*Discussion of:*

# Do Investors Overvalue Firms With Bloated Balance Sheets?

## *by Hirshleifer, Hou, Teoh, Zhang*

Kent Daniel

Kellogg-Northwestern and NBER

NBER Behavioral Finance Program Meeting

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# Outline

- Accruals and Future Returns
- Investment and Future Returns
- Decomposing NOA
- The Paper's Findings
- Behavioral Interpretations
- Suggestions for Future Work

# Earnings = CF + Accruals

- Earnings (NOI, *Net Operating Income*) can be decomposed into two parts:

$$NOI_t = CF_t + Accr_t$$

where

$$CF_t \equiv \text{Cash-Flow}$$

$$Accr_t \equiv \text{Accruals}$$

- Cash-Flow is actual cash
- Accruals should eventually result in more cash flow for the firm, but haven't yet!:

$$\textbf{Accr}_t = \Delta_t(\mathbf{CA} - \mathbf{Cash}) - \Delta_t(\mathbf{CL} - \mathbf{STD} - \mathbf{TP}) - \mathbf{Depr}_t$$

# Accruals Components – *Assets*

$$\mathbf{Accr}_t = \Delta_t(\mathbf{CA - Cash}) - \Delta_t(\mathbf{CL - STD - TP}) - \mathbf{Depr}_t$$

- The "assets" part is the change in (Current Assets - Cash)
- $\mathbf{CA - Cash}$ includes:
  1. Accounts Receivable
  2. Inventories
  3. Prepaid expenses
- Notice that these are: (1) not as good as cash, and (2) can be manipulated.

# Accruals Components – *Liabilities*

$$\mathbf{Accr}_t = \Delta_t(\mathbf{CA} - \mathbf{Cash}) - \Delta_t(\mathbf{CL} - \mathbf{STD} - \mathbf{TP}) - \mathbf{Depr}_t$$

- The "liabilities" part is the change in (Current Liabilities - Short Term Debt - Taxes Payable)
- $\mathbf{CL} - \mathbf{STD} - \mathbf{TP}$ includes:
  1. Accounts Payable
  2. Other Accrued expenses
- Increases, resulting in lower earnings, are likely to be less persistent than actual cash earnings, and can probably be manipulated.

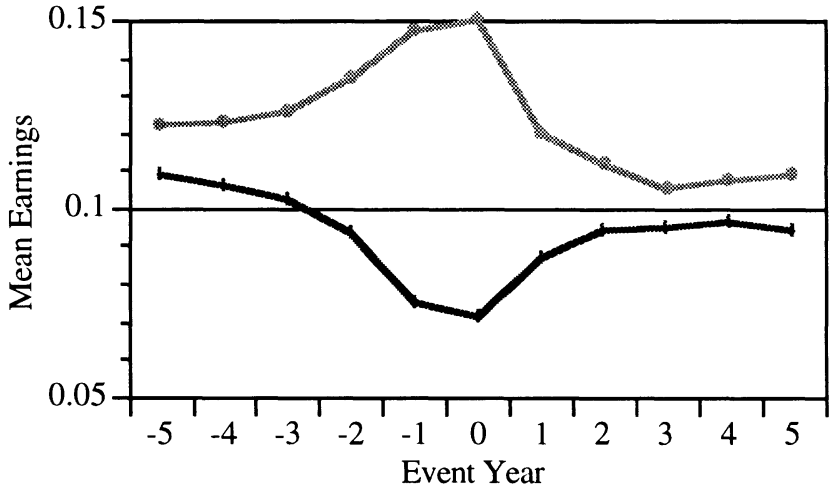
# Accruals Components – *Depreciation*

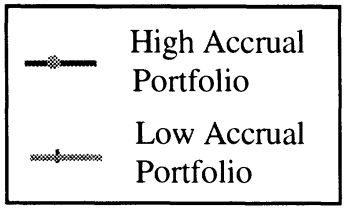
$$\mathbf{Accr}_t = \Delta_t(\mathbf{CA} - \mathbf{Cash}) - \Delta_t(\mathbf{CL} - \mathbf{STD} - \mathbf{TP}) - \mathbf{Depr}_t$$

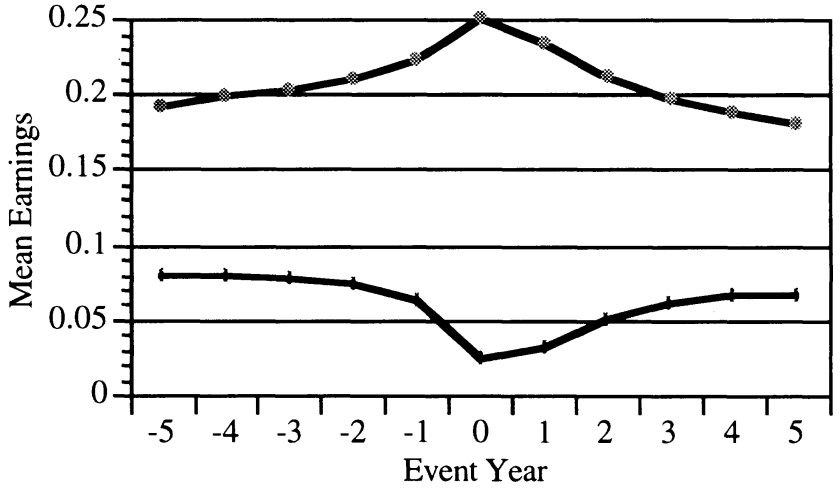
- Firms should generally depreciate capital assets as quickly as possible
  - Firms could manipulate earnings via slow depreciation.

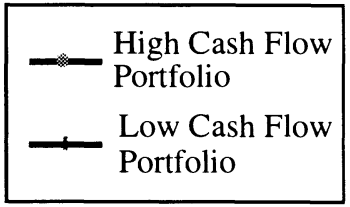
# Accruals vs. Cash Flow Persistence

*From Sloan (1996):*



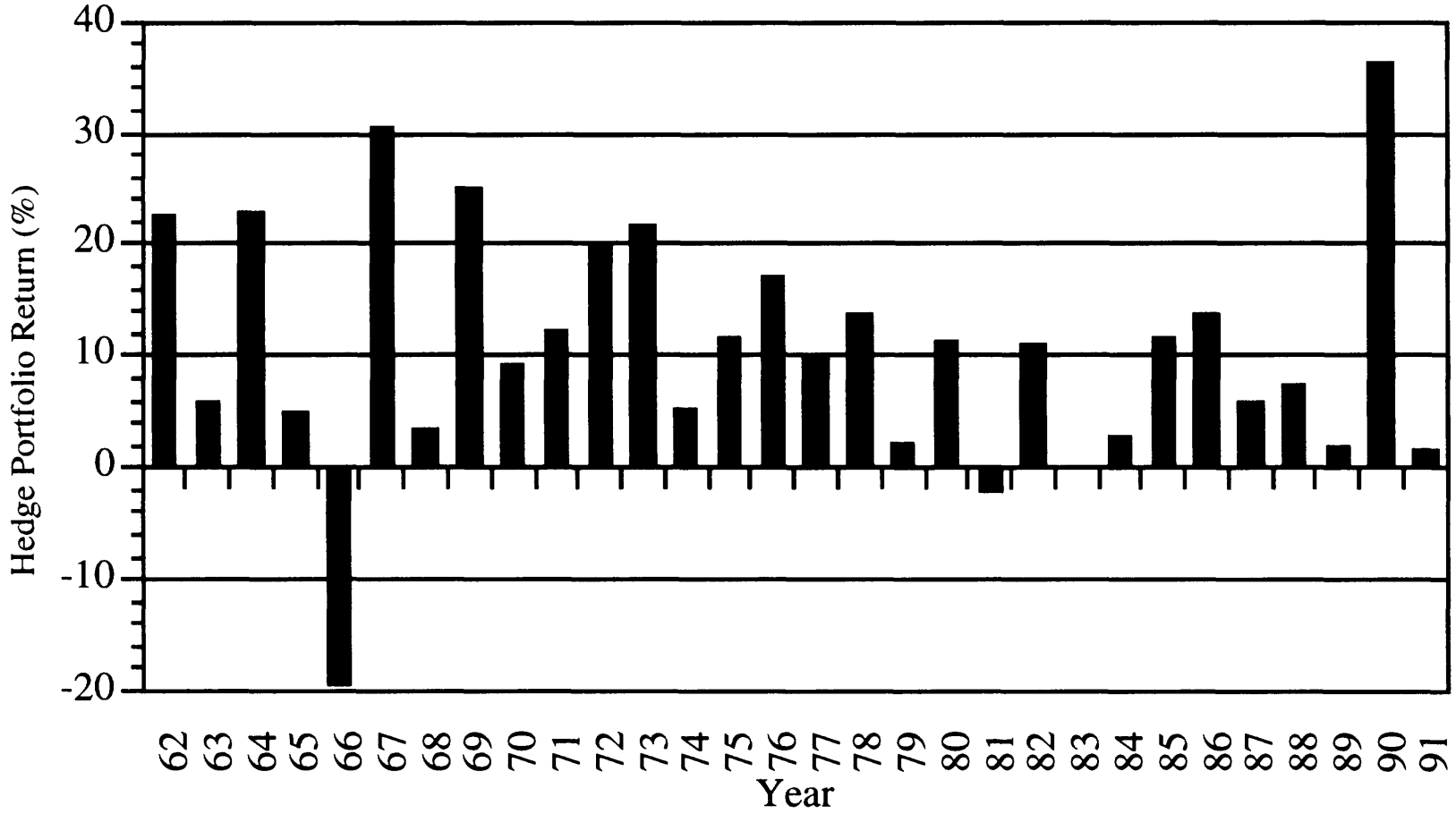



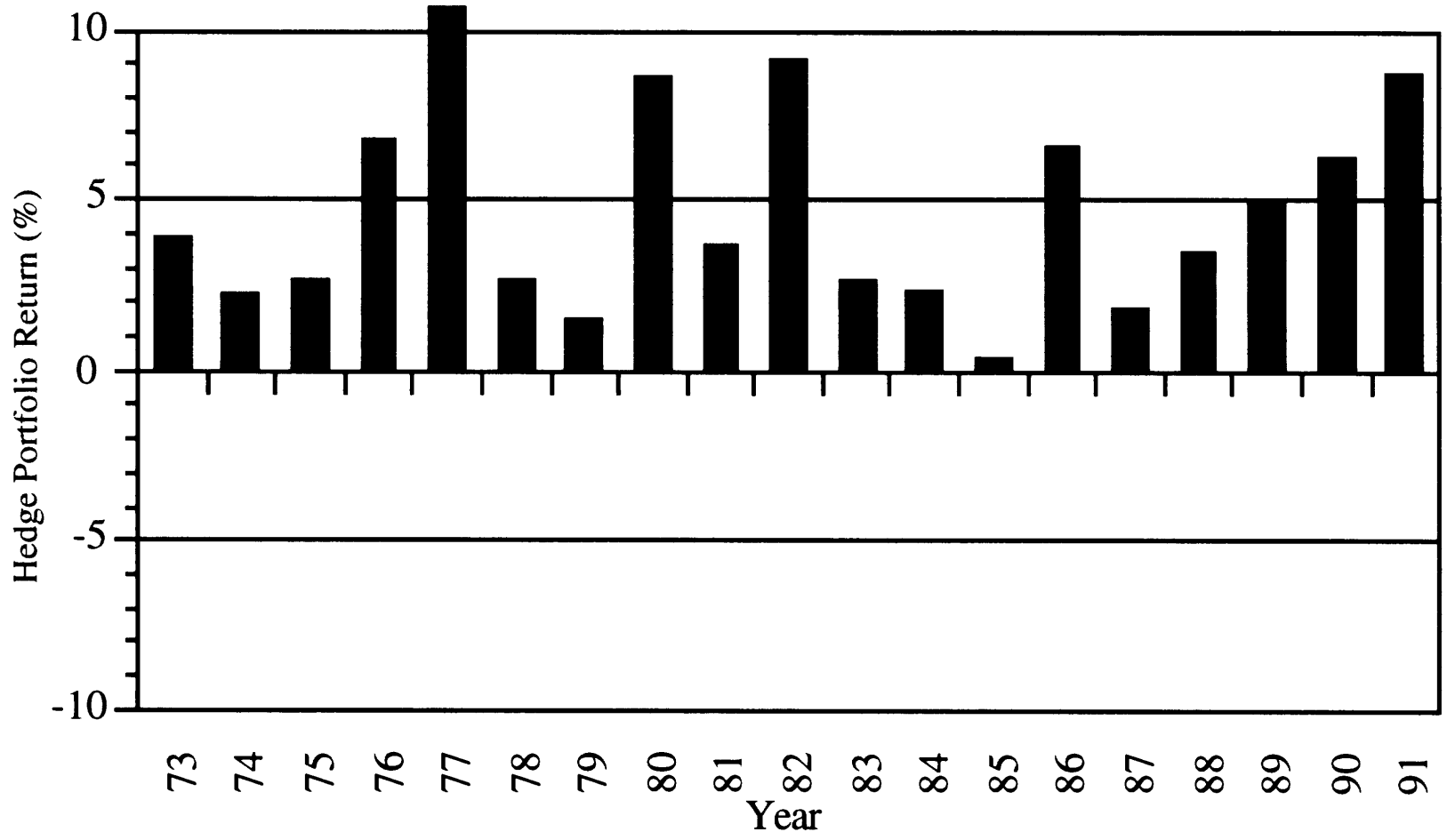
# Accruals - *Hedge Portfolio Returns:*

*From Sloan (1996):*



# Accruals - *Announcement Rets:*

*From Sloan (1996):*



# Accruals - *Stories:*

1. Managers are manipulating earnings, and consistently fooling investors:
   - Some evidence in Teoh, Welch, Wong (1998b, 1998a), Teoh, Wong, and Rao (1998), and Rangan (1998) are consistent with this hypothesis
2. Either way, investors don't seem to distinguish between high and low quality earnings (Collins and Hribar (2000)).
   - *Why?* Hirshleifer and Teoh (2003) argue it is *limited attention*: investors can only focus on one variable, and NOI forecasts future earnings better than either just Cash Flows or just Accruals.

# Investment and Future Returns

(At least) three papers have examined the relation between capital investment and future returns

1. Titman, Wei, and Xie (2001)
2. Baker, Stein, and Wurgler (2003)
3. Polk and Sapienza (2003)

- All of this evidence suggests that firms that invest a lot have too high a price. However, the causation hasn't really been nailed down.
  - Mispricing $\rightarrow$ Investment ??
  - Investment $\rightarrow$ Mispricing ??

# Investment and Future Returns

*From Polk and Sapienza (2003):*

| | Full | Full | Low R&D | Hi R&D | Low Turn | Hi Turn | Full |
|---|---|---|---|---|---|---|---|
| intercept | 1.1561*** | 3.2108*** | 2.7542*** | 3.9667*** | 1.9802*** | 3.0249*** | 3.7119*** |
| | (0.3109) | (0.6949) | (0.7680) | (0.8771) | (0.6625) | (0.7845) | (0.7449) |
| ln $I_{i,t-1}/K_{i,t-2}$ | -0.1579*** | -0.1372*** | -0.1058 | -0.2489*** | -0.0670 | -0.1151*** | -0.0702* |
| | (0.0399) | (0.0342) | (0.0794) | (0.0887) | (0.0417) | (0.0491) | (0.0385) |
| ln $Q_{i,t-1}$ | -0.4161*** | 0.3061*** | 0.2219 | 0.1909 | 0.3818** | -0.0970 | 0.1055 |
| | (0.1067) | (0.1131) | (0.2723) | (0.2355) | (0.1882) | (0.1664) | (0.1355) |
| ln $CF_{i,t-1}/K_{i,t-2}$ | 0.0714* | 0.0179 | 0.0310 | -0.1420 | -0.0266 | 0.0193 | -0.0089 |
| | (0.0389) | (0.0318) | (0.1315) | (0.1737) | (0.0640) | (0.0512) | (0.0404) |
| ln $ME_{i,t-1}$ | | -0.1900*** | -0.1447*** | -0.2351*** | -0.0901** | -0.1755*** | -0.2044*** |
| | | (0.0474) | (0.0514) | (0.0588) | (0.0451) | (0.0518) | (0.0525) |
| ln BE/ $ME_{i,t-1}$ | | 0.3541*** | 0.5003*** | 0.2643 | 0.2888*** | 0.1681 | 0.1625* |
| | | (0.0762) | (0.1815) | (0.1893) | (0.1183) | (0.1033) | (0.0867) |
| ln $MOM_{i,t-1}$ | | 0.9665*** | 0.8603*** | 0.7332*** | 0.7992*** | 1.2381*** | 0.7033*** |
| | | (0.1840) | (0.2472) | (0.2457) | (0.2115) | (0.2066) | (0.2036) |
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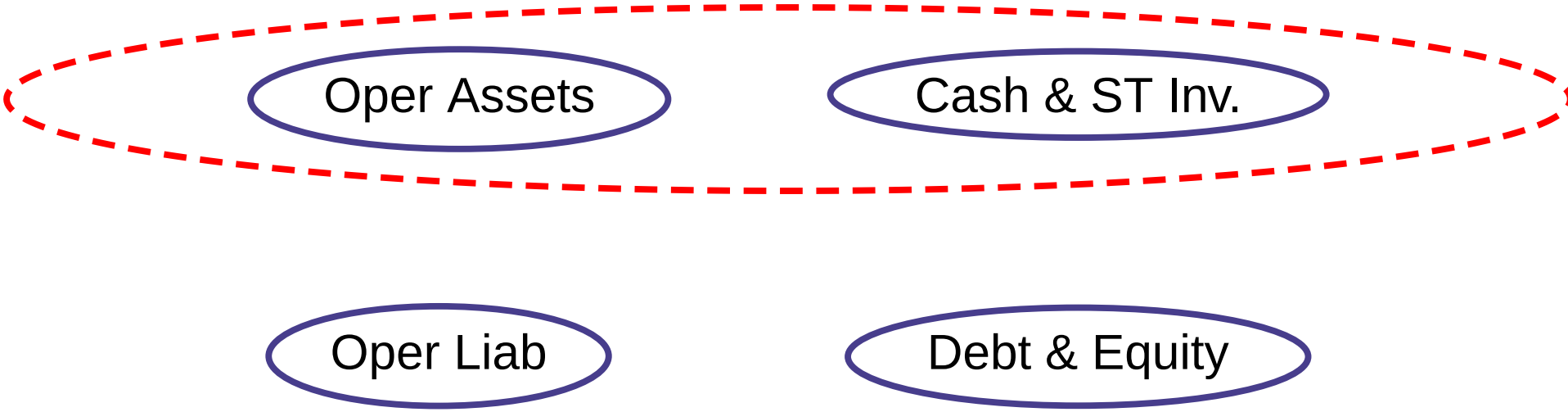
# NOA Components




$$\textbf{Total Assets} = \textbf{OA} + \textbf{(Cash \& Short Term Investments)}$$

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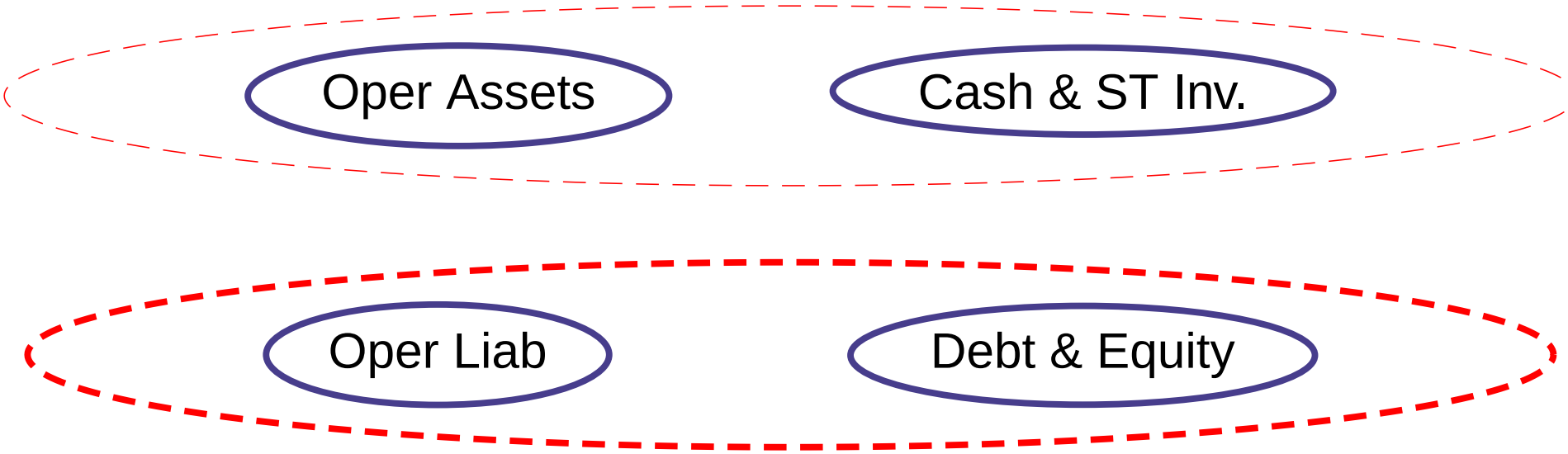


$$\textbf{Total Liab.} + \textbf{Equity} = \textbf{OL} + \textbf{(Debt+Pref+Common Equity)}$$

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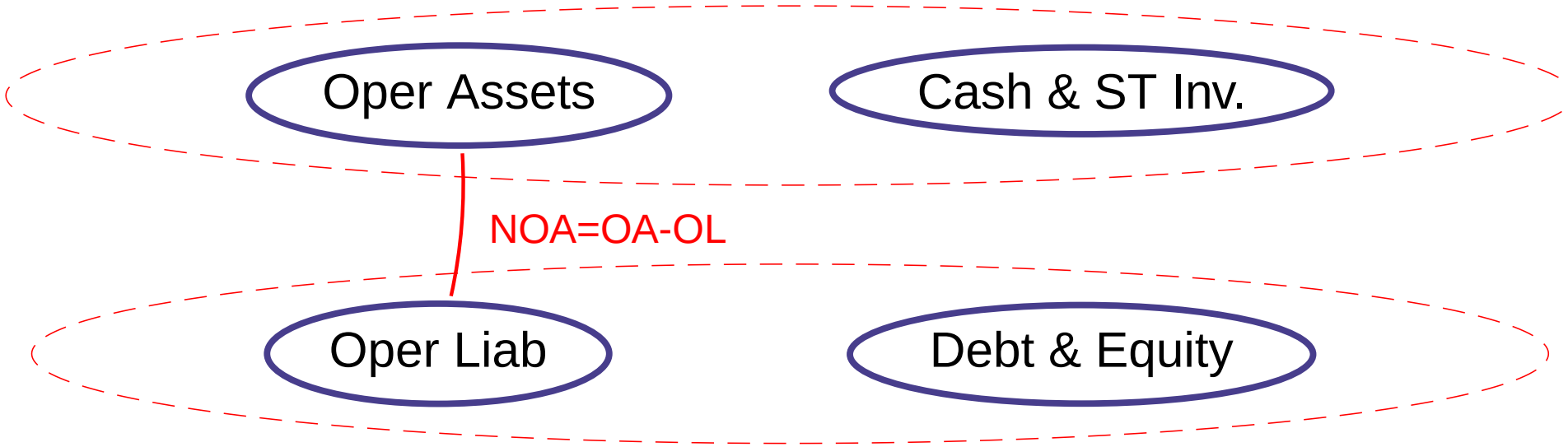


$$\textbf{Net Operating Assets (NOA)} = \textbf{OA} - \textbf{OL}$$

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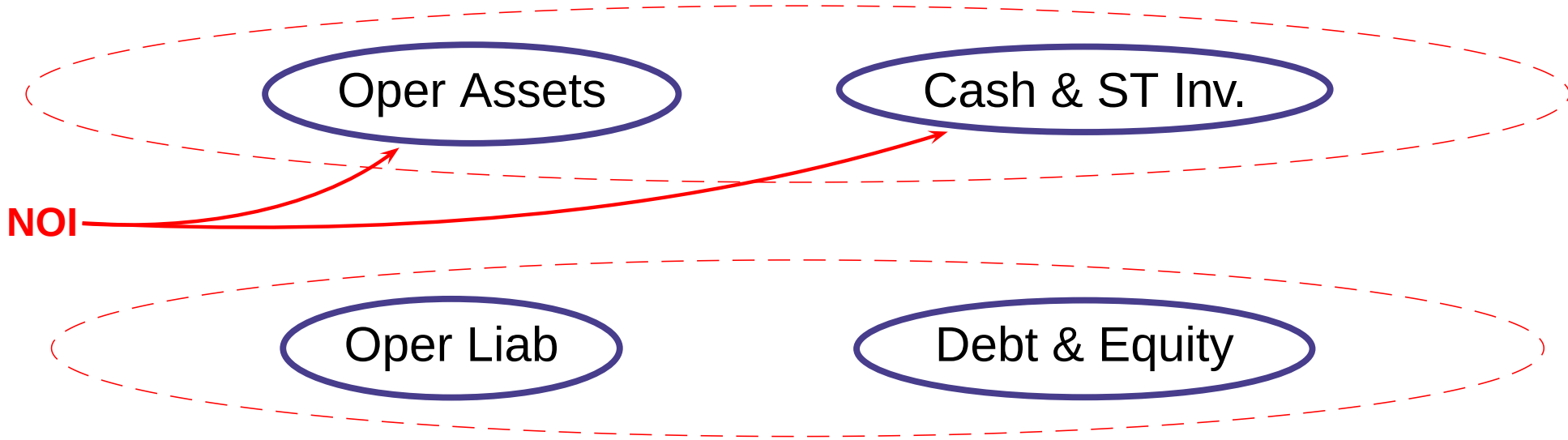
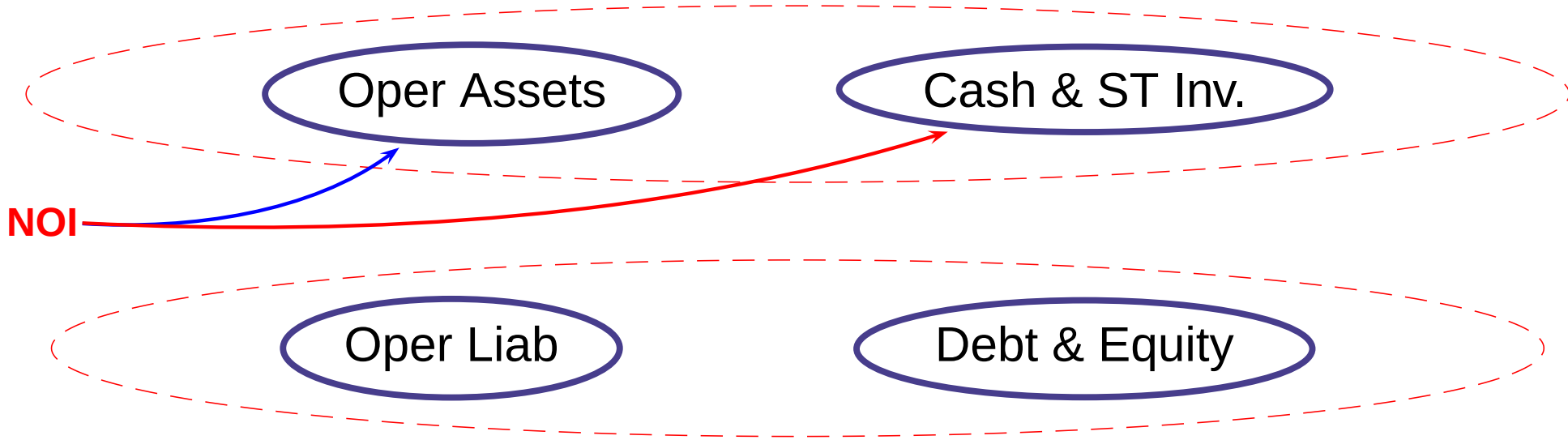


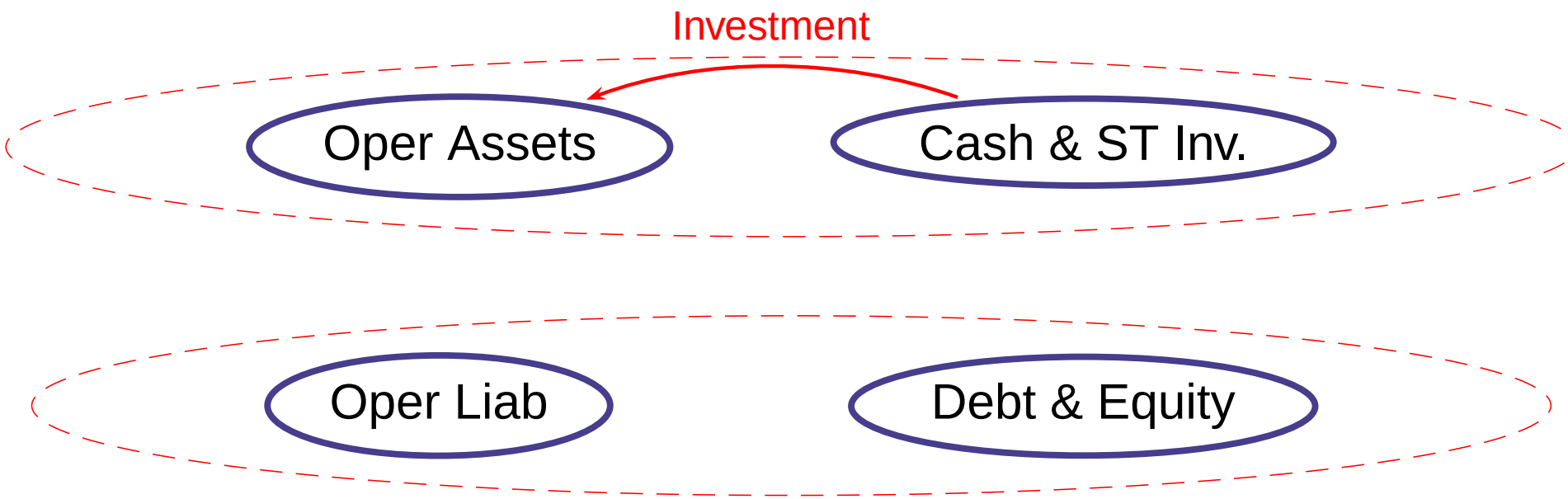

- Positive NOI increases Total Assets
  - or decreases operating liabilities

# NOA Components



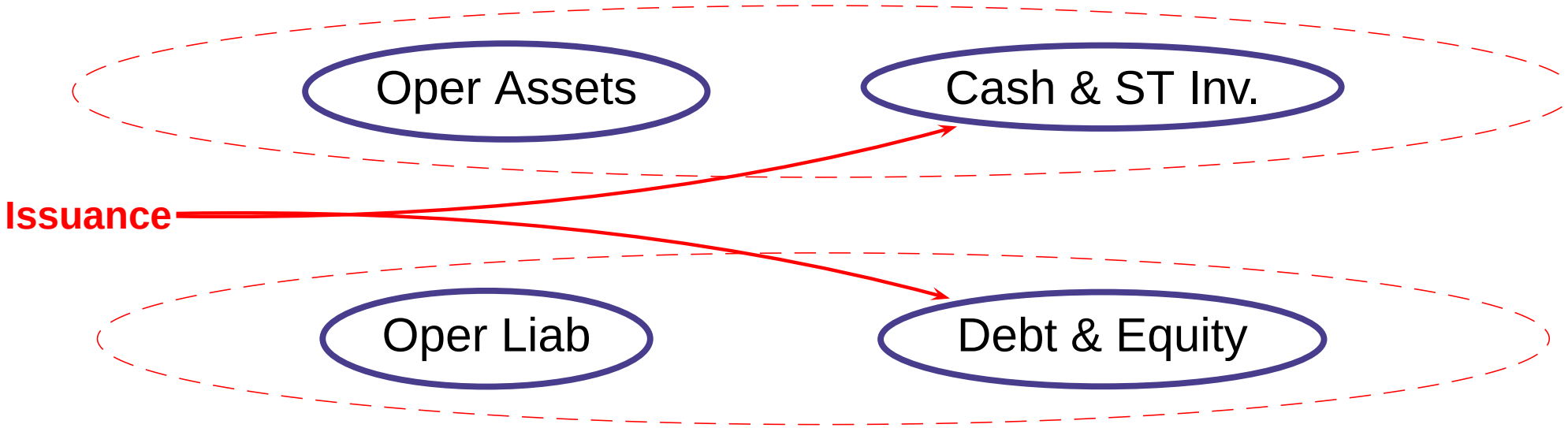

- However, Accruals increase Operating Assets
  - (or decrease operating liabilities)
- while Cash-Flow flows into Cash.
- Thus, changes in NOA will reflect only Accruals, not CF.

# NOA Components




- Investment also increases NOA
  - It is a transfer from Cash to Operating Assets.

# NOA Components




- Notice that Issuing or retiring debt or equity (without investment) doesn't affect NOA:
  - Issuing increases Cash and Debt & Equity, but doesn't affect OA or OL.

# NOA

- HHTZ show that:

$$\Delta_t \mathbf{NOA} = \text{Accruals}_t + \text{Investment}_t$$

- So NOA is the sum of all past accruals and investment:

$$\mathbf{NOA}_T = \sum_{t=0}^{T} \text{Accruals}_t + \sum_{t=0}^{T} \text{Investment}_t$$

- Thus, to the extent that Accruals and Investment are independently negatively related to future returns, NOA should better forecast future returns than one-year Accruals or Investment.

# Results Summary

- Over 1964-2002 period, really high and significant (L-H) portfolio returns
  - Robust to EW or VW; DGTW Characteristic Matching; FF 3- and 4-factor model adjustment.
  - t-statistics suggest very high Sharpe ratios.
- Accruals and NOA both significant in Fama-MacBeth regressions.
  - Including at 1,2 and 3 year lags.
  - Accruals strategy produces losses in 2000-2002; NOA doesn't. (Adaptive Effciency?)
  - Robust to including sum of three lags of Accr variable.

# A Catch-All Variable?

- HHTZ justify NOA as a better proxy for investor mis-perceptions than accruals or investment alone:
  - "captures balance sheet bloat more fully," and
  - reflects a cumulative effect rather than just the current-period flow.

$$\mathbf{NOA}_T = \sum_{t=0}^{T} \text{Accruals}_t + \sum_{t=0}^{T} \text{Investment}_t$$

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# Accruals & Investment: Differences?

- The empirical results here suggest that NOA isn't quite a catch-all variable, in that accruals are still significant when NOA is included in Fama-MacBeth regression.
- Other differences in accruals and investment effects also suggest this.

# Accruals & Investment: Differences?

- **Investment:**
  - Higher for firms with more R&D
  - Higher for firms with more turnover (maybe)
- **Accruals:**
  - Voluntarily disclosing accruals eliminates accruals effect (Levi (2004)).
  - Higher for firms with more residual risk (Mashruwala, Rajgopal, and Shevlin (2004)).
- Also, accruals effect is concentrated among small firms; issuance (and investment?) effect is strong for large firms.

# What else should HHTZ examine?

- HHTZ suggest a really nice behavioral hypothesis:
  - Investors naively use earnings growth to forecast future earnings growth
  - Investors assume that new investment will result in this level of future earnings growth.
- They should write down and test this model:
  - What are predictions for accruals-investment interaction effects?
  - What are predicted lead-lag relationships?

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