Accounting and Asset pricing

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Summary

❑ Earnings and returns are closely related economic variables

❑ Various earnings-related variables predict stock returns, including:

  ✓ Net Income

  ✓ Change in Net Income

  ✓ Operating Profitability

  ✓ Cash-based Operating Profitability

❑ Retained Earnings to Market subsumes Book to Market

  ✓ Because Retained Earnings contains average past earnings

❑ With accounting variables, "the devil is in the details"

  ✓ Earnings and book values have components with different implications for asset pricing

My approach to accounting and asset pricing

❑ Based on economic and accounting fundamentals
  ✓ Not behavioral

❑ Markets are adaptively efficient (Grossman & Stiglitz, 1980; Lo, 2004)
  ✓ Mispricing should not persist indefinitely (the "Red Queen" effect)
  ✓ Persistent profitability most likely is rational

❑ We have limited theory ("bad model problem")
  ✓ We are mere mortals.
  ✓ No person can know all the information in price (Hayek 1945 *AER*)

❑ We also have limited data ("bad data")
  ✓ Listed equity is an unrepresentative subset of aggregate wealth
  ✓ Researchers ignore taxes

❑ Hence anomalies are expected to abound
  ✓ As is normal in science (Kuhn, 1969)

Earnings and returns: Background

❑ Earnings and returns might seem like completely different concepts
- ✓ But they are closely related economic variables
- ✓ Much more so than commonly appreciated

❑ Over a company's life, earnings and returns* both equal:

Cash distributed to shareholders *less* cash contributed by them

❑ They differ substantially in *when* they incorporate cash flow news

❑ Returns incorporate (all?) information about expected cash flow

❑ Earnings incorporate:
- ✓ Realized *ex post* cash flow when it arrives
- ✓ A conservative subset of auditable information about cash flow expectations, using "accruals" (credit transactions, write-offs, etc.)

❑ Returns therefore lead earnings

❑ But they converge in the long run:
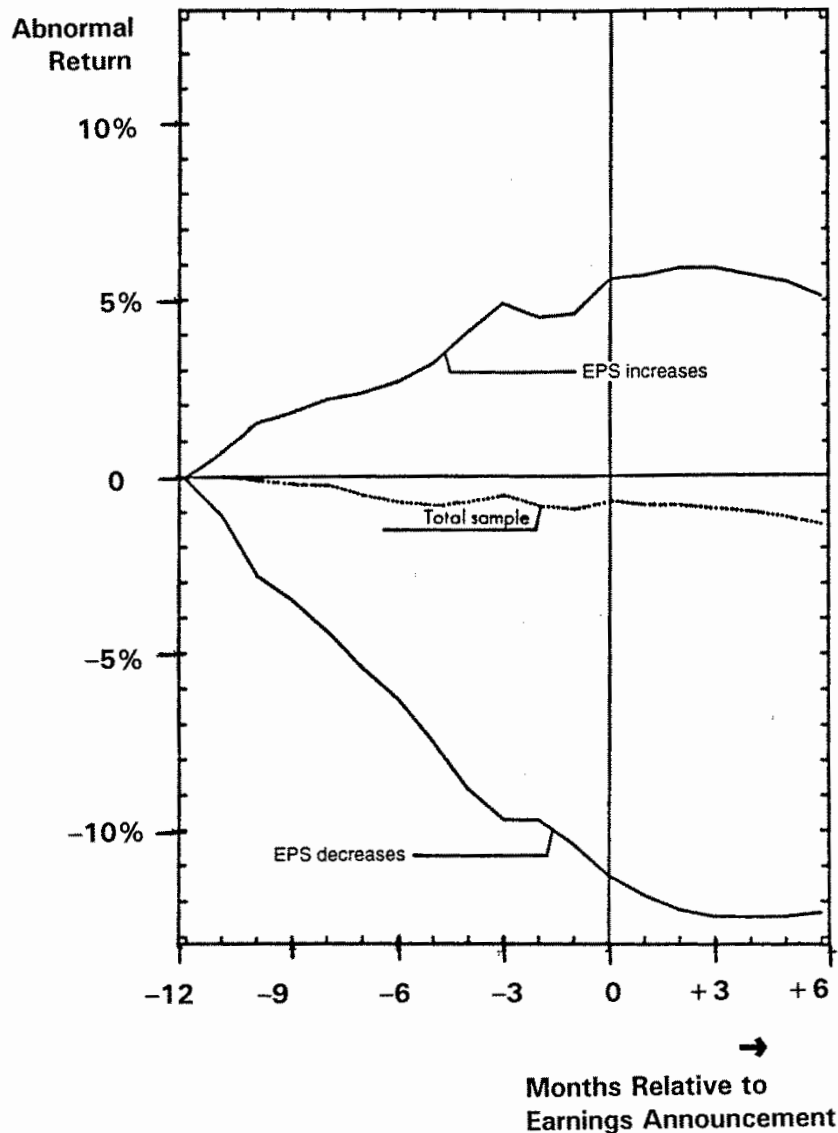- ✓ Ultimately, the only way a firm adds value is generating earnings

*Returns without dividends reinvested

Linking earnings and returns and the first reported anomaly

Linking earnings and returns and the first reported anomaly
Ball and Brown (1968), 1957-65 monthly data

Abnormal Return

10%

5%

EPS increases

0

Total sample

−5%

−10%

EPS decreases

−12 −9 −6 −3 0 +3 +6

→

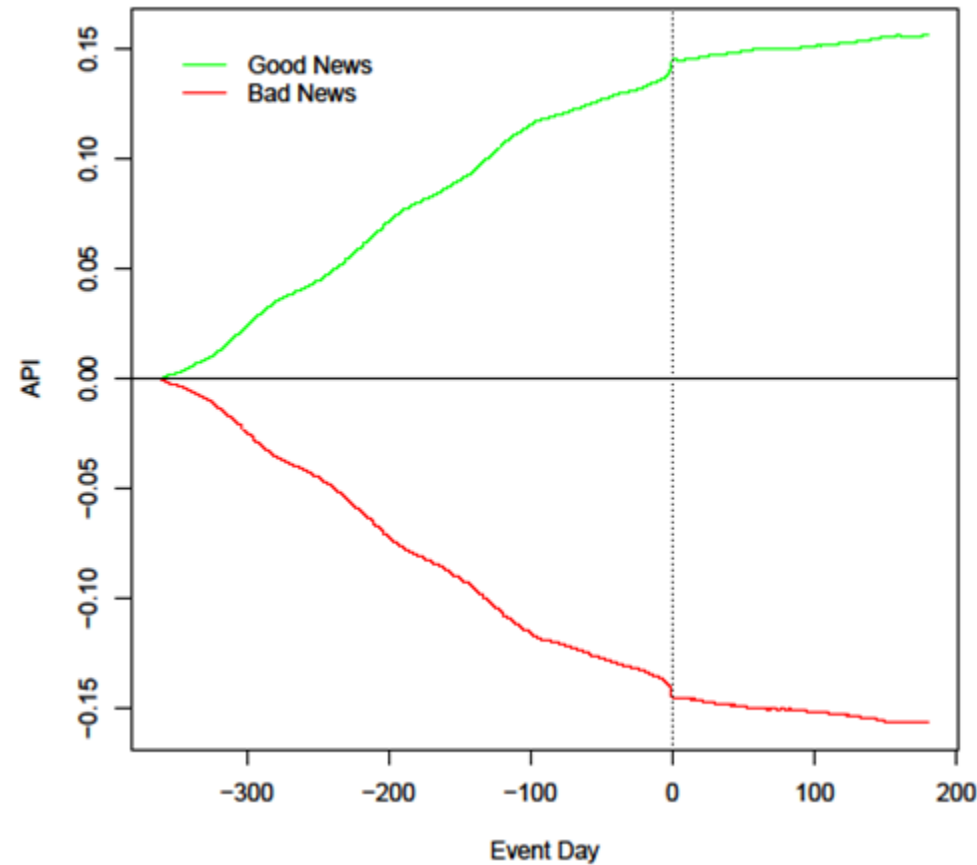Months Relative to Earnings Announcement

Major results:

❏ *"Value relevance"*
  - ✓ Association between signs of earnings changes and annual returns
  - ✓ Annual earnings and annual returns incorporate overlapping information

❏ *Low timeliness:* Prices lead earnings

❏ *Announcement effect:*
  - ✓ Strong earnings/returns relation in month 0

❏ *"Post Earnings Announcement Drift"*
  - ✓ Prices move in the direction of earnings surprises
  - ✓ The first documented "anomaly"
  - ✓ Momentum conditional on Δ earnings sign +/-

Linking earnings and returns and the first reported anomaly
Replication, 1971-2017 daily data

Major Results

API Good & Bad News (less their avge)--pi_pF_roradj_sign, AllYrs

❑ *"Value relevance"*

✓ Association between the signs of earnings changes and annual returns

✓ Annual earnings and annual returns incorporate overlapping information

❑ *Low timeliness*: Prices lead earnings
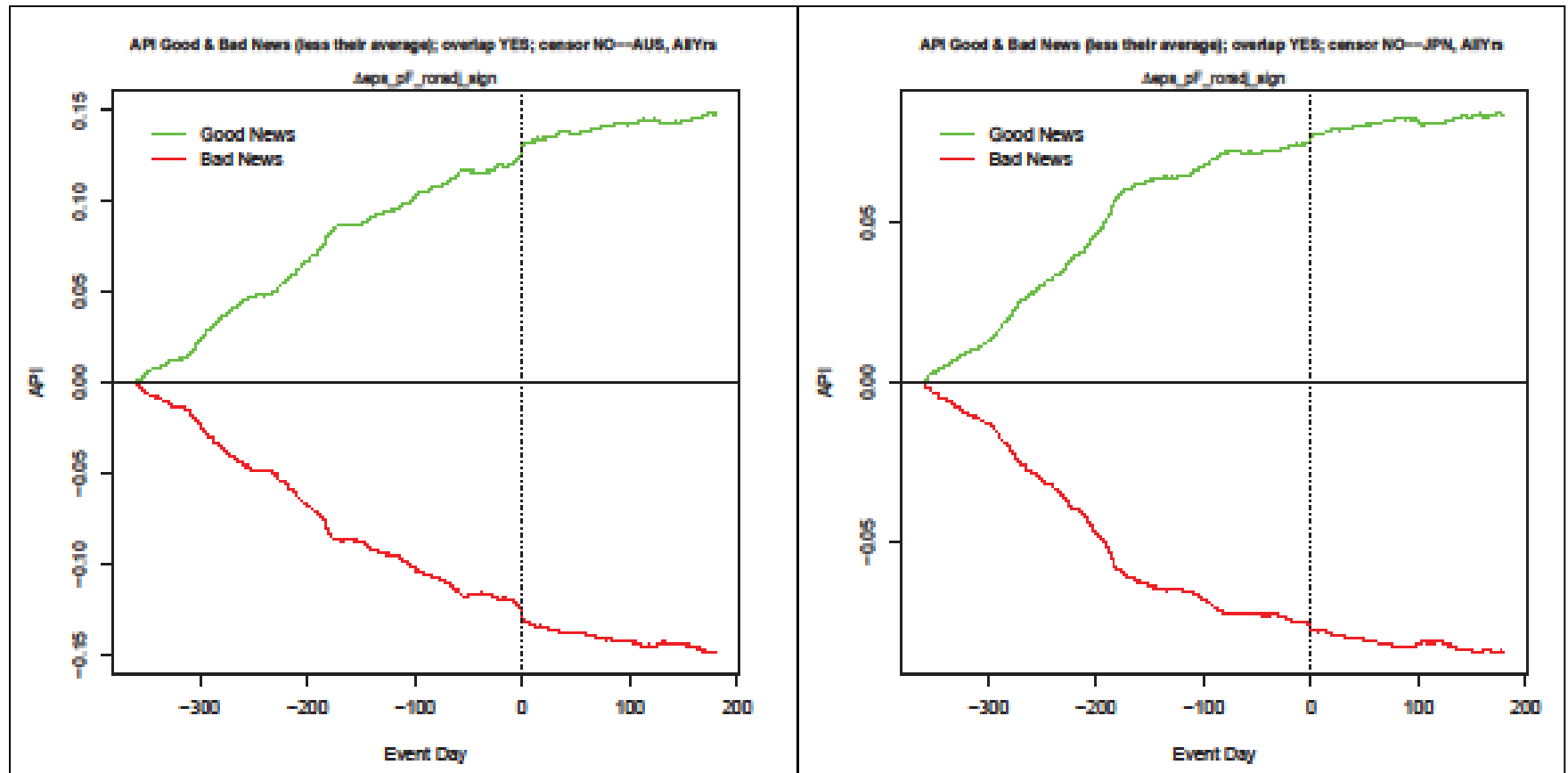
❑ *Announcement effect:*

✓ Small "blips" at day 0
✓ Some earnings "surprise" content

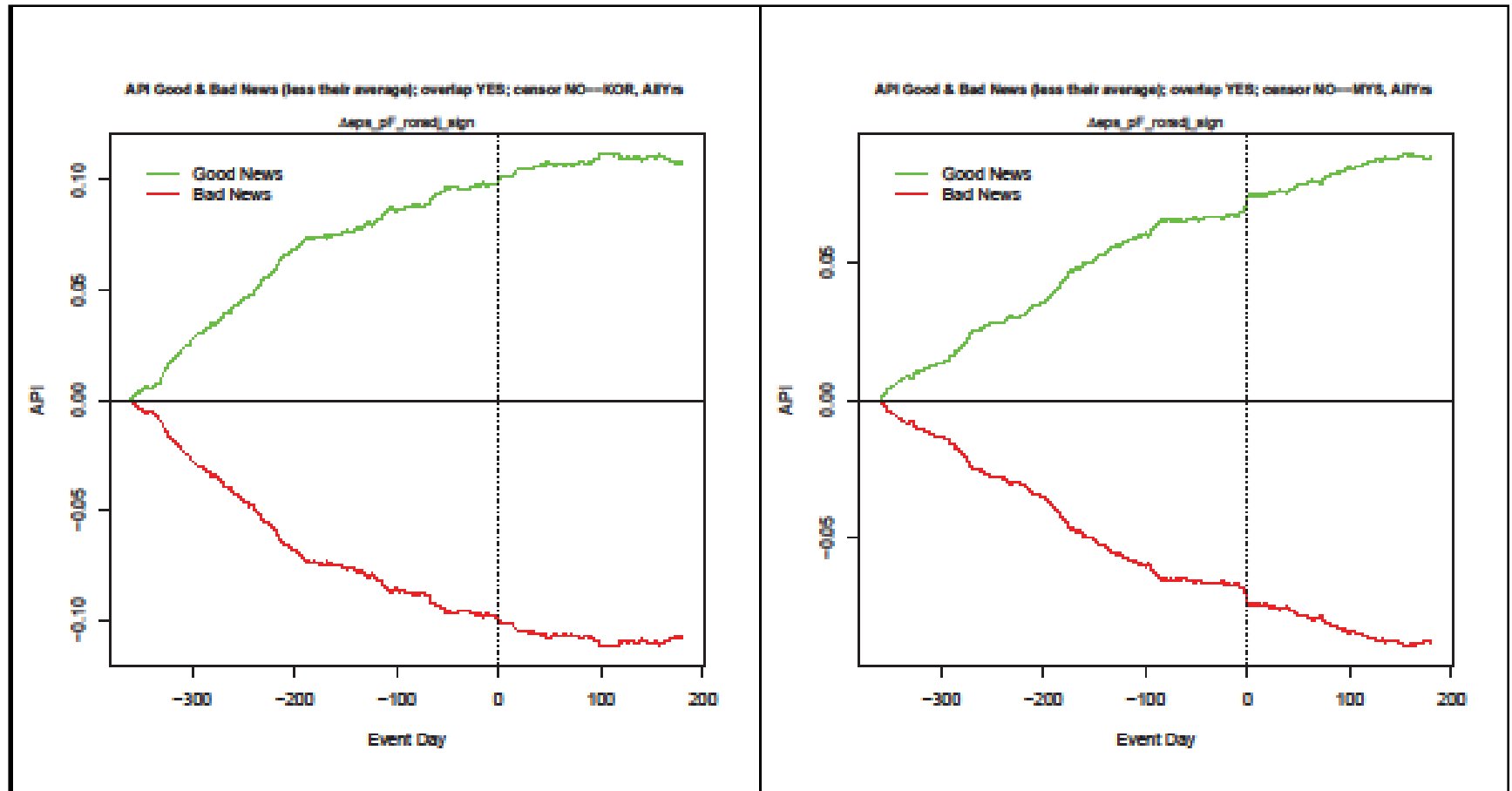❑ *"Post Earnings Announcement Drift"*: In 38 of 47 years, earnings surprises predict post-announcement returns

✓ Momentum conditional on sign (+/-) of Δearnings

Ray Ball and Philip Brown, "Ball and Brown (1968) after 50 years." *Pacific-Basin Finance Journal* 53 (2019) 410–431.

Replication: Australia and Japan, 1989-2017

Replication: Korea and Malaysia, 1989-2017

Replication in 16 Jurisdictions, 1989-2017

❑ Sample: AUS, CHN, HKG, IDN, JPN, KOR, MYS, PHL, SGP, THA, TWN + CAN, NZL + DEU, FRA, GBR

❑ Consistent results are observed across *time* (US) and *countries*:

1. *One year pre-announcement* good/bad return separation* is statistically significant in all 16 countries and averages about 15-25% p.a.

2. *Event day* separation* is positive and small in all 16 countries and significant in 14 of 16.

3. *Half year post-announcement* separation* is positive in all 16 countries and statistically significant in 15 of 16 countries.

❑ Our 1968 results replicate
   ✓ Over time
   ✓ Across jurisdictions

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*Sum of returns on equal weighted long and short portfolios formed on sign of earnings news

Return Spread, Long on ΔEPS > 0 / Short on ΔEPS < 0

"Country"	N(Good)	N(Bad)	Pre-event [-360:-1]	Event [Day 0]	Post-event [+1:+180]
AUS	3204	2190	0.2477	0.0131	**0.0362**
CAN	5661	4146	0.2294	0.0148	**0.0241**
CHN	3943	2442	0.1939	0.0047	**0.0343**
DEU	2044	1384	0.2195	0.0068	**0.0177**
FRA	3585	2546	0.1885	0.0091	**0.0169**
GBR	9870	5854	0.2657	0.0109	**0.0330**
HKG	2578	1793	0.2004	0.0187	**0.0385**
IDN	842	563	0.2040	0.0042	**0.0675**
JPN	10984	8731	0.1503	0.0033	**0.0137**
KOR	2460	2469	0.1968	0.0026	**0.0151**
MYS	2239	1697	0.1407	0.0077	**0.0289**
NZL	651	483	0.2413	0.0064	**0.0458**
PHL	548	337	0.1711	0.0038	**0.0461**
SGP	1061	927	0.1533	0.0096	**0.0393**
THA	1315	1176	0.2510	0.0060	**0.0356**
TWN	1573	1504	0.1647	0.0044	**0.0212**
USA	61600	51204	0.2788	0.0120	0.0216

Earnings-related anomalies

❑ It is not surprising that earnings and price changes are correlated *ex post*

❑ They incorporate information about changes in value with different timing, so the correlation over short intervals (e.g., yearly) isn't perfect (returns lead earnings)

❑ Perhaps less surprising: When earnings are deflated by price, producing earnings yield or its inverse P/E, earnings and *expected* returns are correlated

❑ Hasn't been traded out of the market:
  ✓ In the 5 decades since Ball and Brown (1968) reported it
  ✓ In the 4 decades since Ball (1978) observed it is systematic
  ✓ In any of the 16 countries Ball and Brown (2019) studied

❑ The absence of "adaptive market efficiency" suggests a rational basis for the correlation

Earnings-related anomalies

❑ Earnings predicting returns is the first documented anomaly in the theory of efficient markets

  ✓ In that sense, it is the genesis of the Asset Pricing literature

❑ Ball (1978):

  ✓ Observed it is systematic

  ✓ Introduced Kuhn's term "anomaly" to describe it

❑ Anomalies now abound

Why do accounting earnings predict returns?

1. Price is a function of:
   - ✓ Expected future dividends
   - ✓ The discount rate ("expected return")
2. *Controlling for price*, a variable containing information about expected future dividends therefore reveals information about expected return.
3. The current (annual) earnings observation:
   - ✓ Is the best time-series predictor of next-period earnings (Ball and Watts, 1972; Gerakos and Gramacy, 2013)
   - ✓ Is essentially as accurate as one-year-ahead analyst forecasts (Bradshaw, Drake, Myers, and Myers, 2012)
4. Dividends are distributions of earnings
5. Current earnings therefore contains information about expected future earnings, hence about expected future dividends
6. So, *scaled by price*, earnings reveals information about expected returns
7. The above argument does not depend on the determinants of expected returns (known and unknown)
   - ✓ Risk is a "straw man" in this context

Recent evidence on earnings and expected returns

❑ Three additional earnings-related variables are robust predictors of the cross section of expected returns:

  1. Operating profitability[1]
  2. Cash-based operating profitability[2]
  3. Retained earnings to market[3]

❑ Properties of their predictive ability:

  ✓ Persists over time
  ✓ Appears in international markets
  ✓ Positions based on the variables remain profitable for a long time

❑ Thesis: All are structurally related to underlying earnings yield, which reveals information about expected returns

[1]*Ball, Gerakos, Linnainmaa and Nikolaev (JFE,* 2014*)*
[2]*Ball, Gerakos, Linnainmaa and Nikolaev (JFE,* 2016*)*
[3]*Ball, Gerakos, Linnainmaa and Nikolaev (JFE,* 2019 in press)

Brief tutorial on Fama and MacBeth t-statistics

❑ In each of N cross-sections (e.g., every month), regress future returns on current values of known priced factors:
  ✓ e.g., book/market, size, momentum

❑ Add an accounting-related variable X

$$r(t+1) = \beta_0 + \beta_1 B/M(t) + \beta_2 Size(t) + \beta_3 r(t) + \beta_4 X(t) + \varepsilon(t)$$

❑ The time-series average of the N β_4 coefficients estimates the average additional return from trading on earnings
  -- for an investor already trading on book/market, size, and momentum

❑ The time-series standard deviation of the N β_4 coefficients estimates the additional risk from trading on earnings

❑ The t-statistic then estimates the ratio of the average incremental return to the incremental risk from trading on the variable X
  ✓ Provides a simple metric for ranking strategies

1. What *version* of earnings best predicts returns?

❑ GAAP requires firms to report information that can be used to construct several earnings measures.

❑ Line items near the bottom of an Income Statement generally are:
   ✓ *Transitory* components of "bottom line" Net Income
   ✓ Hence *noisy predictors* of future cash flows

❑ Example: Gain or loss on discontinued operations

❑ Novy-Marx (2013) selects Gross Profitability:

$$\frac{\text{Revenue} - \text{Cost of Goods Sold (COGS)}}{\text{Book Value of Total Assets}}$$

❑ Impressive results:

   ✓ Three-factor model alpha: 52 bps per month (t = 4.49)
   ✓ Better than Net Income, EBITDA, accruals, cash flow

But Gross Profitability is unlikely to be the best predictor

❑ Gross Profit deducts COGS but not Selling, General & Administrative Expenses (SG&A)

- ✓ Both SG&A and COGS are "permanent" (non-transitory) components of earnings
- ✓ Both reduce current earnings and (because they are not transitory) can be expected to reduce future earnings and hence cash available for distribution
- ✓ Further, GAAP has no hard rules to delineate them
- ✓ As earnings components, SG&A and COGS should have similar effects in explaining expected returns

❑ COGS and SG&A vary in relative size across firms

- ✓ Omitting SG&A therefore adds noise to the earnings variable as a predictor of future cash flows in a cross-section
- ✓ Costco and Microsoft Costco illustrate this

Costco Income Statement

(amounts in millions, except per share data)

	52 Weeks Ended September 2, 2018	53 Weeks Ended September 3, 2017	52 Weeks Ended August 28, 2016
REVENUE			
Net sales	$ 138,434	$ 126,172	$ 116,073
Membership fees	3,142	2,853	2,646
Total revenue	141,576	129,025	118,719
OPERATING EXPENSES			
Merchandise costs	123,152	111,882	102,901
Selling, general and administrative	13,876	12,950	12,068
Preopening expenses	68	82	78
Operating income	4,480	4,111	3,672
OTHER INCOME (EXPENSE)			
Interest expense	(159)	(134)	(133)
Interest income and other, net	121	62	80
INCOME BEFORE INCOME TAXES	4,442	4,039	3,619
Provision for income taxes	1,263	1,325	1,243
Net income including noncontrolling interests	3,179	2,714	2,376
Net income attributable to noncontrolling interests	(45)	(35)	(26)
NET INCOME ATTRIBUTABLE TO COSTCO	$ 3,134	$ 2,679	$ 2,350

SG&A is 10% of total operating costs → gross profit is a good predictor of its future distributions

Microsoft Income Statement

(In millions, except per share amounts)

Year Ended June 30,	2018
Revenue:	
Product	$ 64,497
Service and other	45,863
Total revenue	110,360
Cost of revenue:	
Product	15,420
Service and other	22,933
Total cost of revenue	38,353
Gross margin	72,007
Research and development	14,726
Sales and marketing	17,469
General and administrative	4,754
Impairment and restructuring	0
Operating income	35,058
Other income (expense), net	1,416
Income before income taxes	36,474
Provision for income taxes	19,903
Net income	$ 16,571

SG&A is 49% of total operating costs → gross profit is not a good predictor of its future distributions

Different earnings components in F-M regressions

Component	Coeff.	t-value
Gross Profit	2.91	3.46
Reported SG&A	-2.57	-2.94
R&D	1.32	0.88
Depreciation & Amortization	1.79	1.33
Interest	1.98	0.97
Taxes	-0.68	-0.42
Other Expenses (NOPI + SPI + MII)	-1.41	-1.63

❑ The coefficients for Gross Profit and Reported SG&A are similar in absolute value, and have the predicted opposite signs

❑ Adding SG&A to the cross-sectional regression corrects the noise in Gross Profit as a predictor arising from its omission

❑ Implication: *Operating Profitability* (net of SG&A) should be a better cross-sectional predictor of future cash distribution capacity

❑ No other earnings component is significant; three have the wrong sign

*6/1963 – 12/2013, 3-factor model, excl. microcaps. Accounting variables deflated by book value of Total Assets.
Ball, Gerakos, Linnainmaa and Nikolaev (*JFE,* 2015)

# Operating Profitability in F-M regressions

❑ Operating Profitability:

$$\frac{\text{Revenue} - \text{COGS} - \text{Reported SG\&A}}{\text{Book Value of Total Assets}}$$

❑ Results:

1. *t*-values for *Gross* Profitability are 5.46 for All-but-microcaps and 6.57 for Microcaps

2. *t*-values increase to 8.92 and 6.96 for *Operating* Profitability

3. *t*-value for Operating Profitability increases almost 50% from 6.00 to 8.92 undoing Compustat's treatment of R&D*

4. Operating Profitability is reliably informative about expected returns for horizons as long as ten years

* Strangely, Compustat adds R&D to reported SG&A to construct its XSGA variable

Increasing the prediction horizon
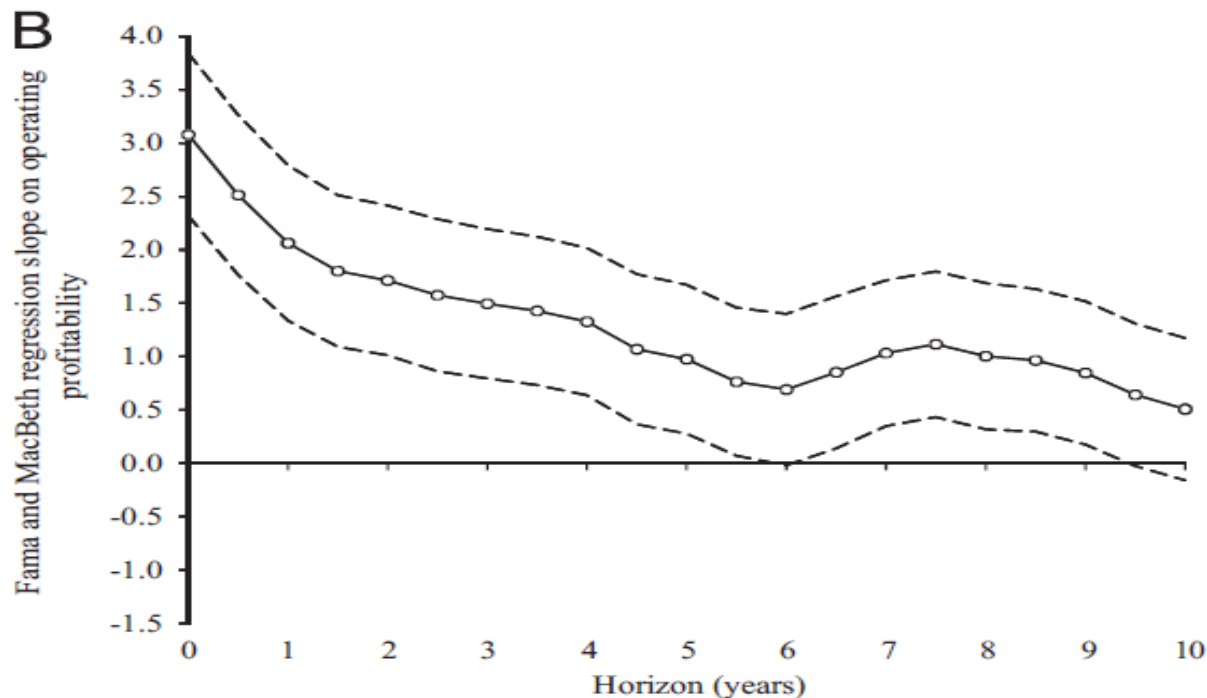
- ❑ 3-factor controls are updated but Operating Profitability is not
- ❑ Our interpretation:
    1. Operating Profitability reliably predicts returns long into the future
    2. The predictive power of past operating profitability weakens as new information about expected cash flows arrives
    3. Is this *really* a gradual, decade-long correction of *mispricing*?

2. Accruals and Cash-based Operating Profitability

❑ Accruals make earnings a better *ex post* performance measure than operating cash flow by purging cash flow of noisy payment shocks (Dechow, 1994).

    ✓ Earnings is less noisy than cash flow

    ✓ Consequently:

$$\sigma^2 \text{ (earnings)} < \sigma^2 \text{ (OCF)}$$
$$\rho \text{ (earnings, returns)} > \rho \text{ (OCF, returns)}$$

but

❑ Accruals make earnings a worse *ex ante* predictor of future returns because investors assume cash flow and accruals have equal implications for future earnings (Sloan, 1996)

Brief Tutorial on Accounting Accruals

❑ ***Working capital*** accruals remove noisy payment shocks from OCF:

1. *Accrued ("earned") revenues* are from goods & services delivered to customers during the period

   ✓ Not booked at the time customers pay

2. *Accrued ("matched") expenses* are the costs incurred in relation to the goods & services delivered to customers during the period

   ✓ Not booked when they are paid for

❑ The bookkeeping mechanics involve adjusting operating cash flows for changes in Accounts Payable, Accounts Receivable, Inventories, etc.

❑ ***Depreciation*** is a smoothed function of past investing cash flows

   ➢ Individual-period investing cash flows are "lumpy"

   ➢ Thus ex post free cash flow per period is noisy

   ➢ Depreciation is a weighted average of past investing cash flows

❑ *Earnings = Operating Cash Flow +/- Total Accruals*

Sloan's hypothesis

❑ Investors are unaware that accruals are less likely to persist into next year than cash flows:

$$\text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \text{Accruals}_t + \gamma_2 \text{Cash Flows}_t + \upsilon_{t+1}$$

$$\text{where } \gamma_1 < \gamma_2.$$

❑ Sloan estimates: 0.721 and 0.781

❑ A hedge portfolio (long in the lowest accruals decile in year *t* and short in the highest) earns +10.4% in year *t+1*

❑ Profitable in 28 of 30 calendar years!

❑ Red flag: The strategy is profitable in years *t+1* and *t+2*, but the research design implies it works only in year *t*

❑ Maybe accruals are proxying for *cash-based profitability,* which could be expected to prevail beyond year *t?*

Converting operating profitability to a cash basis using balance sheet information

Cash-based operating profitability =

Operating Profitability

 -Δ(Accounts receivable (RECT))

 -Δ(Inventory (INVT))

 -Δ(Pre-paid expenses (XPP))

 +Δ(Deferred revenue (DRC+DRLT))

 +Δ(Trade accounts payable (AP))

 +Δ(Accrued expenses (XACC)).

# Cash-based Operating Profitability in F-M Regresssions

Explanatory variable	Accruals from the statement of cash flows		
	(1)	(2)	(3)
Operating profitability	2.328 (5.07)		
Accruals	−2.068 (−3.39)		−0.438 (−0.65)
Cash-based operating profitability		2.267 (6.18)	2.166 (5.50)
$\log(\text{BE/ME})$	0.210 (2.25)	0.216 (2.29)	0.199 (2.13)
$\log(\text{ME})$	−0.074 (−1.29)	−0.074 (−1.27)	−0.076 (−1.32)
$r_{1,1}$	−1.211 (−1.98)	−1.146 (−1.88)	−1.193 (−1.96)
$r_{12,2}$	0.376 (1.51)	0.388 (1.55)	0.370 (1.49)
Adjusted R^2	4.91%	4.65%	4.83%

❑ CbOP subsumes accruals

❑ Accruals predict returns because high-accrual firms have low cash profitability

  ✓ CbOP is a correlated omitted variable in accruals studies

❑ The "accruals anomaly" appears to be another profitability effect

*7/1988 – 12/2014, 3-factor model, excl. microcaps. All accounting variables deflated by book value of Total Assets.   *Ball, Gerakos, Linnainmaa and Nikolaev* (*JFE,* 2016)

How far ahead do their predictive abilities persist?
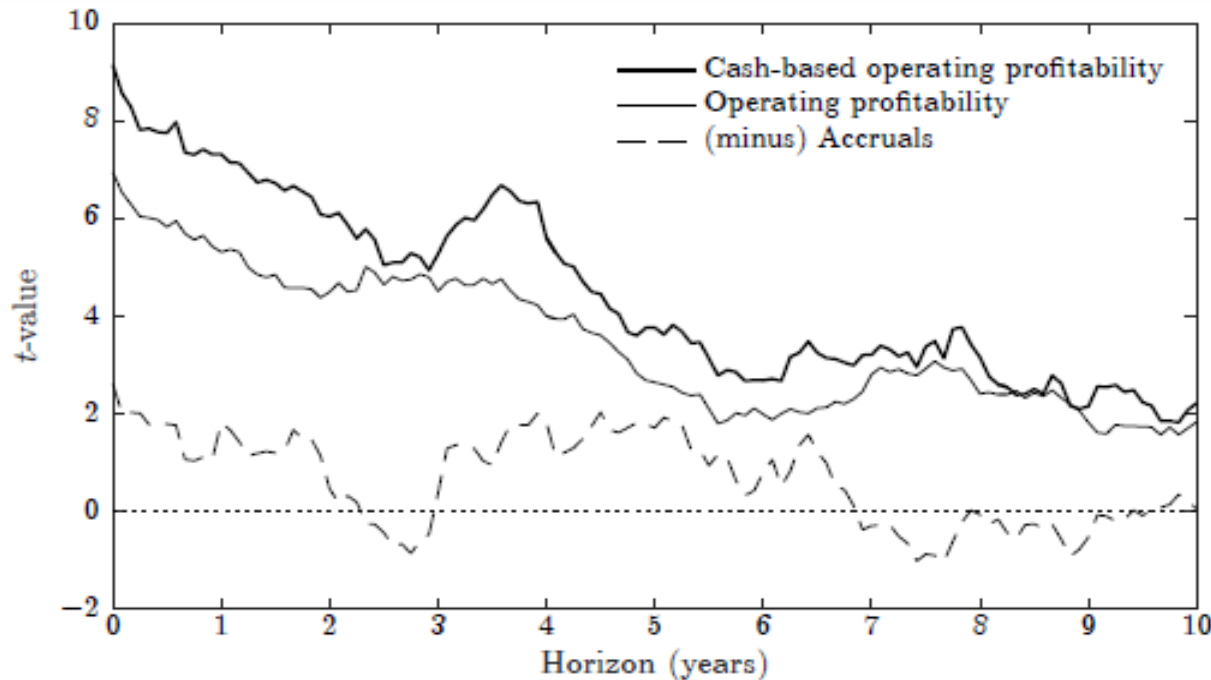
❑ Graph depicts rolling 10-year F-M regression *t*-values
  ✓ 3-factor controls are updated but CbOP is kept stale
❑ CbOP predicts returns long into the future
❑ Predictive power weakens as new information about expected cash flows arrives
❑ In contrast, accruals have only short term effects:
  ✓ Start with a lower *t*-value, and lose it more quickly
  ✓ Predictive abilities of OP and CbOP converge, as accruals become unimportant

3. What underlies the book-to-market "value" premium?

❑ Book-to-market (BE/ME) is one of the oldest documented predictors of stock returns.
  ✓ *Value premium*: Stocks with higher book-to-market ratios earn higher average returns.

❑ Common explanation: Calibrating market against book value helps *identify under- or over-priced stocks*.
  ✓ Value strategies identify *mispricing* that later is corrected
  ✓ e.g., Lakonishok, Shleifer, Vishny (1994)

❑ Our explanation:
  ✓ Book value only works due to its retained earnings component
  ✓ Retained earnings only works because it contains an accumulation (hence averaging) of past earnings.
  ✓ Book-to-market therefore contains information about expected cash distributions which (controlling for price), reveals information about the discount rate (expected return)

Components of book value

❑ *Contributed capital (CC) is total capital received from all past offerings of common stock, less repurchases*

➢ The fact that shareholders have invested in a stock is largely uninformative of its current expected return

➢ It only means that in the past they viewed it a sufficient

❑ *Retained earnings (RE) is total earnings less dividends, both from inception*

➢ The accumulation in RE averages out transitory earnings effects due to:

   i. Accounting effects (e.g., errors in estimating receivable collectability; asset impairments versus depreciation), which average out over time;

   ii. Temporary commercial events (e.g. unusual sales and expenses, strikes, discontinued operations, bond refinancing gains, etc.)

➢ When scaled by price (ME), RE proxies for underlying earnings yield

❑ *Accumulated other comprehensive income (AOCI) is total unrealized paper gains and losses from shocks to some security prices.*

➢ Not important – mean AOCI/ME is only 3%

➢ Shocks to asset prices are largely transitory, hence don't predict cash flows

Descriptive statistics

Distributions of book-to-market and retained earnings-to-market (full sample)

Ratio	Mean	SD	Pct < 0	Percentiles				
				10th	25th	50th	75th	90th
Book-to-market	0.83	2.20	3%	0.18	0.37	0.68	1.11	1.69
Reported book-to-market	0.79	1.88	3%	0.18	0.36	0.64	1.04	1.62
Retained earnings-to-market	−0.14	3.61	27%	−0.97	−0.12	0.24	0.53	0.89

Retained earnings and contributed capital as a share of BE[1]

Relative to BE	Mean	SD	Pct < 0	Percentiles				
				10th	25th	50th	75th	90th
Retained earnings (RE) [2]	41%	42%	15%	−15%	17%	45%	70%	88%
Contributed capital (CC) [3]	54%	42%	4%	8%	24%	48%	78%	113%
Other (AOCI)	5%	12%	20%	−1%	−0%	2%	8%	18%

[1] Requires BE > 0
[2] Requires -100% < RE/BE < +200%
[3] Requires -100% < CC/BE < +200%

Some properties of the major BE components

❑ Relative sizes:
- ✓ Mean (median) RE/BE: 41% (45%)
- ✓ Mean (median) CC/BE: 54% (48%)
- ✓ σ RE/BE and σ CC/BE: both 42%
- ✓ Conclusion: RE & BE are approx. equal components of BE

❑ Correlations:
- ✓ Scaled by BE, CC and RE are essentially perfectly negatively correlated (because RE + CC ≃ BE).
- ✓ Scaled by ME, they are slightly *positively* correlated (Pearson correlation +0.19)
- ✓ Conclusion: CC and RE are priced differently
- ✓ In F-M regressions, the components of BE/ME exhibit low correlation.

Fama and MacBeth regressions: BE as reported

Regressor	(1)	(2)	(3)	(4)
log(ME)	−0.07	−0.09	−0.08	−0.07
	(−1.75)	(−2.40)	(−2.23)	(−2.02)
$r_{1,1}$	−3.12	−3.20	−3.18	−3.21
	(−7.18)	(−7.50)	(−7.44)	(−7.50)
$r_{12,2}$	0.83	0.82	0.83	0.82
	(4.38)	(4.37)	(4.42)	(4.37)
log(BE/ME)	0.24	0.05	0.35	0.22
	(3.49)	(0.70)	(4.53)	(3.61)
log(RE/ME)		0.18		
		(4.67)		
log(CC/ME)			−0.13	
			(−4.32)	
log(AOCI/ME)				0.01
				(0.96)
Indicator variables:				
RE ≤ 0		−0.56		
		(−2.76)		
CC ≤ 0			0.26	
			(2.80)	
AOCI ≤ 0				−0.05
				(−0.57)
Avg. Adj. R^2	5.36%	6.00%	5.73%	5.72%

Payout policy

❑ Retained earnings accumulates the difference between earnings and dividends since inception

❑ Does retained earnings-to-market predict returns:

   ✓ because of its accumulated earnings component

         or

   ✓ because it tells us something about payout policy?

❑ Balance sheets do not break retained earnings down into accumulated earnings and accumulated dividends

❑ However, dividends since 1926 are available on CRSP

❑ We address the question by controlling for our own cumulative dividends in F-M regressions

Payout policy in F-M Regressions

Regressor	(1)	(2)
log(ME)	−0.09	−0.09
	(−2.43)	(−2.64)
$r_{1,1}$	−3.24	−3.34
	(−7.65)	(−7.91)
$r_{12,2}$	0.83	0.82
	(4.50)	(4.47)
log(BE/ME)	0.06	0.06
	(0.79)	(0.86)
log(RE/ME)	0.17	0.16
	(4.66)	(4.38)
log(Cum. dividends/ME)		0.00
		(−0.50)
Indicator variables:		
RE ≤ 0	−0.55	−0.52
	(−2.85)	(−2.73)
Cum. dividends = 0		−0.01
		(−0.09)
Pseudo t-value for joint sig. of add'l. regressors	4.30	3.52
Avg. Adj. R^2	6.12%	6.49%

Earnings in retained earnings

❑ Thesis: Retained earnings-to-market predicts returns due to its average/accumulated past earnings component

❑ Test: Sum earnings over the past *k* years and divide by current price

    ✓ As we accumulate backwards and thereby control for more past earnings, book-to-market should lose more significance

    ✓ The test is not affected by stock repurchases or dividends

❑ Earnings definitions:

(1) *"bottom line" net income* (the amount transferred to RE)

(2) *income before extraordinary and special items* (less noisy than net income on an annual basis, but the noise should wash out with more accumulation)

Accumulated past earnings to price
Fama-MacBeth regressions, July 1967 – December 2016

Years of accumulated past earnings	log(BE∕ME)		log(Earnings∕ME)		Earnings < 0	
	EST	t-value	EST	t-value	EST	t-value
Earnings is "bottom line" net income						
0	0.220	3.18				
1	0.167	2.68	0.107	2.48	−0.507	−2.55
2	0.153	2.56	0.109	2.28	−0.432	−2.24
3	0.133	2.28	0.127	2.54	−0.410	−2.19
4	0.101	1.75	0.165	3.10	−0.457	−2.37
5	0.080	1.39	0.191	3.63	−0.497	−2.57
Earnings is income before extras & special items						
0	0.220	3.18				
1	0.148	2.41	0.137	2.80	−0.780	−3.20
2	0.115	2.01	0.178	3.32	−0.729	−3.17
3	0.085	1.51	0.192	3.33	−0.696	−3.15
4	0.056	1.01	0.227	3.81	−0.738	−3.39
5	0.043	0.78	0.241	3.95	−0.743	−3.37

How far ahead does retained earnings-to-market predict?
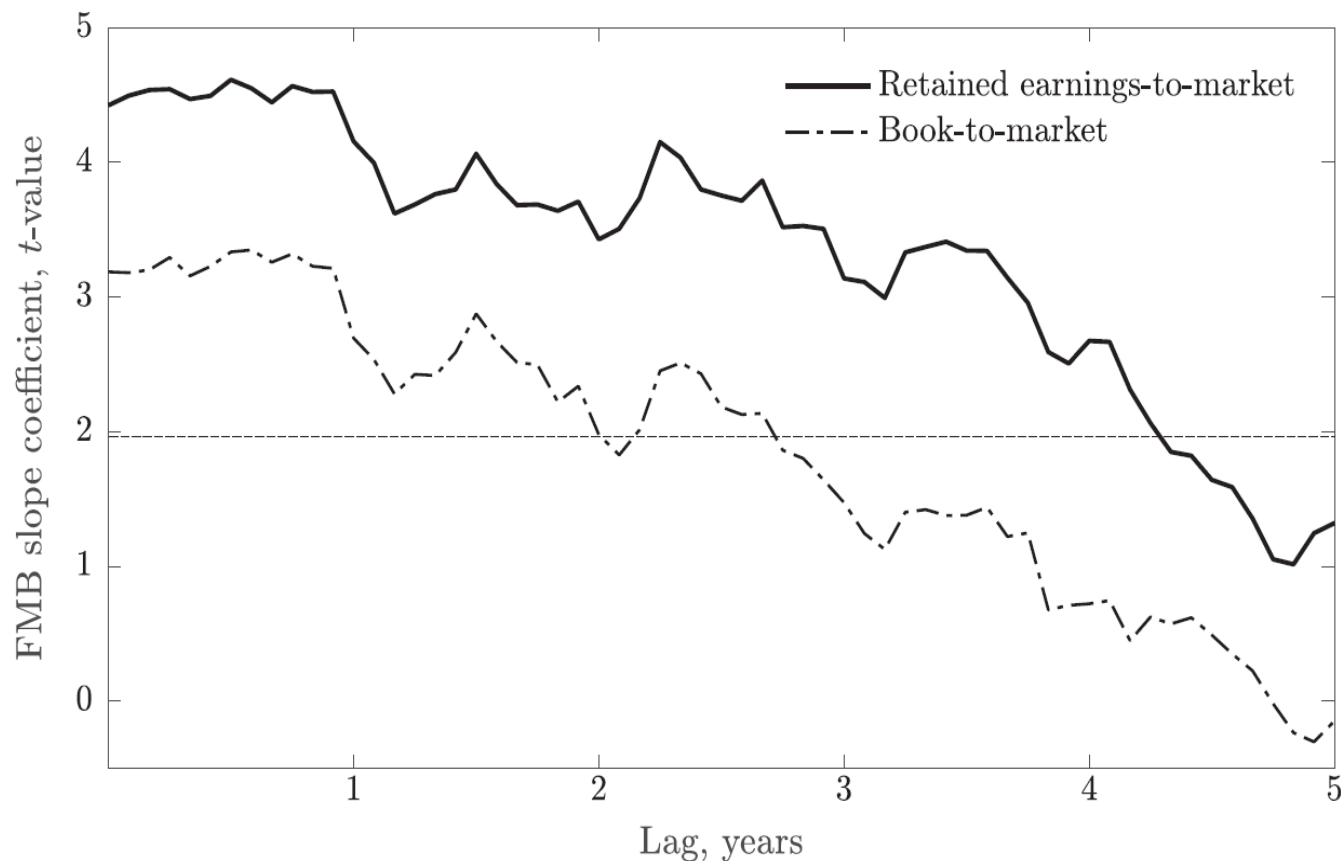
- ❑ Updated monthly: momentum (prior one-month return and prior one-year return skipping a month) and log-size
- ❑ Not updated: RE/ME, BE/ME
- ❑ July 1969 through December 2017, excluding microcaps

International and sub-period evidence

❑ These results could be specific to the U.S. and to the 1964–2016 sample period

❑ They could reflect data mining

❑ We collect data for all developed countries World ex U.S using Worldscope and Datastream

❑ The sample begins in July 1990 and ends in December 2016

❑ We also split the U.S. sample into 1963–June 1990 and July 1990–December 2016 to:

  ✓ facilitate international comparisons; and

  ✓ investigate the performance of retained earnings-to-market in the second sub-period

International and sub-period evidence: Portfolio sorts

| | CAPM alphas | | | t-values | | |
| | Pre-1990 | Post-1990 | | Pre-1990 | Post-1990 | |
Quintile	U.S.	U.S.	World ex U.S.	U.S.	U.S.	World ex U.S.
Book-to-market						
1 (low)	−0.12	−0.03	−0.25	−1.38	−0.38	−2.91
2	−0.03	0.13	0.07	−0.47	1.75	1.06
3	0.10	0.12	0.07	1.18	1.19	1.29
4	0.32	0.13	0.15	3.08	1.13	2.08
5 (high)	0.43	0.29	0.21	3.05	2.02	2.10
H−L	0.55	0.33	0.46	**2.67**	**1.61**	**2.86**
Retained earnings-to-market						
1 (low)	−0.26	−0.33	−0.32	−2.62	−2.19	−3.32
2	−0.04	−0.02	−0.06	−0.69	−0.28	−0.84
3	0.13	0.29	0.14	1.72	3.82	2.38
4	0.29	0.33	0.18	3.28	2.93	2.24
5 (high)	0.35	0.31	0.22	2.64	2.23	2.38
H−L	**0.60**	**0.64**	**0.53**	**2.96**	**2.67**	**3.45**

International and sub-period evidence: Portfolio sorts

| | CAPM alphas | | | t-values | | |
| | Pre-1990 | Post-1990 | | Pre-1990 | Post-1990 | |
Quintile	U.S.	U.S.	World ex U.S.	U.S.	U.S.	World ex U.S.
Contributed capital-to-market						
1 (low)	0.02	0.11	0.04	0.30	1.63	0.45
2	−0.03	−0.08	0.00	−0.46	−1.06	0.09
3	0.02	−0.03	0.03	0.23	−0.38	0.49
4	0.10	0.03	0.11	1.11	0.29	1.65
5 (high)	0.18	0.09	0.08	1.34	0.56	0.86
H−L	0.15	−0.03	0.05	**0.86**	**−0.14**	**0.33**

Why book-to/market failed post-1990
(but retained earnings-to/market did not)

Panel D: Cross-sectional correlations between book-to-market and its components
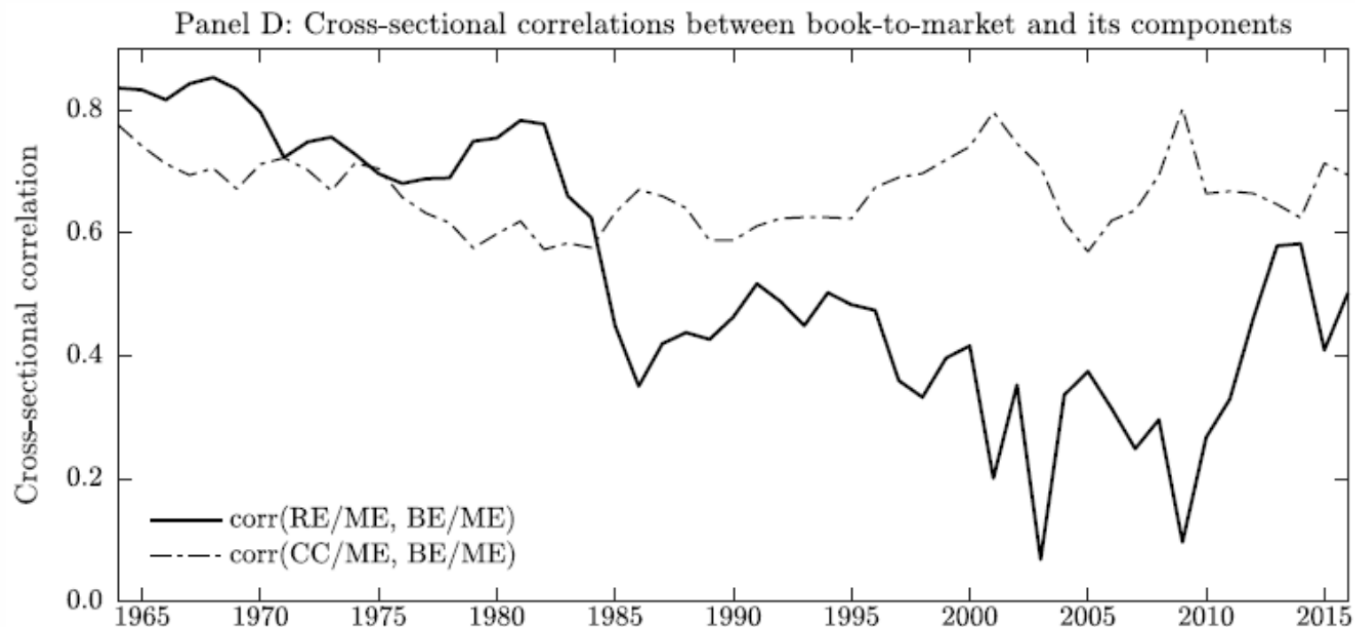
- *Pre-1990:* Book-to-market predicted the cross section because it was highly correlated with retained earnings-to-market

- *Post-1990:* Book-to-market lost its predictive power because its correlation with retained earnings-to-market fell

Conclusions on RE/ME

❑ Book-to-market predicts future returns:

✓ Not because it is a measure of "fundamental value" and a benchmark to gauge mispricing

✓ Because of the earnings accumulated in its retained earnings component, which averages only 41% of total book value.

❑ Other components (CC and AOCI) have little information content.

❑ Our thesis is that retained earnings:

✓ "Washes out" transitory shocks to annual earnings

✓ When scaled by price, provides a good measure of underlying earnings yield

❑ Again, note the absence of the term "risk" in the above the above interpretation. Risk is a "straw man" in this context.

Conclusions

❑ Earnings and returns are related economic variables

❑ Earnings and book values have components that have different implications for asset pricing

- ✓ Transitory versus "permanent" earnings
- ✓ Net Income vs. Gross Profit vs. Operating Profit
- ✓ Cash flow versus accruals
- ✓ Retained Earnings versus Contributed Capital

❑ Predictive ability of earnings-related variables:

- ✓ Persists over time
- ✓ Appears in international markets
- ✓ Persists for a long time

What earnings and book-to-market stories fit the data?

Barriers to arbitrage[1]

❑ This is difficult to reconcile with:

  ✓ Positions formed on RE/ME remaining profitable for ten years after formation

  ✓ … and significantly profitable for almost 5 of those years

❑ What barriers inhibit arbitrage for a *decade*?

❑ Is there *really* gradual correction of mispricing over a decade?

[1] e.g., Jacobs and Müller (*JFE*, in press)

In value strategies, book value acts as a benchmark for identifying market mispricing[2]

❑ This is difficult to reconcile with:

- ✓ All of BE/ME's predictive ability being due to RE/ME
- ✓ RE averages only 41% of BE
- ✓ None of BE/ME's predictive ability is due to BE's CC component, which averages more than half of it
- ✓ All of RE/ME's predictive ability is due to accumulated past earnings

[2] e.g., Lakonishok, Shleifer, Vishny (*J.Fin.*, 1994)

Mispricing Explanation:
Lakonishok, Shleifer, Vishny (1994) Version

``For many years, scholars and investment professionals have argued that value strategies outperform the market. These value strategies call for buying stocks that have low *prices relative to* earnings, dividends, *book assets*, or other *measures of fundamental value*.

" … value strategies yield higher returns because these strategies exploit the *suboptimal behavior of the typical investor* and not because these strategies are fundamentally riskier.''

What earnings and book-to-market stories fit the data?

Anomalies disappear soon after they are published[3]

❑ This is difficult to reconcile with:

✓ "Value" investing has been a well-known strategy since Graham and Dodd (1934)

✓ The profitability of the book-to-market version of value investing was documented by Rosenberg, Reid and Lanstein (*J. Port. Mgt.*, 1984)

✓ The profitability of the P/E version of value investing was documented by Basu (*J. Fin.*, 1984)

✓ PEAD has not disappeared in the 5 decades since Ball and Brown (JAR, 1968) reported it

✓ … or in the 4 decades since Ball (*JFE*, 1978) observed it is systematic

[3] e.g., McLean and Pontiff (*J. Fin.*, 2016)

What earnings and book-to-market stories fit the data?

Data mining [4]

❑ This is difficult to reconcile with:

✓ The Ball and Brown (1968) PEAD result for US stocks in 1957-1965 replicates:

    (a) US 1971-2017

    (b) 16 other countries

✓ The Ball, Gerakos, Linnainmaa and Nikolaev (*JFE*, 2019) RE/ME result replicates:

    (a) US in two sub-periods

    (b) US 1938-1964

    (c) 24-country "world" sample 1989-2016

✓ Wahal (JFE, 2019) finds profitability results since the 1940s

[4] e.g., Lo and MacKinlay (*RFS,* 1990)

Graham and Dodd on Book Value

Graham and Dodd (1934, p. 17):

> "Some time ago intrinsic value (in the case of common stock) was thought to be the same as "book value," i.e., it was equal to the net assets of the business, fairly priced. This view of intrinsic value was quite definite, but it proved almost worthless as a practical matter because neither the average earnings nor the average market price evinced any tendency to be governed by book value."

Graham and Dodd (1934, pp. 351–352):

> "current earnings should not be the primary focus of appraisal" because of temporary earnings fluctuations due to business conditions but also due to arbitrary accounting effects, "legitimate or otherwise".

Continuing relevance of the BB68 findings

❑ The principal reason: the results are universal:

  ❑ Still observed in U.S. data five decades after we reported them

  ❑ Observed in country after country.

❑ In terms of the four main results:

1. *Association/value relevance.* The fact that earnings changes and price changes are related might seem pretty obvious now, but it wasn't at the time we began our study. Knowing the relation between earnings and prices helps active investors frame their thinking about investment ideas. For example, active portfolio managers and their analysts can check the validity of an investment thesis by calculating the future earnings and the price/earnings multiple it implies. This gives them a sense of whether the market price already has incorporated their idea.

Continuing relevance of the BB68 findings

2. *Prices lead earnings.* The result that prices tend to anticipate public information has led investors to be more skeptical of their ability to beat the market. For example, it isn't enough to be good at forecasting earnings, because the market is very good at forecasting earnings; you have to forecast better than the market. This result — and many others that followed in the same vein — underpins the secular move to passive investing.

3. *Announcement effect.* There is now a mini industry reporting consensus forecasts, and the resulting 'earnings surprise' when earnings are announced. The term we introduced for that was 'unexpected earnings.'

4. *PEAD Anomaly.* Quant managers often tilt their portfolios toward various earnings yield variables that have been shown to predict returns. The earnings variables used include profitability, operating profitability, and (more recently) cash-based operating profitability. And 'anomaly chasing' now abounds.