
1% Focus Report: Intel Corporation (INTC)

YCHARTS

Published March 13, 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.

Director of Research

Erik Kobayashi-Solomon | erik@ycharts.com

Product Inquiries

866 965 7552 | sales@ycharts.com

All information provided herein is for information purposes only and should not be considered as investment advice or a recommendation to purchase or sell any specific security. Security examples featured are samples for presentation purposes and are intended to illustrate how to use YCharts data in the analysis of the valuation of public securities. While the information presented herein is believed to be reliable, no representations or warranty is made concerning the accuracy of any data presented.

Valuation at a Glance: Intel Corporation (INTC)



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"

Focus Section: The Great Wall of Intel	pp. 2-5
Intel has built a strong economic moat around its business. But a moat, like any fixed defensive fortification, has a downside as well.	
Revenues: Thank Heavens for Servers and Emerging Markets	p. 6
Revenue growth has continued to be strong even in the face of structural changes.	
Profitability: It's Good to be the King	pp. 7-8
Intel's manufacturing IP gives it profit-boosting first-mover advantages twice every three years.	
Investment Level & Efficacy: Slowdown on the Horizon	pp. 9-11
Increased investment in new technology is beginning to offer lower economic rewards.	
Cash Flow Generation: Cyclical But Strong	p. 12
Over the long-term, owners can expect to claim about \$0.10 out of every dollar of Intel's revenues.	
Valuation: Objective, Data-Driven, and Transparent	p. 13
We offer a valuation range for Intel's shares based on a transparent analysis of cash flows drivers.	
Market Multiples: Slightly Undervalued to Fairly Valued	pp. 14-15
Starting to look cheap on a Price-to-Book Basis.	
Competitive Summary Tables	pp. 16-17
Methodology	p. 18

Focus on Intel Corporation

Ticker	INTC
Name	Intel Corp
Industry	Semiconductors
Market Capitalization	122,312
TTM Sales	52,708
TTM CFO	20,776
TTM CFO Margin	39%
Mkt Cap / TTM Sales	2.3
Mkt Cap / TTM CFO	5.9
Long-Term Debt	20,534
Shareholders' Equity	58,256
D/E Ratio	35%
Altman's Z-Score	4.1
Beta	0.9
Return on Equity	0.2

It is hard to think of a firm that has a more compelling economic moat than Intel.

The source of this moat is straight-forward: There is literally no firm on the face of the earth that has Intel's technical capability in mass producing digital logic chips—the electronic brains that power laptops, desktops, and servers. Despite similar financial resources, Intel's largest manufacturing competitors (Samsung [SSNLF](#), GlobalFoundries, and TSMC [TSM](#)) are still consistently one generation behind its production capabilities thanks to its manufacturing prowess. In an industry that, in a very real sense, has reinvented itself once every 18 months for the last half century, Intel has had a largely uncontested first mover advantage twice every three years.

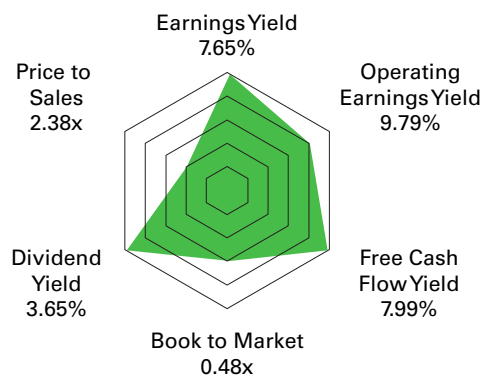
Intel has worked tirelessly to fine-tune its operations to maximize its manufacturing efficiency and its strong-arm marketing strategy. However, efficiency is always created at the expense of flexibility, and inflexible systems are vulnerable to external shocks.

Since 2007, Intel has struggled to adapt to an external shock brought about a shift in consumer preference. In the near future, it is likely to face another, brought about by physical constraints to chip manufacturing technology.

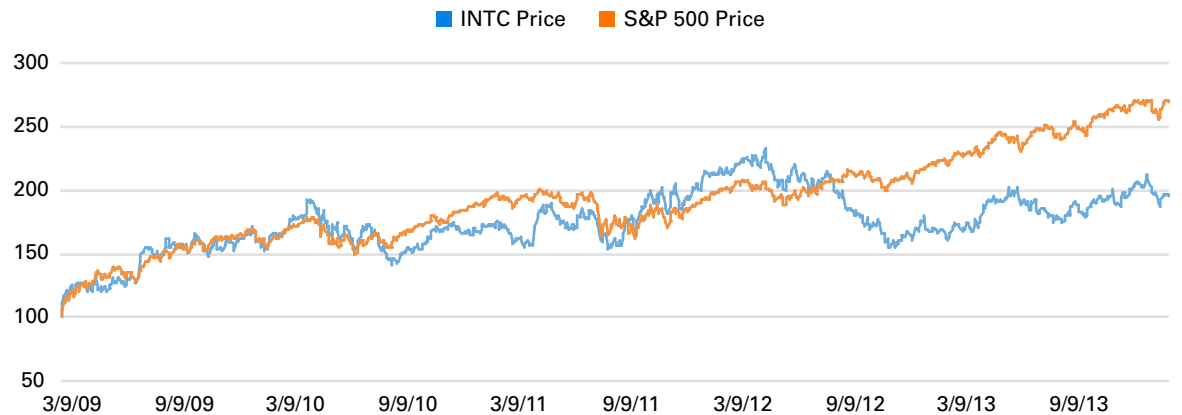
Intel will need to change to survive and thrive. The question is the extent to which its present technological and commercial advantages will help or hinder its prospects.

[\(continued on next page\)](#)

Value Score Factors



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



The Trouble with Moats

Fixed fortifications are monuments to man's stupidity.

—General George S. Patton, Jr.

An economic moat is not the same as a fixed fortification like the [Maginot Line](#) or the [Great Wall of China](#), but they do both implicitly assume a consistent and static strategic environment. An economic moat, like a fixed fortification, requires expenditures to build and maintain, and focuses attention on maintaining the structure itself more than on understanding external threats.

Like the French in the 1930s and the Emperors of the Qin Dynasty, Intel has built an efficient, sensible system designed to accomplish a specific task very well. The French failed to recognize the Maginot line was weak to an attack from Belgium; the Qin failed to recognize that their wall was only as strong as the weakest point. Similarly, Intel has been slow to recognize and respond to shifts in the strategic environment and is now facing two distinct structural shocks that we discuss further below.

This is not to say that a company should not attempt to develop an economic moat. Obviously, having a durable competitive advantage is better than not having one. However, it is important to realize that the durability of the advantages conferred by economic moats is fragile and finite, and that the focus required to maximize a given strategy can lead to the delayed recognition of external threats. To explore this, let us take a look at a concept from systems theory called panarchy.

Panarchy and the Technology Business

Panarchy is meant to describe the development of complex natural and human systems. In this view, a system will evolve through four stages:

Exploitation	Rapid development and creative, inefficient exploitation of abundant resources
Conservation	Development slows as specialists focus on exploiting available resources in as efficient a way as possible
Release	Rapid destruction of system as rigidity born through specialization fails to allow the system to handle an external shock
Reorganization	System reorganizes itself to find and exploit new resources

In the early days of the Information Revolution, companies designed and built their own chips using chip equipment they had built themselves, designed and built a computer around the chip, wrote software for the system, and sold it to distributors and end users (who were dying to get their hands on the best machines). Companies looked for the best solutions for problems rather than the most efficient way to produce and sell the devices; clearly, this period corresponds to a panarchic exploitation phase.

As the Tech Sector matured and personal computers (or microcomputers as they were known then) became more widely available, the creative chaos of the exploitation phase could not sustain itself and gradually, a standardized platform emerged in the form of the [Wintel](#) cabal. Companies carved out specialties in one small niche of the technology value chain: Intel built processors, Micron [MU](#) built memory chips, Seagate [STX](#) made storage drives, and Microsoft [MSFT](#) wrote the operating system software. “Computer companies” like Hewlett-Packard [HPQ](#) and Dell outsourced all computing R&D to the other Wintel firms and concentrated on supply-chain management and marketing (“innovation” meant, for example, allowing consumers to pick the components that would go into their new computer at Dell, and packaging computers in heifer-colored boxes at Gateway).

Intel, for its part, focused on producing decently powerful, general purpose processors as efficiently as possible and also in using coercive methods to make sure PC makers preferentially chose Intel processors over competitor AMD's [AMD](#). Intel's x86 chip designs are known in electrical engineering circles as being somewhat inelegant, but the firm's manufacturing process efficiency allowed it and the rest of the industry to keep developing new computer platforms at a pace established by the [Moore's Law](#) treadmill.

Clearly, this period—extending into the mid-2000s—is the quintessential panarchic conservation stage, characterized by highly specialized actors focused on squeezing every available efficiency out of a given niche environment.

According to systems theory, the conservation stage is phenomenally stable and robust, and is difficult to perturb. However, one shock, presently underway, and another, which may occur very soon, are threats to Intel that an investor must not ignore.

Shock #1: Untethered Computing

The demand shift toward handheld devices starting in 2007 with the release of the first Apple [AAPL](#) iPhone has provided the first and best-known shock to the Wintel ecosystem.

If Intel was more sensitive to customer usage patterns, it might have noticed that most of the processing power it supplied them was going unused. But Intel was focused on reinforcing its moat—shrinking the size of transistors on its chips—and on defeating its historical

rival AMD in the quest to jam more chips down the throats of undifferentiated PC makers. Modern-day Intel chips, being refined versions of 1970s-vintage microprocessors, are built to carry out general calculations very quickly tethered via electrical cord to a continuous power source. In contrast, most consumers nowadays use computing power to carry out a few specialized tasks and do them while on the go: listen to music, watch videos, play simple games, and surf the web.

For untethered computer users (i.e., anyone with a tablet or smart phone), Intel chips, in general, provide too much of things they don't need (generalized calculation power and speed) and too little of what they want (portable battery life). The most popular processor for untethered computing are those designed and licensed by an English company, ARM Holdings [ARMH](#). ARM's processors are architected with the reverse focus of Intel's—built with less processing power, but with higher energy efficiency. ARM-based processors account for roughly 97% of those used for mobile devices all over the world.

Luckily for Intel, those wimpy ARM processors have to request and pull back data from powerful online servers, and roughly 97% of all Internet servers use Intel processors. Intel has attempted to make inroads in the mobile computing market with its Atom chip, but so far, the market share impact is underwhelming.

On the other hand, one of the present day's biggest topics in the server world is power efficiency—as more and more video, audio, and text content is saved in the cloud, the power required to run and cool all those servers is becoming material for large companies like Google [GOOG](#) and Amazon [AMZN](#).

For energy conservation, [what better than an ARM-based processor?](#) A single ARM chip is not that powerful, but chain a few of them together with an intelligent controller, and the whole package is as powerful as an Intel server and much more energy efficient (claim the ARM-based manufacturers).

ARM-based servers are a new entrance in the market and there is a great deal of inertia in the technology world. As such, it may take some time before ARM-based chips make a dent in Intel's server market share. However, considering that it seems Intel has all but withdrawn from the market for smartphone chips, has not been a forceful competitor in the tablet chip market either, and still produces chips that consume more energy than ARM-based designs suggest that ARM has the potential to make more headway in the server world than Intel will in the mobile one.

Shock #2: A Possible End to Moore's Law

Intel has always been on the leading edge of the Moore's Law curve, and its position

there has long given it first mover advantages for its latest chip designs. However, there is evidence that the Moore's Law timeline that has predictably advanced for half a century, is beginning to reach physical limits.

Intel's former chief architect Bob Colwell—who presently manages DARPA's semiconductor research projects—has [gone on the record](#) saying that he believes Moore's Law's limits will be reached by around 2020 at a "node" of either 5 or 7 nanometers (one-billionth of a meter). (Semiconductor nodes are development milestones described by the average distance between inscribed features on a semiconductor chip. Intel is presently working on the 14nm node and the 10nm node is in the development pipeline. These nodes are much smaller than the wavelength of light in the visible spectrum!)

If Colwell is correct and there is only a few more years of 18-24 month doubling in transistor counts (which usually corresponds fairly closely to processing power), this could mean that the one comparative advantage that Intel has called its own so long—a head start in selling the newest technology—may be nearing an end.

It is important to note that this is not the first time that Moore's Law has been declared dead, so it may be wise to take Colwell's pronouncement with a grain of salt. Gordon Moore himself announced back in 2003 that he thought there would be about 10 more years of relatively easy node changes before progress would begin to slow. And while Intel is still showing its ability to cram more transistors on silicon die unabated, the expense involved is rising and performance gains are flattening out, so Moore's 2003 prediction may well be correct.

With higher production expenses, even if Moore's Law is upheld, it may be a Pyrrhic victory—the cost involved in production of the chips may be greater than the benefit of having produced them.

If the pace of node changes starts to slow or if the cost of the node changes become cost prohibitive, it may give Intel's biggest production rivals—Korean Samsung and Taiwanese TSMC—the chance to close the technology gap. With innovation coming less often, the focus of the chip industry will necessarily move from innovation to efficiency.

Panarchic Release?

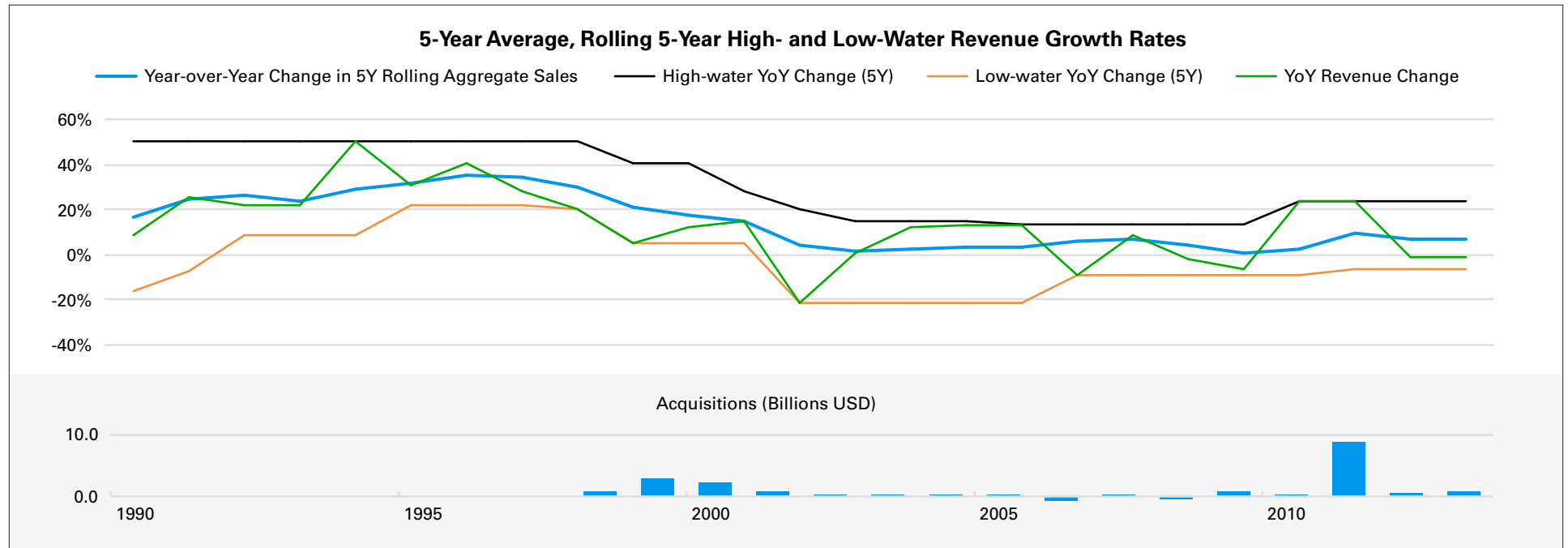
Systems theorists expect a system in a conservation state to eventually face a period of destructive de-evolution termed "release." In my view, the conservation state of the Wintel ecosystem is robust enough to avoid such a calamitous end any time soon. However, Intel, as well as the other players in the industry, will have to work to adapt to the new environment of untethered computing off the Moore's Law treadmill.

Intel's new CEO, Brian Krzanich—a long time company insider—hails from the firm's manufacturing operations and has said that he wants to refocus Intel on its main strength: manufacturing. As part of this, Krzanich has talked about expanding Intel's foundry operations. Chip foundries are contract manufacturers of chips according to the design of a third-party. TSMC is a pure foundry—making only third-party designed chips; Samsung has a hybrid model—producing some branded chips of its own design and offering foundry services to third parties. Long-term Intel competitor, AMD, recently spun off its manufacturing operations into a foundry specialist named GlobalFoundries.

Focusing more on foundry operations would be a big change in business focus and strategy for Intel, potentially meaning that Intel would produce ARM-based processors on behalf of a third party in its own fabrication facilities or "fabs." Despite the big shift in focus, considering the firm's engineering capabilities and manufacturing IP, a greater emphasis on foundry production would allow it to leverage the part of its moat that is suited to the present environment, give the firm a way to amortize the huge costs of building modern fabs, and allow it to profit from the trend toward untethered computing even if it cannot field its own horse in the race.

The semiconductor business is changing, but for a company with the skill set like Intel's, it can be a very good one.

Valuation Drivers: Revenues

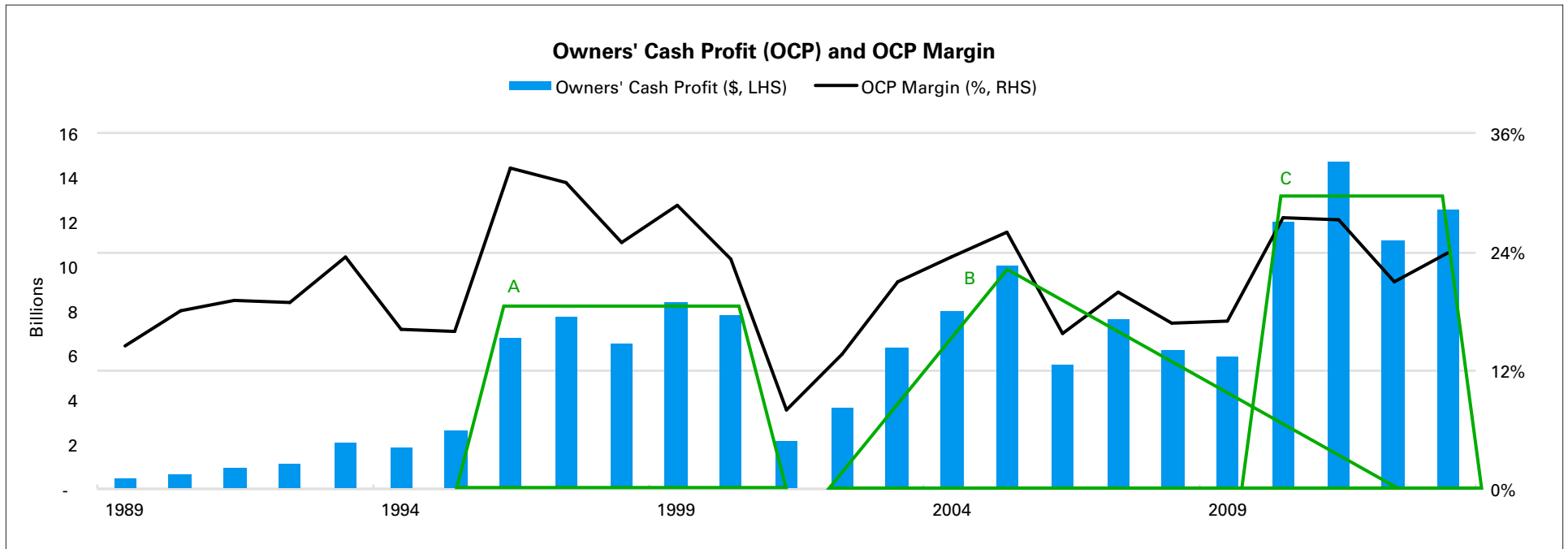


It is a testament to the strength of Intel’s microprocessor franchise that it has been able to maintain the revenue growth it has throughout the demand shift toward untethered devices. It has emerging market demand for PCs and demand for cheap, general-purpose servers to thank for that revenue growth. It is interesting to note that Intel’s processors were originally considered data center also-rans. That is, until someone realized relatively cheap Intel x86 “boxes” could be chained together to approximate the power and performance of specialty chips manufactured by IBM [IBM](#) and Oracle’s [ORCL](#) Sun segment. In a twist of Tech Karma, companies selling ARM-based processors may now be trying to eat into Intel’s server share in the way Intel originally ate into Sun’s and Big Blue’s.

Over the past 10 years, the year-over-year change in rolling 5-year aggregate revenues at Intel has recorded a median value of 5%, a minimum value of 0% and a high value of 10%.

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



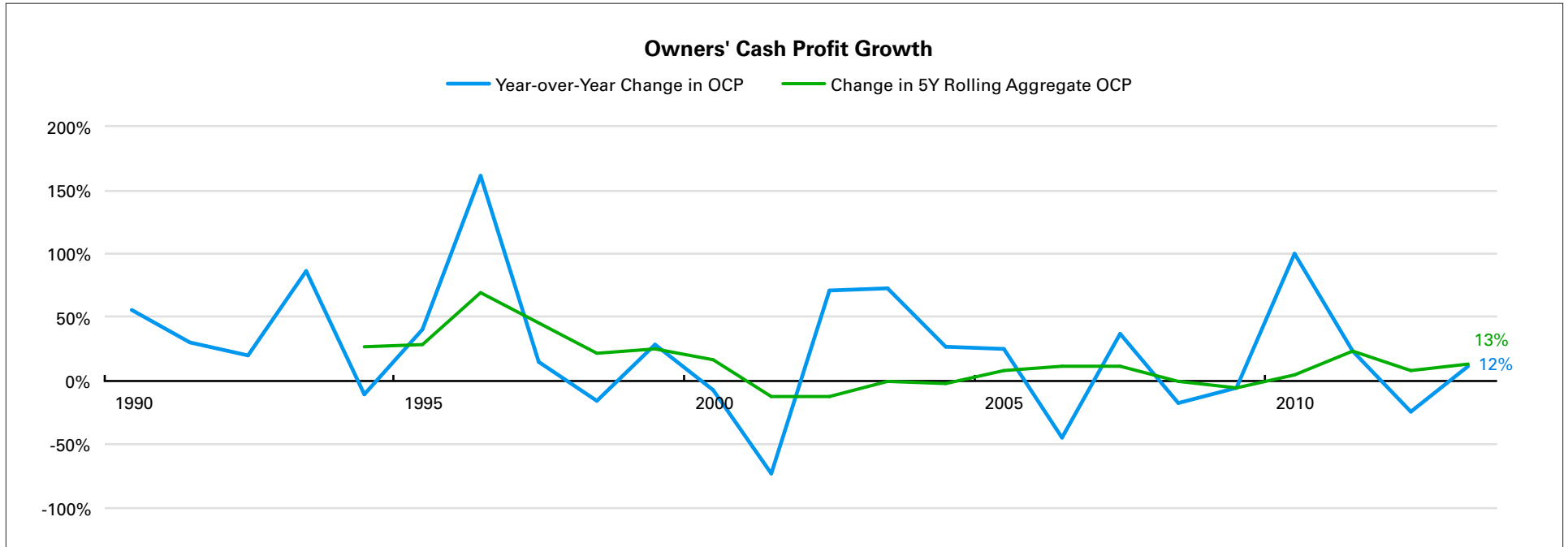
Manufacturing semiconductors is a fabulously expensive proposition with companies spending billions of dollars on building and outfitting fabrication facilities (“fab”). After building the fab, one gets about 1,800 days’ worth of use out of the facility before Moore’s Law renders it obsolete. Any day the fab is not producing at full capacity is a day with no revenue to cover the fab’s fixed costs while simultaneously edging 1/1,800th closer to obsolescence. It is for this reason that Robert Palmer, former CEO of Digital quipped: “Building semiconductors is like playing Russian roulette. You put a gun to your head, pull the trigger, and find out four years later if you blew your brains out.”

Each green mountain / plateau shows the outlines of a new semiconductor cycle starting, peaking, and finishing. Note how the black OCP margin lines tracks these cycles.

Over the past 10 years, the median OCP margin at Intel has been 22%, with a low of 16% and a high of 27%.

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: Profitability (continued)



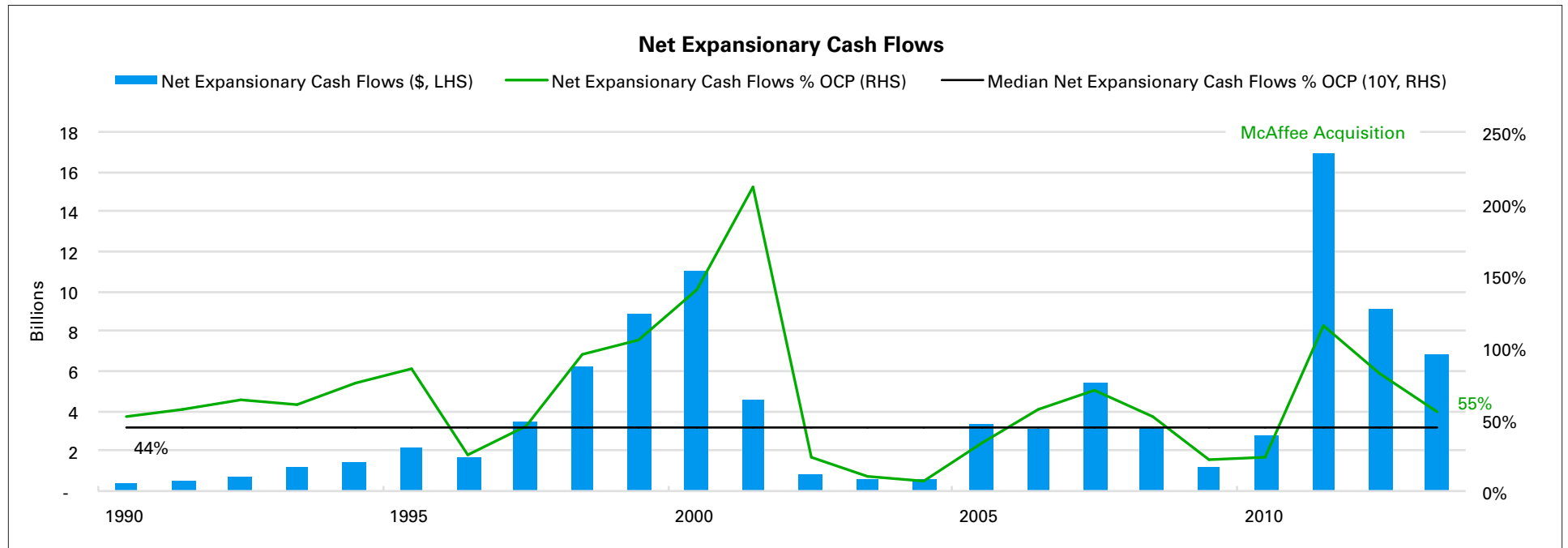
Any business that spends so much on factories has, by definition, a huge amount of what financial theorists call operating leverage. High operating leverage means that small changes in sales volume have an enormous effect on profitability. We can see this clearly by noting the enormous swings in year-over-year profit growth represented by the blue line above. The notable peak in 2010 had two root causes: 1) new demand for (mostly) laptops and (less so) desktops from newly-wealthy emerging market consumers and 2) pent-up demand for servers and enterprise equipment after the freezing of tech budgets during the mortgage crisis of 2008-2009.

Over the past 10 years, the year-over-year change in rolling 5-year aggregate OCP at Intel has recorded a median value of 8%, a minimum of -6%, and a maximum of 24%. The maximum value—recorded in 2011—is an artifact of several things, most critically the pent up demand mentioned above, but also the acquisition of McAfee antivirus—an investment we discuss below.

Even removing the acquisition, a reasonable estimate of Intel's maximum OCP growth rate would likely be in the mid- to high-teens percentage region.

The largest proportion of a company's overall valuation is related to the projected growth rate of future free cash flows. Because free cash flows are a portion of OCP, it is vitally important to understand growth of OCP in order to develop a rational view of future free cash flows. For more information, please see the Methodology Section at the end of this report.

Valuation Drivers: Investment Level



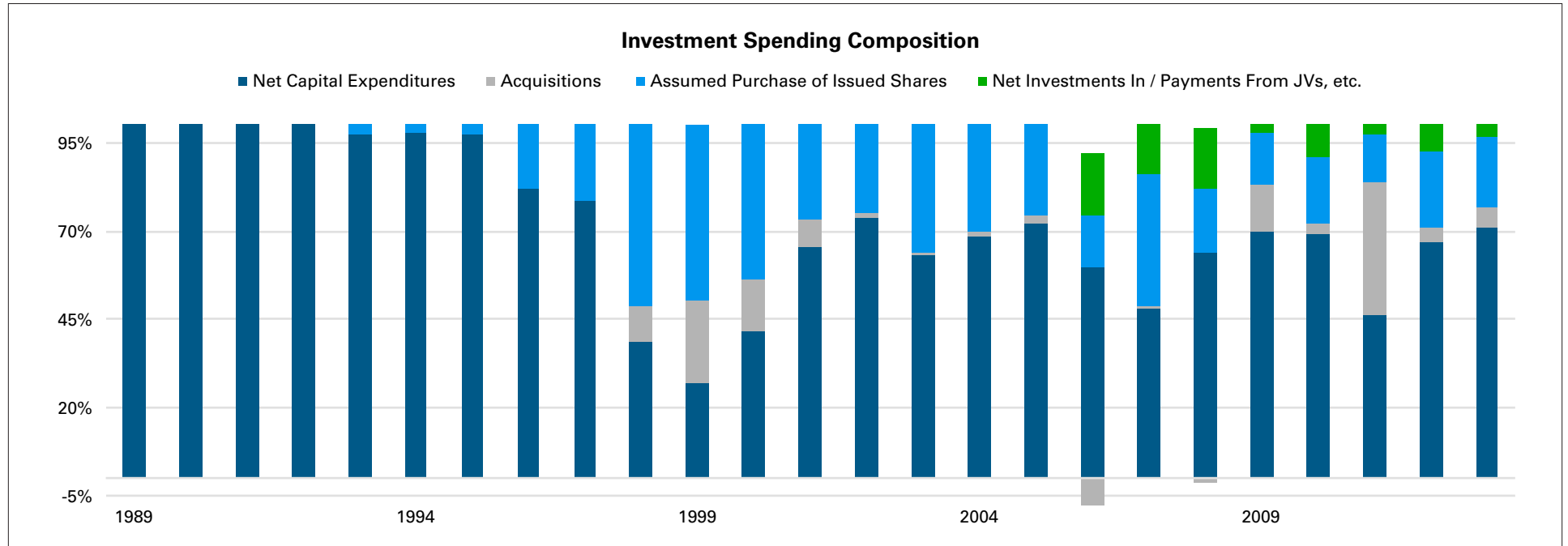
Intel's acquisition of antivirus software firm McAfee in 2011 under CEO Paul Otellini may make sense from a technical perspective, but its business benefits are questionable, in our opinion. The idea was that protection from computer viruses would be pushed down to the hardware level, so would be operating system agnostic. Several years have passed since the acquisition but Intel executives spend little time talking about it on conference calls and are not trumpeting the efficacy of this hardware-level protection, as might be expected if the project had been a smashing success.

Meanwhile, Intel's core business has faced enormous changes as its largest clients (Dell, Hewlett-Packard) have suffered from a continuing fall in desktop and laptop demand as consumers switched to handhelds. ARM Holdings' chip designs have become ubiquitous in handhelds, while Intel's Atom processors have failed to garner much market share in tablets and are not efficient enough to run in mobile phones.

Intel's median expansionary capital expenditures as a percent of OCP has been at 44% over the last 10 years. Obviously, these investments are lumpy—the company spends heavily on new fabs to create chips on the most recent processing node, pump out as many chips as possible over a few years, then build another fab to build chips at the new node.

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.

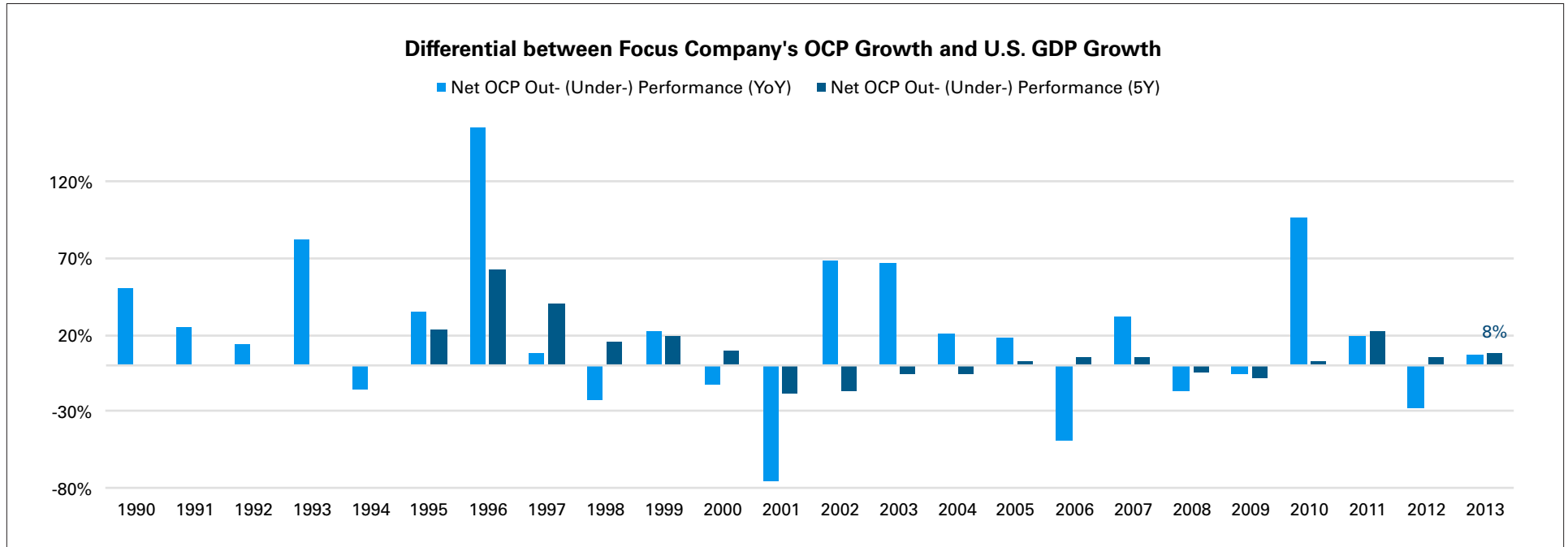
Valuation Drivers: Investment Level (continued)



In addition to spending enormous amounts of money on fabs and several billion dollars a year on research and development, Intel also makes loans and investments to smaller firms that are involved in the research and development of specialized chips. These are the moneys listed as above as payments to JVs. The negative acquisitions displayed above in 2006 and 2008 represent net cash inflows from divestitures of businesses and / or production equipment. Note also that Intel is a very active issuer of shares to its employees and the assumed repurchase of these shares constitutes a material cash outflow for the firm.

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.

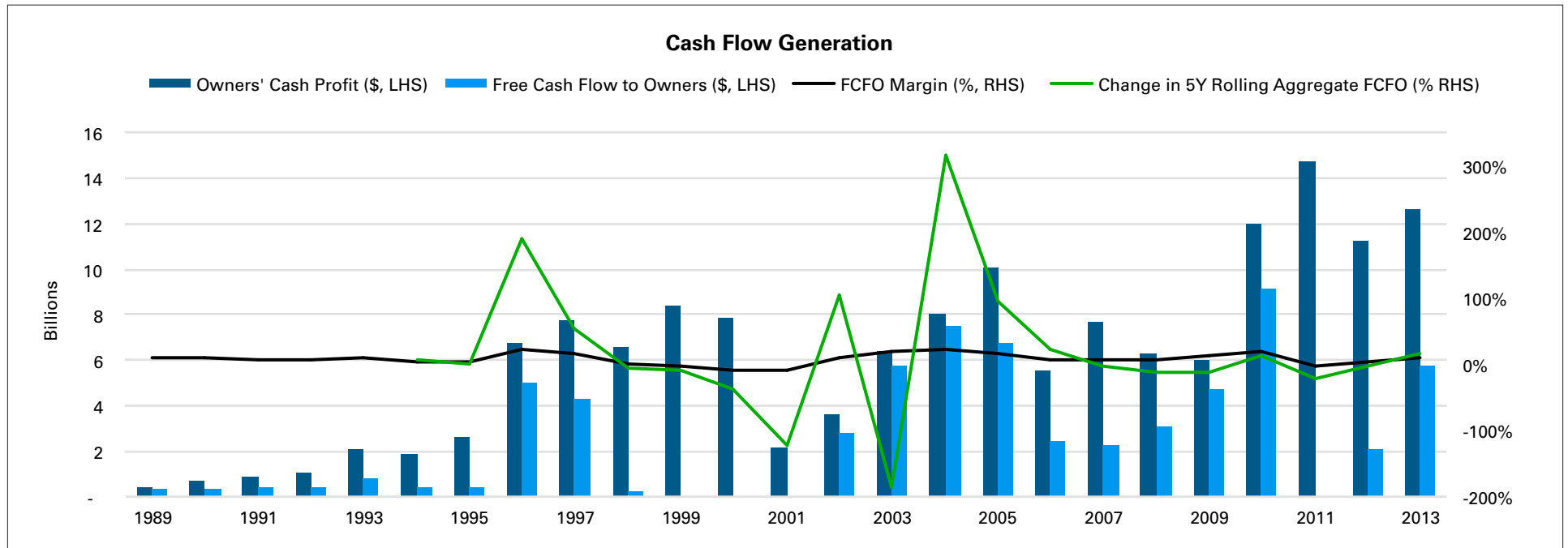
Valuation Drivers: Investment Efficacy



The days of Intel's highest investment efficacy—as measured by growth of OCP compared to nominal GDP—are likely behind it, due to the structural shifts mentioned in the Focus Section. That said, the company is still generating healthy cash flow growth on behalf of its shareholders. The growth of OCP varies a great deal depending on what stage of the semiconductor cycle we are in, but over the last 10 years, its median outperformance vis-à-vis nominal U.S. GDP has been 4 percentage points.

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.

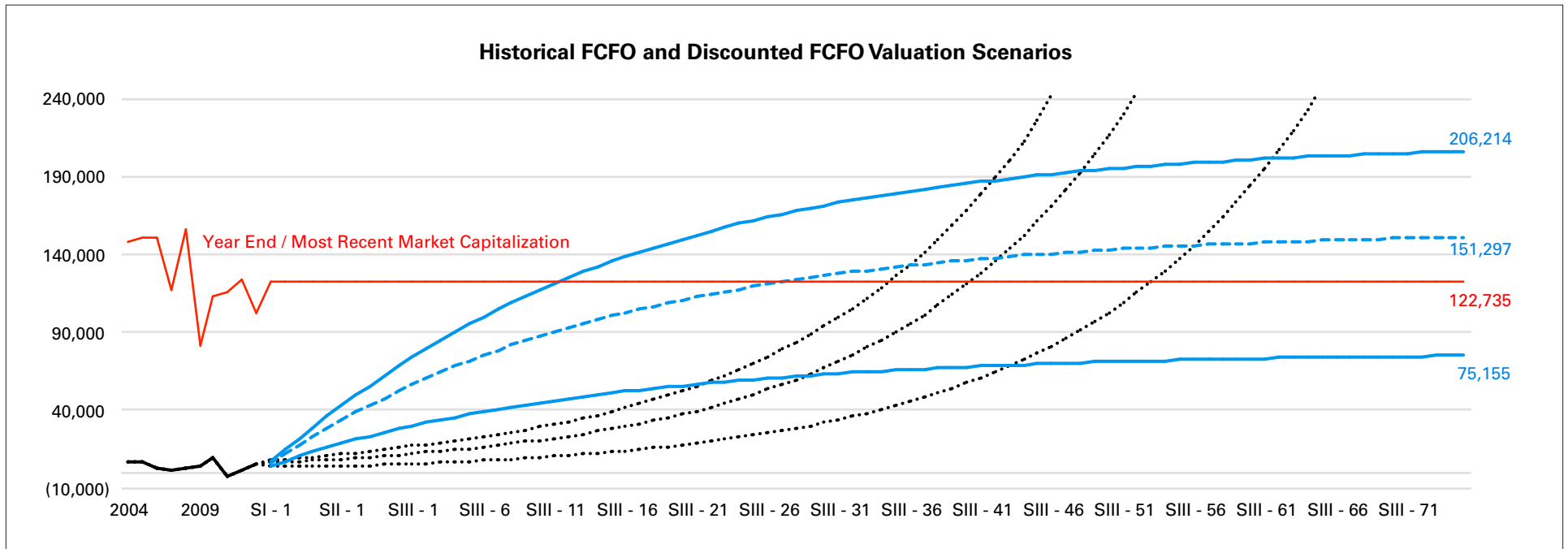
Cash Flow Generation



Comparing Intel to another manufacturer, it is quite profitable, with a median FCFO margin over the past 10 years of 10%. Cyclical peak FCFO margins are in the high-teens or low-twenties percentage range and trough margins are roughly in the -5% to -10% range. The median growth for year-over-year aggregate 5-year FCFOs over the previous 10-year period is 6%, but the range is enormous—317% on the high side (2004, coming out of the Tech burst) and -21% on the low side (2011, caused by the cash outflow for the purchase of McAfee).

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, which are all based upon an analysis of the median, best, and worst-case values for the drivers mentioned earlier in this report.

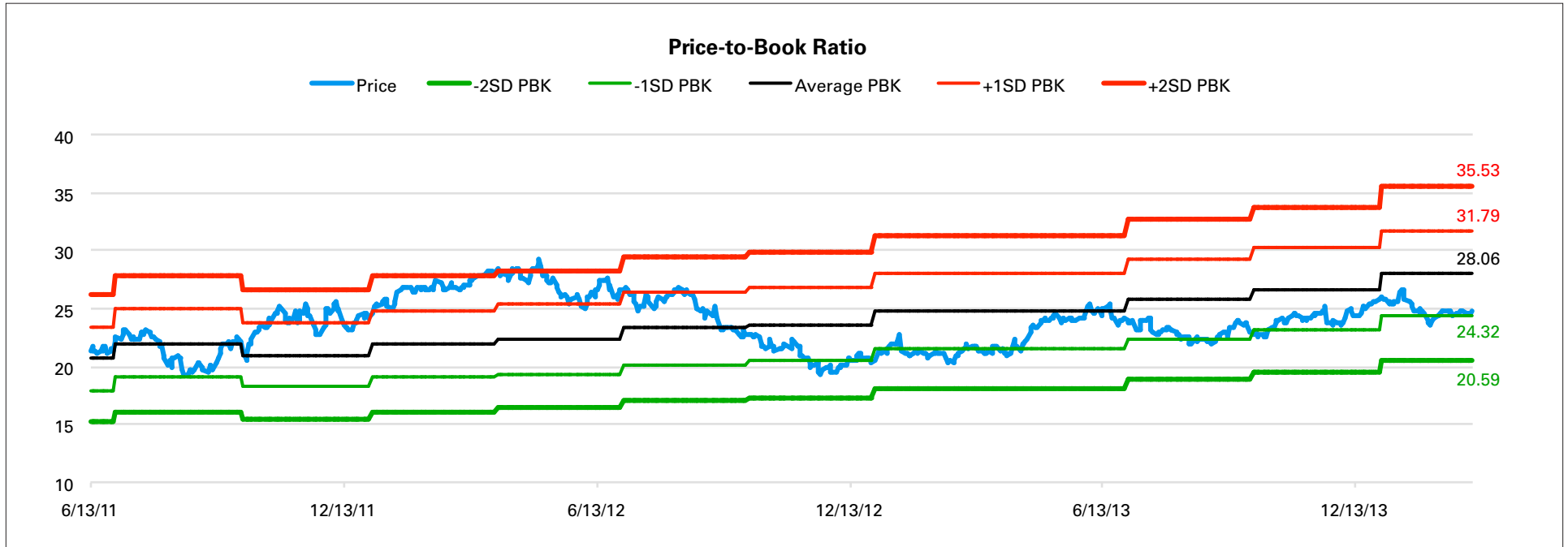
Valuation Assumptions & Scenarios

	Likely	Worst	Best
Revenue Growth	5%	0%	8%
OCP Margin	22%	18%	24%
Expansionary % OCP	44%	55%	40%
Medium-term Growth	7%	5%	8%
Long-term Assumed Growth	-	-	6%
Discount Rate	-	-	10%

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.

With these assumptions, we calculated a fair value range for the firm of \$15-\$41 with a median case valuation of \$30 / share.

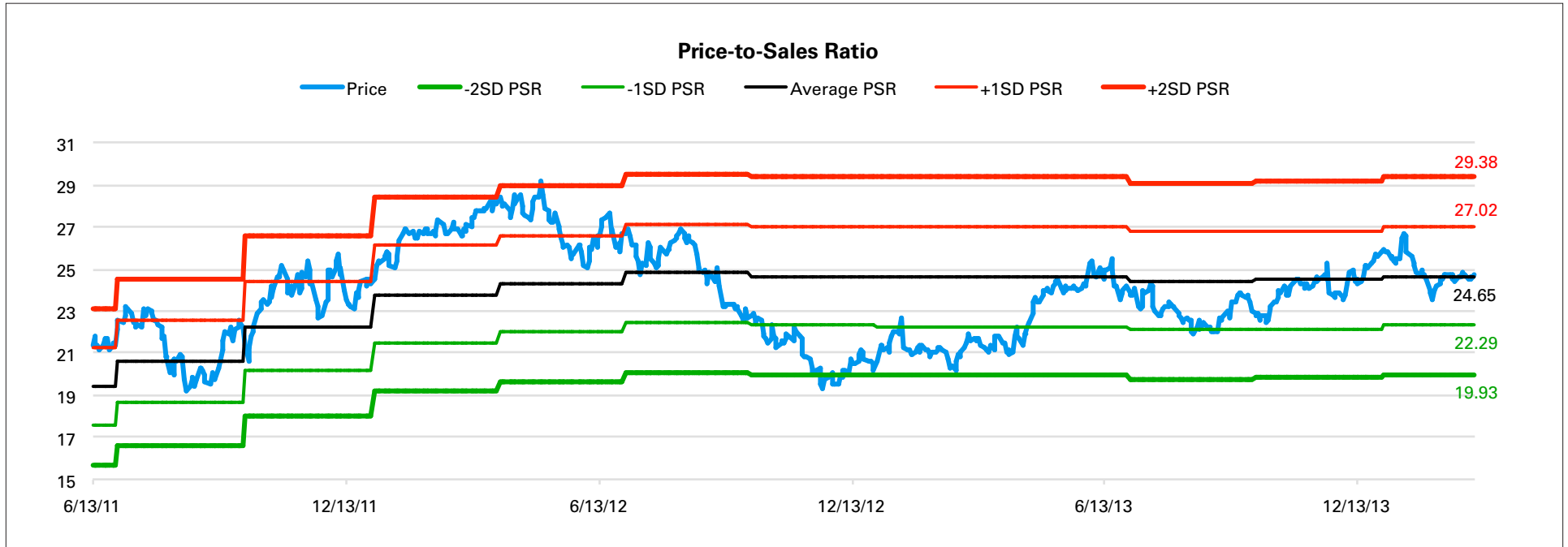
Market Multiples: Price to Book Ranges



Intel's shares have not deviated much from a value of one standard deviation below its average price-to-book ratio over the past few years. The present range between two-standard deviations below and above the average price-to-book ratio corresponds fairly well to the valuation ranges calculated on the previous page, though is a bit tighter on both sides.

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



On a price-to-sales ratio, Intel's shares appear approximately fairly valued at this time. If we take two standard deviations below as a strong buy signal, we see that price-to-sales generates roughly the same buy price as the price-to-book ratio. On the sell side, though, two standard deviations above average price-to-sales generates a much lower sell target than price-to-book.

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)
AMD	Advanced Micro Devices Inc	2.9B	-0.1B	-0.1B	0.1B	5.3B	4.3B	0.5B
ARMH	ARM Holdings PLC	23.5B	0.2B	0.3B	0.3B	1.1B	2.7B	2.2B
QCOM	Qualcomm, Inc.	129.8B	6.8B	7.6B	7.6B	25.5B	46.3B	37.0B
SSNLF	Samsung Electronics Co Ltd	166.9B	26.8B	34.2B	34.5B	204.9B	196.2B	134.4B
IBM	International Business Machines Corp	198.5B	16.5B	19.5B	19.9B	99.8B	126.2B	22.8B
INTC	Intel Corp	122.3B	9.6B	12.6B	12.9B	52.7B	92.4B	58.3B

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)
AMD	Advanced Micro Devices Inc	1.00	(1.00)	2%	1.23	-2%	8.60	-20%
ARMH	ARM Holdings PLC	0.67	1.00	27%	0.41	7%	1.23	9%
QCOM	Qualcomm, Inc.	0.89	1.00	30%	0.55	15%	1.25	18%
SSNLF	Samsung Electronics Co Ltd	0.78	0.99	17%	1.04	14%	1.46	20%
IBM	International Business Machines Corp	0.85	0.98	20%	0.79	13%	5.54	72%
INTC	Intel Corp	0.76	0.98	24%	0.57	10%	1.58	16%

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
AMD	Advanced Micro Devices Inc	0.0B	-0.4B	-0.1B	-2%	-0.2B	-4%	0.0%
ARMH	ARM Holdings PLC	NA	NA	NA	NA	NA	NA	0.5%
QCOM	Qualcomm, Inc.	NA	0.9B	9.6B	38%	8.5B	33%	1.8%
SSNLF	Samsung Electronics Co Ltd	0.7B	-0.2B	46.1B	22%	26.8B	13%	2.0%
IBM	International Business Machines Corp	NA	-4.7B	17.3B	17%	13.3B	13%	2.0%
INTC	Intel Corp	0.3B	3.1B	20.8B	39%	10.0B	19%	3.7%

Multiples and Misc.

Ticker	Name	PS Ratio	PB Ratio	EV / EBITDA	P/E Ratio	P/FCF	Altman Z-Score	Beta
AMD	Advanced Micro Devices Inc	0.6	5.3	15.8	NA	NA	0.1	2.4
ARMH	ARM Holdings PLC	21.0	10.9	75.0	144.8	NA	30.2	0.83
QCOM	Qualcomm, Inc.	5.3	3.5	14.7	19.6	15.7	10.4	1.05
IBM	International Business Machines Corp	2.1	8.7	10.1	12.5	15.6	4	0.62
INTC	Intel Corp	2.4	2.1	7.3	13.1	12.5	4.1	0.91
UA	Under Armour, Inc.	5.3	11.6	40.2	77.1	386.3	13.7	1.32

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

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.

find detailed explanations of each valuation driver and the resultant valuation measure in the below sections.

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 services¹, 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 [NIKE](#) Phil Knight said about his company's transition from supply- to demand-constraint in a 1992 Harvard Business Review article²:

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.

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.

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 low⁵, 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

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

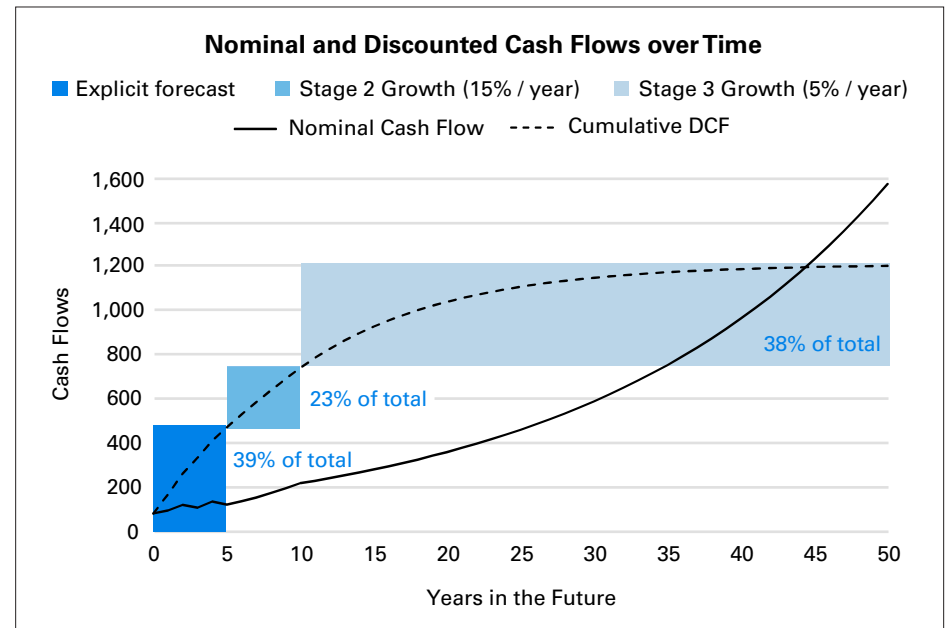


Figure 1.

first find a way to quantify how much of the owners’ profits the firm is spending on expansionary investments.

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.

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

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.

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.

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

⁶There 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.

⁷There 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 than 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 / sec², neglecting wind resistance. Stocks conform to no such physical constants.

LEGAL NOTICE

YCharts does not act in the capacity of a Registered Investment Advisor. As such, all information provided herein is for information purposes only and should not be considered as investment advice or a recommendation to purchase or sell any specific security. Security examples featured are samples for presentation purposes and are intended to illustrate how to use YCharts data in the analysis of the valuation of public securities. While the information presented herein is believed to be reliable, no representations or warranty is made concerning the accuracy of any data presented.