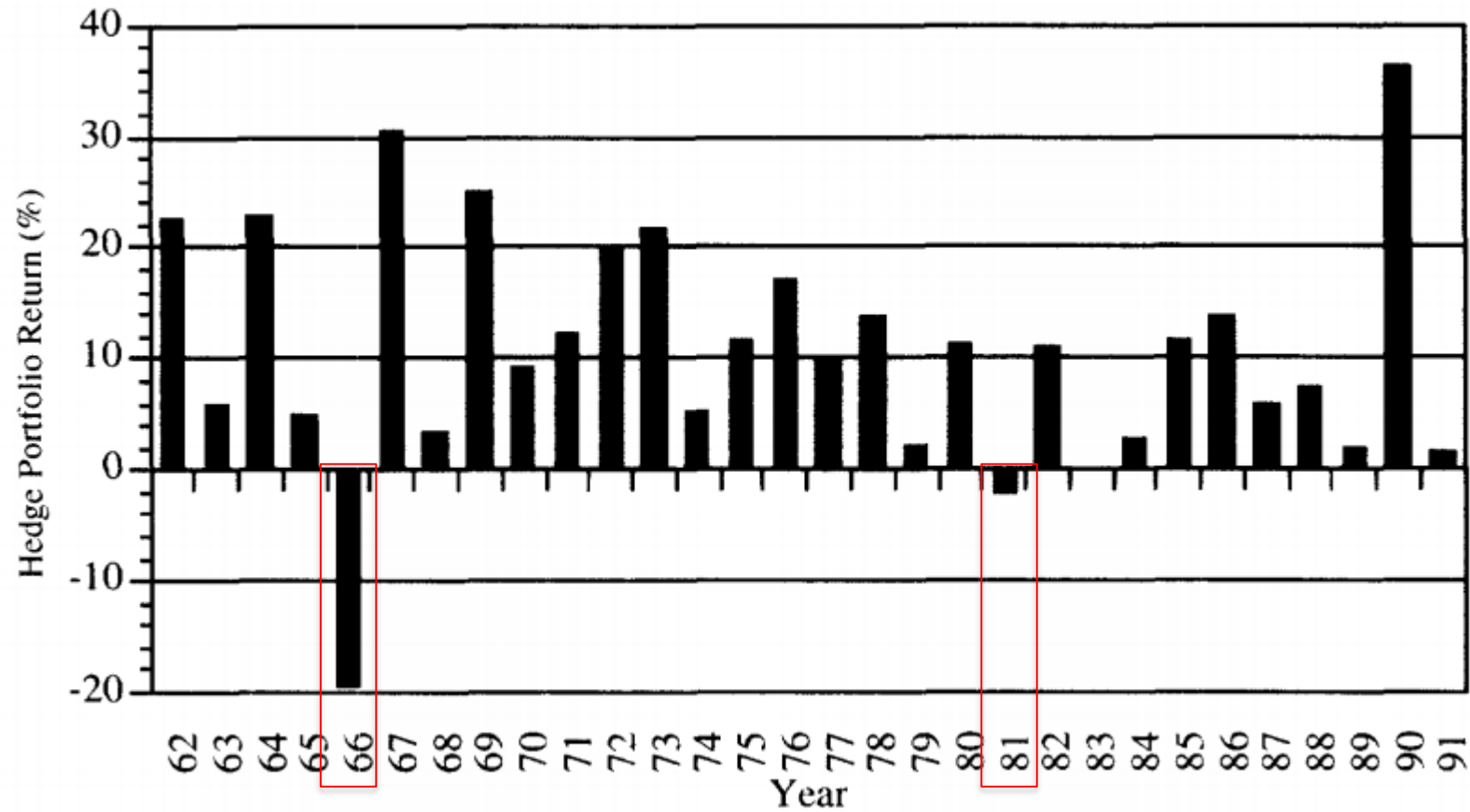
**H2(ii):** A trading strategy taking a long position in the stock of firms reporting relatively low levels of accruals and a short position in the stock of firms reporting relatively high levels of accruals generates positive abnormal stock returns.

<i>Portfolio Accrual Ranking</i>	<i>Size Adjusted Returns<sup>b</sup></i>			<i>Jensen Alphas<sup>c</sup></i>		
	<i>year t+1</i>	<i>year t+2</i>	<i>year t+3</i>	<i>year t+1</i>	<i>year t+2</i>	<i>year t+3</i>
Lowest	0.049 (2.65)**	0.016 (1.17)	0.007 (0.55)	0.039 (2.01)*	0.007 (0.40)	0.001 (0.08)
2	0.028 (3.60)**	0.019 (1.65)	0.006 (0.68)	0.020 (1.68)	0.022 (1.53)	0.012 (1.06)
3	0.024 (3.84)**	0.012 (2.27)*	-0.006 (-0.86)	0.018 (1.70)	0.014 (1.28)	-0.006 (-0.72)
4	0.012 (1.66)	0.001 (0.05)	0.020 (2.72)*	0.017 (2.09)*	0.002 (0.17)	0.017 (1.29)
5	0.001 (0.03)	0.002 (0.22)	0.006 (0.86)	0.010 (0.87)	0.004 (0.38)	0.014 (1.12)
6	0.010 (1.43)	0.005 (0.72)	0.016 (1.90)	0.006 (0.57)	0.002 (0.24)	0.003 (0.43)
7	-0.002 (-0.22)	0.003 (0.60)	-0.006 (-0.83)	0.004 (0.39)	0.006 (0.97)	0.005 (0.56)
8	-0.021 (-3.03)**	-0.002 (-0.31)	-0.001 (-0.01)	0.011 (-1.17)	-0.004 (-0.39)	0.002 (0.16)
9	-0.035 (-3.70)**	-0.018 (-2.52)*	-0.015 (-1.60)	-0.028 (-3.04)**	-0.012 (-1.36)	-0.012 (-1.15)
Highest	-0.055 (-3.98)**	-0.032 (-2.25)*	-0.022 (-1.61)	-0.064 (-4.68)**	-0.040 (-2.87)**	-0.036 (-2.47)*
Hedge <sup>d</sup>	0.104 (4.71)**	0.048 (3.15)**	0.029 (1.64)	0.104 (4.42)**	0.048 (2.41)*	0.038 (1.62)

# IV. Empirical Analysis: Tests of H2(ii)



Hedge Portfolio Return



## IV. Empirical Analysis: Tests of H2(ii)



*Panel C: Cross-sectional regressions of stock returns on accruals and other predictors of returns*

	<i>Dependent variable is stock return for:</i>		
	<i>year t+1</i>	<i>year t+2</i>	<i>year t+3</i>
Intercept	0.28	0.27	0.22
(t-statistic)	(5.60)**	(5.42)**	(4.86)**
Accruals	-0.30	-0.10	-0.11
(t-statistic)	(-6.15)**	(-2.19)*	(-1.74)
Size	-0.02	-0.02	-0.01
(t-statistic)	(-3.24)**	(-2.75)**	(-2.08)*
Book-to-market	0.03	0.02	0.02
(t-statistic)	(2.31)*	(1.97)	(2.32)*
Beta	-0.02	-0.02	-0.01
(t-statistic)	(-0.91)	(-0.77)	(-0.54)
Earnings-to-price	0.16	0.05	0.00
(t-statistic)	(2.04)*	(0.55)	(0.01)

## IV. Empirical Analysis: Tests of H2(iii)



**H2(iii):** The abnormal stock returns predicted in H2(ii) are clustered around future earnings announcement dates.

<i>Accrual portfolio</i>	<i>Total period return<sub>t+1</sub></i> <sup>b</sup>	<i>Announcement period return<sub>t+1</sub></i> <sup>b</sup>	<i>Non-announcement period return<sub>t+1</sub></i> <sup>c</sup>	<i>Proportion of late reporters<sub>t+1</sub></i> <sup>d</sup>
Lowest	0.055 (2.01)*	0.045 (5.45)**	0.009 (0.34)	0.285
2	0.056 (2.04)*	0.027 (3.76)**	0.032 (1.11)	0.276
3	0.010 (0.42)	0.016 (2.49)**	-0.006 (-0.30)	0.272
4	0.012 (0.61)	0.018 (3.37)**	-0.003 (-0.12)	0.285
5	-0.010 (-0.70)	0.014 (3.12)**	-0.023 (-2.00)*	0.272
6	-0.019 (-1.08)	0.016 (3.53)**	-0.034 (-2.14)*	0.259
7	-0.001 (-0.32)	0.012 (2.01)*	-0.014 (-0.76)	0.283
8	-0.013 (-0.71)	0.010 (1.82)	-0.020 (-1.15)	0.279
9	-0.011 (-0.40)	0.010 (1.50)	-0.017 (-0.61)	0.304
Highest	-0.057 (-2.21)*	0.000 (0.02)	-0.051 (-2.04)*	0.345
Hedge <sup>c</sup>	0.112 (6.22)**	0.045 (5.51)**	0.060 (3.41)**	

# V. Conclusions



- The persistence of earnings performance depends on cash and accrual components of earnings
- Stock prices act as if investors fail to identify the difference of the components correctly
- Inconsistent with efficient market, but do not necessarily imply investor irrationality or unexploited profit opportunities
  - ✓ Information acquisition and processing costs