

Note #1: Assessing Changes in Shareholder Wealth: An Example

The readings used in the course make heavy use of ‘event study methodology’ to measure the specific impact of corporate decisions on shareholder wealth. This technique is widely used in practice to assess the change in shareholder wealth generated by announcements of corporate events (e.g., security offerings, mergers, lawsuits, earnings). The example below reviews the fundamental assumptions behind this technique. My example considers the change in shareholder wealth resulting from an announcement of a repurchase by Intel, Inc. (in late 1991 Intel was considering a repurchase.) Below is the hypothetical sequence of prices (P) for Intel's stock around the announcement day for the repurchase (t=0). The announcement day is the first day the public learns of the event. Typically this day coincides with a public announcement by the firm to that effect.

The total percentage return to shareholders (R_t) on day t is given by the expression:

$$R_t = [(P_t - P_{t-1}) + D_t] / P_{t-1}$$

However, since at the time Intel paid no dividends (D), its observed or actual daily stock returns (R_t) are as follows:

Day t	Close Price	Intel's Daily Returns (R_t) (%) [1]
-4	40.0	
-3	39.0	-0.025
-2	38.5	-0.013
-1	39.8	0.034
Announcement day 0	43.4	0.090
+1	44	0.014
+2	43	-0.023

By what criterion does the 9 percent return observed on the announcement day constitute an extraordinary (or abnormal) return? To measure ABNORMAL returns, we first have to measure NORMAL returns. By normal we mean, "what would we have expected to happen to Intel's stock in the absence of the repurchase?"

Now enter the quagmire. What model of expected returns do we use to forecast the return on Intel's stock on day t?

Suppose we pick the CAPM, then the theoretical expected return, $E(R_t)$, on day t is

$$E(R_t) = R_f + \beta (R_{mt} - R_f) \tag{1}$$

where R_f is the risk free rate of interest, β is the beta coefficient for Intel's stock, and R_{mt} is the return on the 'Market' portfolio. In practice the CAPM model is implemented using the *empirical market model* that is a regression of stock returns on a proxy for the market portfolio. The market model regression is given in (2) below.

$$R_t = \alpha_t + \beta R_{mt} + \varepsilon_t \quad (2)$$

Suppose we have the stock prices for Intel and therefore daily returns for 120 days prior to any information being known about the repurchase. Then using equation (2), we regress Intel's daily returns on those of the S&P500 as a proxy for the market portfolio. Assume that the regression yields estimates of $\alpha=0$ and $\beta=1.75$. Alternatively, we could go to *Value Line* or *Bloomberg* prior to the repurchase and obtain estimates of alpha and beta. With these estimates, we can compute the abnormal gain to shareholders at the time of the repurchase. The daily abnormal returns (AR) on Intel's stock are *the difference* between Intel's actual returns [1] above and the CAPM determined expected returns [4].

Day t	S&P 500 Index, close [2]	S&P Market return, % Rm [3]	Intel's Exp return- CAPM 1.75 * Rm [4]	Intel's Abnormal Return (AR) [1] - [4]	Cumulative Abnormal Return (CAR) Sum AR(t)
-4	\$358				
-3	354	-0.011	-0.020	-0.005	-0.005
-2	354	0.000	0.000	-0.013	-0.018
-1	352	-0.006	-0.010	0.044	0.025
Announcement day 0	356	0.011	0.020	0.071	0.096
1	360	0.011	0.020	-0.006	0.090
2	358	-0.006	-0.010	-0.013	0.077

Intuitively, the abnormal return attempts to separate the effect of Intel's repurchase decision from other market factors that influence equity value. Since the market rose on the announcement day 0.011, Intel's stockholders, given their greater risk, would have 'normally' experienced a 0.020 return ((1.75* 0.011). On day 0, Intel's stockholders 'actually' earn 0.09 [1]. Therefore, 2% of the observed 9% increase is due to overall market movements and thus cannot be ascribed *uniquely* to the repurchase. Notice also that the estimates of alpha and beta are determined prior to the event period. Thus, the expected or 'normal' return attempts to capture what would have happened to the firm in a period unaffected by the circumstances of the repurchase.

Because markets are informationally efficient in responding to this type of 'news', the standard practice is usually to measure the impact of a corporate announcement with a two-day window (i.e., add the AR on day -1 and day 0). Thus, the cumulative abnormal return [CAR(-1,0)] is 0.115 (0.044+0.071). In dollar terms, Intel had a market value of equity of approximately \$8,151 million before the repurchase announcement. Hence, the increase in shareholder wealth due to the repurchase is approximately \$937 million.

Investment advising, consulting, corporate strategy firms make heavy use of the above technique. Because of concerns about the CAPM, firms are moving in two directions. The 'low tech' group now estimates expected returns using *net of market returns*. This approach implicitly assumes that each firm's beta is 1. Accordingly, the net of market abnormal returns for Intel are simply $R_t - R_m$. The 'high

tech' group is substituting a multi factor model (APT) for the CAPM. Alcar, Duff and Phelps, McKinsey have or are developing APT software models to estimate multi-factor returns. Many firms continue to rely on the CAPM.

Given the emphasis in the class on capital market evidence, you should understand the concepts behind computing abnormal returns and be able to apply this methodology in other contexts.