1) Introduction

Perhaps the most exciting part of all of finance is the set of ideas surrounding valuation of corporations. It is exciting not only because such valuations form the basis for most mergers and acquisitions (M&A) and corporate control activity, but also because it integrates much of the theory of finance. This is where ‘Wall Street’ meets ‘Main Street.’

During the period 1981-mid 2002, M&A activity totalled nearly $10 trillion in the US alone, and the average premium paid in a typical acquisition was about 25%. In other words, almost $2 trillion went to shareholders of acquired corporations in the US as profits! A substantial portion of this dollar value was predicated, for better or worse, on corporate valuation tools such as the ones we’ll talk about below.

The underlying ideas behind corporate valuation are no different from those relating to the valuation of any asset: we want to find the: (i) “correct” set of cash flows; (ii) “correct” cost of capital—i.e., discount rate; and (iii) the PV, where our decision will be to go ahead with the transaction presumably only if the price paid is lower than the PV (or, the NPV of the transaction is greater than zero).

All of this, however, requires that we have to make assumptions—assumptions are unavoidable because we are dealing with our expectations of the future. But we can say three things in favor of “assumptions”: (i) at least, they are honest (if explicit); (ii) they give us a basis to agree or disagree; (iii) they give us—and those who lend money to us—a benchmark against which to judge how well we are doing relative to what we expected to do (maybe this is the reason why people avoid making assumptions).

In addition to the valuation itself, there are a whole host of other layers that determine the success or failure of mergers and acquisitions, and the price that is paid—these include factors such as the nature of the bidding contest or the bargaining game between the bidder and the target, the role of “poison pills” and anti-takeover defenses, the role of financial market participants (e.g., risk arbitragers), the structure and styles of corporate governance, etc.

2) The Structure of Corporate Valuation Exercises

Assume that you are contemplating some transaction—e.g., an acquisition, a merger, a leveraged buyout (LBO), etc.—with respect to some target firm. The first thing you want to do, prior to undertaking the transaction, is to try to get a benchmark value of the target on an “ongoing” basis—i.e., you want to try to get an answer to the questions, “Does the market currently appear to undervalue or overvalue the firm?” and, “If so, why?”
The next step is to think through and make specific assumptions regarding what you plan to do with the target once you have undertaken the transaction: i.e., what is the value of the synergies that you expect to derive from the transaction, and what are the specific assumptions you need to make to achieve these synergies?

Assumptions concerning synergies may be made on both the operating and the financial sides of the target’s balance sheet.

Examples of the kind of assumptions on the assets side (these are only illustrative) include things such as reducing excess cash, selling off “non-strategic” assets, improving operating efficiencies, increasing asset turnovers, achieving synergies through shared distribution channels, closing down plants or laying off employees, overhead reductions, etc.

Examples of the kind of assumptions on the liabilities side include things such as taking on more debt, reducing debt, issuing more stock, or more generally any capital structure changes you want to make after the transaction goes through.

The assumptions on the assets side are far more important than those on the liabilities side—if you are serious about the “real” or operating synergies and can convince others that is the case, you can always find the money. It is then often only a question of making a set of capital structure decisions that are relevant to the type of asset being acquired.

Thus summarizing, the structure of a typical corporate valuation exercise is as follows:

```
VALUATION

Pre–transaction
(What is it worth on an ongoing basis?) + Post–transaction
(What synergies can I bring to it?)

Operating changes
(i.e., increases in cash flows from synergies)

Financial changes
(i.e., capital structure and cost of capital for the transaction)
```

What are the commonly used valuation methodologies?
3) Commonly Used Corporate Valuation Approaches

There are four commonly used corporate valuation approaches:¹

i) Premiums paid analysis (relative valuation)
ii) Valuation based on share price multiples (relative valuation)
iii) Valuation based on replacement/breakup value of assets
iv) Valuation based on discounted cash flow (DCF) techniques.

Premiums paid analysis looks at the percentage excess price paid to acquire a target firm’s stock in transactions of similar types in similar industries. For instance, if there have been other acquisitions in a particular industry, and you are thinking of a purchase in the industry, you should look at the premium that other acquirers have paid for firms in this industry.

The main advantage of this method is that it is simple (you probably should do it anyway, just to benchmark yourself relative to your competitors). But it is also pretty crude, and subjective. The sources of subjectivity with this approach include: (i) What do you use as the appropriate pre–transaction price—i.e., what should you use as the “base price” to assess premiums paid? (ii) What if the stock market behaved differently at different points in time, and these comparable acquisitions took place at various points in time? (iii) What if other acquirers are bringing synergies that are different from the ones you expect to bring to the acquisition?

Valuation based on share price multiples looks at a few typical ratios: The common ones are the price-to-earnings ratio (P/E), price-to-EBIT ratio (P/EBIT), price-to-EBITDA ratio (P/EBITDA), the price-to-cash flow ratio (P/CF), and the market-to-book ratio (M/B). The idea is to look at relevant multiple for other firms in the industry (or other similar acquisitions), and use an “average” or “median” in your valuations. This approach is typically used to get a back-of-the-envelope benchmark value of what the target firm is worth on an ongoing basis. Again, it is extremely easy to do, and you should probably do it anyway.

We can similarly use the other ratios to get additional benchmarks. Note, however, that this approach is also crude, and suffers from the following kinds of problems: (i) Earnings numbers and other accounting numbers can be distorted by the accounting rules used by particular firms; (ii) Earnings numbers are affected by the debt-to-equity ratios; this can often vary quite a bit within an industry (although, on average, not as much as across industries).

¹ There is another increasingly commonly used method, the method of ‘real options valuation.’ We will not deal with it in this Note. We will also not deal with the ‘rules-of-thumb’ approaches to valuation that are used to value small businesses, since there are too many of them across too many industries (however, such rules of thumb are quite similar to relative valuation techniques that use relevant multiples of comparable transactions).
Valuation by looking at the replacement or breakup value means that you sit down with a good assessor and/or accountant and try to figure out the market price of every single major item on the assets side of the balance sheet. You sum it all up, subtract the value of all interest-bearing debt, and then divide the remaining value (the “net asset value”) by the number of shares outstanding. This will give you price per share for the firm’s assets.

This approach is useful if you think that the firm has a lot of undervalued assets on its balance sheet (e.g., land, buildings, investments, etc., that may be carried at historical cost on the balance sheet, but may have a much higher market value if sold).

While all three of the above approaches are useful—and the first two can be done on the back of an envelope—you should always undertake a credible DCF analysis in any serious exercise on corporate valuation. There are four DCF methods that are commonly used:

- The Adjusted Present Value Method (APV)
- The Flow–to–Equity Method (FTE)
- The Weighted Average Cost of Capital Method (WACC)
- The Economic Value Added Method (EVA).

But, before we examine these methods, a quick recap two basic cash flow formulae:

\[
FCF = \text{Unlevered free cash flows} = \text{EBIT} \times (1-t) + \text{Depreciation} - \text{Capex} - \Delta \text{NWC}
\]

\[
LFCF = \text{Levered free cash flows to equity} = \text{Net Income} + (1-\pi) \times (\text{Depreciation} - \text{Capex} - \Delta \text{NWC}), \text{ where } \pi \text{ is the firm’s debt-to-capital ratio.}
\]

4) APV, FTE, WACC, and EVA: A Summary Description

- The APV (“adjusted present value”) approach values corporations by pieces. The basic piece is the value of the firm as though it is an all-equity firm; on top of that, if the firm has debt, you add a piece that captures the PV of the tax shield benefits of debt; if there is risk of financial distress, you subtract a third piece, the PV of financial distress costs and so on.

The APV formula for a firm with positive debt capacity is simply:

\[
APV = PVE + NPVF
\]

where,

\[
PVE = \text{Value of an all-equity firm, calculated using the cash flows to unlevered equity (i.e., FCF, or as through the firm is all-equity financed) and the unlevered cost of equity for the firm (i.e., based on the asset beta, and not equity beta, of the firm)}
\]

\[
NPVF = \text{NPV of the effects of financing. The most common one is that associated with the tax shield benefits of debt (i.e., } t_cD, \text{ where } t_c \text{ is the corporate tax rate, } D \text{ the face value of the long term debt, and the debt is assumed to be perpetual)}
\]
• The **FTE ("flow-to-equity") approach** estimates the cash flows due to levered equity, and discounts the cash flows to levered equity at the cost of equity applicable to a levered firm. Thus, it involved three steps:
  1) Estimate the free cash flows to levered equity;  
  2) Estimate the levered cost of equity ($r_e$);  
  3) Compute the PV of equity using the levered free cash flows and the levered cost of equity.

• The **WACC ("weighed average cost of capital") approach** estimates the cash flows due to unlevered equity (FCF, as with the APV calculation) and discounts these cash flows to unlevered equity at the weighted average cost of capital of the firm (considering the after-tax cost of debt if interest payments are tax deductible), where:
  \[ WACC = r_e \left( \frac{E}{E+D} \right) + (1-t_c) r_d \left( \frac{D}{E+D} \right) \]
  where $E$ is the market value of equity, $D$ is the market value of debt, $r_e$ is the cost of levered equity (i.e., based on the equity beta), $r_d$ is the cost of debt, and $t_c$ is the corporate tax rate.

• The **EVA ("economic value added") approach** calculates the EVA for each period, discounts this EVA at the WACC, and thereby directly calculates the NPV of the target firm value (if the PV of the target firm is sought, the initial capital should be added to the NPV). EVA is defined as:
  \[ EVA = EBIT \times (1-t) - \text{Capital Charges} \]
  where EBIT is the earnings before interest and taxes, calculated as EBIT*(1–t) (sometimes also called the ‘NPAT’ or net operating profit after taxes), and Capital Charges are the total capital invested (beginning-of-period gross PPE plus net working capital) in the target multiplied by the target’s WACC.

• If done right, all four approaches should give us the same answer.

5) A Simplified Example of Equivalence of APV, FTE, WACC, and EVA Methods

• Suppose a firm has an acquisition opportunity that requires an initial investment of $10,000,000, with expected target EBIT of $3,030,303 per year forever. The target has perpetual debt at 10% (call it $r_d$), with a present value of $5,000,000 (call it D; therefore, the equity, E, is also $5,000,000)).

Assume that the corporate tax rate is 34% (call it $t_c$). For simplicity, assume that the target’s depreciation equals its net capital expenditures plus changes in net working capital: In this situation, the target’s unlevered free cash flow is simply equal to EBIT*(1–t). Assume a the risk free rate of 7.4%, an asset beta of 1.8, and market risk premium (MRP) of 7%. (The unlevered cost of equity for this firm is then $r_a = 7.4\% + 1.8*7\% = 20\%$.
• The APV Valuation

1) The unlevered cash flow of this firm—i.e., the cash flow if the firm is considered an “all-equity” firm—is given by

\[ \text{EBIT} \times (1 - t_c) = (3,030,303)(1 - 0.34) = 2,000,000 \]

2) At a 20% unlevered cost of equity, this perpetual cash flow will be valued at

\[ \frac{\text{EBIT} \times (1 - t_c)}{r_a} = \frac{2,000,000}{0.20} = 10,000,000 \]

3) The unlevered NPV of this project is

\[ 10,000,000 - 10,000,000 = 0 \]

4) The NPV associated with financing (NPVF) of this project is

\[ t_c \times D = (0.34)(5,000,000) = 1,700,000 \]

5) Therefore, the NPV of the project, according to the APV approach, is

\[ 0 + 1,700,000 = 1,700,000 \]

• The FTE Valuation

1) First estimate the cash flow to levered equity:

\[ (\text{EBIT} - r_d \times D)(1 - t_c) = (3,030,303 - (0.10)(5,000,000))(1 - 0.34) = 1,670,000 \]

2) Then estimate the levered cost of equity. This first involves relevering the asset beta at the appropriate capital structure (in market value terms) to calculate the equity beta, \( \beta_e \), and applying CAPM to this \( \beta_e \). The formula for this is:

\[ \beta_e = \beta_a + (1 - t_c)(D/E)(\beta_a - \beta_d) \]

However, in order to do this, we first have to derive the debt beta, \( \beta_d \), from the data provided. Since we are told that the cost of debt is 10%, \( r_f = 7.4\% \), and MRP = 7%, we can back out the \( \beta_d \) from CAPM as:

\[ \beta_d = \frac{(r_d - r_f)}{\text{MRP}} = \frac{(10\% - 7.4\%)}{7\%} = 0.3714 \]

We can now calculate the equity beta:

\[ \beta_e = 1.8 + (1 - 0.34)(50/67)(1.8 - 0.3714) = 2.5036 \]

2) Note that, since Depreciation is assumed to equal capital expenditure plus change in net working capital, \( (1 - \pi)(\text{Depreciation} - \text{Capex} - \Delta\text{NWC}) = 0 \).
Applying CAPM to this equity beta:

\[ r_e = 7.4\% + 2.5036 \times 7\% = 24.925\% \]

(Where did the D/E ratio of 50/67 come from? It is a bit of a fudge. Note that the D/E ratio should be based on the value of the firm’s assets after taking on the project, which, in turn, means that we must already know its PV. From the APV analysis, we know that the NPV of the project is $1,700,000, on top of the initial equity base of $5,000,000. Therefore, the total project value must be $11,700,000 (= 5,000,000 debt + 5,000,000 equity + 1,700,000 NPV). Thus, the D/E ratio is 50/67).

3) Therefore, the NPV of the project, according to the **FTE approach** is

\[
\frac{1,670,000}{0.24925} - \text{initial equity investment} = \frac{6,700,000}{0.24925} - 5,000,000 = \frac{1,700,000}{0.24925}
\]

(Note with the FTE approach that, since we are directly valuing the cash flow to levered equity, we should take out only the investment made by equityholders).

• **The WACC Valuation**

1) Estimate the free cash flow to unlevered equity: we already did this earlier, and saw that it is $2,000,000.

2) Estimate the weighted average cost of capital:

\[
\text{WACC} = r_e \left[ \frac{E}{(E+D)} \right] + (1-t_c) r_d \left[ \frac{D}{D+E} \right] = 0.24295 \times \frac{67}{117} + (1 - 0.34) \times (0.1) \times \frac{50}{117} = 17.094\%
\]

3) The value of the levered firm is \(1,000,000/0.17094 = 11,700,000\)

4) Therefore, according to the **WACC approach**, the NPV of the project is \(11,700,000 - 10,000,000 = 1,700,000\)

• **The EVA Valuation**

1) First, estimate the EBIAT. In this instance, given the no-growth firm, the per-period EBIAT = EBIT \times [1 - t_c] = $2,000,000

2) Estimate the WACC—we have already done that: it is 17.094%

3) Calculate the capital charges. In this case, the investment required is $10,000,000 (it does not change from period to period) and therefore, the per-period capital charges are \(10,000,000 \times 0.17094 = 1,709,400\)
4) Calculate the EVA:

\[ \text{EVA} = \text{EBIAT} - \text{Capital Charges} = 290,600 \]

5) Calculate the PV of the stream of EVA discounted at the WACC, to get the NPV. The NPV from using the EVA approach (after adjusting for rounding errors) is:

\[ \text{NPV} = \frac{290,600}{0.17094} = 1,700,000 \]

- “Done right,” all four approaches should give us the same answer.

6) Which Method is “Right?” Which One Should You Use?

- All four methods are, of course, “right.”
- But, note from the example above that:
  - The APV method is more convenient to use when you know (or are willing to make assumptions about) the dollar level of debt for the target company.
  - The FTE, EVA, and WACC methods are more convenient to use when you know (or are willing to make assumptions about) debt/equity ratio for the target company.

7) Some Other General Issues to Keep in Mind in Corporate Valuation

- With the APV, WACC, and EVA methods of valuation, the calculated PV is the enterprise value, or the value of the whole firm. If we want to derive just the value of equity, we have to subtract the initial level of all interest-bearing debt from this enterprise value (Some analysts subtract a ‘net debt’ value, i.e., the value of debt net of cash; note that, if we are doing this, we have to make sure that changes in cash were not included in the calculation of change in net working capital). With the FTE method of valuation, the calculated PV is the value of equity in the firm.
- All estimates—cash flows, discount rates (i.e., beta, costs of equity, cost of debt), tax rate, etc.—relate to the project, firm, or target being acquired, and not to that of the acquiring firm.
- If the target is in the same line of business and will have same capital structure and same marginal tax rate, only then is it OK to use the cost of capital of the acquiring firm.
- If the target is in a different line of business, then estimate betas, costs of capital etc., for that firm (based on its stock prices). If the target is not a publicly traded firm, then use the cost of capital for ‘comparable’ firms in similar lines of business as the target.
- If computing betas based on other firms, make sure to: (i) unlever the betas based on the D/E ratios of those firms, to get the asset beta; (ii) take the average unlevered (asset) beta for the group of comparable firms; (iii) then, based on assessment of the appropriate target D/E ratio (in MV terms), relever the betas to get the appropriate WACC.
8) The Market for Corporate Control and Its Terminologies

- The Anglo-American system has an active market for corporate control, where the essence of the market is the types of valuation techniques we talked about above. Of course, valuation is only the necessary part. There are lots of other layers that creep into the determination of the ultimate price paid to acquire the target—these include the bargaining game between the bidder and the target, the types of antitakeover provisions in the target’s arsenal, whether the bid is likely to be contested by other bidders, etc.

- All corporate control activity is based on one of three categories of beliefs:

  1) The CEO believes that $2+2 > 4$; this is the basis for mergers, acquisitions, tender offers, joint ventures, etc..

  2) The CEO believes that $3-1 > 2$; this is the basis for divestitures, asset sales, spin-offs, equity carveouts, etc..

  3) The CEO believes that $3+1 > 2+2$; this is the basis for exchange offers, ownership restructurings, share repurchases, going private, LBOs, etc..

- Here are some (very broad!) definitions of commonly used words and phrases in relation to corporate control activities:

  **Merger:** An economic transaction that forms one entity from two or more previous ones; there is typically an “acquirer” and an “acquired firm.” It can be vertical, horizontal, or conglomerate.

  **Tender Offer:** The bidder takes the initiative of making a monetary offer to shareholders of the target, with or without the approval of the target’s management. It can be “friendly” or “hostile.” Usually, it is hostile.

  **Proxy Contest:** An outside group seeks to obtain representation or control over the target’s board of directors. Usually, not considered friendly.

  **Spin-offs:** A spin-off creates a new legal entity whereby shares of the spun-off entity are distributed on a pro-rata basis to the existing shareholders of the parent company.

  **Split-offs:** A portion of the existing shareholders receive shares in a subsidiary in exchange for the parent company’s stock. Thus, the new shareholders own the subsidiary, and not the parent.

  **Split-ups:** The entire firm is broken up into a series of split-offs, so that the parent is no longer alive—only the offspring survive.

  **Divestiture:** Sale of a portion of the firm to an outsider. Cash comes into the firm. The reverse of an “acquisition.”
Equity carve-out: Sale of a portion of the firm via a new stock offering to a group of outsiders; in other words, a new set of shareholders own a portion of the previously existing firm.

Exchange offer: Basically, an exchange of one type of paper for another; e.g., debt-for-equity, equity-for-convertibles....

Equity Repurchase: Basically, a “self-tender offer” for a portion of the firm’s stock.

Going private: The equity of a previously publicly traded firm is bought by a small group of investors. The firm is no longer subject to the purview of the SEC. If the firm’s management does it, it is called an “MBO” (a management buyout); if non-management is involved and a lot of debt is involved (sometimes up to 90% of the firm’s capital), it is called an “LBO” (a leveraged buyout).

Antitakeover amendments: These are changes to the corporate bylaws that attempt to make a takeover more difficult or expensive. These include “supermajority provisions” (where, say, substantially greater than 50% of the shareholders have to agree of an acquisition), staggered terms for directors (which can make proxy contests more difficult), golden and tin parachutes (which award large “change of control” severance payments to incumbent management), “poison pills” (which give management the right to issue new equity at substantial discounts to a ‘non-controlling’ group of shareholders when a ‘controlling’ shareholder that the management does not like acquires 15% - 20% of the company), incorporation in the state of Delaware (which has a set of laws friendly to incumbent management), etc.

- The following page contains summary evidence from well–known event studies that have looked at the stock price impacts of many of these activities.
A (BROAD) SUMMARY OF EMPIRICAL RESULTS FROM STUDIES OF ABNORMAL RETURNS AROUND ANNOUNCEMENTS OR EVENTS

<table>
<thead>
<tr>
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<th>Abnormal Returns Upon Announcement</th>
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<td>Merger Studies</td>
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<tr>
<td>1. Acquired firms</td>
<td>20%</td>
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<td>2. Acquiring firms</td>
<td>1-2%*</td>
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<tr>
<td>Tender Offer Studies</td>
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<tr>
<td>1. Acquired firms</td>
<td>35%</td>
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<td>2. Acquiring firms</td>
<td>1-4%</td>
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<td>Sell–Offs</td>
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<td>1. Spinoffs</td>
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<td>2. Divestitures</td>
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<td>Sellers</td>
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<td>Buyers</td>
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<td>3. Equity carve–outs</td>
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<td>Premium Buybacks</td>
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<tr>
<td>1. Single blocks from outsiders</td>
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<td>2. From insiders or small shareholdings</td>
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<td>3. Sellers of single blocks</td>
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<td>Standstill Agreements</td>
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<td>(non–participating shareholders)</td>
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<tr>
<td>Leveraged Buyouts</td>
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*Not statistically significant