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BUSINESS VALUATION IN MERGERS AND ACQUISITIONS

This note discusses valuation in the context of business mergers and acquisitions (M&As). It builds on standard methods of business valuation to consider the unique questions arising in an M&A setting. The note focuses on valuation using the discounted cash flow (DCF) approach and the comparable-firm-multiples approach. It presupposes an understanding of the principles of business valuation, such as those presented in "Business Valuation: Standard Approaches and Applications" (UVA-F-1684).[1]

Motivation for M&A

M&As are important corporate events that allow companies to achieve a wide variety of strategic goals. Through acquisitions, firms can expand to new markets (horizontal integration), build a more efficient supply chain (vertical integration), mitigate competition, achieve operational efficiencies, or diversify business-portfolio risk. For each of these motives, the acquirer aims to generate additional economic value that can only be realized by combining two independent businesses. The term for such gains, in which the combined value is greater than the sum of its parts, is "synergy."[2]

Synergies can be categorized by their effect on a firm's financial statements. Cost synergies occur when business combinations generate cost reductions. Economies of scale, for example, occur when increases in the scale of the business result in declining unit-production costs. Revenue synergies occur when business combinations generate revenue enhancement. For example, Microsoft's acquisition of Skype and Walgreen Co.'s acquisition of Drugstore.com were motivated by expected revenue synergies as the acquiring firm sought to enhance the revenue of both businesses through merging. Synergies also result when the buyer brings better management to the target. The acquirer might address the target's operating inefficiencies,

[1] Michael J. Schill, "Business Valuation: Standard Approaches and Applications," UVA-F-1684 (Charlottesville, VA: Darden Business Publishing, 2013).

[2] The term "synergy" comes from the Greek word *synergos* (working together).

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streamline the supply chain, or achieve a leaner management structure. An example of such a takeover was Carl Icahn's bid for military-vehicle maker Oshkosh Corporation, which had been motivated by a desire to replace management and run the business better.[3]

The acquirer might be motivated to purchase businesses that are deemed "undervalued." By purchasing a business for less than its fundamental value, the acquirer effectively achieves a trading gain. For example, Berkshire Hathaway Inc.'s acquisition of Burlington Northern Santa Fe Railway was motivated by a gamble on abnormal future profits for the railroad industry.[4] Such acquisitions represent bold bets on the part of the acquirer, since they maintain that the acquiring management knows more about the target's value than the market's value assessment. Acquisitions can also be motivated by objectives that are not connected with firm value. Management may acquire businesses simply because of the personal gains from managing larger firms.[5] Such "empire-building" objectives tend to destroy value for the acquirer's shareholders. Neither mispricing nor empire-building motivations for a merger are considered in this valuation note.

Considerations Behind the Acquisition Price

In considering an acquisition, the acquirer must assess the value of the target firm and determine how much to offer the target firm's owner(s). In the presence of multiple bidders, the acquisition price becomes a crucial factor in determining the success of an attempted merger or acquisition.

[3] In a letter to Oshkosh shareholders on October 22, 2012, Carl Icahn wrote, "I am a long time shareholder of Oshkosh Corporation ('OSK'). To my dismay I have watched this company continue to overpromise and under deliver. I have completely lost confidence in the management team…We are now offering a clear choice that we view as a win-win for shareholders. Shareholders can win by selling their shares to us in our tender for $32.50. Or, shareholders can win by voting for our slate of directors in our proxy fight to replace the existing board, and implementing a shareholder friendly business strategy—the cornerstone of which is the spinoff of JLG. We will be releasing our full slate of director nominees before this week's deadline."

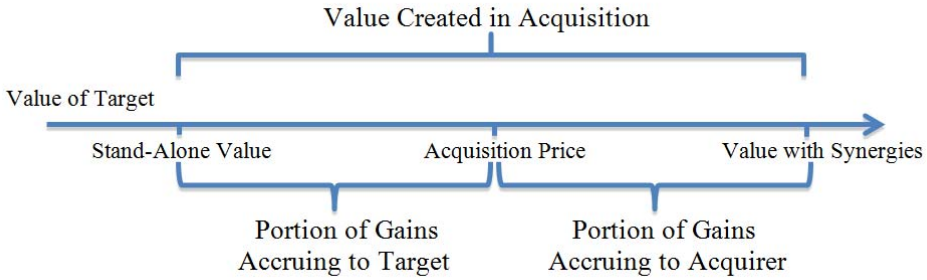
[4] At the time of the acquisition (November 3, 2009), Warren Buffett, Chairman of Berkshire Hathaway, said in an interview with CNBC, "[Railroads move goods] in a cost-effective way and extraordinarily environmentally friendly way…I basically believe this country will prosper and you'll have more people moving more goods 10 and 20 and 30 years from now, and the rails should benefit. It's a bet on the country, basically."

[5] In the *Journal of Economic Perspectives* 2, no. 1 (1988), Professor Michael Jensen writes, "…managers have incentives to expand their firms beyond the size that maximizes shareholder wealth. Growth increases managers' power by increasing the resources under their control, and changes in management compensation are positively related to growth. Moreover, the tendency of firms to reward middle managers through promotion rather than year-to-year bonuses also creates an organizational bias toward growth to supply the new positions that such promotion-based reward systems require."

When acquiring a business, the bidder typically pays a premium over the prevailing market value. The premium, frequently called the "control premium," aims to entice the target's shareholders to sell their company. Assuming that the preoffer market value of the target reflects the stand-alone valuation of the target business, it is typical for the premium to be 40% to 60% of the preoffer value of the target.[6]

Given the magnitude of the control premium, it is important for acquiring firms to carefully consider how the expected gains created through acquisition compare with the cost required to gain control. **Figure 1** illustrates graphically the tradeoffs an acquirer faces in determining a price it is willing to pay for a target corporation.

Figure 1. Partition of value creation for acquisition



Source: All figures and tables were created by the case writer unless otherwise specified.

The stand-alone value is the value of the target company on its own. In an efficient market, it is equal to the target's prevailing market value. From the target's shareholders' perspective, this value establishes the floor to the selling price since the acquisition price must exceed the stand-alone value in order to entice the target's shareholders to sell.

The value with synergies incorporates the expected net gains and costs associated with acquiring the business. The value with synergies establishes the price ceiling from the bidder's perspective. In order for the acquirer to accrue some positive expected gain from the transaction, the acquisition price must fall below the value of the target with synergies.

When the acquisition price is between the stand-alone value and the value with synergies, the transaction creates value for both the acquirer's and the target's shareholders. In any merger negotiation, the buyer and seller must determine what portion of the synergies accrues to the

[6] In a sample of more than 10,000 acquisitions in the United States between 1973 and 2002, the final offer premium was found to be 46% on average. Across various subsamples, the average premium was 43% when the acquirer was a private company and 61% when the target considered the acquisition to be hostile. See, for example, Sandra Betton, B. Espen Eckbo, and Karin S. Thorburn, "Merger Negotiations and the Toehold Puzzle," *Journal of Financial Economics* 91, no. 2 (2009): 164.

target's shareholders and what portion accrues to the acquirer's shareholders. If the control premium paid by the acquirer is close to the firm's value with synergies, then the merger generates no value for the acquirer's shareholders. In this case, the target's shareholders capture all the benefits created by the merger.

The larger the synergies the merger creates, the larger the interval between the stand-alone value and the value with synergies will be. This difference leaves more room for negotiation and increases the likelihood that the two parties will come to a mutually beneficial agreement. A wide interval between the stand-alone value and the postdeal value also creates a large cushion for the parties in case the value of the synergies is overestimated.

Estimation error for the value with synergies is an important concern. There is substantial evidence that acquiring firms tend to overpay for acquisitions, resulting in the target's shareholders benefitting at the expense of bidder shareholders. In other words, acquirers, on average, pay more than the value with synergies. Some attribute this trend to companies' tendency to express synergies in vague strategic or organizational terms.[7] One expert claims that "the easiest way to lose the acquisition game is by failing to define synergy in terms of real measurable improvements in competitive advantage,"[8]—for example, cash flows. Others attribute the bidding firm's tendency to overpay to the "winner's curse," wherein the most optimistic (about the potential synergies) acquirers are willing to pay the highest price for the target and hence win the bidding war to buy the target company.[9] That being said, pinning down realistic estimates of the specific cost and revenue gains of the business combination is an important aspect of successful acquisition analysis.

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[7] Robert F. Bruner, *Applied Mergers and Acquisitions* (Hoboken, New Jersey: John Wiley & Sons, 2004).

[8] Mark Sirower, *The Synergy Trap: How Companies Lose the Acquisition Game* (New York: the Free Press, 1997).

[9] In the *Journal of Economic Perspectives* 2, no. 1 (1988), Professor Richard Thaler describes evidence of the winner's curse in the following way: "Next time that you find yourself a little short of cash for lunch, try the following experiment in your class. Take a jar and fill it with coins, noting the total value of the coins. Now auction off the jar to your class (offering to pay the winning bidder in bills to control for penny aversion). Chances are very high that the following results will be obtained: (1) the average bid will be significantly less than the value of the coins (bidders are risk averse); (2) the winning bid will exceed the value of the jar. Therefore, you will have money for lunch, and your students will have learned first-hand about the 'winner's curse.'" The jar-of-coins example cited above has, in fact, been conducted under experimental conditions by Max Bazerman and William Samuelson (1983). Their subjects were MBA students taking microeconomics classes at Boston University. The objects auctioned off were jars of coins or other objects such as paper clips valued at $0.04 each. Unknown to the subjects, each jar had a value of $8.00. Subjects submitted sealed bids and were told that the highest bidder would receive the defined value of the object less his or her bid. A total of 48 auctions were conducted, four in each of 12 classes. No feedback was provided until the entire experiment was completed. Subjects were also asked to estimate the value of each jar (point estimates and 90% confidence limits), and a $2.00 prize was offered for the best guess in each class. The estimates of the actual values turned out to be biased downward. The mean estimate of the value of the jars was $5.13, well below the true value of $8.00. This bias, plus risk aversion, would tend to work against observing a winner's curse. Nevertheless, the mean winning bid was $10.01, producing an average loss to the winning bidder of $2.01.

DCF Valuation in the M&A Setting

We now consider two tools to estimate the value of specific economic gains in an M&A setting: the DCF approach and the comparable-firm-multiples approach. In discussing these approaches, we focus on the *enterprise value* of the firm, which is equal to the value owned by both the equity holders and debt holders of the business.

The DCF approach is based on the assertion that the value of the merger is equal to the discounted value of the cash flows that the merger generates. It is common to break the cash flow analysis into two parts: a forecast period and a terminal value. The forecast-period free cash flows capture the target firm's postmerger economic costs and revenues. In order to fully capture these acquisition effects, the forecast period comprises the interval over which the firm is in a transition state. The transition state is defined as the period over which the firm is undergoing significant capital or operational transformations or enjoys a temporary competitive advantage. It is typical for analysts to adopt forecast periods of 5 to 10 years. At the end of the forecast period, the business is expected to be in a steady state, which is defined as the period beyond which the firm is expected to operate at competitive margins and grow at a steady rate. Even though the firm may never truly reach steady state, the concept works because steady state is a fair representation of the expectations for the firm's performance. The terminal value uses simple rules to capture the remaining value of the firm associated with the remaining steady-state period. The enterprise value is equal to the sum of the present value of the cash flows over the forecast period and the terminal value. It is common for the terminal value to represent a large portion of the total valuation.

Stand-alone valuation

In a stand-alone DCF valuation, the analyst estimates the target's free cash flows on a stand-alone basis without any of the economic benefits associated with the merger. The relevant discount rate reflects the risk premium associated with the stand-alone target operations. The choice of the terminal growth rate and/or comparable-firm-multiples valuation is driven by the business characteristics of the target irrespective of the acquirer. Estimating the value of a target on a stand-alone basis is informative for a number of reasons. First, it allows the target's shareholders to justify a floor for their negotiations. Second, a stand-alone DCF valuation can be compared with the target's current market value. The analyst can use the target's market value as a benchmark and calibrate the model assumptions to those implied in prevailing securities prices. Such analysis provides insight into the reasonability of the analyst's assessments of the target's future prospects.

Valuation with synergies

Once a stand-alone valuation model is in place, the model can be adjusted to accommodate the incremental costs and benefits associated with the acquisition. These cash flow adjustments might include multiyear synergies such as sales gains due to accessing new markets

or margin improvements stemming from better negotiating power with suppliers. The effects might also include one-time adjustments to cash flows such as incremental equipment purchases or severance payments stemming from trimming the management team. The costs and benefits associated with both the target and acquirer businesses are modeled to estimate the incremental cash flows associated with the deal.

In assessing the merger cash flows, it is useful to remember that mergers commonly disrupt the daily operations of the target. The target's employees and customers may face considerable uncertainty about the effects of the acquisition. Loss of customers and employees is typical. Mergers are also associated with internal restructuring costs incurred by the acquirer. In evaluating these costs, the analyst should be cognizant of whether such events are long- or-short-lived and account for these costs accordingly.[10]

Discount rate

The discount rate used to value the target with synergies should compensate the acquirer for the risk associated with the target's cash flows. Because of this, the target's cost of capital—not the acquirer's—generally better captures the risk premium associated with the risk of the target's cash flows. More precisely, the target's weighted average cost of capital (WACC) is usually a more appropriate discount rate than the WACC of the acquiring firm. This logic can be counterintuitive. Novices tend to want to use the acquirer's cost of capital as the discount rate since managers are using the acquiring firm's capital to make the purchase. To properly account for risk, however, the appropriate discount rate should be determined by where the money is going (i.e., the target) and not where the money is coming from (i.e., the acquirer).

The following example illustrates the flaws of using the acquirer's WACC in valuing a target company. Consider a hypothetical merger in which a toy manufacturer acquires a petrochemical company that produces plastics. The merger allows the toy manufacturer to reduce a major supply cost by owning the supplier (vertical integration). What discount rate should be used to value the acquisition of the petrochemical company? The risks associated with these two companies' cash flows are very different. The toy manufacturer has cash flows that are riskier than the petrochemical company's. The toy manufacturer's revenues are very sensitive to economic conditions: driven mostly by winter-holiday sales, the toy industry typically sees rapid declines in sales during recession years. The unstable revenue base prohibits the toy manufacturer from funding operations with a lot of debt. In contrast, the petrochemical company has lower risk (including beta risk): the petrochemical company has a diversified client base (serves a variety of industries), can pass raw material price increases to clients, and is

[10] It is possible that an acquirer also recognizes synergies as a result of a merger, such as improved margins or higher sales growth. The acquirer can decide to merge some operations with the target and liquidate part of its own operating capacity. Valuing synergies recognized by the acquirer by incorporating them into the target with-synergies cash flows calculation is not straightforward. One may find it easier to build a separate valuation of synergies recognized on the side of the acquiring company. Specifically, one should consider incremental cash flows recognized directly by the acquirer and discount them back using the appropriate acquirer's discount rate.

characterized by rather stable cash flow base. The stability of cash flows allows the petrochemical company to use more debt in financing its operations. Combined, the lower risk premium and higher debt levels suggest that the target's WACC is lower than the acquirer's. In this situation, valuing the petrochemical firm's low-risk cash flows using the toy manufacturer's relatively high WACC leads to an undervaluation of the target.

Depending on the circumstances of individual transactions, an analyst can use different approaches to estimating the discount rate for the target company.

Approach A. One might estimate the discount rate by simply estimating the target's WACC. Using this approach, the analyst estimates the cost of debt and cost of equity for the target firm and then uses the target's current capital structure to calculate the WACC. This approach explicitly assumes that the target's current capital structure is the appropriate or "optimal" capital structure for the firm.

Approach B. If the analyst believes that the target's current capital structure is not optimal (e.g., the target firm's debt level is very different from that of industry peers), the target's current WACC would not be an appropriate discount rate. For example, when the target's current level of debt is below the appropriate optimal capital structure, the acquirer can recognize an additional tax shield by levering the target up upon acquiring it. In this situation, the analyst should reevaluate the core components of the WACC calculations individually: the "optimal" capital structure and the corresponding cost of equity and cost of debt.

A set of comparable companies might be informative in helping to determine the optimal debt structure for a target firm. Specifically, the analyst can evaluate an average or median estimate of comparable companies' debt-to-enterprise-value (or debt-to-equity) ratios. Sometimes an acquirer intends to radically change the target's debt level after the merger. In this situation, the WACC calculations should be adjusted *only if* the analyst believes that the planned capital structure is reflective of the optimal capital structure for the target. With the appropriate capital structure in hand, an analyst can proceed with estimating the new cost of equity and cost of debt.

If the analyst is using the capital asset pricing model (CAPM) to estimate the cost of equity, he or she first needs to estimate the beta of a firm's assets (beta of operations, or unlevered beta: $ß_u$). The following formula (**Equation 1**) is commonly used to obtain an estimate for unlevered beta:

$$ß_u = ß_L \div [1 + (1 - T)\, D/E] \quad (1)$$

where $ß_u$ is the unlevered beta of the target firm's equity, $ß_L$ is the levered beta of the target firm's equity, T is the prevailing marginal tax rate, and D/E is the predeal (actual) debt-to-equity

ratio of the firm.[11] Since one can commonly observe estimates of the levered beta, the tax rate, and leverage, these values are gathered to estimate the unlevered beta for the firm.

To reduce estimation error for beta, the analyst can perform this operation for comparable firms to generate an unlevered beta for each comparable firm. Taking the average or median of the comparable unlevered betas provides an alternative baseline operational risk level of the target ($ß_u$). $ß_u$ should then be relevered to $ß_L^*$, which reflects the appropriate capital structure (D/E^*). This can be done by reorganizing **Equation 1**, but this time using the appropriate capital structure (**Equation 2**):

$$ß_L = ß_u [1 + (1 - T) D/E^*] \quad (2)$$

where D/E^* is the "optimal" capital structure chosen for the target. The revised estimate of equity risk, $ß_L$,is then used to estimate one of the core components of WACC, the cost of equity (K_E).

Finally, the cost of debt (K_D) should reflect both the business risk and the financial risk of the target's cash flows. As such, one can estimate it by observing the cost of debt of companies with similar business risk and financial risk (e.g., leverage ratios D/E^*). The cost of debt may be estimated by observing the prevailing yields of publicly traded corporate bonds.

With all three components in hand, an analyst can proceed to estimate a revised WACC and the target's estimated value with synergies.

Approach C. The method above requires an analyst to estimate all three components of WACC individually. As such, this method is not only theoretically cumbersome, but also introduces multiple sources of estimation error. To reduce estimation error, an analyst can directly examine the WACC of comparable firms and use the average or median value of these individual WACC estimates. The comparable firms may also include the target firm's WACC. This approach incorporates the same fundamentals: a broader sense of prevailing (optimal) capital structure, the respective cost of debt, and so on. With this approach, the analyst not only simplifies the calculations but also reduces the error in estimating the WACC.

It is possible that the target's business risk, and hence beta, could somehow change as a result of the merger. For example, the operating assets of the target firm could be repurposed to produce a different product. In this case, the analyst might choose to make an adjustment based on his or her judgment. Any adjustments, however, should accommodate one key concept: the discount rate should reflect the business and financial risks of the target's cash flows after the merger.

[11] This common model of the relationship between levered and unlevered betas maintains the assumption that debt and tax shields are risk-free. If the analyst is using an alternative model of the cost of equity, it is still important to adjust the values for the effect of leverage on the financial risk of equity cash flows.

Terminal value

The last component of estimating the value with synergies is the terminal value. It can be estimated using the constant-growth-model approach or the comparable-firm-multiples approach. In either case, the terminal value should be based on the cash flows associated with the "with-synergies" financial statements.

When calculating the terminal value using the perpetuity growth model, the analyst should be cognizant that the competitive advantage coming from the synergies (e.g., higher margin or lower net working capital) cannot be sustained in perpetuity. For example, in perpetuity, the competition should level the playing field and bring the target's margins to a competitive equilibrium.

When estimating the terminal value using comparable-firm multiples, the analyst should be cognizant of the potential changes in the target's operations after the merger. It is possible that the set of comparable firms would be different for the stand-alone valuation and the valuation with synergies.

Multiples-based valuation

In a typical enterprise valuation, peer multiples and transaction multiples are used as an alternative method for estimating either the terminal value or the enterprise value of the target company. The multiples are based on ratios of market value to fundamental value, such as the ratio of enterprise value to EBITDA (earnings before interest, taxes, depreciation, and amortization). Peer multiples are based on the prevailing values of comparable firms. In contrast, transaction multiples are based on past M&A transactions and, as a result, incorporate the partial value of synergies or control premium (recall **Figure 1**). The control premium is not present in peer multiples. One needs to be cognizant, however, of the fact that this premium is merger-specific, since the value of synergies is different for different mergers.

Consequently, transaction multiples are more informative in evaluating the value of a target with synergies if the target and the acquirer in the comparable transaction are close to those in the deal under consideration. For example, the strategic buyers can typically recognize more synergies and pay higher premiums than financial buyers (e.g., private equity or portfolio investors). Similarly, the timing of the merger also plays an important role in determining the control premium. During market booms, when cheap debt is abundant, an acquirer might be willing to pay more for a target. Finally, the analyst would benefit from considering a few transaction multiples to eliminate any estimation error due to outliers. Combined, the similarities across mergers, the timing, and the number of comparable transactions contribute to the quality of the value estimates based on transaction multiples.

Even if the set of comparable transactions is ideal for the M&A deal under consideration, one should be careful about agreeing to pay a similar "control premium" relative to a *current* share price. Once the intent to merge is announced, and well before the acquisition price may be

agreed upon, the market price of the target jumps in expectation of the acquisition premium. The magnitude of this change in a target's share price depends on the market estimates of the premium to be paid by an acquirer as well as the market assessment of the likelihood of target and acquirer shareholders coming to an agreement. In fact, the market can even anticipate a merger and adjust the target's price well before the merger negotiations are announced. The analyst accounts for this merger "anticipation" by the market and benchmark his or her value estimates against the value of the target at least 15 to 30 days before merger announcement. This "pre-merger-anticipation" share price can be used as a benchmark for stand-alone valuation as well as a comparable "control-premium" analysis.

Equity value versus enterprise value

In a merger, the acquirer can bid for the assets of the firm (the whole firm), the firm's equity, or for partial-equity ownership. If the acquirer buys the whole firm, it receives all the assets of the target but does not absorb its liabilities. The acquirer would have no obligation to service the premerger debt of the target. It is the target's premerger shareholders who have a responsibility to repay their debt holders out of the acquisition price paid by the acquirer. Under this scenario, the acquirer pays the price equivalent to the enterprise value of the target.

The merger can also result in transferring the equity of the target, in full or partially (e.g., 51%), to the acquirer. The equity value calculations are straightforward. The enterprise value is the value of cash flows available to all claimholders in the business. If the business is funded with debt and equity, the enterprise value (V) is equal to the value of the debt (D) plus the value of equity (E) (**Equation 3**):

$$V = D + E \tag{3}$$

To calculate the implied equity value, one simply subtracts the value of claimholders of the debt from the total enterprise value (**Equation 4**):

$$E = V - D \tag{4}$$

For publicly traded targets, the implied share price is equal to the equity value divided by the number of shares outstanding.

An Example of DCF Valuation

We will now review the details of an example of an acquisition valuation. Suppose that a multinational food and beverage company, International Food, is considering making a bid for publicly-traded nut grower, Earthy Nut. In considering how much to bid for Earthy Nut, International Food starts with a cash flow forecast of the stand-alone business drawn up by International Food's investment bankers and shown in **Table 1**.

Table 1. Stand-alone valuation of Earthy Nut.

		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
1	Revenue Growth	0.0%	2.5%	4.5%	6.5%	5.5%	4.5%
2	Gross Margin	32.9%	33.0%	34.0%	35.0%	36.0%	36.0%
3	SG&A	25.4%	25.0%	25.0%	25.0%	24.0%	23.0%
4	Depreciation/PPE	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
5	NWC Turnover	4.4	5.0	5.2	5.5	5.8	6.0
6	PPE Turnover	1.8	1.8	1.9	2.0	2.0	2.0
7	Tax Rate	35%					
8	Discount Rate	8.0%					
9	Terminal Growth Rate	4.5%					

		Calculation	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
10	Revenue		140.0	143.5	150.0	159.7	168.5	176.1
11	COGS	12 − 10	94.0	96.1	99.0	103.8	107.8	112.7
12	Gross Profit	10 × 2	46.0	47.4	51.0	55.9	60.7	63.4
13	SG&A Expense	10 × 3	35.5	35.9	37.5	39.9	40.4	40.5
14	Depreciation	18 × 4	8.0	8.0	8.0	7.9	8.0	8.4
15	Operating Profit	12 − 13 − 14	2.5	3.5	5.5	8.1	12.2	14.5
16	NOPAT	15 (1 − 7)	1.6	2.3	3.6	5.3	8.0	9.4
17	Net Working Capital	10 ÷ 5	32.0	28.7	28.8	29.0	29.0	29.3
18	Net PP&E	10 ÷ 6	80.0	79.7	78.9	79.9	84.2	88.0
19	Return on Capital	16 ÷ (17 + 18)	1.5%	2.1%	3.3%	4.8%	7.0%	8.0%
20	NOPAT	16		2.3	3.6	5.3	8.0	9.4
21	Add: Depreciation	14		8.0	8.0	7.9	8.0	8.4
22	Less: Capital Expenditures	Change in 18 + 14		7.7	7.2	8.8	12.4	12.2
23	Less: Increase in NWC	Change in 17		(3.3)	0.1	0.2	0.0	0.3
24	Free Cash Flow	20 + 21 − 22 − 23		5.9	4.2	4.1	3.5	5.3
25	Year 6 Steady-State FCF	20 (1 + 9) − (17 + 18) 9						4.5
26	Terminal Value	25 ÷ (8 − 9)						128.9
	Discounted Cash Flow			5.4	3.6	3.3	2.6	91.3

Enterprise Value	106.2

In considering a discount rate, the bankers estimate the WACC of three comparable nut growers: Earthy Nut (the target) at 8.2%, Quirky Nut at 7.9%, and Normal Nut at 8.0%. (See the calculations in **Table 2**.) Although International Food's WACC is estimated to be considerably lower at 6.2%, this rate is not used since the cash flows for International Food are substantially less risky than those of the nut growers. Since the three nut growers were considered to be good comparables, the bankers chose to use the average discount rate of 8.0% to reduce the estimation error that exists in the single estimate of 8.2%. Despite the fact that the resulting rate is significantly higher than International Food's WACC (6.2%), the chosen discount rate will more fairly value the cash flows as the risk of a diversified foods producer appears to be lower than that of the nut growers.

Table 2. Estimates of weighted average cost of capital.

10-Year Government Bond Yield					4.7%
Market Risk Premium					5.0%
	International Food	Earthy Nut	Quirky Nut	Normal Nut	
Cost of Debt	5.8%	6.1%	5.9%	6.1%	
Tax Rate		35%	35%	35%	
Beta	0.8	1.1	0.9	1.2	
Cost of Equity	8.7%	10.2%	9.2%	10.7%	
Debt/Value	0.50	0.32	0.25	0.40	
WACC	6.2%	8.2%	7.9%	8.0%	
				8.0%	

Based on the stand-alone DCF analysis, Earthy Nut's stand-alone enterprise value was estimated at $106 million. This valuation is very close to the calculated $104 million valuation of the public capital markets, as Earthy Nut's equity market value is $71 million ($20.20 per share times 3.5 million shares outstanding) and the book value of the debt is $33 million.

International Food believes that the acquisition creates some improved cost efficiency for Earthy Nut. In particular, being part of the International Food network improves the efficiency of Earthy Nut's working capital management and its marketing and distribution operations. In **Table 3**, these synergies are incorporated into the valuation model used to estimate Earthy Nut's value with synergies. In the merger model in **Table 3**, to account for postmerger cost efficiencies, the SG&A/sales ratio is reduced with respect to the stand-alone valuation model by two percentage points declining to a half percentage point by the terminal year. The merger also anticipates improving accounts receivable and inventory management such that net working capital turnover is anticipated to increase by one unit of turnover. It is assumed that all of the merger synergies are expected to be realized within the five-year forecast period. In Year 5, the effect of the cost efficiency is to increase the expected return on capital from 8.0% to 8.8%.

Despite the fact that Earthy Nut will become part of International Food after the merger, International Food's WACC is not used in the valuation. International Food is a diversified food company and its WACC is not reflective of Earthy Nut's business and cash flow risks, even after the merger. By focusing on a WACC that matches the target rather than the source of capital, the analyst properly prices the cash flow risks. Consistent with this notion, the WACC used to value Earthy Nut with synergies is 8.0%—exactly the same as the WACC used in valuing the stand-alone company. This is because the target's business risk would not change after the acquisition. It would still be a nut grower—only now operating within an international food conglomerate.

Table 3. Valuation of Earthy Nut with synergies.

		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
1	Revenue Growth	0.0%	2.5%	4.5%	6.5%	5.5%	4.5%
2	Gross Margin	32.9%	33.0%	34.0%	35.0%	36.0%	36.0%
3	SG&A	25.4%	**23.0%**	**23.0%**	**23.0%**	**22.5%**	**22.5%**
4	Depreciation/PPE	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
5	NWC Turnover	4.4	**6.0**	**6.2**	**6.5**	**6.8**	**7.0**
6	PPE Turnover	1.8	1.8	1.9	2.0	2.0	2.0
7	Tax Rate	35%					
8	Discount Rate	8.0%					
9	Terminal Growth Rate	4.5%					

		Calculation	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
10	Revenue		140.0	143.5	150.0	159.7	168.5	176.1
11	COGS	12 − 10	94.0	96.1	99.0	103.8	107.8	112.7
12	Gross Profit	10 × 2	46.0	47.4	51.0	55.9	60.7	63.4
13	SG&A Expense	10 × 3	35.5	33.0	34.5	36.7	37.9	39.6
14	Depreciation	18 × 4	8.0	8.0	8.0	7.9	8.0	8.4
15	Operating Profit	12 − 13 − 14	2.5	6.4	8.5	11.3	14.8	15.3
16	NOPAT	15 (1 − 7)	1.6	4.1	5.5	7.3	9.6	10.0
17	Net Working Capital	10 ÷ 5	32.0	23.9	24.2	24.6	24.8	25.2
18	Net PP&E	10 ÷ 6	80.0	79.7	78.9	79.9	84.2	88.0
19	Return on Capital	16 ÷ (17 + 18)	1.5%	4.0%	5.4%	7.0%	8.8%	8.8%
20	NOPAT	16		4.1	5.5	7.3	9.6	10.0
21	Add: Depreciation	14		8.0	8.0	7.9	8.0	8.4
22	Less: Capital Expenditures	Change in 18 + 14		7.7	7.2	8.8	12.4	12.2
23	Less: Increase in NWC	Change in 17		(8.1)	0.3	0.4	0.2	0.4
24	Free Cash Flow	20 + 21 − 22 − 23		12.5	6.1	6.0	5.0	5.8
25	Year 6 Steady-State FCF	20 (1 + 9) − (17 + 18) 9						5.3
26	Terminal Value	25 ÷ (8 − 9)						151.3
	Discounted Cash Flow			11.6	5.2	4.8	3.7	106.8

Enterprise Value	132.0

Based on the DCF analysis with synergies, Earthy Nut's enterprise value, as part of International Food, is estimated at $132 million (value with synergies) or $25.8 million above the stand-alone valuation. The existence of synergies makes the merger an attractive proposition for both sides of the transaction: International Food can offer an acquisition price well above Earthy Nut's current market value ($104 million) and still recognize a positive gain. To get a sense for the source of the value creation, one can sequentially eliminate the synergy gains included in the merger valuation. If one eliminates the margin gains, the enterprise value drops to $114 million. If one also eliminates the working capital gains, the enterprise value returns to the stand-alone value of $106 million. The valuation model indicates that the margin gains are worth $18 million and the working capital gains are worth $8 million. In order to realize the synergy gains in the merger, it is imperative that the management of the combined entity realizes these two operational efficiencies.