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

Richard G. Sloan, 1996

The Accounting Review Vol. 71, No. 3, 289-315

Hongwen CAO
September 25, 2018

1

Content

Background

Brief introduction to the paper, its author, and the topic of interest.

Data and Methodology

Data: Main definitions, sample formation, and adjustment.
Methodology: Hypothesis testing.

Hypothesis and Empirical Analysis

Each hypothesis followed by its corresponding analysis.

Conclusion and Comments

Conclusion of the paper.
Personal comments to the paper.

Background

- ## About the author
  - ➔ 1996: Assistant Professor of Accounting at the Wharton School of the University of Pennsylvania
  - ➔ Current: Chaired Professor of Accounting at University of California at Berkeley

- ## About the journal
  - ➔ *The Accounting Review*: One of the leading academic journals in accounting published by the American Accounting Association (AAA)

- ## Why this topic

Importance

"CFO, as a measure of performance, is less subject to distortion than is the net income figure… because the accrual system, which produces the income number, relies on accruals, deferrals, allocations and valuations, all of which involve higher degrees of subjectivity than what enters the determination of CFO… Some analysts believe that **the higher the ratio of CFO to net income, the higher the quality of that income**."

—Bernstein, L. 1993. *Financial Statement Analysis.*

Data and Methodology

- **Definitions:**
  - <u>Earnings</u>: Operating income after depreciation, excluding non-recurring items.
  - <u>Accruals</u>:

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

  - <u>Cash from operations</u>:

  $$Cash = Earnings - Accruals$$

Data and Methodology

- ## Sample formation

  - Stock: CRSP monthly stock returns file provides data on NYSE and AMEX firms.

  - Financial statement data: Compustate annual industrial and research files.

 - Final sample: 40,679 firm-year observations for 30 years from 1962 to 1991.

- ## Adjustments

  - All 3 variables are standardized by firm size for cross-sectional and temporal comparison.

  - Size-adjusted returns are computed by measuring the return in excess of that on a value-weighted portfolio of firms having similar market values.

  - Jensen alpha estimation: $\left(R_{pt} - R_{ft} \right) = \alpha_p + \beta_{p(R_{mt} - R_{ft})} + \epsilon_{pt}$

Data and Methodology

- **Empirical Analysis:**
  - Linear and non-linear regression
  - Student's t-test
  - F test: Statistical test with an F-distribution under the null hypothesis.
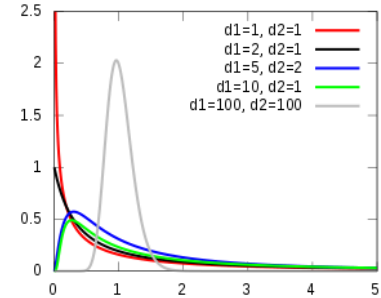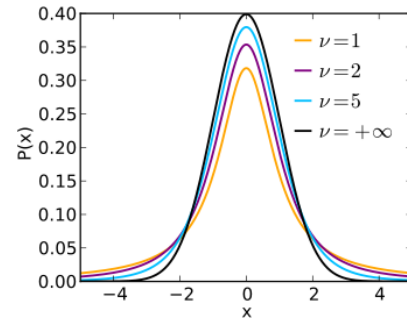
Left: Student's t-distribution; right: F-distribution

Hypothesis and Empirical Test

Persistence of current earnings

Earning expectations

Trading strategy
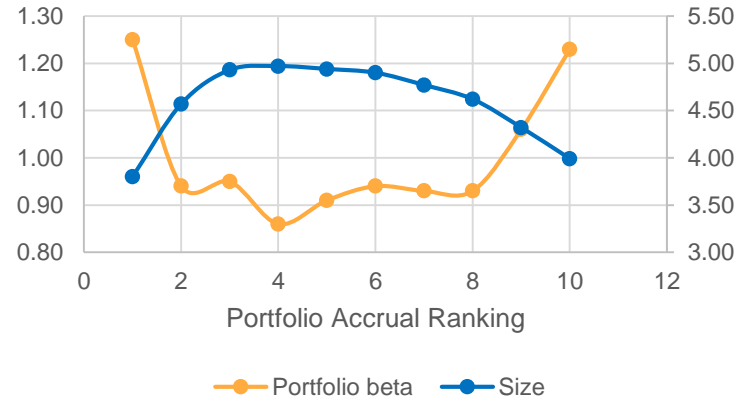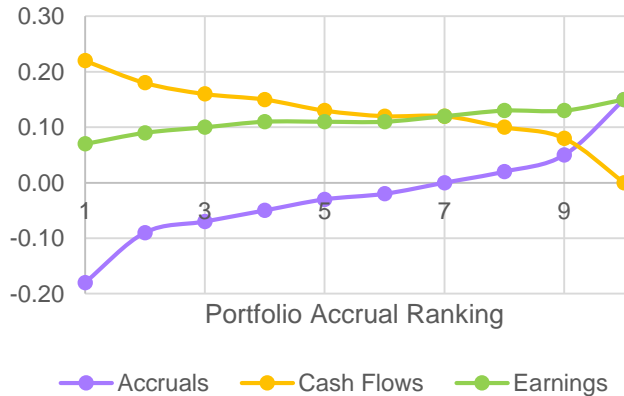
Timing of abnormal stock returns

Descriptive Statistics

- Components of earnings

A strong negative relation between accruals and cash flows.

Portfolio Accrual Ranking

Accruals — Cash Flows — Earnings

Portfolio Accrual Ranking

Portfolio beta — Size

- Risk proxies

"U-shaped" relation, with the extreme portfolios containing the smaller, more risky stocks.

Descriptive Statistics

- Components of accruals

$$\frac{\Delta CA - \Delta Cash}{Average\ Total\ Asset}$$
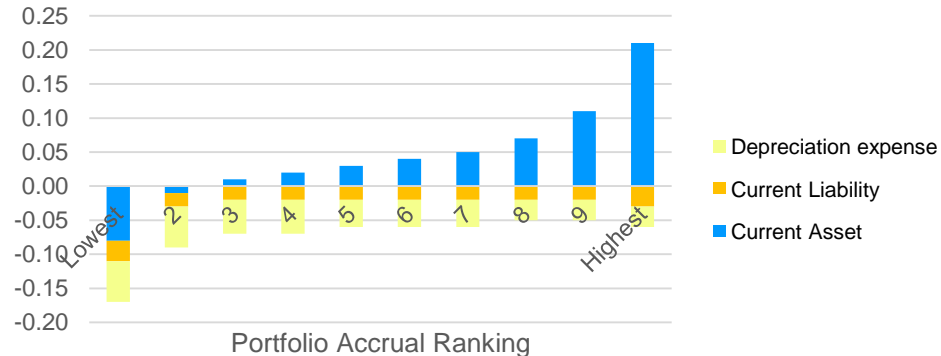
Current Asset

-

$$\frac{\Delta CL - \Delta STD - \Delta TP}{Average\ Total\ Asset}$$

Current Liability

-

$$\frac{Dep}{Average\ Total\ Asset}$$

Depreciation

The majority of the variation in accruals is attributable to variation in the current asset component.

Portfolio Accrual Ranking

Legend: Depreciation expense, Current Liability, Current Asset

Hypothesis 1

- ## H1:

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

Step 1

Current earnings performance & future earnings performance

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

Step 2

Specification implied by H1

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

Results from Ordinary Least Squares Regressions of Future Earnings Performance on Current Earnings Performance (t-statistics in parentheses) Sample Consists of 40,679 Firm-years from 1962 to 1991[a]

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

Panel A: Regressions using actual values

	Pooled	Industry Level			
		Mean	Q1	Median	Q3
α_0	0.015 (32.57)**	0.021	0.014	0.019	0.027
α_1	0.841 (303.98)**	0.773	0.708	0.774	0.863

Panel B: Regressions using decile rankings

	Pooled	Industry Level			
		Mean	Q1	Median	Q3
α_0	1.193 (62.37)**	1.300	0.885	1.187	1.454
α_1	0.783 (253.93)**	0.768	0.699	0.772	0.825

[a] Earnings is income from continuing operations divided by average total assets.
** Denotes significance at the 0.01 level using a two-tailed t-test.

✓Robustness of the result.

✓Mean reverting.

✓Overstating α_1.

Results from Ordinary Least Squares Regressions of Future Earnings Performance on the Accrual and Cash Flow Components of Current Earnings Performance
(t-statistics in parentheses)
Sample Consists of 40,679 Firm-years from 1962 to 1991[a]

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

Panel A: Regressions using actual values

	Pooled	Industry Level			
		Mean	Q1	Median	Q3
γ_0	0.011 (24.05)**	0.019	0.009	0.016	0.022
γ_1	0.765 (186.53)**	0.721	0.635	0.703	0.780
γ_2	0.855 (304.56)**	0.781	0.733	0.777	0.873

F-test of $\gamma_1=\gamma_2$: 614.01[b]   Proportion of cases in which $\gamma_1 < \gamma_2$: 86%[c]

Panel B: Regressions using decile rankings

	Pooled	Industry Level			
		Mean	Q1	Median	Q3
γ_0	−2.216 (−55.86)**	−1.691	−2.666	−1.938	−1.459
γ_1	0.565 (141.02)**	0.507	0.438	0.520	0.585
γ_2	0.838 (209.34)**	0.794	0.760	0.805	0.884

F-test of $\gamma_1=\gamma_2$: 4894.24[b]   Proportion of cases in which $\gamma_1=\gamma_2$: 99%[c]

✓No constraint on persistence coefficients.

✓Equality of γ_1 and γ_2 is rejected.

✓Strong evidence to support H1.

- ## 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.

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

Results from Nonlinear Generalized Least Squares Estimation of the Stock Price Reaction to Information in Current Earnings about Future Earnings Sample Consists of 40,679 Firm-years between 1962 and 1991[a]

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

Panel A: Regressions using actual values of financial statement variables

Parameter	Estimate	Asymptotic standard error
α_1	0.841	0.003
α_1^*	0.840	0.009
β	1.920	0.032

Test of market efficiency:	$\alpha_1 = \alpha_1^*$
Likelihood ratio statistic	0.007
Marginal significance level	0.933

Panel B: Regressions using decile rankings of financial statement variables

Parameter	Estimate	Asymptotic standard error
α_1	0.783	0.003
α_1^*	0.775	0.009
β	0.082	0.001

Test of market efficiency:	$\alpha_1 = \alpha_1^*$
Likelihood ratio statistic	0.783
Marginal significance level	0.376

✓ α_1: Result from Table 2; α_1^*: Regression result in stock price equation.

✓ Stock prices correctly reflect the implications of current annual earnings for future annual earnings.

Results from Nonlinear Generalized Least Squares Estimation of the Stock Price Reaction to Information in the Accrual and Cash Flow Components of Current Earnings about Future Earnings
Sample Consists of 40,679 Firm-years between 1962 and 1991[a]

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

Panel A: Regressions using actual values of financial statement variables

Parameter	Estimate	Asymptotic Standard Error
γ_1	0.765	0.004
γ_1^*	0.911	0.014
γ_2	0.855	0.003
γ_2^*	0.826	0.010
β	1.894	0.032

Test of market efficiency:	$\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$	
Likelihood ratio statistic	180.91	
Marginal significance level	0.000	

Panel B: Regressions using decile rankings of financial statement variables

Parameter	Estimate	Asymptotic Standard Error
γ_1	0.565	0.004
γ_1^*	0.675	0.014
γ_2	0.838	0.004
γ_2^*	0.747	0.014
β	0.063	0.001

Test of market efficiency:	$\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$	
Likelihood ratio statistic	203.75	
Marginal significance level	0.000	

- ✓ γ_1 & γ_1^* :The coefficient on accruals is larger in stock price regression.
- ✓ γ_2 & γ_2^*: The coefficient on CF is smaller in stock price regression.
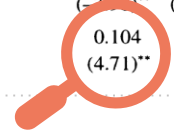- ✓ Reject null hypothesis of market efficiency.

Hypothesis 2(ii)

- ## H2(ii):

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

- Decreasing trend for abnormal return over time.
- A hedge portfolio at $t+1$ has a return of 10.4%—economic significance.

Time-series Means of Equal Weighted Portfolio Abnormal Stock Returns
**Sample Consists of 40,679 Firm-years Between 1962 and 1991[a]**

Portfolio Accrual Ranking	Size Adjusted Returns[b]			Jensen Alphas[c]		
	year t+1	year t+2	year t+3	year t+1	year t+2	year t+3
Lowest	0.049	0.016	0.007	0.039	0.007	0.001
	(2.65)**	(1.17)	(0.55)	(2.01)*	(0.40)	(0.08)
2	0.028	0.019	0.006	0.020	0.022	0.012
	(3.60)**	(1.65)	(0.68)	(1.68)	(1.53)	(1.06)
3	0.024	0.012	−0.006	0.018	0.014	−0.006
	(3.84)**	(2.27)*	(−0.86)	(1.70)	(1.28)	(−0.72)
4	0.012	0.001	0.020	0.017	0.002	0.017
	(1.66)	(0.05)	(2.72)*	(2.09)*	(0.17)	(1.29)
5	0.001	0.002	0.006	0.010	0.004	0.014
	(0.03)	(0.22)	(0.86)	(0.87)	(0.38)	(1.12)
6	0.010	0.005	0.016	0.006	0.002	0.003
	(1.43)	(0.72)	(1.90)	(0.57)	(0.24)	(0.43)
7	−0.002	0.003	−0.006	0.004	0.006	0.005
	(−0.22)	(0.60)	(−0.83)	(0.39)	(0.97)	(0.56)
8	−0.021	−0.002	−0.001	0.011	−0.004	0.002
	(−3.03)**	(−0.31)	(−0.01)	(−1.17)	(−0.39)	(0.16)
9	−0.035	−0.018	−0.015	−0.028	−0.012	−0.012
	(−3.70)**	(−2.52)*	(−1.60)	(−3.04)**	(−1.36)	(−1.15)
Highest	−0.055	−0.032	−0.022	−0.064	−0.040	−0.036
	(−2.28)**	(−2.25)*	(−1.61)	(−4.68)**	(−2.87)**	(−2.47)*
Hedge[d]	0.104	0.048	0.029	0.104	0.048	0.038
	(4.71)**	(3.15)**	(1.64)	(4.42)**	(2.41)*	(1.62)

➢ 2 out of 30 years have negative return.

➢ Over 90% of positive returns rules out risk-based explanation.

Returns by calendar year to a hedge portfolio taking a long position in the stock of firms in the lowest decile of accruals and an equal-sized short position in the stock of firms in the highest decile of accruals. Returns are cumulated over a one-year period beginning four months after the fiscal year end. Accruals is the change in non-cash current assets, less the change in current liabilities (exclusive of short-term debt and taxes payable), less depreciation expense, all divided by average total assets.
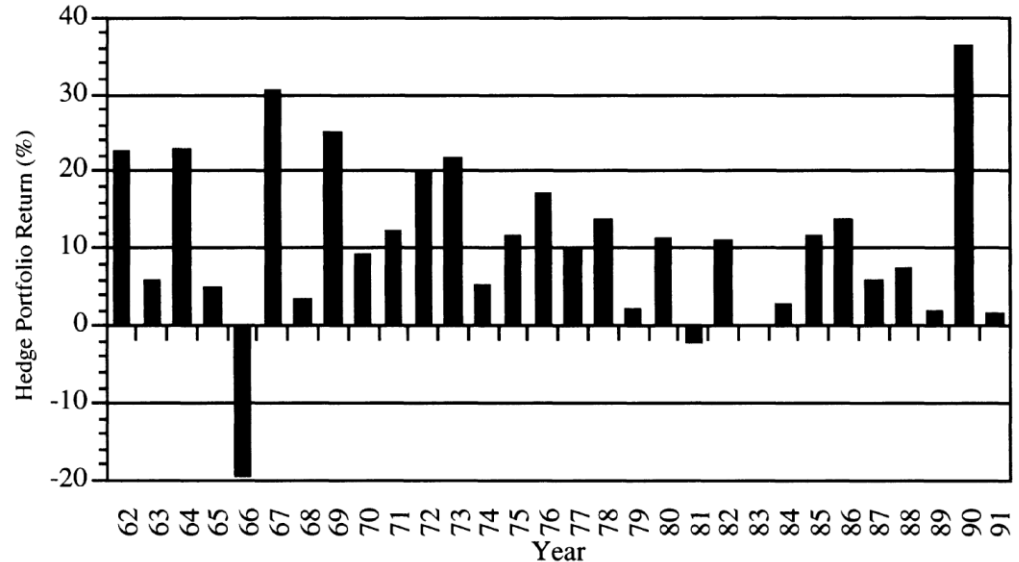
➢ Further examination for the coefficient on the accrual component.

Cross-sectional Regression Tests of the Explanatory Power of Accruals with Respect to Future Annual Stock Returns (t-statistics in parentheses). Sample consists of 40,679 firm-years between 1962 and 1991[a]

Panel A: Cross-sectional regressions of stock returns on accruals

	Dependent variable is stock return for:		
	year t+1	year t+2	year t+3
Intercept	0.16	0.16	0.17
	(4.43)**	(4.42)**	(4.29)**
Accruals	−0.32	−0.16	−0.14
	(−4.60)**	(−2.75)**	(−2.61)*

Panel B: Cross-sectional regressions of stock returns on the components of accruals

	Dependent variable is stock return for:		
	year t+1	year t+2	year t+3
Intercept	0.17	0.17	0.18
	(4.30)**	(4.18)**	(4.28)**
Current asset	−0.35	−0.17	−0.15
	(−4.81)**	(−3.16)**	(−2.72)*
Current liability	−0.25	−0.08	−0.04
	(−3.44)**	(−0.98)	(−0.49)
Depreciation	−0.14	−0.01	−0.02
Expense	(−0.57)	(−0.05)	(−0.07)

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

	Dependent variable is stock return for:		
	year t+1	year t+2	year t+3
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)

Hypothesis 2(iii)

- ## H2(iii):

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

  Quarterly announcement
  3 days around the announcement are the announcement period (total of 12 trading days per year), and the rest non-announcement period (total of 242 trading days per year).

Announcement and Non-announcement Period Size-adjusted Portfolio Stock Returns in the Year Following Portfolio Formation (year t+1) Sample Consists of 16,795 Firm-years between 1973 and 1991[a]

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

- Percentage of return in announcement period.
- Announcement period return decrease as accrual component increases.
- "Bad news" earnings announcement are more likely to be delayed.

Conclusion and Comments

Stock prices act as if investors fail to identify correctly the different properties of accrual and cash flow components of earnings.

Non-trivial trading cost
Limited trading quantities
Earnings management/manipulations

End of presentation
Review of "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?"