Merger Model Overview

The **merger model** tells you what happens when one company acquires another company.

Usually, the buyer makes an offer to acquire the seller at a **premium** to the seller’s current value in hopes that:

1. The deal is **accretive** – it increases the buyer’s Earnings Per Share (EPS); and / or
2. The deal is **strategic** and will give the buyer an advantage in the market.

We can divide the **merger model** into an 8-step process:

1. **Calculate** the purchase price.
2. **Determine** the financing for the deal – cash, debt, stock, or a mix of those.
3. **Project** the financial profiles and income statements of the buyer and the seller.
4. **Combine** the buyer and sellers’ income statements.
5. **Calculate** Goodwill and allocate the Purchase Price.
6. **Combine** the balance sheets and adjust for acquisition effects.
7. **Adjust** the combined income statement for acquisition effects.
8. **Calculate** accretion / dilution and create sensitivity tables.

After we finish these 8 steps, you’ll learn about **important Rules of Thumb for Merger Models** and how to tell at a glance whether a deal is accretive, dilutive, or neutral based on a few simple guidelines.

**Step 1: Calculate the Purchase Price**

There’s no “formula” to determine the purchase price – it depends on the valuation of the seller, how much the buyer wants to pay, and how much value the seller can add.

The buyer must pay a **premium** to acquire the seller because otherwise no one would ever sell – if your company is currently trading at $20.00 / share and the buyer offers $20.00 per share or even $21.00 per share, you don’t exactly have a compelling reason to do a deal.

You might look at the following criteria when determining the purchase price:

- Public comps, precedent transactions, and a DCF to **value** the seller.
- Recent **premiums** – what companies have paid over sellers’ share prices to acquire them (usually in the 15-30% range).
• How much in synergies the deal will generate – can the buyer cut costs or generate extra revenue as a result of acquiring the seller?
• The maximum amount the buyer can pay without reducing its EPS (dilution).

If the seller is a public company the price is quoted on a per-share basis, e.g. “They offered $30.00 per share to acquire Company X”; if it’s private you list it as the lump-sum amount for the entire company.

To determine the total price for the entire company, you multiply the per-share offer price by the shares outstanding, taking into account dilution from options, warrants, and other securities.

For example, if the seller has 100 million shares outstanding, 10 million options with an exercise price of $5.00 and the buyer offers $10.00 per share to acquire them, the purchase price would be $10.00 * (100 million + 5 million) or $1.05 billion.

That 5 million number comes from applying the Treasury Stock Method (see the related lessons) to the 10 million options outstanding.

Here’s an example calculation from the model covered in the course:

<table>
<thead>
<tr>
<th>Purchase Price:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Shares Outstanding</td>
<td>568,900</td>
</tr>
<tr>
<td>Basic Equity Value</td>
<td>$42,668</td>
</tr>
<tr>
<td>Diluted Shares Outstanding</td>
<td>573,986</td>
</tr>
<tr>
<td>Diluted Equity Value</td>
<td>$43,049</td>
</tr>
<tr>
<td>Less: Cash &amp; Investments</td>
<td>$2,498</td>
</tr>
<tr>
<td>Plus: Debt</td>
<td>$0</td>
</tr>
<tr>
<td>Plus: Minority Interest</td>
<td>$0</td>
</tr>
<tr>
<td>Plus: Preferred Stock</td>
<td>$0</td>
</tr>
<tr>
<td>Plus: Other Liabilities</td>
<td>$0</td>
</tr>
<tr>
<td>Enterprise Value</td>
<td>$40,551</td>
</tr>
</tbody>
</table>

In a merger model, we only use the Enterprise Value to calculate transaction multiples such as the Purchase EV / EBITDA or Purchase EV / Revenue.

Otherwise, we care more about the Diluted Equity Value because that’s what we use to determine how much in funds the buyer needs to raise to acquire the seller.

If the seller has debt that gets refinanced (paid off) in the deal, then we need to add that refinanced debt to the Diluted Equity Value to determine how much the buyer is really paying to acquire them.

Step 2: Determine the Financing for the Deal

There are 3 ways to fund the acquisition of another company: cash, stock, or debt.

• **Cash:** Just like normal cash in your bank account. Cold, hard money that you can immediately withdraw and use to pay for something. The downside is that you give up interest that you could have earned on that cash when you use it to acquire a company, which is known as the **foregone interest on cash**.

• **Debt:** Similar to a mortgage, student loan debt, or auto debt in real life: you take out a loan and pay interest on that loan, also repaying the principal to the lenders over time.
- **Stock:** Sort of like “trading in” your existing car or house when you go to buy a new one. You’re using the value of an existing asset – your company – to buy something else. The downside is that you’ll get **additional shares outstanding**, which will reduce your Earnings Per Share and may upset investors.

Similar to determining the purchase price, there’s no formula to determine the appropriate mix of cash, debt, and stock – you would look at a wide range of factors:

- **Feasibility:** How much cash does the company have? Can it use all, or most of, its cash balance? How much debt can it take on given its EBITDA and Free Cash Flow? How much stock can it issue without reducing EPS too much or diluting shareholders too much?
- **The Market:** How have similar companies completed similar, recent transactions? What type of cash / debt / stock mix have they used, and how did the market react when they announced the deal?
- **Internal Strategy:** Does the buyer need cash to fund an upcoming expansion? Do they not want to issue stock right now because they’re trading at a 52-week low? Are they in the middle of an equity or debt issuance and can’t afford to be distracted by more fundraising?

*Generally*, the buyer prefers to pay with 100% cash if possible because it’s the **cheapest option** – interest rates on cash in a bank account are lower than interest rates on debt. And issuing new stock tends to result in greater dilution unless the buyer has a much higher P/E multiple than the seller.

The buyer may choose to issue debt if it has little cash or if debt is cheap at the moment; they may be more likely to issue stock if they’re trading at a high stock price – that means they won’t have to issue as many shares to acquire the seller.

In addition to the percentage of cash, debt, and stock, you also need to assign a **foregone interest rate** to the cash and an **interest rate** to the debt. You base these on:

1. What the company has **earned historically** on its cash balance / paid on its debt; and/or
2. **Current market interest rates** for cash and debt from similar companies.

Here’s an example of how to make these calculations in a merger model:

<table>
<thead>
<tr>
<th>Transaction Assumptions</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Share Purchase Price:</td>
<td>$75.00</td>
<td>Equity Purchase Price:</td>
<td>$43,049</td>
</tr>
<tr>
<td>% Cash:</td>
<td>33.3%</td>
<td>Cash Used:</td>
<td>$14,350</td>
</tr>
<tr>
<td>% Debt:</td>
<td>33.3%</td>
<td>Debt Issued:</td>
<td>$14,350</td>
</tr>
<tr>
<td>% Stock:</td>
<td>33.3%</td>
<td>New Shares Issued:</td>
<td>74,714</td>
</tr>
<tr>
<td>Foregone Cash Interest Rate:</td>
<td>1.0%</td>
<td>Debt Interest Rate:</td>
<td>9.0%</td>
</tr>
</tbody>
</table>
The “Equity Purchase Price” line item above corresponds to the Diluted Equity Value number from the previous screenshot.

Often senior bankers will give you the assumptions they want to use, or give you several different cash/debt/stock scenarios to try – so you don’t need to worry about picking the right numbers.

**Step 3: Project the Financial Profiles and Income Statements of the Buyer and Seller**

This is not difficult and if you’re creating a merger model you should already have plenty of equity research, public filings, and/or your own 3-statement models for both the buyer and the seller.

If you don’t have much on the buyer and seller, you should find *equity research* (you can get equity research for many large companies for free if you have an online brokerage account with **TD Ameritrade**) and then use the assumptions they are using for revenue growth, profit margins, and so on.

The most important items you need:

- **Valuation** – Share Price, Shares Outstanding, and Equity Value and Enterprise Value.
- **Tax Rates** – You’ll need the buyer’s tax rate when combining the income statements in the next step.
- **Revenue** – Kind of a big deal on the income statement…
- **Operating Income** – You actually *don’t* need all the items in between revenue and operating income on the income statement. If you have them, great, but revenue and operating income are the most important line items.
- **Interest Income / (Expense)** – You need this to determine Pre-Tax Income and Net Income.
- **Pre-Tax Income and Net Income** – Self-explanatory.
- **Shares Outstanding and EPS** – You need these to calculate accretion / dilution at the end.

I’m not going to go through how to calculate all of these and what everything means – see the 3-statement modeling course if you want to review these concepts. Here’s an example of what everything might look like:

<table>
<thead>
<tr>
<th>Buyer - Financial Profile</th>
<th>Seller - Financial Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buyer Name:</strong> Apple Inc.</td>
<td><strong>Seller Name:</strong> Research in Motion Limited</td>
</tr>
<tr>
<td><strong>Share Price:</strong> $152.06</td>
<td><strong>Share Price:</strong> $52.91</td>
</tr>
<tr>
<td><strong>Diluted Shares Outstanding:</strong> 920,526</td>
<td><strong>Diluted Shares Outstanding:</strong> 572,551</td>
</tr>
<tr>
<td><strong>Diluted Equity Value:</strong> $176,796</td>
<td><strong>Diluted Equity Value:</strong> $36,044</td>
</tr>
<tr>
<td><strong>Enterprise Value:</strong> $141,401</td>
<td><strong>Enterprise Value:</strong> $33,547</td>
</tr>
<tr>
<td><strong>Tax Rate:</strong> 30%</td>
<td><strong>Tax Rate:</strong> 28%</td>
</tr>
</tbody>
</table>
You'll notice that the Diluted Shares Outstanding numbers on both income statements above do not match what's in the “profiles” — that happens because the income statement numbers are weighted-average projections for future periods, whereas the ones in the profiles are from the most recent date.

Normally you make projections for 2 years in a merger model – you might see projections for longer time periods occasionally, but buyers and investors tend to care most about the next 1 – 2 years.

Sometimes you will also create monthly projections in addition to annual projections, but that’s an advanced topic and it’s addressed in more detail in the Advanced Modeling course.

### Step 4: Combine the Buyer and Sellers’ Income Statements

This is simple because you just add together most of the line items and then adjust for acquisition effects. Acquisition effects are a few steps away, so we’ll focus on the items that you can add together or calculate for now:

- **Combined Revenue**: Add buyer revenue and seller revenue each year.
- **Combined COGS**: Add buyer COGS and seller COGS each year.
- **Combined Gross Profit**: Calculate this by subtracting combined COGS from combined revenue.
- **Combined Operating Expenses**: Add buyer OpEx and seller OpEx each year.
- **Depreciation, Amortization & Stock-Based Compensation**: Add these in each year.
- **Combined Operating Income**: Calculate this one by subtracting combined OpEx and D&A and SBC from combined Gross Profit.
- **Combined Interest Income / (Expense)**: Add the buyer and seller numbers.
- **Combined Pre-Tax Income**: Calculate this by adding Interest Income / (Expense) to Operating Income.
- **Net Income**: Calculate this one by applying the buyer’s tax rate to the combined Pre-Tax Income. 
  
  \[ \text{Net Income} = (1 – \text{Buyer’s Tax Rate}) \times \text{Combined Pre-Tax Income} \]

- **Earnings Per Share**: Calculate this by dividing the Combined Net Income each year by the buyer’s shares outstanding in each year (this will change by the end of the model).

Here’s what our combined income statement looks like *without* acquisition effects at this point:

<table>
<thead>
<tr>
<th></th>
<th>FY 2010E</th>
<th>FY 2011E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined Revenue</strong></td>
<td>$70,862</td>
<td>$83,617</td>
</tr>
<tr>
<td><strong>Cost of Goods Sold</strong></td>
<td>$41,410</td>
<td>$48,905</td>
</tr>
<tr>
<td><strong>Gross Profit</strong></td>
<td>$29,452</td>
<td>$34,711</td>
</tr>
<tr>
<td><strong>Operating Expenses</strong></td>
<td>$8,193</td>
<td>$9,689</td>
</tr>
<tr>
<td><strong>Depreciation of PP&amp;E</strong></td>
<td>$1,348</td>
<td>$1,637</td>
</tr>
<tr>
<td><strong>Amortization of Intangibles</strong></td>
<td>$399</td>
<td>$470</td>
</tr>
<tr>
<td><strong>Stock-Based Compensation</strong></td>
<td>$939</td>
<td>$1,101</td>
</tr>
<tr>
<td><strong>Operating Income</strong></td>
<td>$18,572</td>
<td>$21,814</td>
</tr>
<tr>
<td><strong>Interest Income / (Expense)</strong></td>
<td>$404</td>
<td>$510</td>
</tr>
<tr>
<td><strong>Pre-Tax Income</strong></td>
<td>$18,976</td>
<td>$22,324</td>
</tr>
<tr>
<td><strong>Income Tax Provision</strong></td>
<td>$5,693</td>
<td>$6,697</td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>$13,283</td>
<td>$15,627</td>
</tr>
<tr>
<td><strong>Earnings Per Share (EPS)</strong></td>
<td>$14.65</td>
<td>$17.23</td>
</tr>
<tr>
<td><strong>Diluted Shares Outstanding</strong></td>
<td>907,005</td>
<td>907,005</td>
</tr>
</tbody>
</table>

This looks like a great deal so far, but before you break out the champagne bottle and start celebrating remember that we’re not done: we still need to take into account all the acquisition effects.

To do that, we’ll have to combine the balance sheets of the buyer and seller first (see the next section).
Step 5: Calculate Goodwill and Allocate the Purchase Price

Combining the balance sheets is also fairly simple, but there’s one hitch: the buyer writes off the seller’s entire shareholders’ equity balance before adding the rest of the seller’s balance sheet to its own.

That creates a problem because the buyer usually pays more than the shareholders’ equity of the seller to complete the acquisition.

Let’s say that the buyer is paying $60 for the seller and that the seller has $50 in assets, $20 in liabilities, and $30 in shareholders’ equity. For simplicity, let’s assume that it’s a 100% cash deal.

Consider what happens when we combine the balance sheets:

- The buyer adds $50 to its own assets and $20 to its own liabilities… but the $30 in shareholders’ equity is written off, so the buyer’s balance sheet is now out of balance by $30.
- The buyer has paid $60 of its own cash to acquire the seller, so we subtract $60 from its assets.
- As a result, the buyer’s balance sheet is now out of balance once again – it’s down by $10 on the assets side but up by $20 on the liabilities & shareholders’ equity side.

If the buyer does not pay exactly the value of the seller’s shareholders’ equity to acquire the seller, the combined balance sheet will go out of balance. And that happens in 99.9999% of merger models.

That’s why we need Goodwill and Other Intangible Assets and why we need to adjust the combined company’s balance sheet – otherwise it wouldn’t balance and our model would be wrong.

Goodwill and Other Intangible Assets represent the premium above the seller’s shareholders’ equity the buyer pays to acquire the seller. They don’t correspond to anything tangible, like factories, land, or inventory, but instead represent items such as:

- The seller’s brand name and recognition in the marketplace.
- The seller’s relationships with customers.
- The seller’s human capital – its employees and the knowledge and experience they have.
- The seller’s intellectual property.

Whereas Goodwill stays on the combined company’s balance sheet indefinitely and is tested for impairment each year, Other Intangible Assets are amortized over time and eventually disappear.

That’s because Other Intangible Assets represent items that have well-defined useful lives and therefore expire in the future, such as copyrights and patents.
Typically, you allocate a percentage of the **Purchase Premium** to Other Intangible Assets and you allocate the remaining portion after adjustments (see below) to Goodwill.

**Other Balance Sheet Adjustments – Asset Write-Ups and Deferred Tax Liabilities**

There are a wide range of other balance sheet adjustments you may make in a merger model, but the most important ones include:

- **PP&E Write-Up**: Over time, the book value of the seller’s PP&E (the number on its balance sheet) drifts from the true market value, and the market value of PP&E tends to increase over time. So normally in a merger model, you assume that the seller’s PP&E is written up by a small amount (5–10%).
- **Write-Off Existing Goodwill**: As standard practice in a merger model, you “reset” Goodwill to $0 and create new Goodwill in its place.
- **Write-Off Existing Deferred Tax Liabilities**: You also “reset” the seller’s tax basis in an M&A deal and assume that existing Deferred Tax Liabilities (DTLs – how much they owe in future tax payments) are written off.
- **Creation of New Deferred Tax Liability**: When you write-up assets (PP&E) or create new assets (Other Intangible Assets), the associated depreciation and amortization are deductible for book purposes, but not for tax purposes. Therefore the company will owe cash taxes in the future and you need to reflect this with a new DTL.

You can see an example of how to factor in all of these adjustments below:

![Goodwill Creation & Balance Sheet Adjustments](chart)

Here’s how you calculate each of these items:

- **Equity Purchase Price**: Pulled directly from our assumptions in the beginning.
- **Seller Book Value**: The shareholders’ equity number on the seller’s balance sheet (exclude preferred stock and noncontrolling interests as they usually stick around).
• **Write-Off of Existing Goodwill:** Pull this from the seller’s balance sheet.

• **PP&E Write-Up Amount:** Multiply the Write-Up Percentage by the seller’s PP&E Balance. Assume 5 – 10 years for the Depreciation Period, and use straight-line depreciation.

• **Intangibles Write-Up Amount:** Multiply the “Purchase Price to Allocate” by the % Allocated to Intangibles (10 – 20% is normal). 5 years for the Amortization Period is standard.

• **Write-Down of DTL:** Pull directly from the seller’s balance sheet.

• **New Deferred Tax Liability:** (PP&E Write-Up Amount + Intangibles Write-Up Amount) * Buyer’s Tax Rate. This represents how much in future cash taxes the combined company will owe.

The end result is the amount of **Goodwill Created** on the combined balance sheet.

We subtract items in this calculation if they reduce how much new Goodwill we’ll need, and we add items if they increase the amount of new Goodwill we’ll need.

For example, creating a new Deferred Tax Liability increases the Liabilities & Shareholders’ Equity side of the balance sheet. That means that we now need more of a “plug” (more Goodwill) on the Assets side, so we add the new DTL in this Goodwill calculation.

But creating new Intangible Assets increases the Assets side of the balance sheet – which means that we don’t need as much Goodwill to act as a “plug” on the Assets side anymore.

Once we’ve determined how much Goodwill gets created, we can move into the next step of the merger model: combining the balance sheets of the buyer and seller.

**Step 6: Combine the Balance Sheets and Adjust for Acquisition Effects**

Similar to combining the income statements of the buyer and seller, combining the balance sheets is fairly straightforward since you add together most of the line items.

There are 3 points to keep in mind when you combine the balance sheets:

1. **Deal Financing** – Subtract the cash used and add the debt and/or stock issued.
2. **Goodwill and Purchase Price Allocation** – Add the new Goodwill and adjust for the Other Intangible Assets, the DTLs, the Write-Ups, and so on.
3. **Write Off the Sellers’ Shareholders’ Equity** – The seller no longer exists as an independent entity. To represent this, you always write off the seller’s shareholders’ equity in an M&A deal (exceptions: preferred stock and noncontrolling interests usually remain there, depending on the deal terms).

To make this more concrete, let’s continue with the example from above and learn how to adjust the Assets side of the balance sheet first:
For each item, we add together the buyer’s number and the seller’s number and then add in anything in the “Adjustments” column. Here’s what happens in the “Adjustments” column for each line item:

- **Cash**: Subtract however much cash the buyer used to acquire the seller (33% of the total funds here).
- **AR / Inventory / DTAs / Other Current Assets**: Typically no adjustments required (see note below).
- **PP&E**: Add the PP&E Write-Up from the previous step to this balance.
- **Goodwill**: Subtract the seller’s existing Goodwill because you’re writing it off and add the new Goodwill created in the deal.
- **Other Intangible Assets**: Add in the new Other Intangible Assets that get created in the deal.
- **Long-Term Securities / Other Assets / etc.**: Typically no adjustments required.

Now let’s see what happens on the other side of the balance sheet, starting with the Liabilities section:

- **AP / Accrued Expenses / Deferred Revenue**: Typically no adjustments required (see note below).
• Short-Term Debt (not shown here): Subtract any short-term debt that’s being refinanced, and add any new short-term debt that the buyer issues to finance the acquisition.

• Long-Term Debt: Subtract any long-term debt that’s being refinanced, and add any new long-term debt that the buyer issues to finance the acquisition.

• Deferred Income Tax Liability (DTL): Subtract the seller’s existing DTL because you’re writing it off, and add the new DTL that gets created in the previous step.

• Other Long-Term Liabilities / Other: Typically no adjustments required.

Note on AR / Inventory / DTAs / Other Current Assets / AP / Accrued Expenses / Deferred Revenue etc.: Sometimes you do make adjustments here (e.g. inter-company receivables or payables, an inventory write-up or write-down, a deferred revenue write-down and so on) but these are not as common and are therefore addressed in more detail in the Advanced Modeling course.

Moving on, here’s what happens in the Shareholders’ Equity section:

<table>
<thead>
<tr>
<th>Shareholders’ Equity:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Stock:</td>
<td>$7,177</td>
<td>$2,236</td>
<td>($2,236)</td>
<td>$7,177</td>
</tr>
<tr>
<td>Additional Paid-In Capital:</td>
<td>$1,185</td>
<td>$139</td>
<td>$14,211</td>
<td>$15,355</td>
</tr>
<tr>
<td>Treasury Stock:</td>
<td>$0</td>
<td>($45)</td>
<td>$45</td>
<td>$0</td>
</tr>
<tr>
<td>Retained Earnings:</td>
<td>$23,364</td>
<td>$4,654</td>
<td>($4,654)</td>
<td>$23,364</td>
</tr>
<tr>
<td>Accumulated Other Comprehensive Inc</td>
<td>$179</td>
<td>($8)</td>
<td>$8</td>
<td>$179</td>
</tr>
<tr>
<td><strong>Total Shareholders’ Equity:</strong></td>
<td><strong>$31,905</strong></td>
<td><strong>$6,987</strong></td>
<td><strong>$7,363</strong></td>
<td><strong>$46,255</strong></td>
</tr>
<tr>
<td><strong>Total Liabilities &amp; SE:</strong></td>
<td><strong>$47,786</strong></td>
<td><strong>$9,224</strong></td>
<td><strong>$23,894</strong></td>
<td><strong>$80,884</strong></td>
</tr>
</tbody>
</table>

• Common Stock: Subtract the seller’s existing common stock balance.

• APIC: Subtract the seller’s existing APIC balance and add the dollar value of new shares issued in the transaction: Shares Issued * Buyer’s Share Price.

• Treasury Stock: Subtract the seller’s existing treasury stock balance.

• Retained Earnings: Subtract the seller’s existing retained earnings balance.

• AOCI: Subtract the seller’s existing AOCI balance.

When you finish this, go back and verify that the combined balance sheet balances – if it doesn’t, you have a problem and you need to go through all the items above and all the formulas to see what might be wrong.

**Step 7: Adjust the Combined Income Statement for Acquisition Effects**

With the combined balance sheet finished, we can now adjust the combined income statement for acquisition effects.

Just as with purchase price allocation, there are a wide variety of effects that you might see, but the most important ones are below:
• **Revenue Synergies**: Can the buyer now sell more products, sell to new customers, or otherwise increase its revenue as a result of acquiring the seller?

• **Costs Associated with Revenue Synergies**: There’s no such thing as a free lunch – the combined company will have additional COGS and/or OpEx as a result of these synergies.

• **Cost Synergies**: Can the buyer achieve efficiencies of scale, reduce its headcount, consolidate buildings, or trim its marketing / sales / research & development budgets as a result of this deal?

• **Depreciation of PP&E Write-Up**: Just like normal PP&E, any write-ups of PP&E must be depreciated over a 5-10 year period, which reduces Pre-Tax Income and Net Income.

• **Amortization of New Intangibles**: Just as with amortization of existing intangibles, any new intangibles created in the deal must be amortized over a 5-year period, reducing Pre-Tax Income and Net Income.

• **Foregone Interest on Cash**: This is what the buyer “gives up” when it uses cash to acquire the seller; it reduces Pre-Tax Income and Net Income.

• **Interest Paid on New Debt**: This is what the buyer “pays” when it uses debt to acquire the seller; it reduces Pre-Tax Income and Net Income.

• **Diluted Shares Outstanding**: You must add the new shares the buyer issues to pay for the seller here. More shares outstanding = more dilution and a lower EPS.

And here’s how you calculate everything above:

• **Revenue Synergies**: In a simple model, make these a percentage of the seller’s revenue – anything less than 10% is normal.

• **Revenue Synergy COGS (and / or OpEx)**: Make these a percentage of the revenue synergies, and try to make the percentage similar to the buyer or seller’s COGS or OpEx as a % of revenue.

• **OpEx (and / or COGS) Synergies**: In a simple model, make these a percentage of the seller’s OpEx or COGS – again, anything under 10% is standard.

• **Depreciation of PP&E Write-Up**: Divide the PP&E Write-Up Amount by the Depreciation Period.

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**Combined Income Statement**

<table>
<thead>
<tr>
<th></th>
<th>FY 2010E</th>
<th>FY 2011E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Revenue</td>
<td>$70,862</td>
<td>$83,617</td>
</tr>
<tr>
<td>Revenue Synergies</td>
<td>$1,723</td>
<td>$2,087</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td>$41,410</td>
<td>$48,905</td>
</tr>
<tr>
<td>Revenue Synergy COGS</td>
<td>$862</td>
<td>$1,043</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>$30,313</td>
<td>$35,755</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>$8,193</td>
<td>$9,689</td>
</tr>
<tr>
<td>OpEx Synergies</td>
<td>$270</td>
<td>$326</td>
</tr>
<tr>
<td>Depreciation of PP&amp;E</td>
<td>$1,348</td>
<td>$1,637</td>
</tr>
<tr>
<td>Depr. of PP&amp;E Write-Up</td>
<td>$22</td>
<td>$22</td>
</tr>
<tr>
<td>Amortization of Intangibles</td>
<td>$399</td>
<td>$470</td>
</tr>
<tr>
<td>Amort. of New Intangibles</td>
<td>$1,448</td>
<td>$1,448</td>
</tr>
<tr>
<td>Stock-Based Compensation</td>
<td>$939</td>
<td>$1,101</td>
</tr>
<tr>
<td>Operating Income</td>
<td>$18,233</td>
<td>$21,713</td>
</tr>
<tr>
<td>Interest Income / (Expense)</td>
<td>$404</td>
<td>$510</td>
</tr>
<tr>
<td>Foregone Interest on Cash</td>
<td>($143)</td>
<td>($143)</td>
</tr>
<tr>
<td>Interest Paid on New Debt</td>
<td>($1,291)</td>
<td>($1,291)</td>
</tr>
<tr>
<td>Pre-Tax Income</td>
<td>$17,203</td>
<td>$20,789</td>
</tr>
<tr>
<td>Income Tax Provision</td>
<td>$5,161</td>
<td>$6,237</td>
</tr>
<tr>
<td>Net Income</td>
<td>$12,042</td>
<td>$14,552</td>
</tr>
<tr>
<td>Earnings Per Share (EPS)</td>
<td>$12.27</td>
<td>$14.82</td>
</tr>
<tr>
<td>Diluted Shares Outstanding</td>
<td>981,719</td>
<td>981,719</td>
</tr>
</tbody>
</table>
• **Amortization of New Intangibles**: Divide the Intangibles Write-Up Amount by the Amortization Period.

• **Foregone Interest on Cash**: Cash Used in Deal * Foregone Interest Rate on Cash (from assumptions).

• **Interest Paid on New Debt**: Debt Issued in Deal * Interest Rate on Debt (from assumptions).

• **Diluted Shares Outstanding**: Buyer’s Shares Outstanding in Given Year + Shares Issued in Deal.

Also make sure that your calculations for Gross Profit, Operating Income, and Pre-Tax Income take into account all the acquisition effects above each one of those line items, respectively, and that you calculate the Income Tax Provision and the Net Income with the buyer’s tax rate applied to the combined Pre-Tax Income.

**Step 8: Calculate Accretion / Dilution and Create Sensitivity Tables**

Once these calculations are in place, we arrive at the purpose of the merger model: figuring out whether the buyer’s Earnings Per Share (EPS) has gone up, gone down, or stayed the same:

You calculate the **Accretion / Dilution number** by taking the Combined Earnings Per Share (EPS) and subtracting the Buyer’s Earnings Per Share (EPS); you calculate the **Accretion / Dilution percentage** by dividing this number by the Buyer’s Earnings Per Share (EPS).

In this case we have modest **accretion**, meaning that the buyer’s EPS has increased as a result of the deal.

We can also create **sensitivity tables** that show how the accretion / dilution percentage changes with different values for the purchase price, synergies, cash/debt(stock mix, and other assumptions):
To create these tables, you fill in the numbers you want to use at the top and on the left side and then enter a link to the cell that contains the accretion / dilution formula in the top-left corner of the table.

Then you highlight the entire table from the top-left corner to the bottom-right corner, press Alt + D + T in Excel and then enter the variable at the top of the table for the “Row Input Cell” and the variable on the left of the table for the “Column Input Cell”:

In this case, we learn that the EPS accretion / dilution is much more sensitive to the per-share purchase price than it is to the cost synergies – which is not surprising given that the purchase price is a much bigger number and affects all parts of the model.

**Rules of Thumb on Merger Models**

You should also learn a few rules of thumb on merger models and how to estimate whether or not a deal will be accretive, dilutive, or neutral to EPS:

- Generally, **100% cash deals** are the most accretive because the foregone interest rate on cash is less than the interest rate on debt, and also less than the “cost” of issuing stock (more on this below).
- **100% debt deals** tend to be the next most accretive after that because the interest rate on debt is also “less expensive” than the cost of issuing stock.
- **In 100% stock deals**, if the buyer has a higher P/E multiple than the seller, it will be accretive (assuming no acquisition effects) because the buyer is paying less for each $1 of earnings than what its own earnings “cost.” Vice versa if the buyer has a lower P/E multiple than the seller.

How do you determine the “cost” of issuing stock and compare it to the cost of using cash or issuing debt?
You invert the P/E multiples of the buyer and seller and compare those percentages to the after-tax foregone interest rate on cash and after-tax interest rate on debt. For example:

- The buyer has a P/E multiple of 12x and the seller’s P/E multiple is 10x. The foregone interest rate on cash is 4% and the interest rate on new debt is 8%. The buyer’s tax rate is 40%.
- If you invert the buyer’s P/E multiple of 12x, that’s 1/12, or 8.3%. That represents the after-tax cost of issuing stock in this deal (it’s after-tax because EPS is based on Net Income, which is after-tax).
- If you invert the seller’s P/E multiple of 10x, that’s 1/10, or 10.0%.
- The after-tax interest rate on debt is 8% * (1 – 40%), or 4.8%.
- The after-tax foregone interest rate on cash is 4% * (1 – 40%), or 2.4%.

Therefore, issuing stock will be the most expensive, followed by debt and then using cash.

However, since all of these percentages are still lower than the seller’s inverted P/E multiple, the deal will still be EPS-accretive for the buyer assuming no acquisition effects aside from foregone interest on cash, interest on new debt, and additional shares outstanding.

But looks what happens if we had slightly different numbers:

- The buyer’s P/E multiple is 8x and the seller’s P/E multiple is 12x now. Everything else is the same.
- The buyer’s inverted P/E multiple is therefore 1/8, or 12.5%.
- The seller’s inverted P/E multiple is therefore 1/12, or 8.3%.
- The after-tax interest rate on debt is still 8% * (1 – 40%), or 4.8%.
- The after-tax foregone interest rate on cash is 4% * (1 – 40%), or 2.4%.

In this case, the after-tax costs of debt and cash are still less than the seller’s inverted P/E multiple of 8.3%, so both a 100% debt acquisition and a 100% cash acquisition would still be accretive.

However, the buyer’s inverted P/E multiple is greater than the seller’s inverted P/E multiple now, so a 100% stock acquisition would be dilutive.

You can combine these rules to estimate what would happen in other scenarios, such as a 50/50 cash/stock deal, or a 33/33/33 cash/stock/debt deal – just calculate the weighted average cost using the method above.

The only problem with this shortcut is that it doesn’t account for other acquisition effects – synergies, new depreciation and amortization, and so on. So think of it as a way to quickly estimate what a deal will look like on a non-synergy, cash-only basis, rather than as a hard-and-fast rule that always works.