How to Perform an Asset Reproduction Value Analysis

oldschoolvalue.com/blog/valuation-methods/how-to-asset-reproduction-value-analysis/

How to Value Stocks Series

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Let's talk about Asset Reproduction Value

Getting Back to Basics: Asset Valuation

Asset Reproduction Value Calculation

There is a new blog (csinvesting) that has intense educational valuation material available. Pages and pages of notes and valuation based on Greenwald's and Greenblatt's classes from Colombia University.

The valuation method focused on the site is based on **asset reproduction value** and earnings power value (EPV). The overall idea is simple, but to analyze, value and understand the valuation method and apply it to your company requires digging and hard work.

I was surprised by how much I had missed in my EPV valuations after reading a few of the case studies, and it has inspired me to take a more systematic approach and to re-learn everything. With that in mind, I'll be using the approach from csinvesting to go through NPK's asset valuation, which is the first company that I wanted to study from the best small companies list.

I've made the math easier by incorporating EPV into my stock valuation tools, but for those that do not know in detail how EPV works, here is a detailed step by step EPV of Microsoft.

From Book Value to Asset Reproduction Value

First step in a Graham and Dodd valuation is to calculate the asset value of a company. Rather than making this the first and only step, you need to go further to check the reliability of the data and strategic direction of the company and industry to determine what the actual cost of the balance sheet really is.

A company could have two vastly different valuations based on the accounting method used. You can see the differences between conservative and aggressive accounting methods.

At the end of the day, GAAP accounting is "theory" and the purpose of the asset valuation is to determine what the actual cost of running the business is. This requires going beyond the balance sheet and diving deeper into the footnotes to make adjustments to find undiscovered value.

Replicate NPK's Balance Sheet

Book value is simply the assets – liabilities as stated on the balance sheet. This is the value of the of how much it is worth today.

Reproduction value looks at how much it will cost a competitor to purchase the assets required to run a competing company.

As an example, based on book value, machinery and equipment could have been depreciated over 5 years and is now worth $1m on the books compared to the purchase price of $2m.

However, a competitor would have to pay $2m to purchase new equipment instead of $1m.

Thus the balance sheet of NPK will have an increased adjustment to the machinery line item to be $2m instead of $1m.

Confusing? Well let me go through NPK's 2010 balance sheet.

Balance Sheet Adjustments to Current Assets

Based on the numbers from the 2010 annual report, below is the stated book value versus some slight adjustments to the line items.

As you can see, the difference between the book value and the adjusted values for the current assets are negligible.

			values in millions
Asset	**Book**	**Adj.**	**Total**
Cash and cash equivalents	49.7		49.7
Marketable securities	101		101
Accounts receivable	91.1	0.5	91.6
Inventories:	83.1		87.2
- *Finished goods*	*37.1*	*4.2*	*41.3*
- *Work in process*	*37*		37
- *Raw materials*	*8.9*		8.9
Deferred tax assets	6.3	-1.6	4.7
Other current assets	14.3		14.3

Cash and market securities will always be 100%. Cash is what it is, no more, no less. $1 cannot = $2.

You need to add the doubtful reserve to **accounts receivables**. A competitor will not have the luxury of being able to perform at the same level without a doubtful account for A/R.

Inventory is increased by $4.2 million because NPK uses the LIFO inventory method. Restating it in terms of FIFO results in an increase of $4.2m. The way to look for this is to do a search on the 10-K for "LIFO" or "FIFO" reserves and see what it says in the notes.

Deferred taxes. NPK expects to receive $6.3m from overpaying taxes. This 2010 report was released at the end of its fiscal year so at the time this report came out, I'm guessing that it was one quarter away from receiving the deferred taxes.

$1.6m is one quarter worth of deferred taxes ($6.3m/4) and my rough estimate of the present value of the deferred tax.

No adjustments to **other current assets**.

Balance Sheet Adjustments to PP&E

Basic **PP&E** is $58m but after reading up on the company a little, I'm convinced that it will be worth much more. NPK is very easy to analyze because they lay all their stated and adjusted values for you.

PP&E	58	49	107
- Land and land improvements			*1.9*
- Buildings			*25.5*
- Machinery and equipment			*79.6*

In this case, the 2010 value of PP&E was $58m, however, $49m was deducted for accumulated depreciation. Add that back in to get the adjusted $107m.

Rather than skip ahead, here is a deeper look at PP&E.

NPK is over 100 years old. This means that they have assets that have been written off to zero, when in fact, a competitor will pay to own that same asset.

NPK owns **land and buildings** and uses a straight line depreciation method giving 15-40 years of depreciation to buildings. I would be willing to bet that their buildings are worth much more than what is stated on the books after depreciation considering their long operating history.

To get better value ranges of the buildings, you could get somebody to appraise the property/surrounding comparable properties and use it as the adjusted value.

Or do searches online to get estimates. All this takes time though.

If NPK was a much larger company, with many operating units, you should break it down further.

E.g. NPK has a facility where 314,000 sq ft is used for industrial purposes, and 140,000 sq ft is used for offices.

Doing a search shows that the industrial buildings are much cheaper compared to offices. In Wisconsin, where this building is located, industrial buildings go for a range of $2 – $5 per sq ft compared to $7 – $12 per sq ft for office buildings.

So you could do something like 314,000 x $5 + 140,000 x $12 = $3.25m for this facility.

Repeat for other buildings and land values.

Machinery and equipment in NPK's business is specialized. In a liquidation scenario, highly specialized equipment will be discounted heavily as the number of buyers are limited and could already have such a machine making the equipment worth much less than say a photocopier that everyone wants.

But as an ongoing asset, NPK's equipment is expensive and requires a competitor to pay the full price.

Again, NPK makes it easier by stating the actual cost of the equipment.

Balance Sheet Adjustments to Goodwill

Adjusting for goodwill is trickier. This is where you have to understand the business and industry.

GOODWILL	11.5	4	15.5
- *R&D*	*0*		*0*
- *Patents*	*0*		*2*
- *Customer Relations*	*0*		*0*
- *Specialized Skills*	0		2

Goodwill means that a company has overpaid for another company but what that additional cost doesn't specify is the relationship with customers, the brand image, network effect, patents and other skills that can't be valued on the balance sheet.

It's up to you to think things through and add back those special cases.

For NPK, R&D is negligible but it does have important patents for its housewares/small appliance business. The housewares segment make up 30% of revenue and its patents protect that revenue to a certain degree. I've assigned a value of $2m for its patents. A tiny amount compared to the revenue.

Since NPK sells its products through distributors, and there are no long term contracts set with any of their buyers, I don't see any value here. Anyone could copy their distribution channel.

The Absorbent Segment requires in-depth know how and special training to operate the machines and to maintain quality. It costs money to train all those people to guarantee product quality meets specifications and orders.

$2m in value for this skill is a small yet fair amount.

Final Adjusted Asset Side of Balance Sheet

The total adjusted asset side of the balance sheet is shown below.

You may have noticed by now that performing this exercise forces you to think about all aspects of the business. You start with a broad view and then with each line item, you try to break it up into smaller pieces. This is how you find hidden value that most investors would miss.

			values in millions
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PP&E	58	49	107
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- Machinery and equipment			*79.6*
GOODWILL	11.5	4	15.5
- R&D	*0*		*0*
- Patents	*0*		*2*
- Customer Relations	*0*		*0*
- Specialized Skills	0		*2*
Total	498	56.1	669.2

At first the process is quite long, but once you get used to it, it will become quicker. Practice makes perfect.

Adjusting the Liabilities

The accounting/mathematical definition of the balance sheet is

Assets = Liabilities + Equity

but the financial/business definition of a balance sheet is

Liabilities and Equity are the sources of funds that support the assets.

Rather than paying the asset reproduction value you must know how much money you have to pay out of pocket to acquire or replicate the assets. This means subtracting certain liabilities. Not total liabilities.

The reason for not subtracting total liabilities is because total liabilities includes what Bruce Greenwald calls spontaneous and circumstantial liabilities.

Spontaneous Liabilities or Non Interest Bearing Debt

Investopedia says:

> *Liabilities of a company that are accumulated automatically as a result of the firm's day-to-day business. Spontaneous liabilities can be tied to changes in sales - such as the cost of goods sold and accounts payable. These liabilities can also be "fixed", as seen with regular payments on long-term debt.*

Other examples include accounts payable, deferred taxes and accrued expenses.

These liabilities arising from day to day operations are not required by a new entrant, thus this amount should be removed from the reproduction value.

Circumstantial Liabilities

This liability is as the name implies; liabilities incurred by circumstances in the past.

Such circumstances may include

- paying penalties for insider trading
- lawsuits from former employees
- inventory catching on fire
- etc

These types of liabilities must be subtracted as it adds no value to assets. A competitor is not required to pay for these circumstances to start a competing business.

Subtract Cash not Required to Run the Business

The final step to calculate the reproduction value is to subtract cash that is not required in the business because you want to value the assets based on how much a competitor would pay for the same things today.

It takes about 1% of sales to run 1 year of operations so the remaining 99% of cash can be removed.

Final Net Reproduction Value of NPK in 2010

Net Reproduction Value = Adjusted Asset Value – Spontaneous & Circumstantial Liabilities – Cash not Required in Business

$669.2m – $66.7m (spontaneous) – $4.5m (deferred tax liability) – $4.8m (1% of sales) = $593.2m

NPK Asset reproduction value is $593.2m vs Book value of $426.5m.

Putting it Together

Dec 31, 2010 at the time of the annual report; $130 stock price with 6.86m shares outstanding.

- Market valuation of equity was $889m
- Enterprise value is $955.7m

Both book value and net reproduction value makes up about half the market value which means that the stock price is well supported by the assets. The remaining half of the stock price is made up of growth expectations, which you can also consider as the “speculative” value.

You know what you are paying for with the $130 price tag. Whether the remaining half of the stock price can be attributed to a strong competitive advantage is another discussion.

I was lucky that NPK is a very straight forward example. The company is very shareholder friendly, and it shows in the way they present the data in the financial statements.

Other companies will be more difficult because the required information may be buried deep in the report.

If you try the same exercise for a company like GRPN, you will see that the adjusted balance sheet will be considerably lower than what is stated on the books.

Then compare the net reproduction value to the market cap and enterprise value to understand what the market is expecting from the company.

Additional Resources for more about Asset Reproduction Value

Earnings Power Value EPV and Book Review

Bruce GreenWald's Earnings Power Value EPV Lecture Slides

Valuing Liz Claiborne

Sealed Air Valuation Case Study