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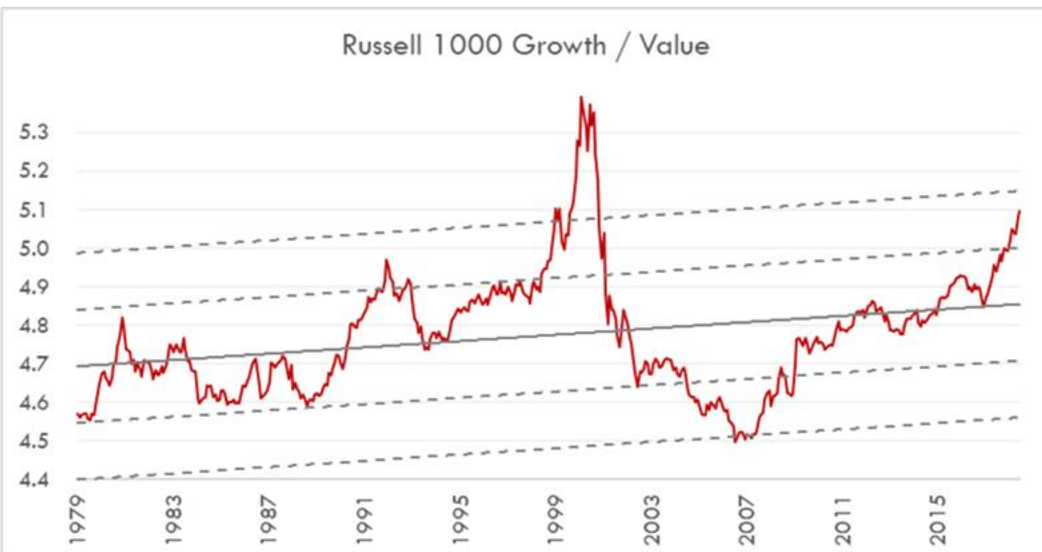
Lining Up Asymmetry Through Valuation, Capital Allocation, Optionality, and Themes

A concern brought up by some investors since I have expertise in TMT is some variation of, “isn’t technology expensive right now?” On a macro level I share that concern with respect to aggregate valuations; growth stocks relative to value are as high as they’ve been at any time in history other than the Internet bubble. On the long side, I find myself gravitating more towards sectors outside of technology, with current investments in consumer staples, MLPs, industrials, and consumer businesses (feel free to reach out to talk about these ideas). However, I still find there are cheap stocks in the technology sector. The real dichotomy is growth vs. value, with speculative growth stocks trading as expensive as I have seen and value stocks at quite reasonable levels. This suggests an opportunity for mean reversion, finding attractive returns in value stocks with good fundamentals and finding growth companies whose narratives are changing for the worse.



An important tenant of my process is making sure I am underpinned on the downside on investments I make. Investing is about probabilities and the probability of losing money on an investment, if you hold it long enough, goes down if the valuation you invest at is low. However, protecting your downside is also about making sure you are investing in companies that generate significant cash over time, and it doesn’t hurt to be aligned with secular growth trends. While I’m not a thematic investor, it’s much easier to invest with the wind at your back than in your face.

Simply restricting yourself to the lowest valuations in the market means it is likely you will own a number of cyclical businesses at peak cycle or low-quality businesses that earn weaker returns over time. A fast-growing software business at 20x free cash flow can be cheap and a shrinking obsolescent tech hardware business trading at 8x P/E can turn out to be expensive. The multiple you pay on current earnings depends on your assessment of the future cash flows of the business, with most of the value in any equity a function of the terminal value of the business. That said, when you are making a judgment on an investment, the probabilities are more in your favor if you don't fight the quantitative probabilities that broadly have held true through history. In the book *Deep Value: Why Activist Investors and Other Contrarians Battle for Control of Losing Corporations*, the author Toby Carlisle shows that the cheapest decile of the cheapest stocks in the market based on enterprise value to EBIT generated compound annual growth of 15.72% from 1951 to 2013.

Historically, value works as a factor that outperforms the market. Interestingly, Carlisle finds that when you combine ROIC with the value factor, it reduces returns in most markets, with the exception of Japan. This is because ROIC tends to mean revert – low ROIC companies tend to improve and high ROIC companies tend to deteriorate over longer time periods. Other studies also show that returns are mean reverting for the vast majority of businesses. Returns revert due to the long-term process whereby high returns draw in new competition to a business, which drives increased supply or share losses in that business.

While value and the capital cycle are correlated for most companies, the best investments are in what Peter Thiel calls monopolies that are trying to hide the fact they are monopolies. While it's rare for businesses like these to become the cheapest stocks in the market, there are many times when controversy creates opportunities to buy them at reasonable prices.

Companies that create software applications that benefit from the convergence of megatrends at just the right time and do it in a way that has a sustainable advantage can create huge value in a relatively short amount of time. For instance, Uber got the mega trends of smartphone adoption + "the sharing economy" and created a useful utility that made transportation much more convenient. The company also did it in a way that created a network effect, which was key to its sustainability. Indeed, most of the meaningful value creation that has been sustained has a two-sided network attached to it or benefits from Pareto's Law. Below are some examples of network effects, we have found the clear existence of network effects to be one of the most reliable drivers of sustainable high returns in TMT.

eBay Buyers	eBay Sellers
Uber Drivers	Uber Passengers
PayPal Merchants	PayPal Users
YouTube Videographers	YouTube Viewers
Booking.com Hoteliers	Booking.com Travelers
Android Developers	Android Users
LinkedIn Employers	LinkedIn Employees
Tinder Men	Tinder Women

One name I've liked the past few years that has two network effect businesses is IAC/Interactive Corp. Through its ownership of Match and HomeAdvisor (now ANGI Homeservices Inc), the company is participating in the growth of Tinder and growing the relatively nascent market for connecting home repair/remodel professionals with homeowners. The company has done a great job of focusing its efforts on dominating these new categories of dating and home service, respectively, developing two-sided networks and removing friction in the process of finding a date or a plumber. There are a lot of jokes I could make here, but I will keep this piece PG. When we bought IAC, the stock was trading at 15x P/E. Another way of looking at it was if you backed out the company's Match stake, which at the time was attractively priced, you got the faster growing HomeAdvisor for around 7x EV/EBITDA assuming almost no value for the company's other businesses, some of which are significant cash flow generators and growing. At the time, we thought the company's increasing dominance in a huge market size (see below) suggested this asset should trade at a very high multiple. While the stock has re-rated now, we still think this is a huge opportunity.

	(1)	Etsy (2)	OpenTable (3)	GH (4)	HomeAway (5)	Zillow (6)	Expedia (7)	ebay (8)
Vertical	Home Services	Crafts & Handmade	Restaurant Reservations	Food Delivery	Vacation Rentals	Real Estate	Travel	eCommerce
TAM	$400B	$34B	$3T	$54B	$100B	$77B	$1.4T	$1.7T
GMV (Transaction Value)	$12B	$2.7B	$12B	$2.4B	$4.7B	$3.2B	$61B	$82B
Market Share	3.0%	8.1%	0.4%	4.4%	4.7%	4.2%	4.4%	4.9%
Take Rate	3-4%	12%	2-3%	15%	10%	15%	11%	8%
Adjusted EBITDA (LTM)	$42M	$56M	$81M	$118M	$118M	$148M	$1.3B	$3.5B

Source: Interactive Corp.

Value investing works well and is not widely copied, partially because people find it uncomfortable and/or don't have a sufficient time horizon to see things through. When a company is embroiled in a scandal, has very bad earnings, or is being mismanaged, it is difficult for people to stomach owning the stock. Hence, being emotional creatures, people usually sell the stock down to prices that are too cheap. One interesting narrative to look for is when analysts say a business is "uninvestible." Usually this means the lack of buyers in the market are creating an attractive opportunity. However, to avoid value traps, fundamental research must be done to probabilistically assess whether the business is highly likely to stabilize, or better yet, return to significant growth in the future. As discussed in prior pieces, it's usually better to wait for a positive inflection than predict it in value stocks or levered companies. Sometimes you can dig into a business and find the possibility for growth in one business a company owns that will offset the negatives associated with an asset the market is fixated on.

In early 2016, I noticed VMware plunging following a relatively weak earnings report. Exacerbating the earnings issue, Dell had recently purchased EMC, which was the majority owner of VMware. To help finance the deal it announced it would issue a tracking stock to existing EMC holders when the deal closed. Several VMware executives resigned including the company's CFO, which many on Wall Street view as a red flag. I read several sell side reports suggesting the company was "uninvestible."

I started to dig in, both on the technical issue (new issuance of shares to holders that may sell indiscriminately as arbs start to dominate the holding of EMC stock – plus technical pressure from arbs coming in to short VMW to capture the spread on EMC), and the fundamental issues for the company.

My analysis on the fundamental issues found that while cloud computing was hurting VMware's core vSphere server virtualization business, the growth in the other businesses were highly likely to offset this issue over time. The company had a networking virtualization business (NSX), computing and mobile virtualization (now called Workspace One), and storage virtualization (vSAN) business that were growing fast enough to offset the potential decline of server license sales. Bookings for these businesses were collectively growing at over 50%. Also, because VMware was a core standard for server virtualization and a high portion of its revenue was maintenance, I thought this business would be relatively sticky and the company could develop a better narrative to help its customers navigate migrating portions of their business to the cloud.

While I didn't know whether VMware would become a growth company again, I thought it was unlikely the company would experience a significant deterioration in its free cash flow. The business was clearly quite a good business – cap-x was a tiny fraction of cash flow from operations consistently and software businesses are quite scalable with high margins and low capital intensity. While Wall Street was looking at the potential technical issues related to the EMC buyout and was worried Amazon Web Services was a challenge to VMware, I saw a company with good technology and multiple fast-growing products that were the best solutions in their niches. We spoke to several distributors and resellers whose business with VMware was still growing despite the issues faced by vSphere. At 5x EV/EBITDA and 6x EV/FCF (enterprise value to free cash flow), the stock was extremely cheap. We modeled out over a 4-year period the company generating its enterprise value in cash using assumptions that weren't very demanding. Frankly, outside of the financial crisis, I've never seen this in an unlevered, relatively stable company with a good business.

Software businesses are hard to kill. An example we looked at was CA, Inc. whose mainframe and management software has been around almost as long as the software business has existed. Despite being hated by customers and not cutting edge, the company's earnings have never meaningfully declined. VMware, by contrast, had very complex technology on a number of fronts, with its network virtualization product growing bookings over 100% at the time. Feedback on its endpoint virtualization products told us they were the market leader in the space and taking share from the main competitor Citrix. Resellers we spoke with said their business overall was growing with VMware, even if their core vSphere business was declining.

At GMT Capital, we bought the stock, which was then trading in the mid-$40s. It was the best investment I made in 2016 with the stock doubling within a year. As I expected, the company's network and storage virtualization businesses continued to grow, the company was able to partially deal with the EMC stock overhang with a stock buyback, and there was a positive surprise of VMware announcing an agreement with Amazon Web Services to co-market VMware's software and enable customers to pivot to hybrid cloud offerings, making VMware's services more strategic. I met with the company's CEO, Pat Gelsinger, at a Goldman Sachs conference in San Francisco and was extremely impressed with his technical knowledge and the way he strategically morphed the business into a bridge to the cloud.

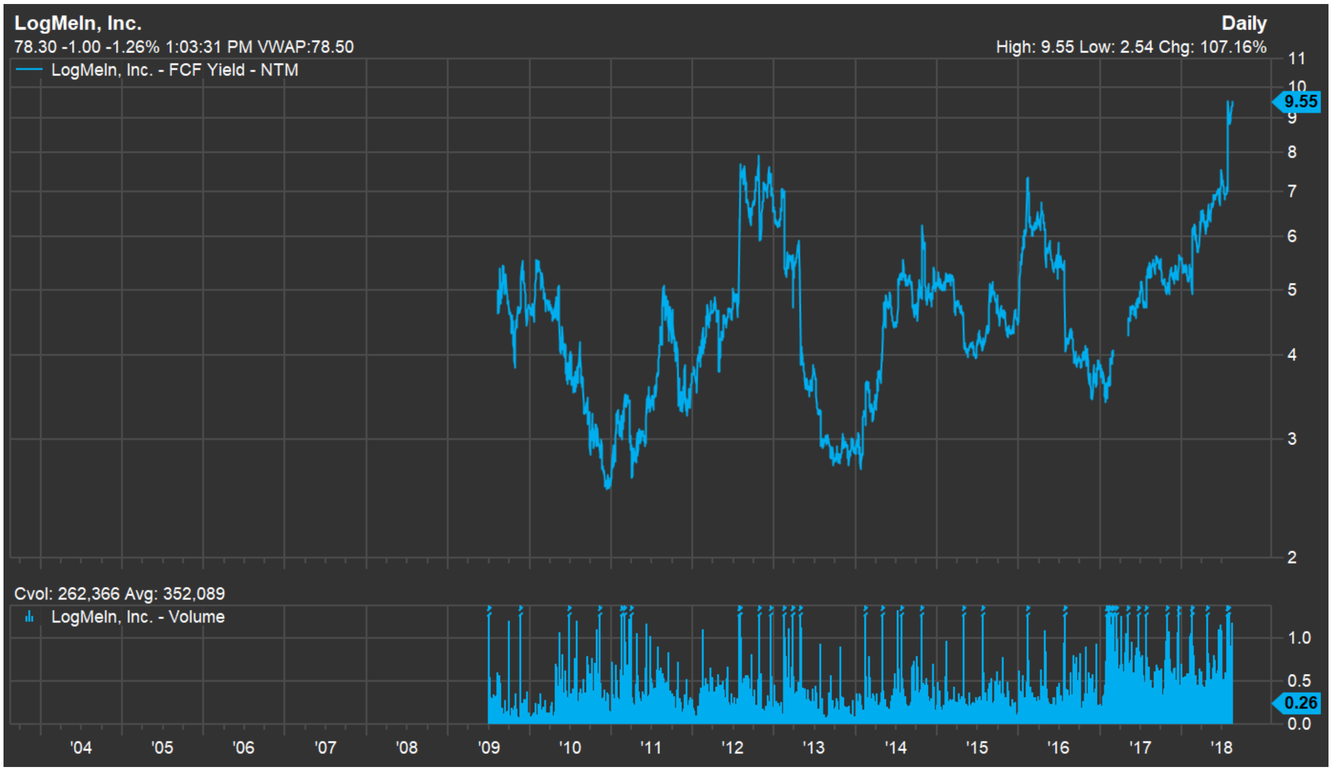
While GMT Capital usually buys and sells positions slowly, we made an exception with VMware at the time, buying much more quickly given the great opportunity. The idea resonated across the firm and the riskiness of the idea seemed low given the company's strong balance sheet, strong cash generation, and good management team. Sometimes when an opportunity like this pops out, you need to make sure you capitalize on it.

A current name that has a similar feel to it right now is LogMein, Inc. (LOGM/$78.90). The company has three major franchises, including a collaboration business, a remote log-in and support business (mainly used for tech support), and identity management software (the largest asset is LastPass, a password management tool). The company has some unique capabilities and is likely the largest "freemium" company in the world, with the leading products in web conferencing, remote access and support, and password management. While the company has 2.3 million paying subscribers, it also has 24 million free subscribers that it can try to move to paying customers over time, an attractive strategy from a customer acquisition standpoint. Part e-commerce company, part SAAS, the company has a broad portfolio of brands that focus on different subsegments of the markets it participates in, giving it a lot of levers to pull over time.

In 2016, LogMein doubled its share count but more than tripled its sales and cash flow with the acquisition of Citrix's GoTo assets. Recently, the company acquired an asset called Jive in the UCaaS (unified communications as a service) space, an asset that is growing ~25% and has obvious synergies with the company's collaboration product suite.

Recently, the company took its guidance down for 2018, due to mis-execution in the collaboration space. Since acquiring GoTo, the company tried to move the month-to-month subscribers in this business to annual contracts and to raise pricing for some of the base. This caused increases in churn, and predictably, several competitors tried to benefit from the friction. The aforementioned levers the company could pull were pulled too hard, and frankly, we think the collaboration space is fairly mature with lots of competition.

As we alluded to when discussing VMware, most software businesses are hard to kill, especially when the business is primarily subscription (or maintenance) based. The company does have some faster growing assets, including Jive and LastPass (the latter of which is currently growing 70%). Meanwhile the disappointing guidance caused a barrage of sell side downgrades and capitulation, which means the stock is trading around 11x this year's FCF. We think the issues facing the business are largely execution-driven and correctable. We've known the management team for some time and have largely been impressed with their thoughtful approach to the business and capital allocation.



Asymmetry Through Optionality

Another way to capture value that is less obvious on the surface is to find free options embedded within businesses that you aren't paying for. This has been a core tenant of many successful investments I've made. It's also a core tenant of good management of a business – the best management teams are always thinking about lower cost investments they can make that have huge upside if they pan out. If they fail, they can shut them down and make another bet. But don't take my word for it, here is Jeff Bezos, founder and CEO of Amazon:

"If you invent frequently and are willing to fail, then you never get to that point where you really need to bet the whole company. AWS also started about six or seven years ago. We are planting more seeds right now, and it is too early to talk about them, but we are going to continue to plant seeds.

And if you get to a point where you look at it and you say, look, we are continuing [to] invest a lot of money in this, and it's not working, and we have a bunch of other good businesses, and this is a hypothetical scenario, and we are going to give up on this. On the day you decide to give up on it, what happens? Your operating margins go up because you stopped investing in something that wasn't working. Is that really such a bad day? I can guarantee you that everything we do will not work."

In an interview, Bezos says "Nine times out of ten, you're going to fail. But every once in a while, you'll hit a home run that in business terms is more like 1,000 runs. 'Given a ten percent chance of a 100 times payoff, you should take that bet every time."

This is why Amazon Web Services was the fastest software business to reach $10 billion in revenue ever. The company incubated that option, and ten years later it has become one of the drivers of the biggest mega-trends in technology. It's also why the company now has high potential businesses in AI, media, and transportation – some of those may fail, but one or more may result in a big pay-off.

This is one of the reasons I wasn't very concerned when I first invested in Google. One of the big controversies on Google at the time was how much the company was investing in various technologies, engineering talent, and new products. For instance, the company was investing a significant amount in maps, YouTube, infrastructure for the company's display and ad technology business, fiber, Android, and Chrome. A lot of these businesses had yet to achieve any meaningful revenue streams or were unprofitable at the time. However, what I saw was an extremely profitable search and display business, which was supporting a lot of really large call option businesses that could be huge drivers of the business in two to four years.

What ended up happening? YouTube surpassed $10 billion in revenue in 2017. Android found a vehicle to monetize through the Google Play store plus advertising through app search. Chrome helped the company reduce traffic acquisition cost on the web and became the most used web browser. And fiber, while not successful, was cut back dramatically and is now less of a drag on profitability. Now I think Google's Waymo division has a huge head start in developing autonomous car technology, which if licensed to a considerable portion of the auto market could have a huge payoff one day. But right now, it is loss making and optically makes Google look more expensive on P/E or free cash flow.

Another successful investment we made at GMT, I started to buy in late 2011 and 2012. SoftBank, which at the time was viewed by the sell side as a Japanese telecom company, was really a holding company run by the always aggressive Masayoshi Son. Starting as a software distributor in Japan, Son recognized the potential of the Internet and during the dot com bubble was for a brief time the world's richest man because of his company's investments in various Internet businesses. By the time I started analyzing the company, SoftBank owned a controlling stake in Yahoo! Japan, plus many different Internet businesses. The company's Japanese wireless business had been taking market share and was attractively positioned in a three-player telecom market with structurally high margins.

Son originally got into the telecom business by buying out Vodafone K.K. in Japan a few years prior, which seemed like a disastrous decision at the time. I followed Vodafone at the time he bought this asset and Vodafone's Japan business was one of the worst managed telecom businesses in the world and was generating significant losses. Masa saw that Steve Jobs would eventually release the iPhone and went to Jobs before he even bought Vodafone and asked to be an exclusive seller of the iPhone in Japan, which Jobs agreed to at the time. As an aside, we spoke to Son's former right-hand man a few years ago, who previously worked for Jobs and brokered the discussion between the two. He described how Masa would make what he thought were huge mistakes and then make them work through tireless intervention.

While the stock was originally punished when SoftBank made the purchase, Masa worked until the telecom business turned around. He introduced simpler, easy to understand rate plans and his exclusive on the iPhone improved SoftBank's market share, all while cutting costs and managing the business more efficiently. The turnaround of this business was truly impressive.

What attracted me to the story in 2011 and 2012 was SoftBank's ownership of the largest stake in Alibaba Group. At the time, the company owned close to 40% of Alibaba, which was growing at exponential rates (sales were growing over 70% and operating income over 180% at the time) in China and was the market leader in e-commerce. Bizarrely (at least to me), the market was assigning basically no value to this asset. We were buying a Japanese telecom asset at 6x EBITDA and getting Yahoo! Japan and Alibaba for basically nothing (the company also was effectively a top ten venture capital firm globally and owned a variety of other assets too).

There was nothing wrong with the Japanese telecom asset and we were moderately bullish on its prospects. So here was the ultimate case of optionality, with an asset in China we were getting that was dominating the e-commerce market and was like a combination of Google, Amazon, eBay, and PayPal. Oddly, all of the Japanese analysts we spoke with were telecom analysts in Japan, who completely ignored Alibaba in the valuation of SoftBank and gave no credit for the other private assets it owned (most still don't value private assets to this day).

Late in 2012, SoftBank bought Sprint, which we thought was a problematic acquisition (although like Vodafone K.K., we suspected Masa would eventually make it work). When the stock was punished on this deal, going down substantially, we thought it was a great opportunity because while Sprint potentially diluted value, the option value of Alibaba was growing much faster than risks associated with Sprint. We were also getting bullish on Japan, with the election of a new Prime Minister potentially changing the deflationary dynamics that had afflicted its stock market for over 20 years.

We bought the stock heavily in late 2012 and continued to buy into early 2013. In 2013, it became more obvious that Alibaba would eventually go public, which attracted other investors to SoftBank. Also, the deprecation of the Yen associated with a new monetary policy tied to the new Japanese Central Bank Governor also caused Japan's stock market to rally substantially. The acquisition of Sprint and stake in Alibaba combined with Yen-denominated debt gave the company leverage to the weakening Yen.

SoftBank lead the Japanese market and the stock went up 3-fold that year. The Alibaba deal wouldn't happen until September 2014, but the market anticipated the value creation that occurred when Alibaba couldn't be ignored. The mega-option in Softbank paid off; SoftBank's now 28% stake in Alibaba (even after selling some to fund its acquisition of ARM) is worth $130 billion, compared to the market cap of SoftBank at the time we first made the investment of around $30 billion.

As a side note, SoftBank's value right now is again quite extreme relative to the value of a lot of assets, the biggest of which is Alibaba, but also includes some of the biggest e-commerce and ride sharing businesses in India and SE Asia. While people dismiss the Vision Fund as the sign of a bubble and/or think Masa is a mad man, spraying around $100 billion, his track record suggests otherwise. He has generated a 44% IRR since SoftBank's inception and over 40% excluding his investment in Alibaba.

While we don't agree with all his investments by any means, the Vision Fund will have a positive value if he earns a return over 7.5%, and the liability associated with it is limited to what SoftBank put in. Uber, his biggest investment to date, which SoftBank bought at 4x revenue, is not crazy by any means given it is a network effect business with more than 50% revenue growth. The Vision Fund also has already seen material gains through sales of stakes in India and current market valuations in businesses like Didi Chuxing. Meanwhile, the company is in the process of setting an IPO of its telecom unit, while the Sprint/T-Mobile merger could also create meaningful value. SoftBank is one of the few reasonable ways to invest in e-commerce in emerging markets, ride sharing, and fast-growing private software assets. We expect many of these investments not to pay off, but in venture capital many times the top returning investment can make more money than the rest of the fund combined.

Optionality Through Capital Allocation

Optionality can come from the ownership of a number of businesses that aren't reflected in the valuation of a stock. It can also come from a company's ability to allocate capital attractively, which can be hard to model or think about when looking at a business in its current form. If a company has the ability to execute on accretive acquisitions over time, many times the market won't give the company credit for it until it happens. This means owning that stock can result in receiving inconsistent payoffs that can be unpredictable from a timing perspective, but nonetheless predictable given management intent and track record.

Even mature businesses with sustainable advantages can be good investments if management is good at allocating capital. Capital allocation is as important to longer term compounding as having a sustained competitive advantage. If you have both, even if the growth opportunities of the firm aren't stellar, returns can be quite remarkable.

For example, we invested in DirecTV a few years coming out of the financial crisis. While the satellite TV market was relatively mature, the management team was influenced by John Malone, who swapped his stake in 20th Century Fox for a stake in DirecTV. The company very clearly articulated a capital allocation policy of levering up to around 2.5x net debt to EBITDA and continually buying back stock with excess FCF. The company was earning 25% ROIC in its core business and high returns in its fast-growing Latin American business.

It was also able to continually grow its gross profit dollars by passing through the majority of content price increases it incurred and getting cash flow growth by holding most other costs relatively flat. The entire sector at the time acted in an oligopolistic fashion, raising prices on video every year. While the street was focused on the content cost increases that offset this for half of their cost structure, it glazed over on the fact that the rest of the cost structure was fixed. While gross profit percentages were shrinking slightly, the pricing umbrella of the sector helped drive overall cash flow growth. The company was able to leverage this cash flow growth, and in addition the satellite companies were generating significant free cash flow that also could be used for buybacks.

As a result, the company was able to get huge EPS leverage by continually earning high returns in its core business and allocating capital to buybacks at cheap prices. Below we demonstrate this through a chart I presented at GMT Capital's Partner's meeting in 2012.

	2010	**2011**	**2012E**	**2013E**
Revenue	+11.8%	+13.0%	+9.9%	+8.0%
EBITDA	+20.0%	+9.4%	+7.7%	+8.9%
Net Income	+53.4%	+18.7%	+9.6%	+12.5%
EPS	+70.3%	+39.7%	+29.0%	+30.9%

Source: DirecTV reports and former GMT Capital estimates.

Despite the company's ability to compound EPS at a fast rate as seen above, the stock at the time traded at 11x P/E, which actually perpetuated its ability to continue to earn high returns on its stock buybacks, thereby increasing the earnings growth potential.

The company was able to compound at a fast rate based on 1) having a sustainably high ROIC (driven by the competitive dynamics it faced in the industry at the time), and 2) instead of wasting money on lower return capital projects or acquisitions it bought back stock at a high return, paradoxically because the market was ignoring its compounding capability and always worried about competition and technology risks.

Eventually DirecTV's management team saw that the business's edge may be coming to an end due to technological shifts and changes in consumer behavior. Mike White, the company's CEO, did a great job compounding EPS at a very high rate over a decent time period but the board rightly sold out to AT&T, finally giving the company a terminal multiple when it probably didn't even deserve it. Strong capital allocation and management behavior combined with good structural forces in an industry can be a powerful combination.

While a bit expensive now, one company at GMT we generated high returns in is a conglomerate in Canada called Constellation Software. The Chairman and President, Mark Leonard, thinks like an investor, coming from the venture capital business prior to starting Constellation with a $25 million initial investment. The company is a roll-up of vertical market software businesses, usually in unexciting niches that get little attention, like ERP systems for government customers. The company has acquired hundreds of these small (usually $2-$5 million in revenue, although sometimes higher) vertical software companies at high returns because it acquires them at a low multiple of their maintenance revenue.

Mr. Leonard's annual letters highlight the company's long-term shareholder orientation, focus on returns on invested capital, and case studies the company studied with other high returning software and business services conglomerates. The table below shows the remarkable returns on invested capital the company has achieved.

Many of the employees in addition to Mr. Leonard also own significant amounts of stock, another factor I look for, especially in execution-driven businesses where you are placing your trust in management to a larger degree.

Table 1

	Adjusted Net Income (a)	Average Invested Capital	ROIC	Organic Net Revenue Growth (YoY)	ROIC + Organic Net Revenue Growth
2006	26	123	21%	8%	29%
2007	33	154	22%	1%	23%
2008	54	195	28%	5%	33%
2009	62	256	24%	-3%	21%
2010	84	325	26%	-2%	24%
2011	140	394	36%	7%	43%
2012	172	491	35%	2%	37%
2013	207	585	35%	4%	39%
2014	274	739	37%	3%	40%
2015	371	965	38%	-3%	35%

(a) Historical figures restated to comply with revised definition.

As a result of extremely high returns on capital, cost discipline, and some modest organic growth, the company grew EPS 28.5x from 2007 - 2017. Sometimes when you see a track record like that you should suspend disbelief and just buy the stock. When we bought the stock, it was trading around 20x P/E, not cheap by most value investor standards. However, if Constellation can compound earnings at even a quarter of its prior growth rate, it will be a great long-term investment (over 7-fold in ten years).

I know a lot of investment managers that would shun an opportunity like Constellation Software or even investing in Berkshire Hathaway years ago. They argue that just investing in a management team is somehow cheating or not interesting to them. I personally think these investors miss the point – backing a management team with a superior platform, plan, and shareholder orientation is what you are doing in any business. Whether the manager is investing externally or internally, they are still making conscious capital allocation decisions; if they are buying back stock like DirecTV or buying small software companies like Constellation Software, in both situations they are investing on behalf of the shareholder. Selecting the best management teams to invest in is part of making the smartest stock picks.

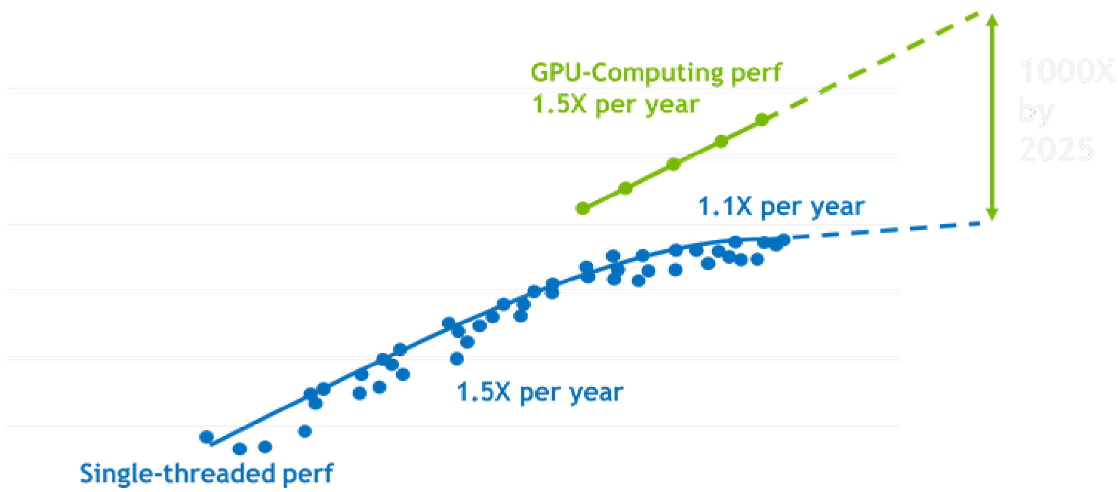
Optionality Through New Products

New products can also create optionality when a company is being valued only on its core business. In technology, owning companies with potentially big new products can be a way to make significant returns. When Apple just had the iPod, many forward-looking investors anticipated the company's next move into phones (as described above, SoftBank even bought a telecom company to position for it). NVIDIA was a great investment for those who saw the company was building an ecosystem in the data center for artificial intelligence using its GPUs and proprietary software. As described above, VMware was being viewed solely as a server virtualization company, but had great new products in networking, PC, mobile, and storage virtualization.

Technology companies in particular can change their fortunes dramatically with new products. Sometimes the company in question doesn't even develop a new product but benefits from new products that other companies produce. Several companies today are benefiting from the adoption of 3D sensing products by Apple and eventually the Android phone OEMs. Being early in stocks that benefit from new product growth can result in interesting risk/reward. That said, sometimes these kinds of stories get ahead of themselves and the hype can be more substantial than the reality. It is important to not overpay for less certain new product growth, which may or may not materialize, and when making forecasts to forecast using realistic or even pessimistic estimates.

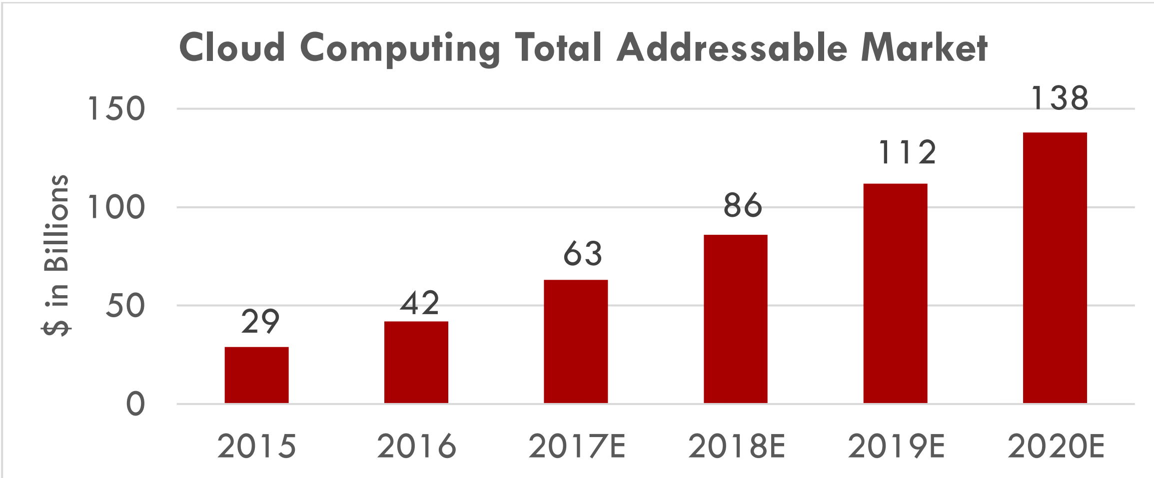
Trends in Technology: Aligning with Themes with Valuation on Our Side

There are several important themes in technology that I expect to converge and interact in the coming years. Taking a 10,000-foot view of technology, the most important trend has historically been the compounding of Moore's Law and its implications. We are currently undergoing a paradigm change: the traditional advances in computing power were driven by the number of transistors in a dense integrated circuit doubling around every two years. While Intel is currently moving from 14 NM to 10 NM and advancements are still being made to CPUs, the advances here are coming at a diminishing rate. Instead, computing power is being advanced by parallel computing driven by the use of GPUs, which NVDIA projects will cause a 1,000x advance in computing power vs. the traditional CPU paradigm by the year 2025.

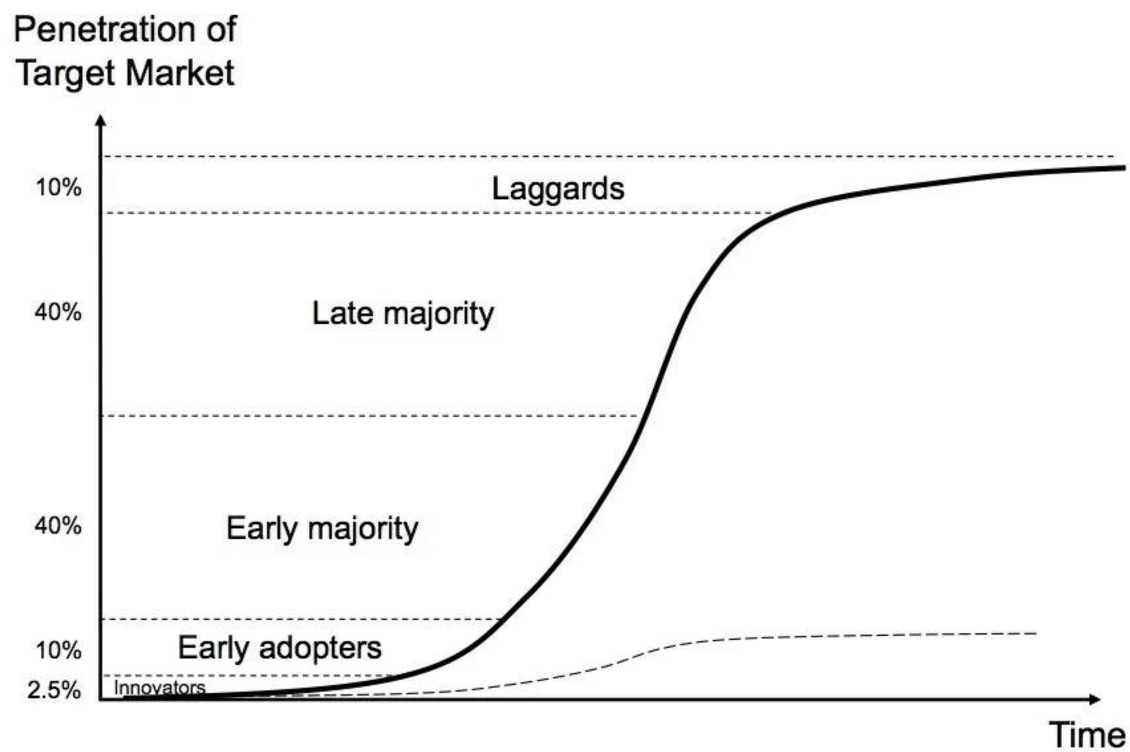


Source: NVDIA

While GPUs are being used for deep learning applications, it seems to me we are just scratching the surface on what can be accomplished in developing AI. So far AI has been developed using brute force computing power, with pattern recognition problems like identifying and interpreting speech, winning at Go, and developing expertise at driving. However, while the GPU architectures being designed today may be loosely inspired by the human brain's structure, the human brain is much better at utilizing memory to store a sequence of patterns, recall those patterns auto-associatively, and storing those patterns in an invariant form. In this way, a human can quickly catch a ball thrown at her from any angle without making a massively quick calculation of how fast the ball is coming at you from what angle. Computers can make many more calculations per second than humans and now can store and run algorithms on much more data, but the human brain's algorithm is still way more cleverly designed (instead of going on a huge tangent, we recommend the book *On Intelligence*, by Jeff Hawkins). For right now, AI is developing partially because we can throw much more computing power at algorithms that were developed as early as the late 1970s, which is advancing at a rapid rate partially due to cloud computing.



Source: Gartner, UBS



Cloud computing is driving huge reductions in the cost of computing (for instance Microsoft estimates as their cloud advanced to 100,000 servers, it reduced the total cost of ownership of servers by 80%) and AI is increasing the number of applications that can be applied with this lower cost computing power. We think this is driving real benefits to companies who are embracing the cloud.

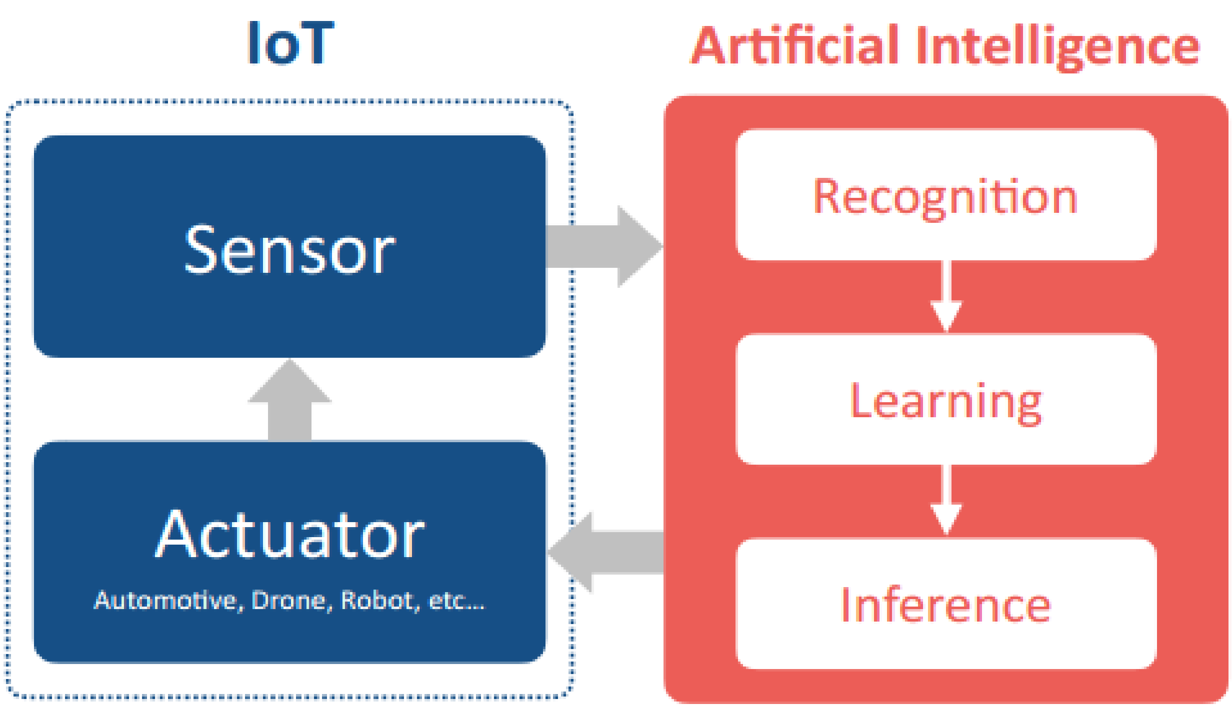
As an example of a very indirect beneficiary of cloud computing, Expedia recently moved the majority of its new data center spending to AWS and plans to push as much as 80% of the applications it runs to the cloud. This freed up engineering resources at the company to focus on its core business and potentially to catch up with its main competitor Booking.com in the area it historically lagged, namely marketing efficiency/conversion. While there are key differences between the two companies, this means in practice, that Expedia may be 1) able to take share at the margin from Booking.com and/or 2) the company could potentially partially catch up with its peer on margins, with Booking.com having 40% EBITDA margins compared to Expedia at under 15%. Historically, Booking.com took share constantly by being able to convert on its website at a better rate than competitors; if Expedia can convert at similar rates, that means it can increase its spend on performance marketing at high rates of return and/or improve its margins on existing performance marketing spending. We note Expedia trades at around 15x our estimates of this year's FCF, so even if we're wrong that Expedia can take share or expand its margins, the downside seems limited, especially since the OTA market has largely become an attractive duopoly. Expedia also can benefit from a relatively new product, because it is the strongest public player in the alternative accommodations market with its Homeaway asset, which grew operating income 106% last quarter.

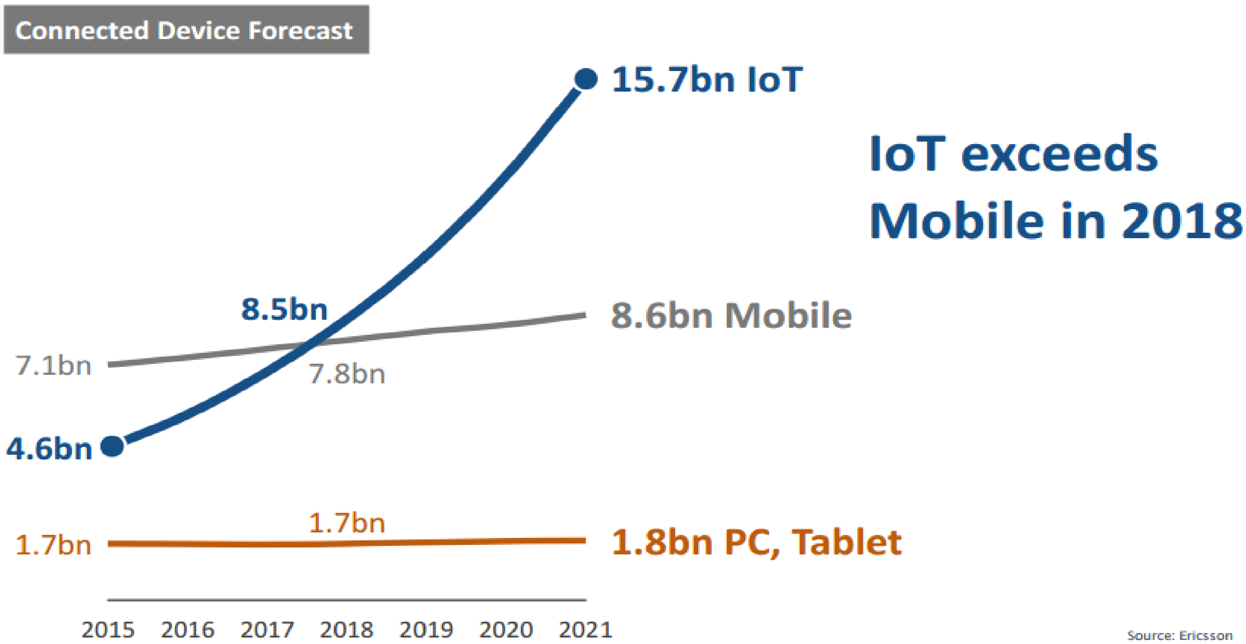
The convergence of AI and cloud computing are just starting to come into view, which is driving excitement for the cloud computing companies (Amazon, Microsoft, and Google) and NVDIA. In our view, this excitement is warranted, although we tend to look for less appreciated (and therefore cheaper and more asymmetric) beneficiaries of cycles/trends. Google and Facebook have been capturing over 90% of the incremental ad spend in the U.S. in recent periods and digital is now close to half of advertising spending, suggesting law of large numbers issues may start to show up in these companies' core businesses. NVDIA seems to be over earning in cryptocurrencies and we think the growth the company has experienced in video games is unsustainable. We wouldn't bet against these companies, which have world class franchises (and we were long Google and Facebook at GMT), but just don't think they are cheap enough today.

While some value investors tend to fight secular trends in business, we have always found it much easier to have tailwinds in the businesses we invest in, but sometimes it pays to dig deeper below the surface to find less obvious beneficiaries. While AI and cloud computing trends are exciting, there are few ways to play these trends cheaply outside of somewhat indirect beneficiaries like we highlight above. However, in order to facilitate the advancement of different applications for AI and the cloud in the real world, we believe sensor adoption will become much more important.

The Eyes and Ears of AI

We think to develop more real-world applications for AI and the cloud, more data must be collected, which is made possible by the reduction in costs of computing. This all leads to increased sensor adoption, a secular trend where you can find numerous investments that are still more reasonably priced and less crowded.

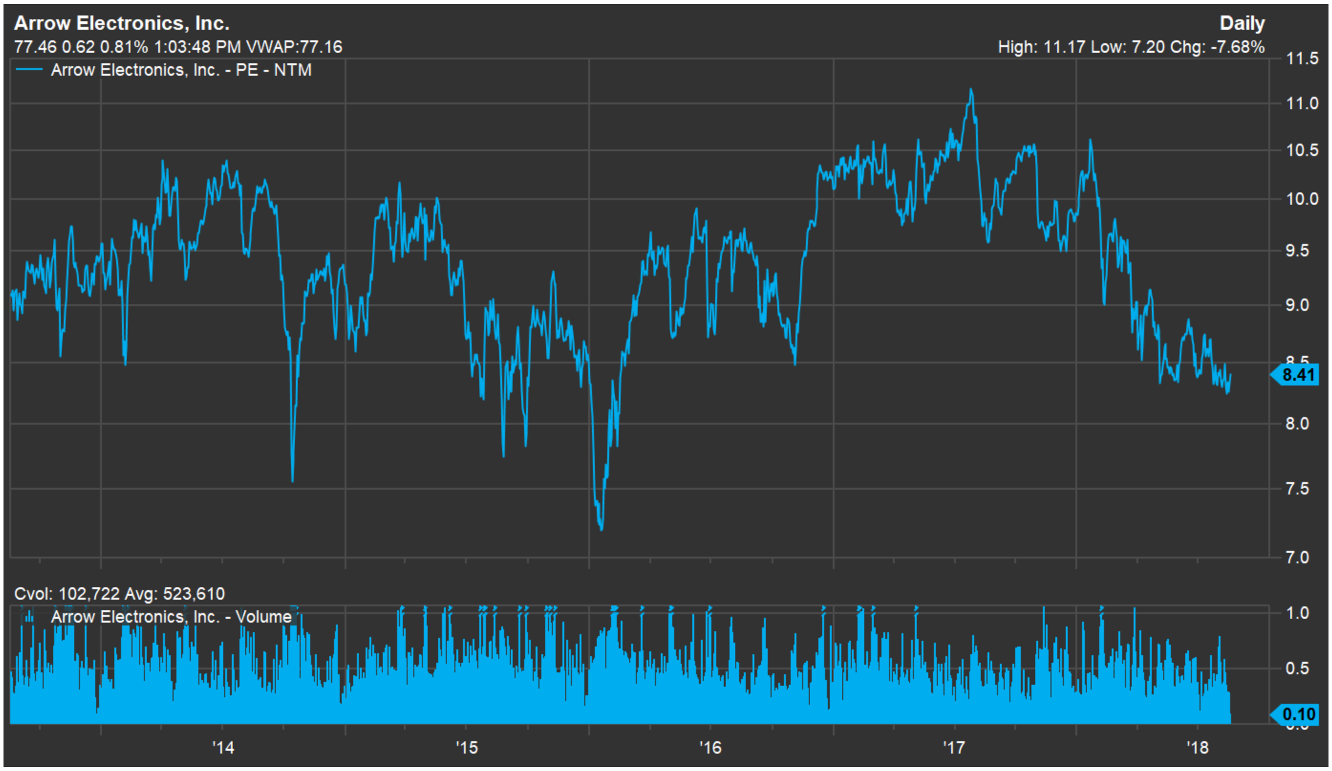




An example of a few beneficiaries of this trend towards senor and IoT adoption are Arrow Electronics, the largest distributor of semiconductors in the world, and Sensata, the largest auto sensor producer, which also has a meaningful business selling sensors for other industrial products.

With the market for most IoT applications somewhat fragmented, Arrow is a great way to bet on volume growth in this market, with the semiconductor distribution market largely a duopoly. Arrow is increasing the proportion of sales related to design activity as it helps a fragmented IoT supply chain develop solutions for enterprises. Even several years ago, the company was highlighting its investment behind IoT in both divisions of the company, which it is increasingly coordinating to deploy advanced solutions for IoT.

The company is also benefitting from the strong market for technology infrastructure spending right now through its Global Enterprise Solutions business, which has higher margins than its core distribution business. Arrow grew EPS 23.5% in the latest quarter and over 5x in the past ten years yet trades at 8x forward EPS. At the low end of its historic trading range despite strong business trends, we think Arrow is asymmetric. The main risks relate to the cycle rolling over, but we would argue that 1) our shorts are likely to face far more pressure if this occurs, 2) Arrow generates significant cash by reducing inventory when the cycle contracts, and 3) there are few signs that the cycle is getting worse today. At 1.3x book value, Arrow is trading at a level that suggests downside is relatively limited even in a downcycle.



Sensata is a beneficiary of the shift towards electric vehicles, the ongoing secular trend of increased adoption of semiconductors in the automotive market, and the need for new technology to improve energy efficiency. As electric autos increase in penetration, this increases the need for thermal management systems, regenerative breaking to save battery life, and electrification protection on the battery and charging systems. The company sells a range of sensor solutions that go into autos, but also heavy industrial products, trucks, appliances, HVAC, and aerospace. The company sells a range of solutions including pressure sensors, temperature sensors, speed and position sensors, power conversion and control products, and thermal and magnetic-hydraulic circuit breakers. As an example of the increasing penetration of sensors and semiconductors in autos, UBS estimates that semiconductor content in the Tesla model 3 was 10% higher than semi content in the Chevy Bolt.

Part roll up of various sensor producers, part secular growth company, Sensata grew EPS 15% on 9% revenue growth in the latest quarter despite a relatively flat SAAR in the auto market (which represents around 60% of sales). We think the industrial markets the company designs into generally have very long lead times, which reduces the competitive intensity of the business and leads to a more structurally sound pricing environment compared to many other semiconductor and component markets. Despite strong current and long-term growth, the company trades at only 13x forward EPS.

Conclusion

If I could only teach one thing to someone new to investing, it would be to look for investments where if you're right, you will make a lot of money and if you're wrong then its unlikely you will lose a meaningful amount. One can find asymmetry through valuation, first and foremost, but it's also important to find other forms of asymmetry. When company management teams invest as I am advocating, this creates great alignment. Management teams can create high upside by investing in huge new markets (creating optionality), or they can invest in lower risk but high return acquisitions or buybacks (if at an attractive valuation, which unfortunately is not usually the case). When management teams buy stock in the open market and create a culture of equity ownership in a company, this also creates good alignment. It is also important to align yourself with themes or secular trends as the world is always changing and it is important to be on the right side of secular trends.

Sincerely,

Ben Gordon, CFA

Founder and Portfolio Manager

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