

The Intrinsic Value of Microsoft, Intel, and Cisco.

by Mohnish Pabrai

Microsoft, Intel, and Cisco are remarkable companies that, in many ways, represent the pillars of strength and leadership of the American Economy. They have a very dominant monopoly/oligopoly type hold on their respective markets and are led by world-class leaders. The talent pools, technological prowess, and management strength in each of these companies are formidable.

However, all three, in recent weeks, have had hundreds of billions of dollars knocked off their market caps. A quick glance at the numbers reveals some of the damage:

Intel ended the year at about \$31/share, resting at 40% of its pinnacle value of \$75.81. In other words, Intel **lost \$300+ Billion** of its market capitalization.

Microsoft shares ended the year at about \$44.75, plunging 62% from its high of \$119.93. In other words, Microsoft lost **over \$417 Billion** of its market capitalization.

Cisco ended the year at about \$38/share, down 53% from its peak of \$82. In other words, Cisco lost **over \$333 Billion** of its market capitalization.

These are big numbers. Between these three companies, there is over a **trillion dollar loss** in market capitalization! As I write this, I suppose that the thought on many an investor's mind is:

It must be time to buy. Can they go any lower than they already have?

However, before investors call their brokers to buy stocks, they should ask themselves:

What are these companies really worth? Are they selling below their intrinsic value?

Let's say a neighborhood gas station was put up for sale and the owner offered it for \$500,000. If one was interested in buying the gas station, one would start with a subjective evaluation of the quality of the business considering factors like its location, traffic patterns, and competition from other gas stations. This would be followed by a quantitative analysis. Some of the critical questions one would need to ask the owner are:

1. What were the annual revenue, income, and free cash flow for the last ten years?
2. What are annual revenues, income, and free cash flow expected to be for the next ten years?
3. What assets and liabilities does the business have?

If the gas station could be sold for \$250,000 after 10 years and free cash flow was constant at \$100,000/year for the last ten years and expected to be constant for the next ten years, then you'd have a basis for determining the intrinsic value of that gas station. It is simply the present value of all the future free cash flow that the gas station would generate. In discounting future cash flow, one should use a reasonable interest rate which today would be around 10%.

Year	Free Cash Flow	Present Value of Future Cash Flow
2001	\$100,000	\$90,909

2002	\$100,000	\$82,645
2003	\$100,000	\$75,131
2004	\$100,000	\$68,301
2005	\$100,000	\$62,092
2006	\$100,000	\$56,447
2007	\$100,000	\$51,315
2008	\$100,000	\$46,650
2009	\$100,000	\$42,410
2010	\$100,000	\$38,554
2011	Sale Price \$250,000	\$96,386
TOTAL		\$710,839

Since the gas station is being sold below its intrinsic value, it may be worthy of consideration. The bigger the discount to intrinsic value the more compelling the business becomes as a buy. However, if the sum of future cash flows were \$400,000, one should take a pass. Regardless of the quality of the business, **no business should be purchased above its intrinsic value.** Buying a business above intrinsic value is not investing, it's gambling.

When analyzing Intel or Cisco or Microsoft, the qualitative analysis is different (and somewhat more complicated) than the gas station. However, the quantitative analysis of intrinsic value is very similar.

The Quality of a Business and The Buffett Filters

Whether one considers purchasing a gas station or a piece of a given public company, one should run the business through a three-question filter. This system is similar to the one used by Warren Buffett to determine the quality of a business. 95+% of companies won't make it through these filters and can be quickly discarded as poor investments. The ones that do pass the initial test should nonetheless be rigorously re-analyzed before you make the decision to add anything to your portfolio. The three questions are:

- 1. Do you understand the business well? Is it well within your circle of competence?**
- 2. Is it a great and predictable business?**
- 3. Is it on sale i.e. available at a deep discount to intrinsic value?**

Let's run Intel, Cisco and Microsoft through these filters.

- 1. Do I understand the business well? Is it well within my circle of competence?**

If the answer is no, the business is simply skipped over. No need to do an intrinsic value calculation.

Most readers use Intel and Microsoft products directly on a daily basis. Most of us use Cisco's products indirectly each time we go on the Internet or a network within the workplace. It's fair to say that most readers understand these three businesses quite well.

- 2. Is it a great and predictable business?**

The definition of a great business would mean a business that has some of the following characteristics:

Recurring Revenue Streams (e.g. Allstate Insurance)

Ability to raise prices ahead of inflation (e.g. CNN's advertising rates)

Some sort of Monopoly or Oligopoly type market positioning (e.g. American Express)

Strong franchise/brand that gives it insulation from most competitors (e.g. Coca Cola)

Most businesses do not have ANY of the above characteristics and some may just have one of the above. A business that has more than one of the above characteristics is, by definition, rare.

Microsoft:

<i>Recurring Revenue Stream?</i>	Yes (Upgrades to large installed base)
<i>Ability to raise prices ahead of inflation?</i>	Yes, although not necessarily due to low cost of goods sold nor rising volumes and technology innovation/efficiency
<i>Monopoly or Oligopoly?</i>	Yes
<i>Strong franchise/brand?</i>	Yes

Intel:

<i>Recurring Revenue Stream?</i>	Yes (Upgrades to large installed base)
<i>Ability to raise prices ahead of inflation?</i>	Sort of. AMD etc. put pricing pressure. In areas where they have significant technology lead, they have some price control.
<i>Monopoly or Oligopoly?</i>	Yes. Not as good as Microsoft.
<i>Strong franchise/brand?</i>	Yes

Cisco Systems:

<i>Recurring Revenue Stream?</i>	Yes (Upgrades to large installed base). However, more prone to losing installed base to upstarts etc. than Intel or Microsoft
<i>Ability to raise prices ahead of inflation?</i>	Sort of. They can control price in the hottest sectors, but have limits on competitive sectors. Far better price control than Dell or Compaq.
<i>Monopoly or Oligopoly?</i>	Sort of. Not as good as Microsoft or Intel.
<i>Strong franchise/brand?</i>	Yes

Microsoft Examined Further

Of the three companies, based on the above data, Microsoft looks like the best company. Microsoft does have a near-complete lock on its marketplace. While there are disrupters like Linux and Palm on the horizon, their installed base is a very significant asset and a

durable advantage. Even if Linux does become mainstream, it will take a long time to make significant inroads into the Microsoft desktop installed base. Linux is far more likely to erode into the HP/Sun/IBM Unix/NT server marketplace than the Microsoft desktop market. Microsoft has no disrupters on the horizon for its Office or database server marketplace. The desktop accounts for the bulk of Microsoft's revenues.

Intel - Venture Capitalist or Pentium Producer?

Intel is a very different company today than it was a decade ago. Almost 50% of its net income in recent quarters has been through its investment portfolio. Thus, an investment in Intel is partially like making an investment in the largest venture capitalist around. It's a typical case of a company taking its profits from a great business (Pentium chips) and investing it in a plethora of not-so-great businesses.

There are publicly traded companies that are pure venture capitalists (e.g. meVC DFJ Fund) or venture capitalist like (Safeguard Scientific, CMGI etc.). All of these companies trade today at significant discounts to their net asset values. MeVC, for example, trades on the NYSE (MVC) at a 40% discount to net asset value. In simpler terms, they trade below their net cash balance! So if one were to value Intel's Venture business, finding the intrinsic value would be simple. It would be, at most, the net asset value of the portfolio. If Intel has a portfolio worth \$20 billion, its investment business is \$20 billion at most. The rest of the operating company can be appraised with traditional measures of intrinsic value.

Intel lost its monopoly in microprocessors a few years ago. Today AMD's chips are faster and cheaper than Intel's. So margins, while still healthy, will shrink as each fights for market share. Intel has built a distinguished brand, but its name will only carry it so far if the underlying technology is not the best around.

In the near future, Intel will face another problem. Over the next decade, the game in computing will not be about the fastest or best processor (as it has been during the last 20 years). It will be about bandwidth. Current microprocessor speeds already exceed the needs of most users. My PC is 3 years old with an Intel Pentium II 266 Mhz chip. It's ancient by today's speeds, but I see no reason to upgrade hardware. I'd like a 100 Mbps connection to the Internet. I'm choked in my productivity because of bandwidth, not the speed of the processor. Intel is not a major player in the bandwidth game. It's trying to enter and dominate that game, but there are formidable competitors in that space.

So all in all, Intel is a good, but not great, business.

Cisco - Buying Insurance Policies

Cisco is a fascinating company. They are in a space that is highly susceptible to disruption. However, I consider Cisco the most "future-proof" of the three companies. The reason is Cisco's phenomenal track record of successful acquisitions. Cisco understands quite well that innovation and disruption in the networking space is likely to

come from outside Cisco. The culture within Cisco makes it a very inviting proposition for a company to be acquired by it.

Let's examine Cisco's biggest acquisition - Cerent. Cerent was a company with about 200 employees and revenues under \$50 million when they were acquired by Cisco for nearly \$7 billion in stock. Cisco understood that Cerent was a possible disrupter with its optics technology. Cerent was one of the preeminent leaders in the optical networking arena, an area that's witnessing explosive growth.

Was Cerent a good buy for Cisco? The answer is yes. Cisco has a very fat pipe to its customers. This sales and service infrastructure is unrivaled in the networking industry. That "fat pipe" was responsible for Cerent going from less than \$10 million in revenue/year before the Cisco acquisition to over \$200 million in 2000 and an expectation of revenue over \$400 Million in 2001. So Cisco is like a big portal that can connect any innovation in the networking industry to a large mass of customers. Such innovations may be acquired and then nicely integrated within Cisco.

The fat pipe is enormously expensive and time-consuming to build, maintain and grow. A start-up would need to spend billions of dollars and exhaust many years to replicate the pipe. So a simpler answer is to join the pipe and send all the start-up's innovations through it.

Cerent knew it had awesome technology and was well on its way towards an IPO that

would have given it a market cap of several billion dollars. For a start-up with \$10 million in revenue, they had a sales force of over 100. They were trying to build the pipe as soon as possible. Yet even with the most aggressive pipe builders, their pipe was paltry compared to Cisco. So they sold.

It is a given that we need thousands upon thousands of times the bandwidth we have today. We need a lot more bandwidth at a lot cheaper price. The situation is like Intel in 1985. The demand for computing was insatiable in 1985 and the cheaper computing got, the more new applications were deployed. Cisco is sitting right in the middle of an industry that's guaranteed to grow many fold over the next decade. Thus, the question becomes: how does Cisco guarantee that it is a winner regardless of the left and right turns that technology is going to take? Furthermore, how do they guarantee that they do not miss a turn? They do so by buying an "insurance policy" that future proofs its franchise.

Cisco did not pay \$6.9 Billion for Cerent. They paid about 4% of Cisco. Cisco bought an "insurance policy" last year that costs it about 10% of its valuation every year. It's by buying these insurance policies that cost it 5-10% of its valuation annually that allow it to become future proof. Cisco's insurance policy is designed to make certain that:

1. They have the fattest and most efficient pipe to the customer.
2. The pipe is always full of all sorts of high-margin goodies that keep it the pipe of choice for customers worldwide.

Another interesting facet of Cisco's franchise is the near-monopoly it has in acquiring companies. Cerent had only two options in front of it: go public or sell to Cisco. There was no other buyer that would have been of interest to Cerent. No one else has Cisco's nurturing culture with acquisitions or its fat pipe. If IPO markets are closed (as they are now), the next Cerent has just one good option: selling to Cisco. When there is only one choice, Cisco can get a great deal on its insurance policy. The near-monopoly Cisco has in its acquisition engine is a powerful asset.

3. Is it on sale at a price well below its Intrinsic Value (IV)?

Microsoft's Intrinsic Value

The question an investor should ask when looking at Microsoft, or any other company, is not what the stock is priced at, but what the market capitalization of the company is. Like the gas station is selling for \$500,000, Microsoft is selling for \$235 billion. Most investors fixate on the stock price. Microsoft, however, through splits or reverse splits, can make its stock price *whatever it wants it to be*. Think of it as a business, just like you think of the gas station as a business.

All operating companies are worth the sum of the future free cash flow that they will generate from now to eternity discounted to present value. The only addition to this number is any net assets the company has that are not required for it to operate (excess

capital, investments etc.). The reason why this is the only metric of valuation is because all those advantages that make Microsoft such a great business have to translate into revenue and cash flow. Thus, they are all “counted” when the cash flow is counted.

Microsoft’s free cash flow is vastly different from reported net income. Like many technology companies, Microsoft issues stock options to virtually all employees. It has historically spent a large portion of its net income buying back stock to offset the dilution effect of options. The share buybacks annually are less than the options exercised each year. So, in my book, the money used to buy back stock (less the amount received from employees when they exercise options) should be subtracted from net income to get closer to free cash flow. In effect, the money spent buying back stock might as well have been delivered in the form of checks to employees. The end result is the same.

In Fiscal 2000, Microsoft had net income of \$9.4 billion, but spent about \$4.9 billion buying back its stock. So ignoring other minor balance sheet items, free cash flow was around \$4.5 billion. Let’s assume that Microsoft grows at 10% annually through 2005, and 8% thereafter for the next few years. Let’s also assume that free cash flows are a healthy 25% of revenues after stock buy backs. Finally, let’s assume a sale of Microsoft in 2011 for a rich 15 times cash flow or almost 2 times its 2010 growth rate.

Year	Free Cash Flow (in billions)	Present Value of Future Cash Flow (in billions, 10% discount rate)
2001	\$6.3	\$5.8

2002	\$6.9	\$5.8
2003	\$7.6	\$5.8
2004	\$8.4	\$5.8
2005	\$9.2	\$5.8
2006	\$10.0	\$5.6
2007	\$10.7	\$5.5
2008	\$11.6	\$5.4
2009	\$12.6	\$5.3
2010	\$13.6	\$5.2
2011 (Sale)	\$203.7	\$71.4
SUB-TOTAL		\$127.2
Current Book Value		\$41.0
TOTAL		\$168 Billion
Shares Outstanding in 2011		7.3 Billion
Intrinsic Value of Microsoft		\$23/share

Microsoft has about \$41 billion in book value. If I generously give them 100% credit for all of it being excess capital, the total intrinsic value of Microsoft is about \$168 billion or \$23/share. The growth assumptions on Microsoft and the assumption that they will hit no road bumps or disrupters in the next 10 years are quite optimistic. If interest rates rose to 12% from 10%, the intrinsic value would again drop dramatically. I also assumed annual dilution of shares outstanding to be 3% annually which is consistent with Microsoft annual share dilution via option issuance net of stock buy backs.

If \$23/share is the correct intrinsic value, then value investors would want a “margin of

safety” to justify the investment. This margin in a technology centric business should be at least 40-50%. So, at most, Microsoft may be a buy at under \$13/share. It’s a far cry from the \$44/share it was trading at year-end.

As Ben Graham succinctly put it, the stock market is a voting machine in the near term and a weighing machine in the long term. In the long run, all companies will trade around their intrinsic values. So, unless the fundamental business improves dramatically, we are bound to see a significant additional drop in Microsoft’s share price over the next decade.

Let’s do the math from another angle. Microsoft has a market cap of \$235 billion. If someone invested in Microsoft thinking it was a good long term investment, they might be looking for at least a 15-20% annual rate of return from this blue-chip tech company.

If a 20% annual return has to be realized over a 5-year period, Microsoft needs to have a market cap north of \$600 billion in 2005 (including employee option exercise dilution). To justify a valuation of \$600 billion, Microsoft needs to be generating free cash flow in the range of \$50-60 billion a year in 2005. How many companies in the United States have ever generated that type of cash flow? The answer is zero. It is very unrealistic that free cash flow will grow 10-fold in the next 5 years. Even GE does not generate that type of cash flow.

Intel’s Intrinsic Value

Let's start with the free cash flow calculation on Intel's operating businesses. Intel grew operating earnings by 23% in 1999 and 14.5% in 2000. In 2001, operating earnings are projected to grow just 7.6%. Beyond 2001, I'm assuming a 10% annual growth rate. On a \$40 billion base of revenue, with declining chip prices, even a 10% growth rate is not "in the bag" for Intel.

Year	Free Cash Flow (in billions)	Present Value of Future Cash Flow (in billions, 10% discount rate)
2001	\$8.5	\$7.7
2002	\$9.4	\$7.7
2003	\$10.3	\$7.7
2004	\$11.3	\$7.7
2005	\$12.4	\$7.7
2006	\$13.6	\$7.7
2007	\$15.0	\$7.7
2008	\$16.5	\$7.7
2009	\$18.2	\$7.7
2010	\$20.0	\$7.7
TOTAL		\$77

The sum of future cash flows is \$77 billion. Intel is projected to dilute its stock by 2% a year via option issuance (net of buybacks). This yields a 20% dilution in shares outstanding, which reduces the real cash flow by \$13 billion.

Thus present value of future cash flow is \$64 billion. Intel's present book value is about \$38 billion. Of this number, \$5.7 billion is goodwill and \$15 billion is property, plant, and equipment. This \$15 billion is being used to generate the earnings. So the "excess capital" is \$16 billion. Thus the intrinsic value of Intel today is about \$80 billion or \$11.85/share. Adding in a 40% margin of safety yields a buy price of about \$7/share.

Another way to do the math is from the market cap angle. Intel's market cap today is about \$210 billion. If a 20% annual rate of return is expected by holding Intel, the market cap in 2005 would need to be \$520+ Billion. The 2005 free cash flow would need to be north of \$50 billion and growing to justify that cap. By our assumptions the 2005 free cash flow is \$12.4 billion. So a 2005 market cap of about \$130 Billion is in the ball park -- or a negative return over the next five years.

Cisco's Intrinsic Value

Let's start with the free cash flow calculation on Cisco's operating businesses. Cisco grew operating earnings (excluding goodwill and in-process R&D) from \$2.7 billion in 1998 to \$3.4 billion in 1999 to \$4.9 billion in 2000. From 1999 to 2000, it grew earnings

by an astounding 44%!

Cisco has consistently grown earnings by over 30% a year for the last 5+ years. It's projected to have 2001 revenues of \$30 billion - a 63% rise over 2000! So I'll assume 2001 operating earnings (excluding goodwill and in-process R&D) rise by 63% in 2001 and 25% thereafter for the next four years and 20% thereafter for the following five years.

Year	Free Cash Flow	Present Value of Future Cash
	(in billions)	(in billions, 10% discount rate)
2001	\$8.0	\$7.2
2002	\$10.0	\$8.3
2003	\$12.5	\$9.4
2004	\$15.6	\$10.6
2005	\$19.5	\$12.1
2006	\$23.4	\$13.2
2007	\$28.1	\$14.4
2008	\$33.8	\$15.4
2009	\$40.5	\$17.1
2010	\$48.6	\$18.7

TOTAL \$126.4

Thus, the present value of future cash flows is \$126 billion. Cisco has a wonderful capital allocation model. Virtually all manufacturing is out-sourced. Consequently, it looks like Microsoft from an asset deployment perspective. They have \$23 billion of tangible book value. Therefore, the intrinsic value of Cisco is \$149 billion. Cisco has not recently bought back its stock. Assuming 30% dilution in shares via option grants yields an intrinsic value of \$15/share. Adding in a 40% margin of safety yields a buy price of \$9/share.

If the assumption were a 30% increase in cash flow annually for the next 10 years, the intrinsic value would be \$195 billion or \$20/share after considering option-related share dilution. I consider the 30% annualized increase in earnings over the next 10 years highly optimistic.

Year	Free Cash Flow	Present Value of Future Cash Flow
	(in billions)	(in billions, 10% discount rate)
2001	\$8.0	\$7.2
2002	\$10.4	\$8.6
2003	\$13.5	\$9.4

2004	\$17.6	\$12.0
2005	\$22.8	\$14.2
2006	\$29.7	\$16.8
2007	\$38.6	\$19.8
2008	\$50.2	\$23.5
2009	\$65.3	\$27.7
2010	\$84.8	\$32.6
TOTAL		\$171.8

Cisco's market cap at year-end was \$288 billion. If a 20% annual rate of return is expected by holding Cisco, the market cap in 2005 would need to be \$840+ billion including option relation dilution. The 2005 free cash flow would need to be north of \$70 billion and growing to justify that cap. By our assumptions, the 2005 free cash flow would be \$19.5 billion. Thus, an investor would be lucky to just get their money back in 2005 with Cisco at \$38/share.

Conclusion

Investors would be well served to look for great businesses within their circle of competence and then calculate intrinsic values for those businesses. If they are being sold well above intrinsic value, just take a pass. On the other hand, if they are available a deep discounts to IV, back-up the truck ...

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