1% Focus Report:

Dow Chemical (DOW)

YCHARTS

Published May 8, 2014

The 1% Focus Report hones in on the valuation drivers underlying a firm in either the top or bottom Value Score deciles in YCharts' data universe. The report is designed to be a visual form of financial statement analysis, allowing for an analyst or portfolio manager to understand the financial metrics that drive the focus company's valuation.

The Value Score is a quantitative six-factor model designed to separate companies according to their relative (rather than absolute) valuation; companies with a Value Score of 10 (highest) have historically performed much better than the S&P 500 index and those with a Value Score of 1 have historically performed worse.

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Valuation at a Glance: Dow Chemical (DOW)

VALUE SCORE

10

The Value Score is a quantitative six-factor model designed to separate companies according to their relative (rather than absolute) valuation.

Companies with a Value Score of 10 (VS10) have historically performed much better than the S&P 500 index, and those with a Value Score of 1 (VS1) have historically performed worse.

Learn more by reading the Value Score Support Page or our separate document "The Big Picture: YCharts Value Score".

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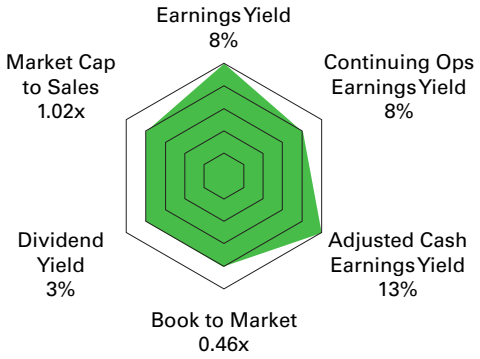
Focus on Dow Chemicals

Ticker	DOW
Name	Dow Chemical Co
Industry	Chemicals
Market Capitalization	59,143
TTM Sales	57,158
TTM CFO	7,951
TTM CFO Margin	14%
Mkt Cap /TTM Sales	1.0
Mkt Cap /TTM CFO	7.4
Long-Term Debt	30,266
Shareholders' Equity	22,898
D/E Ratio	132%
Altman's Z-Score	2.8
Beta	2.5
Return on Equity	0.3%

Value Score Factors



As Dow Chemical closes in on its 120th anniversary as a company, it finds itself in the midst of a major transition—a reduction in its dependence on the commodity chemical business and an increase in emphasis on its specialty chemical line.

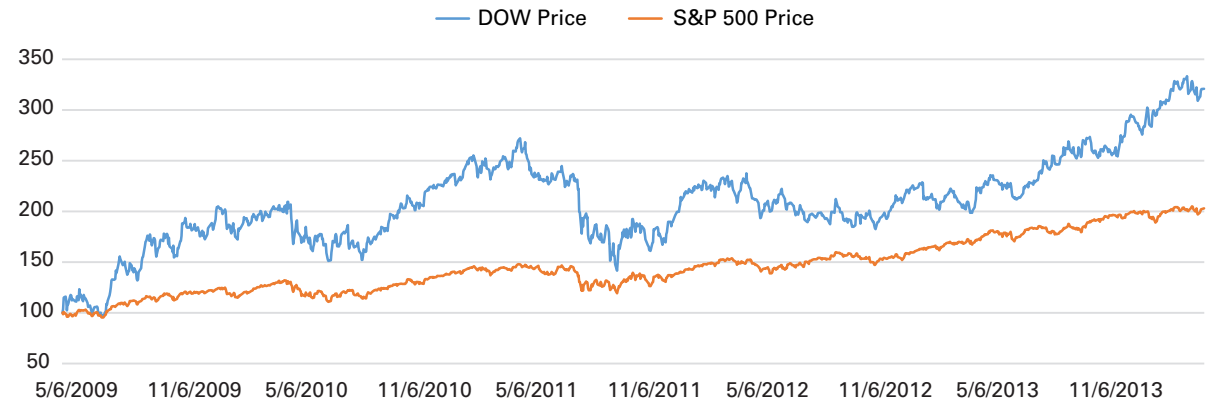
This transition has been underway for some time, but lately has been goaded along by famous activist investor and acerbic letter-writer, Daniel Loeb at Third Point Partners, who has announced a large stake in the firm and asked for a strategic review.

Our analysis of Dow indicates that Loeb is likely correct in his contention that Dow could stand to improve efficiency, but our view of his recommendation to split Dow into two firms—one commodity producer and one specialty producer—is mixed.

Dow likely showed up on our Value Score screen due to a one-off event that boosted its earnings and cash flows temporarily. Even still, it is an interesting story and a potentially attractive investment, though not one without a healthy degree of uncertainty.

(continued on next page)

Price of Focus Company vs S&P 500 (Indexed, 5 Years)



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Efficiency versus Innovation

Commodity chemicals are those that can be produced through the refinement of a complex chemical compound into a simpler one. For instance, Dow's foundation was its business to extract the chemical bromide from brine, and it presently does a booming business in petrochemicals—produced by refining oil or natural gas into chemicals that can be made into plastics, fertilizers, and a host of other products.

This business is one built on economies of scale, meaning that the company with the most efficient processes and cheapest costs of inputs wins.

Specialty chemicals are formulated by processing commodity chemicals in a complex way that might necessitate multiple steps of heating, cooling, and mixing. The end uses of specialty chemicals are too numerous to list—everything from the glue that allows a bandage to stick to skin to emulsifiers to make ice cream more appetizing to agricultural pesticides to specialized detergents used in semiconductor manufacturing.

This business is one built on innovation, meaning that the company that has the best engineers designing new products (or modifying old products for new use cases) and the best sales network to sell as much of the chemicals as possible wins.

While there are undoubtedly similarities in the science and materials used in commodity and specialty chemicals, the business are very different, and require a different management approach—the commodity business focused on controlling costs and the specialty business focused on generating revenue.

Given the challenges in running two businesses as different as these, it is sensible to ask what Dow management's track record has been.

Dow's Track Record

The first thing to say about Dow's track record is that it is hard to tease out from the financial statements. Over the last 10 years, management has reshuffled its segment names and product line-ups four times, and switched from reporting segment-level profits on an Earnings Before Interest and Tax (EBIT) basis to an Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA) basis, making it very difficult to string together a cohesive view of segment-level performance.

Being an analyst for some time, this author's first reaction was a cynical one: management is attempting to obfuscate bad performance by segment reshuffling. However, the more I read, the more I worried that the shuffling was not malicious as much as it was a reflection of a lack of management vision and clarity regarding the company's business strategy.

Barred from making an assessment of segment growth and profitability over time, our analysis here looks at overall company performance vis-à-vis companies in commodity and specialty fields.

Commodity Chemicals

Analyzing Dow's commodity products, I was struck by how many similarities there were between those that Dow manufactured and those manufactured by Exxon Mobil's Chemicals segment (for those not familiar with Exxon Mobil's segments, please contact the author for YCharts' 1% Focus Report on that firm). The comparison is not perfect, because Exxon is solely a producer of petrochemicals whereas Dow has historically produced non-petroleum commodity chemicals as well; however, there is enough overlap that the comparison is at least valid.

A comparison of Dow's NOPAT margin (Net Operating Profit After Tax) to Exxon Mobil's Chemicals Segment's After Tax Profit margin is surprising.

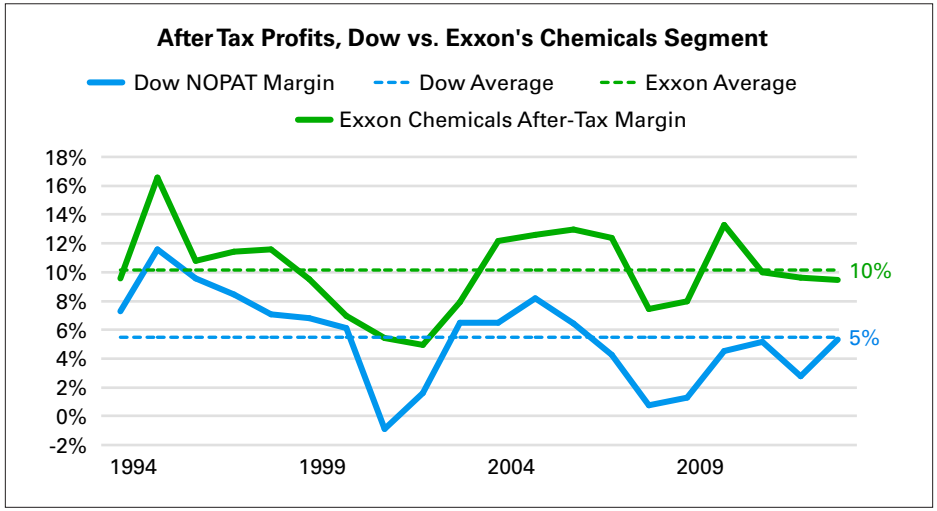

Figure 1, Source: Company Statements, YCharts Research Analysis

Note: We have adjusted the segment-level NOPAT figures to include the chemical segment's share of corporate overhead. We have multiplied Exxon's "Corporate and Financing" losses or profits by the chemical segment's revenues as a percentage of total. In this way, we hope to create as "clean" of a comparison between Dow and Exxon Chemicals as possible.

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Mind you that Figure 1 compares Dow's overall profit margin—which includes profits from specialty lines as well as from commodity lines—to profits from Exxon's pure commodity business. From the names "commodity" and "specialty" one might be tempted to assume that profit margins for the former would be lower than that of the latter.

Surprisingly, however, Exxon's commodity margins are persistently higher than Dow's blended specialty / commodity margins.

There are a few reasons this counter-intuitive observation might be true.

Some of the reasons are not important in terms of Dow's competitive position—including Exxon's Chemicals segment profitability likely being boosted through transfer pricing designed to minimize Exxon's overall tax burden and the fact that the profit measures compared are not exactly the same.

However, setting aside for a moment these bookkeeping issues, the fact that the profitability spread is so wide between the two measures suggests that Dow's management has not been making the most of either its commodity business or its specialty one. Third Point's Loeb believes that Dow is misallocating resources toward the specialty chemicals business at the expense of the commodity chemical business. Indeed, the graph above suggests that Dow's efficiency in converting revenues to profits is not as high as a close competitor.

In short, Dow's track record regarding commodity chemicals appears less than stellar.

Specialty Chemicals

In 2009, Dow purchased specialty chemical firm Rohm & Haas for just over $15 billion—about 1.6 times Rohm & Haas's 2008 revenues. Dow had specialty lines before that time, but the Rohm & Haas purchase was executed with a view to bolstering that part of the business and transforming Dow from mainly a commodity producer to mainly a specialty one.

We discuss this acquisition more later in this report, but considering that Rohm & Haas forms a core component of Dow's specialty chemical business, it is reasonable that we compare profitability between Dow and Rohm & Haas (here, we switch to our preferred definition of profitability—Owners' Cash Profits—please see this report's methodology section for a full explanation).

While Figure 2 shows that Rohm & Haas's profitability is historically better than Dow's, it is interesting to note just how small the gap is. In fact, excepting the large jump in profitability in the mid- to late-1990s, it would be hard to argue that normalized profit margins at Rohm & Haas were too far from the 6% mark. While 6% is better than Dow's normalized profit margin of around 4%, it is not shockingly so.

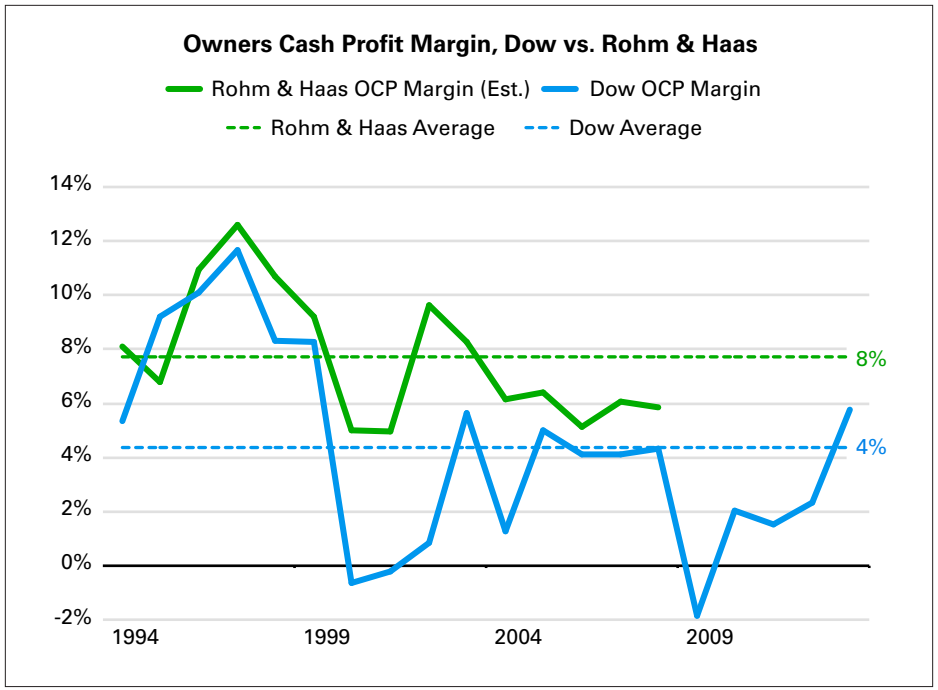

Figure 2, Source: Company Statements, YCharts Research Analysis

Also, it is worth noting that the revenue base on which Rohm & Haas were generating these profits were much smaller than that on which Dow was generating its profits. Indeed, 6% of Rohm & Haas's 2008 revenues totals an OCP of $559 million compared to Dow's 2008 OCP of $2.5 billion.

In general, looking at these data, we were underwhelmed by management's contentions of profitability and of revenue potential in the specialty chemicals field, especially considering the generally smaller size of the revenue base of specialty chemical firms.

To illustrate this point, note that after Dow, the three largest US specialty chemical producers—Huntsman HUN, Ashland ASH, and Cabot CBT—have generated aggregate trailing twelve month revenues of around $22 billion—not even half of Dow's $57 billion in revenues. In addition, average Owners' Cash Profit margins for these three firms have been on the order of 3% and extremely volatile.

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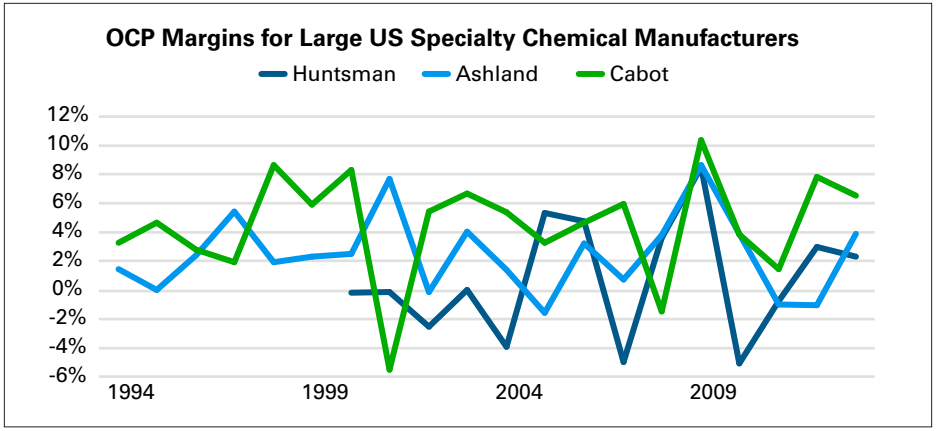

Figure 3, Source: Company Statements, YCharts Research Analysis

Considering Rohm & Haas's relatively low margin variability and relatively high profitability, it is safe to say that Dow purchased a top specialty chemical producer, so to that extent, Dow's track record in this area is good. However, considering the lower revenue potential and generally uninspiring profitability of this business, one wonders why management is so keen to enter it. Like Loeb, reading through the company's statements, we are further suspicious that Dow has misallocated owner capital toward the specialty business.

As such, we believe Dow's track record in specialty chemicals is best described as mixed.

This mixed portfolio, however, contains a product line that represents the potential for a truly transformational effect on Dow's future: agricultural chemicals.

Feeding the World

Dow's co-producer of the now-infamous defoliant Agent Orange, Monsanto MON, has transformed itself from a specialty chemical manufacturer into what might be called a biotechnology IP (intellectual property) firm.

At the core of its biotechnology juggernaut is a defoliant known commercially as "Round-Up"—a bog standard agricultural chemical which, when sprayed on plants, blocks the plants' production of growth hormones, causing them to die.

This product would simply be another specialty chemical if it was not for parallel developments in genetic engineering. Monsanto's scientists realized that they could engineer the genetic material of certain important cash crops (soy, corn, and cotton in particular) so that the resulting seeds would be immune from the defoliant effect of Round-Up (these seeds are known as "Round-Up Ready").

While the Round-Up formulation has long since lost its patent protection, Monsanto makes a great deal of money by licensing its genetic modification technology to seed companies and also by selling its own seeds. The result is that anywhere from 70-80% of all soy, corn, and cotton grown in the U.S. contain Monsanto technology, and provide high margin revenue to that company.

Monsanto's transformation has allowed it to generate an OCP margin of 16% over the last 10 years—a full five times greater than that of Dow's over the same period.

This discrepancy has not been lost on Dow's management, and starting in 2000, Dow acquired and began work on a competitive technology similar to the Round-Up / Round-Up Ready seed combination, called Enlist. The active ingredient in the Enlist defoliant has been approved for use in Brazil and is on the verge of being approved in the U.S. This is important because those two countries represent the second-largest and largest markets for genetically modified agricultural commodities in the world.

Just because Dow has a product to compete in this market does not necessarily mean that it will succeed. Monsanto has an almost monopolistic hold on the market for genetically modified seed technology, so Dow will be fighting an expensive, uphill battle against an entrenched competitor in its attempt to commercialize Enlist.

The Long and Short of It

Our analysis, outlined above and continued in the graphical section of the report, leads us to believe three things about Dow:

- The commodity chemical business is likely not being run as efficiently as it might.
- There is a compelling upside case surrounding the company's agro-business, but this upside is not without uncertainty.
- Dow's management has done a poor job of allocating owners' capital in the past.

As to the question whether Dow should split, as recommended by Loeb's Third Point, our opinion is more nuanced. It is likely that a separation of the business would in focus the attention of the respective managers on improving results.

However, companies that have related but very different business can and do succeed (Exxon's business, comprising the very different Upstream, Downstream, and Chemicals segments is a case in point). In fact, to the extent that transfer-pricing related tax arbitrage is possible and helpful to owners, it might even be said that an intelligent consolidation of related global businesses makes good business sense.

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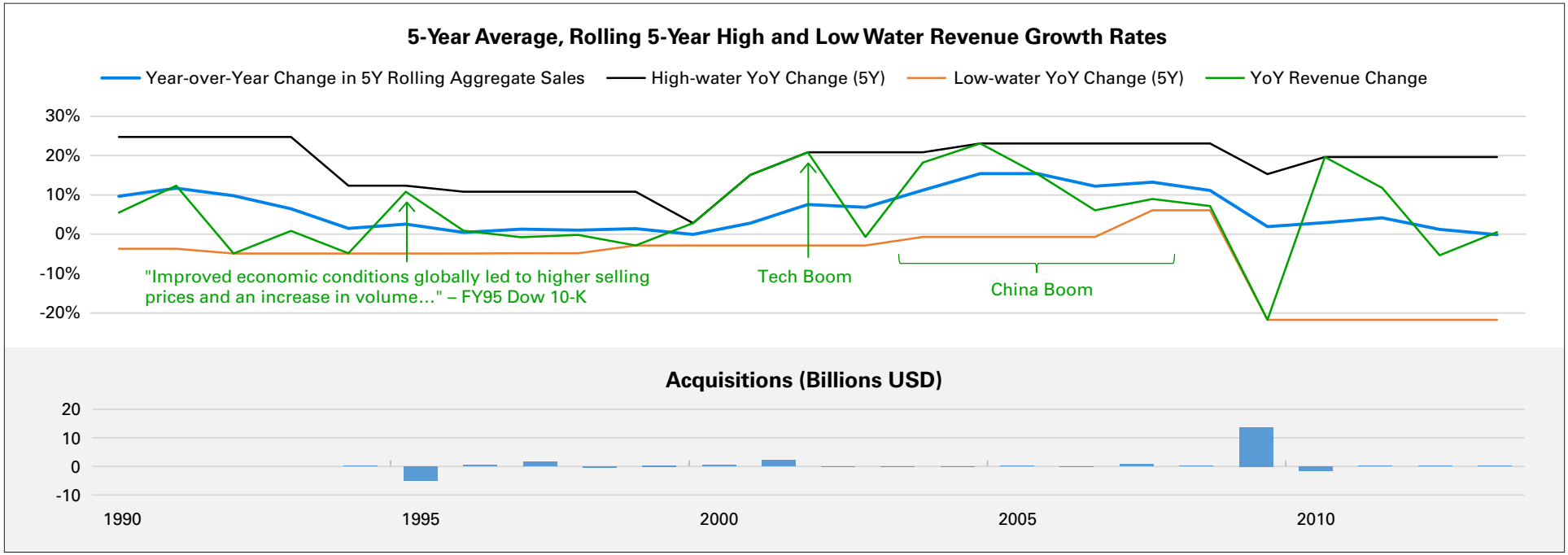
Valuation Drivers: Revenues



Growth in the five-year rolling aggregate sales change (thick blue line) shows the cyclicality inherent in this business that is so tied to the larger business cycle. The past five years' revenue growth have been depressed in part due to continuing weakness in consumer end demand, but also due to divestitures the company has had to make to pay down debt incurred in the 2009 acquisition of Rohm & Haas.

On conference calls, the management team talks about the higher growth potential of specialty chemicals, but industry analyses we have read project specialty chemicals growth of on the order of 2% per year for the next few years. True, this is better than the sub-1% revenue growth seen for commodity chemicals, but is hardly robust. The best hope Dow has for more rapid revenue growth comes from its Enlist product line of defoliant / defoliant resistant GMO seeds.

Each page of the YCharts Focus Report focuses on a piece of the three fundamental elements that drive company valuations. Revenue growth is the first of these. Please see our detailed notes in the Methodology Section at the end of this report regarding this and the other drivers.

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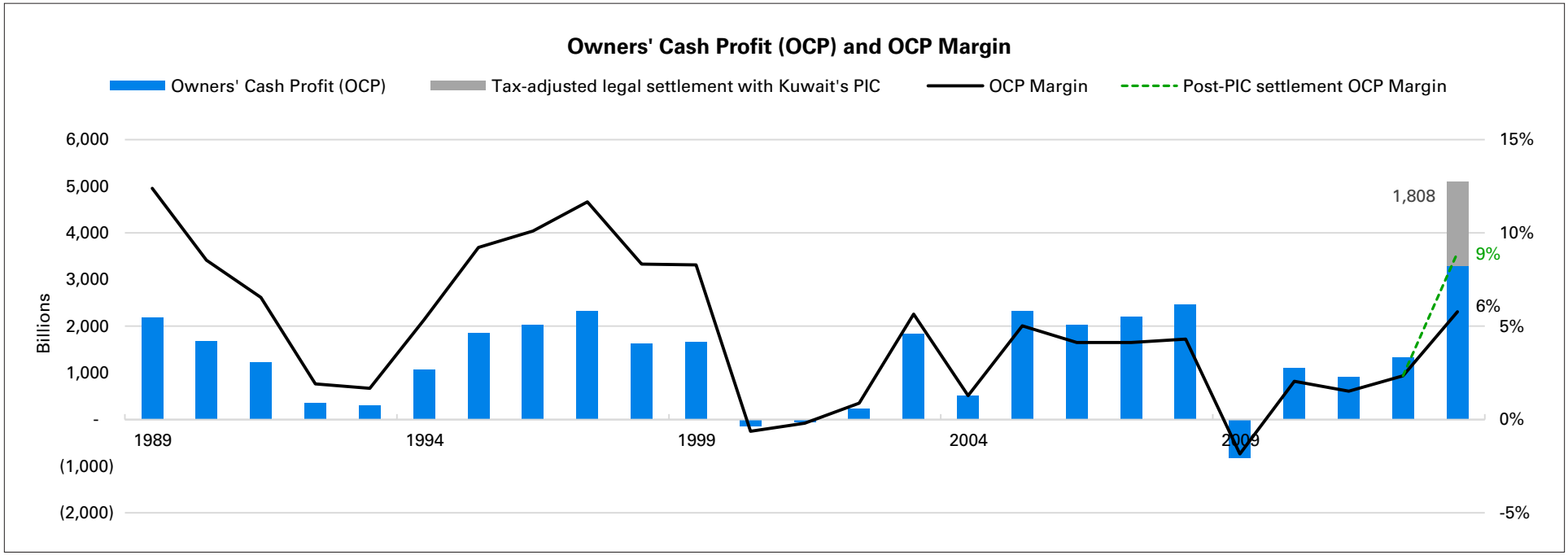
Valuation Drivers: Profitability



The Value Score screen likely picked up Dow due to a one-off boost to income during 2013. Dow had originally planned to sell its half of a joint venture to the Kuwaiti Petrochemical Industries Company (PIC) to partially finance the 2009 acquisition of Rohm & Haas. However, in the midst of the global economic meltdown, PIC backed out of the deal and left Dow scrambling to scrape up the money to buy Rohm & Haas (to which it had a contractual obligation to purchase).

Finally, in 2013, an arbitration resulted in PIC paying Dow $2.2 billion in cash. Those funds boosted Dow's Net Income and Owners' Cash Profits. Note, however, that after adjusting for this payment, Dow's 2013 OCP margin is only at the 6% level—hardly higher than Dow's profit margin before the Rohm & Haas merger.

Profitability—which we define as Owners' Cash Profits (OCP)—is the second of three fundamental valuation drivers. OCP is a cash-based measure equivalent to Cash Flow from Operations less a rough estimate of maintenance capital expenditures. Its calculation is an essential intermediary step to calculating Free Cash Flow to Owners. For detailed information regarding both measures, please see the Methodology Section at the end of this report.

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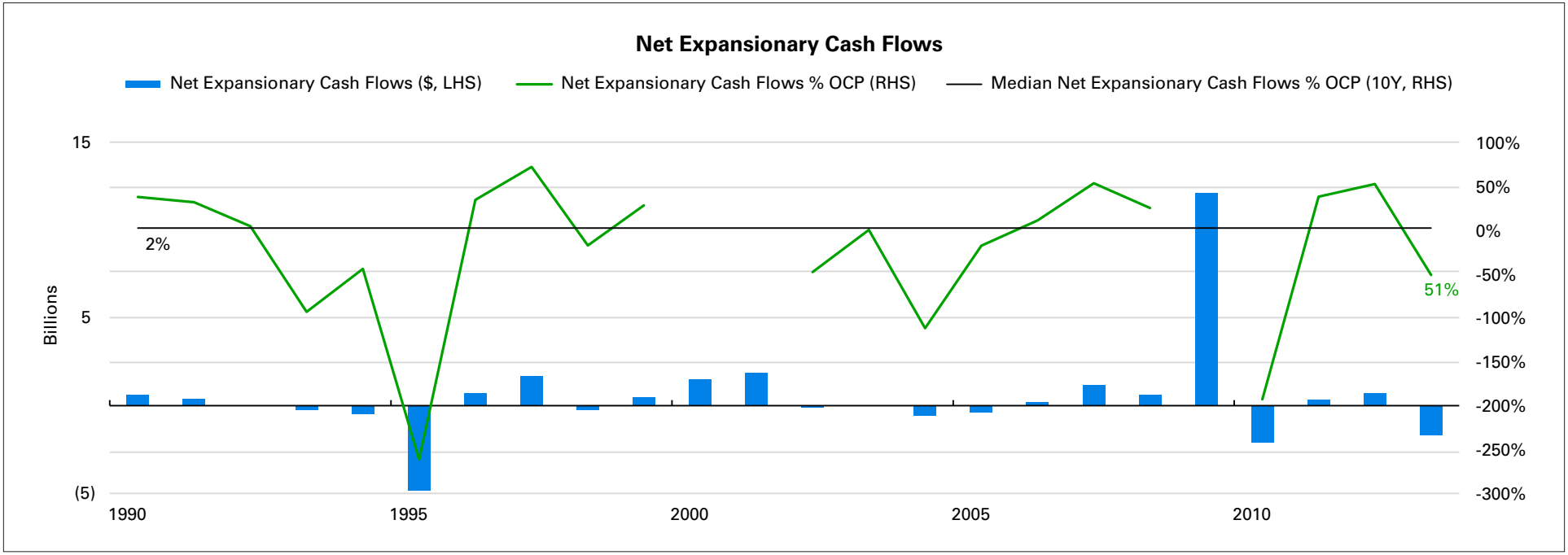
Valuation Drivers: Investment Level



One big surprise to us was how modest capital expenditures are for this business, though it makes sense if one thinks about the very low levels of revenue growth.

By far, the largest expansionary cash flow in the last generation was Dow's2009 purchase of Rohm & Haas for roughly $15.5 billion. In the subsequent four-year period, the firm has only generated an estimated $6.3 billion in OCP; at current revenue and profitability levels, it would take nearly 10 years before this acquisition begins to generate cash flow for its owners.

In addition, the most attractive part of Rohm & Haas's business—the agricultural chemicals business—had already been acquired by Dow in 2001 for roughly $1 billion. Considering the points raised in the Focus Section of this report, we do not believe the 2009 acquisition was a wise use of owners' capital.

Expansionary spending is defined as all net cash outflows above what is necessary to maintain the firm as a going concern. In short, it is all capital spending above and beyond maintenance capex. From an owner's perspective, it is the portion of owners' cash profits a management team invests to generate excess growth of revenues and / or profits in the future. Please see details regarding the components of this measure and its rationale in the Methodology Section.

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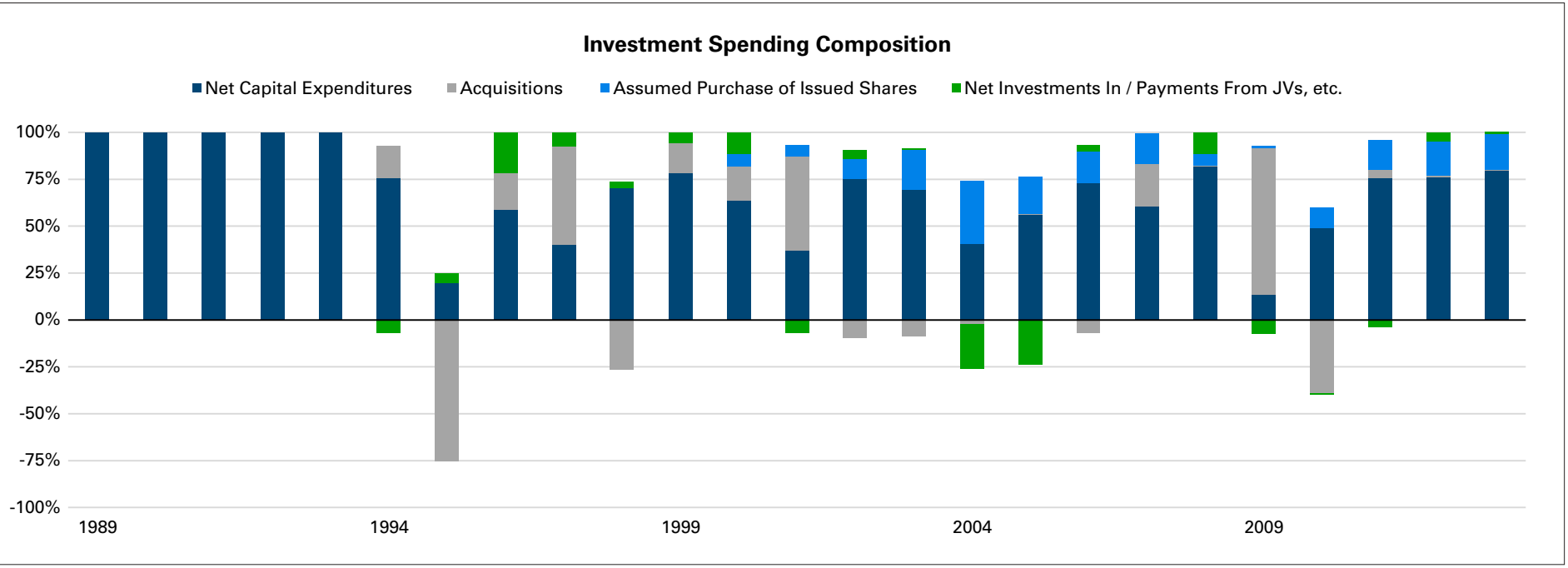
Valuation Drivers: Investment Level (continued)



The two most notable features of Dow's investment program are the joint ventures in which it invests and receives payments, and the degree to which asset sales are used to subsidize the funding of its expansionary spending programs.

Reading through Dow's financial statements, this author started framing its business as that of a professional investor who specializes in investing in chemical companies. Managers assess growth rates and profitability of the assets in their portfolio, diversification to underlying risks, etc., then decide what assets to buy and which to sell.

The inclusion of "Assumed purchase of issued shares" in the Expansionary Spending category is explained fully in the Methodology Section at the end of this report.

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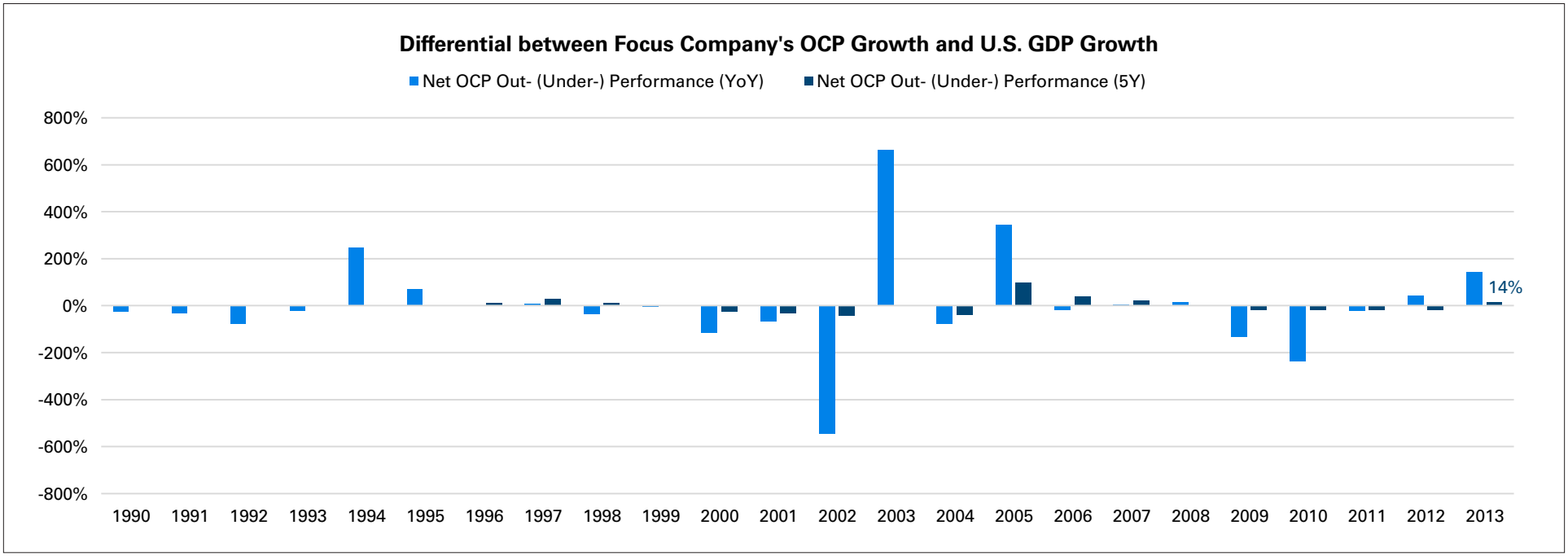
Valuation Drivers: Investment Efficacy



Dan Loeb thinks Dow management has not been doing a good job at investing its shareholders' capital. This graph is a good demonstration of that contention. It tells us that, over the period covered, Dow has not been able to consistently increase its owners' profits at a rate faster than nominal GDP. In effect, Dow has been running to stand still for the past generation.

This chart compares a company's growth in owners' cash profits to the nominal growth in the US economy over the same period. "Nominal" in this case means the growth in both activity (real GDP) and prices (inflation) in the economy. Please see the Methodology Section for more information regarding nominal GDP as a benchmark for corporate growth rates and determinations of company value.

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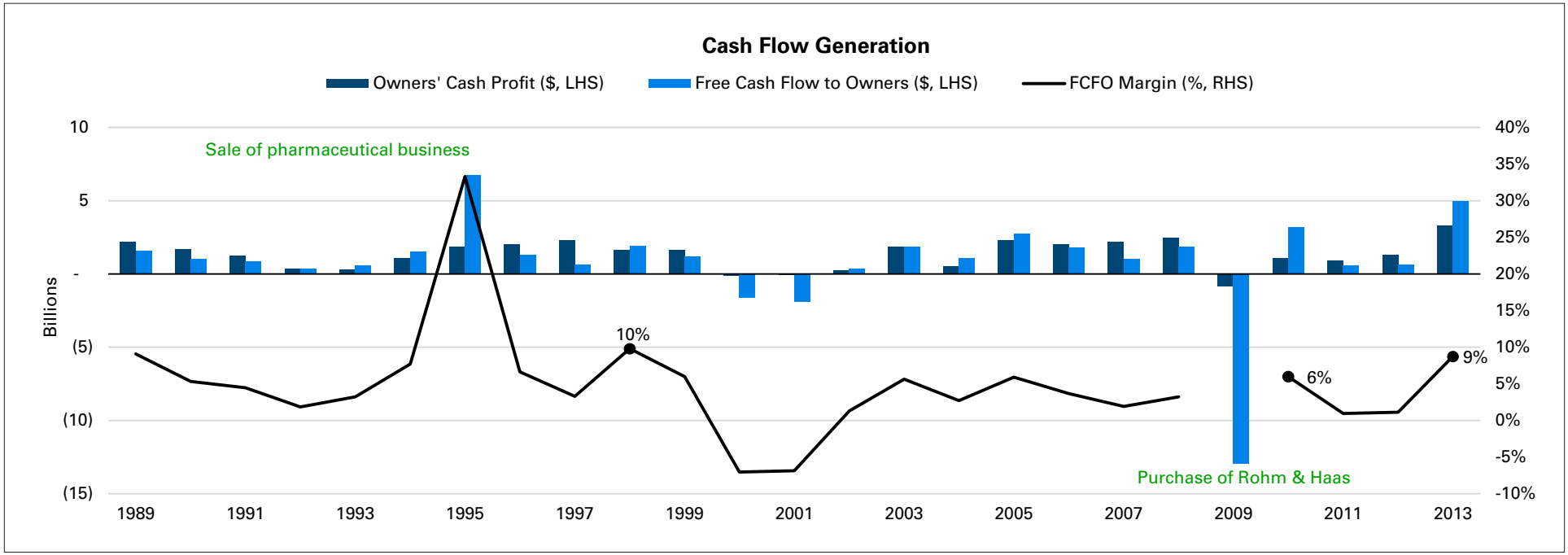
Cash Flow Generation



Because its expansionary expenditures are such a modest portion of its OCP and are often cash inflows rather than outflows (i.e, it is selling off more assets than it is buying), a good guess for a FCFO level for Dow is around 6%, judging by the recent past.

This chart shows two proprietary measures—OCP and FCFO. Please see the Methodology Section for more information regarding our definitions of these measures and their impact on valuation.

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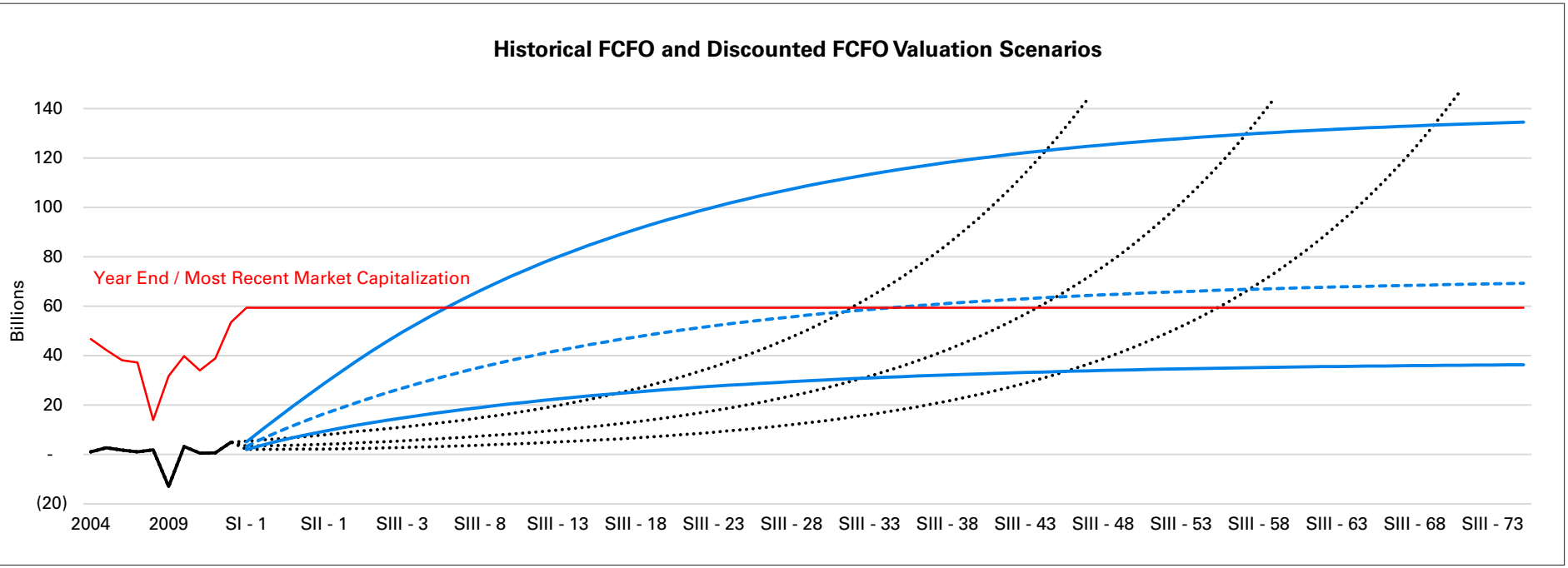
Valuation



We used the following inputs, which are all based upon an analysis of the drivers mentioned earlier in this report.

Valuation Assumptions & Scenarios

	Likely	**Worst**	Best
Revenue Growth	3%	1%	8%
OCP Margin	6%	4%	8%
Expansionary % OCP	2%	10%	-10%
Medium-term Growth	6%	3%	8%
Long-term Assumed Growth	--	--	6%
Discount Rate	--	--	10%

With these assumptions, we calculated a fair value range for the firm of $30-$112 with a median case valuation of $58 / share.

This diagram shows best-, worst-, and median-case scenarios of projected future free cash flows to owners (black dotted lines) as well as the aggregate present value of those flows (blue lines, median-case shown with a blue dashed line). The time frame used is 85 years, broken into three stages (marked SI-SIII). For more information about discounted cash flow analysis, please see the Methodology Section at the end of this document.

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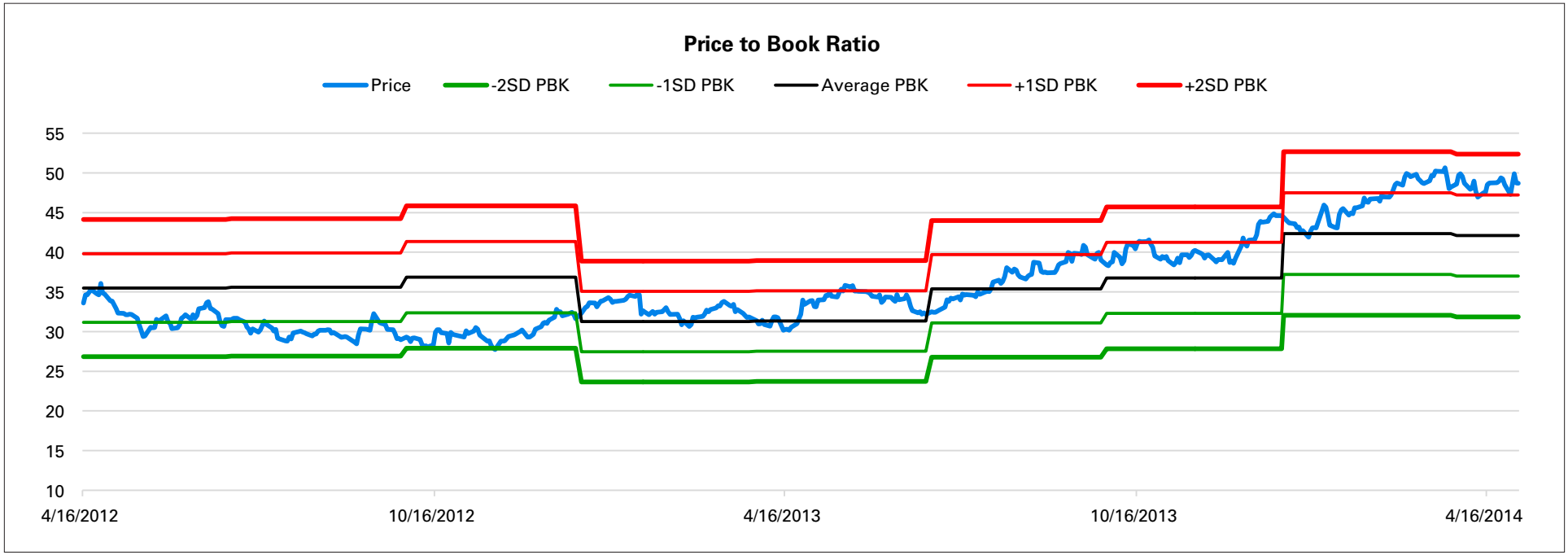
Market Multiples: Price to Book Ranges



Price-to-Book ranges show that Dow is presently moderately overvalued. This is likely due to the historical window used to make these calculations.

Valuation multiples can be used to triangulate attractive buy and sell levels for a company, but are best used in conjunction with profit-based valuation methods. Please see the Methodology Section for more information regarding the strengths and weaknesses of multiples analysis

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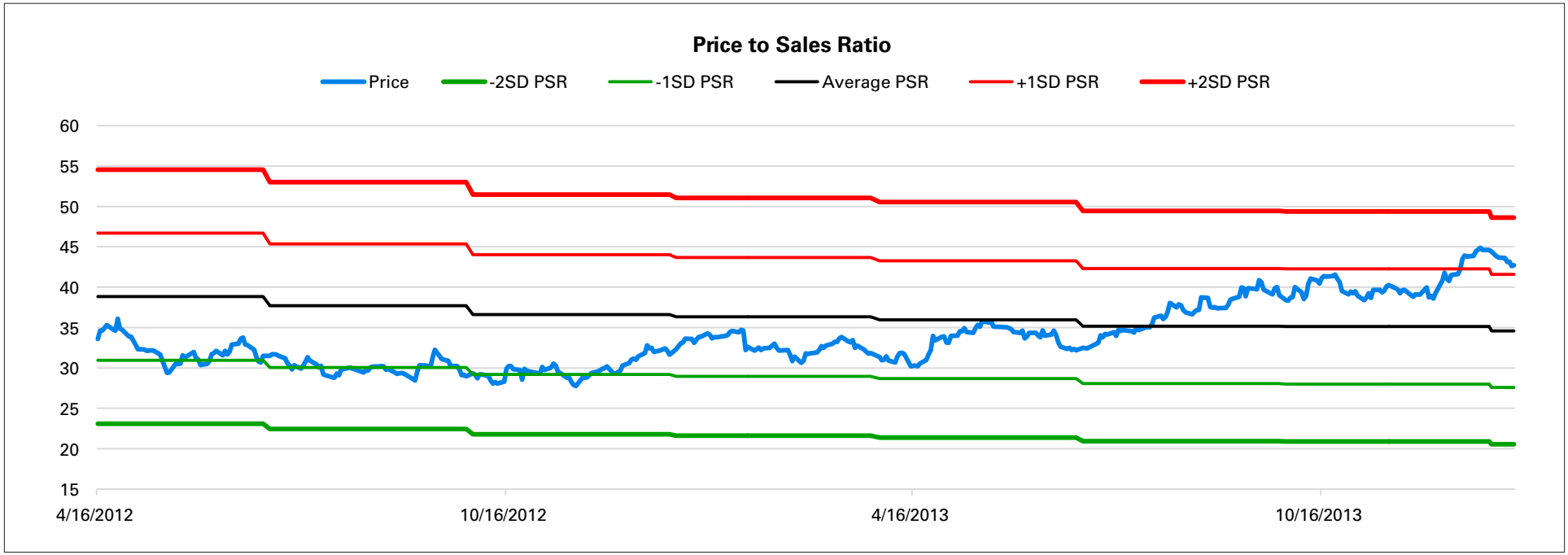
Market Multiples: Price to Sales Ranges



Again, the Price-to-Sales ratio does not offer much help in determining a fair value for Dow.

Please see note on previous page about market multiples.

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Competitive Summary

Fundamental Data

Ticker	Name	Market Cap	Net Income (a)	Pretax Income (b)	EBIT (c)	Sales (d)	Assets (e)	Equity (f)
ASH	Ashland Inc	7.9B	0.6B	0.8B	1.0B	7.4B	12.2B	4.6B
BFFAF	Basf SE	102.2B	6.4B	8.9B	9.8B	98.1B	88.5B	38.2B
MON	Monsanto Co	59.8B	2.7B	3.7B	3.9B	15.4B	23.5B	13.7B
OC	Owens-Corning Inc	4.7B	0.3B	0.3B	0.4B	5.2B	8.0B	3.9B
DD	E I du Pont de Nemours & Company	61.7B	2.9B	3.5B	4.0B	35.8B	47.8B	16.4B
DOW	Dow Chemical Co	59.1B	5.2B	7.0B	8.1B	57.2B	69.2B	26.7B

DuPont Analysis

Ticker	Name	Tax Burden (a / b)	Interest Burden (b / c)	EBIT Margin (c / d)	Asset Turn (d / e)	ROA (a / e)	Leverage (e / f)	ROE (a / f)
ASH	Ashland Inc	0.75	0.80	14%	0.61	5%	2.65	13%
BFFAF	Basf SE	0.72	0.91	10%	1.11	7%	2.32	17%
MON	Monsanto Co	0.73	0.95	25%	0.66	11%	1.72	20%
OC	Owens-Corning Inc	1.00	0.75	8%	0.65	4%	2.05	8%
DD	E I du Pont de Nemours & Company	0.83	0.88	11%	0.75	6%	2.91	18%
DOW	Dow Chemical Co	0.74	0.86	14%	0.83	8%	2.59	19%

All “flow” numbers represent trailing twelve-month (TTM) quantities.

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Competitive Summary (continued)

Cash Flow Measures

Ticker	Name	Dep / Amort	Change in NWC	TTM CFO	TTM CFO Margin	TTM FCF	FCF Margin	Dividend Yield
ASH	Ashland Inc	0.4B	-0.2B	0.7B	9%	0.4B	5%	0.0%
BFFAF	Basf SE	4.4B	-0.2B	10.8B	11%	4.4B	4%	0.0%
MON	Monsanto Co	0.6B	-0.9B	2.7B	18%	1.8B	12%	0.0%
OC	Owens-Corning Inc	0.3B	-0.2B	0.3B	6%	0.0B	0%	0.0%
DD	E I du Pont de Nemours & Company	1.6B	-2.0B	3.4B	9%	1.5B	4%	0.0%
DOW	Dow Chemical Co	2.7B	1.5B	8.0B	14%	5.3B	9%	0.0%

Multiples and Misc.

Ticker	Name	PS Ratio	PB Ratio	EV / EBITDA	P/E Ratio	P/FCF	Altman Z-Score	Beta
ASH	Ashland Inc	1.1	1.7	9.0	13.7	19.7	NA	1.44
BFFAF	Basf SE	1.0	2.7	10.1	15.9	23.2	3.5	1.21
MON	Monsanto Co	4.0	4.4	13.1	22.6	34.3	5.6	1.31
OC	Owens-Corning Inc	0.9	1.2	13.5	15.9	NA	1.9	2.45
DD	E I du Pont de Nemours & Company	1.7	3.8	12.5	21.3	40.6	2.9	1.59
DOW	Dow Chemical Co	1.1	2.6	7.2	12.6	11.5	2.8	2.52

All “flow” numbers represent trailing twelve-month (TTM) quantities.

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Methodology

Introduction

This report covers three topics: Valuation, Market Pricing, and Competition.

Valuation

The majority of YCharts' 1% Focus Reports deal with valuation. Our base assumption is that the value of a firm is proportional to the cash that flows to its owners over its economic life. Considering this definition, there are only four factors that drive the valuation of any firm:

1. Revenue Growth	Affects short-term results
2. Profitability	Affects short-term results
3. "Investment Efficacy"	Affects medium-term growth
4. Balance Sheet Effects	Hidden assets and liabilities

Market Pricing and Competition

A portion of the YCharts 1% Focus Reports deal with market perception of value and operational comparisons to the focus firm's competitors.

The long-term value of a firm sometimes deviates from its publicly-traded price. To provide an aid in triangulating the present market price of a stock to its long-run value, YCharts' 1% Focus Reports provide information about market multiples over recent history as well as summary information about the Focus company's competitors.

Valuation Drivers

What is the value of an asset?

Let's start with a simple asset: a hammer. One can buy a good, sturdy hammer on the Home Depot HD website for roughly $30.

The price of that hammer is fixed, but its value depends on how it is used. A good carpenter would use that hammer to generate revenues.

If those revenues generate profits over and above his cost of living, he can generate some savings.

With enough savings, the carpenter may be able to invest in better equipment that will allow him to generate revenues more quickly or to become more efficient at covering his living and business expenses.

The value of the hammer could, in the right hands, be worth much more than its $30 price.

No matter how complex an asset is—whether it has no moving parts like a hammer, thousands of moving parts like a machine, or thousands of patents like a modern tech company—the essence of valuation does not change.

Focus reports aim to uncover the drivers of value common to all companies and all assets. To have value, an asset must be able to generate revenues greater than costs incurred. The profits from this process can either be distributed to owners or re-invested in the business. If profits are re-invested successfully, the company will grow at a good clip into the future. If profits grow at a good clip into the future, more cash inflows will accrue to owners.

The Focus Report whittles down on each level of this process to bring readers to a modified form of Free Cash Flow to Equity that we call "Free Cash Flow to Owners (FCFO)." Please find detailed explanations of each valuation driver and the resultant valuation measure in the below sections.

Focus reports aim to uncover the drivers of value common to all companies and all assets… Our base assumption is that the value of a firm is proportional to the cash that flows to its owners over its economic life.

Benjamin Graham once observed that over the short term, the market was a voting machine but over the long term, it was a weighing machine. The goal of YCharts' 1% Focus Reports is to highlight the "weight" of a firm.

Reading through, please keep the sage advice of Warren Buffett in mind: "It's better to be approximately right than precisely wrong." It is in this spirit that we have designed this report.

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Revenue Growth

The road to value starts with revenues. Our carpenter's hammer is only a novelty purchase if he cannot use that hammer to generate revenues.

Revenue growth is constrained by both supply and demand factors.

After a hurricane, the carpenter's skills are going to be in great demand. His revenues will increase because he can charge more for his services[1], but his capacity to generate revenues is limited by his small capital base—one hammer. This is an example of how supply factors can limit revenue growth and is typical for a small firm operating in a robust demand environment.

The carpenter may be able to get outside funding to increase the size and / or efficiency of his capital base and in so doing, will realize fewer supply-side constraints to revenue growth. However, after the initial post-storm building boom, the carpenter's business is likely to face more demand constraints to revenue growth than supply-side ones. Demand for his services from local homeowners is simply not as strong after most people's houses are repaired.

Public companies also reach the point at which their revenues cease to be supply-constrained and are begins to be demand-constrained.

This is what Nike's NKE Phil Knight said about his company's transition from supply- to demand-constraint in a 1992 Harvard Business Review article[2]:

The road to value starts with revenues... Revenue growth is constrained by both supply and demand factors.

> [HBR:] "When did your thinking [about business strategy] change?"
>
> [Bill Knight:] "When the formulas that got Nike up to $1 billion in sales—being good at innovation and production and being able to sign great athletes—stopped working and... Reebok came out of nowhere to dominate the aerobics market."

Nike's ability to supply products to consumers was not a constraint to its revenue growth. Rather, demand for a competitor's products cut into demand for Nike's, and this dynamic constrained revenue growth.

In a demand-constrained environment, our carpenter might decide to spend more on advertising to win more clients (which affects profitability—our next valuation driver), or might choose to acquire a similar business with a well-defined client base of its own. For instance, our carpenter might take out a loan or use his business's excess profits to buy a wholesale building products distributor.

This strategy, sometimes referred to as "buying revenues" is, of course, common in the world of listed companies as well. And while some investors look down on these kinds of transactions, as long as the company is not overpaying for its acquisitions, acquiring a new revenue stream by buying a business is as "valid" a strategy as acquiring a new revenue stream by building it.

Phil Knight's comments regarding Nike's purchase of casual shoe company Cole-Haan in the same HBR article quoted above are telling:

> "We bought the brand knowing its potential... We could have created a brand and got it up to $60 million in sales, which is where Cole-Haan was when we bought it, but it would have taken millions of dollars and a minimum of five years."

It should be obvious from this discussion that revenue growth is inextricably linked with capital expenditures and other "expansionary outflows"—such as acquisitions—which is why Focus Reports show revenue growth overlaid with the amount of money spent on acquisitions.

We will look more at how to assess whether acquisitions and other expansionary cash flows are good for owners or not when we look at Investment Efficacy.

For now, let us turn to the second driver of value: profitability.

Profitability

Most of the measures of profitability drawn from Income Statements and widely used on The Street have little meaning to our carpenter and his business. He cares about how much cash his business generates in a year, not how the rarified, polite fictions embodied in Generally Accepted Accounting Principles (GAAP) rules view his growing firm's profitability.

Investors would do well to look at investing from a cash perspective as well since cash is the single accounting line item with the least amount of "fiction" in it. Cash balances are easy for auditors to count and verify and, unless you are living in a hyperinflationary economy, the purchasing power of cash is well-defined and stable.

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1 Revenues are proportional to price and volume. In this instance, volume is fixed, but price rises for an overall rise in sales level.
2 Willigan, G. E. (1992, July-Aug). High Performance Marketing: An Interview with Nike's Phil Knight. HBR, 93-101.

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It is for this reason that our view of profitability is based on a line item on the Statement of Cash Flows rather than on the Income Statement. Namely, we base our measurement of profit on Cash Flow for Operations.

In terms of Financial Statement accounts, the specific calculations we use are:

	Cash Flow from Operations (CFO)
Less	Estimate of Maintenance Capital Expenditures
Equals	"Owners' Cash Profits (OCP)"

CFO is self-explanatory, but "Estimate of Maintenance Capital Expenditures" deserves explanation.

Revenue growth is inextricably linked with capital expenditures and other "expansionary outflows"—such as acquisitions...

In order for our carpenter to maintain his company as a viable economic entity, he must make sure the tools his employees use and the warehouse in which he keeps his supplies are maintained at a level at which they can continue to generate revenues.

Using only cash-based CFO as a measure of profitability—which is, in fact, one step better than relying on a figure like the widely-misused "EBITDA"—would vastly overstate a firm's profitability. CFO overstates profitability because it does not reflect any future payments that must be made for maintenance of revenue-producing capital goods.

Like our carpenter, we as analysts cannot be sure of what cash will be required to maintain a business's capacity to continue generating revenues. Cognizant of the fundamental uncertainties involved, and in keeping with our attempt to be "approximately right rather than precisely wrong," we estimate the required amount of maintenance capital expenditures to be Depreciation Expense adjusted for inflation.[3]

The amount of cash a company generates from its operations less the amount of cash it will probably need to spend to maintain its operations in the future is our preferred measure of profitability. Once we calculate this measure—that we call "Owners' Cash Profits (OCP)"—we are one step closer to the Free Cash Flow to Owners measure needed for valuation. The next step in the process is to see how much cash the firm is spending in excess of maintenance levels to expand the business at a faster rate—what we term "Expansionary Cash Flows."

Expansionary Cash Flows and Investment Efficacy

Our carpenter started the year with an empty bank account and, after paying himself and his employees a salary, paying for supplies and inventories, paying interest on any loans taken out, setting aside money for taxes and equipment maintenance, and doing all the other things necessary to keep his business going, he has a nicely positive balance at his local bank branch.

What does he do with those excess profits? The answer to that question will necessarily determine the future of the firm.

Our carpenter has two choices:

1. Reinvest left over profits in the business
2. Pay himself—the owner—a bonus out of profits

If he invests in projects that bring him greater revenues (geographic or business line expansion) or helps his company convert revenues to profit more efficiently, his future profits will be boosted. If he invests in projects that fail to increase revenues, or in those that increase revenues in an uneconomic way—meaning profits drop even as revenues increase—his future profits will dip.

If he pays himself a bonus out of profits, but otherwise runs his firm efficiently, his company's profits will likely continue growing "organically" from periodic price rises and new customers learning about his services; however, profits will not grow as quickly or reach as high a level if he were actively and successfully investing in the business.[4]

Since our base assumption is that the value of a company is proportional to the cash it generates on behalf of its owners it is obvious that profit growth will have a huge impact on valuation.

Before discussing how to measure and assess "expansionary" investment cash flows, let us look more closely at growth rates.

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3 As a wonkish aside, we are trying to isolate the amount of cash that will be necessary to maintain the basic operations of the company, so we exclude any Amortization charges related to bond discounts, intangibles, etc. if these are split out in the company's financial statements.

4 The one other possible use of excess profits is what we consider "wasting" it. For example, one of the first mortgage brokers to go bankrupt in 2007 was one that had spent its excess profits on building a new headquarters building with an atrium entrance featuring a waterfall decorated with a tile mosaic portrait of the founder behind it. This mortgage broker went the way of all firms that consistently waste resources...

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There is virtually no limit to our carpenter's business's early growth. If his services and products are compelling, and solve problems other carpentry services and products do not, his company will expand locally, regionally, nationally, and globally—limited only by his access to capital to fund the expansion. Think of Google GOOG as an example—its products were so compelling that it went from little more than a graduate school science experiment to one of the largest, most profitable corporations on earth in a decade and a half—despite two downturns of various severity in the interim.

However, if our carpenter is as successful as Google, eventually, he will have soaked up all available demand for carpentry services and squeezed every bit of efficiency out of his operations as possible. At this point, his company's profit growth will slow.

The easiest and most powerful method we have found to analyze a company is to conceive of its future growth as being bucketed into three separate stages: near-, medium-, and long-term.

Near-term, growth of profits will vary according to dynamics related to the competitive environment. To put it in the context of our carpenter—how many people need carpentry services and how many other carpenters are there in the area.

Medium-term, growth of profits will depend on the success, failure, or absence of expansionary projects and organic growth in the core business. For our carpenter, this means whether or not his purchase of the distributor is successful or if he plays it safe and uses excess profits to take a Caribbean cruise.

Long term, a large firm's growth is constrained ultimately by how fast the economy at large can grow. For most carpenters, this relates to the growth of new home construction and home remodeling in their local areas.

These stages and the value generated in each can be represented graphically, as we see in FIgure 1 to the right. Here, we are assuming the company's growth will fluctuate in the near term based on our projections of its revenue and profitability (marked by "Explicit forecast" in this diagram), that it will grow quickly for five years in Stage 2 based on assumed success of its investments, and that after its high-growth period, it will grow at a more or less constant rate equal to nominal GDP after that.

Note that even though future cash flows keep growing at a constant rate into the future, because the present value of those far-distant future cash flows is low[5], their discounted value approaches an asymptote at around $1,200.

It is obvious that if we are to assess the value of the Stage 2, high-growth period, we must first find a way to quantify how much of the owners' profits the firm is spending on expansionary investments.

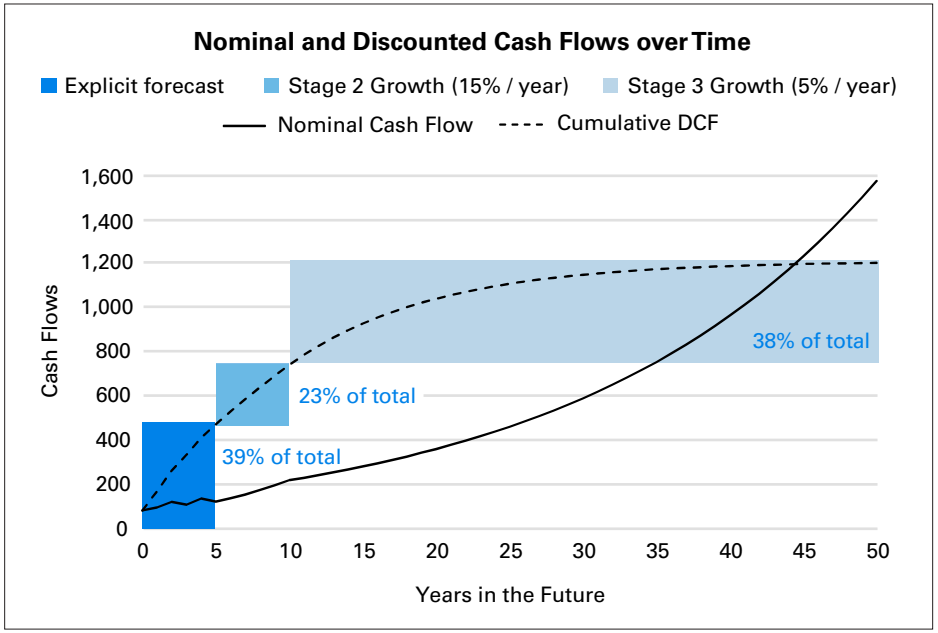

Figure 1.

Measuring Expansionary Cash Flows

People normally think of business reinvestment in terms of capital expenditures. Indeed, this is a valid way to think about investments for manufacturers in a fairly stable competitive environment (like our carpenter).

However, in these days of globalization and rapid technological innovation, we believe "Capex" fails to cover all the cash outflows made by large firms to expand their businesses at a rate faster than the economy at large.

Once these outflows are taken into account, any cash left over is free to be distributed to owners. It is this "Free Cash Flow to Owners (FCFO)" to which we assume companies' values are proportional.

5 Due to the theory of time value of money (TVM).

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The formula we use to calculate investments and FCFO is:

	Owners' Cash Profits
Less	Capital Expenditures over and above Maintenance Needs
Plus	Cash Inflow from Asset Sales and Disposals
Less	Cash Loaned to JVs, Software development, etc.
Less	"Mandatory" Stock Buybacks
Equals	"Free Cash Flow to Owners (FCFO)"

All line items between OCP and FCFO are what we consider as Expansionary Cash Flows.

Recalling that our estimate of economic profit already has an estimate of maintenance capital expenses calculated in it, we can see that the first three lines above are simply the standard definition of Free Cash Flow to Equity Holders (FCFE); namely FCFE = OCF less net spending on PP&E.

Let us look at the other lines, one by one.

Our carpenter might decide to expand his distribution business by opening a new branch in the neighboring state. In order to run this business effectively, he forms a joint venture (JV) with a local businessperson and provides capital to that JV. Clearly, this is a cash outflow made with the purpose of expanding the carpenter's business. It might be a stretch to imagine, but perhaps our tech-savvy carpenter sees the opportunity to hire a programmer to write some inventory management software that will make his business more efficient. Because an increase in efficiency implies a greater amount of future profits being realized, we should also count this sort of investment as an expansionary cash outflow unavailable to distribution to owners.

In these days of globalization and rapid technological innovation, we believe "Capex" fails to cover all the cash outflows made by large firms to expand their businesses at a rate faster than the economy at large.

While these measures are pretty straight-forward, the "Mandatory" Stock Buybacks line item requires a bit more commentary.

Over the past 20 years, companies have increasingly turned to stock buyback programs to "return value to shareholders." Management teams are supported by academicians, who have proved through elegant mathematical reasoning that since managers have inside information about the future prospects of the firm, their purchases of stock on behalf of shareholders must always be value creative.

Indeed, to the extent that stock repurchases increase the proportional stake of an owner in the company, they can, in a certain sense, be thought of as value creative. However, one dirty little secret about stock buybacks is that in most cases, a material proportion of buybacks are going not to increase present owners' proportional stake, but rather to soak up dilution caused by management's granting its employees stocks as a part of their compensation package.[6]

By using equity grants as a form of worker compensation, upper management is essentially funding a portion of its operating costs through dilutive stock issuance. By buying back those shares, it is using cash flow that would otherwise become shareholder wealth to obfuscate this compensation scheme and keep earnings per share (EPS) from falling or stagnating.

It would be nice if we could tie this phenomenon to something a small businessperson like a carpenter might do. However, this is an "innovation" that most small businesspeople do not use for one obvious reason: Owners of a closely-held company would likely not see any sense in doing it. A large corporation can get away with it because, frankly, many of its owners are not paying close enough attention.[7]

It is a toss-up as to whether this spending on anti-dilutive stock buybacks should be treated as a deduction from owners' cash profits or a reduction of FCFO. Because the stock grants

6 There are other dirty little secrets that are well-documented, such as the fact that management teams, which are allegedly super-investors in their own company's stock given their insider information, still tend to purchase more shares when the stock price is relatively high, and less when the stock price is low. While it is impossible to deny that an increase in proportional share of the company is good for shareholders, it is hard to believe that managements consistently do a good job of investing in their own company's stock.

7 There may indeed be some cases in which a small businessperson, in the attempt to conserve cash in the short term, would compensate a lawyer or accountant by promising a share of the business's future profits. It would also be likely that a small businessperson in this situation would attempt to pay off the professional fees in cash as soon as he had cash to cancel the ownership claim. But the thought that a small businessperson would attempt to obfuscate this transaction when presenting financial results to his partners is hard to imagine.

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are given as a way to meet operating costs, it could be counted as the former. However, one could make the argument that granting shares in lieu of cash encourages employees to work hard and creatively in order to generate superlative growth.

In the end, though, the difference is academic since the result is the same—a reduction in the cash flow available to be distributed to owners. We calculate the cash outflow associated with these anti-dilutionary purchases as the number of shares issued multiplied by the average share price during the year.

Now that we have an "approximately accurate" view of how much the firm is spending to boost its future growth, the next task is to find an objective measure of how effective its investment strategy is.

Estimating Investment Efficacy

Assessing the success of a professional money manager, it is typical to measure the degree to which the manager's investments over- or under-performed some benchmark over time. Warren Buffett's investments have consistently outperformed those of the S&P by a wide margin over an extended period of time, so we recognize Buffett as a great investor. Surely, companies that invest in expansionary projects can also be assessed relative to success vis-à-vis some benchmark.

Assessing the success of a professional money manager, it is typical to measure the degree to which the manager's investments over- or under-performed some benchmark over time... Surely, companies that invest in expansionary projects can also be assessed relative to success vis-à-vis some benchmark.

Thinking back to our prior discussion of growth stages, it is obvious that long-term, a company cannot grow faster that nominal GDP. It makes sense then, to use nominal GDP as a benchmark for growth during the high-growth, "Stage II" period.

Now, we have a benchmark, but against which quantity—growth of OCP or growth of FCFO—should we compare it?

Our preference is to compare growth of Owners' Cash Profits to nominal GDP for the following reason:

FCFO is a quantity that is influenced by other investment decisions, so the number tends to be very noisy. For example, let's say our carpenter invests 10% of his cash profits in a new piece of equipment at the end of year 1; this equipment improves his workers' efficiency so much that he is able to generate a huge amount of excess profits over the next year. He has such a surfeit of cash at the end of year 2, that he decides to make a stretch purchase of a new distributor and spends 100% of his cash profits on it. It is clear that the year 1 investment was good for his company, but if one looked at it in terms of the FCFO in year 2—which is $0, because he spent 100% of Owners' Cash Profits on the distributor—it would look like a terrible investment.

Note also that business investments often take several years before their full impact on cash profits are felt. As such, we consider investment efficacy as a valuation factor that influences medium-term growth rates.

By benchmarking growth in Owners' Cash Profits to nominal GDP, we are implicitly making the assumption that, at the end of the company's high-growth period, the managers will be sage enough to return profits to owners rather than embarking on value-destroying investment projects. Depending on the firm and the industry, this might be a pretty big assumption to make, but investors are suspicious of management teams' ability to act as sage stewards of owner capital can lower their "high-growth" growth projections to compensate.

A firm that has plenty of good investment opportunities—say one that is a leader in an emerging industry—and is skillful at choosing the best ones in which to invest, will be able to grow at a rate much higher than nominal GDP for a long time (e.g., 10 or 15 years after the initial 5-year "explicit" Stage I period).

A firm that has middling investment opportunities may be able to grow faster than GDP, but not significantly and not for as long. A company with a mature business in a stable competitive environment will return most of its cash profits directly to owners, so should be able to grow at about the rate of GDP—maybe a few points higher one year and a few lower the next.

Looking at growth stages from this perspective and tying value creation to each growth stage in this way makes it much easier to come to an objective opinion regarding the company's value.

After understanding the level of investment spending and its efficacy, we turn to the value created or destroyed by "hidden" assets and liabilities—Balance Sheet Effects.

Balance Sheet Effects

Let's say our carpenter, after becoming very successful in his own trade and as a distributor, decides to expand into the taxi business. He buys two used cars for $20,000 each as his

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primary operating assets for this, the newest division of his burgeoning economic empire. The cars are used, so he decides to clean them out before putting them into service.

While he is cleaning out the first car, he finds a tightly-wrapped brown package in the spare tire well and, upon opening it, is surprised to find that the package conceals a large quantity of illicit drugs. Reporting his find to the police, the police impound the car as evidence and tell him they cannot give him an estimate of when it will be returned.

In the parlance of accountants, our carpenter's operational asset has become impaired by a non-operational contingency. In plain terms, he can't use his car to make money. Since revenues will decline, the value of his new taxi cab division has necessarily declined.

A firm that has plenty of good investment opportunities—say one that is a leader in an emerging industry—and is skillful at choosing the best ones in which to invest, will be able to grow at a rate much higher than nominal GDP for a long time...

Disappointed about the indefinite loss of one car, he grudgingly starts cleaning out the second one. As he is vacuuming between the seats, he finds a lottery ticket. He goes to claim the lottery ticket and finds it is worth $500,000.

In the parlance of accountants, his operational asset has had a material upward revaluation. In plain terms, his new taxi cab division is his company's newest unexpected rain maker. The after-tax winnings from the lottery ticket are pure, unanticipated profit for his taxi division and hugely increase its value and the value of the firm.

Unlike the drivers of valuation mentioned earlier, these "balance sheet effects"—the hidden assets and liabilities controlled by a firm—are difficult to find with data alone. Instead, it usually requires an in-depth understanding of the company, accounting rules, and, in some cases, legal matters (think Enron or Lehman Brothers).

Because balance sheet effects are difficult or impossible to find by looking only at reported financial data, YCharts Focus Reports cannot directly highlight these drivers of value. However, the long history of data we display and the clear manner in which we do it should point the curious and intelligent investor to areas in which to investigate further and uncover them themselves.

Historical Multiples

See also the notes on YCharts' site entitled Valuations from Historical Multiples.

While the drivers to corporate valuation are as listed above, the inherent imprecision of attempting to forecast economic outcomes for as complex an entity as a modern multinational firm means that it is helpful to use alternate metrics to triangulate our intrinsic value calculations.

One oft-used method for both screening a large universe of stocks for attractive investment opportunities and triangulating intrinsic value calculations is what is known as the historical or market multiple. Common examples include the price-to-earnings (P/E) ratio, price-to-sales ratio (PSR), and the like.

The idea behind multiples is that the price per unit of some financial statement quantity should, in general be relatively constant, or at least that it should return to normalized levels over time.

There is academic evidence of the success of at least one of these multiples (Price-to-Book ratio), but attempting to use historical multiples as a sole tool to value equities is a method fraught with conceptual difficulties.

The most important thing to realize about market multiples is that differences in capital structure, business model, geographical exposure, and other factors can make the direct comparison of multiples across companies difficult.

In order to compare one company to another on an apples-to-apples basis, one must factor in operational and capital structure differences; this often requires a great deal of detailed information about the company and a firm understanding of arcane accounting rules and concepts.

Even comparing a single company's multiples versus previous historical periods is difficult, since companies often change their capital structures over time, buy and sell off divisions, and the like.

In general, it is important to realize that unlike physical constants, there is no rule that a certain company's multiple cannot fall below a certain level. Apples fall to the earth at 32 feet / sec^2, neglecting wind resistance. Stocks conform to no such physical constants.

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