

Sprint Nextel—Valuing Firm Equity

Background Reading

The main objectives of this part of the CPE session (and of the Sprint Nextel case materials) are to help participants (and their students):

- Learn to apply income-based valuation method.
- Develop a parsimonious multi-period forecast of operating profit and assets.
- Understand the concept of residual income and how it relates to fair value.
- Apply the residual income model to estimate fair value of a firm.
- Understand how SFAS 157 Level 2 and Level 3 inputs affect estimated fair values.

The fair value of many companies' equity is easily determined by observing its traded stock price – a Level 1 input (observable quoted prices) in the SFAS 157 valuation hierarchy. However, there are situations when the observed fair value is not appropriate for financial reporting or decision making. For example, if the firm's stock is thinly traded or the shares held are restricted under SEC Rule 144, the quoted market price may not accurately reflect fair value. Other times, Level 1 inputs are not available; for instance, when the firm is undergoing an IPO or the firm is private. When Level 1 inputs are either inappropriate or unavailable, we must rely on Level 2 inputs (observable model inputs) and Level 3 inputs (unobservable model inputs) to estimate valuation models to determine equity fair values.

One commonly used equity-valuation model is the residual operating income (ROPI) model. The ROPI model is very powerful in that it uses accounting information to capture key economic variables in an intuitive fashion. The ROPI model is algebraically equivalent to valuing a company by determining the present value of its future dividends. However, the model uses accrual accounting numbers instead of dividends. The ROPI model demonstrates that a firm's equity value depends on the present value of its future *residual operating income*.

Residual operating income (ROPI) is an economic concept. It represents the profits a company earns above and beyond what we would expect given the company's assets. A normal return on the company's assets is the expected, or hurdle amount; anything above the hurdle, is "residual." How can profits exceed the hurdle amount? One answer is that the company's managers are able to generate additional value for the firm by their exceptional skills and by their superior management of the company's assets. Another answer is that the GAAP balance sheet does not capture all of the firm's economic assets. For example, a well-known brand name may generate additional sales (and operating profits) for the firm but because the brand name was not purchased, it is not on the company's balance sheet. Thus, expected profits calculated with the balance sheet assets will set a hurdle that is low and the company will earn residual income. Were the brand name actually recorded on the balance sheet, the company would have lower residual operating income.

To calculate ROPI, we compare actual and expected operating income (after tax). Each period, the firm's expected operating income is equal to the value of beginning of the period net operating assets times the firm's

weighted average cost of capital. If a firm's net operating income is exactly equal to the expected income, then the firm has earned no residual operating income. When net operating profits are greater than (less than) the hurdle amount, the firm has positive (negative) residual operating income. Algebraically residual operating income is:

$$ROPI_t = NOPAT_t - (NOA_{t-1} \times r)$$

Where:

- $ROPI_t$ is residual operating income for period t.
- $NOPAT_t$ is net operating profit after tax in period t.
- NOA_t is the value of net operating assets of the firm at time t. Note that the subscript on NOA is lagged by one period (i.e., $t-1$) because we use the net operating assets at the beginning of the period to calculate the expected, or hurdle, operating profit for the period.
- r is the firm's weighted average cost of capital and uses SFAS 157 Level 2 inputs.

To estimate the ROPI model we must forecast the firm's operating results for the rest of its corporate life. These model inputs are SFAS 157 Level 3 inputs. Typically, we forecast near term and long-term performance separately. We might forecast operating income and operating asset levels for the next few years (say, three or four) based on the company's current profitability and expected short-term growth. This period is known as the forecast horizon. The period beyond the forecast horizon is called the terminal period and here we would need to estimate long-run growth rates. In general, firms' long-run growth rates are pretty close to the growth for the economy as a whole because long-run profits are more affected by competitive forces and macroeconomic factors than by the firm's managers. Thus, the value of the firm depends on the operating performance during the forecast horizon and the terminal period. Algebraically, the residual operating income model is:

$$V_0 = NOA_0 + \frac{ROPI_1}{(1+r)^1} + \frac{ROPI_2}{(1+r)^2} + \frac{ROPI_3}{(1+r)^3} + \frac{ROPI_4}{(1+r)^4} + \frac{ROPI_5}{(r-g)(1+r)^4} - Debt_0$$

Where:

- V_0 is the estimated fair value to the firm's equity holders at time 0.
- r is the firm's weighted average cost of capital, which also serves as the discount rate to calculate present values of future amounts.
- g is the appropriate long-run growth rate for residual operating income.
- $Debt_t$ is the value of the firm's debt at time t, net of any nonoperating assets such as marketable securities.

The first term on the right hand side of the model, NOA_0 , is the value of the firms' net operating assets at the date of the valuation. Net operating assets include all the company's assets used to generate ordinary operating income *less* all of the company's operating liabilities. Managers don't generate additional value for shareholders by investing excess cash in nonoperating assets like marketable securities. Operating liabilities include accounts payable and other obligations that the company incurs in the ordinary course of business. Importantly, net operating assets exclude short-term and long-term debt and capitalized leases. Thus, net operating assets do not take into account the firm's financing choices.

The next four terms in the ROPI model represent the additional value that managers are expected to create over the forecast period (that is, the additional operating profits generated from "missing" assets). The numerator in each term is the residual operating income generated each period. Each period's residual operating income is discounted to arrive at the present value of the future ROPI amounts.

The penultimate term in the model is the terminal value and it has three parts. The numerator is the amount of residual operating income expected to be generated in period 5 and each period thereafter for the entire life of the firm. Thus, the numerator is an annuity. The first term in the denominator reflects the assumption that residual operating income will continue to grow at a constant rate, g . Dividing by $(r - g)$ yields the present value of an annuity received in perpetuity. The second term in the denominator calculates the present value of the ROPI annuity at the beginning of period 5 (end of period 4); $ROPI_5$ needs to be discounted back to time 0 by the present value factor for four periods (i.e., $(1 + r_e)^4$).

The last term in the model represents the firm's debt at the valuation date (that is, the nonoperating liabilities). This is the portion of the enterprise value financed by non-owners and is net of any nonoperating assets such as marketable securities or other investments that do not contribute directly to the company's ongoing operating profits.