

Event Studies

Methodology

This is based on MacKinlay, *Journal of Economic Literature* (1997).

Estimation window is of length L_1 (250 days in MacKinlay) and runs from T_0 to T_1 .

Event window is of length L_2 (40 days in Maklinlay) and runs from T_1+1 to T_2 .

To conduct an event study, we need to find the deviation of actual returns from “normal”. (“normal” returns here really refers to a conditional expectation).

1. Estimate model

$$R_{i,\tau} = \alpha_i + \beta_i R_{m,\tau} + \varepsilon_{i,\tau} \quad \text{with } \varepsilon_{i,\tau} \sim (0, \sigma_{\varepsilon_i}^2) \quad \text{for } \tau = T_0 + 1 \text{ to } T_1$$

2. Use estimates to generate “normal” (or “forecasted” or “expected conditional on market”).

$$\hat{R}_{i,\tau} = \hat{\alpha}_i + \hat{\beta}_i R_{m,\tau} + \varepsilon_{i,\tau} \quad \text{for } \tau = T_1 + 1 \text{ to } T_2$$

3. Calculate Abnormal Return

$$A\hat{R}_{i,\tau} = R_{i,\tau} - \hat{R}_{i,\tau} = R_{i,\tau} - (\hat{\alpha}_i + \hat{\beta}_i R_{m,\tau}) \quad \text{for } \tau = T_1 + 1 \text{ to } T_2$$

Conditional on the estimation window, these abnormal returns will distributed $MN(0, \sigma^2(A\hat{R}_{i,\tau}))$, with

$$\sigma^2(A\hat{R}_{i,\tau}) = \sigma_{\varepsilon_i}^2 + \frac{1}{L_1} \left(1 + \frac{(R_{m\tau} - E(R_{m\tau}))^2}{\hat{\sigma}_m^2} \right)$$

This first component is due to the error term in our market model -- that is, even if we knew the true regression parameters, we our estimate of the expected return will in general “miss” due to the error term in the model.

The second term is due to sampling error. That is, it is due to error that our parameter estimates are probably not actually the true values of α and β . However, as the estimation window L_1 gets large, this term goes to zero. This should make sense, since as the estimation becomes longer, our estimates of α and β become more precise. In reality, if we make the estimation window too large, we will potentially be subject to parameter shifts, etc....

4. Average Abnormal Return across firms

$$A\bar{R}_\tau = \frac{1}{N} \sum_{i=1}^N A\hat{R}_{i,\tau} \quad \text{with} \quad \text{var}(A\bar{R}_\tau) = \frac{1}{N^2} \sum_{i=1}^N \sigma_{\varepsilon_i}^2$$

5. Cumulate these returns over the event window

$$CAR(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} A\bar{R}_\tau \quad \text{with} \quad \text{var}(CAR(\tau_1, \tau_2)) = \sum_{\tau=\tau_1}^{\tau_2} \text{var}(A\bar{R}_\tau)$$

Under the null of no effect,

$$CAR(\tau_1, \tau_2) \sim N(0, \text{var}(CAR(\tau_1, \tau_2)))$$

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Elder and Westra - The Reaction of Security Prices to Tracking Stock Announcements

Background - Huge trend toward firms diversifying from 1950-1970. Many firms were engaged in a huge number of industries -- ITT (38 industries), Tenneco (28), Gulf and Western (41), Martin Marietta (14). Conglomerates were in fashion.

There were several perceived advantages to being a large diversified firm:

Diversification across industries would stabilize earnings and reduce risk.

Investors can personally diversify their own holdings,
but diversification may have operational and planning advantages to the firm.
Diversification may reduce the cost of debt.

Managerial economies of scale - good managers can manage anything -- whether its auto manufacturing or running a hotel.

Internal capital markets - stable divisions could finance fast-growing divisions, rather than having to access capital markets, which can be very expensive.

Economies of scope in production and marketing - It was believed that large firms could gain substantial economies by sharing production and marketing processes.

In the 1980's and 1990's, things started to change. There was a wave of divestitures, with firms increasing "focus", through the spinning-off and carving-out of subsidiaries, and more recently, issuing tracking stocks.

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Divestiture Method #1

Spin-offs - A new, independent company created by detaching part the parent company's assets and operations.

Distribution - The equity of the spun-off subsidiary is distributed to the shareholders of the parent as a dividend. Distribution is not taxed as long as 80% of the shares are distributed to existing shareholders.

Financing - Results in no new equity financing.

Ownership - Parent firm typically relinquishes control over the subsidiary by retaining little or no equity ownership.

Taxes - Distribution is not taxed as long as 80% of the shares are distributed to existing shareholders, although D'Souza and Jacob report that spin-offs are often taxable.

Shareholders rights - shareholders possess the rights conventionally due shareholders:
the right to elect a board of directors to oversee management,
the right to vote on matters of great importance
a claim against the new entity's net assets.

Empirical Evidence - mean abnormal return of about 3% associated with a announcement (Schipper and Smith (1983).

Recent Examples:

GM spun off EDS (computer services firm) in 1996.

ATT spun off Bell Labs (Lucent) and NCR (computers) in 1996.

Bell Canada recently spun-off cellular-communications unit Nortel Communications

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Divestiture Method #2

Carve-outs - A new, independent company created by detaching part the parent company's assets and operations. 628 from 1985 to about 199x.

Distribution - Similar to spin-off, but the shares in the spun-off subsidiary are sold in a public offering, either as an initial public offering by the subsidiary itself or as a seasoned offering by the parent.

Financing - Results in new equity financing.

Ownership - Parent firm typically maintains control over the subsidiary through equity ownership.

Taxes - Due to tax considerations the parent firm typically maintains at least 80% of the voting rights and a majority interest in the carved-out subsidiary.

Shareholders rights - shareholders possess the rights conventionally due shareholders:

the right to elect a board of directors to oversee management,

the right to vote on matters of great importance

a claim against the new entity's net assets.

Empirical Evidence - mean abnormal return of about 2% associated with an announcement (Schipper and Smith (1986)).

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Why Positive Abnormal Returns for Spin-offs and Carve-outs?

Exploiting transitory mis-valuations? - positive abnormal returns from carve-outs may be due to transitory differences between the market value and manager's perceived value of both the subsidiary and the parent firm. When such differences exist, managers may find it optimal to finance new equity through a carve-out, which signals markets that managers believe the parent firm to be undervalued. (Nanda (1991)).

Supported by empirical analysis of the share-price reaction of rivals to firms that announce voluntary asset divestitures (Slovin, Sushka and Ferraro (1995)).

Tax and regulatory considerations - may also play a role. Some firms announce they expect to benefit through such considerations (Schipper and Smith (1983) and Hite and Owers (1983)).

Diversification "Discount"?

Spin-offs which increase focus earn positive long-run abnormal returns (Desai and Jain (1999)).

Positive relationship between stock returns and increased focus (Comment and Jarrell (1995)).

Diversified firms sell at 13-15% discount from imputed stand-alone values (Berger and Ofek (1995)).

There is some evidence that subsidiary long-run abnormal returns are higher when parents are less focused, consistent with improved focus being an important determinant (Vijh (1999)).

Why a Diversification "Discount"?

Inefficient internal capital markets? - Asymmetries between lower level and top management, in information, preferences or incentives, may result in an inefficient allocation of capital (e.g., transfer pricing). (Milgrom (1988), Bagwell and Zechner (1993) and Harris and Raviv (1996) Comment and Jarrell (1995)).

Pure plays? - divestitures create pure-plays that allow investors to invest separately in the subsidiary without simultaneous investment in the parent. However, arbitrage dictates that this should matter only to the extent that the new pure-play is unique.

Incentives? - increased financial disclosure may facilitate the implementation of improved incentive schemes or otherwise improve the ability of shareholders to monitor management (Schipper and Smith (1983, 1986 and 1989)).

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Divestiture Method #3

Tracking Stocks - A new class of common stock is created by detaching part the parent company's assets and operations. The value of the new class of common stock is linked to the performance of a specific business group through special provisions introduced into the firm's articles of incorporation. From 1984-1990 there were a total of 2 tracking stocks. 16 were issued in 1999.

Distribution - Shares in the tracking stock may be distributed either as a public offering, as dividends to existing shareholders, or as currency for an acquisition.

Financing - The first method results in new equity financing, although it has been used less frequently (that was as of 1998, and should be updated).

Ownership - The formation of an equity structure based on tracking stock does not create a new corporate entity.

Taxes - the distribution, if properly structured, is not taxed. Firm pays taxes as a consolidated entity, so losses in one group can be used as a shield.

Value linked to division performance - This link is usually strongest through a limited claim on the earnings generated by the division.

-dividends paid are typically dependent on the earnings generated by the tracked group in a structured fashion.

Allocation of assets -

-tracking stock represents a claim on a fraction of the assets of the consolidated firm, rather than a legal claim on the assets of the associated business group.

-In the event that assets of the tracked group are sold, the parent might be obligated to distribute the proceeds as a special dividend or as a share repurchase.

Management and Control - The tracked group is also not governed by a separate and independent board of directors.

-governed by the directors of the parent firm

-interests of each tracked group will therefore be subordinate to the interests of the consolidated firm.

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Why Positive Abnormal Returns to Tracking Stocks vs. Spin-off and Carve-outs?

Exploiting transitory mis-valuations? - Doubtful. Many tracking stock issues do not result in new equity financing.

Tax and regulatory considerations - Doubtful. generally no benefit for tracking stocks.

Diversification “Discount”? Or Improved focus?

Inefficient internal capital markets? - Doubtful. There still exists the opportunity for considerable cross-subsidization across business groups, either through exposure to the liabilities of the consolidated firm or through purposeful redirection of resources. Thus, internal capital markets may still be inefficient. (Billet and Mauer (2000) actually find some evidence for improved internal capital mtk.s.)

Pure plays? - Doubtful. The directors may not have an incentive to strategically manage the tracked business group in its own best interests, and, since the internal capital markets may still be inefficient, the tracked business group is less of a “pure” play.

Incentives? - Possibly. These factors should not impede expected gains in managerial efficiency through the design of and implementation of improved incentive structures, increased financial disclosure, or the ability of shareholders to more closely monitor the management of the individual business groups.

Hard to value? - Possibly. Conglomerate firms may be undervalued because security analysts, who typically specialize in one industry, find them difficult to value.

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Existing Empirical Evidence on Tracking Stocks

Billet and Mauer (2000) - sample of 18 non-acquisition related

Find positive relationship between abnormal returns and their measure of the market's value of internal capital markets.

They suggest that markets impose a discount on diversified firms because they believe the firm may spin-off the subsidiary, and lose the benefits of an (efficient) internal capital market. If, instead of a spin-off, the parent maintains the internal capital market by announcing a tracking stock, the "spin-off discount" is removed, and hence the positive abnormal return. Likewise, removing an efficient internal capital market is bad, and results in negative abnormal return.

But many firms with positive AR never claimed to be considering a spin-off! It seems that work here could refute the Billet and Mauer hypothesis. Also, B&M hypothesis suggests AR should be greatest for acquisitions formed as tracking stocks, since they ADD internal capital markets.

D'Souza and Jacob (2000) - sample of 12 non-acquisition related

Find that contemporaneous correlation between the returns targeted stocks of the same company (but different industries) is greater than the corresponding correlation among independent firms in the same industry. (Most probably this is due to shared management, services and liabilities).

Analyst coverage - Conglomerate firms may be undervalued because security analysts, who typically specialize in one industry, find them difficult to value. Bhushan (1989) documents that an increase in the number of business segments decreases analyst following. Find no significant increases in analyst coverage -

Questions for future research -

Is there another story that can explain the B&M findings?

How do AR break down by industry? Are internet trackers getting the bigger jump?