

Discussion of:
The Stock Market Valuation of Research and
Development Expenditures

*by Louis K.C. Chan, Josef Lakonishok and Theodore
Sougiannis*

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Discussant:
Kent Daniel
Kellogg School, Northwestern and NBER

What the Paper Does:

Why look at R&D Expenditures?

High R&D firms are difficult to value:

- High R&D firms' future profits are "tied to the success of new, untested technologies, and hence are highly unpredictable."
- Benefits usually materialize far in the future.
- R&D accounting information is of limited informativeness.

Stated Hypotheses:

- "Functional Fixation Hypothesis"
 - investors mechanically except firms financial statements at face value, without adjusting for the long-term benefits of R&D.
 - Since R&D is expensed, not amortized, this leads to underpricing of high R&D firms.
- Over-optimism about high-tech (high R&D) firms:
 - Would lead to overpricing of high R&D firms.
 - Since high R&D stocks are generally growth (low B/M) stocks, this is consistent with low average returns of growth stocks

A Related Hypothesis:

- Daniel, Hirshleifer, and Subrahmanyam (2001) note that overconfidence is stronger where for more diffuse tasks for which feedback is slow:

Based on psychological evidence (see Einhorn (1980)) on the circumstances leading to greatest overconfidence, the theory predicts that fundamental/price ratios should better forecast risk-adjusted returns among firms that are hard to value (e.g., R&D-intensive firms comprised largely of intangible assets)

- A low book/market ratio is itself an indicator of high intangible assets, but can also be low for other reasons such as a risk premium or market misvaluation. Thus, conditioning on other intangible measures provides a test of how intangible measures affect the misvaluation-induced relation between fundamental-price ratios and future returns.

Results:

- Bottom line is that there is underreaction to R&D expenditures.
 - This is consistent with overconfidence theory, and with many other studies in which the market appears to “underreact” to discretionary managerial actions.
 - See *e.g.*, Ikenberry, Lakonishok, and Vermaelen (1995), etc.
 - See DHS (1997, *JF*) for summary.
- However, degree of underreaction is strongly dependent on Book-to-market, sales-to-market, and size.

- Patterns are:

1. R&D / Sales doesn't forecast future returns

2. However,

$$\left(\frac{\text{R\&D}}{\text{Mkt}}\right) = \left(\frac{\text{R\&D}}{\text{Sales}}\right) \cdot \underbrace{\left(\frac{\text{Sales}}{\text{Mkt}}\right)}_{\text{like B/M}}$$

strongly forecast future returns

3. Another way of interpreting this is that the (sales/mkt) effect is much stronger for high R&D/Sales firms.

How Big is the R&D effect?:

- The magnitude of the effect is huge.
- Raw return differentials (from Table VIII):
 - Small Low R&D/Market firms earned 16.2%/year over sample period.
 - Small, Low R&D/Market firms earned 31.3%/year
- The excess return differential (relative to size/BM matched firms) is:
 - 10%/year, for the smallest decile of firms,
 - 5.5%/year, for deciles 4-6 (medium),
 - 2.9%/year, for deciles 7-10 (big).
- Regressions on Fama and French (1993) 3-factors gives similar results (Table VII, Panel B):
- These are all equal-weighted, buy-and-hold returns with annual rebalancing.
- Sharpe ratios of R&D based strategies would be interesting.
 - How correlated are returns of high- and low-R&D/Mkt portfolios?
- Results are probably highly statistically significant, but these numbers would be useful.
- Is the R&D effect independent of the momentum effect (Jegadeesh and Titman (1993), Chan, Jegadeesh, and Lakonishok (1996))?
 - Performance persistence out to 3-years suggests that it is .

What Else Could be Done?

- Is there more/less underreaction to R&D expenditures for high B/M firms?

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