JACOBS LEVY EQUITY MANAGEMENT CENTER
for Quantitative Financial Research

Ball and Brown (1968) After Five Decades

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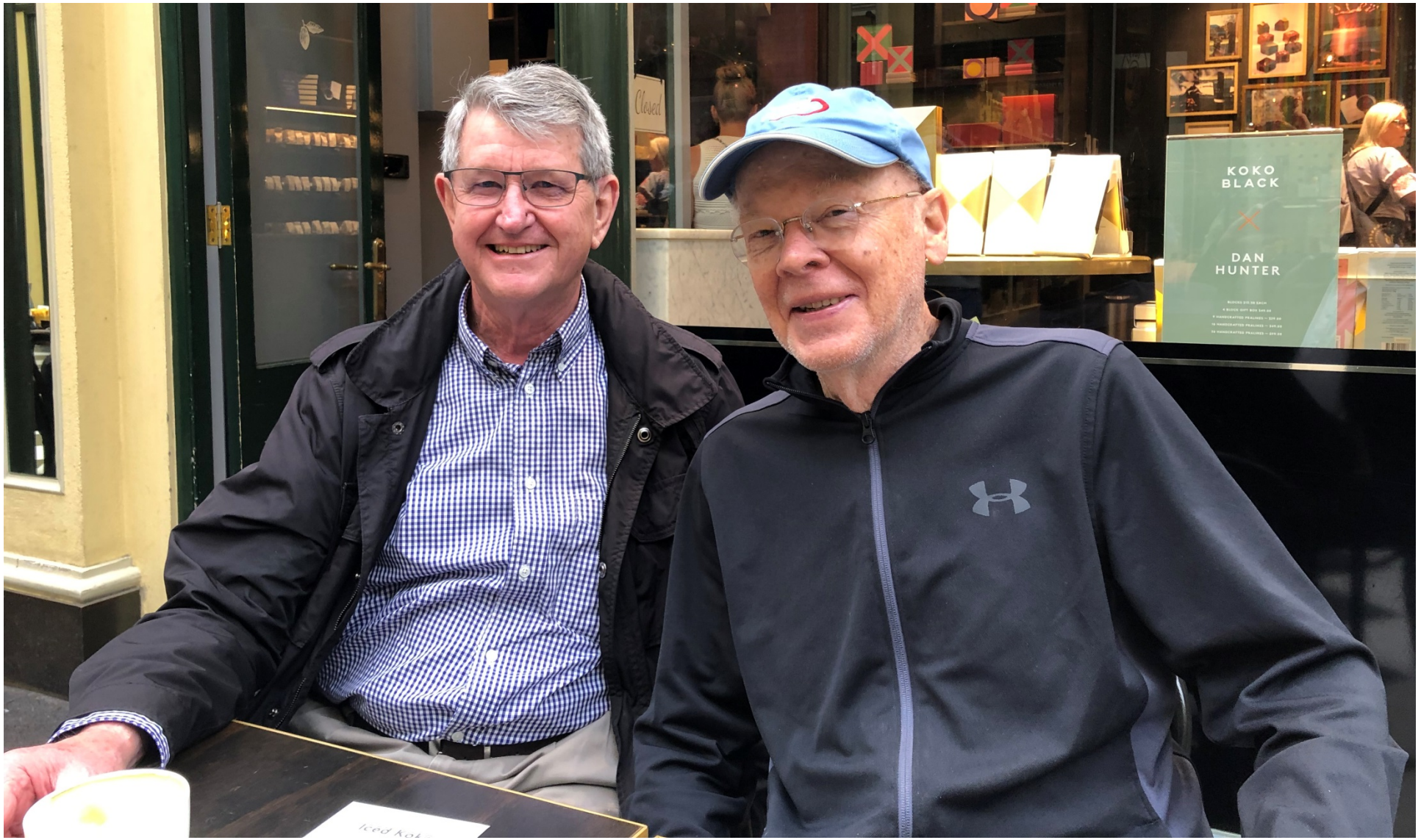
Summary

- Background observations
- Principal research design choices
- Results
- Replication: US 1971-2017 and 16 other countries
- Strengths, weaknesses, outcomes



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Background to the Research: The Accounting Literature in 1967

- Largely verbal and polemical theorizing
- Little systematic empirical work, poorly done
  - ✓ Rudimentary analysis of severely selected data (e.g., failed firms, miscreants)
  - ✓ Confirmation bias: tendency to select cases supporting the researcher's views
  - ✓ Theories not subjected to rigorous systematic testing
- Received theories categorically rejected the existing accounting regime
  - ✓ A single *universal accounting method* is not used to measure Income Statement and Balance Sheet items
  - ✓ So all accounting numbers are *meaningless aggregations*

Background to the Research: The Culture at Chicago

- The ideas of Frank Knight, F. A. Hayek, Milton Friedman, Ronald Coase, George Stigler, Gene Fama, Harry Markowitz and other Chicago notables were in the air
- An important premise/belief:
  - ✓ Unrestricted markets create relentless pressure toward more efficient economic institutions
  - ✓ In the absence of imposed restrictions, inefficiency does not survive
- The culture was one of challenging ideas with (1) other ideas and (2) evidence
- The school crackled with energy

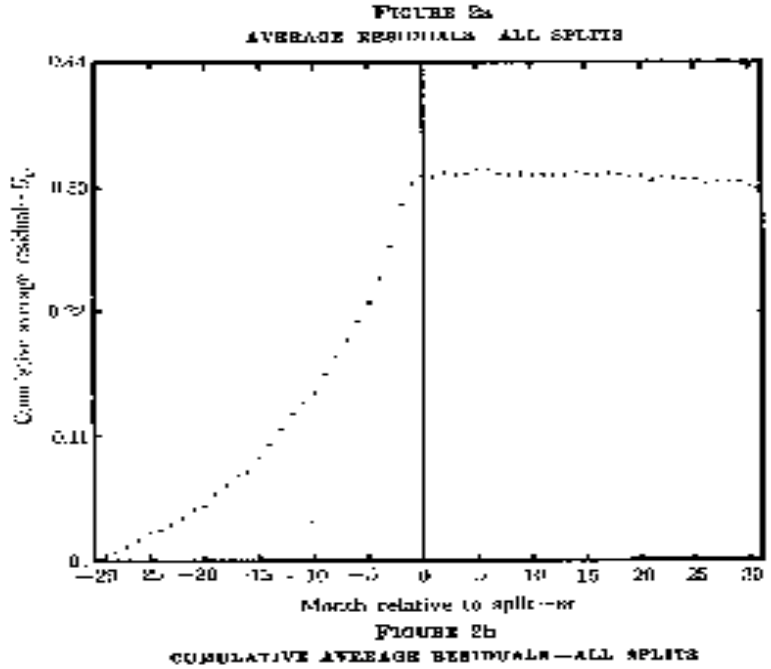
Background to the Research: The Culture at Chicago

- Against this background, the prevailing views in accounting now seemed nonsensical to us:
  - ✓ *Why would so many resources be put into financial reporting (and into analysis of it), if it is so useless?*
  - ✓ *Are other aggregations of heterogeneous measures – such as course grades, GPAs, SAT scores, and IQ scores – really meaningless?*
- So we decided to put these views to a market test
  - ✓ *Do investors – trading voluntarily – really act as if accounting numbers are meaningless?*
  - ✓ *Does the market ignore accounting earnings?*

Background to the Research: Earnings and Returns

- 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, both earnings and returns equal:
  Cash distributed to shareholders *less* cash received from them
- Earnings and returns differ in *when* they incorporate cash flow news
  - ✓ Returns incorporate considerable (all?) information about expected cash flows
  - ✓ Earnings incorporate:
    (a) Realized *ex post* cash flow when it arrives
    (b) Some revisions to expected cash flows accountants "recognize" via accruals
- Returns therefore lead earnings
- But they converge in the long run
  - ✓ Ultimately, the only way a firm adds value is by generating earnings

Background to the Research: FFJR (1969)



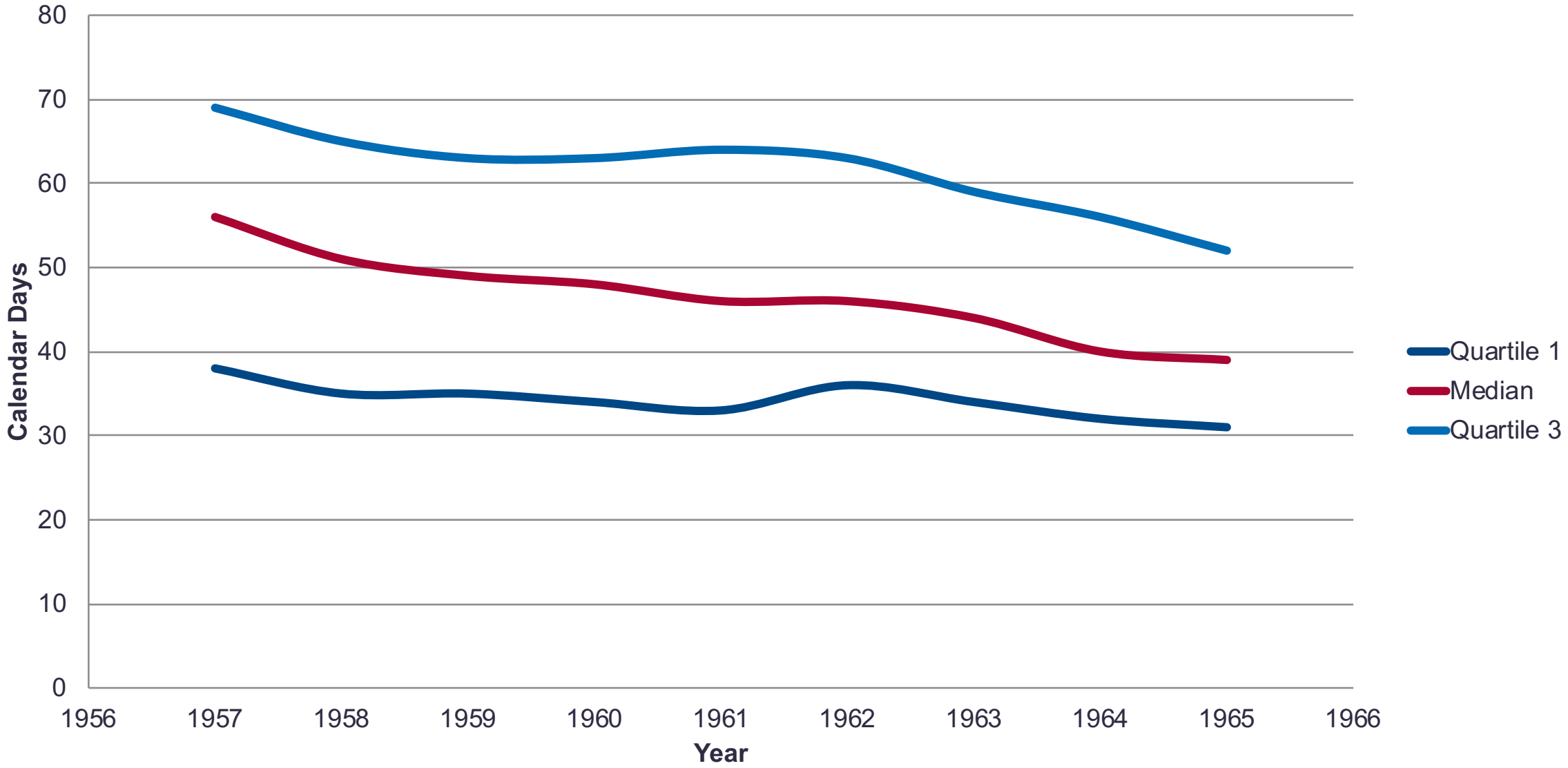
- This graph irreversibly changed our perception of stock markets. It was
  1. The first visual depiction of a seemingly-rational price response function ("*efficiency*")
  2. A validation of Fama's (1965) framing of price behavior in terms of response to *information*;

     … which provided a foundation for both behavioral and rationalist viewpoints
- The FFJR event study design gave BB68 a natural template we could adapt to study price behavior before, at, and after earnings announcements

Principal Research Design Choices

- Defined the information event as “unexpected” earnings – now known as “news” or “surprise” – measured two ways
  - ✓ Earnings changes, due to serial correlation in earnings levels. (Subsequent research validated this “naïve” random walk assumption)
  - ✓ Prediction errors from a “one factor” market model in earnings, as for returns
- Collected earnings announcement dates
- Employed non-parametric statistics due to
  - ✓ Shape of the return distribution
  - ✓ Likely non-linearity in the returns-earnings relation
- Studied a tiny sample by modern standards, but enormous by historical standards
  - ✓ 2340 firm/year observations over 1957-65
  - ✓ Carefully checked the data
- Calculations performed on an IBM 7040/7094 machine.

BB68 Reporting Lag, by Year



Good News

Bad News

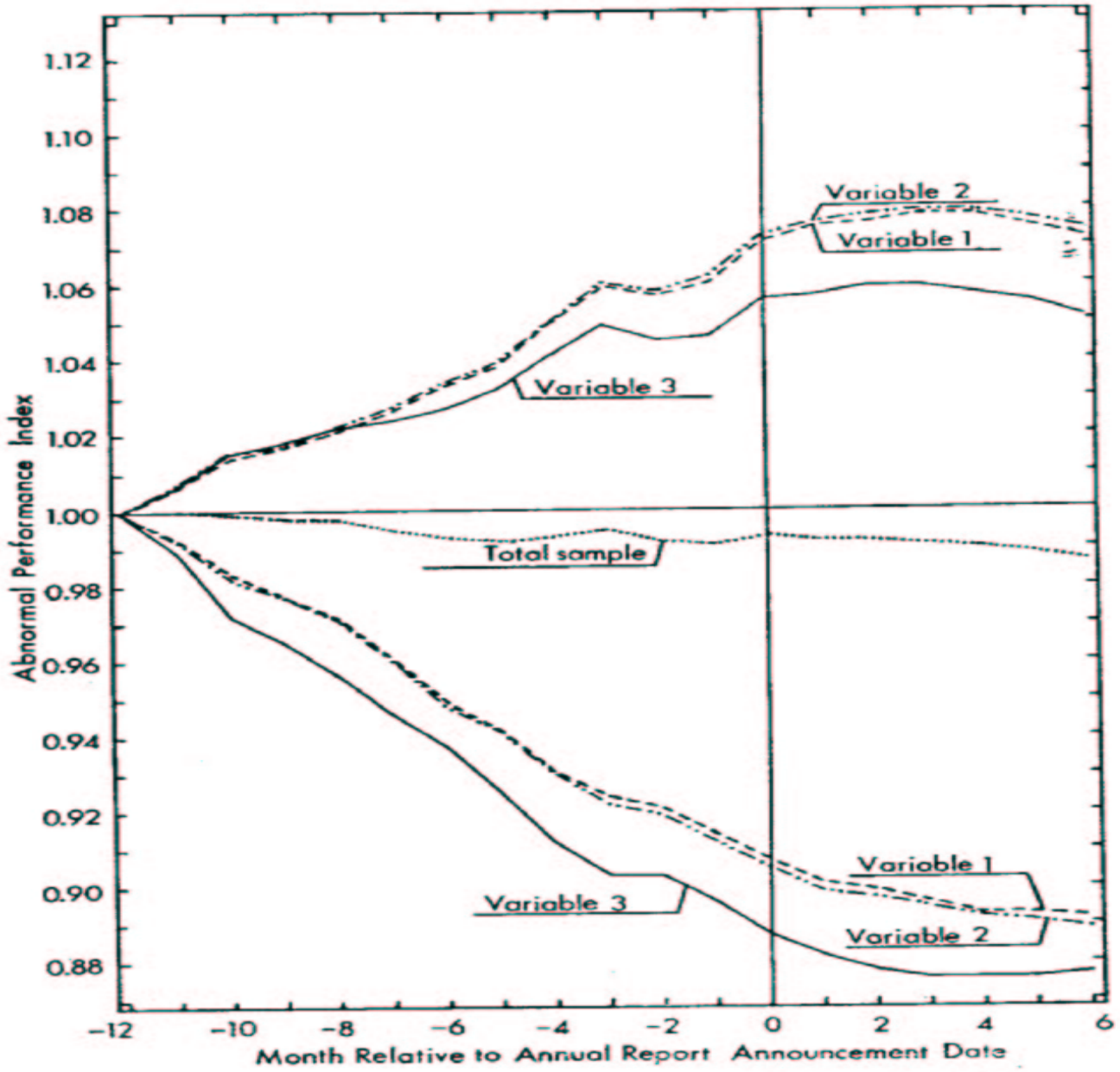


FIG. 1 Abnormal Performance Indexes for Various Portfolios

Key

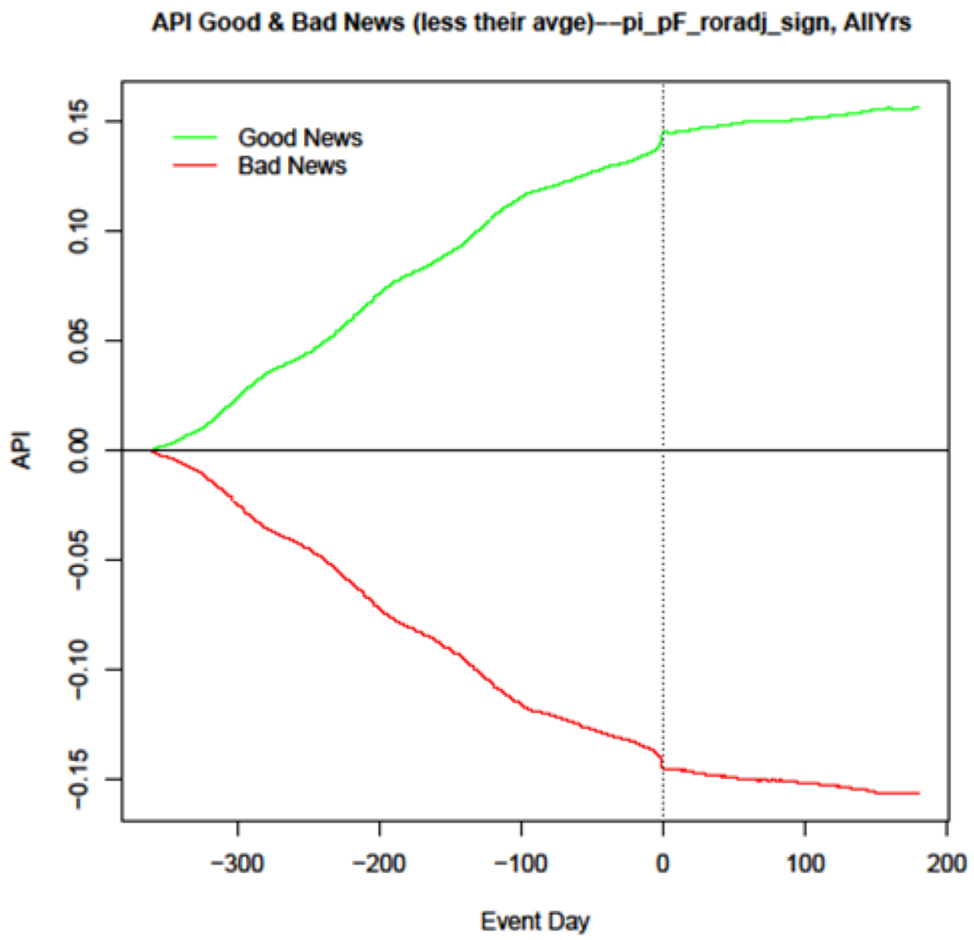
variable 1: Net Income (Mkt Model)

variable 2: EPS (Mkt Model)

variable 3: EPS (RW model)

Source: Ball & Brown (1968)

Replication: USA, Daily Returns 1971-2017*

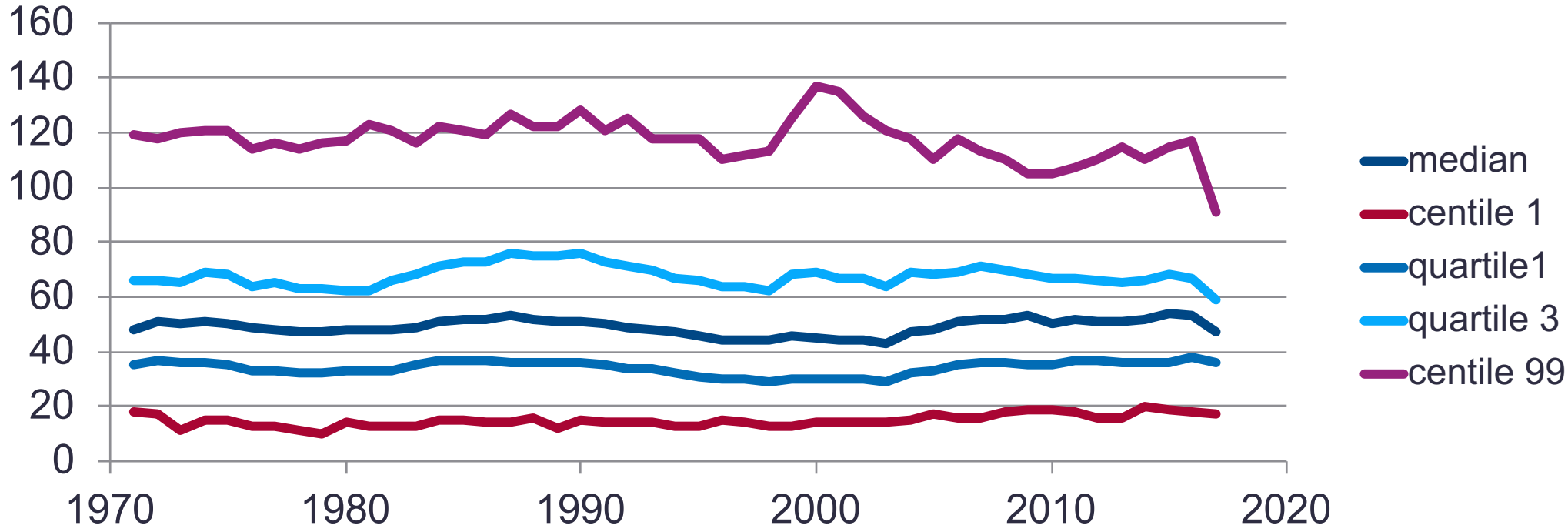


Major Results

- ❑ *"Value relevance"*
  - ✓ An association between the signs of annual earnings changes and annual returns
  - ✓ Annual earnings and annual returns incorporate overlapping information
- ❑ *Low timeliness*: Prices lead earnings
- ❑ *Small "blips" at the announcement:* Only a minor part of the annual earnings-return relation occurs around day 0
- ❑ *"Post Earnings Announcement Drift" (PEAD)*: Prices continue to move in the direction of earnings surprises after the public announcement
  - ➡ *the first reported "anomaly"*

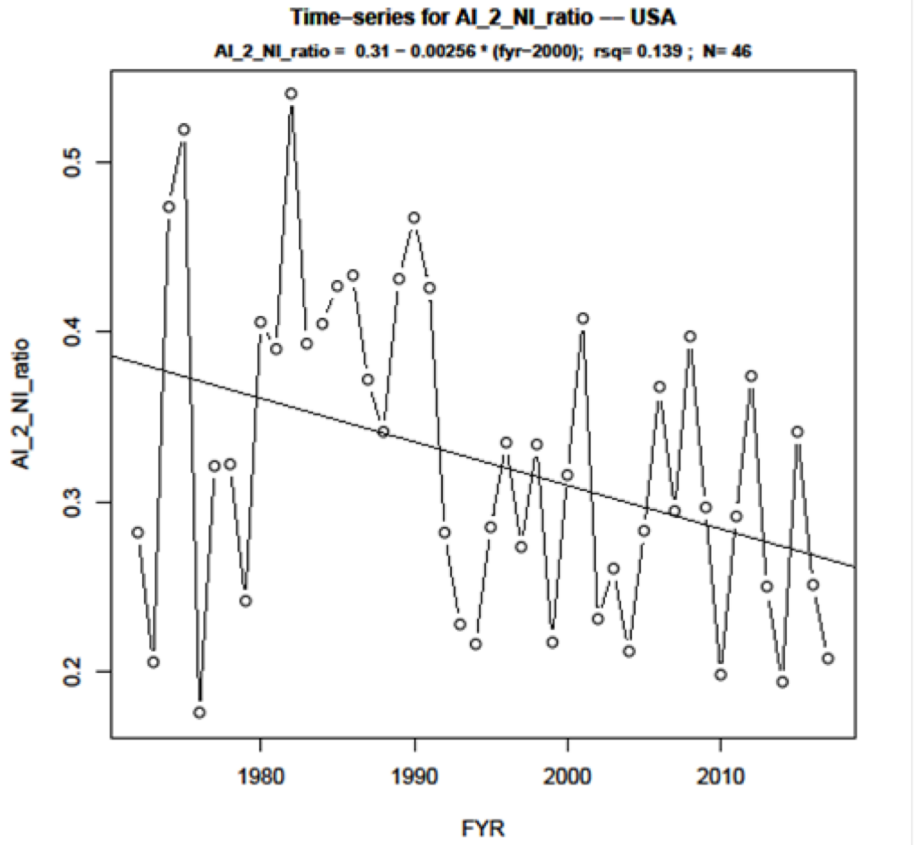
*Ray Ball and Philip Brown, "Ball and Brown (1968) after 50 years." *Pacific-Basin Finance Journal* 53 (2019) 410–431. https://www.sciencedirect.com/science/article/pii/S0927538X18306395. Symmetry is imposed by subtracting the daily mean return.

Reporting lag (calendar days) by year, USA



- Recent fall in the 99th percentile due to pressure on laggards?
- No trend in the median lag for the whole sample
- *But* the lag is ↓'g in adjacent years *for a constant sample*
  - ✓ Newly listed stocks tend to be slower announcers

AI/NI, USA 1972-2017: Declining Value Relevance?



AI: Value of perfect foreknowledge at day -360 of the earnings surprise sign

NI: Value of perfect foreknowledge at day -360 of price on day 0 (earnings announcement)

✓ Parametric OLS equivalent of AI/NI is the annual earnings-returns r-squared.

Replication in 16 Other "Countries," Daily Returns 1989-2017

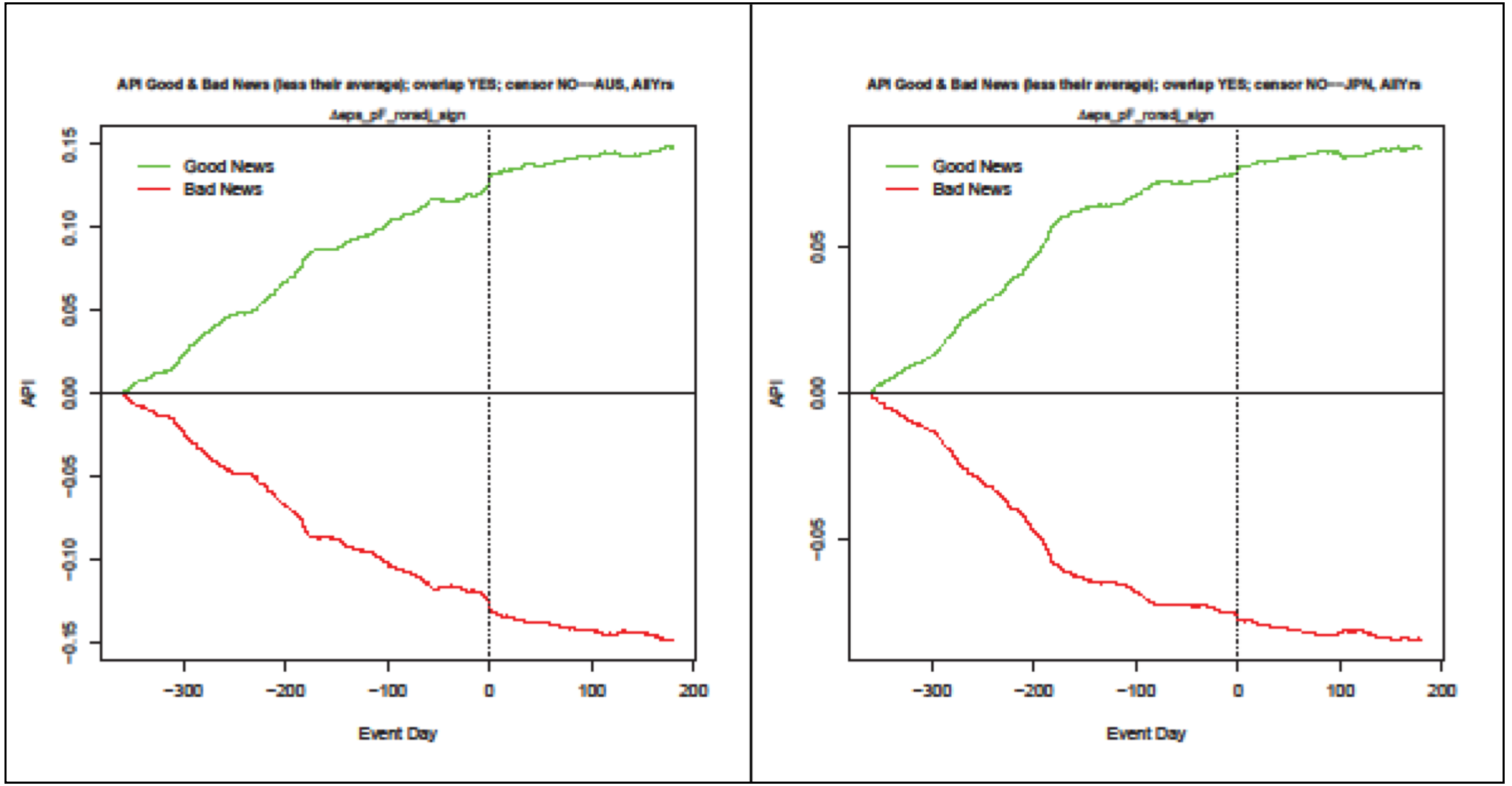
- AUS, CAN, CHN, DEU, FRA, GBR, HKG, IDN, JPN, KOR, MYS, NZL, PHL, SGP, THA, TWN
- Results replicate well, and are compelling evidence of robustness

1. *Pre-event* good/bad return separation is positive and statistically significant in all 16 countries
   - ✓ usually about 15-25% p.a.
2. *Event day* separation is positive in all countries, and significant in 14 of 16
   - ✓ though the magnitude is small
3. *PEAD* is positive in all 16 countries, and significant in 15 of 16
   - ✓ does not look like data mining
   - ✓ was not traded out of the market when our results were published over 50 years ago

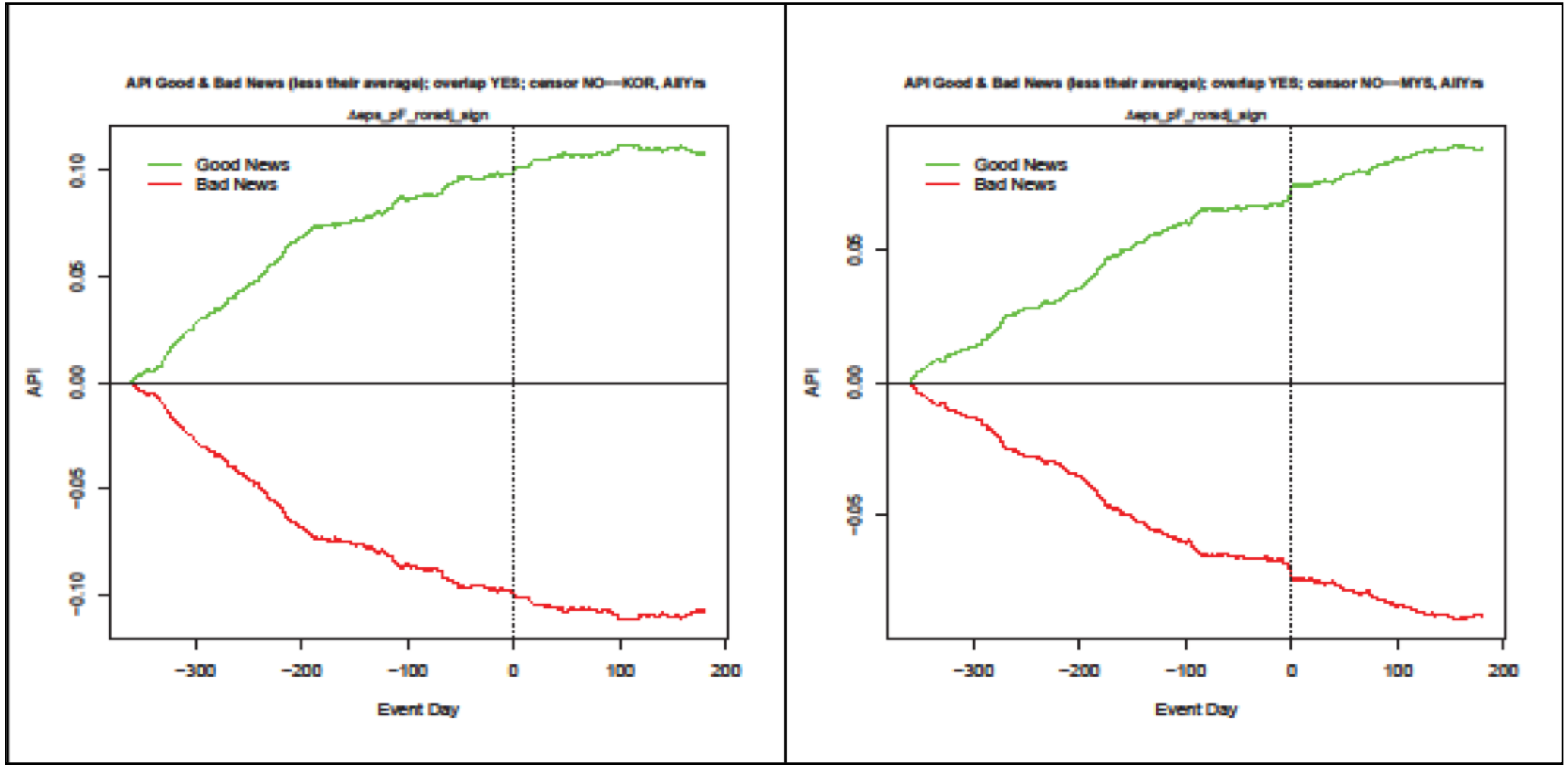
Strategy Long in Good News (ΔEPS > 0) and Short in Bad News (ΔEPS < 0) Stocks

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

Replication: Australia and Japan, 1989-2017



Replication: Korea and Malaysia, 1989-2017



Strengths

- Documented the mapping of ΔMVE (returns) into ΔBVE (earnings) over the year
  - ✓ Revealing important properties of earnings: “value relevance” and timeliness
  - ✓ Accounting earnings was not treated as simply another information signal
- Provided a view of accounting information in markets that was new to both investors and to the accounting literature
- Used data to test theories of optimal accounting regimes (then a novel idea)
  - ✓ a.k.a “evidence-based policy research”
- The results consistently replicated
- Acknowledged PEAD (the first “anomaly”)
- Short, and carefully written
- Opened avenues for other research

Weaknesses

- Tiny sample (by current standards)
  - ✓ 2,340 firm/year observations
  - ✓ Compares with current sample sizes > 100,000
- Survivor bias: Compustat file + our data requirements
- Monthly data
- Cross-sectional correlation ignored
- Market component of earnings not studied (a strength?)
- Simple binary specification of the earnings surprise variable
  - ✓ The not-so-“naïve” random walk expectations model
- Simple test statistics
- This research design would not pass muster today
- *It pays to have the first word, not the last*

Outcomes: Academic

- *The Accounting Review*
  - ✓ At the time, *the* international research journal in accounting
  - ✓ Rejected the paper out of hand
- *Journal of Accounting Research*
  - ✓ New journal (started 1963 at Chicago)
  - ✓ New editor (Nick Dopuch) published it without any refereeing
- Eventually, the results spoke for themselves, and drew the interest of
  - ✓ Academics
  - ✓ Regulators
  - ✓ Investors
- Still heavily cited by accounting literature standards
- The literature on earnings and prices is larger and longer-lived than we expected
- Asset pricing researchers are beginning (after 5 decades) to understand and delve more deeply into accounting issues?

Outcomes: Investment

- Difficult to measure impact (correlation vs causation)
- Knowing the relation between earnings and prices helps active investors frame their thinking about investment ideas
- The result that prices anticipate public information has led investors to be more skeptical of their ability to beat the market
  - ✓ e.g., you have to forecast earnings better than the market
  - ✓ This result – and many others that followed in the same vein – underpins the secular move to passive investing
- There is now a mini industry reporting consensus forecasts and "earnings surprises." (The term we introduced for that was "unexpected earnings")
- Some quant managers tilt their portfolios toward earnings yield variables
- "Anomaly chasing" abounds

We were younger then (Ray 23, Phil 28)