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My Experience with Fundamental Analysis

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Abstract

In finance, there are several overarching schools of thought when viewing equity prices in the stock market, such as technical and fundamental analysis. I find the most enjoyment in quantitative matters, so naturally most of my experience with the stock market includes fundamental analysis. Proponents of this methodology purport that there is a true value of a security based on its financials, and that it will trade around that number eventually. Perhaps the most successful investor who uses fundamental analysis is Warren Buffett. Specifically, he believes in valuing a company’s equity by gauging their cash flows and projecting how they will grow. Buffett’s theoretical style of valuation is taught at the University of Connecticut by Professor Pat Terrion, who knows him personally and manages money using similar methodologies. In this paper, I test this valuation method using information from 30 companies (mainly the Dow 30) around the end of the Dot Com bubble. I then compare my results with how the securities actually traded in one, five, ten, and 16-year time horizons. All of this was geared to answering the question; how reliable is this method in determining the ultimate trading price of the companies?
Introduction

The stock market, in a lot of ways, is similar to gold mining. After investing the first lump sum of energy into finding the gold, wealth will consequently accrue in a steady stream with significantly less effort required on the person who discovered the mine. In that way, picking stocks that will pay well above the initial investment in dividends and capital gains is America’s most recent gold rush.

Unfortunately, there are so many stocks available for purchase on the market that there is a high probability of not meeting the market return, or even losing your money. In The Intelligent Investor, Benjamin Graham describes this risk by alluding to gambling; the investor should be comfortable losing their money if they speculate in the market similar to how a gambler can’t expect to repeatedly succeed against the house.¹ To quantify how much risk Graham was referring to, in casino games like Roulette, a gambler should expect to lose an average of $5.26 dollars for every $100 invested. Craps and Blackjack typically run around 16% average loss, so Graham’s warnings are grave.²

To combat the risk of picking dud stocks, academia gives us intrinsic value of equity equations, with the rationale that if the trading price is lower, it is wise to buy the stock since it’s selling at a discount (and vice versa). The deviance from intrinsic value in the market is attributed to investor emotion and expectation about the worth of the company, especially given its future prospects. These swings in trading price offer arbitrage opportunities for investors who know the true value of the stock. If this buy-low-sell-high strategy is executed properly, fortunes are made. Of course, the effort then becomes finding these discounted stocks.

An alternate way of viewing stock prices is using technical analysis. Technical analysts view price charts and make investment decisions based on things like momentum, investor emotion, recent company news, etc. Given the recent development of data mining, institutional investors are starting to gauge aggregate investor emotion about certain companies using data from tweets, and buying or selling based on those numbers (all done automatically, through high-frequency trading machines).³

In my experience, most investment pitches have some sort of intrinsic value number backing the proposal, whether using multiples, comparables, or detailed free cash flow projections. In that way, you could say that I am in the fundamental analysis camp because of my environment. However, part of me has always wondered how necessary it is. For a long time I thought that it doesn’t matter if you calculate a stock to be overvalued, since if the company survives long enough, it will benefit from technological advances, economic growth, and other macroeconomic trends. In other words, rising economic tides raise all ships, or companies in this case. Therefore, my conviction was that if you put your money into a blue chip company, like one of the Dow 30, it will probably survive long enough for significant capital gains to be realized.

In this paper, I test my theory of the effectiveness of these intrinsic value numbers. I used the free cash flow method to value the Dow 30 companies, with some substitute companies when data

wasn’t available. I used information from the 1998 annual reports, in order to measure the results over a ten year time period without getting too deep into the Great Recession, a very irregular event. I used the free cash flow method because Warren Buffett, arguably the most successful investor in the market today, is a major advocate of the procedure. Furthermore, the free cash flow method is the basis of a security valuation class taught at the University of Connecticut by Pat Terrion, a local money manager who knows Buffett personally. While I am no expert, valuation models in Microsoft Excel have been my passion for the past year, and I’ve done a great deal of research to make my models as effective as possible. All of this to answer the question; how effective are these true value numbers, if not in general then for me, a 22-year old undergraduate?

Valuing Methodology

Perhaps the most prolific investor in the market today is Warren Buffett. He graduated college at a young age with about $100,000 of today’s money from his investing portfolio (and he wasn’t born with a silver spoon). When he took over a textile manufacturer and started Berkshire Hathaway in 1950, each share of the company was worth about $8. On February 5th, 2015 at 2:30 PM, one class A share was worth $223,440.05. That represents a 17% return year over year from 1950 to today. In all the unpredictability in the stock market, he is one of the few who can confidently say he knows what he’s doing (and even then, he has made a considerable amount of mistakes).

Buffett calculates the intrinsic value of his prospective investments by looking at the cash flow the company generates, and grows them based on things like competitive advantage and business model longevity. In order to quantify ‘the cash flow the company generates’, information is pulled from the financial statements; those being the income statement, the balance sheet, and the statement of cash flows.

Using the valuation example set in *Valuation: Measuring and Managing the Value of Companies* by Koller, Goedhart, and Wessels, as well as advice from professors Pat Terrion and Paul Borochin, I valued the Dow 30 companies using their 1998 annual reports. I replaced Traveler’s, DuPont, Merck & Co., and Phillip Morris, with the Hartford, Dow Chemical, Berkshire Hathaway, and Nike, since I couldn’t find adequate information on those companies. The Hartford and Dow Chemical are good substitutes for Traveler’s and DuPont, since they are their primary competitors. Nike and Berkshire aren’t as fitting for the other two, but they fall in my core competency, so I felt like I would do an above average job valuing them. Also, since much of paper has to do with Mr. Buffett, I figured valuing his company wouldn’t be out of line. I picked 1998 because if I went earlier, I doubted my ability to find the annual reports online, since the Internet was gradually being utilized by Corporate America then. If I went later, I would run deep into the Great Recession, which was an economic downturn of historic proportions.

I read 30 annual reports and supplementary documentation, and tried to glean the data that was most pertinent to the operating business itself. Ultimately, I am attempting to determine the worth of the business model, so I didn’t include one-time charges and income from nonoperating sources.

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Therefore, line items like restructuring charges and interest expenses/income were never considered. I would take the operating income and multiply it by its marginal tax rate, which should be around the international average at the time of 35%.\textsuperscript{6} The tax rate was calculated by dividing the provision for income taxes by the earnings before interest and taxes, which I would make sure was around that 35%. This is because in some years companies have an extraordinary amount of tax credits, which is often the case in years where multiple acquisitions were made. The resulting number would be the net operating income after taxes, and then I would add depreciation to arrive at gross cash flow. This is the money the company generates before they spend it on investments.\textsuperscript{7}

\textit{Working Capital Calculation}

To find out how much the company had invested, I would then go to the balance sheet and calculate noncash working capital. I didn’t include cash because that line item tends to be very volatile depending on a firm’s financing needs, as well as dividend policy. Damodaran’s free cash flow to equity model helps shed some light on how dividends can impact cash and thus firm value (2008). If a company is paying out less than their free cash flow to equity on dividends, there will be a cash accumulation (in the absence of repurchases) and the dividend discount model will underestimate firm value.\textsuperscript{8} I also took out short-term investments from current assets, since that line item is so liquid that it’s essentially cash. Furthermore, I withheld deferred income taxes if they appeared in current assets.

For current liabilities, I took out short-term debt financing, including things like repurchases and commercial paper. I also deducted long-term debt maturing within the year. I would then be left with adjusted total current assets and adjusted total current liabilities, and would subtract the latter from the former to find the noncash working capital.

\textit{Calculating Invested Capital}

Noncash working capital is the first element of invested capital, the next is capital expenditures, which is easily found under investing activities in the statement of cash flows. Some discretion is required, mainly that the number exceeds depreciation. If it doesn’t, net property, plant, and equipment would be decreasing, which isn’t normally indicative of a strong, healthy company.

For certain businesses, a substantial amount of money is spent acquiring leases. For example, when Chevron and Exxon want to drill for oil in a certain regions, they need to lease the land from whoever owns it. Therefore, leases are a type of investing activity, but unfortunately they aren’t easily located on most annual reports. To locate this number, I relied heavily on information provided by the Bloomberg Terminals.

I also considered the ‘other assets’ category, assuming that they were operating and non-current (current other assets are considered in working capital). I normally had to check in the notes for

what those assets were, and in a lot of cases they involved deferred tax assets, which aren’t considered operating.9

I would add the 1998 working capital, net property, plant, and equipment, operating leases, and other assets (if applicable) to arrive at the total invested capital number. Some analysts add goodwill to that number, but when comparing the value of the business model by itself, invested capital should be calculated without goodwill. I would then subtract the change from 1997 to 1998 to find the change in invested capital, which would be subtracted from the gross cash flow (net operating profit after taxes plus depreciation) to find free cash flow. The charts below help illustrate this process.

If there were major expenditures for acquisitions that weren’t normal in a company’s history, they weren’t considered. It doesn’t make sense to assume that similar acquisitions are going to be made year after year, unless otherwise stated in the annual report.

Return on Invested Capital and Growth

Return on invested capital is calculated by dividing net operating income after taxes by invested capital. The main red flag to look for was if this number was less than the company’s weighted average cost of capital. If the company is returning less than their cost of capital, growth hurts the company. If that trend is experienced for too long, that company (or at least that segment in the company’s portfolio) will fail.10

To project how a firm’s free cash flow will grow, return on invested capital is multiplied by the amount of cash flow plowed back into the firm. I calculated retention ratio by taking the dividends per share and any consistent repurchases per share, and dividing it by basic earnings per share. This yields the dividend payout ratio, so I would then subtract it from 100% to find the retention ratio. Multiplying retention ratio by return on invested capital yields the growth rate (at least in a short to medium term context). I then looked at the company’s growth prospects and their competitive position to see if that growth rate made sense, and if it didn’t, I would adjust it upwards or downwards depending on the relevant information. These adjustments were mainly made if the

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9 *Valuation: Measuring and Managing the Value of Companies.* Page 110
10 *Valuation: Measuring and Managing the Value of Companies.* Page xii
figure was ridiculously high, since it’s an accepted fact in the financial world that growth comes from the return on the firm’s investments times how much capital they allocate to those investments.

I projected the 1998 free cash flow out for nine years, since in finance the medium-term is around ten years (i.e. medium-term notes). On the tenth year, I would grow the previous cash flow by about 3%, since historically United States GDP growth has been 2-4% per year. I would then divide that number by the weighted average cost of capital minus 3% to get the perpetuity value of the firm’s cash flows. For the long-term, growth of any company is hard to calculate, especially since perpetuity implies that we know by what percent cash flows will grow until the end of time. Therefore, it makes the most sense to say that if the company survives into perpetuity, most of the time it will grow in line with the economy.

I used 10% as the weighted average cost of capital for each company. According to Professor Terrion, most firms use a 30% debt to total capital ratio over time, and given the historical cost of debt and equity over the last century, average WACC is about 10%. In today’s economy, interest rates are very low, so costs of debt and equity are less than what they would usually be. This may bias the numbers for short-term, but given that we are very long-term investors, this should balance out at some point in the future.

Adding up the present value of the free cash flows yielded the firm value, and then I added cash (since it was subtracted from working capital earlier on). I then subtracted long term debt. This yielded the total equity value, which I then divided by shares outstanding to find out the intrinsic value on a per share basis.

1998 Market Conditions

Common to almost every 10-K was slow or negative revenue growth in Asia. By the end of 1998, the Asian Financial Crisis had devastated the regional economies. Free falling currency values (particularly of the Japanese yen and the Russian ruble) made Hilary Clinton and other politicians call for a new Bretton Woods to fix the exchange rate and make it more stable, though it never panned out.

Part of the reason for this crisis was the rapid globalization of the world’s economy. By the early 1990s, communism had fallen in Asia and those nations began privatizing their assets and allowing investment from abroad. Financing domestic projects from abroad for returns that didn’t surpass the cost of capital is ultimately what caused the aforementioned financial crisis in Asia, according to Pesenti, Corsetti, and Roubini.

Businesses were becoming increasingly paperless in 1998 as well. With the commercialization of the Internet in 1995, money, communication, and information traveled across boundaries faster than ever. This new technology seemed to make every business more profitable, and thus the late 1990s compromised most of ‘the Dot Com Bubble’ (as shown below).

The Internet was the fastest growing media ever. It took five years for the web to reach 50 million people. Radio took 40 years to reach this milestone, while it took television 13 years. Circa 1998, about 140 million people were using the web. The Dot Com bubble represented how revolutionary this information medium was, as investors showed their optimism by bidding up stock prices well above earnings per share.\(^\text{13}\)

Every firm had a section addressing ‘Year 2000’ (Y2K) issues. The issue was that computers only used the last two digits to represent the current year, in order to save memory. With the advent of the new millennium, there was concern that the computers would think it was 1900, and processes would be impaired. This would impact the computers and certain machines than ran off of computer chips, such as elevators and digital thermostats. If this event did happen, companies would face huge expenses in order to address the issue and continue business as per usual. There was less trepidation for September 9\(^{th}\), 1999, which would be represented by ‘9999’ in some computers. Some coding techniques had a sequence of consecutive 9’s as meaning ‘end program’, so technicians were worried that September 9\(^{th}\) would shut down computers worldwide.\(^\text{14}\)

### Dow 30 Valuations

The following section will highlight the key points that I used in valuing the Dow 30 companies for the fiscal year 1998. My main source were the company 10-K’s, and I relied heavily on the Management Discussion and Analysis to get a feel for the financial condition as well as the growth prospects of the companies.

\(^{13}\) Taken from IBM’s 1998 Annual Report

Minnesota Mining and Manufacturing Company  
Ticker: MMM

3M originally sold adhesives and coatings, and is the company behind scotch tape. Since then, their product portfolio has expanded to include electrical supplies, transportation and safety equipment, and commercial graphic products. 3M’s product portfolio is incredible in breadth in depth, as is the case for most leaders in the basic materials industry.

The nature of the products MMM sells are inputs for other manufacturers to make a finished product. Therefore, products tend to be cheap and easily replaced. One of the best ways to establish competitive advantage is through research and development, which should lead to the creation of patents. Patents allow the company to develop a protective moat around their products for around twenty years each. Research and development costs went up to $1,016 million in 1998, up from $1,002 million in 1997 and $947 million in 1996. No information on the quantity of patents that resulted from these efforts was mentioned in the 10-K. Suppliers of industrial goods mostly compete on price, since there’s little room for innovation when dealing with spare parts. Given the sheer size of 3M ($2.5 billion in revenues), they are given access to greater economies of scale, and thus their costs are lower (which allows them to drive their prices downwards). Their 68 distribution centers in 24 US states as well as the 210 sales and distribution centers internationally help them be closer to the customer, and push down transportation costs.

3M generated a return on invested capital of about 16% in 1998, and retains about 24% of their cash flows. Multiplying these two gives a growth rate of about 3.4%, which is consistent with what management projects growth to be (3-4% domestically, 5-6% abroad). They attribute the increase in the growth prospects to the continued rebound of the economy in Asia. I didn’t adjust the growth rate upwards because it’s always smart to read management’s analysis with some skepticism, since they are ultimately trying to attract investors. On the negative side, they had a huge litigation reserve of about $1.1 billion for malignant health reactions to breast implants, which was a class action case. Using these inputs, I calculated each share of 3M after 1998 repurchases to be about $18.44 per share. In early 1999, shares were trading in the high 30’s/low 40’s, so as a prospective investor I would conclude that this stock is over-valued and refrain from buying.
My intrinsic value number ($18) ended up being below all trading prices from 1998-2015, which suggests that if the stock does have a true value, it’s above my estimate of it.

*American Express Company*

*Ticker: AXP*

American Express’s core business is its charge cards, which fall under several subdivisions such as corporate, consumer, and travel. Their cards can be issued in 45 different currencies, and the majority of the revenues are from the Asia/Pacific region (about 39%). Merchants that accept American Express credit pay a small percentage fee, but it gives them access to their customer base, who spend more on average than Visa or MasterCard cardholders. American Express is a leader in corporate credit cards. Psychologically, an employee will spend more if he/she knows it will be covered by the company, and thus won’t be incurred as a personal expense. Consequently, more steak and lobster dinners are ordered using these cards, which is good for business.

1998 was both very hot and very cold for American Express. As aforementioned, the Asia/Pacific region generates more revenue for the company than any other geography, so the effects of the Asian Currency Crisis were detrimental. On the bright side, Travel Related Services earned a 30% increase in its revenues, and Merchant Services increased its new merchants signed by 16%. Part of the success is AXP’s willingness to assume outstanding credit balances for customers who switch from other cardholders. This led to an increase in lending balances in 1998.

The company had a good year in court. Prior to October 1998, Westminster Bank was the only financial institution that could issue charge cards to AXP customers. This was because MasterCard and Visa had deals with other banks that threatened termination if they did business with American
Express. However, the Department of Justice found this to be a violation of antitrust laws, so the company should see a very large increase in its consumer segment in the upcoming years.

I calculated the free cash flow in 1998 to be about $411 million dollars. Their return on invested capital was rather low at 13%, but that still is enough to create value over my 10% cost of capital. 1998 was a year that AXP paid out more dividends and repurchases as net income (about $2 billion), but I don’t think it’s fair to assume such a monumental year in terms of repurchases will continue every year in the future. Therefore, I calculated the retention ratio without considering repurchases, which yielded a retention rate of about 81%, and subsequently a growth rate of about 11%. This is relatively high, but makes sense, especially because of the new business opportunities from the change in litigation. After calculating firm value and deducting net debt, I calculated an intrinsic value of equity number of $29.09 per share. In late February/early March 1999, shares were trading around $30 per share, so I would conclude that the equity is fairly valued (and probably not buy, since we want stocks at a significant discount).

My intrinsic value number of $29.09 was traded at rather frequently over this 16 year time-frame, and was well above the minimum of $10.26.

_AT&T Inc._

Ticker: T

In 1998, AT&T was known as SBC Communications Company. The company is in the utilities industry, which can be a tough sector since prices are regulated, depending on state laws. However, SBC is one of the biggest providers in the telephone industry, with 37 million access lines and 6.9 million wireless customers in the United States.
1998 was a fast-paced year for SBC. They acquired Southern New England Telecommunications Corp., which had a virtual monopoly on telephones in Connecticut. This move allowed them to increase their wireless interLATA system into Connecticut, which makes long distance telephone calls faster and cheaper. They also acquired Comcast Cellular Corporation, which had 800,000 subscribers in America and Japan. SBC is complementing this with a venture to build an undersea communications pipeline to Japan, in order to increase their long distance service to that nation. SBC also developed several technological advances in their phones themselves, including Caller ID, Call Waiting, Voicemail, Call Blocker, and Call Return in 1998.

From reading the 10-K, it seems like SBC is just starting to tap its potential to make their services global and wireless. While they still have a long way to go, they have been taking steps in the right direction with their merger with Comcast Wireless and their plan to construct the Japanese pipeline. However, heavy regulation will mitigate this growth, so my calculated growth rate of 7.37% is acceptable; fast growth, but not crazy fast. I calculated free cash flow of about $7.59 billion, which fizzled down to $25.51 equity value on a per share basis. Around the start of 1999, AT&T was trading in the mid $50s, so I wouldn’t buy based on my intrinsic value calculation.

The calculated intrinsic value per share of common equity is quite accurate for AT&T. The average stock price is about $33.06, which is only $8 off my calculated price of $25.
Allied Signal Inc. is a technology and manufacturing company that produces chemicals, fibers, plastics, aerospace and automotive products. In 1998, the company acquired Banner Aerospace, which is a distributor of airplane parts. The acquisition should provide additional revenues of $250 million per year for the company’s aerospace segment. The firm also negotiated new long term contracts for its Enhanced Ground Proximity System, which tells pilots precisely how close to the ground they are while landing. The company has $1.85 billion in contracts as an aerospace supplier with the United States Department of Defense. A firm’s ability to generate long-term contracts is critical to corporate financial success. The US government is considered one of the safest customers to do business with, as evident in their AAA credit rating. The government’s defense spending stays at an almost fixed rate of GDP (about 4%), so as the economy grows, the demand for more products from Allied Signal will grow as well.\textsuperscript{15}

The company also acquired Pharmaceutical Fine Chemicals, of Switzerland. PFC generated $110 million in 1997, and helps bolster Allied Signal’s chemicals segment. The company has been spending more on research and development of late, with $394, $349, and $345 million spent in 1998, 1997, and 1996, respectively.

In a lot of ways, Allied Signal impressed me; more expenditures on research and development, increasing volume of long-term contracts (many of which were with the US government, nonetheless), and lower exposure to basic commodity movements for a parts supplier (since their main commodity used was steel and carbon fiber). However, upon digging into their financials, I calculated a free cash flow of -$2.99 million. Their return on invested capital was satisfactory, at about 19%. Under this valuation methodology, firms that generate negative cash flow should never be invested in. I tried to reconcile the negative free cash flow by reducing it by the growth rate into perpetuity, but it wasn’t enough to break zero. Therefore, the share value cannot be calculated, and shouldn’t be invested in.

In June 1999, Allied Signal announced that it was merging with Honeywell. Given their negative free cash flow, this probably was done out of desperation since it was a quick way for Allied Signal to become financially stable. Honeywell stock has been rebounding well since the Great Recession, and is at about $103.

The Aluminum Company of America
Ticker: AA

The Aluminum Company of America (ALCOA) is a leading producer of aluminum and plastics in the world market. In reading their annual report, I felt like there is very little growth left for this company. In 1998, they increased their dividend by 50%, and started setting company goals of becoming more efficient (they hope to save $800 million dollars via operating improvements by 2001). When companies start distributing more cash flow out as dividends and focus on operational processes, it shows that it’s in the mature development stage and has little left in the way of product development.

However, there were things about ALCOA that I liked in the annual report. The first is their ability to adapt. With the advent of plastic bottling, the demand for aluminum fell off dramatically, but ALCOA adapted and became the largest supplier for global plastic casings by 1998. Furthermore, they are diversifying their services by looking into producing lightweight, durable frames for Audi automobiles. The firm also had two major acquisitions in 1998; Inespal and Alumax, which produce $1 and $3 billion in revenues annually. Inespal also helps increase their geographic dispersion of revenues, since the company is a leading aluminum supplier in the Iberian Peninsula. Chairman and CEO Paul O’Neill was planning to step down after 1998, so it’s interesting to see what Alain Belda will do as his replacement in the position. Furthermore, I find the nature of their industry concerning. If aluminum commodity prices fluctuate, ALCOA would take a huge hit.

In terms of financials, I calculated a return on invested capital of about 8.5%, which means that they are failing to earn past the cost of capital. This makes sense, considering that they increased their dividend by 50% in 1998. They retain about 69% of their cash flows even with this higher dividend level, which amounts to a growth rate of 5.87%. I didn’t see any point in adjusting this rate, since ALCOA mainly sells tin products, so there is little room for innovation. Therefore, a percentage slightly above GDP is acceptable. They did generate a positive free cash flow of about $552 million, and I grew it and discounted it as per usual.

I calculated an intrinsic value of equity per share of about $27.87. In early 1999, AA stock was trading at about $20, so my calculation shows that it is undervalued and should therefore be bought.

The intrinsic value of $27 is right around the middle of the trading prices for the past 16 years, with the average price being about $23. Shares traded well above my estimate until the Great Recession, which clearly plagued the company.
Boeing Co.
Ticker: BA

Boeing is most known for making its airplanes, particularly the 747. Formerly unbeknownst to me, they make fighter aircraft for the US Department of Defense, and have a considerably large space and communications business. In fact, the space industry is probably Boeing’s best opportunity for growth, since international communication and information gathering become borderless with the use of satellites. Therefore, they are growing this initiative, and in 1998 Boeing won several important contracts related to the segment. The first of which was ‘the lion’s share’ of the US Air Force’s Evolved Expendable Launch Vehicle program. Part of the reason that Boeing was able to win the contract was because they can send vehicles to space for cheaper than other companies. The Air Force wanted to find a relatively inexpensive way to buy and launch spacecraft, aiming for about 25% in cost savings. Boeing’s Delta IV satisfied this demand from the Air Force, generating a cost savings of about 50%. Delta IV is also more compact, requires about 93% less unique parts, and uses 95% less welding points than competing models. This same product innovation and price competitiveness helped Boeing win the lead system integrator position in the National Missile Defense program. In terms of existing military contracts, Boeing manufactures the number one attack helicopter used by the Air Force; the Apache.

In the commercial aircraft, Boeing hurt in 1998 as a result of the Asian Financial Crisis. Commercial aircraft compromises about 63% of their revenues, of which Asia was their second highest earning geography. Therefore, they plan to cut production from five aircraft per month to two, to make sure they aren’t increasing inventory inordinately. However, given a window from 1994 to 1998, global commercial aircraft passenger traffic has increased by 6% year over year. The company projects a 4.7% annual growth rate for the next twenty years in passenger demand.

Boeing generates a free cash flow of about $1,158 million, a return on invested capital of about 11.02%, and a growth rate of about 5.47%. I was concerned to see that this was similar to the calculated growth of ALCOA, since Boeing seems to have better opportunities coming its way (as enumerated earlier). This low rate is from the company’s inefficiency at generating a return from their invested capital up to this point (11.02% is quite low). Personally, I’m a conservative investor, so if they’ve only been able to get 11% up until now, I’m going to keep it that way until proved otherwise, at which point I would have to update my inputs. In short, I kept the growth rate low for Boeing at 5.47%. All of this contributed to an intrinsic equity value per share of $14.64. During the first three months of 1999, Boeing was trading in the mid-thirties, so I would not buy it due to it being overvalued.
The 16-year low for the stock was $25.06, which is considerably above my intrinsic value calculation of $15. Therefore, I significantly understated the value of this stock, at least for this time period (I should have scaled up the growth rate significantly).

Caterpillar Inc.
Ticker: CAT

Caterpillar makes machines that aid in construction, mining, farming, as well as engines for energy turbines. CAT has other segments in logistics as well as financing. The company has seen significant growth in the five years ending in 1998; they added 88 facilities, formed 17 joint ventures, acquired 20 companies, and developed 244 new products. Financially, this has led sales to grow by 46% over the period and profit to grow by 58%.

In 1998, CAT introduced its 797 mining truck (pictured to the right), which has 360 ton capacity. The company also is setting its sights on China, since continuing privatization is allowing for the commercialization of much more of Chinese land. CAT has expressed intention to develop a series of compact machines, such as small forklifts and plowing machines. Growth in this compact machine industry is reported to grow by 11% over the medium term.
In my valuation, I found Caterpillar to be earning a return on capital of about 17.24%, which led to a growth rate of about 12%. I thought 12% was rather high, but given all of their acquisitions, joint-ventures, and new products they have developed in the recent past, as well as their intent to enter the BRIC countries, I felt like I could justify the 12%. The firm has a free cash flow of about $1,468 million, which led to an intrinsic value of equity value of $96.62 per share. In early 1999, CAT stock was trading around $22 per share, which means this would be an incredible stock to buy if my valuation is correct.

The intrinsic value of $97 per share was in the range of prices, but that started in 2010. Therefore, it would take some patience for the shares to reach that price, but eventually they would. Therefore, my estimate is on the high side for this time period, but towards the end it is steady in that $90 range.

*Chevron Corp.*
*Ticker: CVX*

Chevron is in the energy business, particularly extracting and selling oil. 1998 was a big year for the oil industry, since that was the year that British Petroleum bought Amoco, and Exxon bought Mobil. These acquisitions increased those companies’ scale, diversified their drilling locations, and increased their market share. However, Chevron has plans to merge with Texaco’s international business segment, which should help them compete with those two giants.

The recession in Asia ‘hammered’ Chevron; profits went down in almost all segments. Net income decreased a whopping 59% for the year. The gas station segment did well, with revenue up 31% due to the low oil prices. Chevron plans to aid in the construction of a pipeline that will connect the Tengiz oil field in Kazakhstan to the Russian port of Novorossiysk on the Black Sea, where oil can
be easily shipped internationally. The pipeline will be 900 miles long and will transport about 700,000 barrels of crude per day from Tengiz, if all goes well. Given that 1998 was such a weak year in terms of oil sales for Chevron, they focused on their own processes, and hope to generate $500 million in cost savings by the end of 1999.

Despite the turmoil, Chevron was able to generate a positive free cash flow of $1.59 billion in 1998. Their return on invested capital was only 8.28%, which of course is a bad sign since they aren’t generating above the weighted average cost of capital. However, some leniency can be granted to them, since 1998 was a year of low oil prices and thus low revenues. The fact that dividends per share was $2.44 while earnings per share was $2.05 shows that my claim that the company isn’t earning above their WACC is true, since they are giving all available funds back to investors. I calculated an equity value per share of $44.72. In the early months of 1999, shares were trading around $47, so I would conclude that the stock is fair priced, and not buy because of the small margin of safety.

Chevron’s shares traded around my calculated value of $45 per share until 2006, and since then shares have increased substantially. For this time period, the estimate is a little low, but it can be seen as accurate since it traded around there for seven years after the 1998 valuation.

The Coca-Cola Company
Ticker: KO

Coca-Cola is a leader in the beverage industry, particularly the carbonated soft drinks industry. Despite the poor global financial condition of 1998, Coke increased its sales volume 6% to 15.8 billion units. Coke also acquired the international segment of Cadbury Schweppes, a competitor
who produces Dr. Pepper, Schweppes, and Canada Dry, most notably. This helped Coke increase its volume by 10% in Canada, where volumes are half of the US.

Coke is looking ahead to increase global consumption of their products, especially because US volumes started declining in 1980. This is because of outrage on how unhealthy their cola is, as well as how wasteful the manufacturing processes are (it takes about 3 liters of water to make one liter of cola). Therefore, Coke is turning to Africa, and is expending money on ice producing facilities, since 70% of consumers drink the beverage warm there. They also launched Dasani in 1998, which should hopefully help sales growth in the US since nothing is healthier for humans than water. The company plans to send more coupons to Asia since the depreciation of the ruble and the yen make their products difficult to afford.

Coke generates an incredible 34% return on invested capital, which results in a growth rate of 20% when the retention ratio is considered. This seems a little high for a mature, established company. However, my free cash flow number was low by Bloomberg’s and Professor Terrion’s standards, so the high growth rate compensates for this. The free cash flow amounted to $2.55 billion in 1998. My calculated equity value per share was $36.09. In early 1999, shares were at about $30, so I wouldn’t buy based on a lack of a margin of safety.

My estimate of Coke’s value of $36 was a little high, since it flirted with that number in early 1999 and didn’t reach it again until 2011. However, after 2011, it was consistently in that range.
Dow Chemical Company
Ticker: Dow

Dow Chemical is a major supplier of the basic materials industry, with major segments in plastics, chemicals, agriculture, hydrocarbon, and polymers. As aforementioned, the basic materials sector is a rather volatile one to do business in, with operating results highly contingent on commodity prices. 1998 was a year when pricing was at trough levels for many commodities, particularly oil. Dow posted strong volume growth across segments, however pricing pressure mitigated this growth and even made it negative (the latter being the case in the hydrocarbon segment).

Growth in the basic materials industry is highly correlated to population growth. One issue that was mentioned by Dow was the decreasing availability of space to plant crops. As a seed producer, specifically of corn and soy, they are looking into ways of making their seeds yield stronger crops. Companies with huge budgets for R&D such as Dow are able to do this the best, since ultimately what spurs innovation is funding. Dow is the world’s largest producer of latex, which is used in many things from rubber to carpets. Their size allows them to have economies of scale, which is a competitive moat that protects them from competitors (as is the case with their patents).

Financially, the firm produce a return on invested capital of about 9.8%, which is just around their weighted average cost of capital. The company earns about $1.17 billion in free cash flow per year. The growth rate was not significantly different from GDP growth, which is plausible since the Basic Materials sector isn’t known to be rapidly changing. I came up with an equity value per share of about $54.30. In early 1999, Dow Chemical stock was trading in the mid 30’s, so I would buy the company based on my numbers.
From the price chart, it’s clear that $54 is a little high for an intrinsic value number, at least for this time frame. DOW shares peaked around $56, and didn’t trade at that number with any consistency.

**Eastman Kodak Company**  
**Ticker: KODK**

Kodak is best known for its image capturing business, mainly by using silver-based films. Their products range from disposable cameras to copier machine equipment to x-rays. In 1998, the company improved its market share in the healthcare industry by acquiring the medical imaging business of Imation Corp.

Sales decreased by 9% in 1997 and then again by 8% in 1998. The company mainly attributed this to the weak global financial markets and foreign currency exchange translation issues. However, they do recognize that ‘electronic components are becoming more prevalent in product offerings’, and many of their business plans involve making that transition. For instance, they plan to partner with Intel to help them go digital as well as with America Online to incorporate photos into the AOL messaging service. Kodak also plans to invest one billion dollars in China over the next two years.

Kodak’s bread and butter is the development of chemical film used in traditional film development. One of the factors that led to their success is that they figured out the chemistry in 1921, which no other company was able to figure out as accurately as Kodak. With the digital revolution, Kodak believes film printing will be done on paper, so they were setting up thousands of on-the-go printing kiosks around America to anticipate this new printing method.

In terms of my valuation, Kodak generates almost $1 billion in free cash flow, and is growing around 10%. I liked the 10% growth rate here, since the Worldwide Web is a huge market the company can develop products for. My financial model gave me an equity value of $59.32 per share. In early 1999, shares were trading around $45 per share, so I would buy Kodak on account of it trading at a significant discount.

Bloomberg, Yahoo! Finance, and other finance websites didn’t have price charts for Kodak. However, after some digging, I found that shares were around $60 in 1999, $30 in 2003, $3 in 2008, and is at about $20 in early 2015. Lines can be interpolated from here. My estimate of $45 per share was relevant for a couple years, but the rapid decline of Kodak wasn’t predicted in my valuation. Without this foresight, my calculation was over-valued, at least up until now. Kodak filed for Chapter 11 bankruptcy in 2012, and their biggest miss was their kiosks, in my opinion. They totally missed out on the digital camera market in the first decade of the 2000’s, which led to rapid loss of market share in the image capturing/photo development business.

**Exxon Corp.**  
**Ticker: XO**

Exxon is an energy company that principally drills and sells oil. However, they are an energy company first, so they plan to adapt if different energy sources take over. The 1998 annual report had a sense of that, since they mentioned that they are increasingly looking into electric power generation. I think this note was more of a sideshow, since CEO Lee Raymond said the only thing that keeps him up at night is “[crude oil] reserve replacement.” The hotbed of the world’s crude oil
production is in the Middle East. Unfortunately, countries in the area are against American oil companies coming in and taking their resources out of the country. This is a concept termed ‘resource nationalism.’ Therefore, companies such as Schlumberger that extract and refine the oil, only to give it to the sovereigns to let them export it, are immune to this threat. Exxon doesn’t have this privilege, so the company has to go to South America and Asia to search for other sources of oil. With BP's acquisition of Amoco, Raymond proposed an acquisition of Mobil, which was still pending shareholder approval by the end of the fourth quarter, 1998.

There are large risks faced by Exxon that other companies in other industries don’t need to worry about. For instance, a decade earlier the Exxon Valdez oil tanker struck a coral reef and produced a momentous oil spill in the Bearing Strait. Part of the issue was that the captain was drunk and gave the steer over to his deckhand. This was catastrophic for local marine wildlife, and really hurt Exxon’s reputation. Since then, they have regulated the process, but such risks still exist. Furthermore, many of the countries Exxon drills in are socially unstable, which requires the company to pay for the military to stand around their compounds. This makes the company liable for war crimes (as would happen a couple years later in 2001, when it was revealed that Exxon power equipment was used to dig mass graves for rebels terrorizing the compound in Jakarta). Other oil companies face similar threats; it’s mainly about what countries the firm earns contracts in and how stable that nation is.

1998 was a tough year for Exxon, since the decline in oil prices pinched their margins. Revenues decreased by 14% while profit was down 25% over the one-year period. However, we are still talking about a company with $117 billion in revenues and $86 billion firm value. Under Lee Raymond, the company’s mantra is increasing return on capital employed (the same as ROIC), which was 29% in 1998. I calculated an equity value per share of $34.18, while it was trading around $37 per share in early 1999. Therefore, I estimate that the stock is fairly priced, and wouldn’t buy due to a lack of a margin of safety.

My estimate of $34 per share was traded around up until 2004, and since then the shares have taken off. Therefore, my estimate was relevant for about six years.

*General Electric Corp.*  
Ticker: GE

General Electric is primarily in the energy infrastructure industry, but they do have a very strong presence in their capital segment. They also sell household appliances, and own the National Broadcasting Company (NBC). 1998 was a great year for the company, with revenue up 11% at $100.5 billion. This was attributed to their operating excellence via their adoption of the Six Sigma practices. Furthermore, GE is starting to focus more on the services industry, and is shifting away from manufacturing (GE capital is 48.5% of revenues in 1998, whereas it was 41% in 1996). I think services has much more potential for growth than manufacturing, which is evident in how a large part of America’s success is because they are a leader in the global service industry.

I think the main thing GE had going for it in 1998 is CEO Jack Welch. 1998 was his 17th year as CEO of the company, and share prices have risen from about $1 when he started to about $37 as of the end of 1998. His philosophy from the start was that if the company couldn’t be first or second in the market for a particular segment, he would sell off that segment. He would have the manager do frequent 'work-outs' with their staff; an all-day meeting about where the industry is going and how GE can be at the forefront. Welch was also very picky in terms of who worked at the company. If an employee was seen to be B or C level, they would be let go immediately. The bottom 10% of performers in the corporation were very likely to be released every year.\(^\text{18}\)  

as he was, the company has experienced significant growth throughout the decade, and 1998 was another best for the company in terms of revenue.

I calculated the free cash flow to be about $4.9 billion, and the return on invested capital to be about 18%. The company has done great under the tutelage of Jack Welch, so their solid financials don’t surprise me. However, GE has a policy of not letting CEO’s serve for more than 20 years, so his remaining tenure with the company is very short. The future after Welch would concern me as a potential investor. My model outputted an equity value of $42.66 per share, which is about $6 above what it was trading at in early 1999. This $6 difference seems paltry, but it is about 14% of my estimate, and when looking for margins of safety, circa 15% is a good buffer. Therefore, I would buy the stock, and the fact that Welch has a couple years remaining would give me confidence, at least in the short-term.

In hindsight, $42 per share was a little high for this 16-year period. It was around that until 2001, but has been below since then (except briefly in 2007).

*General Motors Corp.*

*Ticker: GM*

General Motors is the car company behind brands such as Chevrolet, Pontiac, GMC, Oldsmobile, Buick, Cadillac, and Saturn. Things haven’t been looking well for GM in the three years starting in 1996. Their worldwide market share has decreased to 15.7%, compared with 16.0% and 16.2% in 1997 and 1996, respectively. The number of GM car registrations as a percent of the global industry has declined from 31% to 29% in the same three year period. The manufactured products segment revenues decreased by $8.4 billion, which was attributed to the weak global market as well as work stoppages. In Flint, Michigan, there was a strike at a GM manufacturing plant that lasted all of June
and July, which cost the company about $2 billion. A tentative agreement was made, but there is uncertainty as to whether similar work stoppages will occur in the future, since there were similar demonstrations in 1997 and 1996.

GM also has a controlling interest in DirecTV, which was a bright spot for the company in 1998 (contributing about $900 million in revenues). DirecTV was added to GM’s product portfolio as a result of a series of transactions between GM and Hughes Electronics, the founder of the service. The firm also acquired the defense electronics segment from Hughes.

GM generates an abysmal 4% return on invested capital as well as a negative $2.3 billion dollar free cash flow. Investing firms with negative free cash flow is never recommended in this valuation methodology, so therefore I would leave GM alone.

The company eventually filed for bankruptcy in 2009, so it is clear that they were not able to reconcile their negative free cash flow. However, it was a Chapter 11 bankruptcy, which means the company reorganized and is still in existence today. The negative free cash flow in 1998 was a good indicator of financial trouble for GM in the years to come.

Goodyear Tire and Rubber Company
Ticker: GT

Goodyear manufactures, markets, and distributes tires domestically and internationally. In 1998, the company formed a global alliance with Sumitomo Rubber Industries, which will help market penetration in Japan. Furthermore, Goodyear bought the rights to the Dunlop brand in North America and Europe, which makes them the market leader in the global tire industry with 22% market share.

The company has ambitious plans for innovation and growth in the short-term. They project sales growth to be at about 20% ($2.5 billion increase) and cost efficiencies to be at $300 million (due to synergies with Dunlop). The driver behind this hoped-for success is their new tire lines. By the end of the year 2000, 80% of their product portfolio will be less than three years old. Their main goal is to develop a tire that is flexible yet highly resistant to going flat.

Goodyear generates a return on invested capital of 13%, and a free cash flow of $435 million. They retain about 73% of their funds, which leads to a short-term growth rate of about 9%. I think the company is poised to have a big year in 1999, especially with new products due to be released and an increased global presence. The equity value per share was calculated as $55.80, and in early 1999 shares were trading at about $45. Therefore, the stock is ‘undervalued’, and I would buy it.
My estimate of $55 was realized in early 1999, but Goodyear shares took a huge hit in the latter half of that year, and never rebounded to that number. This was caused by weak demand overseas and weak second quarter earnings. Furthermore, they announced increased layoffs and restructuring charges to streamline the business. As evident in the chart, share prices took a hit from that and never fully recovered.

**Hewlett-Packard Company**  
**Ticker: HPQ**

Hewlett-Packard mainly makes computers and their corresponding accessories, however of late they have established a presence in the medical and chemical testing markets. In the computer manufacturing business, they are trying to transition from the bulky hardware that comes along with standard 1998 computers for something more compact. Under this initiative, they introduced the new HP Brio 7000 business line of PCs, which is considerably less bulky than computers on the market at that time. They also developed the HP Jornada handheld PC, which only weighs about 3 pounds. The software on these new product developments was constructed by Intel, a market leader in computer technologies. The company also developed the Kayak XU and XW PC workstations, featuring advanced 2-D and 3-D graphic capabilities for software developers, design engineers, financial analysts and multimedia professionals.

In 1998, the company acquired Heartstream Inc., which mainly produces external defibrillators for victims of sudden cardiac arrest. HP also works with fiber-optics, microwave semiconductors, and light-emitting dioxides (LEDs), which are sent to other manufacturers or used in the computers themselves.
I think it was risky for HP to expand into the medical and chemical testing industries. I couldn’t understand what the management’s purpose was in these business ventures was. Acquiring two companies won’t make them the market leader in either industry, so I don’t know if this is the first in a long series of acquisitions to win market share, or if it’s just a sideshow to diversify their product portfolio. I certainly hope it’s the former, since I agree with Jack Welch that there’s no point in being in a segment just to lag behind. There were many things I read in the company filings that were positive, though. Research and development increased 9 percent in 1998 to $3.4 billion, compared with a 13 percent increase in 1997, and 18 percent in 1996. These expenditures will help the company generate patents and therefore establish competitive advantage. Also, the company is becoming more efficient, with net revenue per employee jumping from $256,900 to $382,000 in between 1994 and 1998, respectively.

In terms of valuation, I calculated a free cash flow of about $1.65 billion, and a return on invested capital of 13%. This led to an equity value per share of $34.16. In early 1999, shares were trading at about $35, so I would conclude that it is fairly priced, and not buy it due to a lack of a margin of safety.

The $35 estimate was pretty close to the average for this time frame of $32. However, shares were never consistently at that price, but the $32 average was a result of being in the middle of several peaks and troughs during this time period.

*International Business Machines Corp.*
*Ticker: IBM*
IBM is in the information services industry, and claims that their business is helping other businesses gain an edge. One of their major services is transitioning their clients to web. This generates significant cost savings for their customers and opens up new business opportunities for them. For instance, the annual report states that banking becomes 99% cheaper when it’s done online. With more and more companies taking their business to the web, it is necessary to have an Internet presence in order to remain relevant, and IBM positions themselves as the firm that has the hardware and software products that can help these firms do so.

1998 was a great fiscal year for IBM. Revenues were at record levels ($81.7 billion), while earnings rose by $6.3 billion. The company invested $5.6 billion in research and development, $6.5 billion on capital expenditures, $700 million in acquisitions, $6.9 billion on share repurchases, and $800 million in dividends, yet still had $5.8 billion in cash left over at the end of the year. The chart to the right highlights some of their historical trends in the past five years.

IBM generates a free cash flow of about $5.45 billion, and a return on invested capital of about 18%. This led to a growth rate of 10%, which is appropriate for a company in the high-paced technology sector. My equity value per share calculation was $132.53, which is significantly higher than the $70 trading price in early 1999. Therefore, this company would be a strong buy.
My estimate of $132 is close to the average of $123 for the 16 years between 1999 and 2015. It didn’t take very long for the $80 trading price to jump to the high $130’s; only about six months. In this case, my price was realized in the short-term, but was a little under it until 2009.

*International Paper Co.*

*Ticker: IP*

International paper is a manufacturer of paper, paperboard, packaging, and pulp products. They are the largest producer of such products, in a highly fragmented market. Even though they are called International Paper, only about 24% of their revenues come from outside of the United States. They have exclusive access to about 5.9 million acres of forest in America to make their products from. Given that IP is the largest company in such a fragmented industry, they are able to acquire smaller companies to increase synergies, and acquired the Russian paper manufacturing company OAO Svetogorsk in 1998.

International paper has been scaling down their operations recently. This follows from recent weak financial performance; they generated a net loss of $151 million in 1997. Therefore, they sold off $1 billion in non-strategic assets, and cut their operations by 1 million tons in 1998. These efforts resulted in positive net income in 1998 of about $236 million. However, revenues went down by 3% from 1997, and will continue to go down so long as the company keeps scaling downwards. The firm’s main risk is the advent of the Internet, which threatens to make communication via paper much less integral to the day to day operations of companies and institutions in America.

After using my valuation model on International Paper, I calculated a return on invested capital of about 3%, as well as a free cash flow of -$381 million. Therefore, I wouldn’t see this a fiscally healthy company and wouldn’t purchase any shares.
International Paper is still around today despite their weak financials in 1998. In the increasingly paperless world that is represented in this time frame, International Paper has adapted and continues to survive, though no longer a Dow 30 company. One of the ways they’ve adapted is by becoming the sole provider of paper cups for franchises like McDonald’s.

Johnson and Johnson Co.
Ticker: JNJ

Johnson and Johnson produces medical devices, as well as pharmaceutical and consumer goods that promote health and well-being. JNJ is responsible for such brands as Band-Aid and Tylenol. The Band-Aid story is any company’s dream, since American vernacular has substituted the brand name for the name of the item itself; bandages.

In 1998, Johnson and Johnson acquired Depuy Inc., an orthopedic and neurosurgery supplier. Had it not been for the resulting one-time charge of $610 million, net income would have grown by 11% in 1998. Sales were at a record $23.66 billion, marking the 66th year in a row that JNJ has generated positive sales growth. The company also increased expenditures for research and development to $2.3 billion, up from $2.1 and $1.9 million in 1997 and 1996, respectively. The company also had a restructuring plan to increase global operating efficiencies, which it should benefit from 1999 onward.

Johnson and Johnson generates a free cash flow of about $3.5 billion per year, and an eyebrow-raising return on invested capital of 37%. This is one of the only times when I scaled the growth rate downwards. Retention ratio multiplied by return on invested capital is about 16%, and I don’t think JNJ should be growing that fast, at least for a medical supplier. Therefore, I scaled their
My estimate of $60 was very accurate, as the chart shows the average price was about $63 and stayed around there until 2013, after initially getting there in 2002.

**JPMorgan Chase Co.**  
**Ticker: JPM**

JPMorgan Chase is a banking and financial services company, headquartered in lower Manhattan. Most of their business segments earned double-digit revenue growth in 1998. They are able to mitigate poor performance in certain world markets (such as Asia) by their Credit Risk Management group. JPM is one of the only banks to hold such a segment, another being Goldman Sachs. This group helps cut exposures in weak markets; for example they sold about $224 in Russian related positions due to the struggling economy in 1998.

JPMorgan Chase launched a streamlining program to save about $460 million per year in 1999. The board of directors also authorized a $3 billion share buyback program, which indicates that they think their stocks are trading cheaply. Net interest income increased by a healthy 4% in 1998, from $8,253 to $8,566 million. Net interest income is the spread the bank earns from lending at a higher percent than it borrows, and the higher the better.
JPM earns a free cash flow of about $3.2 billion, and a return on invested capital of about 11%. Given that they retain 67% of their earnings, the company’s cash flows will grow at about 7% in the short-term. The equity value per share was $73.68, and in early 1999 shares were trading in the high $50’s. Therefore, I would conclude that the stock is undervalued, and buy based on my intrinsic value number.

$73 is above the 16 year high of $65, so it’s easy to tell that my valuation was a little high for JPMorgan.

*McDonald's Corporation*

*Ticker: MCD*

McDonald’s is the largest global fast food chain, with 24,800 restaurants worldwide (as of December 31, 1998). In 1998, the company introduced the Made For You food preparation system, which is much more operationally efficient than their preexisting system. The Made For You program makes each sandwich as it’s ordered, instead of having numbers of product sitting under heat lamps for hours at a time. This just-in-time system also supports product development, since it has an increased ability to accommodate new items.

The U.S. fast food business has around 463,000 restaurants that earn about $247 billion in annual sales. McDonald's has a 2.7% physical share of the buildings, yet a 7.3% share of the industry revenues. Sales per US restaurant increased from $1.523 to $1.584 million in 1998, an increase of 4%. This shows that demand for current stores is increasing, which follows from the restaurants doing a good job providing their services. McDonald’s high level of revenues per restaurant give people an incentive to become franchisees, and therefore help grow the business.
McDonald’s generates a free cash flow of about $882 million per year. Their return on invested capital is around 12.5%, which reduces to a growth rate of about 10%. This was a surprisingly high growth output for the company, but Bloomberg had a free cash flow considerably higher, so I kept the high growth to compensate for this. The equity value per share was calculated to be about $12.43. In early 1999, shares were trading around $45, so I would conclude the stock is significantly overvalued. I wasn’t surprised by this, since the annual report makes little mention of the increasingly health conscious US population. Therefore, I would think the market isn’t aware of how McDonald’s would be impacted by such societal trends.

$12.43 was just above the 16-year low of $12.38, so it’s clear that my intrinsic value number was low for McDonald’s.

**Pfizer Inc.**
**Ticker: PFE**

Pfizer is a large player in the pharmaceutical industry, where it researches, develops, and distributes healthcare products. Recently, it has been making more money in its Animal Segment, which was 10% of total revenues in 1998, and 3% in 1997. 1998 was a great year for Pfizer, with revenues up 18% to $12.68 billion, and net income up by 51% to $2.2 billion.

Drivers of this growth include the launch of LIPITOR, which can reduce high cholesterol and triglycerides in the bloodstream. At the end of 1998, it became the most prescribed medicine in this category in the United States. ARICEPT was launched in 1997 and continued to gain ground in 1998. ARICEPT is used to treat mild Alzheimer’s disease, and accounted for 97.1% of all Alzheimer’s prescription drug sales in America, and increased the number of prescriptions in this
category by 500%. 1998 was also the year the Pfizer introduced VIAGRA, their treatment for erectile dysfunction. Since its launch in April 1998, it was prescribed more than 7 million times by doctors for about 50 million tablets and 3 million patients by early 1999. Pfizer also released Celebrex in December 1998, which treats rheumatoid arthritis. Given that it was introduced so late in the year, no key statistics were provided on the performance of the drug thus far.

Pfizer increased research and development to $2.3 billion in 1998, up from $1.8 billion in 1997 and $1.6 billion in 1996. Pfizer is hoping to gain more of an international footing with the medications they released in 1998, especially since they were so successful in the US. Judging by their R&D expenditures, it seems like Pfizer wants to keep the innovation ball rolling, so I certainly see the company growing positively in the short-term.

The company generates a free cash flow of about $1.5 billion, and has a return on invested capital of 25%. I was also impressed at how little leverage the company uses, having $886 million in long-term debt compared to about $4 billion in cash. The company generated a relatively high growth rate compared to the others I have valued thus far, at 13.5%. I felt justified in keeping it this high, in light of all the new products that it released in 1998. Ultimately, the equity value per share was calculated at $29.95, and shares were trading in the low $40’s in early 1999. Therefore, the market was too bullish on the stock, and I would refrain from buying it.

$29.95 is a solid valuation for Pfizer, since the average price in the chart is $28.
Berkshire Hathaway is an insurance and reinsurance company that also acts as an investment manager. Their key asset is their executive leadership in Warren Buffet and Charlie Munger. They took the company from a struggling textile manufacturer to a leader in the insurance business. Their business model is to collect insurance premiums and invest them, and pay back whatever they owe in claims as they arise. In the property and casualty business, claims are filed so frequently that the securities invested in have to be incredibly liquid. This concept is called float; it is critical for the success of the company that the premiums invested surpass the claims paid. Berkshire has done a fabulous job at managing and growing their float, as shown to the right.

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<tr>
<th>Year</th>
<th>Average Float (in $ millions)</th>
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<td>1967</td>
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<td>1972</td>
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<td>1977</td>
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<td>1998</td>
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Buffett has a competitive advantage when it comes to float because Berkshire mainly deals in catastrophe insurance, which has claims filed less frequently. Therefore, investments can be made in less liquid assets, and have more time to grow.

What was relevant in the 1998 annual report was GEICO, a subsidiary of Berkshire that was incorporated in 1997. In 1999, the company plans to spend $190 million in marketing in an effort to gain market share. In 1998, Berkshire acquired Executive Jet Aviation, which is similar to a taxi service for wealthy individuals needing a jet to go somewhere. As of 1998, the company has 30% market share for corporate jetting, and is projected to continue to grow as corporations cut costs by owning less private jets and other luxuries.

Berkshire Hathaway generated about $1.2 billion in free cash flow in 1998, and has a high growth rate because the company doesn’t pay dividends. The firm sets a growth target of about 15% per year, and they have often exceeded that, so I set that as my short-term growth rate. The equity value per class A share is about $90,366.25, and the shares were trading around $70,000 in early 1999. Therefore, I would assume the company is undervalued, and buy.
$90,367 was a strong valuation number for Berkshire Hathaway, since shares traded around there through 2006. The average share price in the time frame was about $105,000, which is not too far from my valuation estimate.

Sear’s, Roebuck and Co.
Ticker: S

Sear’s, Roebuck and Co. is a chain of retail stores and a popular cataloging service. Retail stores are often frowned upon as investments, since they are subject to fads and seasonal spending patterns. However, Sear’s has a distinct advantage over other retailers because of their size, which helps with economies of scale, as well as lower lease costs. Malls are willing to give Sear’s reduced rates per square foot, since should Sear’s decide not to roll over their lease, finding a new tenant to occupy such a large space would be very difficult. The company also has a very diverse product portfolio, selling everything from bedding to pool tables to automobile services.

In 1998, net income fell to $1,048 million from $1,188 million in 1997, which fell from $1,271 million in 1996. Sear’s closed 487 retail stores in 1998, which is responsible for this drop in earnings. The annual report also highlights decreasing interest in the men and junior boys sections, while demand for women’s apparel has remained consistent.

Despite their recent financial woes, Sears generates a free cash flow of about $3 billion, and has a return on invested capital of 9% (below our 10% WACC). I calculated a short-term growth rate of about 6%, which is feasible, especially since the economy was at a boom period with the DotCom bubble (and an online presence means Sear’s can reach more customers). The equity value per share is $50.23, which was above the trading price in the low 40’s in early 1999. Therefore, I would
conclude that the market is being too harsh on Sear’s. They are a leader in retail, and the malls need their rents, so I would invest in the company.

My estimate of $50.23 was very close to the $55 average, and many times shares traded around this number. Therefore, my valuation model did a very satisfactory job in this case.

United Technologies Corporation
Ticker: UTX

United Technologies owns five major companies: Otis (elevators, escalators, etc.), Carrier (heating, ventilating, and air conditioning), Pratt & Whitney (aircraft engines, space propulsion), and Sikorsky (helicopter parts and services). The company also has a segment called UT Automotive, which provides parts and infrastructure for automobiles. Net income has increased every year since 1994, by a total amount of 115%. Revenues have experienced a similar trend, this time with five-year growth at about 23%.

United Technologies has a very strong business model, in my opinion. They sell customers bulky products that can’t be easily replaced, such as elevators, helicopters, airplane engines, and so forth. UTC is a market leader in each of these industries, and once they’ve sold these items, their customers can’t substitute them for a competitor’s products easily. The company then makes a consistent stream of income from servicing these products as needed. Servicing revenues make up about 25% of total revenues every year, so UTC is able to make considerable money after the initial sale, which is a huge strength (especially for down years in the economy when construction and product sales are low).
United Technologies generates about $766 million in free cash flow, with a return on invested capital of 19%. My model gave me an equity value per share of $54.62. In early 1999, shares were trading in the low $30's, so I would buy this stock on account of it being undervalued.

$54.62 is very close to the average share price of $60.80 for United Technologies in the 16 years after 1998.

Nike, Inc.
Ticker: NKE

Nike is a designer, manufacturer, and distributor of athletic apparel worldwide. They increased sales by 43% in 1997, 32% in 1996, and 24% in 1995. In 1998, sales widely missed their targets, only growing by 4% to about $9.5 billion. Net income also fell from $795.8 million to $399.6 million, a decrease of 99%. Nike attributed this loss to the huge inventory amount they accrued in 1998, since they were expecting sales to follow the surge that carried them into 1998.

It’s strange to think of a company with $9.5 billion in revenues as still growing, but looking at their recent financial history, it’s clear that they are. 1998 was a hiccup, but 1999 should be a year of rapid growth, in my opinion. In 1998, Nike released the Jordan brand, Tiger Woods golf apparel, and the Mercurial brand for soccer. I expect these brands to establish a stronger footing in the market in 1999, and due to the large in-store inventories, they won’t have to manufacture as much product as before to experience a high-level of revenues. Nike has increased its marketing expense every year, and new commercials and billboards for their emerging brands should help move their product out of stores into the hands of the consumers. Nike is in the retail industry, and as I said in the Sear’s valuation, retail is subject to highly cyclical trends and fads. I think Nike is exempt from this
because of how they sponsor prominent athletes to be the face of their campaign. They have attracted the best and brightest names to wear their clothing, from Michael Jordan to Tiger Woods. Therefore, fans are loyal to Nike as a result of being supportive of their athletes.

Nike generates free cash flow of about $120 million, and a return on invested capital of 17%. Multiplying this by the retention ratio, the company is growing at 11.5%, which makes sense given all of their upcoming product offerings. Ultimately, I calculated an equity value per share of $12.48. In early 1999, shares were trading around $12, so I would conclude that the stock is fairly priced and not buy due to a lack of a margin of safety.

$12.48 was traded at in the short-term, but in the big-picture is was clearly a little low for Nike.

Union Carbide Corporation
Ticker: UK

Union Carbide produces and sells chemicals and polymers. In 1998, the company also partnered with Archer Daniels Midland Company to form the World Ethanol Company, which could become a huge asset for the firm in the event engines are produced that can effectively run off ethanol. Inorganic growth is symptomatic of companies in the basic materials industry, since increased size brings increased scale, and competing on price is very important for this sector, as aforementioned.

Union Carbide spent $143 million in 1998, $157 million in 1997, and $159 million in 1996 on research and development. The company also has a low level of cash for a company that earns $5.7 billion per year, which was at $49 million in 1998 and $20 million in 1997. As mentioned previously, it’s difficult to gain a real competitive advantage in the basic materials industry, since growth mainly
is inorganic except when discoveries are made by R&D, which has been steadily decreasing for Union Carbide. On the bright side, volumes have increased from 11,102 to 14,715 millions of pounds of product since 1991. Furthermore, employee productivity increased from 665 to 1,266 thousands of pounds per employee.

Union Carbide has a return on invested capital of 5.1%, so the company isn’t earning above the weighted average cost of capital. Their free cash flow in 1998 was about -$250 million, so therefore I wouldn’t pay the firm further attention, at least under the free cash flow method. The company’s poor financials led them to be acquired by Dow Chemical in 2001, so this case is similar to Allied Signal, where a firm with negative free cash flow is purchased as a way to save the company from more financial ruin and still create shareholder value.

The Hartford Financial Services Group
Ticker: HIG

The Hartford is one of the leading providers of personal line insurance, with $150.6 billion in assets. As aforementioned, float is one of the most important things to look at with insurance companies. The company increases its float to $3,003 million in 1998, up from $2,502 million in 1997, and $1,238 million in 1996. Their life insurance segment grew its total assets by 21%, and is currently at about $122 billion.

One thing that concerns me about the property and casualty insurance industry is how companies gain competitive advantage. These services are easily replaceable, and revenues earned are really a function of the marketing and underwriting processes. One way to gain competitive advantage is to have a licensing agreement with an institution that has a high volume of members. The Hartford has such an agreement with The American Association of Retired Persons (AARP) as their exclusive provider for automobile, homeowners, and home-based business through 2002. The company will also be the provider for health care services through 2007. This contract will appreciate in value as a large amount of the baby boomer population becomes eligible to enroll in AARP. This is a great thing for the company in the short-term, and if they are able to continue to win such contracts, they will grow strongly throughout the future.

The company earns about $894 million in free cash flow and generates a return on invested capital of 8.8%. This is just below the WACC I used, which means the company may have to lever up some more to increase their ROIC. The equity value per share was calculated at $60.50, which was considerably above the shares’ trading range in the low 50’s in early 1999. Therefore, I would conclude that the stock is undervalued, and buy based on that. I would also monitor their ability to win contracts for institutions such as AARP upon the expiration of those contracts in 2002.
$60.50 is relevant here, at least until the Great Recession, when shares fell to $3.62. Despite this catastrophic drop, my estimation was still relatively precise, with only a $10 difference from the average.

**Walmart Stores, Inc.**

**Ticker: WMT**

Walmart is a chain of discount retail centers, selling items ranging from clothes, hardware, and groceries. 1998 was a great year for Walmart, with sales growth at 12% (to $13 billion). Earnings per share also increased by 17%, which led to investor confidence and a corresponding 73% increase in stock price.

Walmart is a market leader in terms of operating efficiency. They compete based on low prices, which are achieved through scale, effective production, inventory, and transportation management. The company has a system that tells them when a sale has been made, and when a certain product needs replenishing in a store. Their fleet of trucks is able to get them new shipments of products needing replacing almost in the same day. The firm utilizing data generated from the stores to make projections on what the demand will be for certain items, and produce based on a just-in-time basis. In 1998, they continued to excel operationally by achieving a higher gross margin, which was a function of their improved merchandising, and they also reduced their inventory levels.

The company plans to increase their presence in foreign markets in the short-term. In 1998, they completed a tender offer for Cifra Stores shares, which gave them a controlling interest in Mexico’s largest retailer. The company also has its sights set on Argentina, Brazil, and China, as these represent healthy emerging markets that aren’t plagued by the financial crisis.
The retailer has a free cash flow of about $5.5 billion, as well as a return on invested capital of 14.6%. Walmart retains nearly all of its cash flow, so growth is about 12%. I didn’t scale it downwards, since I think Cifra is a new opportunity that will be lucrative for the company. The equity value per share was $53.47, and shares were trading in the upper 40's in early 1999. Therefore, I would probably wait for the stock to drop to the mid to low 40's before investing, but overall I would invest in this company.

$53.47 is very close to the average trading price of $56.35, and was consistently around there until 2012.

*The Walt Disney Company*

*Ticker: DIS*

The Walt Disney Company is a diversified multimedia company, with television and radio channels, movies, and theme parks owned under its name. In 1998, the company opened Animal Kingdom in Florida, Disney Quest, the Disney Cruise Line, the ESPNZone (in various locations around the world), *ESPN-The Magazine, Jane* magazine, new Disney Channels in Italy and Spain, and Downtown Disney, to name a few.

Frank Wells and Michael Eisner took over as president and CEO, respectively, in 1984. The company was struggling up until then, mainly because the Disney family was holding on to some outdated traditions that were suppressing revenues. For instance, Walt had a policy to never raise ticket prices. As soon as Eisner took over, he raised ticket prices by $5, which helped to revitalize theme park revenues. Furthermore, his time as president of Paramount Pictures helped him develop...
several Disney Classic movies, such as *Beauty and the Beast*, *the Lion King*, *Aladdin*, and *the Little Mermaid*. In 1994, Wells died in a plane crash, so Eisner become sole leader of the company. Unfortunately, he developed a reputation as a micromanager, which sowed discord among the ranks of the company (especially between him and fellow board member Roy Disney). Furthermore, increasing capital expenditures and programming rights fees have caused theme park improvements to dissipate.¹⁹

Disney generates a return on invested capital of about 14%, but currently has a free cash flow of -$4.5 billion. This has a lot to do with the inordinately high amount of capital expenditures year over year, at about $5 billion for the past three years. This has caused their cash balance to decline to $127 million, a -150% decline from 1997. Considering the company’s inability to generate cash flow above their invested capital, I wouldn’t buy any shares, and would expect Disney to run out of steam in the short-term (unless the new investments do incredibly well).

The firm has continued to survive and thrive, but the negative free cash flow in 1998 was a good indicator of their financial troubles in the early 2000’s. Through the efforts of Roy Disney and other board members, operation ‘Save Disney’ got Eisner fired in 2005, and the company has done increasingly well since then. The Great Recession hit Disney hard, since people started taking ‘stay-cations’. However, with the gradual rebound of the economy, and new movies like *Frozen*, Disney stock has thrived of late.

Results

Out of the Dow 30 companies, five of them generated negative free cash flow, and therefore their stock value could not be calculated using the free cash flow method. A synopsis of all of my intrinsic value numbers is displayed below:

<table>
<thead>
<tr>
<th>Equity Computation</th>
<th>Average Stock Price</th>
<th>2/4/2015 Price</th>
<th>Difference between estimate and Average Stock Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-year</td>
<td>5-year</td>
<td>10-year</td>
</tr>
<tr>
<td>Minnesota Mining</td>
<td>18.44</td>
<td>45.10</td>
<td>56.37</td>
</tr>
<tr>
<td>American Express</td>
<td>29.09</td>
<td>40.49</td>
<td>37.99</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>25.51</td>
<td>50.48</td>
<td>38.29</td>
</tr>
<tr>
<td>Allied Signal</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ALCOA</td>
<td>27.87</td>
<td>31.31</td>
<td>31.13</td>
</tr>
<tr>
<td>Boeing</td>
<td>14.64</td>
<td>41.82</td>
<td>43.03</td>
</tr>
<tr>
<td>Caterpillar</td>
<td>96.62</td>
<td>26.84</td>
<td>25.57</td>
</tr>
<tr>
<td>Chevron</td>
<td>44.72</td>
<td>44.99</td>
<td>41.50</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>36.09</td>
<td>30.35</td>
<td>25.77</td>
</tr>
<tr>
<td>Dow Chemical</td>
<td>54.30</td>
<td>39.53</td>
<td>34.07</td>
</tr>
<tr>
<td>Kodak</td>
<td>59.32</td>
<td>59.88</td>
<td>20.03</td>
</tr>
<tr>
<td>Exxon</td>
<td>34.18</td>
<td>39.13</td>
<td>39.17</td>
</tr>
<tr>
<td>General Electric</td>
<td>42.66</td>
<td>40.51</td>
<td>38.55</td>
</tr>
<tr>
<td>General Motors</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Goodyear</td>
<td>55.80</td>
<td>45.99</td>
<td>22.81</td>
</tr>
<tr>
<td>Hewlett-Packard</td>
<td>34.16</td>
<td>37.15</td>
<td>29.30</td>
</tr>
<tr>
<td>IBM</td>
<td>132.53</td>
<td>111.48</td>
<td>99.21</td>
</tr>
<tr>
<td>International Paper</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>60.01</td>
<td>47.02</td>
<td>51.11</td>
</tr>
<tr>
<td>JPMorgan</td>
<td>73.68</td>
<td>53.05</td>
<td>40.76</td>
</tr>
<tr>
<td>McDonald's</td>
<td>17.43</td>
<td>41.74</td>
<td>29.77</td>
</tr>
<tr>
<td>Pfizer</td>
<td>29.95</td>
<td>37.42</td>
<td>37.53</td>
</tr>
<tr>
<td>Berkshire Hathaway</td>
<td>90,366.25</td>
<td>63,716.10</td>
<td>68,343.90</td>
</tr>
<tr>
<td>Sears</td>
<td>50.23</td>
<td>30.63</td>
<td>42.96</td>
</tr>
<tr>
<td>United Technologies</td>
<td>54.62</td>
<td>31.23</td>
<td>33.84</td>
</tr>
<tr>
<td>Nike</td>
<td>12.48</td>
<td>13.18</td>
<td>12.59</td>
</tr>
<tr>
<td>Union Carbide</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>The Hartford</td>
<td>60.50</td>
<td>50.53</td>
<td>55.66</td>
</tr>
<tr>
<td>Walmart</td>
<td>53.47</td>
<td>51.11</td>
<td>53.22</td>
</tr>
<tr>
<td>Disney</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1-year</th>
<th>5-year</th>
<th>10-year</th>
<th>2/4/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Absolute Distance</td>
<td>11.40</td>
<td>10.32</td>
<td>11.30</td>
<td>30.75</td>
</tr>
<tr>
<td>Median Estimate</td>
<td>44.72</td>
<td>44.72</td>
<td>44.72</td>
<td>44.72</td>
</tr>
<tr>
<td>% distance</td>
<td>25.5%</td>
<td>23.1%</td>
<td>25.3%</td>
<td>68.8%</td>
</tr>
<tr>
<td>Minimum Absolute Distance</td>
<td>0.27</td>
<td>0.11</td>
<td>2.11</td>
<td>2.15</td>
</tr>
<tr>
<td>Maximum Absolute Distance</td>
<td>69.78</td>
<td>71.05</td>
<td>56.13</td>
<td>146.81</td>
</tr>
<tr>
<td>Standard Error</td>
<td>2.99</td>
<td>3.31</td>
<td>3.54</td>
<td>7.73</td>
</tr>
</tbody>
</table>

Surprisingly, the median absolute difference between my estimates and the actual trading prices stayed relatively consistent throughout one, five, and ten-year time frames. Average trading prices for those time periods were about 25% off from my estimates, again using the median data. I used the median because Berkshire’s stock price is so high that the discrepancies of $25,000 would have thrown off my numbers if I used the average. My estimates also could be incredibly precise, since my one-year estimate was only 27 cents off of the average one-year trading price of Chevron. For
the maximum data, again I couldn’t consider Berkshire, since its stock price is already so high. I broke the stock price down to about $100 per share (since $100 was on the high end of what shares in my portfolio were trading at), and found that if this were the case, Berkshire wouldn’t be my maximum absolute distance.

Out of the 30 companies, I would have purchased 14 of them since they were ‘undervalued’. The returns if I bought one share of each of the 14 companies for one, five, ten, and 16 year time frames is displayed below:

<table>
<thead>
<tr>
<th>14 'Undervalued' Portfolio Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Starting Portfolio Value</strong></td>
</tr>
<tr>
<td>1-Year</td>
</tr>
<tr>
<td>5-Year</td>
</tr>
<tr>
<td>10-Year</td>
</tr>
<tr>
<td>16-Year</td>
</tr>
</tbody>
</table>

(note that the 16-Year line item isn’t a full 16, it’s about one month short of it)

It’s ironic that as an investor with a long-term investment ideology, I did the best in the first year, with a gain of 10.2% on my money. After about 16 years, I only grew the portfolio by 2.9% annually, which is better than what savings accounts offer, but still not spectacular (especially when the benchmark is considered). For this portfolio, I only beat the market in the 5-year time frame, so the results aren’t convincing for calling this a good long-term valuing methodology (at least so far). The performance of the 11 stocks that I considered to be overvalued is depicted below:

<table>
<thead>
<tr>
<th>11 'Overvalued' Portfolio Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Starting Portfolio Value</strong></td>
</tr>
<tr>
<td>1-Year</td>
</tr>
<tr>
<td>5-Year</td>
</tr>
<tr>
<td>10-Year</td>
</tr>
<tr>
<td>16-Year</td>
</tr>
</tbody>
</table>

It’s interesting to see that the 11 ‘undervalued’ stocks perform better in the one and five-year time periods, while the ‘overvalued’ stocks pulled ahead in the ten and sixteen-year frames. In fact, this portfolio beats the S&P500 in all my time periods except the one year. This makes me think that the free cash flow valuation model is a good way to find discounted stocks and capitalize off that pricing mismatch in the very short-term, but isn’t substantial in terms of finding stocks that will produce consistent returns in the medium to long-term.
The return on all of the 25 companies that I was able to value using the free cash flow to the firm method is shown below:

<table>
<thead>
<tr>
<th>All 25 Portfolio Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting Portfolio Value</td>
</tr>
<tr>
<td>1-Year</td>
</tr>
<tr>
<td>5-Year</td>
</tr>
<tr>
<td>10-Year</td>
</tr>
<tr>
<td>16-Year</td>
</tr>
</tbody>
</table>

These returns show the value of diversification, since the loss in the five-year frame isn’t as bad as the ‘overvalued’ portfolio, and the gain by February 2015 is greater than the ‘undervalued’ portfolio. Therefore, this portfolio represents a happy middle ground from the other two portfolios.

**Conclusion**

I’ve long thought that a solid investing ideology is to put your money in discounted blue-chip stocks, and then to hold those for the long-term. Large cap stocks like those in the Dow 30 are less likely to go bankrupt than small and middle cap equities, so I thought that an investor would be justified in holding these stocks without too much insight into what the future holds. However, given that five of the 30 companies were generating negative free cash flow, and needed to undergo drastic restructuring (in the case of Disney) or were bought out (in the case of Allied Signal), my conviction that these companies are too big to fail has abated. Although my experiment can’t conclude anything, it did teach me that the intrinsic value number isn’t very important when a long-term context is considered. Again, this is evident in how the 14 discounted stocks did better after one-year, but lagged behind the other portfolio in ten and 16 year periods.

All valuation models are biased, and I’m sure my intrinsic value models had areas where Professor Terrion or the writers of the *Valuation* textbook would have done things differently. If I could go back and change things, I would definitely had used more judgment in the growth rate I used for these companies, since I normally just used whatever ROIC multiplied by the retention ratio was. This is normally a good indicator, but I let Coke get away with a 20% growth rate, which was higher than IBM and other companies in high growth sectors. I sometimes used the higher growth rate if my free cash flow was lower than the estimate Bloomberg or my advisors gave, but I still wish I used more discretion. Other than that, I stand by my valuations.

So, is fundamental analysis effective in anticipating stock price? Given that my estimates were off by about 25% for the first ten years, and then tripled by 2015, I can say that my intrinsic value numbers were pertinent for about ten years, and then were in dire need of updating. I think that understanding the intangibles of a company, such as competitive advantages, future growth prospects, and the talent of the management team are more important in determining value than
accounting line items. I think Warren Buffett would agree considering he doesn’t invest in ‘cigar butts’ (discounted stocks that don’t have great long-term prospects).

The founder of Forbes said that there’s more money to be made by selling financial advice rather than following it. Given my experiences up until now as a finance major at the University of Connecticut, I believe that money is made when time and sweat are dedicated to security analysis. Detailed study is required to discover all relevant information and to consequently make a sound investment decision. I think that’s why the non-stop workweeks of Wall Street bankers are the stuff of legend. I still think that the stock market can be America’s last free-lunch program; no doubt, there is money to be made merely by investing in the right company. However, you need to have inside information (which is illegal), or you need to be incredibly lucky. Either way, the stock market is just one security market that can take hard earned money and turn it into something more, or in the worst cases, something less. I think that an equal amount of hard work must go into the investment decision as it took the client to make that money, and so long as that is the case, successful investing shouldn’t be too far behind.