Client Focus Report:
International Business Machines Corp (IBM)

YCHARTS

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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: International Business Machines Corp (IBM)

VALUE SCORE

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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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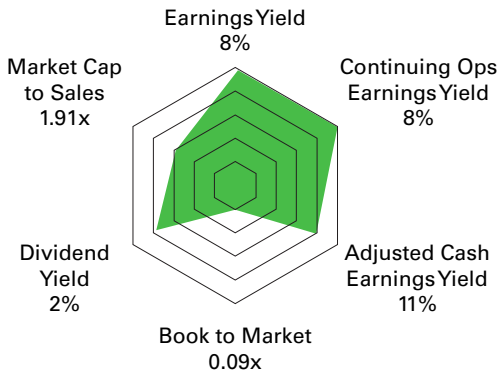
Focus on IBM (IBM)

Ticker	IBM
Name	Intl. Bus. Machines Corp
Industry	Info. Technology Services
Market Capitalization	182,912
TTM Sales	98,828
TTM CFO	16,788
TTM CFO Margin	17%
Mkt Cap /TTM Sales	1.9
Mkt Cap /TTM CFO	10.9
Long-Term Debt	64,980
Shareholders' Equity	22,792
D/E Ratio	285%
Altman's Z-Score	4.0
Beta	0.7
Return on Equity	0.8%

Value Score Factors



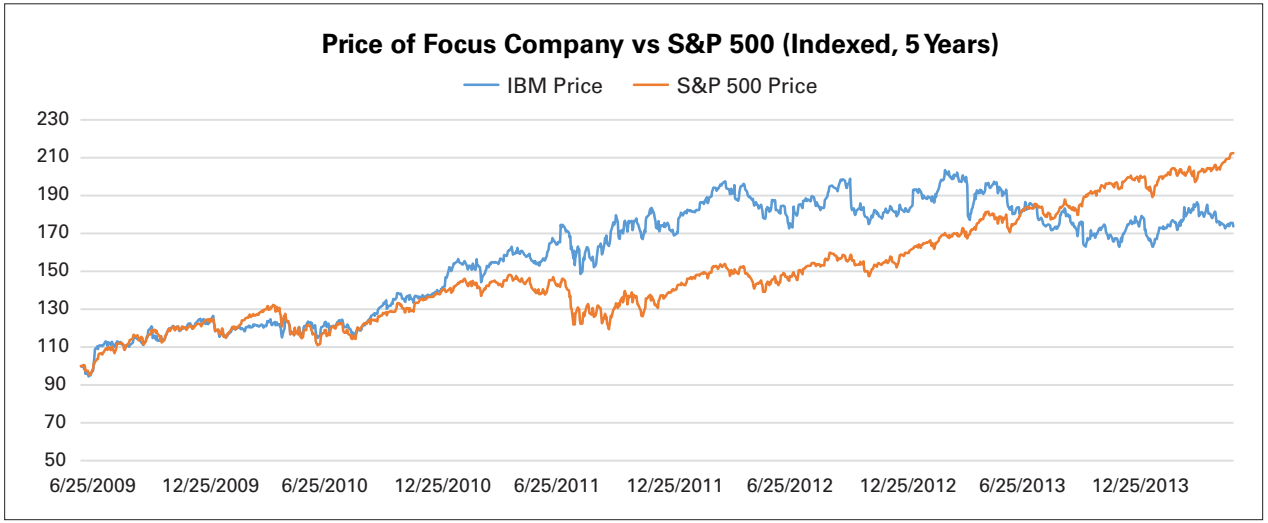
IBM is like Japan. Both have their own, distinctive cultures that value conformity and technical prowess. Both are known for their rigidity and hierarchy. And both react to structural change in a way that this author terms “the earthquake model.”

The earthquake model of structural change implies a slow build-up of tension which causes no noticeable difference for years, followed by a sudden, disruptive shift. Japan has experienced political and economic earthquakes many times in its history, and, interestingly enough, so has IBM.

Lou Gerstner’s tenure as CEO (1993-2002) marks a notable IBM earthquake. The company, which had been the nearly uncontested leader in the tech world for decades as a producer of mainframe computers, PCs, and consistently unexciting but functional software, nearly went bankrupt before Gerstner transformed it into mainly an IT services firm.

The ground is again moving under IBM’s feet. Pundits claim that the present changes could be the end of Big Blue. Will the company’s edifice remain standing when the shaking stops?

(continued on next page)

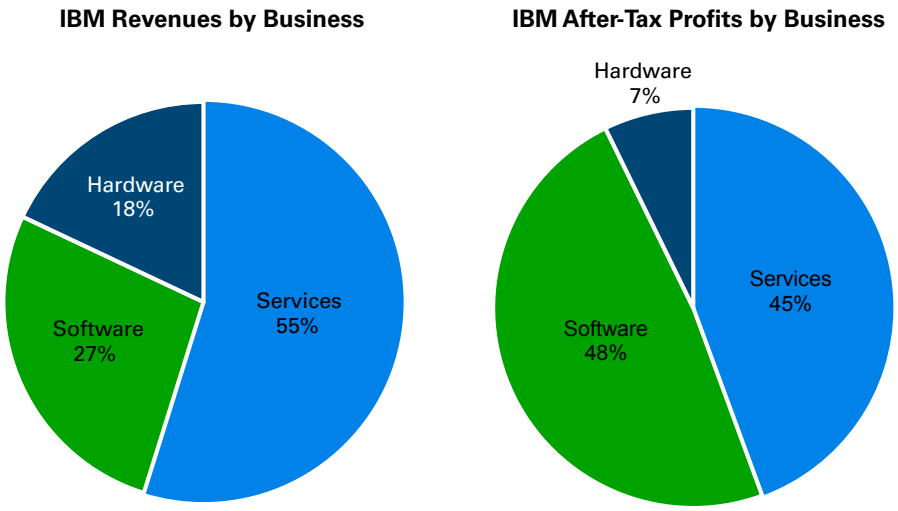


What's Moving?

IBM is in the midst of an earthquake, but the cause of the Tech firmament's movement has an ethereal name. It is the transfer of storage and computing power onto the Internet commonly known as The Cloud.

The linked Wiki article provides much more in-depth information about the Cloud, but for this report, we will assess its probable effect on each of IBM's three main business lines: Hardware, Software, and Services.

Before going any further, let's take a look at the most recent levels of annual revenues and profits for each of these lines:



Figures 1 and 2. Source: IBM financial statements, YCharts Research analysis

After noting that Hardware (including Financing) represents only 7% of IBM's after tax profits, let's take a look at how the shift toward the Cloud has the potential to affect IBM's hardware business.

Hardware

The first problem is that the servers used for Cloud implementations—termed "x86 systems" from the Intel chips that power most of them—are generic and commoditized. As anyone who has taken an Economics course knows, and it is hard to differentiate oneself or extract outsized economic rents from a generic, commoditized business.

To avoid getting caught up in a commodity price war with other makers, IBM announced it would sell its x86 business—probably worth somewhere around $3 billion in revenues per year—to Lenovo in January of 2014.

The second problem of cloud computing from IBM's perspective is that, because so many people are shifting to the Cloud—renting computer power rather than making capital expenditures—the relative importance of the market for owned machines and the dollars spent on them is shrinking.

Pedants may take umbrage, but I'm going to call these machines "UNIX servers" because UNIX is the operating system that most of these high-end computers run. IBM is the dominant force in the UNIX server market, with nearly 60% market share (Oracle ORCL is the runner up with only mid-teens percent market share).

The effect of the shift to the Cloud has been visible in IBM's hardware segment revenues over the past several years.

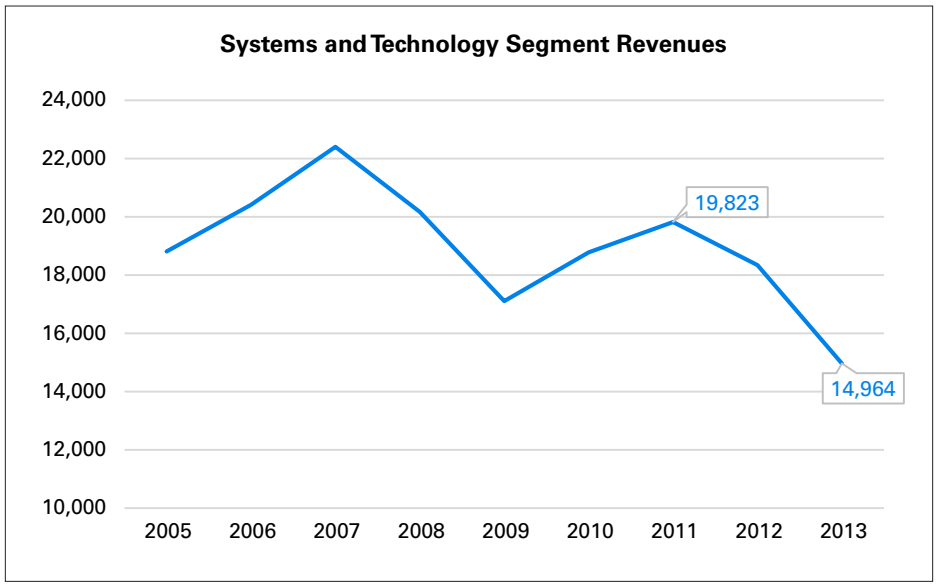


Figure 3. Source: IBM financial statements, YCharts Research analysis

(Part of the notable decline after 2011 is due to the fact that IBM hemmed and hawed about selling the business since 2012, and this caused some client flight.)

Due to the sale of the x86 business to Lenovo, IBM's revenues will shrink by around $3 billion this year (all else held equal), which translates into a revenue growth headwind of around 3 percentage points. Profits in this business are low, so hardware margins will likely expand after the sale.

IBM probably makes about $7 billion in revenues from the UNIX market. This line (along with the line for storage devices) is facing Cloud headwinds, so around 7% worth of IBM's total revenues is likely to be drag on growth. Let's say that 7% of revenues shrinks by 5% per year for 5 years; the total effect on IBM's top line will be a drag of less than half a percentage point per year.

Consulting

IBM's consulting business is inextricably tied to its hardware business. According to a retired executive of an IBM Consulting competitor, one of IBM's sales strategies has been to bundle its hardware, services, and software products together in order to make direct price comparisons between competitors more difficult. An IBM salesperson anxious to seal a services deal may be able to sweeten the offer by packaging in some cut-rate hardware or software, for instance.

IBM's sale of its x86 server business to Lenovo might make these kinds of packaged deals more difficult, and may cut into the services business. However, the majority of IBM's consulting (help desk staffing and technology outsourcing) does not depend on hardware sale (otherwise companies like Infosys INFY and Wipro WIT would be severely disadvantaged and they are not).

The bit of IBM's consulting that is tied to hardware sales (technology implementation and integration) is mainly tied to the UNIX business that IBM is planning to hold onto. This is business like building out a new Enterprise Resource Planning (ERP) system using SAP SAP software or installing a new Oracle accounting database. Despite what bubbleheaded pundits in the financial press may say, companies like Salesforce.com CRM and their Cloud-based products are not driving the big software companies out of business. Granted, this business is not a rapid growth business, but mid-single-digits is probably a pretty good ballpark guess.

Because of IBM's packaging strategy, it is harder to know what the ultimate impact of the Cloud will mean for IBM Services longer term. It could mean lower revenues on the technology outsourcing side, but again it might mean that profitability increases if the lost revenue is relatively low-margin business.

Software

Look back at the pie charts above showing the proportion of revenues generated by each of IBM's business lines. Are your eyes drawn to Software?

With a 27% share of profits but a 48% share of profits, it is a natural place for a profit seeking executive to focus; indeed, the new CEO of IBM, Virginia "Ginni" Rommety, is betting big that software is where her company's future lies.

Thanks to the ubiquity of mobile communications, widespread use of the Internet, and increasing transaction volumes online, the amount of data generated in a single day is staggering. But data is meaningless without the ability to gather it together, interpret it, and transform it into information.

IBM has a strong position in what is termed middleware—software which allows data from different systems to be shared (where it can then be aggregated and reported on). In addition, it has spent years working in the field of artificial intelligence in the form of its Watson project, and is claiming that Watson is on the verge of being able to be commercialized (e.g., helping doctors diagnose illnesses, helping financial advisors structure portfolios, etc., etc.).

While indirect, this is one way that IBM may be able to profit from the earthquake of the Cloud.

In addition, over the past few years, IBM has been buying smaller companies with Cloud technology and know-how. A recent Bloomberg article laid into IBM for having lost a Cloud computing contract for the CIA to Amazon.com but, for whatever it is worth, IBM has just begun to cobble together its Cloud capability, mainly through these kinds of acquisitions.

This author is actually more circumspect about IBM's ability to generate returns for its owners by the direct provision of Cloud services. Amazon is already an enormous player in this field and other powerful players like Google and Microsoft have more experience than IBM in Internet technology and Cloud provisioning. Each seems to be intent upon winning market share through price cutting, and this is a scary dynamic for a late entrant to the field like IBM.

In this author's opinion, if IBM can parlay its advances in AI, its strength in middleware, and develop some technical competence in Cloud technology (to make more credible bids for private clouds like the CIA deal), it will probably be better for shareholders than if it were to get into a slugfest with Internet titans to provide Cloud services more broadly.

What's Not Moving?

Even during an earthquake, there are some things that don't move around too much. The same is true for IBM during the present Cloud shake-up.

IBM's immovable hardware market is that for mainframe computers—likely worth around $5 billion per year in revenues. In this niche market—made up of clients who are mainly governments, banks, and educational institutions—IBM holds a near monopolistic position, and it is tough to see this position changing quickly if at all.

Mainframes can be used to power the same kind of processes that UNIX and x86 servers carry out, of course, but their security, stability, and computational power means that most often, they are employed in highly critical situations (such as preparing statements for investment banking clients and counterparties or analyzing data at the Internal Revenue Service).

This is not a mass-market, of course, and because one main customer group is governmental agencies, fiscal shortfalls (like those in the U.S. and Europe in the aftermath of the financial crisis) can depress demand. Demand also depends on the product cycle—if you are planning on spending millions of dollars on a mainframe system, you're likely to hold off if you know a newer model will be coming out soon.

Despite these characteristics, the mainframe business is a wonderful one for IBM. Not only are customers relatively price-insensitive, but the products that this hardware is bundled with—both consulting and software—are lucrative and long-lived. From a customer perspective, there are not many other choices, the costs of switching are large, and the benefits of switching uncertain. Truly, this is one case in which the old maxim that you can't get fired for buying an IBM holds very true, indeed. This is almost certainly one of the features that attracted Buffett to make his 2011 investment of around $11 billion in the firm.

Financial Engineering

A lot of pundits have been critical of the steps IBM has been taking to meet the financial goal Sam Palmisano set for his successor in the CEO spot, Ginni Rommety: generating $20 per share of operating profit by 2015.

One of the ways in which Rommety has moved the firm closer to the $20 per share goal is by reducing the number of shares outstanding using share buybacks. And while many observers, including the Oracle of Omaha, love the effect on their shares of a company buying back shares, one of the unintended consequences of their doing so is a rebalancing of a firm's capital structure.

Issuing debt to buy back shares—what IBM is, in practice doing—means that the firm become more and more highly levered. Leverage can increase profitability during good times, but it is a double-edged sword and can injure just as surely as it can help.

We can see the step-by-step increase in IBM's leverage ratio during each CEO's tenure over time in the following graph.

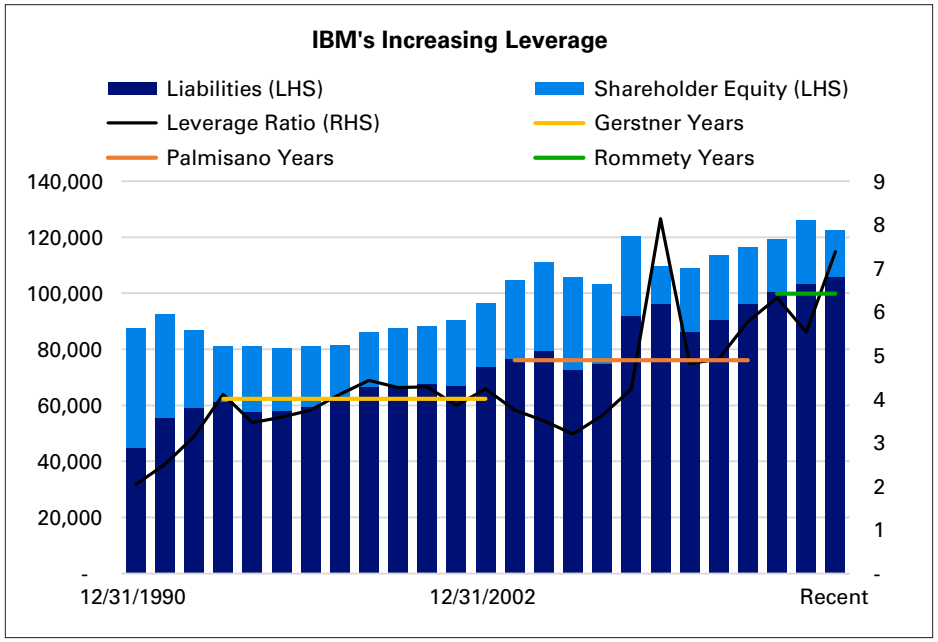


Figure 4. Source: IBM financial statements, YCharts Research analysis

Increasing leverage means that a company can generate progressively higher ROEs even as return on assets stays the same. However, it also means that the cushion of equity that protects shareholders from shocks due to business downturns gets thinner and thinner.

Leverage is a problem if a company runs into the kind of a business issue that makes it unable to service its debt. To analyze how severe of a problem IBM's leverage was, we looked at the amount of long-term debt a company holds versus the amount of cash flow from operations it is generating.

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1. For a full explanation of operational and financial leverage, please see this article that is an excerpt of this author's upcoming book.
2. Leverage ratio = Total Assets / Total Shareholders' Equity

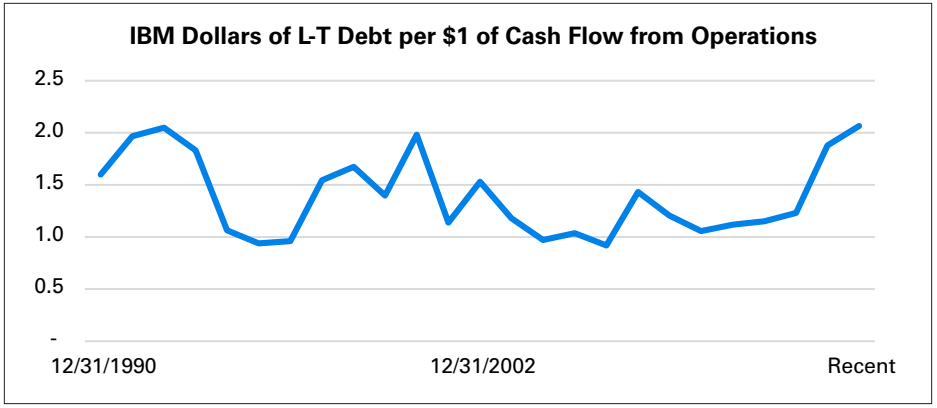


Figure 5. Source: IBM financial statements, YCharts Research analysis

This graph is shocking when one considers that the present relationship of debt to cash flow from operations is even higher than the level when IBM was at risk of going bankrupt (1992-1993).

However, looking only at Cash flow from Operations implicitly ignores the shift of IBM's business away from capital-intensive manufacturing toward capital-lite services.

To look at this, I compared IBM's long-term debt to its Owners' Cash Profits. OCP deducts an estimate of maintenance capital expense, so takes the requirements of maintaining the capital assets of the company into account. Here is that graph:

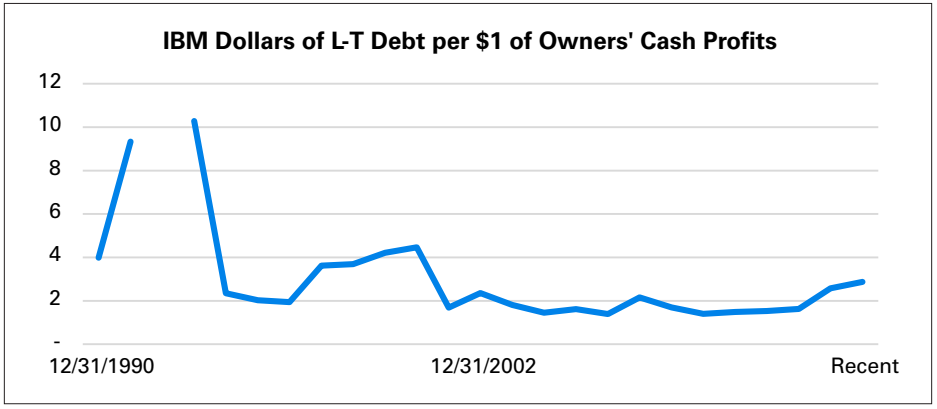


Figure 6. Source: IBM financial statements, YCharts Research analysis (one year's data deleted in the interest of clarity)

There is a bit of an uptick at the end, but this graph certainly does not suggest that IBM is in imminent danger due to its leverage level.

This author is extremely cautious about leverage and believes that it is crucial to look at the effects of a company's operational and financial leverage to understand the potential effect on valuation. Starting from a position of extreme suspicion and worry about the degree to which IBM's leverage has increased over time, this author has at last come to peace with this aspect of the company, thanks mainly to Figure 6, on the bottom left.

IBM's Historic Bets

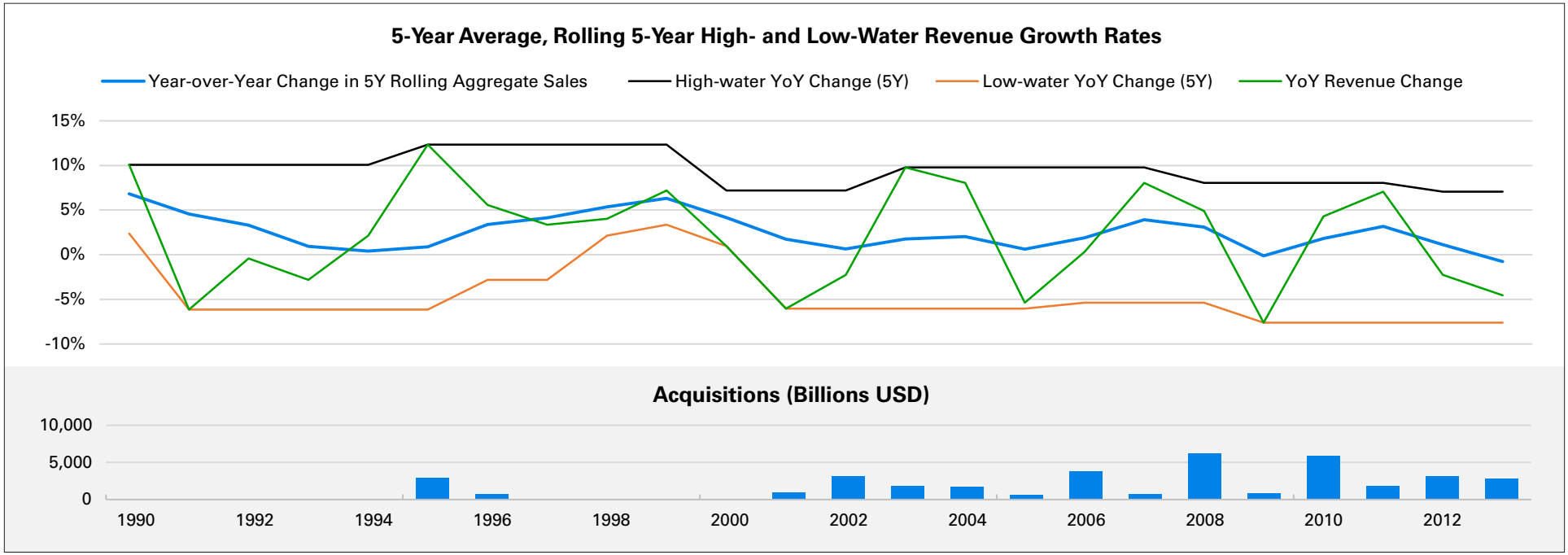
In 1964, IBM was in danger of becoming a footnote in the history of business and computing; within a decade, it was the most important computer company in the world.

In 1992, IBM was in danger of going bankrupt; a decade later, it was a beacon of strength and sanity in the Tech sector.

Both of these transformations were enormous, surprising, and hinged on a big, risky bet (System/360 mainframes in 1964, Services in 1992).

After seemingly standing still for so long as competitors moved into the Cloud, the ground is now shaking below IBM's feet and it is in a position where it must make another bold and risky bet. If history is a guide, a decade from now, we will be looking back at another example of its grand transformations.

Valuation Drivers: Revenues

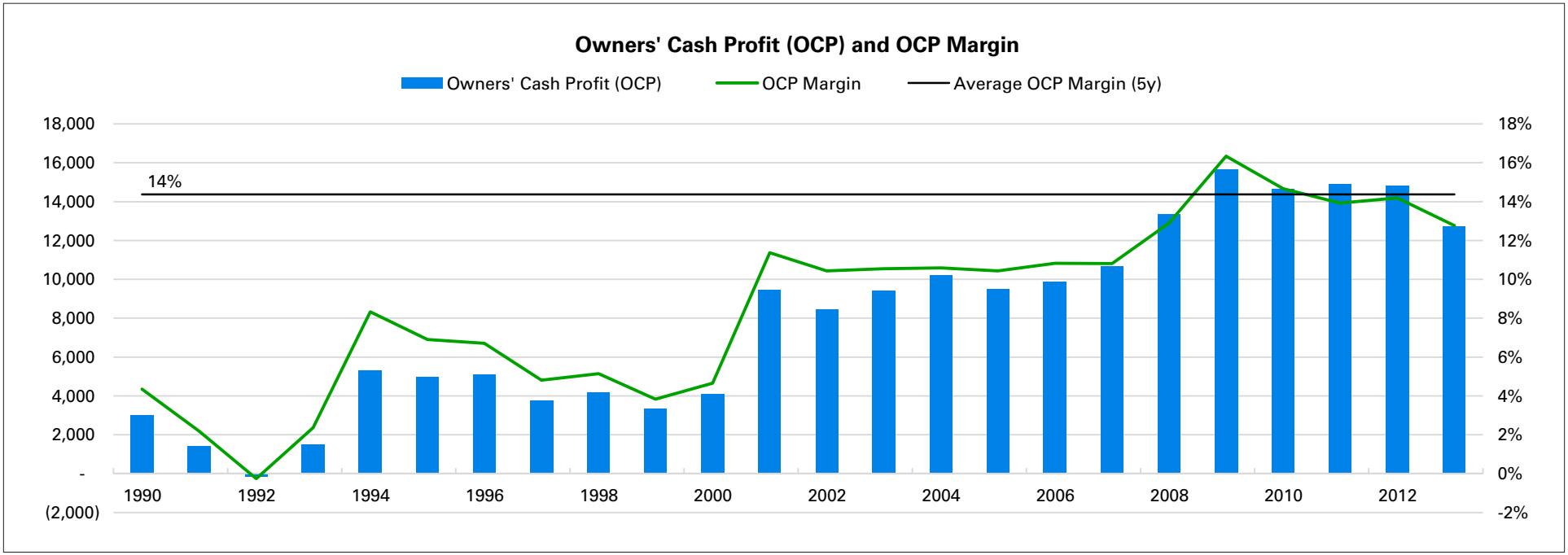


The most notable feature of this graph at first glance is the saw tooth growth pattern since 2005. Contractions are partially due to a data artifact—the -5% fall in 2005 was related to the PC business spinoff; excluding PCs, revenues climbed by 3% that year—partially due to the Great Recession (2009), and most recently, due to IBM's slow-motion retreat from the commodity server business. Hardware sales have slipped by an average 13% per year since 2011 as rumors that IBM would divest that business drove competitors to Hewlett-Packard HPQ. Indeed, the rumor became fact this January.

Note all the acquisition activity. These acquisitions have mainly been made to beef up IBM's software and services business.

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.

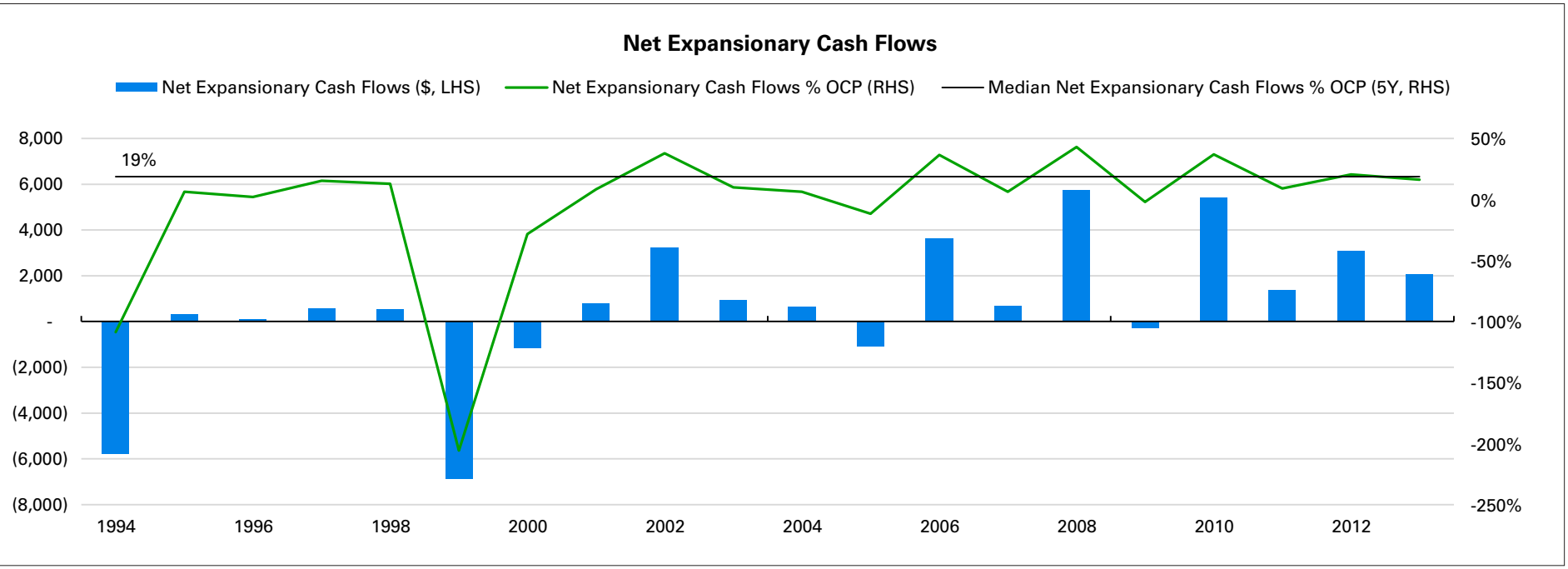
Valuation Drivers: Profitability



Gerstner—the first outsider to fill the CEO role—was the architect of Big Blue's shift toward the software and services business; by the end of his tenure, profitability had jumped from the mid-single-digit range to around 10% of revenues. By the time Gerstner's successor, Sam Palmisano retired in 2012, profitability had increased to the mid-teens percentage of revenues, thanks to notable improvements in software and services profitability, but partially offset by hardware losses. Software and services margins have stabilized (high-30% range for software, mid- to high-teens percentage range for services) and are likely at a peak given the present business mix. If Rommety's push toward data analytics and artificial intelligence and her simultaneous jettisoning of commodity hardware is successful, IBM's profit margin will likely increase.

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.

Valuation Drivers: Investment Level

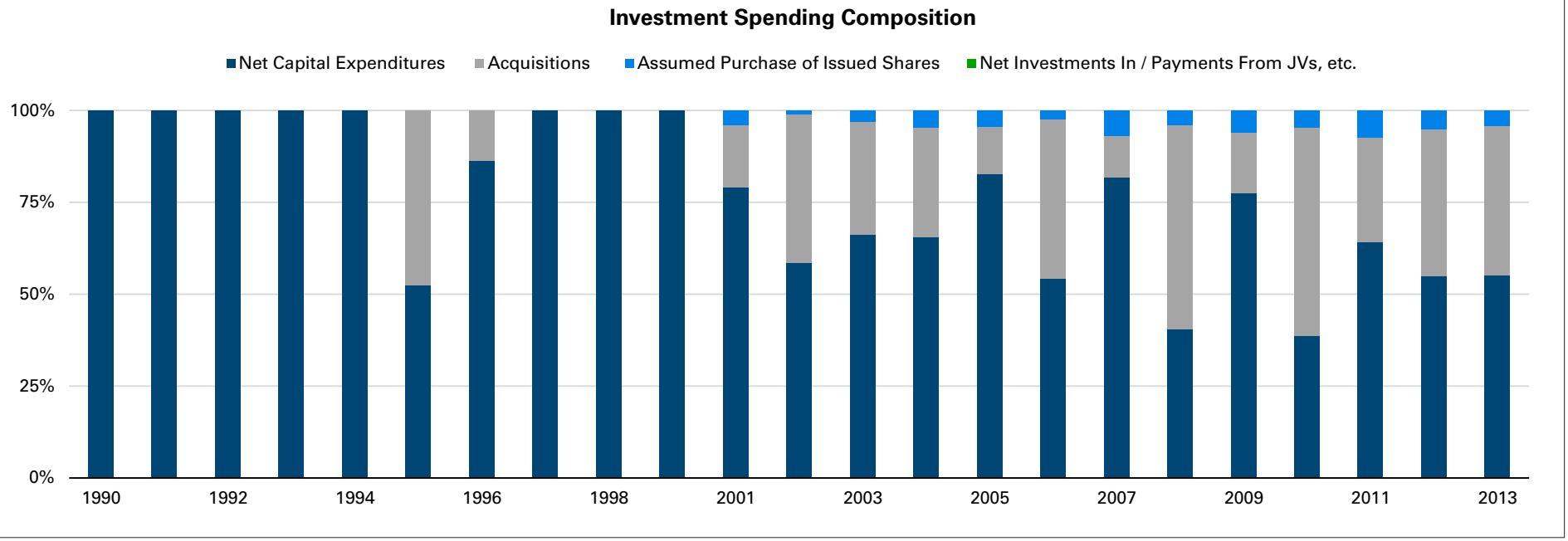


Net inflows are more notable than outflows during IBM's early history. The 1994 inflow is related to Gerstner's initial restructuring push and the sale of data centers and campuses around the world. 1999 was the year that IBM sold its networking business to AT&TT and 2005 was the divestiture of the PC business to Lenovo. The sale price of the PC business was likely too low, but was likely done for strategic reasons. The deal specified that IBM receive nearly 20% of Lenovo's stock; this gave IBM a partner in the Chinese market and a foot in the door with Chinese bureaucrats (Lenovo was majority owned by a Chinese state entity and, even now, the Chinese government is a large owner of the firm).

More recently, IBM has been acquiring firms to help boost its presence in the Cloud and in the software business. Over the last few years, IBM's management has been spending just about a fifth of its Owners' Cash Profits on expansionary projects.

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.

Valuation Drivers: Investment Level (continued)

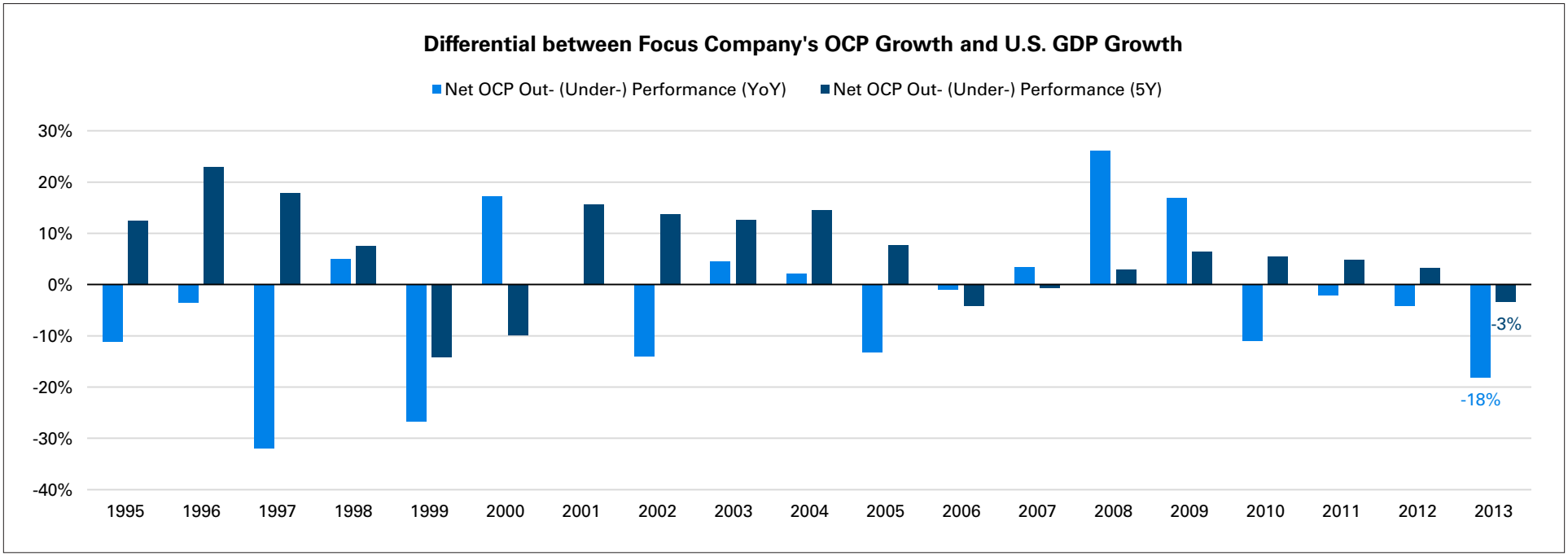


Note that over the past few years, acquisitions have been a much larger part of overall investment spending than capital expenditures. According to industry reports, IBM may have been underinvesting in its semiconductor fabrication plants, or "fabs." The complete story is a longer and more complex one involving IBM's PowerPC chip design losing ground to Intel's x86 architecture; however, to make a long story short, IBM is reputed to be preparing its two remaining fabs (in Vermont and New York) for a sale to Freescale Semiconductor (formerly Motorola's semiconductor division and a long-time partner of IBM).

We estimate that share issuance to managers cost owners from $300 to around $500 million per year. Buffett should not be quite so happy about IBM's "generous" buy-back program, seeing that a material part of it represents buybacks intended to ameliorate dilutive effects of its executive compensation policy. (Note that we removed data from 1999 in the interest of clarity.)

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.

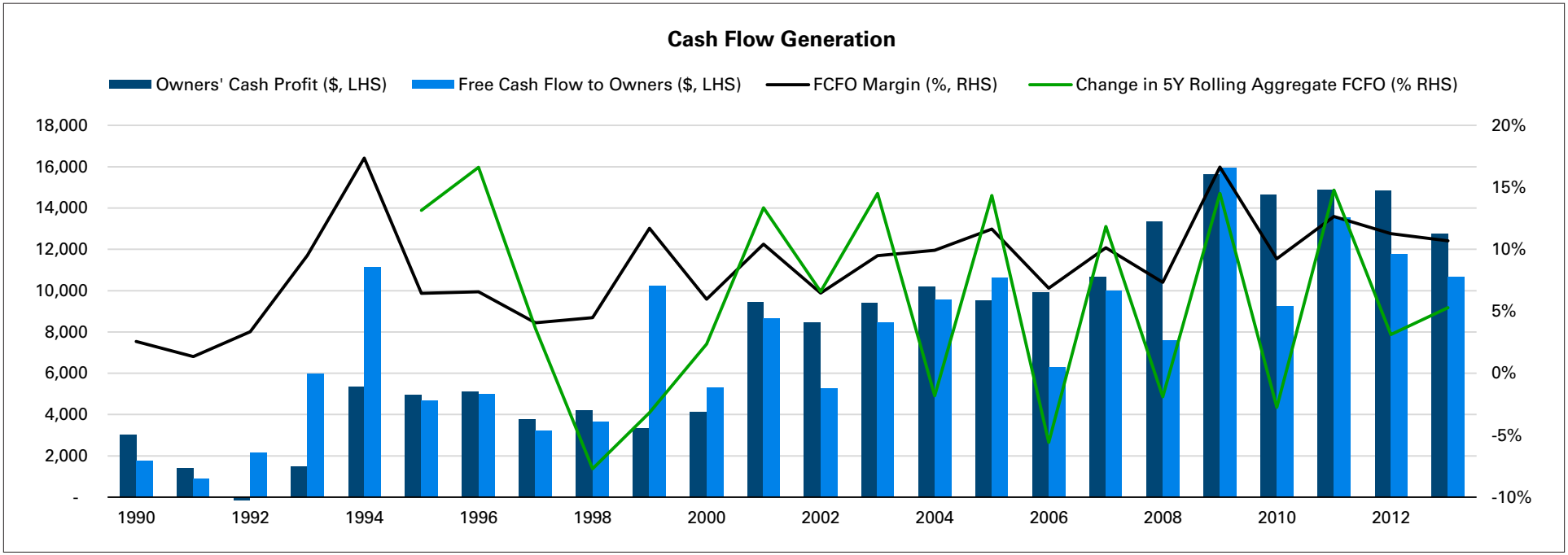
Valuation Drivers: Investment Efficacy



While the last few years have been tough for IBM, we can see (by focusing on the dark blue columns) that historically, it has done a good job in generating profit growth faster than the economy at large. Thinking back to the first graph in this report—showing fairly modest and sometimes negative revenue growth—we know that IBM's profit growth has more to do with increasing the efficiency with which it converts revenues to profits than it does in selling more products and services.

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.

Cash Flow Generation

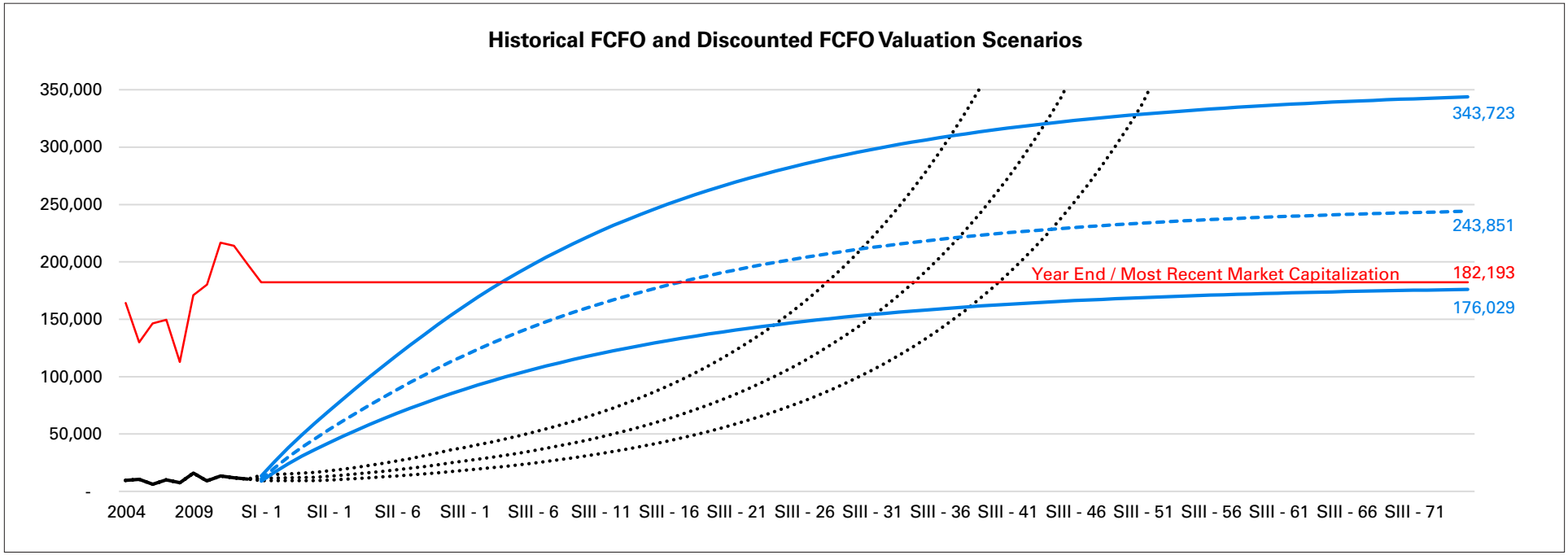


Our preferred measure of free cash flow—FCFO—has fluctuated from around 7% of revenues to around 17% of revenues over the past few years (represented by black line). Acquisition-related net cash outflows, being "lumpy" have necessarily meant that FCFO growth rates have saw toothed over the last few years.

While FCFO seems to have leveled off, due to IBM's stock buyback policy, the FCFO per share has increased notably over the time frame shown here. The downside of stock buybacks--increased leverage--was discussed in the Focus Section of this report, but the upside of buybacks is undoubtedly the increase in ownership concentration for long term shareholders.

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.

Valuation



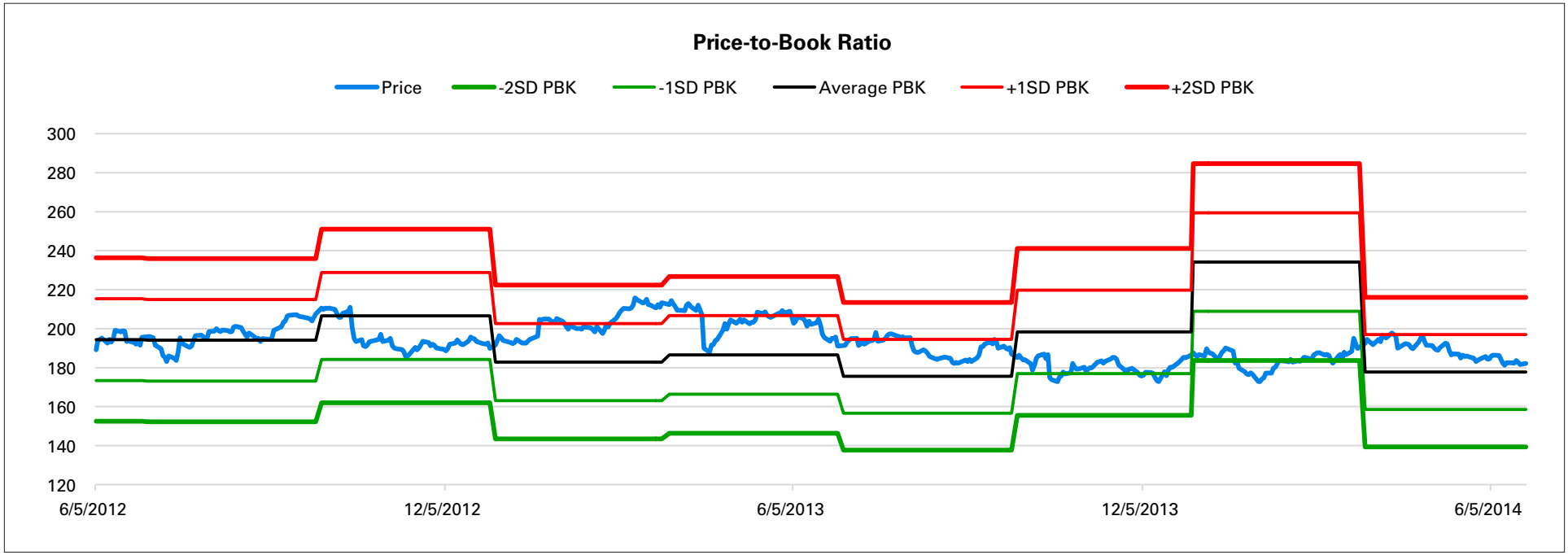
We used the following inputs to generate our valuation range.

	Likely	**Worst**	Best
Revenue Growth	2%	0%	4%
OCP Margin	14%	12%	16%
Expansionary % OCP	19%	24%	15%
Medium-term Growth (10-year)	7%	6%	8%
Stage III Assumed Growth			6%
Discount Rate			10%

With the assumptions above, we calculated a fair value range for the firm of $174-$340 with a median case valuation of $241 / share. The median case valuation implies a rise of 34% from recent market prices.

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.

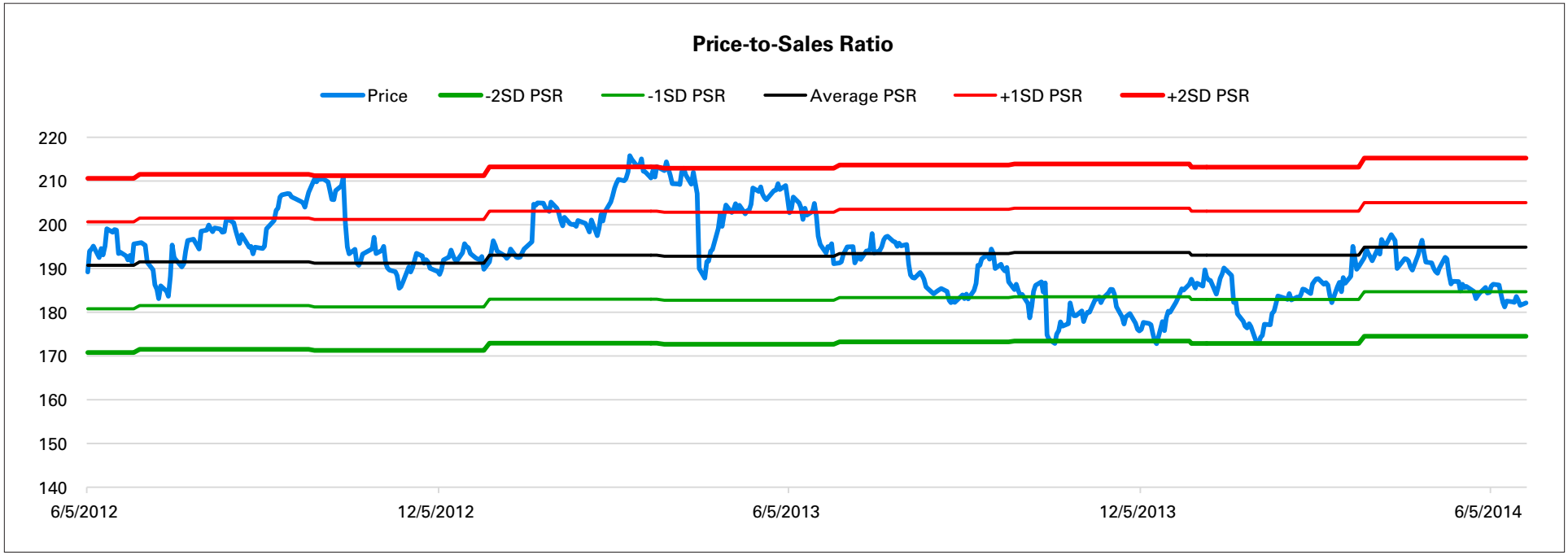
Market Multiples: Price to Book Ranges



Hard to tell much by looking at IBM's price-to-book...

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

Market Multiples: Price to Sales Ranges



...However, it has looked attractive on a price-to-sales basis since last December—likely due to concerns about market share losses in its hardware business.

Please see note on previous page about market multiples.

Competitive Summary

Fundamental Data

Ticker	Name	Market Cap	Net Income (a)	Pretax Income (b)	EBIT (c)	Sales (d)	Assets (e)	Equity (f)
ORCL	Oracle Corporation	183.2B	11.0B	13.7B	14.6B	38.3B	90.3B	47.4B
AMZN	Amazon.com Inc	150.6B	0.3B	0.5B	0.7B	78.1B	36.4B	10.3B
CSCO	Cisco Systems Inc	126.3B	7.9B	9.8B	10.4B	47.2B	101.9B	55.8B
ACN	Accenture PLC	67.0B	2.9B	4.1B	4.2B	30.6B	16.4B	5.3B
HPQ	Hewlett-Packard Co	64.6B	5.5B	7.0B	7.6B	111.8B	104.0B	28.2B
IBM	IBM	184.3B	15.8B	18.9B	19.3B	98.8B	122.6B	16.6B

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)
ORCL	Oracle Corporation	0.80	0.94	38%	0.42	12%	1.91	23%
AMZN	Amazon.com Inc	0.60	0.71	1%	2.15	1%	3.53	3%
CSCO	Cisco Systems Inc	0.81	0.94	22%	0.46	8%	1.83	14%
ACN	Accenture PLC	0.71	0.98	14%	1.87	18%	3.09	55%
HPQ	Hewlett-Packard Co	0.79	0.92	7%	1.08	5%	3.69	20%
IBM	IBM	0.84	0.98	20%	0.81	13%	7.39	95%

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

Competitive Summary (continued)

Cash Flow Measures

Ticker	Name	Dep / Amort	Change in NWC	TTM CFO	TTM CFO Margin	TTM FCF	FCF Margin	Dividend Yield
ORCL	Oracle Corporation	2.9B	0.0B	14.9B	39%	14.3B	37%	1.2%
AMZN	Amazon.com Inc	3.3B	0.5B	5.3B	7%	1.5B	2%	0.0%
CSCO	Cisco Systems Inc	2.4B	1.8B	12.7B	27%	11.4B	24%	3.1%
ACN	Accenture PLC	0.6B	-0.8B	3.3B	11%	2.9B	9%	2.3%
HPQ	Hewlett-Packard Co	4.6B	0.7B	11.5B	10%	7.8B	7%	1.9%
IBM	IBM	4.7B	-2.4B	16.8B	17%	12.5B	13%	2.4%

Multiples and Misc.

Ticker	Name	PS Ratio	PB Ratio	EV / EBITDA	P/E Ratio	P/FCF	Altman Z-Score	Beta
ORCL	Oracle Corporation	4.9	3.9	9.5	17.2	13.2	4.3	1.3
AMZN	Amazon.com Inc	1.9	14.6	33.7	517.0	101.4	5.9	0.92
CSCO	Cisco Systems Inc	2.8	2.3	7.7	16.7	11.5	3.1	1.39
ACN	Accenture PLC	1.9	12.7	14.4	19.0	19.9	6.9	1.16
HPQ	Hewlett-Packard Co	0.6	2.3	6.0	12.2	8.5	2.3	1.5
IBM	IBM	2.0	11.1	9.1	12.5	15.7	4.0	0.72

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

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.

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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.

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.

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...

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.

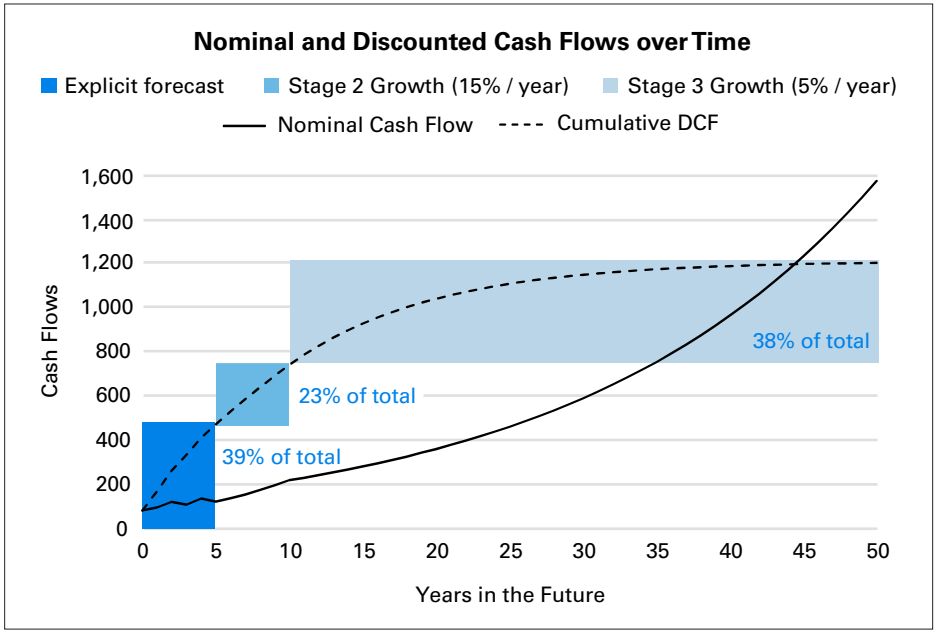

Figure 1.

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).

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.

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

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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