



THE POINT OF NO RETURN

**THE PATH FROM DEFLATION TO HYPERINFLATION;
EXPEDITION EVEREST; AND – BERKSHIRE: THE GOAT
GOES FULL REPO**

2020 LETTER TO CLIENTS

February 15, 2021

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THE POINT OF NO RETURN

I heard the fools printing fiat
Governments tell they pay you well
And they say they need credit men to
Show how to debase today
Was it Alan that said, how low?
How low?
They say money turns so fast that
You know it's time, you see no sign
They say the point debasers set is
No interest rate for all that's saved
Was it Ben that said, how low, how low
How low to the point of no return?
Fed governors, you know they bleed you
Your secretary, she said she loves you
Your lenders, they echo your words
How low to the point of no return?
To the point of no return O
How low, how low?
Today I found a dollar floating
In the air from you to me
The note that when you could spend it
You cried for gold, the point was near
Was it Jay that said
How low, how low, how low to the point of no return?
How low, how low to the point of no return
No return
How low
How low
How low
How low
How low
How low
How low
How low
How low

IN THE LETTER – INTRODUCTION

One short year seems like a decade ago. With the 2019 letter put to bed, I had the good fortune to speak to the finance and economics students at my daughter's school in Southern California over parent's weekend. From there, a couple of quick business trips to the hearts of auto country and horse country. The second weekend of March was circled in anticipation of seeing said daughter tee it up in Phoenix for her first collegiate spring tournament. Who would have known that instead, she and I would be driving her Jeep back from L.A. to St. Louis, with me riding shotgun spending the entire drive on the phone and iPad, navigating the early financial stage of a pandemic?



Just east of the junction of I-15 and I-70, Salina to Green River is a desolate 110-mile stretch across Utah with no motorist services, the longest in the U.S. interstate system. There is a point beyond which your remaining fuel is insufficient for a return to the “last chance for gas” station that you decided to breeze by. The economy is low on fuel and past such a point.

Thanks to the gents from Topeka for inspiring the theme of this year's letter. Who knew that a pandemic would send interest rates back to zero and monetary and fiscal policy past the point of no return? Triple entendre right there – interest rates being the point, no return being the yield for the indefinite future, and the point of no return being the inability of central bankers and policy making legislators to ever walk back the path to financial ruin laid by their own hands.

The job description reads capital allocation with professional worry skills required. I try to have fun with the annual letter, making light when possible of dry finance, accounting and economic theory. The “intelligent investor” is conditioned to focus on the first two, ignoring the dark art of economics for the betterment of the investment result. The process at Semper is very bottom up with a majority of time spent under the hood and in the footnotes of businesses, trying to mesh business quality and price. A dual margin of safety approach we call it. The majority of my career spent ignoring the “macro” has proven the wise course. However, a wary eye on a growing debt bubble compels worry and forces strategic thought on how to best deal with the issue that's now front and center.

The Point of No Return examines the history of how we got to this point and the likelihood of dealing first with deflation and ultimately hyperinflation, perhaps...2021 marks the 40th anniversary of record high interest rates in the United States. For four decades we have become a society conditioned on immediate gratification. The entirety of the industrialized global economy is in the same boat. We are a society living beyond our means, governed by none willing to sacrifice today for a better tomorrow. A willingness to spend with no governor and a false belief that no level of debt is too great if interest rates can be set at a low enough level comes with consequences. The role of central banks is apparently to finance unlimited deficits. Whichever direction the monetary and fiscal paths take us, austerity is coming. Our role as stewards of capital only grows more complicated. Owning proper assets, at the right time, will require every ounce of focus and every bit of cumulative experience. COVID-19 pulled forward in a short span so many trends and disruption already unfolding, accelerating the timeline on dealing with the coming fallout of the debt bubble

On a cheerier note (thank God), the portfolio trades at a wide discount to intrinsic value. The section in the letter titled *Intrinsic Value Update – Opportunity Knocks and Opportunity Cost* is a portfolio-specific discussion of portfolio activity and rationale for prospective expected returns. Despite stock market returns outstripping underlying business fundamentals, our ability to shift capital around – adding and eliminating a few positions from the portfolio and adding to and trimming others – kept quality high and

price low, yielding substantial earning power and prospective accretion to fair value. The quality and valuation gap between world markets and the Semper portfolio widened considerably, and we again compare fundamentals and valuation against the market.

Regarding the market, valuations are consistent with those seen at major historical secular peaks. *Expedition Everest*, a nod to Disney's famous rollercoaster, compares current valuation and economic yardsticks against those at various inflection points in the past. By several measures, prices have never been more expensive. Others, such as durably higher profit margins than in past cycles and low interest rates perhaps temper some of the excesses. But in the context of a debt bubble, overall capital market valuations are troubling.

TAMs are the New Eyeballs continues the valuation discussion and specifically drills down on price-to-sales as a valuation metric. A working hypothesis that paying high prices portends weak investment returns is tested. The investment derby in 2020 was led by unprofitable companies, stocks with a high proportion of shares sold short and those with prices at more than ten times sales. The number of companies trading at very high multiples ballooned, bringing back memories of the late 1990s. A brief discussion about Tesla is included in this section. The reaction by Tesla shareholders to a fundamental case that future returns stand to be poor because the stock is way ahead of the business is the same visceral response we confronted when making the same case about many tech and Internet stocks in 1999 and early 2000. One chap suggested I return my degrees and CFA charter because clearly, I learned nothing. Social media provides endless entertainment value.

A great privilege is spending time on campus with aspiring investors each year. Opportunities available to business students today are just awesome. Most institutions of higher learning have endowments and foundations, a growing number of which have carved out small (in some cases not so small) pieces that students directly manage. I can think of no better teaching tool, and no reason why schools that have, A) an endowment, and B) undergraduate and/or master's programs in business, finance, investing or economics, would not have a student-run "fund." *Back to School* highlights some "best practices" that I've encountered among some of the funds with which we are familiar. We added a tab on the website in hopes that sponsors or students themselves will contribute data points about their respective programs, which will be summarized in next year's letter. The purpose of the exercise is to share best practices among student funds that they may adopt or incorporate, and also to encourage schools that either don't have funds, or do but don't give them proper emphasis, to get it in gear. My hope is that each of you will look into what's being done at your respective alma maters and get involved. In addition to being a great teaching tool, a well-organized student-run fund showcases the schools that do it right. They serve to strengthen the alumni base and open doors for participating students.

A small handful of reading recommendations are listed in *To Read or Not to Read*, as well as a couple music recommendations. My time spent annually with the letter is done with music in the background, and I'm always happy to find new stuff. I'm trying to listen to more investing podcasts. There are some exceptional ones out there. My struggle is carving out the time. A good conversation requires focus, and I can't write and listen well at the same time. I usually listen when working out, which for whatever reason I didn't do as faithfully while locked down as I do in more normal times. I've taken to walking the dog, Big Oil, where I put the earbuds in while he sniffs and marks his territory. The moderate exercise is good for us, both overfed by the same master.

Finally, and as usual, a few comments are reserved for Berkshire Hathaway. By far our largest holding, the shares have fallen out of favor. It reminds me of 1999 and early 2000. Berkshire was "out of step" and the stock had declined while the tech darlings surged. Berkshire's shares finished 2020 up only 2.4% for the year, again trailing the more fashionable. Meanwhile, underlying value clips along per expectations, making the shares incredibly inexpensive. The stock spent much of the year underwater, affording the

GOAT the opportunity to practice some masterful capital allocation. Meaningful share repurchases at extraordinary discounts to intrinsic value may mark another of Berkshire's famous and shareholder-friendly pivots.

In the win column, you will see that the letter is FOURTEEN pages shorter than last year. For the first time in a long time, perhaps ever, I kept my promise on that front. It remains a labor of love and I'm always humbled by the response. For the handful (small) that encourage me to make the letter longer each year, I'm sorry to have failed you this year...

Huge thanks to everyone I was lucky to spend time with in 2020. Between Zoom, Teams and the old-fashioned iPhone, it was an unusual year for sure. I'm grateful to all of you so generous with your time and perspectives on the pandemic and in your respective fields and endeavors. We are blessed with great friends and clients. Navigating the investment seas with such engaged, supportive, remarkable people makes our job fascinating, humbling and utterly enjoyable.

INTRINSIC VALUE UPDATE – OPPORTUNITY KNOCKS AND OPPORTUNITY COST

“Finding a single investment that will return 20% per year for 40 years tends to happen only in dreamland. In the real world, you uncover an opportunity, and then you compare other opportunities with that. And you only invest in the most attractive opportunities. That's your opportunity cost. That's what you learn in freshman economics. The game hasn't changed at all. That's why Modern Portfolio Theory is so asinine.” – Charlie Munger

“There's no such thing as a free lunch.” – Milton Friedman

Opportunity knocks during times of turmoil, the seizing of which involves an understanding of opportunity cost. In the investment arena, often the most logical course of action is to do nothing. A portfolio constructed of high-quality companies acquired and trading at attractive prices and with favorable risk-to-reward characteristics is often best left alone. On occasion, price can move far beyond the conservative appraisal of value, affording the opportunity for action. Broad examples are the extreme overvaluation of large capitalization stocks such as Coca-Cola and Berkshire Hathaway in 1998, which warranted selling; or the massive bifurcation of value two years later, with everything involving technology, Internet and communications pushed to bubble levels while most everything else went begging, allowing buyers and sellers alike to prospectively thrive, or not. The real estate bubble of 2007 as well, fueled by low interest rates, created pockets of excess but also pockets of value in the wake of its bursting. The COVID-19 pandemic of 2020 and subsequent recovery joins the list.

Opportunity cost measures simply what's sacrificed at the expense of what's chosen: “I invested in Spacely Space Sprockets because my next best idea lacked either its safety or its prospective risk-adjusted return for example. Alternatively, I quit my job, founded Cogswell's Cogs with my life savings, and operate it such that it pays me a salary equivalent to my former consulting job, but no return on my money invested (a too-often occurrence).” Opportunity cost is the measure of the tradeoff of one decision versus the alternative. In the case of the business owner not making a return on said life savings, the opportunity cost tradeoff may be happiness, or the satisfaction of owning a business on an asteroid...

As the economic impact of the demon pandemic became apparent and then widespread, and the reaction by elected officials and central bankers manifested in policy, markets tanked, and then blasted off. Who wasn't aware that on March 23, 2020 major stock market indices had plunged by a third or more in 38 short days? Businesses were impacted differently. Costco, Dollar General and Amazon thrived, while malls, amusement parks and airlines were bludgeoned. The passive investor and the index fund ride the vagaries of price, so up and down they go. The active investor can weigh whether selling one portfolio holding and buying another is a value-added decision. The institutional investor can shift capital among asset classes, or among a roster of investors. Every investment decision is one of opportunity cost, and 2020 provided a bounty of opportunity, and of cost.

Semper entered 2020 with the stock portfolio trading at 13.5 times earnings (an earnings yield of 7.4%), 1.7 times sales and a 1.4% dividend yield. The equity portfolio produced a gain of 11.9% during the year, exceeding gains in sales and earnings. Thus, you would expect the portfolio's multiples to earnings and sales to have risen and the earnings and dividend yields to have fallen. As it turns out, the portfolio closed out the year with multiples to earnings and sales of 12.5 and 1.4 times, respectively, a dividend yield of 1.8% and an earnings yield (simply the inverse of the P/E multiple) of 8.0%. How does a portfolio outpace underlying business fundamentals yet wind up with a lower price and more earning power, this during a pandemic? The opportunities to trim and sell positions that became expensive, and conversely to add to and initiate positions in terrific businesses producing high levels of earnings power, particularly at opportunistic prices available at times throughout the year, created an enormous amount of value.

Major stock market indices likewise saw sizable gains during the pandemic year but given their passive and static nature (beyond the active decision to add companies like Tesla to the S&P 500 at a wild premium to sales and earnings power) are at the mercy of the ebbs and flows of the tide. Therefore, on an 18.4% gain, in the absence of sales and earnings growing that quickly, multiples expanded dramatically, and earnings and dividend yields plummeted. The fact is, earnings for the companies comprising the S&P 500 *declined materially*, by 23% on an operating basis and 32% on a GAAP reported basis. Stocks surging to new highs and beyond suggests a rapid earnings recovery in 2021, or something more sinister, the subplot of this letter. Indices like the NASDAQ and other growth-oriented benchmarks saw total returns blow past business fundamentals after markets bottomed out on March 23. Fast-growing companies, or those expected to do so in the future, experienced the greatest gains. Many of the best performing stocks were of businesses earning no profit, trading at the highest multiples to sales and most heavily shorted. Not exactly our cup of tea.

Disney

With few exceptions, portfolio activity added tremendous earning power. Sales were generally undertaken at high prices where price gains had outstripped fundamentals and thus as earnings yields diminished. Buys added wholesale earnings power. When numerous holdings plunged in price in March and later, we both added to and initiated positions at high single-digit expected earnings yields.

Portfolio activity in Disney provides an example of the opportunity the year brought. Disney was originally purchased in 2018 prior to the closing of their merger with Twenty-First Century Fox (21st Century Fox). Disney's shares were weak during the prior four years, largely due to the well-known fact that cord cutting was harming Disney's valuable ESPN franchise. Hard to believe in my household but some people evidently don't enjoy watching televised sports, and as the highest priced platform in the traditional cable or satellite bundle, a loss of subscribers comes with a loss of revenue. Further, the merger-arbitrage community had bid up the price of Fox and down the price of Disney shares. At \$100 per share, Disney traded for roughly 15 times its then earning power.

Disney's decision to pull content from Netflix shined the light on the investment case at Semper. Netflix was initially viewed by Disney as just another pipe for distribution of TV and film content to its audience. Pulling content back in house and then distributing directly to customers via a new Disney+ app as well as Hulu, ESPN+ and a number of global platforms coming with the Fox deal turned us on to the enormous value of the franchise. Growth would come with *much* higher margins. My mistake at the time was not buying enough Disney. The merger consummated in March 2019 and we watched our little 1% position race ahead by half by the end of that year. I've done this many times, buying an outstanding company at an attractive price with too little money and watching my small position approach fair value. The mistake when made is not enough of an initial burn to qualify as a "touching of the hot stove" lesson, but I'd like to think I've done it enough to know better. Some rationale can be attributed to an appreciation of opportunity cost not being an exact science. In fairness there *were* other attractive venues for capital when buying Disney, but only 1% in a position of *that* business at *that* price was inexcusable. A lesson for all investors when making an initial acquisition is to look in the mirror and ask, "Am I buying enough if for some reason I don't get to add to it?"

Redemption came with the pandemic, an unusual phrase in these tough times. In the case of Disney, the mouse was taken behind the woodshed and more than roughed up. Closed entirely were the theme parks, the cruise line, the broadcast and movie studios. Live sports were cancelled or moved to later dates. The company acted rationally, even brilliantly by suspending the semi-annual dividend, increasing its liquidity position by drawing on lines of credit and adding term debt to an already encumbered balance sheet (thanks to having only recently financed the Fox deal). In the case of Semper, a determination that the

plague would be finite and stress testing the balance sheet and degree of cash flow impairment allowed for survival. Survival? Would you have imagined?

Confident that Disney would survive the pandemic with the balance sheet intact, the original sin of underspending led to salvation by adding materially to the position following the plummeting of the stock. By March, Disney's shares traded back to \$100 and even below our original purchase price. At our "new" purchase price, Disney fetched an expected 10% post-pandemic earnings yield and was valued at less than 2/3 of fair value. Of course, the calculation of earnings yield required an estimate of earning power in a more normal environment because Disney was surely going to lose money in 2020. Valuations using temporarily depressed earnings produce what appears a high price. At two-thirds of value, expected return becomes the earnings yield plus a 50% gain to fair value, plus any additional organic growth between here and there. When the world caught on to the success Disney was having attracting customers to its new app, even though much of Disney's operations still run below capacity (Disneyland in California remains closed due to government dictate for example), investors looked beyond the immediate horizon and bid up the shares. By yearend, Disney rose to \$181.18, somewhat north of our appraisal, allowing us to trim a now large, more fully valued position. Opportunity knocks.

Portfolio Activity

Portfolio activity in Disney illustrates the folly of several beliefs. Under the efficient market hypothesis, whereby the market is all knowing, and no amount of research can add independent value, one might ask whether during a twelve-month period of time an established, mature company like Disney should see its shares fall by 45% and then rise by 129%. Even in a crisis like the one we all dealt with during 2020, is there room for rational analysis determining that Disney was Disney at the end of 2019, and at some point, post pandemic, will again be Disney, and oh by the way, with better content distribution than before and a cascade of pent-up demand?

During the wild year, five new portfolio companies were acquired, and eight others were materially added to. On the sell side, three holdings were completely eliminated and another eight were trimmed. It was a much more active year than typical.

The first holding to go was our position in AVX, which was ultimately acquired by Kyocera on March 30. Instead of filing a contemplated lawsuit to block the transaction, we followed the lead of Billy Joe and Bobbie Sue and took the money and run. We actually liquidated the AVX holding two weeks prior to the March market low, but unlike Steve Miller's famed robbers, invested the loot at the market's depths. Last year's letter recounted our attempt to undo a strongarm takeover of AVX by majority-owner Kyocera at far too-low a price. Unsuccessful in the endeavor, we "lost" our shares at a large capital gain. We are thrilled for the acquirer, closing the deal just as the pandemic reared its ugly head. Kyocera was able to cherish their new commodity capacitors and transistors while we deployed our previously unwanted cash into far better businesses, run by far better and more honorable capital allocators at far better prices. Seems some "successful" hostile attacks ultimately turn out better for the assaulted.

Beyond our hand being forced with AVX, Intel was sold at a nice gain and in advance of their struggle with competition and end-market demand. Analog semiconductor manufacturer Skyworks was also completely liquidated. The stock had reached our appraisal of fair value early in the year and then fell by half, back to our cost basis in March. Worried about the duration of loss of demand in consumer electronics and having better opportunities, we sold the Skyworks position at the same time as the Intel, wanting the cash for deployment elsewhere. Skyworks was sold at approximately our original cost basis, all of the prior gain evaporated. The Intel sale was a good one. The Skyworks sale was boneheaded, as the shares not only doubled back to their highs but continued higher from there. That the proceeds were

invested well doesn't remedy that the sale was of too good of a company at way too low a price. Opportunity cost in this case was opportunity lost.

A material trim in Dollar General throughout the year typifies portfolio activity. We had acquired Dollar General in March 2017 following a two-year, 30% slide in the shares. The convention that Amazon and Internet distribution were destined to destroy all retailers contributed to indiscriminate selling in all things brick and mortar. Dollar General has one of the most defensible, Internet-immune and growing presences in all of retail. Their small store, small footprint, small basket size, largely rural stores make Internet distribution very difficult and expensive. The initiative-driven management team blocks and tackles extremely well. As an example, a focus on refrigerated coolers makes the intra-week trip for necessities like milk a Dollar General mainstay for the rural family. Too far to drive to Wal-Mart in a larger town and too competitive on price versus local competitors like convenience stores or pharmacies, Dollar General possesses extremely durable advantages. When Amazon figures out how to economically deliver a quart of milk and a head of lettuce to Knob Noster, Missouri, population 2,767 according to the sign at the edge of town, then we'll worry. In the meantime, the company will open 1,000 new stores each year, will recondition or relocate another 1,000 and will perhaps double its systemwide square footage over the next decade.

With any investment made at Semper, price matters. At the initial acquisition price of \$69 we paid about 15 times the then earning power of a retailer earning high teens returns on capital and low 20's on equity. Aided by the cut in the U.S. corporate tax rate to 21% from 35% at the end of 2017 and with ongoing growth in units and increasing margins, the stock climbed to a high of \$167 per share in 2019, 24 times earnings at that point. Come the virus, Dollar General saw its shares drop to a low of \$125 in the March selloff. It was obvious that not all businesses would be harmed. Dollar General stores and the distribution system would be critical to feeding and supplying not only its rural but also its suburban and urban customers. The company has been a major beneficiary of the pandemic, seeing very high comparisons in year-over-year growth in same store sales. Weak economic times always favor Dollar General as its typical customer, with half of household income relative to the national median, leans more frequently on the national food stamp program, now known by its catchy name, the Supplemental Nutrition Assistance Program, SNAP for short. Who said bureaucrats don't have senses of humor?

The boom in demand for Dollar General, which sells smaller size packages but at industry low prices per ounce or unit, sent the shares ever upward, trading as high as \$223 in October, 22 times what the company will earn in the 2020 fiscal year ending in January. There is no doubt that sales will be higher at each unit store because of the pandemic, and it's likely that the stock does no more than tread water for a few years as the fundamentals catch up to the valuation. The last time Dollar General posted a quarter of negative same store sales was their third quarter ended 2016. The yearly record of negative comps is barren. It's a good bet the streak may be broken in 2021, but not for any real downturn. Simply, revenues were so far above normal that the 2020 comps will be extremely difficult to beat. We used the large advance to trim our holdings at incrementally higher prices and ultimately cut the position size from 4% to 1% of portfolio capital. Gains realized at progressively higher prices (and lower earnings yields) were diverted to likewise terrific companies but at lower prices and therefore increasing earning power per dollar of portfolio capital invested.

Fundamentals Versus the Market

The results of portfolio activity can be observed in what should now be a familiar table. This year, the side-by-side fundamental comparison of the Semper portfolio with the unmanaged S&P 500 on a common size basis includes figures for the most recent three years. Our portfolio holdings are aggregated as though they are a single business through common-size balance sheet and income statement figures, leverage and profitability ratios, and finally some valuation measures. Our “company” is presented side by side against the S&P 500, similarly consolidated as though all 500 businesses were a single entity. I’ve always found common size analysis extremely useful by referencing all measures against a unitized common \$100 in sales.

Comparing these three year-end periods demonstrates the impact of stock prices and investment returns on valuation and prospective earning power when business fundamentals trail investment returns by a wide margin over a period of time. The S&P 500 was up 18.4% in 2020 and 31.5% in 2019. Sales grew by 5.4% in 2019 and likely declined 5% in 2020. Earnings advanced on a per share basis by 3.6% in 2019 (having been way up in 2018 thanks in large part to changes in the tax code under 2017’s Tax Cuts and Jobs Act, or TCJA). Earnings fell precipitously in 2020, by 23% on an operating basis and 32% using GAAP reported profits that are net of sizable write-offs. Past letters discuss write-offs and write-downs in depth. Charges have averaged roughly 15% per year since the late 1980s and are small in boom times and sizable when the economy turns south. 2020 was a turn year and we observed the classic big bath and kitchen sink write-offs and write-downs. When earnings are already poor, “Who cares if you throw in the kitchen sink?” is how the thinking goes.

Regardless (pay attention here), we are using year-end 2019 earnings for the index as opposed to 2020’s depressed numbers. Why? It makes sense to give the benefit of the doubt to a recovery from the pandemic. At some level, 2020 is a “throwaway” year, and determining when profits and activity will recover to 2019’s level and then grow from there is a valid and critical exercise. You will see no shortage of reports with the P/E multiple of the index reported in the mid-to-high 30’s at yearend 2020. A similar reporting in late 2008 and early 2009 would have shown multiples approaching 100, and at a point impossible due to a calendar quarter of actual losses on a reported (after charges) basis.

Instead of using Wall Street 2020 consensus estimates of \$120.24 and \$95.00 for operating and reported earnings, we are reverting to 2019’s \$157.12 operating and \$139.47 reported, both peak at that point before turning down in March as the pandemic took hold. Thus, when you look at the P/E for 2020, we are generously using a 26.9 multiple to GAAP reported, rather than 31 times operating or 40 times GAAP reported using actual 2020 profits. The use of 2019 earnings for the index “inflates” all of the profitability measures in the table, from EBIT to pre-tax profit and also necessarily inflates all three profitability ratios listed – EBIT/total capital, ROE and ROC. Use of the higher earnings figures makes sense unless one believes profits will be depressed permanently or for a much longer time than anticipated. As to whether operating and reported earnings rise to 2021 consensus forecasts of \$164.41 and \$149.93 remains to be seen. Earnings forecasts typically taper downward during most years, putting the “B.S.” in Wall Street. They don’t have a bull in front of the New York Stock Exchange for nothing. Even using the optimistic operating estimate for 2021, the P/E is still a historically high 22.9.

Note in the table the progression in price and valuation measures for the index and then compare the incremental changes from 2018 to 2020 for the Semper portfolio. The incremental differences are striking.

Key Common Size Figures for the Semper Portfolio and S&P 500

Income Statement Figures	2020		2019		2018	
	S&P 500	Semper	S&P 500	Semper	S&P 500	Semper
Sales	\$100	\$100	\$100	\$100	\$100	\$100
Earnings Before Interest and Taxes	14.9	15.5	15.4	17.5	15.6	17.3
Interest Paid	1.7	1.6	2.4	1.3	2.2	1.1
Pre-Tax Profit	13.2	13.9	13.0	16.1	13.4	16.3
Tax Rate	21.6%	21.6%	21.6%	20.0%	21.0%	22.5%
After-Tax Profit	10.4	10.9	10.1	12.9	10.6	12.6
Dividends	4.4	2.4	4.2	2.4	4.1	2.4
Retained Earnings	5.9	8.5	6.0	10.5	6.5	10.2
Balance Sheet Figures						
Equity (Book Value)	\$66.9	\$82.4	\$64.1	\$101.2	\$63.0	\$102.0
Debt	86.4	47.6	79.0	43.7	74.6	35.0
Cash	29.2	51.3	19.1	28.5	18.6	30.7
Net Debt	57.1	-3.7	59.8	15.3	56.0	4.3
Total Capital (Equity + Net Debt)	124.1	78.7	123.9	116.4	119.0	106.2
Leverage Ratios						
Debt / Equity	129.1%	57.7%	123.2%	43.3%	118.5%	34.3%
Net Debt / Equity	85.4%	-0.5%	93.4%	12.8%	88.8%	4.3%
Net Debt / Total Capital	46.1%	-0.5%	48.3%	13.1%	47.1%	4.0%
Profitability Ratios						
EBIT / Total Capital	12.0%	19.6%	12.4%	15.0%	13.1%	16.3%
Return on Equity	15.5%	13.2%	15.9%	12.8%	16.8%	12.4%
Return on Total Capital	9.5%	15.4%	9.6%	12.0%	10.4%	12.4%
Key Valuation Figures						
Price (Market Value)	\$279	\$136	\$232	\$174	\$189	\$155
Price / Sales	2.8	1.4	2.3	1.7	1.9	1.6
Price / Book Value	4.2	1.7	3.6	1.7	3.0	1.5
Price / Earnings	26.9	12.5	23.0	13.5	17.9	12.3
Earnings Yield (Earnings / Price)	3.7%	8.0%	4.4%	7.4%	5.6%	8.2%
Dividend Yield	1.6%	1.8%	1.8%	1.4%	2.1%	1.5%
Retained Earnings Yield	2.1%	6.3%	2.6%	6.0%	3.5%	6.7%
Dividend Payout Ratio	42.3%	21.9%	41.8%	19.0%	37.5%	18.3%
Enterprise Value / EBIT	22.6	8.5	19.0	10.9	15.7	9.2

Figures are rounded and may appear off; Index data are estimates for 2020.

Sources: Semper Augustus; Standard & Poor's; Bloomberg

Start with price (Market Value). We know sales advanced 5.4% in 2019 and were likely down about 5% in 2020. Coincidentally, the unit figures of 100 by which the entire table is derived aren't far off the mark over the two years! But look at the increase in Price in the "Key Valuation Figures" in the bottom section. As you would expect, the 31.5% and 18.4% total returns for the index, which include dividends, can be approximated in the increase in price per unit of sales, from \$189 to \$232 to \$279. Balance Sheet Figures reveal an increase in debt but also in cash as many companies borrowed to increase liquidity during the crisis. Net debt remains essentially unchanged as well as when comparing debt to equity and capital measures. Now, we find these debt levels uncomfortably high, which should be obvious against the Semper portfolio, but we'll get to that. In the Income Statement Figures section at the top, profitability for the index across all margin lines remains flat to slightly down. The big changes result in valuation in the bottom section. Stock prices outstripping sales and profits drove all valuation yardsticks not only substantially higher but in many cases to all-time record highs. Price-to-sales and to book value are both now at records. The P/E multiple, even when inserting earnings that are not depressed, is rivaled only by the peak in 2000. Given the extreme P/E multiple, its correspondent low inverse, the earnings yield, is a

puny 3.7%. How much future return has been pulled forward by the recent strong advance, not only during the last two years but over the last decade, which has taken the index from arguably very undervalued at the end of 2008 during the financial crisis to significantly overvalued today?

The change in Price (Market Value) per dollar of sales is a different story altogether with the Semper portfolio. The price figure jumps from \$155 at year-end 2018 to \$174 at 2019 but plummets to \$136 in 2020. If the stock portfolio earned 23.6% in 2019 and 11.9% in 2020, why wouldn't the price have risen by some rate close to the gain minus any dividends earned? The answer, I hope, should be obvious. Portfolio activity, the ability to sell and buy, to trim and add to positions, works to keep portfolio price low and earnings yield high. There are scores of investors with high levels of portfolio turnover, but one must wonder to what end. By contrast, turnover is typically low, averaging 15% annually over 21 years. To the extent we are modestly active, sedentary compared to some, I like to believe that when we do move, we do so with purpose. In years like 2008 and 2020, when volatility is high, the ability to trade far more around positions and to fully replace portfolio holdings with entirely new businesses serves well the dual margin of safety approach (remember, business quality and price).

Despite earning returns that are above underlying portfolio fundamentals and also above the long-run expectation of total returns, activity has not pulled forward future portfolio returns. Expected returns are as high as they were at the end of 2018, when the portfolio P/E of 12.3 was only slightly lower than today's 12.5. Other fundamental yardsticks reveal the degree to which the portfolio remains significantly undervalued and strongly capitalized. At 8%, the earnings yield is more than double that of the index. Of the 8% earnings yield, 1.8% is earned as a dividend yield, with the 6.3% balance retained and reinvested by portfolio companies. The businesses are reinvesting at an aggregate 13.2% return on equity, and with net cash on the aggregate balance sheet, they actually earn more on capital than on equity. The index earnings yield of 3.7% (again, stated upward by using 2019 earnings and not 2020's depressed profits), sends 1.6% to shareholders as dividends and reinvests 2.1%. For the first time in my memory since probably March 2000, when the S&P 500 dividend yield was only 1%, the Semper portfolio dividend yield is higher than the index dividend yield. This is amazing to me, largely because portfolio anchor Berkshire Hathaway pays no dividend. We are getting more cash dividends than the index, on half of the payout, and our retained earnings yield of 6.3% is triple the index's 2.1%. If my high schooler knew what this meant he would say, "That's savage, Dad." Nomenclatures these days are very different.

The portfolio, again with a now higher dividend yield, only receives 21.9% of profits in the form of dividends. The balance of 78.1% of profits are reliably being reinvested at the portfolio return on equity of 13.2%. Arguably the most important aspect of our work is determining how well managements reinvest profits. Actively sought are managements that wield good capital allocation skills. That portfolio businesses reinvest at 13.2% on a *net unleveraged* basis is such a favorable element, particularly in a world of no or low interest rates. Compare again the difference here with the index. The index payout is nearly double, at 42.3%. Almost twice the payout but less dividend income? That's the degree to which price matters. But it's more telling considering only 57.7% is being invested *theoretically* at a higher 15.5% return on equity versus our 13.2%.

Three things worth mentioning here. First, it takes nearly as much net debt (debt minus cash) in the capital structure of the index companies to produce the nominally higher return on equity. When comparing returns on total capital, our 15.4% is almost 6% higher than the index return of 9.5%. Second, ask whether the profits reinvested by index companies are really earning the return on equity. You can revert back to the last two letters for more detail, but in a nutshell the answer is no. After paying dividends, more than 100% of retained earnings are used repurchasing shares at high multiples to earnings and thus low earnings yields. Share reduction was a modest 1% per annum for the past decade because the majority of the repurchases were merely offsetting shares given to management as options and restricted share units. Retained earnings are NOT reinvested at the return on equity. More egregious,

repurchases made at high multiples to book value are driving book value per share lower and lower, overstating returns on equity by an increasing margin every year. Third, Berkshire Hathaway “only” earns 10% on equity as we measure it. More on this in the Berkshire section, but because Berkshire, for good reason, earns 10%, know that the rest of the Semper portfolio of companies is earning more than the aggregate 13.2%.

2020 will be an exception to egregious repurchase behavior thanks to the pandemic. Many companies suspended repurchase programs to preserve capital and in certain cases even reduced or suspended dividend payments. They did the same thing in 2008. Isn't this always the case? When shares drop to genuinely attractive prices, it's often the decline in share prices that compels companies to *not* purchase shares. Share declines often come with some fear-inducing external shock. It's the most backward game of buy high and sell low that you can find, and it's what so many investors are stuck with by passively investing in indices or overdiversified portfolios of companies all practicing the same capital destroying behavior. The investor aware of these expensive oddities can work to keep them out of a well-constructed portfolio.

Forward Expectations

Presume we've gauged the profitability of our portfolio holdings reasonably well. As long as those profits prove durable, we should earn the earnings yield on the portfolio, today at 8.0%. As mentioned, 1.75% is earned as a dividend yield with the remaining 6.25% (rounded to 100th's here) is retained and reinvested. If we've likewise done a good job measuring and estimating the prospects our companies have in reinvesting capital, then that portion of our profits should earn the portfolio return on equity of 13.2%. A 9% to 11% long-run expected return becomes a realistic target from today's valuations.

There exists a drag on returns, and that's the rate at which dividends are reinvested. New capital, or the proceeds from portfolio sales and trims, suffer the same fate. If we are having to pay premium prices, to book value at least, then paying 12.5 times earnings takes the return on that portion of our capital back to the starting point, to the “go” of the earnings yield if you will. We are far better off with the majority of profits retained and reinvested at good returns than having to pay the premiums typically involved in acquiring new fractional shares of companies in the stock market. The luxury is choosing the businesses and the prices paid upon the reinvestment of dividends, new capital and portfolio process cash. In a sense, it's the lack of portfolio sales and trims by index investors that never have to be reinvested at premiums that is a genuine advantage. Our portfolio activity has to be of enough value added to overcome the drag of always having to pay the multiple to earnings with the proceeds from any portfolio sales. I think we do this well, but it's very difficult for most active investors to do so. In fact, I'd bet most active investors don't even contemplate or understand this hurdle when selling a position. Opportunity cost, remember? There exists the alternative to not sell. It's this understanding that contributes to generally low portfolio turnover.

I've long described a similar second way to view expected returns on the portfolio. Starting again with the earnings yield, today at 8%, as long as profits are properly estimated, we should earn the earnings yield. To that the accretion of any discount to intrinsic value that exists at the time of purchase should be earned. If Mr. Market, between his manic and depressive phases, genuinely occasionally offers up businesses for less than value, then a purchase at 75 cents on the dollar will see an additional 33% return over whatever period of time it takes to close the discount gap. A purchase at 80 cents on the dollar yields 25% upside, added of course to the earnings yield. The portfolio discount typically is seen around that level. In late March, following a decline of 30%, the portfolio traded close to 50% of intrinsic value and sported earnings yield of roughly 10%. That's a nice combination – an expectation of earning 10% per annum plus a double over some period! Who would have expected a 61% advance from the lows over the next nine months, but that's what transpired. The stock market is a funny place. The portfolio was valued at

74% of intrinsic value at yearend. The number is not meant to imply precision, but when aggregating a bunch of estimates of value for each portfolio, a number appears on paper. As Mr. Buffett famously quips, “You are better to get it roughly right than precisely wrong.”

Contrast expected returns to those of the index. Semper expects the 8% earnings yield plus 35% accretion to fair value or 8% plus a pull upward to the return on equity of 13.2% on the nearly 80% of profits not earned as dividends. The index should be expected to earn the 3.7% earnings yield plus some *decline* to intrinsic value over some period. Our estimate of intrinsic value for the index is far below the year-end closing price of \$3,756. Fifteen times the most optimistic operating earnings estimate for 2021 profits of \$164.41 produces a price of \$2,466 – 34.3% lower than at yearend. Combining the earnings yield with a decline to fair value produces at best a low single digit 10-year expected return. I’d wager that at some point in the next decade the price will be decidedly lower than where it closed 2020. The caveat is the elephant in the room, the theme of this year’s letter.

The portfolio intrinsic value has been calculated since March 31, 2000. Appearing out of step by not owning technology stocks in the late 1990s, we didn’t match the NASDAQ’s meteoric rise of 86% in 1999. Not even close. A tool was needed to demonstrate the value in the portfolio, by then loaded up with very inexpensive small and mid-size businesses. Berkshire had also been acquired in February 2000, itself out of favor, having plunged by half over the prior two years. The portfolio was decidedly devoid of the tech darlings of the day, perfectly priced for dismal long-run returns and a more immediate painful plunge. That, however, was not the conventional wisdom of the day, so to the tool shed.

March 2000 marked the peak of a secular stock market bubble and most definitely the pinnacle of the technology bubble. It also marked the end of a depression in value. The parallels to today are striking. While the S&P 500 began a 50% decline that month and the NASDAQ an 80% slide, many good value-oriented managers made money over the three years through 2002. The pain they felt up to the peak was brutal. Value had been crushed; “underperformance” was rampant. If an investor earned 20%, even 30% in 1999, it wasn’t “good enough,” being nowhere near the 86% return on the NASDAQ. Numerous value managers had capital pulled from them by individual and institutional investors, creating further pressure on the already undervalued stocks in their portfolios.

Semper benefited from the bifurcation in the market. We had capital to put to work and found tremendous bargains in oversold, out of favor small and mid-cap stocks, many trading at single-digit multiples to earnings while the market multiple approached 40 times and the NASDAQ more than 240 times. But if you didn’t own tech (and we refused to chase the bubble) it required a herculean effort to keep clients from abandoning ship to chase tulips. I remarked at the time that the next time we’d have to do this much handholding would be at the next secular market low when nobody wants to own stocks.

The first Intrinsic Value report on March 31, 2000 revealed the Semper portfolio at 15.6 times earnings with a 6.4% earnings yield. The S&P 500 traded at 40 times and a 2.5% earnings yield. The report calculated that the portfolio traded at 84% of intrinsic value, giving it 19% upside over some period. The intrinsic value of the index was suggested at \$590. Against a March 31, 2000 price of \$1,499, such sentiment did not make for welcome chitchat on the cocktail party circuit of the day. Given the immediate market decline, and the index having spent the better part of the next 12 years underwater, it never did become much of a welcome subject matter for most.

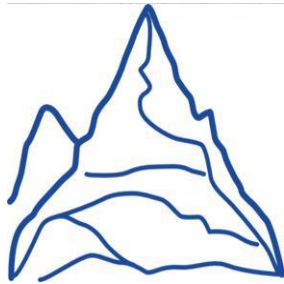
Curiously, how predictive or reliable has the report proven? If a process couples earnings yield with the purchase of stocks at a discount to intrinsic value and expected return adds the accretion of the discount over some period of time to the yield, then our process seems to stand the test of time. Since running the intrinsic value report for the first time in 2000, the portfolio earnings yield averaged 7.5%, a 13.4 multiple to earnings. At an average 75 cents on the dollar of fair value, the presumed 33% accretion to value

earned over a period of years should add perhaps 2% to 3% to the earnings yield. A 9.5% to 10.5% expected return compared to a 10.3% average actual return over 21-years makes the tool powerfully predictive. Recent results will be skewed higher by aberrantly high returns over the past five years.

Date	SAI Equities Only	Reverse CAGR from 2020	Beginning Earnings Yield	Beginning P/E Ratio
2000	30.7%	10.3%	6.4%	15.6
2001	23.1%	9.4%	6.6%	15.2
2002	-22.0%	8.7%	7.4%	13.5
2003	38.2%	10.8%	7.9%	12.7
2004	16.3%	9.3%	7.7%	13.0
2005	7.4%	8.9%	8.2%	12.2
2006	18.4%	9.0%	7.3%	13.7
2007	3.1%	8.4%	7.0%	14.3
2008	-21.6%	8.8%	7.5%	13.3
2009	27.9%	11.8%	10.0%	10.0
2010	14.4%	10.4%	8.4%	11.9
2011	7.1%	10.0%	8.3%	12.0
2012	6.8%	10.4%	8.7%	11.5
2013	17.3%	10.8%	8.9%	11.2
2014	5.2%	9.9%	8.0%	12.5
2015	-10.3%	10.7%	7.7%	13.0
2016	27.7%	15.5%	8.1%	12.3
2017	18.0%	12.6%	7.6%	13.2
2018	-1.4%	10.9%	7.2%	13.9
2019	23.6%	17.6%	8.2%	12.2
2020	11.9%	11.9%	7.4%	13.5

The other takeaway is the steadiness in returns over time. Outside of a 17.6% 2-year return (skewed higher by 2019's 23.6% gain) and a 15.5% 5-year return (pulled up by 2019 and high-return years in 2016 and 2017), the remainder of the compound annual periods ranges from 8.4% to 11.8%. Similar tables seen later in the letter for the S&P 500 and various yardsticks for Berkshire Hathaway indicate much higher volatility and dispersion of returns in their compound period returns. With an 8% earnings yield and a sizable discount to intrinsic value heading into 2021, we like our portfolio.

EXPEDITION EVEREST



“You’re just as dead if you fall from forty feet as you are from four thousand fathoms, that’s what I say.” – Terry Pratchett

“Getting to the top is optional. Getting down is mandatory.” – Ed Viesturs

“While the crash only took place six months ago, I’m convinced we have now passed the worst and with continued unity of effort we shall rapidly recover. There is one certainty of the future of a people of the resources, intelligence and character of the United States – that is prosperity.” –Herbert Hoover, May 1, 1930

I have this recurring dream. Nightmare, really. From my tent at base camp, looking up at the summit, central bankers are descending the mountain from the summit in procession. At first, they are happy, healthy, giving me the thumbs up. Then some are bandaged from frostbite. It gets worse. Stretchers. Then body bags. Finally, dollars start blowing by, down from the mountaintop. Then it’s Euros, Pounds, Yen, Renminbi. The flying currency turns to a river. Finally, giant snowballs of people, investors I presume, are rolling by. The rolling becomes an avalanche of bankers, investors, currency, a printing press and snow, headed right at me. I wake up at this point, of course, always in a cold sweat. Fortunately, I keep a copy of Security Analysis on the nightstand. Whenever I wake from this dream I reach for the book and repeat to myself, it’s only a dream, it’s only a dream.

OK. You’ve probably figured out this isn’t a true story. I really don’t keep a copy of Security Analysis by my bedside. I keep it under the pillow. Kidding aside, if you ever wondered what an economic and market peak was like, you don’t need to visit the Himalayas. Cast your eyes downward to the table below, appearing in past letters and updated again here at the outset of 2021. Good riddance to 2020, and what hath the pandemic wrought? At this time last year, yardsticks like market cap to GDP, price-to-sales and after-tax profit margins had reached all-time highs. Then, March sees the global economy shuttered and every ounce of fiscal and monetary might subsequently thrown at it. In doing so, asset prices blow past prior peaks to new rarified air.

Numbers don’t lie, they say, and comparing meaningful fundamental measures of value to prior secular peaks and troughs serves a purpose. Peaks generally develop gradually, troughs more suddenly and violently. Irrational prices can become more irrational, we all know, but in surveying these measures against other secular tops, 2020 compares dangerously and even surpasses the priors. In the red columns, behold the Matterhorn, Kilimanjaro, Aconcagua, K2, Denali, and now, Everest. Don’t email or call me with the wisdom that these are not the six highest in the world, OK? I like the names. I’ve heard of them, and they are used to name stuff like rides at Disney and SUVs. Fuji is intentionally omitted, which in Japanese loosely translates to “the sumo of all stock and economic bubbles.” To save trees and time looking up myriad data points from the Land of the Rising Sun, circa 1989, it didn’t make the cut, but ’89 Japan was absolutely one of the great bubbles of all time. When this modern-day Goliath finally succumbs to oxygen deprivation, it too will go down in the record books as one for the ages. By numerous measures we are already there.

100 Years of Peaks and Troughs

	9/29 Peak	7/32 Low	3/37 Peak	4/42 Low	2/66 Peak	8/82 Low	3/00 Peak	10/02 Low	10/07 Peak	3/09 Low	12/19	12/20 Peak?
S&P 500	34	4	20	7	102	102*	1527	777	1565	666	3230	3756
After-Tax Profit Margin	8.9%	-3.2%	6.4%	6.6%	6.7%	4.0%	7.4%	5.8%	9.4%	-0.1%	11.2%	8.8%
Price to Op Earnings (TTM)	26	NMF	8	7	18	8	33	19	22	NMF	23	31^
Price to Earnings (CAPE)	30	4	23	9	25	7	44	23	28	15	34	35
Price to Sales	2.31	0.48	0.51	0.46	1.20	0.32	2.13	1.11	1.57	0.666	2.32	2.79
Price to Book Value	3.0	0.3	2.2	0.8	2.4	0.9	7.7	2.3	6.0	1.5	3.6	4.2
Dividend Yield	3.0%	17.5%	3.7%	8.7%	2.9%	6.1%	1.0%	2.0%	1.7%	4.0%	1.8%	1.6%
Market Cap All Stocks	93.3B	15.3B	66.2B	32.4B	624B	1.1T	14.0T	7.0T	15.9T	7.0T	33.8T	39.1T
GDP	103.7B	58.8B	91.9B	162B	789B	3.3T	9.9T	11.0T	14.6T	14.4T	21.7T	21.4T
Market Cap to GDP	90%	26%	72%	20%	79%	33%	141%	64%	109%	49%	156%	183%
Total Credit Market Debt	175B	150B	159B	227B	1.12T	5.2T	26.7T	32.2T	51.2T	54.6T	75.9T	82.3T
Total Credit Mkt Debt / GDP	169%	255%	173%	140%	142%	158%	264%	293%	352%	380%	350%	385%
U.S. Government Bond Yield	3.4%	3.5%	2.6%	1.9%	4.6%	14.6%	5.9%	4.7%	4.9%	3.5%	2.4%	1.7%
U.S. Discount Rate	6.0%	2.5%	1.5%	1.0%	4.5%	10.75%	5.5%	1.25%	5.0%	0.75%	2.25%	0.25%
Inflation (CPI)	0.6%	-9.9%	3.6%	10.9%	3.7%	11.0%	3.4%	1.6%	2.9%	-0.4%	2.4%	1.4%
Unemployment Rate	2.3%	24.9%	11.7%	4.9%	4.2%	10.8%	3.9%	6.0%	5.0%	9.9%	3.5%	6.7%

*A peak price can equal the subsequent trough price following 17 years, especially when marked by high inflation.

Source: Semper Augustus. Federal Reserve St. Louis, Bureau of Economic Analysis, Bureau of Labor Statistics, Standard & Poor's, US Treasury

^Price to Operating Earnings for 2020 uses 2019 peak earnings of \$157.12 in the portfolio fundamentals section, not 2020 actual earnings of \$120.24 which are depressed and shown here.

A handful of the specific figures in the U.S.-centric table warrant discussion. Note that 2019's numbers remain and are side by side with 2020's. 2019 looked like a duck and quacked like a duck, but given central bank fuel provided in the pandemic year, it won't go down in the archives as "the peak." As long as the market continues defying gravity, and the physical property of valuation, the table will remain a fixture in the letter. Once the peak is firmly entrenched as the peak, perspicaciously called here first, something else can take its place. In the meantime, some thoughts on valuations at a peak:

Price to Sales at a Record

Departing 2019, operating earnings for the S&P 500 reached \$157.12, a record. An after-tax profit margin of 11.2% was also a yearly record (the quarterly peak was seen in 2018's third quarter at 12.1%, the point of maximum benefit from 2017's TCJA tax changes). The price-to-sales ratio at year-end 2019 of 2.32 was a record, but students of valuation would correctly point out that at the prior record, March 2000, the 2.13 multiple seen then was on a 7.4% profit margin, much lower than 2019's, thus the new price-to-sales record wasn't as "high." The price-to-sales purist (they meet for beers at Moe's), would argue that to match the 2000 peak requires the price-to-sales metric being adjusted a full 50% higher to 3.2 times to reflect 2019's record margin itself being 50% higher than 2000's. Here at the close of 2020, there is no doubt that the new record 2.79 price-to-sales measure smashes the prior, unless adjusted against 2000's lower peak earnings. Another 14% advance and the record would be asterisk free. With this mind-

numbing analysis, are we not determining whether the Honey Crisp and the Red Delicious are both apples?

In reality, we know that instead of hitting Wall Street's 2020 targeted earnings per share of \$175.52, the economic "slowdown" led to only \$120.24 in operating profits and an even lower \$95.00 on a reported GAAP basis, a fraction of what was expected. The operating margin fell to 8.8% from 11.2% over the year and is likely bouncing back sharply. Here's the takeaway: A 2.79 multiple to sales is high, Everest high. It doesn't matter that sales were probably off by 5% in 2020 and will recover; 2.79 times exceeds prior peaks in 1929, 1937, 1966, 2000 and 2007 by a bunch. The barometer flashes red, with investors paying the highest price for each dollar of revenues, *ever*.

Market Cap to GDP at a Record

Long described as Warren Buffett's favorite proxy, measuring the market value of a stock market against economic output is a useful but imperfect measure. Market cap to GDP reached a whopping 183% at yearend. Put me down as calling this figure a nosebleeder. The ratio at no prior peak was even close. It's a full 30% higher than in 2000 when the market reached an unprecedented 141% of GDP. Earlier records hadn't breached 100%. 1929 held the standard at 90% for seven decades. Between here and there, however, the economy changed. If one assumes that far more business is done by publicly traded companies today than in 1929, which is true, the measure should be adjusted upward by the differential. Second, if one assumes the proportion of business and profits earned abroad today is higher than in the past, also true, then the measure should be further adjusted upward. Third, if one assumes that profit margins are higher now than in the past, again true, whether due to less capital intensity or accounting differences, then the ratio should be even further tilted upward and to the right. Finally, if one assumes that the level of interest rates should bear on the valuation of the market, true to a degree, then more upward adjustment is necessary. I've suggested in the past that someone in academia ought to take on this adjusting project. The "glory" of perfecting the "Buffett Indicator" would be the stuff of legend. The data is all there, be it from the Bureau of Economic Analysis with their National Income and Product Accounts, the Bureau of Labor Statistics with inflation data or the St. Louis Federal Reserve and data on US Treasury tax collection. DM me. We can collaborate. You do the heavy lifting, and we'll share the credit.

Peaks to Troughs

Pay attention to the stark differences between each individual peak and subsequent trough. By the time the stock market hits rock bottom, the economy is generally in the tank. Stocks tend to be leading indicators, but damage done between secular peaks and secular troughs is generally massive. Peak and trough figures, depending on the data set, are from either the day, week, month or quarter closest to the specific day the market topped out or reached its floor.

Take 1929 to 1932, when the S&P 500 fell from 34 to 4. That will leave a mark. 1929's record 8.9% after-tax profit margin not only disappeared but losses mounted. Fundamental yardsticks like price to earnings, sales and book value logically plunged, but it was the decline in not only the numerator that tanked. Denominators were hammered as well. Earnings fell. Sales fell. Book value was spared as KSAP had not yet been adopted. [That's Kitchen Sink Accounting Principles if you weren't keeping time.] Note the spike in the dividend yield from 3% to 17.5%. If your reaction is hey, wow, companies raised their dividends, then it's time to revisit 4th grade math. Khan Academy is great. If the index falls 88% in price, the dividend yield would rise from 3% to 25%, holding dividends constant. The fact that the yield "rose" to 17.5% means dividends were "only" cut by 30%, not bad, all things considered. Numerous companies were losing money, loaded with net cash and still paying dividends at huge yields given washed out stock prices. Kind of reminds me of a portfolio holding Exxon Mobil, except for the net cash part...

Take note of the economic figures in the lower half of the table between 1929 and 1932. They didn't call it the Great Depression for nothing. Nominal GDP plunged 43% over three years as the unemployment rate spiked from 2.3% to a depressing 24.9%. The Federal Reserve is widely assumed to have been inactive, but a proper study of history reveals anything but. I highly recommend a read of *America's Great Depression* by the great Murray Rothbard in 1963 and published most recently by the Mises Institute in 2000. Now, back to the show. The discount rate was lowered incrementally from 6.0% to 2.5% but didn't engineer an inflationary response. Instead, inflation as measured by the CPI registered negative 9.9%, decidedly deflationary. History presumes debt to have been the primary scourge that tipped the economy into depression. A high level of margin debt is famously referenced and indeed, in the stock market there was a rush to margin investment accounts in the late 1920s. The majority of economic output was not derived by publicly traded companies, however. The US economy was still very agrarian. We hear of Smoot-Hawley in school, trade and tariffs, but the absolute levels of gross trade, imports and exports, were nascent, tiny compared to today. The US then was a net exporter, largely of agricultural products. Imports ran 5.4% of GDP and exports 5.7% at the peak of global trade in 1929. Today, those numbers are multiples of that.

Total credit market debt in the system was excessive, at 169% of GDP in 1929. The Federal Reserve was birthed only in 1913 and played a lesser role in the economy. Fractional lending allowed nowhere near the leverage employed in modern banking and the commensurate debt levels that have ballooned since 1981. Still, debt was large by the end of the Roaring 20s. Charts of debt to GDP show a spike to 255% of GDP, a level we again saw in 2000. Many presume the spike to 255% was at the economic and stock market peak in 1929. No. As GDP was nearly halved, the system managed to reduce total credit market debt from \$175 billion to \$150 billion. GDP fell by \$44.5 billion and debt *fell* by \$25 billion. It was the economy plunging faster than credit markets could restructure debt that showed a spike in debt to GDP from 169% to 255%.

I won't walk through detailed nuances of each successive peak to trough comparison. Each period has parallels but were also uniquely different. Succinctly, the 1937 to 1942 period brought war, a very washed-out stock market (the battle going decidedly not well in April 1942), rising government debt to finance the war, helped by holding short-term rates at very low levels despite inflation that came with the fighting, rationing and tightness in supplies. Unemployment of course, had plunged, thanks to the sacrifice of the Greatest Generation. Think about the mental process of committing to buy stocks when the prospects of speaking German and Japanese looked not entirely unlikely.

Jumping ahead, the 1966 to 1982 cycle was a stagflationary nightmare for investors. You can see the S&P 500 flat from \$102 to \$102 over the long period while inflation raged higher and higher. The economy was marred by deep, frequent recessions and rising unemployment that reached 10.8% by 1982. Interest rates rose steadily with the discount rate at 10.75% in 1982. The long Treasury yielded 15.71% in 1981 while the prime rate, which then dictated mortgage rates, hit 20.5%. A 30-year mortgage borrower paid 18.6% (plug that into your home affordability calculator). Adjusted for inflation, investors lost 75% of their purchasing power by 1982. [Of note, one canny investor sensed by the 1966 peak that stocks had run their course. Said oracle-to-be proceeded to close his partnership to new investors that year. By 1969, he'd closed the partnership entirely and admonished his investors to seek high-quality municipal bonds, invest with pal Bill Ruane if you had to have stocks, and keep your position in crappy textile manufacturer Berkshire Hathaway if you like because he'd be keeping his and running it for the time being. Of the alternatives, all were base hits. One, naturally, was a walk-off grand slam in game 7 of the World Series.] It was the stagflation, weak output coupled with rising unemployment and inflation at the same time, that led to the Fed's dual mandate of seeking maximum theoretical employment without pushing inflation above an upper bound. The bank leaned on a concept they called NAIRU, the non-

accelerating inflation rate of unemployment. It was gospel. Now, they are trying to manufacture boundless inflation in any fashion they can. God save us.

The next two peaks saw the S&P 500 at roughly the same level just above \$1,500. March 2000, of course, was the tech and Internet bubble, from which many tech stocks never recovered. Others, like Microsoft, produced a negative total return for 15 years and took fully two decades to produce even a mid single-digit annual gain. 2007 was the bubble in real estate. Today's investors are more familiar with the two periods and the ensuing bears that followed each peak. In both cases, the central bank slashed rates as unemployment and stock prices plunged. Recessions pulled inflation downward, unlike the 1970's. By now, the principal interest rate tool employed by the Fed is the setting of the federal funds rate. The discount rate, the rate at which banks can borrow from the Fed overnight, had been set at 1 percentage point above fed funds for years. You can see in the table the discount rate was cut from 5.5% in 2000 to 1.25% by 2002, left there for too long, in part fostering the real estate boom. The real estate madness was popped by, among other things, rates rising nearly back to where they had been in 2000. In August 2007 the discount rate was reduced from 6.25% to 5.75%, a level 0.5% above the federal funds rate. The financial crisis ensued, sending rates downward again to 0.75% in 2009 (with the upper bound of the fed funds target still 0.5% below that at 0.25%).

Now we come to 2020. The reason for leaving 2019 in the table is to show exactly what's transpired over twelve short months, which felt like twelve years. All are familiar with what's happened but it's interesting to view the year through the historical lens afforded via the table. We had a big economic downturn and recession, triggered by an economy-closing pandemic, which naturally drove unemployment to the stratosphere, jumping from a full 3.5% at year-end 2019 to 14.7% by April, the highest level since the Great Depression. The S&P 500 fell by 31% from January 1 to March 23, the fastest decline of that magnitude ever. Congress, the Treasury and the central bank intervened in unprecedented fashion, setting short-term rates at 0%, passing an enormous "stimulus" bill, none of which is really stimulus, and rolling out and adding to many of the same central bank lending and liquidity programs used in the financial crisis to support credit markets and the banking system, with a nod to the stock market that the Fed has your back. From the March 23 low, the index rose 68% by yearend and closed the year up 18.4%. Unemployment remains high at 6.7% (higher adjusting for those that left the workforce and aren't looking for jobs) thanks to ongoing geographical lockdowns and muted business activity in certain areas and industries.

A gargantuan surge in debt during 2020 was startling. Unlike the 1930s when both GDP and debt declined, in 2020 government debt and to a lesser extent corporate debt exploded upward. GDP will have declined modestly from \$21.7 trillion to my estimated \$21.4 trillion (with the government component offsetting large declines in industrial output and trade and a lesser decline in consumption). While GDP fell slightly, total credit market debt simply ballooned, by \$6.4 trillion and from 350% of GDP to a record 385%. The increase is similar to that seen from 2007 to 2009, when nominal GDP declined modestly but the system created \$3.4 trillion in new debt and spiked total credit market debt to GDP from 352% to 380%. Outside of running a 16% budget deficit of \$3.1 trillion by the government's fiscal year ended September 30 and financing it with a \$4.6 trillion increase in federal debt outstanding over calendar year 2020, companies also borrowed heavily to provide needed cash for survival.

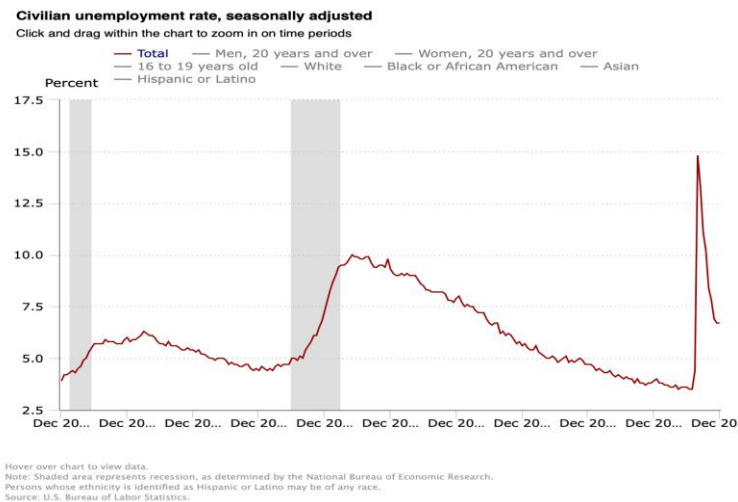
Herein lies the rub. Few would have predicted that in a single year a pandemic would halt much of the global economy, nominal GDP would decline, unemployment would spike to 14.6% and remain at nearly double the rate at which it ended the prior year, the stock market would fall by a third in less than three months, short-term interest rates would be fixed at 0% for the indefinite future, the 30-year US Treasury bond would fall to less than 1%, oil would fall 21% for the year and at one point would technically trade at a negative price on the near-month futures contract, passenger air traffic fall 60% and see the

property/casualty insurance industry suffer billions in losses for civil unrest. Having predicted all of that, how many would peg the S&P 500 at an 18.4% gain for the year and the NASDAQ a higher 43.6%?

A student of financial history would look at the table and say, 2020 will mark a peak, and not just because Bloomstran painted the column in red. A wise student of history, of a history predating the period covered since the 1929 peak, would say 2020 *may* mark a peak, but it depends. With that, onward to the theme of the letter...



Source: St. Louis Federal Reserve



Source: Bureau of Labor Statistics

The most compelling argument for stocks *not* being overvalued is in the context of negligible interest rates. If equity risk premium and opportunity cost can be set aside, we'd wholly endorse that asset prices should be inversely correlated to interest rates (or that earnings yields and interest rates should be positively correlated). Only to a point. Academic tools such as the Fed Model, which quantifies the tradeoff between asset prices and rates, breaks down at extremes in interest rates. We saw that in the early 1980s when both profit margins *and* P/Es were depressed (with the benefit of hindsight, of course). An 8 multiple to earnings is the same as a 12.5% earnings yield. When inflation was 11% and government bonds yielded 14.6% at the 1982 stock market low (the 1981 long treasury yield peaked at 15.7%), nosebleed interest rates absolutely forced earnings yields upward as well. A 14.6% earnings yield would have equated to a 6.9 multiple to earnings, so not far off of where stocks traded. You got rich by

projecting that interest rates would ultimately decline, and also that profit margins would expand. From the lows through the subsequent March 2000 peak, P/E's and profit margins each tripled, multiples from 8 to 24 times and margins from 4% to 12%. Basketball may have its triple double, but a double triple in the investing game is a nine-bagger, and that's what investors got. In addition to the nine-bagger, investors were also rewarded with healthy top line growth, combining to produce a bottom tick to top tick 20% annualized gain.

An investor expecting higher sustained levels of interest rates would naturally expect stock market valuations to commensurately decline (lower P/E's and higher earnings yields). But what if interest rates are destined to be forever low? Are today's multiples to earnings justified? At extremes, the tradeoff breaks down because the economy is broken at extremes. Had runaway inflation not been broken in the early 1980s with high interest rates and instead we had experienced even higher levels of inflation or even hyperinflation, money would have lost value and stocks would likely have ultimately proven to be a store of value. Flip to today, at extremely low levels of interest rates, or even negative interest rates, what becomes the proper multiple? In a mathematically perfect Fed Model world, at 1% interest rates should the P/E be 100 times? At a 0.5% interest rate should the P/E rise to 200? A 10,000 multiple at one basis point of yield? What of a 0% rate of interest, or a negative rate? Should the multiple be infinite?

Investors must demand some absolute level of return, regardless of interest rates. Low interest rates reflect low growth and an inability to commit new capital to productive use. As the economy grew during the 20th century and into the first seven years of the 21st, an ever-expanding amount of credit was required to produce a dollar of economic output. By 2007, no fewer than six dollars of debt were needed to grow GDP by a dollar, and total credit market debt ballooned to 350% of GDP. Debt spiked in 2008 to 385% of GDP on an increase in government debt and a decline in GDP. Once clear of the crisis it backed down to 350% of GDP and remained there until ballooning during the 2020 pandemic. Thus, from 2007 through 2019, every dollar of growth in output required an identical \$3.50 in debt. The problem is, real GDP growth collapsed. Nominal GDP grew by only 3.3% per year for the past twelve years. If inflation averaged 2%, real growth shriveled to all of 1.3% per year, half of which is eroded when adjusting for growth in population. Here and abroad, central banks and governments are trying to push inflation higher. Japan for three decades comes to mind here. In reality, debts are incurred and must be serviced in *nominal* dollars, or yen, or euros. Throw a little inflation into the mix and servicing your debts becomes easier. Deflation, disinflation, lower sales – are all bad for servicing debt. So, what price do you pay for stocks? Coupled with record profit margins, high multiples suggest there exists far greater risk than most care to admit. How valuable is genuine organic growth? The market may have gotten some valuations correct by rewarding previously insane multiples to growing organically. However, to expect further market-wide multiple expansion in a slow-growth environment seems delusional. Stick low growth in your DCF...

The case for higher interest rates is a hard one to make. It's surely not a pleasant one. Many suggest that rates will be higher simply because they are lower now than ever. Well, they are lower because governments set the price of money at the short end of the curve, and when they print money and purchase long-duration assets, they can directly impact the price of money at the long end of the curve as well. Until they can't. Interest rates can remain lower for longer than conventionally assumed. The globe is awash in debt. Industrial economies, emerging economies, backwater economies, black market economies, companies, households, students. We are maxed out and to service debt at four times the size of the economy, the interest rate paid on that debt is necessarily pushed lower – it has to be lower. When private borrowers gorge on leverage, to the point where they can't meet obligations, rational lenders determine it's enough, and compel a restructuring. Private lenders to governments may require a higher price of money and force a liquidation through inflation. But when everyone and every government has feasted too much, where is the creditor that demands a higher price of money?

Who knows how this plays out? It likely ends badly. When? Dunno. How bad? Dunno. In the interim, returns on equity and profit margins are too high and will be competed, regulated or taxed downward. Interest rates are likely to stay very low for much longer. We should all hope we don't get to the point where the price of money must be set higher to prevent capital flight. Flight to where? Gold? Crypto currency? Governments are likely to forgive unsustainably high debt balances. To whom? Where the government and its agencies are the debtor and the creditor alike. The Federal Reserve can erase its U.S. Treasury debt holdings, essentially a default. The government can compel private owners of debt to take haircuts. We saw it in the General Motors restructuring, when senior creditors were forced to take losses despite seniority to more governmentally preferred junior creditors and entities (some not even creditors). Moments like that instill wariness, if not fear, in investors in any asset. To think it was only a decade ago, yet complacency today matches the highest levels we've ever seen. There is discussion of forgiving student debt, a terrible idea, but government agencies and pseudo agencies own much of it. Another discussion involves the federal government paying the bills of state and local governments. Another terrible idea.

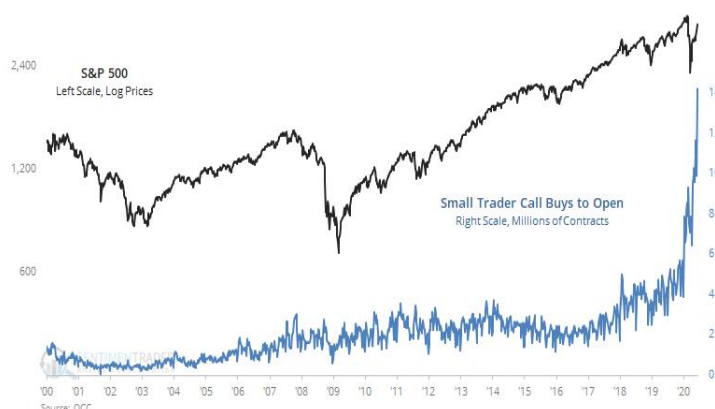
If spectacularly high valuations and deteriorating economic fundamentals don't complete the dim view of prospective returns, classic contrarian signs of speculative excess are screaming.

Margin debt and free credit balances accelerate late in a momentum-driven rally. The \$300 billion increase over the past nine months exceeds spikes prior to the 2000 and 2007 peaks. In percentage terms the gains are similarly strong. Surely part of the rise is the surge in retail discount brokerage accounts opening and trading heavily on margin and in option markets. Retail participation in the options market is like nothing we've ever seen.



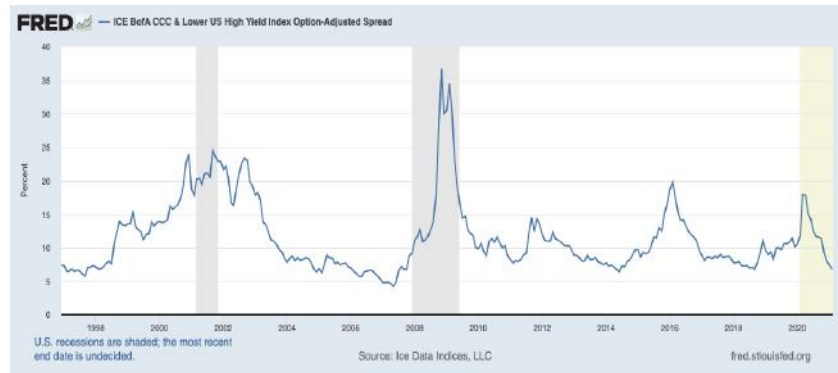
* Debit balances in margin accounts at broker/dealers.
Source: New York Stock Exchange through December 1996, FINRA thereafter, and Haver Analytics.

Source: yardeni.com



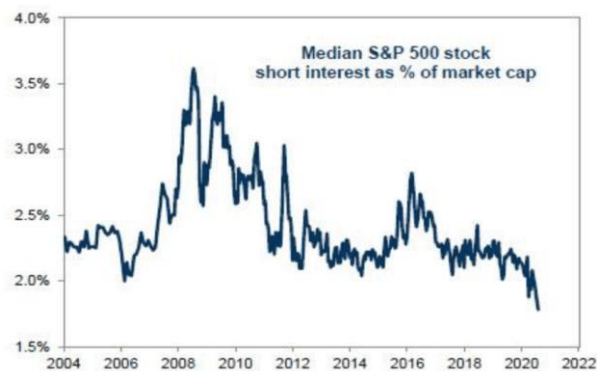
Source: Sentimen Trader

As interest rates fell to record lows, the spread between yields on corporate debt and U.S. Treasuries also compressed to levels providing little room for error. Below are charts on BBB and CCC spreads versus Treasury debt. The absolute yield on high-yield paper at 6.5% is incredibly low given the proportion of yield lost to default and restructuring over full cycles. You'd think the economy is out of the woods. Low absolute yields combined with tight spreads seem like a bad combination. But risk on, baby.



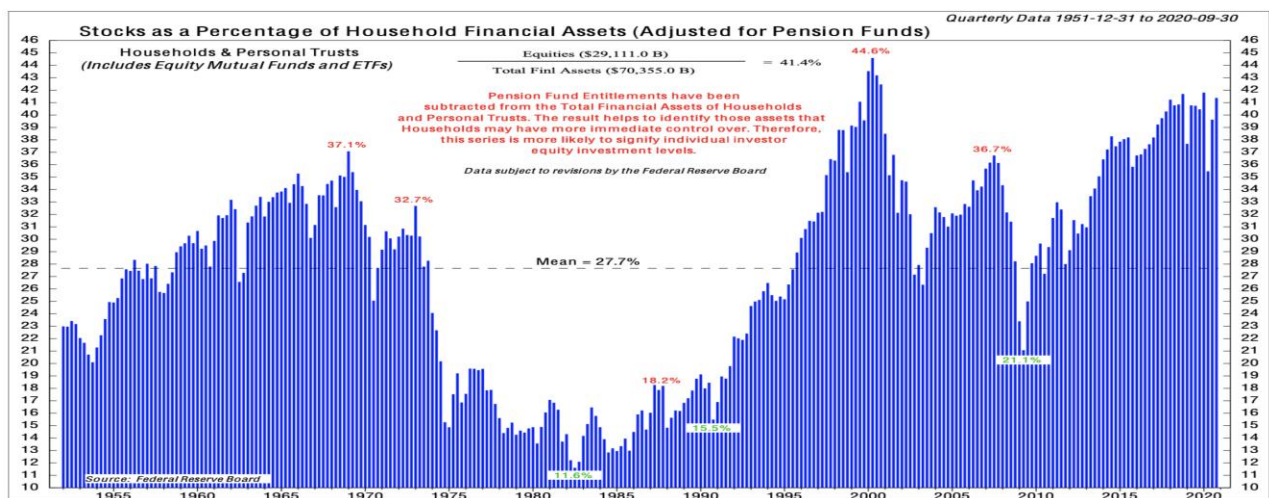
Source: St. Louis Federal Reserve

Short interest as a percentage of market capitalization and in number of days to cover short positions fell to lows last seen in early 2000. With so many speculative issues rising violently from March lows, shorts were driven out of positions. The GameStop folly is the icing on the cake.



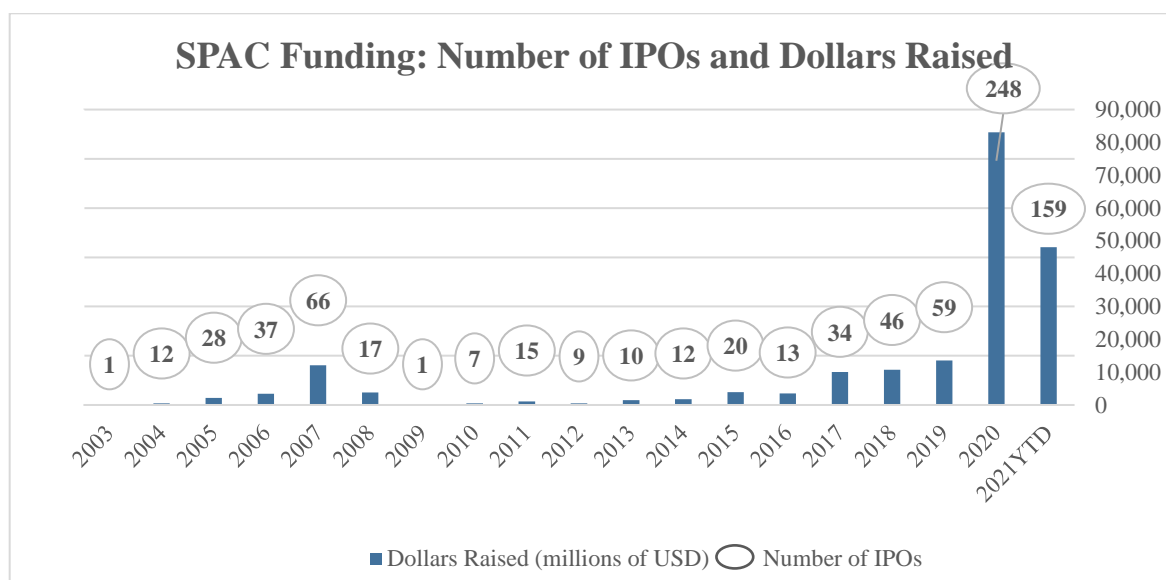
Source: Goldman Sachs

The chart below from Ned Davis Research (outstanding data and charts) is one of my favorites. Stocks as a percentage of household financial assets invariably peaks with the stock market. At secular lows like 1981, 16 years of losses and high inflation drove ownership of stocks down to 11.6%. 44.5% marked the high in 2020. Secular peaks in the late 1960s and 2007 marked highs in household allocations as well. Ned also has a chart of institutional allocations that matches the household series.



You Gotta' Be SPACKING Kidding Me

Perhaps one of the most telling signs indicating that we may be reaching a speculative peak is the mania for Special Purpose Acquisition Corporations, SPACs as they are so well known recently. In case you've somehow missed this facet of the mania, SPACs are also known as "blank check companies" that go public via an initial public offering to raise capital with which they will purchase an unknown private company, thus bringing the private company public. It's one of the most convoluted structures I've encountered. The chart below is dated by a year. 240 SPACs raised more than \$80 billion in 2020, literally off the chart on both counts. Bear in mind the figures for 2021 are for five weeks!



Source: S&P Global Market Intelligence

SPACs made their debut in the early 1990s. I read my first SPAC S-1 registration offering in 2006 when a friend and client was offered "friend and family" shares in a SPAC IPO being put together with a local former CEO of a public company here in St. Louis. As I read, I kept a running tab of all of the ways the shareholder would be diluted, and the promoter would get rich (that is already richer than he already was). Both sides of the ledger were robust.

SPACs are promoted as a more cost-effective way for a company to go public than via the traditional IPO route. For the shareholder in most deals this is false. The traditional IPO sees a typical 5-7% underwriting discount paid to the investment banking firm(s) conducting the offering. There's an argument that the additional cost of issuance is the typical underpricing that allows the first-day "pop" in the shares. Money left on the table they call it. The shareholder acquiring shares at the IPO price participates in the pop. Generally, only a portion of the equity of a new IPO is sold, and more often than not a portion of proceeds goes to selling shareholders and not to the company.

SPACs typically come public at \$10 per share and often trade slightly higher when trading begins. The company receives cash proceeds. Prior to the IPO the promoter/sponsor buys a sizable portion of the shell company (often 25%) at a heavily discounted price to the subsequent \$10 per share offer price. This "promote" is the payment for all of the subsequent heavy lifting to be done in putting the ultimate deal together. The promoter also *purchases* warrants at the IPO with strike prices 10% to 15% above the \$10 IPO price. The word "purchases" is emphasized because the warrants are often only paid for by swapping a fraction of shares *if* the eventual merger takes place. It is emphasized because the SPAC generally has a defined period of time to find an acquisition target and complete a merger. Shareholders are refunded

most of their investment, plus interest, if no deal is consummated. Fair, right? What few realize is that when the promoter finds a target and proposes a deal, shareholders have the right to redeem their shares and walk away, receiving their original \$10 per share back, which many do. In the meantime, the promoter can sell private sidecar investments (Private Investment in Public Equity – PIPEs) in the SPAC to private investors at discounts to the redemption price and often are sold warrants as well. Further, it's not uncommon that insiders at the target company are able to buy shares in the SPAC prior to completing the merger. All in, once a deal is finally done the original shareholders only own between 30% and 50% of the merged entity, of which the aforementioned promoter owns a quarter on average.

That may sound extremely dilutive and bad, but it only gets worse. Targets know SPACs have a finite window in which to do a deal. Who has leverage in that negotiation? Often losing control as well, insiders at the target have maximum incentive for the SPAC to pay as much of a premium as possible. I encourage anybody investing in the SPAC game to review the history of how shareholders fare, on average – the ones who stick around through the merger and the satisfying post-coital cigarette (thanks, Linc). It's neither pretty nor financially healthy. As a single reference point, I convinced my pal to graciously pass on the wonderful 2006 opportunity. The merged entity was bankrupt in less than ten years. Watching these recent SPAC prices scream upward is just bizarre. Raise \$1 billion, escrow it and set aside underwriting discounts. Less than \$1 billion in cash and no other assets. That's worth a \$4 billion market value, of which the shares themselves can't be used as currency in the subsequent deal? Break out the bourbon.

From the vantagepoint at the summit, it appears we are past the point of no return, and the air is mighty thin.

THE POINT OF NO RETURN

“The church says the earth is flat; but I have seen its shadow on the moon, and I have more confidence even in a shadow than in the church.” – Ferdinand Magellan

A single fear sits permanently atop a long list of professional worries. For years I compartmentalized a growing concern over policy response to an inflating global debt bubble to two extremes in the remote tails of a probability distribution curve – severe deflation and hyperinflation. The financial crisis of 2008 and now the pandemic of 2020 combined to fatten the tails and bring them inward to the point of now having to face fear. I’d hoped to escape a long investment career not having to navigate the climate now likely upon us. The mutilation of fiscal and monetary policy and their impact on capital and personal liberty are more troubling today than ever. The attempt to properly articulate my thoughts falls far short of my distress. The problem is, while the outcome appears clear, the path there is entirely unknowable.

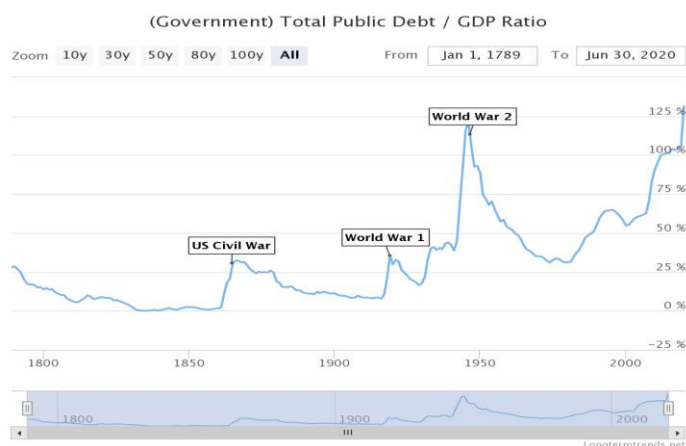


My investing career began in 1991 in the teeth of a fairly nasty economy that was struggling with the fallout of the Savings & Loan crisis. The 1990-1991 recession and 26% stock market decline proved to be the only economic speed bump in a nearly two-decade expansion. The Volcker Fed had broken inflation a decade earlier (having been in part responsible for the high levels of inflation in the first place) by pushing the federal funds rate to 19%. The peak in inflation coincided with the outset of one of the greatest expansionary bull markets that financial assets had ever seen. Yet, during the first thirteen or fourteen years of the 1982-to-2000 period, few realized they were in a major bull market. It was an amazing time to begin navigating the capital markets. The old guard that I worked with in my early years were battle-scarred from the brutal 1970s bear markets and stagflation. Memories of the breaking of the Nifty 50 in 1973 and 1974 were permanent. The October 1987 crash was a recent memory (I had just started college) with the next surely just around the corner. The decade that unfolded was a straight-up race, and I climbed the wall of worry with the grizzled veterans. It was not a new-era, Pollyanna bunch to be sure, but I owe a lot to the education I received while working with the experienced when I was young. The upside was that I learned to respect risk. The downside, and it was important to see the peril of this as well, was that a too-cautious approach never assumes proper risk, even when the odds are heavily tilted in your favor.

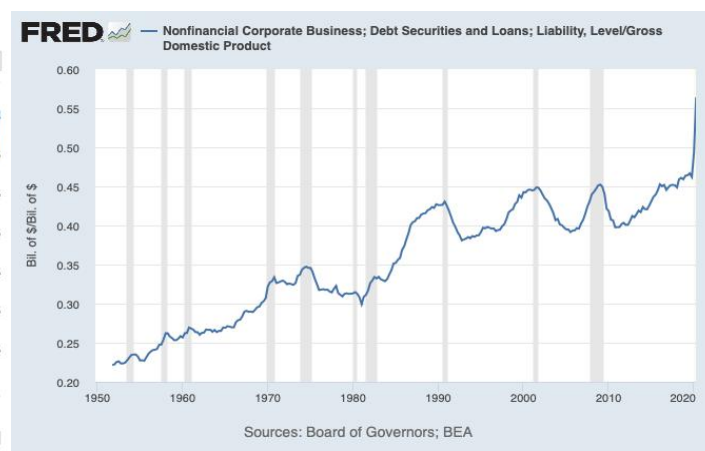
By the time Semper Augustus (a nod to bubbles) launched at the end of 1998, I’d arranged my mental furniture in such a way that everything within the economy and the capital markets are relational and piece rationally together. U.S. GDP fits within the global economy, public and private businesses each contribute to some proportion of economic output, all the way down to the margin structure of a software company with different capital needs being bounded differently than a drug manufacturer or an auto manufacturer. Each piece can grow at different rates, but why? At what point is one variable too logically large or too small? When large-cap stocks peaked in 1998 and then everything technology related ballooned into 1999 and early 2000, those “components” did so alongside debt levels. Government, household and corporate debt skyrocketed higher with the stock market. I’ve carried the following very rounded data points, particularly the figures in the first three rows, as a fixture in my head since sometime in the mid-1990s. The final two rows cemented in during the financial crisis. The proportional extremes between the market value of stocks on the one hand, and the size of the economy and debt employed in producing a dollar of GDP on the other, should leap from the table. GDP grew by \$7 trillion from 1981 but required an additional \$20 trillion in debt to do so. At the same time, stocks, as cheap in 1981/1982 as they were in 1932 and only one-third the size of GDP, gained 14-fold and by 2020 were 40% larger than GDP. Debt was at a record 250% of GDP. These were uncomfortable extremes.

	1981	2000	2007	2020
Nominal GDP	\$3T	\$10T	\$14T	\$21T
Credit Market Debt	\$5T	\$25T	\$50T	\$82T
Market Cap All Stocks	\$1T	\$14T	\$16T	\$39T
Federal Reserve Assets	\$200B	\$700B	\$850B	\$7.4T
Federal Funds Rate	19.0%	6.5%	5.3%	0.1%

Total credit market debt totaled a very modest 158% of GDP as interest rates hit their highs in the early 1980s. The composition of total debt between government and corporate debt makes interesting history. Government debt naturally balloons to finance major wars. World War II saw federal debt at 121% of GDP, a record that stood until 2020, when it hit 136%. During the postwar period beginning in 1945, government debt ground steadily downward as a percent of the economy to 31%, not coincidentally at the peak in interest rates in 1981. Corporate debt, by contrast, marched steadily upward following the war. I don't have data prior to 1951 for the level of corporate debt, but you can see companies lever up from 1951 through 1974, sparking enormous growth in real GDP per capita. When the U.S. exited the gold standard in 1971, inflation sparked and soon raged upward. Companies and governments alike (as well as households) were forced to reduce debt levels relative to output. At increasing rates of interest, you can't afford a large debt burden. Hence, total credit market debt touched its nadir at the same point that interest rates peaked. If the system worked off debts as interest rates rose, what do you suppose happens when rates reverse course and plumb record depths?



Source: Longtermtrends.net



Source: St. Louis Federal Reserve

A gradual decline in interest rates over the next two decades allowed for increasing financial leverage. Falling rates necessarily means a lower cost of debt capital; few businesses avoided the attraction of leveraging balance sheets. Lower rates encouraged leaning more and more on debt as a factor of production to fuel growth and profits. The interest burden naturally declined, making debt seemingly less onerous. In like fashion, lower interest rates made it easy for politicians to outspend tax revenues, constantly issuing net new Treasury debt used to finance deficit spending. Plenty of private demand existed for new Treasury debt, as our trading partners soaked up the dollars from parallel trade deficits. Rates were high and declining so returns in fixed income were attractive. Total returns included not only coupon payments but price increases. There were plenty of natural bond buyers. In addition to trading partners, banks (with lower capital requirements), insurance companies, fixed-income mutual funds and private households easily absorbed Treasury issuance. Corporate debt, junk bonds and mortgages were all the rage. You didn't get your MBA to become a stock jockey. Bonds were the game. Mike Milken was king, and the "Big Swinging Dick" was the envy of every junior bond broker on the trading floor (see Michael Lewis' *Liar's Poker*).



Source: St. Louis Federal Reserve

Boom times should encourage government surpluses (or only small deficits relative to inflation and economic growth), building reserves for the inevitable recessions. Instead, the size and scope of government marched ahead, regardless of the political party holding majorities in Congress or occupying 1600 Pennsylvania Avenue. Big spending equals big votes. Deep recessions appeared in 2008 and 2020, leading to populist deficit spending measures financed in large part by the central bank.

The decision to allow a recession to run its course, restructuring debt through the bankruptcy process, has become an impossibility at too-high levels of debt outstanding. Alan Greenspan assumed the reins at the Federal Reserve in the summer of 1987, replacing Volcker as Chairman of the Board of Governors. By August that year, the stock market was ahead by 44% for the year, an unchecked advance from the 1982 trough. Over the next two months, the Dow Jones Industrials would fall more than 36%, from 2,722 to 1,738, with 508 of those famous points lost on October 19, Black Monday. For the first time since the 1930s, the Fed became an active one. The first arrow in the Fed quiver is moral suasion, and Greenspan pronounced the Fed's readiness to provide liquidity to the economic and financial system. He then followed up with the most conventional of Fed tools and cut the Fed Funds rate by 0.5%, injecting reserves into the system with open market purchases. He also persuaded banks to lend to securities firms. Combined, the policy response became known as "The Greenspan Put," putting a floor under stock prices. We've since had the Bernanke Put, the Yellen Put and now the Powell Put, which dots the "i" in "Don't Fight the Fed."

The 2008 financial crisis nearly decimated the entire banking system. Response by the central bank and the Treasury were unprecedented. Total credit market debt grew to 350% of GDP in 2007, up from 250% at the peak of the tech bubble in 2000 and the aforementioned 158% at the outset of the bull market in stocks and the peak in interest rates. From 2000, GDP grew \$4 trillion, but the economy took on a staggering \$25 trillion in new credit market debt, doubling the on-balance-sheet amount held by the private sector to \$50 trillion. Signs of trouble appeared in residential real estate in 2007 and also among European banks. The Fed established a number of swap lines with numerous foreign central banks and by late 2007 created a Term Auction Facility (TAF) which functioned as a run-around lending conduit to U.S. banks in distress. Banks typically more conventionally (and very publicly) borrow through the Fed's discount window. Throughout 2008, liquidity and collateral became scarce as the subprime mortgage market melted down. The Fed, along with the Treasury, created myriad facilities to provide credit and backstop entire segments of the loan market. The Troubled Asset Relief Program (TARP) was an act enacted by Congress that sent liquidity to homeowners and allowed for direct investment in private

companies (General Motors for example). Without exhaustively running through all of the acronymed programs created by the Fed, those supported included:

- Primary dealers (counterparty banks and brokers to the Fed that conduct primary operations in the U.S. Treasury market).
- The entirety of the money market fund complex through guarantees of bank accounts and in commercial paper (GE, for example, couldn't roll its \$90 billion commercial paper obligations and was functionally bankrupt).
- Holders of asset backed securities: student loans, credit card loans, auto loans, equipment loans, floor plan loans, insurance finance loans, SBA guaranteed loans, mortgage servicing rights and various commercial mortgage-backed securities (CMBS).

Considerable debate persists over whether the Federal Reserve exceeded its authority under the Federal Reserve Act. During the depths of the Depression, the Fed's powers were expanded in 1932 with Section 13(3) of the Act, expanding its lending authority among banks and again in 1933 by Section 13(13), authorizing loans to corporations and partnerships of the *highest credit quality* as long as the loans were collateralized by *direct obligations of the government*. The scope of the Fed's powers in times of "unusual and exigent circumstances" really came to bear in 2020. Instead of cavorting with the Easter Bunny, I spent most of that weekend rereading the relevant sections of the Act trying to figure out what was allowed and coming to grips with the unprecedented support being thrown at the economy and markets. Good times. It remains unclear if the Fed did exceed its authority. There can be no doubt, however, that the policy response to shutter the global economy introduced unusual and exigent circumstances.

My working assumption presumes that at incrementally higher levels, additional debt yields less and less economic or stimulative benefit. Economic scholars believe that as government debt passes 50% and approaches 75 or 80% of GDP, any long-term benefit has dissipated. Despite higher and higher levels of government and corporate debt taken on after the financial crisis, little headway was made in growing GDP. Back to undergraduate Macroeconomics 101, the combined output of the economy is measured by adding private consumption, gross private residential and fixed investment, government investment and net exports (measured as exports minus imports).

$$\text{Nominal GDP} = C + I + G + (X - M)$$

The proper evaluation of GDP adjusts for both inflation and population growth. I find myself more often thinking in terms of nominal GDP. I can't eat inflation adjusted food, but Lord knows my waistline could use a little inflation adjusting. The businesses I own don't tell me their profits would be lower if adjusted downward by the inflation rate. I don't think about inflation every day because the rate of inflation has been so low over the past couple decades. Central bankers and economic policy wonks believe if the inflation rate is positive, but not so high to alarm the populace, then they are doing a good job. You can deficit spend and devalue the debt taken on to do so, and if nobody notices then "Bully!" When measuring the purchasing power of each dollar (or yen or euro) of output, if \$100 grows by \$5 to \$105 but the inflation rate is 6%, then 1% is actually lost. If the Fed achieves the creation of 2% annual average inflation but holds short-term rates at 0%, then bank depositors or owners of U.S. T-bills (or any other assets or none at all) lose 2% to the inflation rate. Further, if the economy manages to grow in real terms by 2% per year *after* subtracting inflation, but the overall population grows by 2%, then the output of the economy is now spread among 2% more people and real growth of GDP per capita is zero.

Rising debt can be hugely additive to output and to the economy, to a point. When debt becomes excessive, it gets more difficult to productively grow output. Debt becomes overused as a factor of production and the marginal investment or project becomes less attractive, or at least less prospectively profitable.

The same logic can be applied to fiscal tax policy. When debt levels are low or manageable, tax cuts can be extremely stimulative. The Reagan tax cuts in the 1980s are a great example. However, tax cuts lose stimulative effect when federal and total credit market debt become excessive. The TCJA passed at the end of 2017 proved fleetingly stimulative, particularly for corporate profits. Given the already mammoth federal debt, the cuts did little to boost longer-term GDP, which has been stagnant for two decades.

The post-World War II economy is segmented by decade in the table below. While leverage in our economy ground upwards since 1981, gains in nominal GDP slowed, and when accompanied with inflation, albeit falling with interest rates, real GDP slowed across time. Worse, our mature economy is accompanied by slowing population growth. When adjusted for both inflation and population, growth in real GDP per capita grinds downward.

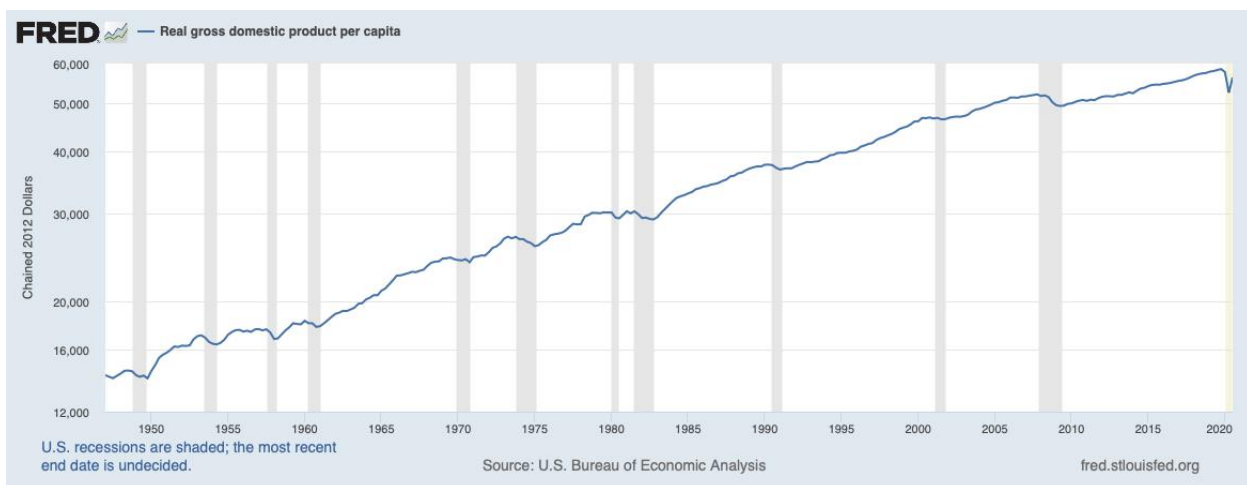
	Nominal GDP	U.S. Population (millions)	10-Year Nominal GDP Growth	Population 10-Year Growth	Average Inflation Rate	Real GDP Per Capita Growth
1940's ^	\$280.8 B	157.3	7.7%	1.4%	2.1%	4.2%
1950's	\$542.60	179.3	6.8%	1.7%	3.8%	1.3%
1960's	\$1.05 T	203.3	6.4%	1.3%	2.1%	3.0%
1970's	\$2.79	226.5	10.2%	1.1%	6.9%	2.2%
1980's	\$5.90	248.7	7.7%	1.0%	4.5%	2.2%
1990's	\$10.00	281.4	5.5%	1.2%	2.0%	2.3%
2000's	\$14.70	308.3	3.9%	0.9%	2.2%	0.8%
2010's	\$21.4*	328.2*	3.8%	0.6%	1.9%	1.3%

*estimated

Source: St. Louis Federal Reserve; BEA; U.S. Census Bureau; Semper Augustus

^4Q 1939 GDP \$92.2 billion; 12/31/1939 population 132.1 million

The U.S. economy enjoyed significant growth in real GDP per capita through the year 2000. Since the bursting of the tech bubble, the economy grew nowhere near as fast as it had not only post WWII, but even from 1870 and the industrial revolution forward as the economy shifted from agrarian to industrial, technical and service oriented.



Source: St. Louis Federal Reserve

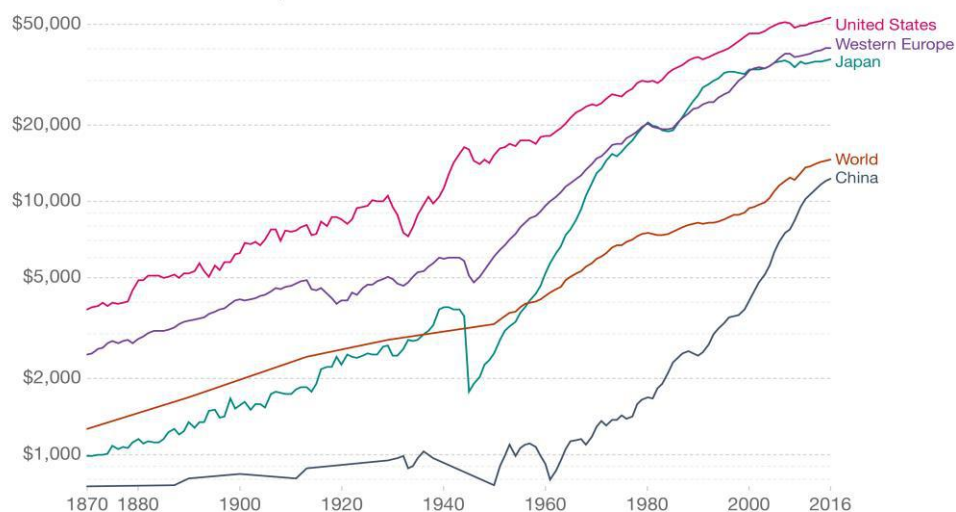
The chart below is fascinating. It tracks growth in real GDP per capita for major economies and regions since 1870. The U.S. leads the pack for the duration, helped absolutely via superior population growth and productivity, and relatively by an enormous gap created by the two world wars. Note the dip in the economies of Western Europe from 1914 to 1918 during World War I. In the second world war, the U.S. didn't enter the fight until December 1941. The war began more than two years earlier, on September 1, 1939, and simply demolished much of Europe. The U.S. supplied arms and munitions to its allies, benefitting exports and helping rapidly claw out of the Great Depression. In addition to exporting arms, there were many in the private sector that knew that entering the war was only a matter of time. Despite the Roosevelt Administration's reticence to engage, a massive effort was undertaken to convert the industrial stock of the country to military production. The U.S. would need to arm itself as well as to help its allies in Europe and Asia. [On this front, one of the very best books I've read recounts this effort: *Freedom's Forge* by Arthur Herman, highly recommended.] Note the severity of the decline in GDP in Western Europe, Japan and even in China, which hadn't yet entered the industrial age but suffered nonetheless as it battled Japan from 1937 until the war's end in 1945. China saw 14 million killed with more than 100 million becoming refugees. If you can help it, a lesson learned from the economic fallout seen during major wars is don't fight them on your soil.

Between the wars, the Great Depression ravaged the U.S economy and to a lesser extent Western Europe's. Japan and China hadn't yet entered the global economy and relatively sailed through the 1930s. Both nations' economies were insular. The world economy skipped nary a beat as well. Most trade, certainly where countries had both sizable import and export bases, was conducted between Europe and the U.S. Even then, while gross trade in Europe and the U.S. had begun in earnest, it was nowhere near the degree to which industrial nations are interconnected today. The Depression impacted the more industrialized economies the greatest, and with the U.S. and Western Europe far ahead of the globe in terms of GDP per capita, those suffered the brunt of the pain.

GDP per capita, 1870 to 2016

GDP per capita adjusted for price changes over time (inflation) and price differences between countries – it is measured in international-\$ in 2011 prices.

Our World
in Data



Source: Maddison Project Database (2018)

Note: These series are adjusted for price differences between countries using multiple benchmark years, and are therefore suitable for cross-country comparisons of income levels at different points in time.

OurWorldInData.org/economic-growth • CC BY

Following World War II, Western European and Japanese economies surged as they rebuilt capital stocks destroyed by the war. History forgets, but the victorious Allies learned from mistakes made following World War I. Forcing the losing Germans and the Axis partners to impossibly pay war reparations left would have left currency debasement as the only economically viable solution. Knowing that the Weimar

hyperinflation seeded the rise of the Nazis and ultimately led to another global war led the U.S. wisely passed the Marshall Plan. In doing so, the U.S. financed much of the rebuilding in Europe and in Japan. Global trade surged, which was a win-win for the broad world economy. Western economies absorbed and utilized capital surpluses created in the 1920s (or destroyed in the war) and made extraordinary strides in productivity fostered by electrification, air conditioning, electronics and air travel. The Japanese economic miracle was one to behold as the small nation grew to the second-largest economy in the world by 1989. Like all good things at first, when taken to an extreme, Japan overbuilt. It hit a huge demographic wall and saw its population stagnate since then. Nominal GDP remains roughly at 1989 levels, and the Nikkei at year-end 2020 remains 30% below its 1989 year-end closing high of 38,916.

China experienced hyperinflation from the mid-1930s through 1949 under Chiang Kai-Shek and the Nationalist party. Following the long, expensive war with Japan and then a brutal civil war with the communists, China finally grew with its Great Leap Forward in 1958 under Mao Zedong. Not many outside of today's CCP would argue that the ride up was a fun one for the majority of the populous, but a 10x growth in real per capita GDP has taken China only 60 years. A similar gain required more than a century for the rest of the industrial world. Introduce a middle class to a nation with the size of the Chinese population and a lot of purchasing power and wealth can be created in a hurry.

Despite astounding gains in per capita GDP over recent decades, China is fast approaching its own modern-day version of the great wall, self-inflicted thanks to its one-child policy. At the outset of China's Cultural Revolution in the late 1960s, the fertility rate was as high as 6 births per woman. The old Chinese were like good Irish Catholics. Being Communists with Malthusian concerns, the government limited women to one birth in 1979. It was not a lucky thing to be born a baby girl. The gruesome policy remained until 2016 when the limit was raised to two children per woman. The country is running full steam ahead into a major demographic crisis, with a now shrinking, fast-aging population thanks to policy introduced four decades ago. Aging populations with too few workers to pay for the aged sow not the seeds of prosperity.

Like Japan and China, Western Europe has its own demographic problem. The trouble is, Europe is old, and so are its citizens. The population is barely growing, at a recent clip as low as 0.2% per year. Recent trends in emigration, largely from Muslim nations, is helping offset an otherwise declining population.

The United States fares better than most major economic blocks on the demographic front. We do have a poor fertility rate, expected to match 1980s all-time low of 1.77 in 2020. A fertility rate of less than 2 implies a shrinking population. Augmented with reasonably healthy legal immigration policy, the population grows faster than in Europe, Japan and China, but is itself growing at a record low pace. For the decade to 2010 the U.S. population grew by 0.93% per year. The most recent decade ended 2020 saw average growth of only 0.63%. The really bad news is we are staring down the barrel of the Baby Boom generation entering what should be their retirement years. We'll see how this goes. Post WWII, it took one wage earner to earn an entire household's worth of living standard. Beginning in the 1970s, debt, productivity and corporate profits started crowding out labor, and we drifted to more of a service-based economy, with a split between high-paying and low-paying jobs. Too few have adequately saved for retirement, so the Boomers remain in the workforce, crowding out younger generations to some extent. The drain on the fiscal purse is already bad. It's going to get worse.

Beyond poor demographics, most industrial world governments are beholden to enormous and burgeoning social contracts with their citizens. German Chancellor Otto Von Bismarck introduced the first "pay as you go" old-age social security insurance scheme in Germany in 1889, with current workers paying the benefits of the aged. He'd passed a health insurance program in 1883, ironically to head off growing socialism in the country. Whoops. Accident and unemployment insurance came next. Before long, much of Europe had followed suit, and high taxes became the new normal. The United States seized

upon the crisis of the Great Depression to expand the size and scope of the state. FDR coopted Bismarck and signed the Social Security Act in 1935. Medicare and Medicaid followed in 1965. By 1970, 30% of federal spending was mandatory. Today? 65% and growing fast. Social Security, which is funded by current workers, chews up a quarter of Federal outlays. Health outlays for Medicare and Medicaid account for more than a quarter. Throw in another 15% for food stamps (SNAP), federal civilian and military retirement benefits and unemployment insurance and barely more than one-third of spending is now discretionary, which are things like defense and infrastructure. One last item strikes me as “mandatory” but is categorized as a stand-alone expenditure. Net interest on the federal debt was budgeted at 8% of spending for 2020, not much higher than the 7% budgeted in 1970, when federal government debt stood at 35% of GDP, a far cry from today’s 135%.

Combining federal debt held by the public with total corporate debt and household debt outstanding is a big number. At 385% of GDP, one can see where we have a problem. Including the portion of U.S. government debt held by the central bank in the mix, combined debt totals close to 410% of GDP. The argument is made that interest on government debt held by its central bank is turned around and paid back to itself. Fair, but it’s debt that at some point needs to theoretically be retired from the balance sheet of the central bank. At four times the size of the economy, any rate of interest much higher than zero becomes untenable. As debt marches upward, the ability for the term structure of interest rates to exist at higher rates than we have today becomes impossible. The saver requiring a positive yield on cash equivalents is starved (or maybe drowned is a more apt word) by any differential between short-term interest rates and inflation.

Debt is a four-letter word, but its use can have both stimulative and deleterious effects. Businesses incur debt for use as a factor of production. An allocation of debt capital into projects or other uses generating profits in excess of the cost of the debt is generally a productive use of leverage. Obviously, companies can squander capital as well, whether through failed acquisitions, investment in unproductive assets, unreasonably increasing compensation or overpaying in the repurchase of common shares. We’ve seen our fair share of all of the above. A household can borrow, using a mortgage to purchase a home, for example. The opportunity cost of diverting income to savings and earning a higher return can be a productive use of capital. Maxing out installment debt to increase consumption at the expense of saving can lead to trouble, naturally. Government spending is a different animal to a degree. Spending on productive infrastructure, education, health or in the defense of the country has obvious benefits, some of which can boost GDP. But what of social spending on programs like Social Security? The taxing of income and redistribution to the aged and retired works when those being taxed are productive and can earn a rising stream of income over time. Ok. But what of transfer payments that discourage the undertaking of labor? Can spending have a negative impact on an economy and behavior? These questions are hard.

We’re All Keynesians Now

Debt, like anything, can be a positive, but when taken to an extreme is problematic. Debt levels rose so high that the incremental dollar incurred has little, if not negative, stimulative benefit. The ease by which elected officials spend beyond collecting revenue, coupled with central bankers that believe in an active, Keynesian monetary response to any economic hiccup allowed debt levels to surpass and rise to an untenable level. Everybody should want to see growth in inflation-adjusted GDP per capita. The addition of corporate debt had an obvious positive impact on revenue growth and increased returns on equity. Over the past two decades, following the bursting of the tech bubble, revenue growth slowed markedly. Likewise, declining interest rates allowed for the addition of more and more leverage across all sectors.

At progressively higher levels of debt to GDP, we can expect less and less benefit to GDP. The law of diminishing returns enters the equation and eventually overcomes it. The addition of \$25 trillion in new

debt dwarfed \$4 trillion in GDP growth from 2000 to 2007. The Greenspan Fed put the put back under the capital markets in 2002, taking rates back down and suggesting liquidity aplenty. The real estate bubble would not have happened without the implicit nod from the Federal Reserve. With population by then growing at less than 1% annually on average and inflation seemingly in check, new debt didn't seem burdensome. The financial crisis disproved that notion.

The central bank response to the financial crisis ballooned total Federal Reserve assets from \$850 billion in 2007 to \$2.2 trillion by the end of 2008. Those banks and investment banks that didn't fail by then survived on seemingly more solid footing. All large banks took "voluntary" new capital courtesy of the Treasury whether they thought they needed it or not. Fannie and Freddie were rolled into conservatorship, safe under the Treasury's wings. The new capital helped offset some of the losses the banks had incurred in their mortgage holdings. When it appeared the "all clear" had sounded, the Fed tried to shrink its balance sheet by allowing some of the U.S. Treasury and mortgage debt it had acquired to roll off at maturity. The balance sheet was reduced by roughly 10%, to \$2 trillion, and the market reacted badly, sending long-term interest rates and credit spreads both upward. It was obvious, to the Fed at least, that more "stimulus" was required. The first of three iterations of Quantitative Easing (QE) were rolled out in early 2009 and lasted intermittently until 2014 with the balance sheet now loaded with \$4.5 trillion in Treasuries and mortgages, mostly. Prior to 2008, assets on the Fed's balance sheet consisted of largely T-bills.

The stock market celebrated the expansionary policies of the central bank. The S&P 500 rose 126%, an annual rate of growth of 17.3%, from the outset of the first QE through the end of QE3 in 2014. Six years clear of a recession, the Fed then telegraphed and began shrinking the balance sheet. Over the next four years of taper, the S&P 500 gained only 7.2% per year on average and declined in 2018 by 4.4%. Over the course of the decade that began at the end of the crisis, real GDP per capita advanced a mere 1.3% annually, nearly 2% per year below its average rate of growth over the seven decades prior. It was becoming clear that despite the massive leveraging of the Federal Reserve's balance sheet, done so to finance deficit spending well in excess of the declining inflation rate, that increases in government debt weren't working. Even a parallel leveraging of non-financial corporate debt outside of the banking system proved of little value. Sales growth of the S&P 500 crawled to a less-than-conventionally-believed 3.5% per year. Over an even longer period, from 2000, when credit market debt reached 250% of GDP and stocks peaked, subsequent per capita growth in GDP averaged 1% annually and sales for the companies comprising the S&P 500 grew 3% per year (with roughly no change in shares outstanding over the two decades).

Monetary policy appears to be at a point where it can only act as a drag on the economy. Tightening can clearly slow things down. We've seen that. The Fed tightened its Fed Funds target range in nine quarter-point hikes from a target of 0-0.25% in December 2015 to 2.25-2.50% by December 2018. Simultaneously, as mentioned above, the Fed tapered and reduced the balance sheet from \$4.5 trillion in 2014 to just under \$3.7 trillion by August 2019. Not only did the stock market react badly to the tightening phase but the tapering of the balance sheet went hand in hand with a reduction in bank reserves held at the Fed, both required and non-required reserves. The drawdown in reserves reduced the amount of cash the banking system had on hand for overnight lending in the overnight repo market (where banks lend cash overnight to institutions in exchange for collateral, generally U.S. Treasuries).

The squeeze in liquidity became a crisis, so out came the punch bowl. The Fed lowered rates in three quarter-point cuts during the fall of 2019, from August 1 to Halloween, to a target range of 1.50-1.75% on Fed Funds. At the same time, the Fed ran its balance sheet back up, buying Treasuries back out of the market in exchange for cash, which the banks desperately needed. Think about what happened during the financial crisis and during the three rounds of QE. The Treasury ran large ongoing deficits with the Fed financing most of the net new Treasury issuance, which is money printing. When it decided to try

shrinking its balance sheet by not replacing maturing Treasury securities (and mortgages) with new ones, what was the Treasury and federal government not doing? They weren't running surpluses, and neither were they retiring debt. The new Treasuries that were issued to replace those maturing that had been held by the central bank compelled cash to be sent to the Fed, which went with bank reserves at the Fed shrinking. The other thing required was the private sector needed to now purchase the new Treasury debt being issued to replace maturities. Shrinking the central bank balance sheet is a huge drain on cash from the system, which is like cocaine to financial markets. Hot stove. "Withdrawal symptoms" has more than one meaning. That didn't work.

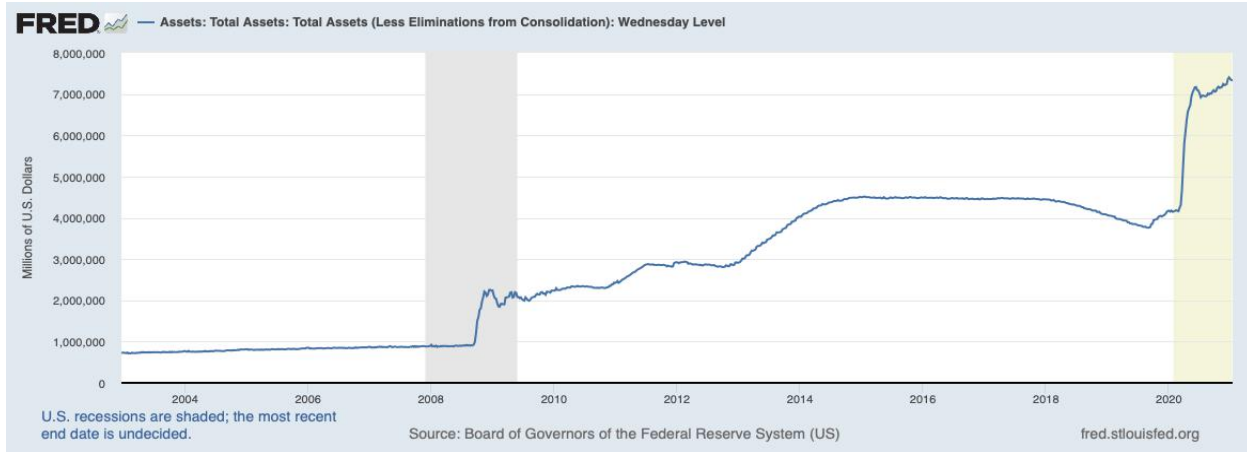
The Fed's balance sheet was back up to \$4.2 trillion by the end of February 2020, only \$300 billion below its QE3 peak of \$4.5 trillion in December 2014. It seems like a decade ago, but what was coming at the economy that February of one year ago? Yep. In response to the onslaught of the pandemic and widespread lockdowns, the economy stopped, and the stock market dropped. The Fed cut interest rates by a half point on March 3 and then to zero with a full 1% cut on March 16. It was definitely not a time to dally. The bond market faced enormous liquidity and collateral posting strains. Banks needed cash, so the Fed bought Treasuries, \$1.7 trillion of them between March and June and a boatload of mortgages as well. On March 17, the central bank quickly reignited several of its financial crisis conduits, bringing back its vehicles to support primary dealers, the commercial paper market, the term asset backed security market and state and local governments. Central bank liquidity swaps were also beefed up with its primary central bank "partners" but also with nine new foreign central banks. A day later they backstopped the money market mutual fund complex, again.

The crisis was the most severe, sudden decline on record. New programs were introduced pushing the bounds of what is allowed under the Federal Reserve Act. On March 23, a Primary Market Corporate Credit Facility (PMCCF) and a Secondary Market Corporate Credit Facility (SMCCF) were introduced. The Primary Facility was established to extend *direct credit* to investment grade corporations. The Secondary Facility went further, allowing the purchase of investment grade bonds in the *secondary market* and also the purchase of U.S. exchange traded funds (ETFs) that own U.S. corporate bonds. In other words, the central bank could buy bonds in companies that had previously issued the debt. The purchases were not a source of funds for the issuing companies but provided cash to whomever was *selling* the bonds or ETFs. Further, the purchase of ETFs not only didn't provide liquidity to companies, but it allowed for the purchase of non-investment grade debt, also known as junk. OMG (that's not original mortgage guarantee)!

To make all of this activity legal under Section 13(3) of the Federal Reserve Act, these two facilities were created as Special Purpose Vehicles (SPV's), which the Treasury, using funds from the CARES Act, utilized to make equity investments in the vehicles and with a wink and a nod was the guarantor of the assets. Recall, the Federal Reserve Act mandated that credit quality be of the highest rating and guaranteed by U.S. Treasury collateral. My reading of the Act suggests that the Fed can only own U.S. Treasuries, Agency mortgage-backed securities, debt of Fannie and Freddie, and perhaps municipal debt. I don't see how it can own corporates, certainly not secondary paper or junk, collateralized loan obligations (CLOs) or commercial mortgage-backed securities (CMBS). The Fed also provided unprecedented liquidity to small businesses through a Main Street Lending Program and to the Small Business Administration, which was administering a Paycheck Protection Program.

In all, by the end of 2020, assets on the Fed's balance sheet totaled \$7.4 trillion, fully double from August 2019 and nine times where they stood immediately prior to the 2008 financial crisis. The balance sheet at the Fed thus grew by more than 18% per year for the past 13 years. Of the nine-fold expansion, the balance sheet doubled in each of the two crises, with QE making up the difference between the crises.

Federal Reserve Balance Sheet: Total Assets 2004 - 2020

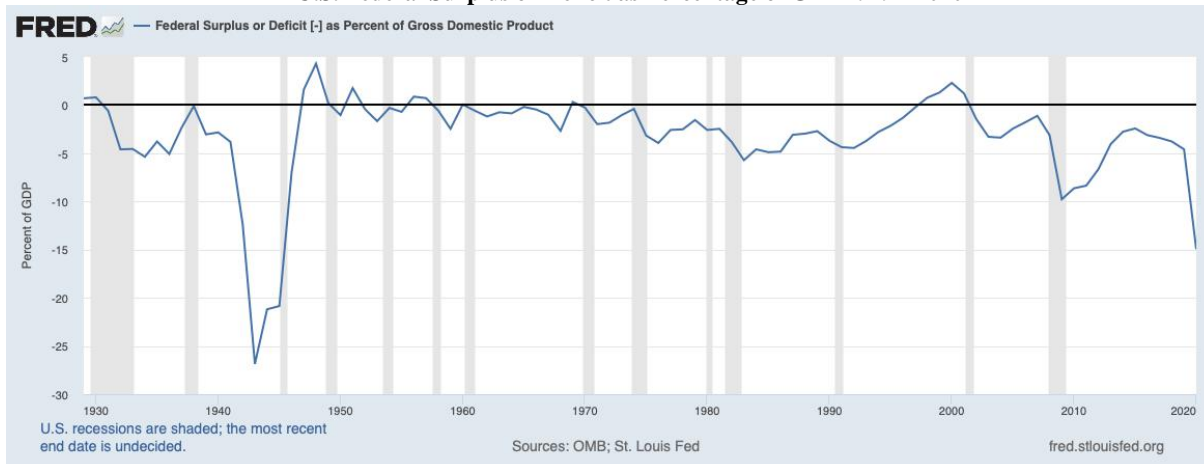


Source: St. Louis Federal Reserve

On the fiscal front, the budget deficit exploded in 2020 and looks to not be slowing down any time soon. 2020's budget deficit was projected prior to the pandemic at under \$1 trillion and on what was projected GDP of perhaps \$22.5 trillion. With the trifecta of GDP declining year over year to probably \$21.3 trillion, tax revenues dropping and expenditures skyrocketing, instead of running a \$1 trillion deficit, the shortfall totaled \$3.1 trillion during the fiscal year ended September 30. Guess where net new Treasury issuance wound up? The balance sheet of the Fed would be the correct answer. During the fiscal year, the Federal Reserve more than doubled its holdings of Treasury debt from \$2.1 trillion to \$4.45 trillion. The Fed thus acquired three-fourths of the governmental budget shortfall. Here on January 16, 2021, the Fed owns an additional \$278 billion above what it owned on September 30.

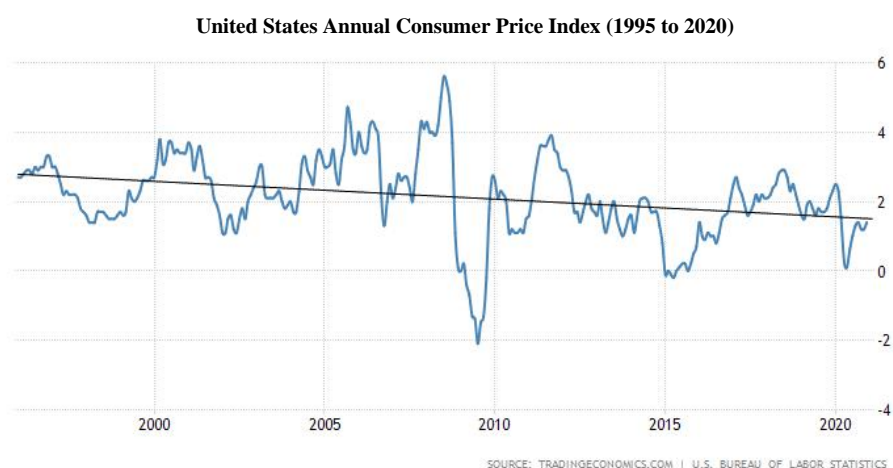
The chart below puts the 2020 budget in perspective. The 2020 deficit totaled 16% of GDP. In 2008, even considering the magnitude of the financial crisis and a doubling of the Fed's balance sheet, the deficit totaled an eye-popping 10% of the economy. A 16% deficit in peacetime is simply huge. During WWII, the deficits ran 12% in 1942 and 27%, 21% and 21% over the next three years. Who knows how large 2021's deficit will be? At this point we know how much "stimulus" went out the door at yearend. With a new administration in Washington and single-party control of the budget-making process, it's not unreasonable to expect another \$3 trillion (or more) deficit again, much of which will find its way to the balance sheet of the Fed.

U.S. Federal Surplus or Deficit as Percentage of GDP 1929 - 2020



Source: St. Louis Federal Reserve

This is where the conversation turns to inflation. The three rounds of QE, which financed a sizable portion of the ongoing budget deficit, plus emergency spending undertaken during two crises, come with an unprecedented and mammoth growth in debt. Yet for the better part of the past decade the inflation rate wallowed below the Fed's target rate of 2%. I was lucky to sit at a lunch with James Bullard, President of the St. Louis Federal Reserve in January 2018, and watched him then lay out a trial balloon for allowing the inflation rate to average more than 2% for a period of time to make up for the period of time it was below the magical rate. His speech was aptly titled, "A Primer on Price Level Targeting in the U.S." Sure enough, when Fed governors float balloons, you're often looking at future policy. The Fed adopted the averaging approach during the pandemic. Will they be successful in raising the rate of inflation? The Japanese have been trying to do so for four decades to no avail. In the meantime, the Bank of Japan's balance sheet jumped from 100% of GDP to 130% this past year. The Fed's, by contrast, advanced from 17% of GDP to 35% during the pandemic. Perhaps we can expect the Fed's balance sheet to grow three times in size from here with little economic growth? There exists precedent. Running \$3 trillion deficits, we'd be there in five short years in the absence of GDP growth. Amazing.

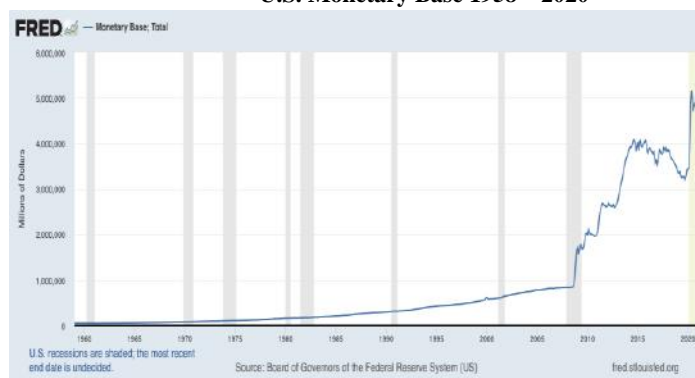


Surely if one considers massive 25% growth in the money supply, eventually that must become inflationary, right? I mean, financial assets inflated. What about seeing inflation in wages and the cost of living? The monetary base grew \$1.8 trillion, or 52% in 2020, from \$3.4 trillion to \$5.2 trillion (62% from the fall of 2019, prior to the repo crisis). M2, a conventional proxy for the money supply, "only" grew by half the rate of the monetary base, to \$19.1 trillion from \$15.3 trillion, a \$3.8 trillion increase and \$2 trillion more than the monetary base expanded. The relationship between the two is important in understanding how an increase in money is transmitted into the economy. The monetary base is simply the amount of currency in circulation plus currency as a part of commercial bank deposits held at the central bank as reserves. Currency in circulation is obviously an asset of whomever holds it. Deposits at central banks are also assets of the depositors (think your checking account). The cash you deposited becomes an asset of the bank and also a liability payable back to you on demand (double-entry bookkeeping, and all). The portion of commercial bank deposits held at the Fed thus become assets of the bank and liabilities of the Fed. The currency in circulation is also a liability of the Fed. Simple, right?

M2 is simply the monetary base times the money multiplier (little m). One of the actions taken during the crisis was a complete elimination of reserve requirements. If bank customers demand loans and banks choose to make loans, right now there is no required dollar amount of reserves that must sit on deposit at the Fed. Normally, the Fed can encourage more or less lending by moving reserve requirements down or up, respectively. At yearend, commercial banks still had \$3 trillion sitting on deposit at the Fed. At the outset of 2020 the monetary base of \$3.4 trillion and M2 of \$15.3 trillion implied a money multiplier of 4.5. At year-end 2020, the monetary base (up 52%) of \$5.2 trillion and M2 at \$19.1 trillion meant the

multiplier fell to 3.7. The Fed can't control *whether* banks make new loans or not, outside of setting reserve requirements. Eliminating those requirements, you would think loans would expand. A money supply booming by 25% *must* be inflationary, right?

U.S. Monetary Base 1958 – 2020



Source: St. Louis Federal Reserve

U.S. Monetary Base 1958 – 2020 (logarithmic)



This brings us to the velocity of money, the rate at which money turns over in an economy, or the rate at which consumers and businesses spend money. Tying the money supply to the economy, the second way to think about deriving GDP is the money supply, M2 multiplied by the velocity of money.

$$GDP = M2 \times V$$

With GDP at yearend at \$21.3 trillion and M2 up to \$19.1 trillion, the velocity of money is implied at 1.12. I spent the better part of my early career observing velocity not moving much from measuring 2.0, meaning M2 was half the size of the economy and money turned over twice a year. 1.12 is a very low number when it comes to velocity (low Semper portfolio turnover good; low money turnover bad). Depending on how much GDP recovers in 2021 and how much additional “stimulus” comes out of Washington, it doesn’t require much more growth in M2 to send the money supply past GDP, not something I’d ever even fathomed as possible. Hey, if negative interest rates and negative oil prices are not impossible, can the laws of nature prevent a negative velocity of money? I think I need a nap.

Velocity of M2 1958 - 2020



Source: St. Louis Federal Reserve

Declining money velocity since 1997 tells quite a bit of the story. It tells us that incrementally larger debts lose long-term stimulative power. The Fed is most definitely increasing the money supply, but it is not finding its way to productive use in the economy. No doubt in the pandemic, sending checks to every couple making less than \$150,000 per year will either push up consumption (70% of GDP) or be added to

savings. We have seen a big spike in household savings, much like we did in the Great Depression. The offset to the private saving rate is the federal deficit, which is a negative public sector saving rate. During 2020 especially, the *combined* private and public saving rate was negative. The alphabet soup of Federal Reserve facilities and transfer payments to households and businesses increases liquidity in the system but does not increase productivity or output. You would expect a decline in velocity in a pandemic, a financial crisis or even a mere recession. The grey areas in the table denote recessions. Velocity clearly turns down during these rough patches throughout time. The ongoing decline over more than two decades is another thing altogether, and absolutely means that even though we can balloon the money supply, it doesn't mean we'll see an increase in inflation, or even a boost to real GDP per capita. We are swimming in increasingly unproductive debt.

A debt bubble can be worked off in several ways, and none of them are fun. When you are taking on debt it's a good damn time. The twentysomething living on credit cards for a decade, who "owns" all kinds of stuff, travels and eats well, has a great time. When the bill comes due and income is insufficient, austerity sets in. An indebted society, whether internal like Japan since 1989, or now the entire planet, surely can live within its means. Divert income or profit to debt reduction, increase savings, both private *and public*, and create modest and manageable inflation to shrink it away slowly. Easily said. Point to the politician or central banker, CEO or neighbor that would vote for austerity. On the point of inflation, it can't really be created in this context. Shrinking debt relative to output is a deflationary process, which bears on the overly indebted. The debtor fails, restructures, and the creditor becomes the new equity owner. So, you have no money saved? Guess what? You don't travel. You don't have HBO and the NFL Network. You don't drink Pappy. You go to Costco and cook at home. You don't use DoorDash, or Grubhub, or even Amazon. Convenience comes at a steep price and you can't afford it. Afford it? The overall price level falls. Incomes fall. Profits are squeezed. It's no fun. Generations molded by the Great Depression, or by the Weimar hyperinflation, could tell you all about austerity. Sadly, they are all gone, so all we have are pictures of people with wheelbarrows full of money. But they are in black and white, so it can't happen here. Right!

The Path from Deflation to Hyperinflation

Total privately held credit market debt approaches 400% of GDP, not only in the U.S. but across the industrialized world. Throw in government debt owned by the central bank and the figure exceeds 400%. Off-balance-sheet liabilities for government promises to pay unfunded healthcare and retirement benefits perhaps doubles the total, depending on assumptions used in calculating the present value of the cost. When credit is systemically excessive, the natural path forward is deflation. With it comes lower corporate profitability and financial asset prices. On that front, we know there exists the Fed (Insert Any Chairman Name Here) Put.

Society will soon clear the COVID-19 pandemic. With it, surely the rate of growth in the money supply will decline. We may even see M2 come back down. Deflation is the battle but a shrinking money supply for a bit won't exacerbate it. Remember, an increase in the money supply alone is not inflationary. I don't expect much if any growth in real GDP per capita. There are a whole bunch of businesses that won't come back. The service sector in particular will not return to 2019 levels for a long time. Employment won't return to 2019 levels for a long time. In that setting it will be very difficult for the Fed and its central bank cousins to back away from QE. If they try to taper and allow holdings of government debt and mortgages to roll off, liquidity will again disappear from the system.

A loss of liquidity places strain on collateral and what remains of the shadow banking system. Measuring the money multiplier and the velocity of money is easy. Determining how much leverage exists outside of the banking system and off-balance-sheet is beyond my pay grade. We know it's large. In times of stress, distressed assets invariably find their way back into the traditional fractional lending system. A simple

question I have is if credit vehicles like Long Term Capital Management operated with enough leverage to nearly cripple the financial system, why do we continue to allow lookalikes to pop up all the time? Liquidity evaporated in the fall of 2019 and exited the system in March 2020 as the pandemic unfolded. It makes sense that some portion of non-required bank reserves sitting at the Fed reflect not only little appetite for new loans and credit creation but also cash building up from off-balance-sheet deleveraging as well as temporary cash balances on deposit from the private sector that had been borrowed to raise liquidity to survive the pandemic. If the Fed and central banks are really trying to get money moving, how do they do it? I can only presume that with the Powell Put firmly in place, it's not just stock prices that are rolling. Visions of March 2020 are a faded memory. Credit funds that survived March, thanks Jay, are surely geared back up. The CLO market is active. Yields on junk debt plummeted. Credit spreads are back near record lows. What's the path forward? Will the Fed try removing the punch bowl again? *Can* the Fed *ever* remove the punch bowl is the real question.

The reaction of politicians and Keynesians to crisis is never to austerity. Nobody wants austerity when the real economy is not growing. If the "easiest" solution is to devalue the debt stock, what becomes of the value of the currency? The U.S. can't devalue against Europe because their central banks and politicians are all playing the same game. Ditto the Japanese. Ditto the Chinese. So how do you get hyperinflation? Do you get it by forgiving student debt, more than 90% of which is owned by the government? Do you get it by sending unlimited federal money, created by the Fed but only to finance deficit spending, to states and municipalities with their own debt burdens and underfunded pensions? Do you get it by taxing the wealthy into oblivion (or into lower-tax-rate countries, in the name of fairness)?

I genuinely don't know how the path forward evolves, but I believe that given how far we have come that we are past the point of no return. Central bankers and our politicians will do their mighty best to create inflation, but the deflation they are fighting is mighty powerful. Understanding the inflection point between a deflationary outcome, which is natural, and an inflationary outcome, probably requires watching the central bank and any prospective changes to the Federal Reserve Act acutely. The central bank already pushed the envelope, if not in 2008 then certainly in 2020. As the reserve currency, what of the Fed setting short-term rates at less than zero? The current Fed chairman suggests that's not on the table, which means it's probably on the table. Watch the regional Fed heads and their trial balloons. As mentioned, Bullard telegraphed average inflation rate targeting (not that they will pull that off). That's now policy. I read a transcript of a speech given by Cleveland Fed President and CEO Loretta Mester this fall to the Chicago Fed's Payments Symposium. Toward the end of the virtual speech, she spoke about "Central Bank Digital Currencies." Her comments toward the end of her talk are worth including here. When I first read them first my fear mechanism kicked in. As I reread them, even knowing what was said, I can't shake the reaction:

The experience with pandemic emergency payments has brought forward an idea that was already gaining increased attention at central banks around the world, that is, central bank digital currency (CBDC). Legislation has proposed that each American have an account at the Fed in which digital dollars could be deposited, as liabilities of the Federal Reserve Banks, which could be used for emergency payments. Other proposals would create a new payments instrument, digital cash, which would be just like the physical currency issued by central banks today, but in a digital form and, potentially, without the anonymity of physical currency. Depending on how these currencies are designed, central banks could support them without the need for commercial bank involvement via direct issuance into the end-users' digital wallets combined with central-bank-facilitated transfer and redemption services.⁸ The demand for and use of such instruments need further consideration in order to evaluate whether such a central bank digital currency would allow for quicker and more ubiquitous payments in times of emergency and more generally. In addition, a range of potential risks and policy issues surrounding central bank digital currency need to be better understood, and the costs and benefits evaluated.

This does not strike me as the creation of high-powered money through conventional fractional lending. When I see the central bank talking about creating liabilities with no offsetting asset, effectively paying the bills of the government directly during times of “unusual and exigent circumstances,” I think about Weimar Germany, Venezuela, Brazil, ancient Rome... That just might do it. Surveying the public speeches of other regional Fed Presidents, you see more and more discussion recently about digital currency. We already have digital currency. I don’t remember the last time I used cash. I don’t even use it in Europe. That said, the replacement of paper fiat with digital fiat allows for direct devaluation. Hyperinflations happen when the citizenry loses faith in the currency. If you think your bank will fail, you will sprint to the bank and remove your cash, if allowed. Suppose we have deflation? Currency earning nothing strikes me as superior to a price level that’s declining. If deflation is a negative 5%, your Franklin is money good by 5%. But what if you are not allowed to hold cash, and your new digital “Fed dollars” are charged a penalty of 5% per annum for holding them? That solves the cash hoarding problem right there.

Pay attention to discussions at the Fed or in Congress about allowing for negative rates and amending the Federal Reserve Act. The Fed pays a nominal rate of interest on reserves held at the Fed. When the Fed lowered the Fed Funds target in March 2020, they also lowered the rate paid on both required and excess reserves to 0.1%. Required reserves are no more for the time being, but there are still \$3 trillion of bank deposits sitting at the Fed earning a dime annually per each hundred dollars. Suppose the rate was set at a negative one percent? Leave your money here Jamie and pals, and instead of paying you \$3 billion we’ll *charge* you \$30 billion to keep it here. But then again, you come back to Japan.

The Bank of Japan has relentlessly fought deflation since 1989, trying to reflate the economy with myriad unsuccessful programs. Early examples include the lowering of interest rates, setting a zero-interest rate policy (ZIRP) in 1999, QE in 2001. In 2010, the central bank expanded QE to allow the purchase of ETFs and corporate debt. Governor Kuroda adopted a negative interest rate policy (NIRP) in 2013. Despite continuous attempts at stimulus (fiscal as well), years before similar action taken by the Fed, the European Central Bank, the Bank of England and countless others, none of these monetary endeavors created any sustained inflation. Economic output weakens and debt compounds on debt.

In ancient Rome, tax collectors sent coinage to the government which was used to then pay the government’s bills. Bills and promises eventually exceeded the government’s ability to tax sufficiently. The denarius, pure silver and originally equal to 10 asses, could be debased by shrinking the silver content. Another fun trick – collect 100 denarii, clip the edges, melt the edges and forge 10 more. Wash, rinse, repeat. Figuring out what the transmission mechanism will be won’t be so simple today. \$85 trillion in on-balance-sheet U.S. credit market debt is a lot of asses after all. We know we are fighting strong deflationary forces created by introducing new debt to solve a debt problem. It’s brilliant. We know politicians and central bankers are austerity averse. We know central bankers are determined to create inflation, so far unsuccessfully. We know that at higher levels of debt, especially government debt, additional debt has no multiplier effect. We know hyperinflation comes to bear when citizens and businesses do not want to own the currency. Perhaps conventional wisdom has it backward? Perhaps it’s not the printing of money that causes hyperinflation and a collapse in the economy. Perhaps it’s the collapse in the economy that compels the printing of money and direct payment of the governments bills by the central bank. Higher debt levels are weakening the economy. At which dollar or euro or yen of new debt will the economy collapse? May we get to the point where no amount of money printing puts a floor under it? The Fed Chairman’s Put expires worthless.

Owning assets that stand to retain durable purchasing power, regardless of the degree or duration of deflation or inflation becomes the imperative. We know what is likely to come, we just don’t know when. There remains a lot of error in trying to get it right. For that, I worry.

BACK TO SCHOOL

Bring us a pitcher of beer every seven minutes until somebody passes out. And then bring one every ten minutes. Rodney Dangerfield – Thornton Melon



- Jason Melon: Uh, we got Economics tomorrow at 11 o'clock.
- Thornton Melon: 11 o'clock? No good. I got a massage 11 o'clock. Tell 'em to make it 2 o'clock.
- Jason Melon: No, dad. Uh, you don't get it. They're not gonna re-schedule the classes around your massage.
- Thornton Melon: All right, 11 o'clock, but I'm gonna talk to that Dean. I mean, these classes could be a real inconvenience.

Mario Gabelli, founder of the eponymous Gabelli, Inc, needs no introduction in investing circles. When hiring, Mario famously and perfectly described the criteria he most sought in those interested working for him. It's simple. He said he wanted Ph.D.'s, but not in the conventional academic sense. Rather, he wanted people who were *poor, hungry and driven*.

My observation over three decades of investing is that Mario was precisely correct. The best investors I know seem to come at investing with a chip on their shoulder. They will outwork you. They will outcompete you. Even those from more entitled backgrounds check their pedigree at the door and put in the long hours required to succeed in this profession over a lifetime. No doubt money is a scorecard, but the goal is seldom to be the richest – it's to be the most successful.

I've been fortunate over the years to spend time with numerous young, aspiring investors. I'm always invigorated by the thirst for knowledge I see in many of them. The stagflationary period ended with sky-high interest rates in the early 1980s that eroded so much capital fostered a climate that was mighty unattractive to undergraduate business students and MBA's. The boom that followed ended with the tech bust in 2000 but picked back up in earnest with the recovery since the financial crisis has made the investment arena the hot destination for ambitious young Ph.D.'s (Mario's kind). Stocks, bonds, private equity, venture capital or real estate, the field matters not. By the time so many are ready to enter the work force, they are coming in with so much more exposure to investing and even experience that my level of preparation at the same age was laughable.

While I'm not sure I want to see any more competition than we already have, there is so much brainpower and drive dedicated to outsmarting the capital markets that a young undergraduate, or even late-year high schooler that either knows, or thinks they know, that a field in investing is for them, it would be helpful to know where in academia one can get the most practical, even hands-on education in investing.

The flaw from a pure blocking and tackling perspective with much of financial academia is just that. A finance education is often very academic and often skips genuine financial analysis, critical thinking about investing, portfolio management and even hands-on investment of capital. In my opinion, you can't take enough accounting, but so many students of accounting are never taught or never learn how to actually *use* financial statements. The aspiring investor choosing an institution of higher education with the idea of finding a fit where some of the tools of investing are taught are almost always left with little guide. My time spent on college campuses and speaking to and with students is a career highlight. I hope to provide direction where I can. I've also been privy to observe some ivory towers that have programs and platforms where students genuinely learn, and learn a lot, and those that send aspiring investors out to the arena or job market with skills that passed in my day but now leave many ill-prepared, both absolutely and relatively.

On the Job Training

Almost all colleges and universities have endowments or foundations. Harvard tops the list by size at a not small \$42 billion. Yalies cringe at their number two spot, but in both cases, and among most schools with sizable endowments, the CIO's and their teams running them are extraordinary investors. Historically Black Colleges and Universities have endowments, Howard topping the list by size at more than \$700 million. Fayetteville State has \$25 million working for it. Warren Buffett was famously involved with his friend, Joe Rosenfield in overseeing small Grinnell College's endowment and helping foster it along. At \$2 billion in size, Grinnell's endowment goes a long way to supporting the school's tiny enrolment of 1,683 students. Math majors can tell you that's \$1.2 million per student. Most public and state schools also have endowments or foundations. Alma mater to half of Semper, the University of Colorado, Go Buffs, has more than \$1.5 billion working for it. The University of Missouri-St. Louis is endowed with over \$90 million. Some schools have a few thousand dollars endowed. Many alumni of all schools have a charitable bent, and often the vehicle for their philanthropy winds up being the school endowment that uses a small percentage of capital each year to support need-based scholarship and any number of school needs.

Having established that most schools have some amount of endowed dollars supporting the school. Many schools have programs whereby teams of students are involved in managing a small portion of the capital. Lest you gasp at the notion of unexperienced teenagers and early twentysomethings pulling the levers of moving money around, structured correctly the risk of "loss" is no greater than when hiring the best and brightest investors in the world, whether outside managers or highly qualified in-house staff. There is nothing more educational than sharpening your skills managing "other people's money." With proper structure and supervision, even the smallest sliver of endowed funds managed by students can provide a wonderful educational tool. In many cases, given that the "student funds" don't charge management fees, it's not unusual to see the students outperform the pros over longer periods.

Back in the day, the conventional teaching tool was to have students manage a hypothetical portfolio of some sum of imaginary dollars. They were given unlimited trades. The objective of the contest was to outperform some benchmark, or the other students in the class, over some period of time, usually the semester or quarter, or even over a few weeks. Nothing I can think of can more ill-prepare the young investor for how to properly think about and approach investing. Even students uninitiated to the concept of "Beta" would figure out the best way to win was to pick the most high octane, volatile stock they could find. Just stupid. These contests are still used as teaching tools in the halls of academia.

Schools that do have students managing a portion of the endowment structure their programs in myriad ways. The best that I have seen do it in a club setting, supervised and even taught by professors with an interest in investing, by the CIO or members of the team managing the endowment, or by outside professionals, often alumni. Of the best, with intelligent "bumper guards" in place, the students are left to it. They do their own research. They make their own recommendations. Students write analyst reports, make investment pitches and are hands on with portfolio maintenance and trading decisions. The very best programs are inclusive, accommodating as many students as are interested and willing to do the work. The very best also have programs whereby the volunteer students can be involved for long periods of time. Some, like the alma mater to much of Semper, occasionally have a portion of endowed capital (which had been donated by an alumnus for the purpose of creating a student fund) managed by students for a semester when a teacher is willing to take on the responsibility in the classroom setting. You make investments for a few weeks, and over winter, spring and summer break, and during semesters when no teacher takes on the responsibility, the firm charged with managing the overall foundation takes management back over. No continuity, no ownership and certainly no genuine learning about how investing should work. Rest assured, a number of alums, all very established investment pros in private

practice, are aware of the program and on board with making some changes. If you know academia, you know change happens glacially, if ever.

I thought it would be fun to highlight a program with a great reputation that does a lot of things well, in terms of structure, opportunity, involvement and education. Done right, a well-run student fund will see investment firms lining up to interview and hire the best of the bunch. It can be a little like the NFL draft, without having to run the 40 or see how many times you can bench press 225 pounds. Coming out of school, I was better prepared for the bench press than investing dollar one, so had to sprint a marathon to figure out what the heck was going on in investing.

I know lots of folks involved with student-run funds all over the place. There's nothing better than seeing the CIO or members of the team lecturing in the classroom. At places like Notre Dame, not only are classes taught but *every* professional on the staff of the investment office are alumni. Teach 'em right and let 'em run the joint. Outside professionals that volunteer their time to get involved make this a great profession. Faculty have no motivation to be involved in many places. When a professor volunteers time to oversee and coach the student team it's simply a great thing.

I'm always honored when I get a chance to speak on campus and work with the students. From Columbia University, where Mr. Buffett cut his teeth under the tutelage of Ben Graham (and where Mario and so many other investing greats learned), to my good friend, Boone Bradley's Applied Portfolio Management program at Kansas, to Claremont McKenna, where my daughter learns econ and stats today, there are just so many great volunteers at so many great programs. There are too many to mention all here. What I thought we would try is to showcase a program considered exemplary in the letter this year. Using some of what you might call "best practices," no doubt incomplete by any stretch, is to create a template and gather some simple data over the course of the year. I invite any schools that would like to contribute data via a survey to head to our website. We'll round up the results, invariably talk with many of you over the course of the year and put together the results. I'll follow-up with details in next year's letter and we'll post the findings to the website as well.

It seems like an absolute no-brainer that if a school has an endowment and a business school or economics/finance program or MBA program that it would have a student-run fund. For those that have a fund but haven't made it a priority, what better way to improve than to see best practices among your contemporaries. The greatest utility should be for the young aspiring investor having a tool to help make more knowable the unknown of who has a program for investing, who does not and who does but doesn't make it much of a priority.

In addition to having a student-run fund, more and more schools are fielding teams of students to compete in the CFA Institute's Global Research Challenge. In the contest, a faculty rep works with the local CFA society who organizes the contest. Teams are assigned a mentor in the fall – a buy or sell-side analyst who helps oversee the drafting of a comprehensive research report on a local company. Local schools all research the same company, meet with top management, are allowed follow-up questions, and complete their report. The reports are graded by local analysts. Each team then presents the company and their recommendation with support to a panel of judges followed by Q&A. Winning teams advance to a regional round. – Americas (North and South America combined), EMEA and Asia Pacific. Winners there advance to a regional final and the four winning teams advance to a Global Final. I've had the privilege of judging our local St. Louis contest for ten years and have judged either the Regional or Global Finals for the past five years. From the local contest to the final rounds, the knowledge and talent of the undergraduates and master's teams blow me away every year. I'm also stunned there are schools with undergraduate and also graduate programs in finance and economics that don't have teams participating. The contest is more limiting (teams of 3-5) than a student-run fund, but the Institute has opened up the contest to two teams per school. If a student is interested in investing, between the

Investment Challenge and the student funds, if these programs are available to you then get involved. To those schools that have business/finance/econ programs and don't participate in the Challenge, what are you waiting for? Schools with endowments or foundations that also offer degree programs in the aforementioned disciplines and don't have student-run funds, what are you thinking?

The University of Dayton has a first-rate student-run fund. For the record, we don't manage a portion of the school's endowment, I don't know the CIO of the endowment and I've only talked to Dan Kapusta, the gentlemen administering/sponsoring the student fund program once, on the telephone. I will tell you that when I meet analysts and other professionals throughout the year, I often ask about where they went to school and about the business programs, particularly whether the school has a student fund. Invariably, alumnus Flyers rave about the business school and particularly about the student fund. After many conversations about why some funds seemed better administered and inclusive than others, an analyst introduced me to Dan.

According to Dan, the "Flyer Investments Fund" began in 1999 and is a 100% student-managed portfolio as a portion of Dayton's endowment. Dayton's was the 10th student fund in the country. Dan believes at least 300 exist today. The portfolio is administered by approximately 60 undergraduates in the Davis Center for Portfolio Management. The Davis Center is a full-on "investment technology hub designed to replicate a Wall Street trading floor, equipped with industry-leading technology including Bloomberg, Morningstar and FactSet." Dayton's Board of Trustees initially funded \$1 million to the student fund, with \$11 million in funding from 1999 through 2010. The fund's assets under management have grown to \$35 million, a sizable portion of the \$800 million total endowment.

The student team is comprised of 50-60 student research analysts covering 11 sectors, each with a leader. The teams prepare a weekly buy-side portfolio maintenance report. Admission to the "club" is intense. Of 80-100 applicants, 15 are admitted each fall. It can be a four-year program for freshman so inclined but those only just figuring it out can apply anytime. The new class is trained by two or three seniors. Dan calls it a "mini-CFA level 1 curriculum" (I'll probably lose my charter for writing that...). Each member must be involved in at least one stock pitch per semester. A senior level finance class of 15 members makes final decisions. Each pitch consumes 30-50 hours of preparation, so not a small commitment. The portfolio is comprised of 50-70 holdings. 20 new names are pitched each year and roughly 10 are approved. Several holdings have been maintained for more than a decade.

The student fund and business school in general has a very active alumni network. Dayton's student leadership participates in numerous student pitch contests around the country, as do many of the established student funds. Dayton's program is so long running and broad in terms of student involvement it makes the program a magnet for recruiting young talent.

Takeaways and best practices from those student-run funds that I have encountered seem to be:

- The mission of the fund must be to facilitate learning and hands-on application of investment management. Investment performance is a goal but not the mission.
- Students take leadership roles.
- The endowment or foundation should be supportive but must act as a client and hold the fund accountable for keeping process and philosophy consistent.
- If management of the endowment/foundation is completely outsourced, the outside advisors should be encouraged to be involved with the faculty advisor and student leadership.
- Duration of involvement ideally is over longer periods – a semester only scratches the surface. Structuring funds as an extra-curricular group allows for longer duration of involvement, lower turnover, and better incentives.

- A formal, “for credit” class can be built into the fund structure for the more senior “managers” of the fund. Often this is the portfolio management group.
- Students should be encouraged to join from any major in any year of their education.
- More senior experienced students are responsible for the teaching and training of newer members. Recruitment of new members from earlier grades is essential to continuity.
- Involvement requires commitment, not a checkbox for a resume. A repeatable application process in place keeps turnover low.
- Faculty or outside advisor involvement is critical. Experience in investing and analysis a plus. A network with the alumni base important.
- Broad support by school leadership and those overseeing the main endowment/foundation.
- Custody and trading systems are well thought out, often integrated with the investment office or outsourced manager.
- Proper benchmarking, diversification and a limited defined universe create necessary safeguards and risk management – investing in boiler room promotions would not be looked on with favor by the Board or folks running the endowment!
- Adequate diversification but not so much as to not be manageable is important. Position sizing is part of the process. The mission is learning and experience.
- Focus on company valuation, business quality and price. Research on potential portfolio holdings should be rigorous and face open floor debate among other members of the fund before a decision is made. Incorporate opportunity cost into the research process.
- Investment horizon should be extremely long to match the horizon of the client and incentivize a long-term investment mindset.
- Stress proper portfolio maintenance and research. Emphasis on portfolio maintenance should be just as strong as emphasis on buys and sells. A position should not be held complacently because, “I wasn’t on the team that bought it.”
- Rigorous fundamental analysis, valuation methods, financial statement analysis and accounting.
- Outside speakers and networking a must. Involve the alumni and keep in touch with them.
- Facilitate networking and employment opportunities. Participate in other stock pitches or research competitions. Get involved with the CFA Institute and the local Society.

In a nutshell, these characteristics are among those that contribute to a well-run student investment fund. The experience for the students is amazing if done right. The fund becomes a marketing tool for the school and a source of pride (perhaps though second fiddle to the football team). If you are the dean of a business school and your school doesn’t yet have a fund, why not? If you are an alumnus and your school has no fund, how can you get involved? Time or money are both good options!

We added a tab to the Semper website for “Student Fund” and included a template there. We also created an email address to which you can submit information or questions. We’d love to see as many schools as possible get involved. If you are an alumnus, look into your school’s program. Please encourage those running the programs to head to the website and submit data. We’ll gather the information and see what comes of it. If nothing more than raising the awareness of some of the things certain schools are doing to advance the education of the next generation of professionals, then I hope there is some utility to this. If we make the next crop of investors too good, then in a few years we’ll encourage all of the aspiring young investors to be engineers and build bridges instead. It’s a jungle out there.

studentfund@semperaugustus.com
www.semperaugustus.com

TAMS ARE THE NEW EYEBALLS

The best business is the one with no expenses.

The greater the price an investor is willing to pay for a business, the more one or a combination of these things must be the case to allow for a decent return.

- The speculator must expect a very high level of profitability.
- The speculator must expect a very high level of sales growth.
- The speculator must expect the growth in sales to persist at high or maximum levels of profitability.
- The speculator must expect a greater fool to be on hand at the point the aforementioned fails to come to pass (failure being nearly always the case).



The architecture of my simple investor brain is wired to believe that a 6.5% profit margin capitalized at 15 times earnings equals one times sales. It's actually 97.5% but roll with the logic.

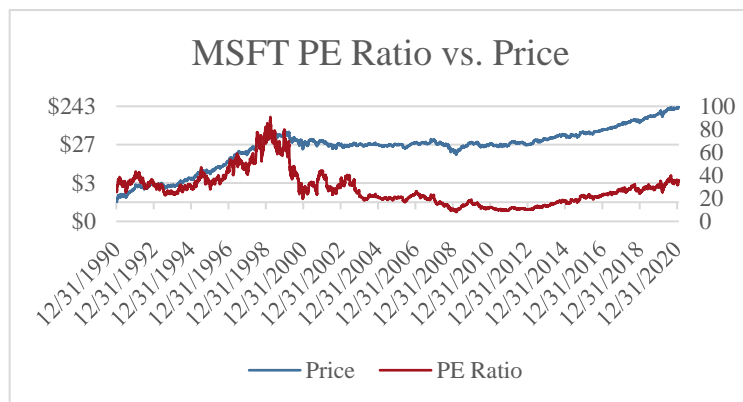
I've long considered 6.5% a fairly typical profit margin for an industrial business. For years a profit margin for the broad stock market north of 6.5% was considered an upper bound. In September 1929 the profit margin touched 8.9% but that was an outlier and a record that would stand for decades. Mr. Buffett wrote an article in Fortune to the effect of the upper bound on profitability in 1999 that didn't foresee margins achieved over the past 15 years or so. A number of things happened since 2000 affording higher margins. Interest rates drove downward, adding some 3% to the corporate bottom line despite the surge in non-financial total corporate debt outstanding. More debt in the capital structure amplifies returns on equity but also means the profit margin per dollar of revenues is more leveraged as well. R&D and the way it is accounted for replaced some portion of capital expenditures and the way they are accounted for, perhaps understating profitability in businesses that are more R&D intensive. Many businesses required less capital, allowing for higher returns on each dollar of revenue produced.

The point of the above is merely that the profit margin multiplied by the P/E multiple gets you the multiple to sales. A retailer earning a 3% profit margin, in a world of normal interest rates and normal growth expectations, trades at half of sales at the same 15 times earnings (remember imprecise, this is a mental model). A company like Costco earning a record 2.5% profit margin, when rewarded for its proven history of growth, likewise trades at a record 40 times earnings, or 100% of sales (ha, mathematical precision in this case). The fast-growing software company with 30% profit margins that trades at 30 times earnings gets you to 9 times sales (30x30).

To pay 30 times earnings for a 30% profit margin, you must believe in bullet point 3, that growth and the margin are durable, or can even expand. MasterCard and Visa earn 50% profit margins and when trading for 40 times earnings trade at 20 times sales. Pharmaceutical companies with 20% profit margins at 20 times earnings equal four times sales. Handy shorthand, for me at least. Let's revert to the Microsoft example. Microsoft? That's the 30% margin at 30 times earnings example (amazingly higher on both counts again recently). Let's simplify and call Microsoft 3 squared. 3x3. Nine times sales.

Occasionally Mr. Market goes berserk and layers on an entire additional power. Let's call this power 3 cubed. In terms of capitalizing margins that's 30 times a 30 percent profit margin times 3. What's the last three for? It's the quantum leap. It's the assumption that you can pay 27 times sales for a business which implies a heckuva lot of growth in sales or a heckuva profit margin expansion. It could be that said business has yet to attain a 30% margin but will. Of course, it could also imply the greater fool theory, the premise that there always exists someone to buy from you at a higher price.

Mr. Market went completely bonkers with Microsoft in the late 1990s, covered in detail in the January 1, 2000 Semper letter. In a nutshell, Microsoft was such a good business, such a profitable business and such a fast-growing business that it traded for 81 times a 38% profit margin, 31 times sales. That's ballpark for not much more than the 3 cubed model's 27 times sales. The stock produced a negative return for more than the next 15 years, dividends included, making my prediction of that outcome sagacious, in my mind at least. What happened was growth slowed, naturally, and the multiple contracted, naturally, and margins contracted, naturally. By the time the stock traded for 10 times a then reduced profit margin of 30%, the multiple to sales worked out to 3 times – more than a 90% haircut in the multiple. That usually leaves a mark. Needless to say, the Microsoft investor fan club saw a drop-off in members.



An unusually high number of companies traded at extremely high multiples to sales by the late 1999, most peaking on or around March 10, 2000. I don't believe the market had ever seen more companies trading for more than 10 times sales, let alone at 20 and even 30 times. We all know the tech bubble broke and pulled the NASDAQ down by 78%. The number of nosebleed valuations ground downward, until the last few years.

The bull market from the end of 2008 is one of the most powerful advances of all time. The S&P 500 earned 15% per annum for the 12 years since, the NASDAQ and growth indices even more. Perhaps it's thanks to social media and seeing more and more investors raving about many of the new economy darlings. From software as a service, fin-tech and biotech and anything to do with electric vehicles or solar, all of the buzz centers on new market darlings. For the first time since 1999 it became fashionable to talk about multiples to sales. Total addressable market (TAM) is the new "eyeballs" or "page clicks" profit be damned.

Then came Tesla, whose shares advanced 743% in 2020 alone after a stock split (meaningless) and inclusion in the S&P 500. The wizards at the price insensitive inclusion committee brought in the largest company at the highest position in the index ever. It's already the fifth largest company in the index by market capitalization. On fully diluted shares outstanding, the market values the company at a cool \$1 trillion. That figure lacks the punch it would have packed only a few years back until Microsoft, Apple, Amazon and Google (Alphabet) all surpassed it. In Tesla's case it doesn't command the now 33.6% profit margin at Microsoft, which at 35 times earnings prices the stock at 11.7 times sales. Apple fetches a \$2.3 trillion market cap, the biggest of them all, and of all time. Apple's 21.7% profit margin gets capitalized at 35 times. These margins and multiples are impressive considering Apple is closing in on \$300 billion in annual revenues and Microsoft a not shabby \$153 billion. In the big revenue and market value club are Amazon with \$386 billion in sales and a 5.5% margin in the midst of doubling. Alphabet earns \$34 billion on a \$183 billion top line.

Tesla is a stock on the come. By any fundamental measure, the only thing Tesla commands is a market cap. Recently passing Facebook for a spot in the starting lineup, how long until Tesla passes Apple as team captain? Or does it call timeout and fall back to reality. Well, as Michigan's Fab Five found out the hard way, if you call time out it's game over. I'm not going to belabor why Tesla is highly unlikely to grow into its valuation any time soon. I'd say it's more likely the Tesla shareholder loses money for the next 15 years than were Microsoft's on January 1, 2000 (they did). I won't mention the blatantly aggressive accounting. I won't even mention that it's an automaker, requiring fully a dollar of capital to produce a dollar of annual revenues. To produce the number of vehicles required of the valuation will require multiples of present manufacturing capacity. Factories in Fremont and Shanghai plus two under construction in Germany and Austin won't cut it in terms of volumes required to justify the current value of the company. By comparison to Tesla's four plants and 48,000 employees, GM employs 165,000 and owns 11 assembly plants, 25 stamping, propulsion, component and battery plants, 19 parts distribution centers and 2 engineering campuses. They make 14-times as many vehicles as Tesla. GM's share price, having announced its electric vehicle ambitions, has surged to a post-bankruptcy high. GM's \$77 billion market cap is 7% of Tesla's. That's an odd relationship – you make seven times as many vehicles but are worth 7% of the value of your competitor.

All I will do here is ask if paying \$1 trillion for a car company with \$31 billion in annual revenues earning less than \$1 billion in profit makes sense. Tesla sold 500,000 vehicles in 2020, roughly a market share of 0.5%. Ignore the present condition and make believe it had 20% market share. That's 20 million vehicles sold (as large as Toyota and Volkswagen combined, presently #'s 1 and 2). Now allow Tesla a profit margin 0.5% better than Toyota's best in industry 6% profit margin. Now assume average vehicle sales of \$50,000, \$20,000 more than the global average price. If Tesla were operating at these levels today it would have precisely \$1 trillion in revenues and earn \$65 billion. You see what I did there by assuming a 6.5% profit margin. At 15 times a 6.5% margin you get one times sales (ok, still 97.5% but you get the point). Tesla is not doing \$1 trillion in revenues. It's doing 3.1% of that, only needing to grow revenues more than 32-fold from here.

Tesla shareholders are betting on the bullet points from above in spades. Chances are good they are only biting the bullet.

The New Fab 5?

	Market Cap	Sales	Profits	Profit Margin	P/E ^	Price/ Sales ^
Apple	\$2.30 T	\$294 B	\$64 B	21.7%	35	7.5
Microsoft	1.84 T	153 B	51 B	33.6	35	11.7
Amazon	1.70 T	386 B	21 B	11.0*	39*	4.4
Alphabet	1.40 T	183 B	34 B	18.5	38	7.1
Tesla	1.02 T	32 B	813 M	2.6	1,254	32.4
Facebook	0.77 T	86 B	29 B	33.9	25	8.3

*Amazon profit margin 5.5% assumed 11.0%; P/E 39x not 78x on reported net income

Tesla market cap fully diluted

^ P/E and Price-to-Sales: Price is reduced by net cash

Facebook becomes the first sub off the bench, having been passed by Tesla in market cap

One of my Dad's famous stories involved a question from a test you had to take to get into the elevator workers union back in the 1970's. Multiple choice: Which one does not belong? There were five pictures. A hammer, screwdriver, wrench, crowbar and a duck. I'm not sure it was even a true story, but you get the point.

Which one is the duck?

The Price Paid to Sales is Steep

Instead of suggesting today's stock market leaders are ahead of themselves and that growth may slow, or profit margins may contract for whatever reason (regulation, competition?), let's shift to the underbelly of the market. Over the last couple years, it seemed more and more companies traded at very high multiples to sales. Always a believer that price matters, and weighs mightily on outcome, I've long preached that paying huge multiples for profits and certainly for sales that don't yet exist more often than not ends badly. Instead of simply assuming that to be the case, I thought it would be interesting to see how investors paying incrementally higher multiples to sales fared over time. What I thought was going to be a simple data run wound up being an incredibly data-rich and time intensive burden to prove.

The hypothesis suggested that paying incrementally higher multiples of sales for a broad basket of companies would underperform the market and certainly the universe of companies trading for lesser multiples. We screened the entire universe of U.S. traded companies back to December 31, 1999 that had a positive price-to-sales multiple. You'd think that should be all companies but turns out there are plenty of shells with no business or even financial statements that trade on the pink sheets and elsewhere. We pulled the whole population of companies and downloaded them to a portfolio in Bloomberg. From there, the master universe of what became the "2000 class" was subdivided into an additional four 2000 class portfolios – the over 30, over 20, over 10, and less than 10 times sales groups. Yearly performance was run for each of the five subgroups for every year from 2000 to 2020, so 21 years of yearly performance for each group. Each component of each subgroup was equal weighted at the outset such that the best performers would continue compounding. Knowing there is no easy way to deal with subsequent mergers or bankruptcies, when a component dropped off, its performance record ended in that year. Far from perfect, at least a merged company would appear as part of another component, unless it was acquired by a private or foreign entity.

Yearly returns for each group (the over 20's for example) were dropped into an insurance loss development-looking triangle format. We were starting to see the expected results. Stocks that began 2000 at 30 times sales or above earned less than those above 20 times, which earned less than those over ten times. The less than 10 times sales group not only crushed the more than 10's but also trounced the S&P 500. It was interesting that by the time the 2000 class finished the 21-year progression that a very small number of companies drove the preponderance of return in each of the three groups that began at more than ten times sales. The vast majority of the 30 and above group from the class of 2000 lost money. Many failed. Driving the 3.8% annualized 21-year return of the group were three companies. By 2020, Gilead comprised 67%, 39% and 13% of the over 30-, 20-, and 10-times sales subgroups respectively. In the over 30 to sales group, Gilead, Biogen (15%) and eBay (8.5%) comprised 90% of the weighting of the group. The concentration seen among the winners over long periods is extremely high.

2000 "Class" Annual Total Returns 2000 to 2003

Price-to-Sales	2000	2001	2002	2003
> 30	-23.4%	-34.1%	-55.7%	78.3%
> 20	-20.6	-37.6	-50.2	67.3
> 10	-19.1	-28.7	-42.3	60.7
< 10	13.3	8.3	-9.5	38
Universe	9.6	5.2	-11.4	38.9
S&P 500	-9.1	-11.9	-22.1	28.7

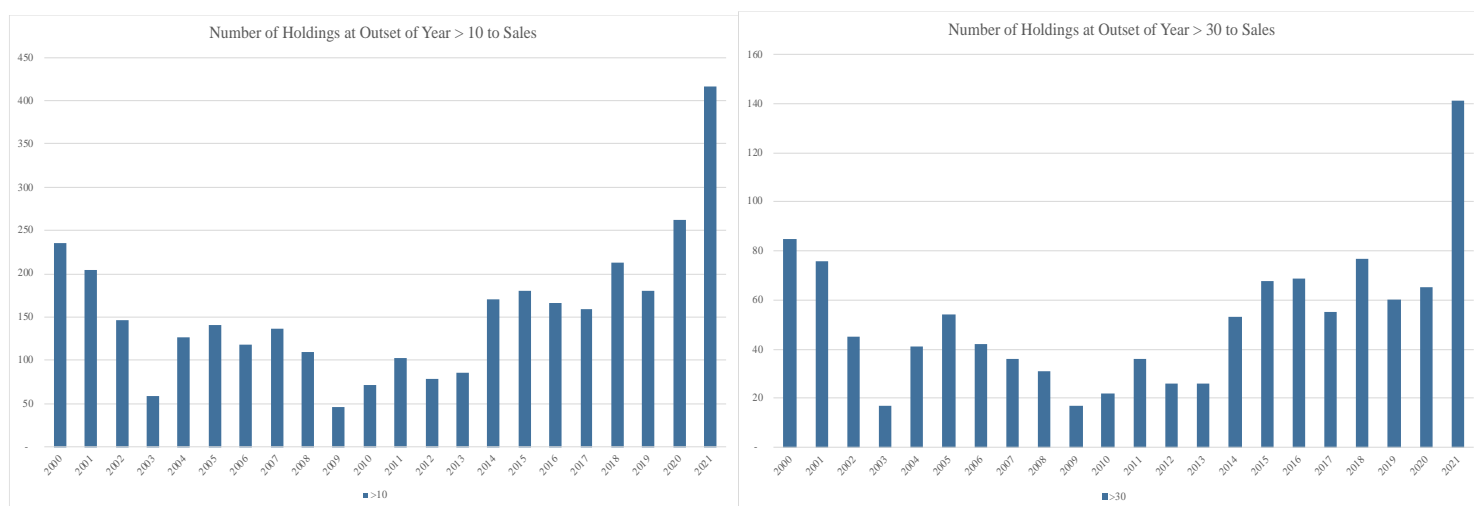
Carefully examine annual returns earned by speculators for each of the years 2000 to 2002. If you weren't in the contingent owning high price-to-sales stocks at the end of 1999, put yourself in the shoes of those

that did. Take the 30-plussers. This included bellwethers like Microsoft as well as dotcoms destined for the dustbin of history. Cocksure in 1999, you lose 23.4% in 2000. Ok. We'll bounce back. However, being down 34.1% in 2001 started to sting. Following the subsequent loss of 55.7% of your remaining capital, you had 22% remaining. How many speculators had the fortitude to stick around for the 78.3% bounce in 2003? I know lots that owned the highflyers in 1999 and not one that stuck it out. If they managed to hold through the bottom, they were quick to sell when they recovered some of the loss. Being down 78% by 2002, the 78% return in 2003 didn't get you back to even. In mathematics, $100 - 78 + 78 = 100$. In compounding, however, you are still down more than 60%.

2000 "Class" Cumulative and Compound Annual Returns 12/31/1999 to 12/31/2020

Price-to-Sales	Cumulative Return	Compound Annual Return
> 30	118.4%	3.8%
> 20	197.4	5.3
> 10	338	7.3
< 10	715.1	10.5
Universe	669.6	10.2
S&P 500	284	6.6

One would expect the number of high-multiple to sales stocks to increase as bull markets progress and wane during declines. The number of companies trading at 20- and 30-times sales nearly disappeared by 2002 and 2008. The surge seen in 2020 is impressive. Using a floor market capitalization of \$250 million will account for some upward inflationary skew over time, but the pattern is consistent with overall market levels. While we did not have access to complete market universe data prior to 1999, I'd expect the runup in the number of high-multiple stocks seen recently would look similar to rising counts in the earlier period. Surely market charts for price-to-sales for indices would bear this out. The 20-plus chart is omitted in the spirit of saving trees but is a mirror image of the others with midrange y-axis numbers.



Source: Bloomberg; Semper Augustus

Deep into the data pull and analysis we realized we had a problem. The companies comprising the class of 2012 started showing crazy, impossibly high returns for the year 2020. Sorting for which names were causing the problem, it was clear that numerous penny stocks were getting promoted or bid up by insane percentages during 2020. Writing this in the midst of the GameStop fireworks, the point should be

obvious. Whether by pump and dump or by Robin Hooder's bidding up whatever traded for 1/10th of a penny per share, there were a ton of these in 2020. We completed each yearly "class" through the class of 2020 and then reverted to do it all again, this time with a market cap threshold of \$250 million and above to qualify for admission to each year's class. Remarkably, even with the size filter, 2020's returns among so many companies with no profits and high short interest were unreal. The entire universe of companies with multiples to sales in excess of 10 from ALL classes back to 2014 posted returns of at least 40%.

The data show that paying high multiples to sales produces dramatically inferior returns over long periods. There are two specific climates when the most expensive stocks as a group do excel. The first is toward the very end of a momentum driven rally, so 1999, 2007 and 2020 (presuming we are at or near a high today). The predictable second "zone" for jumping on high price-to-sales stocks is during the dramatic bounce off lows. You see the 10, 20 and 30 multiple sub-classes outperforming in 2003 and 2009. In both cases the market had fallen by at least 50% and the most highly priced by much more.

I don't think any grand conclusions can be drawn from this exercise or add much to the valuation body of knowledge. Paying high multiples to revenues requires everything and then some to go right and stay right. Lower valuations trounce high valuations over long periods. The investor/speculator betting on rapid growth in sales and profits lacks margin of safety. To do well it seems catching the momentum phase of the updraft helps considerably. The downdraft must be avoided given how much further high multiple to sales fall during broad declines. Further, any hopes of long-term success require owning the small number of companies that ultimately not only grow as intended but grow into their valuations. Even owning the ultimate winners like Gilead, NVR and Nvidia, the ride was never smooth. Most that own high price-to-sales stocks suffer.

The owner of high price-to-sales shares left the less than 10 group in the dust in 2019 and 2020. The most expensive names in 2020 outpaced everything. The folly is thinking you can pay high prices and reap outsized gains prospectively. Stock-picking prowess is tough when price gives the buyer no margin of safety. The following securities were required ownership in producing even the mediocre long-term returns seen by beginning with an expensive portfolio:

Company	Class Year	Cumulative Return	Compound Annual
Gilead	2000	4,097%	19.5%
Apple	2000	14,902	26.9
Amazon	2000	4,178	19.6
Vertex	2000	1,251	13.2
Biomarin Pharma	2001	805	11.6
Nvidia	2001	9,537	25.6
Alexion Pharma	2001	862	12.0
Regeneron	2001	1,270	14.0
Universal Display	2004	1,585	18.1
Seagen	2004	1,941	19.4
Immunomedics	2011	2,354	38.6
Tesla	2012	12,254	70.7

We stripped each of these names from the mediocre long-term result for each class and without them mediocrity became terrible. The majority of high-priced stocks produce awful results over time. The

number of percentage of stocks losing money when starting at expensive valuations over the entire 21-year period should be eye-opening.

“2000 Class” Percentage of Stocks with Negative Cumulative Returns (2000 to 2020)

- Universe: 30.6%
- >30: 81.2%
- >20: 78.2%
- >10: 69.5%
- <10: 28.6%

Even Microsoft spent 15-years underwater growing into its valuation. It's taken Office 365 subscriptions to pull the profit margin back up to 33.6%. From a profit margin of 38% and a P/E multiple of 81, the road to 10 times a 22% profit margin was a painful one. Despite rapidly growing sales and share repurchases, the stock declined by 75% over six years. It's taken ongoing sales growth plus the rebound in both the margin and the multiple to produce a 7% return over 21 years. At least 11.7 times sales is no longer the 31 seen at the 2000 peak. For those kind of prices on giant market caps today's speculator has Tesla. The graveyard of high price-to-sales flameouts is larger than the mountaintop.

TO READ OR NOT TO READ

Last year I wrote, “The crown of best letter by a CEO has passed to Weston Hicks at Alleghany. Funny, erudite, but most importantly useful and transparent, Mr. Hicks walks through Alleghany’s insurance operations and investments in securities and in private companies. In any event, Weston Hicks’ letter is a great read every year.” Not long after writing that, Larry Cunningham released yet another terrific book, *Dear*

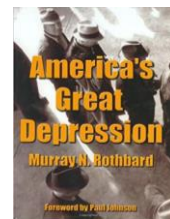


“Scuse me, Buddy, is this the bread-line or a run on a bank?”

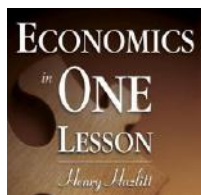
Shareholder; The Best Executive Letters from Warren Buffett, Prem Watsa & Other Great CEO's. I bought my copy on release and enjoyed the terrific compilation, featuring a number of outstanding CEO's and highlights from their shareholder letters. While I highly recommend reading each of Alleghany's letters back to 2004, Larry's book assembled some super highlights from several of Weston's finest. A bit later, the folks at Harriman House, publishers of the book, were kind to surprise me with a hardback copy of Larry's book, featuring Weston alongside Warren Buffett on the cover, a collector's item I'll treasure. If you do go back to read the old Alleghany letters, I'd start with 2002 and 2003, co-written by F.M. Kirby and John Burns, followed by 2004 and 2005, co-written by Kirby and Weston.

As the pandemic unfolded, I dusted off some relevant gems and reread them. There's a common theme. I've mentioned a couple elsewhere in the letter. All are highly recommended. The first three are essential:

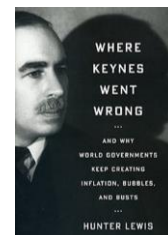
America's Great Depression by Murray Rothbard. The 5th edition is the most recent in print, published by the Mises Institute. Pay special attention to the introductions to each of the editions, when they were written and what they suggested about the future. Given the sequence, we should expect the 6th edition anytime! The book dispels numerous myths about the “inactive” Federal Reserve as the Depression got underway and evolved. It's a timeless and timely classic.

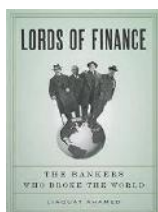


Economics in One Lesson by Henry Hazlitt. I've given dozens of copies of this classic to students. Hazlitt frames economics in an easy-to-understand way with countless examples usable throughout your life. The book should be required reading on every campus. We'd be better served by our elected officials if this was required reading before entering public office, with annual rereading and testing compulsory. I believe you can order this book as well as the Rothbard classic directly from the Mises Institute, mises.org. They will send you *Economics in One Lesson* for free. Everything the Institute does is first class, highly educational and relevant. They even accept membership payments in crypto!



Where Keynes Went Wrong by Hunter Lewis. The title is self-explanatory. This is another timely classic given the present condition. The outline structure of the book is brilliant. It's another great read putting the Great Depression and modern government and central banking in proper perspective. Lewis dedicates the book to the memory of Henry Hazlitt, so you can see where my biases are.





Lords of Finance; The Bankers Who Broke the World by Liaquat Ahamed. I'm going to use "classic" again but rightfully so. Through the lens of four 1920s central bankers, Ahamed provides more evidence that central bankers were far more responsible for the economic collapse than is conventionally believed. You will find yourself mentally substituting Montagu Norman, Hjalmar Schacht, Émile Moreau and Benjamin Strong for modern-day central bankers.

Freedom's Forge by Arthur Herman. Already discussed in the letter, a great read about the U.S. private sector gearing up for World War II. One of the best books I've read, it's a great story of industrial production and heroes.



The Rise and Fall of American Growth by Robert Gordon. This is a heavyweight (literally) masterpiece, covering the rise of our standard of living from the Industrial Revolution foreword. It took me almost two years to finish, but well worth the effort. Gordon provides superb examples of how inventions led to productivity gain, and despite the pace of modern technological change makes the case that quantum leaps in output are behind us. It's a data-rich textbook as well as a phenomenal read.



SPAC S-1's. While not a book, any investor should pick a SPAC and read the offering document cover to cover. If you didn't already have a jaundiced eye about Wall Street and promoters, you will after. When I say, "pick a SPAC," I surely don't mean pick one to invest in. Keep a running tab on where the insiders win and where the common shareholder wins.

I've always been a huge Alison Krauss fan. She's technically in the bluegrass genre but crosses over to myriad types of music. She has one of the greatest voices around and is generally backed by Union Station, a group of superbly talented musicians. If you aren't big into bluegrass, listen to *Rising Sand*, an album she recorded with Robert Plant in 2007. In the same corner of the music world, my good friend, Lincoln Minor, sent me a DVD of Rhonda Vincent and the Rage in concert at the Sheldon here in St. Louis. What a nice gift and what a great voice and musicians. By the way, Lincoln sings and plays in a band, and doesn't know it yet, but there's a movement afoot to encourage his band to record the theme songs from the Semper letters once we have enough for a whole album.

I thought I'd "discovered" a new band last year, Phantom, Rocker & Slick. The album cover looked like guys with big hair from the 1980s. Sure enough, two of the three were former Stray Cats guys, the third a session player. Not sure how I missed them at the time. They made two albums which were super and included some tracks with Keith Richards and Nicky Hopkins (who played keyboards with numerous bands like the Stones, the Kinks, the Who, John Lennon, Joe Cocker and a ton more). Speaking of the Stones, Ronnie Wood's early music with Faces and the Jeff Beck Group is great. Faces' *A Nod is as Good as a Wink to a Blind Horse* from 1971 is brilliant. Finally, I love the Christmas season and music. The *Time Life Treasury of Christmas* was released as a four CD set in 1986. Two of my four CD's had gone missing and with the advent of streaming music the set is not available on Spotify. I recreated the entire set (with a couple replacements for songs unfindable), added a bunch of other great songs at the end and made the playlist public on Spotify, "The Chris Christmas." The family finds me odd at times.

A point of clarification to last year's book and music revue. I'd mentioned a 1990 drive to the Little Bear in Evergreen for some libation and live music, to have the amazing surprise of Willie Nelson sitting in with the band. I'd written, "1,200 pounds of the boys loaded in the Chevy Chevette..." A friend remarked and asked, tongue in cheek, "My parents had a Chevette. How'd you get six guys in there?" He knew full well that it was four of us...

BERKSHIRE HATHAWAY: REPO MADNESS

Choose the headline that describe Berkshire's "performance" in 2020:

"Berkshire's Shares Trowned (Again) by the S&P 500 – Shareholders Miffed: 2.4% Versus 18.4% Just Sucks"

Berkshire Hathaway's Stock Portfolio Gains 21% - Apple's 83% Charge Leads the Way, BYD Surges 425% - a 30-Bagger Since 2008

Berkshire Reports \$46.6 Billion in Profit, Stocks Climb \$39 Billion

Berkshire's Book Value Grows \$20 Billion in 2020, A Less Than Stellar 4.9% Advance

Semper Estimates Berkshire's Intrinsic Value Gains 5%, or is it 11%?

Berkshire's Market Value Declines \$19 Billion – Shares Gain 2.4% - Wait, What?

It was only a matter of time, and a long time coming at that. Nary the headline does justice to the year at Berkshire Hathaway, circa 2020. Justice? For a decade I've gotten away with talking about Berkshire in terms of its market value, book value, economic earnings and intrinsic value. In all cases thinking about Berkshire in that way was acceptable, even logical. No longer. There are hints in the last five headlines as to the missing element that's again so critical to thinking about Berkshire, or any publicly traded company for that matter. The missing link is the share count and understanding investing from that perspective is mission critical. For the first time in a long time, Berkshire repurchased a meaningful number of shares, and importantly did so on extremely attractive terms. Perhaps Berkshire found insight in the sub-plot of last year's Semper letter, "Don't Fear the Repo."

Berkshire's book grew an estimated 4.7% in 2020, from \$425 billion to \$445 billion, yet its *per share* book value likely advanced by 11%.

Book value at Berkshire swings wildly around by changes in the prices of the stocks in the equity portfolio. The portfolio gained 21%, which gets netted by a deferred tax liability calculated at the 21% federal corporate rate in place since 2017.

Far more important than book value, our sum of the parts analysis has Berkshire's intrinsic value growing by 4.4% while its *per share* intrinsic value climbed 10.7%. If my guess is correct and Berkshire followed on to its \$15.7 billion share repurchases through September with an additional \$10 billion in the fourth quarter, then total shares outstanding will have declined by roughly 5.7%. All shares purchased during the year were made at modest premiums to book value, but more importantly at meaningful discounts to *intrinsic value*. The repurchases undertaken were an extremely beneficial and intelligent use of capital.

The investor thinking about Berkshire should focus on the railroad, the utility and energy operation, the insurance operation and the myriad businesses competing in manufacturing, retail and various service-oriented industries. Berkshire controls hundreds of subsidiaries (and subsidiaries of subsidiaries), employing nearly 400,000 people worldwide. For 56 years (that is, since present management took over), capital allocation is the singular reason Berkshire grew to be what it is, and this earth has not known a better allocator of capital than Warren Buffett. Activity in 2020 advances the record.

The peanut gallery observing Berkshire clamors for the big hunt. The last trophy, Precision Castparts, deserves no mount on the wall, they note (so far at least). Cash builds as the "obvious" targets are bypassed. "Berkshire sits on a \$145.7 billion mountain of cash (neglecting \$6.7 billion in payables for T-



bills purchased on the lesser read right side of the balance sheet), unable to invest,” laments the media on release of September’s Q. How could Buffett have bought airlines, given the history? How could they have sold airlines, so obviously low? How could they have bought Wells Fargo? How could they have sold banks so low? To sit idly in March, the horror. A 2.4% return, 16 points behind the index? Only 11% in 2019 versus 31.5%? Has Buffett overstayed the party? Has the Oracle lost his touch? Is Berkshire too large? Anybody else would be fired. Please. Henceforth some contrary opinion.

Investors owning Berkshire Hathaway for the long haul should expect to reap the underlying earning power of the company over time and tune out the gallery along the way. Trust the process. As Berkshire compounded in popularity over the years, so too did its critics. A few in the media have a good understanding of Berkshire and do a terrific job reporting on quarterly progress and activity. The remainder have no clue or understanding of how earning power is derived, how it is created and how it’s financed. It is a very difficult business to understand at a granular level, though simpler in terms of what it more broadly and durably creates.

With the Olympics looking to be cancelled yet again, let’s instead measure 2020’s capital allocation at Berkshire as an Olympic event, scored by judges on a 10-point scale. We have five judges – one from China, one from Russia, two from the media, and me. Since I’m penning the letter, if you’ve ever watched Olympic figure skating, balance beam, diving, boxing, synchronized swimming or rhythmic gymnastics, you know the Russian and Chinese judges are in the tank, so without even taking their scores I’m preemptively throwing them out. Give us the hammer throw, the clean and jerk or curling. It’s my kind of contest if you can measure how far it flies, how much it (and you) weigh and whether you successfully hoisted it over your head, or which stone is closest to the button and how many are in the house and inside the opponent’s. We’re conflating summer and winter here but that’s ok.



Lest we get carried away, back to the capital allocation Olympiad. The media judges deduct points for the measly 2.4% return on the stock and an outright decline in market cap, lack of a big acquisition they can write about, airlines, banks, too much cash on the balance sheet, Precision Castparts, fraud at Precision Castparts, fraud at DC Solar, not Zooming Charlie into the annual meeting, the capabilities of nonagenarians, and IBM (even though it’s been years). Points are credited for finally repurchasing a few shares, the decision to hire Ajit (even though it’s been years) and Apple. Did I mention Apple? One judge awards a 3.5 because hey, the Berkshire-downer bandwagon draws a critical mass. The other judge scores 8.9 because Warren was 89, and who doesn’t love Apple, and Ajit, and for the possibility of snagging an interview with the Chairman and CEO at 2022’s Woodstock for Capitalism.

Mr. Repo Man

My score awards the gold medal. Capital allocation over 56 years rarely involved decisions intentionally shrinking the left side of the balance sheet. Berkshire’s history of retaining profit and finding attractive assets producing better than average earning power is incredible. The duration of Berkshire’s history is largely devoid of dividends, dispositions and devaluations (in the accounting sense), all of which diminish some type of asset. Dividends are a parting of cash. Dispositions are sales of any number of assets – property or securities, for example, and always come with some other form of asset being introduced back to the left side of the ledger, some worth more, some worth less. Devaluations are undertaken with an eraser, the reconciliation and confession of past sins, never to be spoken of again. At Berkshire, you see very little of these activities, particularly when compared to “everybody else.” Outside of sales of common stock, always for cash or in a swap of assets and always with the expectation of getting more than that given, there is no history of Berkshire not profitably expanding the asset base with new and incremental capital. Berkshire paid a single 10 cent per share dividend in 1967, but beyond that retained

and reinvested all profit. No complaints here. The performance record speaks for itself. You don't see wholesale sales or closures of subsidiaries unless out of necessity. The record on this front is spartan.

The extraordinary capital allocator knows the value of things and understands opportunity cost. How many CEO's leading public companies have no concept of the worth of what is often the most important arrow in the capital allocation quiver? The arrow is the value of their own company's shares. Mr. Buffett's record using Berkshire's shares as currency is masterful. Know when an asset is cheap and when it's dear. The record is seen in the history of using Berkshire's expensive shares in acquisitions on one hand and repurchasing them when cheap on the other.

On the acquisition front, Berkshire acquired twelve companies using its shares entirely or combined with cash. Eleven of those deals were done with Berkshire's shares trading for more than its book value (only Diversified Retailing bought in 1977 was below – and disappointingly used not an insignificant number). The most profligate use of the Berkshire's shares as currency took place from 1993 to 2002 at times when the stock traded for more than 150% of book value. Five of those deals saw Berkshire spend stock north of twice book. The largest use of Berkshire's shares in an acquisition took place in 1998 when Berkshire bought General Reinsurance. Berkshire's shares in that seminal transaction fetched almost 300% of book value. The acquisition allowed Berkshire to pivot away from an expensive stock portfolio into what are now its vast utility, energy and railroad holdings. The last time Berkshire used shares to finance an acquisition was in the purchase of BNSF, a deal done with cash and a lesser amount of shares trading for close to 140% of book value. It also issued its B shares to the public in 1996 at nearly twice book value. The motivation behind the B share issuance was not to sell expensive shares but to head off an attempt by promoters proposing selling fractional Berkshire unit trust shares to the public for a large annual fee. They did happen to trade for nearly twice book value at the time, but came with the sober warning on page one of the offering document:

WARREN BUFFETT, AS BERKSHIRE'S CHAIRMAN, AND CHARLES MUNGER, AS BERKSHIRE'S VICE CHAIRMAN, WANT YOU TO KNOW THE FOLLOWING (AND URGE YOU TO IGNORE ANYONE TELLING YOU THAT THESE STATEMENTS ARE "BOILERPLATE" OR UNIMPORTANT):

- 1. Mr. Buffett and Mr. Munger believe that Berkshire's Class A Common Stock is not undervalued at the market price stated above. Neither Mr. Buffett nor Mr. Munger would currently buy Berkshire shares at that price, nor would they recommend that their families or friends do so.*
- 2. Berkshire's historical rate of growth in per-share book value is NOT indicative of possible future growth. Because of the large size of Berkshire's capital base (approximately \$17 billion at December 31, 1995), Berkshire's book value per share cannot increase in the future at a rate even close to its past rate.*
- 3. In recent years the market price of Berkshire shares has increased at a rate exceeding the growth in per-share intrinsic value. Market overperformance of that kind cannot persist indefinitely. Inevitably, there will also occur periods of underperformance, perhaps substantial in degree.*
- 4. Berkshire has attempted to assess the current demand for Class B shares and has tailored the size of this offering to fully satisfy that demand. Therefore, buyers hoping to capture quick profits are almost certain to be disappointed. Shares should be purchased only by investors who expect to remain holders for many years*

This is not the language of the SPAC S-1 or the offering document for “at-the-money” Tesla equity sales (oh wait, there is no document).

If Berkshire knows when its shares are valuable as spending currency, they are equally keen to rake them in when cheap. Those familiar with Berkshire's history recall that prior to buying control of Berkshire, Mr. Buffett would scoop up shares at times when the company sold underperforming textile mills and would turn around and buy shares back at big discounts to book value with the cash proceeds. Classic Ben Graham cigar butt investing. On a massive tender offer in 1964 and 1965, the 34-year-old was slighted by 1/8th or 12.5 cents per share (stocks didn't trade in decimals until 2001). Instead of tendering shares for

less than he'd been promised, he and his partnership bought up control of the entire company, booted Seabury Stanton, the grinch who held back the eighth, and launched his career as Chairman and eventually CEO of the modern-day conglomerate. But it started by buying cheap, ugly assets for less than book value.

Once in control, the capital allocation machine was revved up. Two actions in 1967 proved the new man in charge at Berkshire knew exactly what he was doing. Most know that Berkshire acquired National Indemnity in 1967, the first major pivot that began the move away from the miserable textile business, deserving of its discount to book value, and into insurance. Though under the guide of the new helmsman, the discount to book that existed in 1965 only continued to widen over the next two years, to half of book, a price reflecting the struggling low-quality operations. The wide discount to book value, however, made the shares lousy currency for buying an insurance company. Naturally, Berkshire spent cash. At the same time, the shares extended a decline that began in 1966 into the first part of 1967 and were so cheap that Berkshire also bought shares in the open market. Perhaps my largest regret in life was not springing on to the scene until the next year in 1968. I like to think that little baby Christopher would have sensed that the guy in Omaha using cash for an acquisition and also buying his company's undervalued shares was someone you wanted to do business with. If my parents had gotten with the program a year earlier, I could have sent all of my money to Nebraska. Ultimately getting there in February 2000 was better late than never I suppose. Think about the opportunity cost though.

Berkshire subsequently purchased its shares in 1969, 1976 and 1978. In all three years the shares were bought at sizable discounts to its book value. From the mid-1970's Berkshire's shares took off and once clearing the decade never traded below book value again, save for the brief pandemic dip in 2020 that is. After buying shares in 1978, Berkshire wouldn't repurchase another share again until 2012, a 33-year sabbatical, with one brief exception. If I asked you to close your eyes and picture a historical price graph of the U.S. stock market, what moment between 1978 and 2012 do you suppose might have presented a nice opportunity to buy some shares in? Yep. Colonel North was all over the television that October.

The repurchase of shares in 2012 at 110% of book value followed an announcement in 2011 that Berkshire would not buy shares above 110% of book value, later changed to 120%. They took another small bite in 2014. The self-imposed cap on repurchases likely served to place a floor under the shares. Only when the policy directive was repealed in mid-2018 did buybacks resume and only slowly, spending \$1.3 billion that year and a larger \$5 billion in 2019. By year-end 2019, every armchair quarterback was ready to toss the bum out for his inability to spend enough money. "You can't shake loose more than \$5 billion when you have \$140 billion under the mattress?" sang the Greek chorus.

I'll just go ahead and defer to the guy that painted the canvas. Along comes 2020 riding a pandemic wave, sending Berkshire's downward, far below the most conservative appraisal of value. And what does the guy that's proven to have the valuation game figured out do? He plugs in the share repurchase vacuum and Hoovers up a meaningful number of shares. During the first nine months of 2020, Berkshire repurchased \$15.7 billion of its shares for an average price of \$289,238 per A share. The stock opened 2020 at \$339,590 and ended at \$347,815, up the aforementioned "measly" 2.4%. Pre-tax operating earnings for nine months (excluding the \$10.6 billion pre-tax write-down at Precision, which *lowers* book value by \$10.4 billion – writing-down goodwill is not tax deductible) amounted to \$19.4 billion. So, Berkshire spent over 80% of operating profit repurchasing shares at an average price 15% below where they opened the year and at 105% of average book value per share. Right, the guy is washed out.

I'm happy to note that the first time since 1982 that Berkshire's shares traded down to 105% of book value was February 2000 when Semper was fortunate to acquire its first shares at \$43,707 per share, a purchase even more meaningful thanks to its large position size. The shares fell from three times book value prior over the prior two years when they were used as currency in the General Re deal.

That Warren E. Buffett is criticized for the pace of repurchases is mindboggling. Buying them when they traded at wide discounts to book and intrinsic value during the 1960s and 1970s, and then pulling the trigger only once over the next 33 years, and only then at the bottom of the 1987 stock market crash? The patience and perspicacity. The judge of value and opportunity cost. Parting with dear cash assets only when the stock presents better value. To spend shares when they are rich, piling high-yielding assets onto the left side of the balance sheet, and the stock trades for a “conglomerate discount?” For that I am actually thankful. As investors, we always have cashflows, dividends and deposits. Better that the world thinks Berkshire lost its touch. One additional comment on the material repurchases made in 2020. Lest you think paying an average of 105% of average book value for the shares repurchased this past year wasn’t as attractive as those in the 1960s and 1970s, much of the discount during those early years was warranted. Until the stock market got rolling, with Berkshire’s holdings leading the charge, the operating businesses were nowhere near as profitable as today on a return on equity basis, particularly when adjusted for the cost of capital. Buying shares for 5% above book value for an overcapitalized business earning 10% on equity capital during a time with the 10-year U.S. Treasury trading below 1% is incredible, to me at least.

The pace of share repurchases picked up as the third quarter progressed, as did the stock price. By reason, my year-end work on Berkshire bakes in an additional \$10 billion repurchased at an average price of \$335,000 per share, 15% above estimated year-end book value. The crowd will applaud a large purchase, frown on a small buy and boo a no buy. Meriting attention is not only the size of the purchases but the price at which they are made. I have no doubt should the price of Berkshire’s shares again climb closer to our appraisal of value that the repurchase “program” will slow and stop between here and there. Price matters, and it’s such a unique, quaint really, concept at Berkshire compared to the broad swath of share repurchasers.

Beyond the Repo – Capital Allocation

Lest you think Berkshire exhausted its capital allocation ammunition on share repurchases, think again. There is an awful lot of good going on in the allocation of capital arena.

Despite the pandemic’s hobbling much of the globe’s industrial base, Berkshire’s pace of capital expenditures on growth initiatives continues. Berkshire will have likely laid out roughly \$15 billion in capital spending during 2020, not far below the \$16 billion spent in 2019 but well ahead of the \$12.4 billion spent on average over the two prior years. Of course, it has to spend at least \$8 billion for the portion of capital expenditures represented by depreciation expense, at least every dollar of which should be considered required maintenance. That leaves the \$7 billion difference for growth capital expenditures, a giant sum in a pandemic year when so many companies stepped hard on the capex and R&D brakes.

Capital activity receiving no mention by Berkshire watchers, other than marveling at the low rates at which it can borrow, is restructuring and lengthening of debt. Berkshire’s railroad, utility and energy businesses utilize significant debt in their respective capital structures. Over the past three years these capital-intensive subsidiaries repaid or retired \$9.3 billion in debt, offset by an increase of \$18.8 billion.

Debt within the railroad and the utility and energy businesses is an obligation of each subsidiary and not hypothecated to Berkshire as the parent company. Each of the subsidiaries are extremely well capitalized in their respective industries. The debt in these “regulated” businesses carries higher interest rates because of the stand-alone credit risk but was nonetheless borrowed at very low interest rates.

The railroad has \$23 billion debt outstanding at a weighted average interest rate of 4.6%,

some maturing as late as 2097. I'm 100 percent certain I'd never get my principal back on that issue, unless Ponce de León finally finds some success. BH Energy, which contains all of the utilities and energy subsidiaries for reporting purposes, likely has \$46.5 debt outstanding at yearend at an average interest rate of 4.2%. The longest debt issue among the BHE subsidiaries matures in 2064. This one's on the table, putting me past (sadly well past) the IRS mortality table but a year shy of Mr. Munger's present condition. Maybe I should take down a round lot or two to give me something to aim for. Then again, I'd be sacrificing a lot of earning power.

The holding company and remaining subsidiaries, labeled at "Insurance and Other" contain the insurance operations, the MSR businesses and a number of unassigned investments and liabilities. This collection of businesses can only be described as obscenely overcapitalized! Thus, while not their intent, I'm sure Omaha revels in the terms at which it can borrow. Highlighting the \$39 billion in debt within this hodgepodge of businesses and assets are \$22 billion in debt issues held exclusively at the holding company. There are \$8 billion in Euro denominated debt with maturities as long as 15 years with an average interest rate of 1.0%. There is another \$5.9 billion in Japanese Yen denominated debt with maturities ranging from 2 years to 40 years at an average interest rate of 0.6%. How about a bond offering at a 0% interest rate? Any takers? Somebody bought that paper.

The leasing businesses held within "Berkshire Hathaway Finance Corporation" have \$11 billion outstanding at an average interest rate of 3.35%. Without checking, I'd wager there exists no other leasing company in the world that can borrow long-term, mostly over 20 years and as long as 40, at or below this average rate of interest. I could be wrong with negative sovereign yields throughout much of Europe and Asia pulling down corporate yields but tell me it's not an advantage being owned by Berkshire.

BNSF is only modestly growing by carloads and revenues, and that's outside of pandemic years. As such, its ability to absorb growth capital is limited far more than at the utility and regulated energy businesses. Since Berkshire acquired the railroad in 2010, all profits have been directed upstream to Berkshire. BNSF invested heavily expanding and improving infrastructure at attractive returns in the years following the merger. From 2011 through the first half of 2016, capital expenditures exceeded depreciation charges by more than two to one. In the subsequent 4 ½ years the pace of capex slowed to roughly 50% above depreciation and at a rate more closely approximating maintenance expense.

From the end of 2010, net debt at the railroad grew from \$10 billion to \$21 billion, increasing total assets from \$68 billion to \$88 billion and equity by roughly \$10 billion, from \$35.5 to \$44.2 billion. Peak revenues reached \$18 billion in 2008, prior to the acquisition, and since climbed to nearly \$24 billion in 2018 before trade slowed. With all of those figures, the takeaway is debt rose from 22% to 34% of total capital (including \$14.9 billion of goodwill). With the pace of capital expenditure growth tapering off, without economic expansion the railroad becomes less likely less of a source of growth.

The utility and energy operations are another story. These businesses absorb enormous capital spending and do so at regulated returns, well in excess of the debt cost of capital, earning 10% returns on equity or more. Profits are retained and not sent to the parent company in Omaha. By comparison, nearly all utilities and regulated energy assets (such as pipelines) distribute the majority of profit to shareholders. Berkshire's subsidiaries spend anywhere from two to three times depreciation charges on capital projects. Regulators typically like to see debt range between 40% to 60% of capital. Any less then you are likely not spending enough to maintain your regulated assets and are earning too high of a return; above the range and you are going crazy on leverage. To augment retained earnings with commensurate expansion in debt proportionate to the "new" equity gives Berkshire an incredible advantage in growing its base of alternative energy faster than any of its utility competitors. Net debt of \$44 billion and equity of \$40 billion (\$34 billion excluding MidAmerican's investment in BYD plus a modest amount of stocks that fund nuclear decommissioning trusts) finance \$113.5 billion in assets. With tax credits and the use of

accelerated depreciation for tax purposes, the group is earning almost 13% on equity capital, which gets down to 10% or so as allowed by the regulators. When it comes to a place where you want to be allocating capital, this is a very good one. Between retaining profits, borrowing at low interest rates at very long-term maturities and spending \$4-5 billion north of depreciation charges is a home run. As Mr. Buffett said at last year's annual meeting, it's not a place to get rich but it's a place if you are already rich to stay that way.

In addition to capital spending in the energy world, Berkshire inked a deal to buy \$9.7 billion of energy pipeline and LNG distribution assets from Dominion energy. Berkshire lays out \$4 billion in cash and assumes \$5.7 billion in debt. The first portion of the deal closed late in 2020 with the balance to close early this year. Berkshire will eventually lower the debt cost of capital, and by retaining profits undoubtedly expects to make incremental capital investments in the Dominion assets being acquired. As the world increasingly moves to alternative energy, Berkshire is in the sweet spot on that front. In addition, we won't be ending our reliance on natural gas and oil anytime soon, and as storage and distribution assets already in production won't face new competition, their scarcity will soon be apparent.

The pandemic saw most of Berkshire's businesses in manufacturing, service and retail hunker down during 2020. As such, it wasn't a big year for bolt-on acquisitions. Berkshire only invested \$111 million through September 30; a tiny sum compared to years past. Look for more here as competitors of many of Berkshire's subsidiaries struggle in the years ahead. Also look for Berkshire to ramp up sales of underperforming subsidiaries. Some were acknowledged as candidates for sale earlier in 2020. At the end of the day, Berkshire's subsidiaries in the MSR group generally operate on an unleveraged basis, the exception being the leasing businesses and Clayton Homes. It is absolutely the case that with so much money sloshing around in private equity that some of Berkshire's underperforming businesses become good candidates for a new home. While not the classic Berkshire way, in certain cases it really needs to become the contemporary way.

The sum total of capital allocation at Berkshire in 2020 was fantastic. No doubt you can't make everybody happy, but who in their right mind would try? We measure Berkshire's normalized profitability at roughly \$42 billion for 2020. How much of that is available for investment? Consider that \$10 billion is spoken for because it stays with the stock market investees as retained earnings. Another \$7 billion, at least, represents capital expenditures in excess of depreciation charges. Much of this is contemplated growth capital spending at predictable returns. Finally, another \$5 billion of "assumed income" is presently not being earned thanks to interest rate suppression by the Fed. Our method for deriving normalized profitability assumes that a portion of Berkshire's current cash will ultimately be invested in higher-earning assets. \$5 billion represents the present value of the portion of cash likely be deployed in the intermediate term, perhaps on share repurchases. In all, of the \$42 billion in "profit," just over half is already accounted for (or doesn't exist yet as cash profit).

With that context, Berkshire retired a meaningful number of shares at very attractive prices in 2020. If this signals a durable willingness to shrink the left side of the balance sheet when it can be done opportunistically, then we may be in the midst of the next great pivot at Berkshire. Couple that with capital spending, lengthening debt, locking in record-low interest rates, opportunistically making one-off acquisitions, even if not elephants, and picking off shares of publicly traded companies when they are cheap and present earning power, and you have a capital allocation machine still humming after 56 years of running circles around everyone else.

Berkshire Hathaway: Ten-Year Expected Return

“Lucy, you got some ‘splainin’ to do...” – Ricky Ricardo

Conventional history measures the compounding of earning power at Berkshire by adding this year’s profit to the capital base, projecting the prospective return on the old base plus the return on the incremental capital and repeating the same year after year. The math has been very straightforward since Berkshire’s acquisition of Burlington Northern Santa Fe closed in 2010. Prior to that seminal transaction, the method had been similarly consistent back to the closing of the General Reinsurance deal in 1998. Enter 2020 and the math is thrown on its head again. For years, Berkshire’s return on equity matched its progression in book value. Returns on the shares generally followed suit, though not in lockstep. So, what changed? Berkshire repurchased a material amount of its common stock in the secondary market, that’s what changed.

Because writing and reading about accounting is so entertaining, let’s examine a very simple progression of a hypothetical statement of changes in shareholders’ equity:

	Common Stock and Capital in Excess of Par	Retained Earnings	Non-Controlling Interests	Shareholders’ Equity
Balance December 31, Year 0	\$100,000	\$890,000	\$10,000	\$1,000,000
Net Earnings		99,000	1,000	100,000
Balance December 31, Year 1	100,000	989,000	11,000	1,100,000
Net Earnings		108,900	1,100	110,000
Balance December 31, Year 2	100,000	1,097,900	12,100	1,210,000
Net Earnings		119,900	1,210	121,000
Balance December 31, Year 3	\$100,000	\$1,217,690	\$13,310	\$1,331,000

Our hypothetical business earns a 10% return on equity each year, both on current equity and retained earnings. Berkshire’s statement of change in equity has appeared similarly in recent years, particularly if using our normalized earnings progression instead of the volatile series so greatly impacted by short-term swings in the stock portfolio and underwriting. In none of the three years were any shares repurchased or dividends paid.

For the uninitiated to accounting, the “Common Stock and Capital in Excess of Par” figures can be simply viewed as equity capital invested in the firm. Any business that never sells new shares or repurchases shares would see an unchanged balance over time. “Retained Earnings” are just what the name suggests – profits not paid as dividends but retained and added to the equity base. “Non-Controlling Interests” figures represent any portion of the company not owned by the company. A non-controlling interest is included here to simulate the 8.1% share of MidAmerican Energy not owned by Berkshire. The balance represents roughly 1% of Berkshire’s total equity. To keep things simple for the example it also earns 10% on equity.

Should you use this illustration in comparison to Berkshire’s actual consolidated financial statements, there are some nuanced items left out here in the spirit of keeping things simple. A key difference is a column of data in the real financials dubbed “Accumulated Other Comprehensive Income.” Without too much tedium, this was a great set of data in that prior to the 2017 TCJA tax code change, unrealized gains on the stock portfolio flowed through the balance sheet but were not considered income on the income statement until realized. The accounting treatment was to call those unrealized gains accumulated other comprehensive income, kept separate from retained earnings. It was nice to monitor the progression of profits from the operating businesses separately from the whipsaw you get with annual (or quarterly)

changes in stock prices. Now the two components are combined, and the retained earnings balance jumps around like a cat on a hot tin roof. C'est la vie.

Suppose our company has 1,000 shares outstanding, constant over the three-year progression. If the stock traded at one times book value, the price would be \$1,000 per share at the end of year 0. If the stock maintained a price of one times book, it would be \$1,100, \$1,210 and \$1,330 in each successive year. The stock is compounding at 10%, which precisely matches the return on equity. They are one in the same. By extension, if the stock began and continued at 120% of book value, the price at the outset is \$1,200 and by year 3 would be \$1,597.20. The compound return in the shares matches the return on equity, assuming the stock remains at 1.2 times its book value.

Let's complicate things a bit and introduce an additional variable.

	Common Stock and Capital in Excess of Par	Retained Earnings	Treasury Stock	Non- Controlling Interests	Shareholders' Equity
Balance December 31, Year 0	\$100,000	\$890,000	0	\$10,000	\$1,000,000
Net Earnings		99,000		1,000	100,000
Balance December 31, Year 1	100,000	989,000	0	11,000	1,100,000
Net Earnings		108,900		1,100	110,000
Balance December 31, Year 2	100,000	1,097,900	0	12,100	1,210,000
Net Earnings		119,900		1,210	121,000
(Acquisition) of Common Stock			(60,500)		(60,500)
Balance December 31, Year 3	\$99,890	\$1,217,800	(\$60,500)	\$13,310	\$1,270,500

We've now entered the realm of the new and improved Berkshire Hathaway, buying back its undervalued shares in earnest. In the example, our hypothetical company spent exactly half of profit repurchasing shares. Given the business again earned 10% on equity, a repurchase of half of profit, 5% of equity, if made at book value would retire 5% of outstanding shares. Spending half of profit requires buying 50 shares at \$1,210 per share for a total of \$60,500. The investor sees book value grow by only 5% even though the company earned 10% on equity and didn't pay a dividend. Is this fair? There are several ways to answer that. Take the non-controlling interests. In the prior example, and for the first two years of this example, both businesses earned the same 10% return on equity and thus proportional ownership was maintained at 1% of the total equity in the parent. Following repurchase of the parent's shares in year 3, the non-controlling interests' ownership of the parent grows to 1.0476% of the book value and 1.0526% of the book value *per share*. This illustrates that the real total ownership grew by the full 10% return on equity.

The example assumes the shares were purchased at book value, which we know is almost never the correct proxy for a company's intrinsic value or the actual price paid in share repurchases. An investor requiring a 5% earnings yield would pay twice book value for a company earning 10% on equity. Some investors require more earnings yield, some require less. It boils down to opportunity cost, expected growth and any number of considerations. Suppose however that we agree that a 5% earnings yield is fair value. What if the management of this company spent half of profit purchasing shares at three times book value in year 3 instead of at book value? The purchase would cost the same \$60,500. At three times book value the shares would fetch \$3,630 per share. On 1,000 shares outstanding, that makes the market value of the firm \$3.63 million. How many shares can be purchased for three times book and \$3,630 per share? The answer ain't 5% that's for sure! The answer is 1/3rd of 5%, correct? In this scenario, book value grows by the half of profits not spent on repurchases and retained, so by 5%. However, when thinking about investment return, the repurchase would only retire 16.67 shares, not 50. Your pro-rata ownership in per share terms does not grow by the half of profit repurchasing shares, but by only 1.67%. It's a

dilutive transaction because the purchases are made at yields below the company's return on equity. That's not to say that a 3.3% earnings yield is unacceptable. If the business grows fast enough, or there exists a greater fool willing to pay more for the shares than three times book value and 30 times earnings, the price could be right. Some combination of growth and multiple expansion can get you there.

Lest this accounting lesson induce sleep in those still reading, back to Berkshire. The exercise is intended to illustrate how repurchases of common stock, if executed at regularly attractive prices, will alter the growth trajectory of Berkshire. As long as repurchases are made at low prices, investors can still expect to earn close to the return on equity of the business. Presuming (incorrectly) book value is a proxy of fair value, then purchases made at premiums to book value will be dilutive. However, if purchases are made at discounts to intrinsic value, even if intrinsic value is higher than book value, then the purchases will be accretive.

The table below has been included and updated in the letter since 2015. The left side of the table tracks Berkshire's progression in market cap, net income, valuation and records the price change in the A shares by year. At last year's writing our estimate for 2020 profit was \$46.1 billion. Given weakness among numerous subsidiaries due to the pandemic-weakened global economy, Berkshire's 2020 normalized profits are apt to be only \$41.6 billion using our GAAP adjusted method. 2020 profits are depressed by nearly \$3 billion. The majority of weakness resides among many of the companies within the MSR group and to a lesser extent at the railroad. A full recovery and progression in normalized profitability at 10% in 2021 would see Berkshire earning \$48.9 billion. This now is where the presentation of expected profitability for 2021 and beyond heads off the rails.

The progression on the right side of the table demonstrates normalized profitability compounding at two rates of growth, one at a return on equity of 8% and the higher at 10%. A 10% base case for profitability at Berkshire (shaded in green) has proven conservative over the 21 years we've owned the stock. You will later in our 56-year return page that Berkshire's progression in book value per share exceeds 10% in all but one annualized period, the 22-year average gain from 1998 to 2020. **Said more plainly, Berkshire has consistently earned more than 10% on equity over the past two decades.**

The 10% return assumption bounds the high side of expected outcome that we find reliability and durably predictable. Maintaining a 10% *unleveraged* return becomes more challenging the larger Berkshire grows. The railroad, energy businesses and the insurance operation, which combined make up more than 75% of Berkshire's assets, profits and value, collectively earn more than 10% on equity capital. The MSR collection does not. Control premiums required in modern acquisitions work to defeat acceptable returns. Private equity and other corporate buyers operating with more leverage make the elusive giant acquisition on attractive terms in a world of very low interest rates a near impossibility, particularly outside of times of crisis. The deal for the railroad was inked in 2009, for example, and done prior to the world figuring out how the economics of the industry had improved dramatically for the better. Berkshire appreciates the difficulty of achieving a return hurdle and remaining true to its principles in a world of abundant liquidity, low interest rates and little respect for risk.

From a valuation perspective, should Berkshire durably earn a prospective 10% on equity, then it's worth far more than its current 12.8 multiple to trailing normalized earnings. At an 18 multiple, the stock commands 65% upside by year-end 2021 using a recovered earnings figure and allowing for 10% growth. The \$880 billion market cap and 65% gain theorized in purple are neither an expectation nor a forecast for year-end 2021. The figures do become the base for compounding normalized profitability, *assuming retention of all profit*.

Ten-Year Expected Return at Year-End 2018 With ROE at 8% and 10%

	2014	2015	2016	2017	2017	2018	2019 (e)	2020 (e)	2021 (e)	10- Year: 2030 8% ROE and growth (\$44.5B base)				10- Year: 2030 10% ROE and growth (\$44.5B base)			
		-12.50%	23.4%	21.9%	21.9%	2.8%	11.0%	At Int Val	At Int Val	13x	15x	18x	20x	13x	15x	18x	20x
					@ new tax												
Market Cap	\$371 B	\$325 B	\$401.2 B	\$489.4 B	489.4 B	\$501.5 B	\$551.8 B	\$533.1 B	\$880 B	\$ 1,249	\$ 1,441	\$ 1,729	\$ 1,921	\$ 1,500	\$ 1,731	\$ 2,078	\$ 2,308
Net Income	\$23 B	\$25 B	\$27.5 B	\$29.1 B	\$31.8B (H)	\$36.4 B	\$42.1B	41.6*	\$48.9	\$ 96.1	\$ 96.1	\$ 96.1	\$ 96.1	\$ 115.4	\$ 115.4	\$ 115.4	\$ 115.4
P/E	16.1x	13.0x	14.6x	16.8x	15.4	13.8	13.1x	12.8x	18x	13	15	18	20	13	15	18	20
Earnings Yield	6.2%	7.7%	6.9%	6.2%	6.5%	7.3%	7.6%	7.8%	5.6%	7.7%	6.7%	5.6%	5.0%	7.7%	6.7%	5.6%	5.0%
Stock Price Change										106%	170%	224%	260%	181%	224%	290%	333%
Annual Gain Per Year		-12.5%	23.4%	21.9%	21.9%	2.8%	11.0%	2.4%	65.1%	8.9%	10.5%	12.5%	13.7%	10.9%	12.5%	14.6%	15.8%

Source: Berkshire Hathaway; Semper Augustus

If Berkshire's capital allocation strategy has indeed shifted to where it will spend a material portion of annual profit (and even some of its cash reserves) buying back shares, then the portion spent on share repurchases will obviously not be retained and reinvested in the business. Accordingly, assets, profits, equity and intrinsic value will grow at a reduced rate reflective of the portion of profit directed to repurchasing stock. The initiation of a dividend would have a similar effect. Naturally I'm talking about a reduction in growth in the dollar balances of assets, equity, profits and intrinsic value.

The purpose of the accounting exercise above was to illustrate it's the growth in profit, equity and intrinsic value *per share* that matters. If only half of profits are incrementally invested, then the business grows by half and the balance of return comes via increased ownership in the company thanks to a shrinking share count. The growth in intrinsic value per share will be in part determined by the prices Mr. Buffett and his successors choose to pay when buying shares in the market. To date, nobody does it better. In the share repurchase department at most companies, so many shares are retired at prices that destroy intrinsic value but are undertaken under the "repurchasing shares is returning capital to the shareholder" mantra, which is code for we are trying to offset the dilution created by paying ourselves obscene amounts of stock.

The culture of Berkshire is one of creating and understanding intrinsic value. If Berkshire genuinely shifted allocation strategy to retiring stock, and they have stated their intent to do so, then the acknowledgment of Berkshire's ability to deploy capital by elephant hunting only in times of crisis is a monumental one. The best investment alternative sans crisis when liquidity is scarce is front and center and is simply executed via a telephone call to whomever replaced the legendary John Freund as Berkshire's stockbroker. A smaller Berkshire is a better Berkshire if doing so maintains or even enhances profitability.

If the shift in capital allocation strategy proves durable, then the Ten-Year Expected Return table in its present form makes its final appearance in the Semper annual letter. For profits to grow at 8% to \$96 billion or by 10% to \$115.4 billion, unleveraged return on equity must be maintained at 8% to 10% **and** Berkshire must *not* buy back shares or pay dividends. I've known this table was a goner at the point strategy genuinely altered course. I was uneasy with the table the last two years when Berkshire spent \$4.9 billion buying back roughly 1% of its shares in 2019 and spending a smaller \$1.4 billion in 2018, barely denting the share count.

Below are new and improved Ten-Year Expected Return Tables. Projections incorporate various scenarios involving presumed ongoing share repurchases. The plural is used to illustrate the importance and outcome of paying lower and higher prices when buying back stock. The decision to buy back shares is an alternative to whatever else can be done opportunistically with capital. A repurchase is made at the earnings yield. Recall the purchase of shares at book value for a company earning 10% on equity yields a 10% return. Paying 120% of book value yields 8.33% and paying twice book value yields 5%. The

purchase at half of book value, last made by Berkshire in 1975 yielded 40%. What? The math geek notes the correct answer should be 20%, unless you consider that Berkshire was earning 20% on equity in those days, making the repurchase the equivalent of a 40% return on capital decision. That would be the fish in the barrel, weighed against opportunity cost at the time, which the 1973-1974 bear market created plenty of.

The method here is the same as in the prior table. We still present two cases: the expected case of return on equity growing at 10% and also the “bear case” 8% return. Introduced are share repurchases made with half of annual profit and at various hypothetical levels to book value. We also have the same range for terminal price to earnings multiple using 13, 15, 18 and 20 times. A 13 multiple to an unleveraged 8% return on equity becomes the floor (much of the world pays far higher premiums for inferior businesses today). 20 times earnings may sound wildly high for Berkshire. Is 5% as a Berkshire earnings yield really a stretch in a world of zero interest rates? Some would call it a bargain. The 10-year U.S. Treasury yields 1% after all, making the multiple 100 (you don’t see many bond investors reinvesting their 1% coupons at mid-to-high single digit yields either so the reinvestment portion of return pales by comparison).

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Ten-Year Expected Return at Year-End 2020 With ROE at 8% and 10% Share Repurchases Assumed at 50% of Net Income

Repurchase with 50% of profits at 50% of BV						Repurchase with 50% of profits at 50% of BV					
10-Year: 2030 8% ROE and growth (\$44.5B 2020 base)						10-Year: 2030 10% ROE and growth (\$44.5B 2020 base)					
	13x	15x	18x	20x			13x	15x	18x	20x	
Market Cap	674	778	933	1,037			918	1,060	1,272	1,413	
Net Income	51.9	51.9	51.9	51.9			70.7	70.7	70.7	70.7	
Share count	666	666	666	666			534	534	534	534	
P/E	13	15	18	20			13	15	18	20	
Earnings Yield	7.7%	6.7%	5.6%	5.0%			7.7%	6.7%	5.6%	5.0%	
Stock Price Change	291%	336%	403%	448%			494%	570%	684%	760%	
Annual Gain Per Year	14.6%	15.9%	17.5%	18.5%			19.5%	21.0%	22.9%	24.0%	
Share Count Reduction	57%	57%	57%	57%			65%	65%	65%	65%	
Annual Share Reduction	4.6%	4.6%	4.6%	4.6%			5.1%	5.1%	5.1%	5.1%	

Repurchase with 50% of profits at 100% of BV						Repurchase with 50% of profits at 100% of BV					
10-Year: 2030 8% ROE and growth (\$44.5B base)						10-Year: 2030 10% ROE and growth (\$44.5B base)					
	13x	15x	18x	20x			13x	15x	18x	20x	
Market Cap	674	778	933	1,037			918	1,060	1,272	1,413	
Net Income	51.9	51.9	51.9	51.9			70.7	70.7	70.7	70.7	
Share count	1,019	1,019	1,019	1,019			918	918	918	918	
P/E	13	15	18	20			13	15	18	20	
Earnings Yield	7.7%	6.7%	5.6%	5.0%			7.7%	6.7%	5.6%	5.0%	
Stock Price Change	190%	219%	263%	293%			288%	332%	398%	443%	
Annual Gain Per Year	11.2%	12.3%	13.8%	14.7%			14.5%	15.8%	17.4%	18.4%	
Share Count Reduction	34%	34%	34%	34%			40%	40%	40%	40%	
Annual Share Reduction	2.9%	2.9%	2.9%	2.9%			3.4%	3.4%	3.4%	3.4%	

Repurchase with 50% of profits at 120% of BV						Repurchase with 50% of profits at 120% of BV					
10-Year: 2030 8% ROE and growth (\$44.5B base)						10-Year: 2030 10% ROE and growth (\$44.5B base)					
	13x	15x	18x	20x			13x	15x	18x	20x	
Market Cap	674	778	933	1,037			918	1,060	1,272	1,413	
Net Income	51.9	51.9	51.9	51.9			70.7	70.7	70.7	70.7	
Share count	1,092	1,092	1,092	1,092			1,002	1,002	1,002	1,002	
P/E	13	15	18	20			13	15	18	20	
Earnings Yield	7.7%	6.7%	5.6%	5.0%			7.7%	6.7%	5.6%	5.0%	
Stock Price Change	177%	205%	246%	273%			264%	304%	365%	406%	
Annual Gain Per Year	10.7%	11.8%	13.2%	14.1%			13.8%	15.0%	16.6%	17.6%	
Share Count Reduction	29%	29%	29%	29%			35%	35%	35%	35%	
Annual Share Reduction	2.6%	2.6%	2.6%	2.6%			3.0%	3.0%	3.0%	3.0%	

Repurchase with 50% of profits at 150% of BV						Repurchase with 50% of profits at 150% of BV					
10-Year: 2030 8% ROE and growth (\$44.5B base)						10-Year: 2030 10% ROE and growth (\$44.5B base)					
	13x	15x	18x	20x			13x	15x	18x	20x	
Market Cap (billions)	674	778	933	1,037			918	1,060	1,272	1,413	
Net Income	51.9	51.9	51.9	51.9			70.7	70.7	70.7	70.7	
Share count	1,170	1,170	1,170	1,170			1,091	1,091	1,091	1,091	
P/E	13	15	18	20			13	15	18	20	
Earnings Yield	7.7%	6.7%	5.6%	5.0%			7.7%	6.7%	5.6%	5.0%	
Stock Price Change	166%	191%	229%	255%			242%	279%	335%	372%	
Annual Gain Per Year	10.3%	11.3%	12.7%	13.5%			13.1%	14.3%	15.8%	16.8%	
Share Count Reduction	24%	24%	24%	24%			29%	29%	29%	29%	
Annual Share Reduction	2.1%	2.1%	2.1%	2.1%			2.6%	2.6%	2.6%	2.6%	

Repurchase with 50% of profits at 200% of BV						Repurchase with 50% of profits at 200% of BV					
10-Year: 2030 8% ROE and growth (\$44.5B base)						10-Year: 2030 10% ROE and growth (\$44.5B base)					
	13x	15x	18x	20x			13x	15x	18x	20x	
Market Cap	674	778	933	1,037			918	1,060	1,272	1,413	
Net Income	51.9	51.9	51.9	51.9			70.7	70.7	70.7	70.7	
Share count	1,252	1,252	1,252	1,252			1,190	1,190	1,190	1,190	
P/E	13	15	18	20			13	15	18	20	
Earnings Yield	7.7%	6.7%	5.6%	5.0%			7.7%	6.7%	5.6%	5.0%	
Stock Price Change	155%	179%	214%	238%			222%	256%	307%	341%	
Annual Gain Per Year	9.8%	10.8%	12.1%	13.0%			12.4%	13.5%	15.1%	16.0%	
Share Count Reduction	18%	18%	18%	18%			22%	22%	22%	22%	
Annual Share Reduction	1.7%	1.7%	1.7%	1.7%			2.0%	2.0%	2.0%	2.0%	

There is a lot of scenario information here. In all scenarios Berkshire is presumed to spend half of net income repurchasing shares. Excluding the portion of earnings retained by Berkshire's stock market investees, the repurchase assumption is closer to two-thirds of operating profit. Book value in dollar terms will grow by half of the return on equity and book value per share will grow incrementally faster depending on the price paid in repurchasing shares. Illustrated are repurchases taking place at five multiples to book value: 50%, 100%, 120%, 150% and 200%.

Under a regimen of repurchasing shares, Berkshire will grow much more slowly in dollar terms than if profits were retained. From our prior 10-year projection assuming no repurchases, we have Berkshire's net income growing from \$44.5 billion to \$96 billion at an 8% return on equity and to \$115 billion at 10%. With half of profit and two-thirds of operating profit spent retiring shares, net income only grows to \$51.9 billion at an 8% return on equity and to \$70.7 billion at 10%.

I included the five scenarios with differing multiples to book value paid to illustrate how much more penal paying high prices can be. The likelihood that shares can be bought at half of book is ridiculous in today's world but frames the discussion of capital allocation well done and done poorly.

The case of Berkshire earning 10% on equity and repurchasing shares between 120% and 150% of book value is in the wheelhouse of realistic. This is the Semper working assumption. The difference even at these levels is dramatic. At 120%, Berkshire shrinks its annual share count by 3% for a 35% decline in overall shares to just over 1 million (from an assumed 1,532,848 at year-end 2020). Paying 150% of book value reduces the shares out annually by 2.6% and 29% over a decade. At a terminal P/E multiple of 18, the shareholder earns 16.6% annually versus 15.8% with shares bought at the higher price. In either case the investor earns multiple expansion, ongoing return on equity and accretion from shares being retired for less than intrinsic value. The prior case with no share repurchases telegraphed a 14.6% annual return with the stock at 18 times earnings and a market cap of \$2.1 trillion (smaller than Apple today). With a robust repurchase program, the market cap is only \$1.3 trillion, but our annual return as investors is improved by 1.2% to 2.0% per year depending on how aggressively Omaha reaches in price per share.

Let's take the worst of worst cases. Presume Berkshire's return on equity falls to 8% from what has been more than 10% consistently for each of the past two decades. If half of diminished profits are spent buying back shares at 200% of book value (an adjusted earnings yield of 4%), annual share count only declines by 1.7% and 18% cumulatively. At a terminal 13 earnings multiple, the investor makes 155% over the next decade, a 9.8% annual gain. Gads. The repurchases allow the base of capital to earn 8%, with only half of profit and 1/3 of operating profit retained and needing to be put to work outside of repurchases.

Further, the model calculates profit at the presumed return on equity using trailing yearly book value. Berkshire has earned more than 10% consistently on average annual equity, making our 10-year projection that much more conservative. A proper method of measuring profitability at Berkshire leans on our intrinsic value methods, discussed shortly.

There are simply huge advantages when comparing a buyback program at Berkshire to what's done more broadly. In Berkshire's case, every dollar spent repurchasing shares retires shares, the lower the price the better. By contrast, when the companies comprising the S&P 500 retire shares, spending half to 2/3's of income annually in doing so, they are mostly offsetting the dilution created by paying themselves in shares. When Berkshire buys shares at 120% of book value with half of income, they retire 3.4% of shares. When the S&P 500 buys shares with half of profits at 25 times earnings, they should retire 2% of shares but don't. There are 2% of shares being given away on the front end, so the investor's ownership is not improved. The solution? Spend more than half of profit or borrow money to buy more shares. Both courses of action are practiced in spades. It is a complete and utter screw job being practiced on shareholders right in front of their eyes. The textbook case on governance, capital allocation and business ethics done right is right here at Berkshire. It's not a volume much read or emulated. In the meantime, the shares meander at 12 times earnings, an 8.3% earnings yield, ripe for the picking. Keep plowing those profits into the shares, Omaha.

Estimating Fourth Quarter and Full-Year GAAP Net Income and Change in Book Value

Expected 2020 Fourth Quarter and Full Year Results

(In billions of USD)	First 9 months	SAI Q4 Est.	SAI 2020 Est.
Change in Investment Portfolio (Ex KHC) *	\$0.8	\$41.7	\$42.5
Derivative Contract gains (losses)	(0.6)	0.9	1.5
Operating Earnings	8.9	7.5	16.4
Earnings Before Tax	10.3	50.0	60.3
GAAP Income Tax	3.2	10.0	13.2
Effective Tax Rate	0.3	0.2	0.2
Net Income	7.1	40.0	47.2
Earnings Attributable to Noncontrolling Interests	0.4	0.4	0.8
Net Income Attributable to BRK Shareholders #	6.7	39.7	46.3

*Includes gain/loss on fixed income

May not sum due to rounding

An outsized return on Berkshire's investments in common stocks will cause an overstatement in reported profit relative to economic profit for the second year in a row. Berkshire will report GAAP net income of roughly \$46 billion for 2020 which coincidentally is only modestly above our estimation of Berkshire's normal economic earning power of \$44 billion. That the two measures roughly match is pure chance. A \$44 billion pre-tax gain in Berkshire's investment portfolio during the year masked the pain felt among many of the operating businesses. Pre-tax operating earnings (excludes gains and losses on investments) will decline from \$30 billion in 2019 to \$16.4 billion. While the pandemic mightily harmed several subsidiaries, the drop in operating profit was not as severe as it seems. The decline by nearly \$14 billion includes a \$10.6 billion pre-tax (\$10.4 billion after-tax) write-down of the carrying value of Precision Castparts. The real decline in profitability excluding the charge is closer to \$3.2 billion, just over a 10% drop, painful, nonetheless.

On the sunny side, earning as much as Berkshire did on an operating basis in a year riddled with so much economic hardship is testament to the diversity and strength of the conglomerate. All of the \$3.2 billion decline in profitability should be recovered as the economy mends. The \$7.5 billion pre-tax estimate for fourth quarter operating earnings demonstrates that much of the recovery is underway. GEICO is likely to post negative underwriting results for the quarter (and perhaps the first quarter of 2021) because the credits to compensate drivers for fewer pandemic miles driven (lower losses) run through spring. Railcar loadings at BNSF remain weaker by mid-single digits, helped by a high level of variable costs. Further, the industrial economy and trade remain below 2019 levels, which negatively impacts numerous of the manufacturing and service businesses. In all, though, given the degree to which so much of Berkshire was hamstrung in March and April, the recovery of those units harmed and the resilience of groups like energy and insurance lends confidence in the remarkable strength of the whole.

The Stock Portfolio

The media is likely to comment on the 43% decline in Berkshire's reported profit from 2019's record \$81.5 billion. There are so many nuances to accounting for Berkshire's profitability that mere comment on the reported figures is an exercise in futility. GAAP earnings figures are meaningless, requiring myriad adjustments to arrive at true economic earnings. The latter part of the letter touches on these as usual. Period-to-period movement in the stock portfolio will grab headlines but has little utility when estimating core earning power. Of 2019's \$102.7 billion in pre-tax earnings, fully \$72.6 billion was from gains in the investment portfolio. In 2020, \$44.0 billion of the \$60.3 billion is from the portfolio. In a "normal" year, price gains (expressed as retained earnings by the portfolio companies) should be closer to \$10 billion on a pre-tax basis. Still, you will read all about the "headline" number on Saturday February 27th when the annual report is released.

Berkshire takes heat when its stock price lags the broader market. In addition, the peanut gallery is often critical of the performance and management of the stock portfolio, housed primarily within the insurance operations. I don't see the reason for criticism. Berkshire had undergone a number of seismic shifts in strategy over the years. The first was clearly the move to insurance (and investments in securities) with 1967's purchase of National Indemnity. You could argue that the first genuine pivot came when Mr. Buffett closed his partnership, a decision made at a secular top. Regardless, the original textile operation was a terrible business, and though it wasn't fully closed until 1985, the decision to redirect capital away from textiles kept Berkshire from certain failure.

The next major pivot occurred at the very peak in both Berkshire's stock price and also in its stock portfolio. Riding the wave of the great bull market in common stocks, by mid-1998 Berkshire's stock portfolio had grown so much and was so expensive that the portfolio comprised 115% of total book value and 65% of assets. Stock picking was superb, and the portfolio ran circles around the market, even if excluding the additive effect of leverage created with low-cost float. Berkshire solved its valuation "problem" by acquiring General Reinsurance in part to diversify away from common stocks. Berkshire used its stock as the currency for the acquisition which was trading for a record three times book value at the time. I've discussed this before and will include a short synopsis in a bit.

First, let's examine the performance of the Berkshire stock portfolio against the S&P 500 from the end of 1998 forward. Both were very expensive at that point and required time to work off excessive valuation. The big blue chips turned down in 1999 (Coke comprised 36% of the Berkshire portfolio and was extremely expensive in 1998) while the index marched higher into 2000 driven by the tech and Internet bubble. Berkshire's stocks returned 2% in 1999 while the index gained 21%. Still, even beginning with a 19% deficit, the Berkshire portfolio outperformed the index from 1998 to today. The table below contains annual returns for both the stock portfolio and the index. Included as well are compound growth series forward beginning with 1999 returns and also working backward from 2020.

Pay special attention to the reverse CAGR working backward from 2020. These are the one-year return, the two-year return and so forth. Two bifurcated time series exist here, split by the 2008 bear market. Berkshire's stocks for the 12 years back to year-end 2008 averaged 12.8% per year. For the 22 years beginning 1999 the stocks averaged 7.6%, reflecting the post 1998 decline in portfolio peak valuation. Stock returns bear on Berkshire's overall return on equity. Stock market returns are presented pre-tax. Unrealized gains and losses are "taxed" on a non-cash basis at 21%, with a tax liability accumulating as deferred. At the current tax rate, a 13% pre-tax return increases book value by 10.3%. When thinking about Berkshire's normalized return on equity (which we presume is durably 10%), book value understates intrinsic value if actual taxes are either never paid or are paid "later."

Berkshire Hathaway Stock Portfolio						
Year	Berkshire Portfolio Total Return	Reverse CAGR from 12/31/2020	CAGR from 12/31/1998	S&P 500 Total Return	Reverse CAGR from 12/31/2020	CAGR from 12/31/1998
1999*	2.0%	7.6%	2.0%	21.1%	7.2%	21.1%
2000	8.6%	7.9%	5.2%	-9.1%	6.6%	4.9%
2001	-17.4%	7.9%	-2.9%	-11.9%	7.5%	-1.0%
2002	0.2%	9.4%	-2.1%	-22.1%	8.6%	-6.8%
2003	27.5%	9.9%	3.2%	28.7%	10.6%	-0.6%
2004	5.6%	9.0%	3.6%	10.9%	9.6%	1.3%
2005	6.0%	9.2%	3.9%	4.9%	9.6%	1.8%
2006	18.5%	9.4%	5.6%	15.8%	9.9%	3.4%
2007	1.3%	8.8%	5.1%	5.5%	9.5%	3.7%
2008	-24.4%	9.4%	1.7%	-37.0%	9.8%	-1.4%
2009	19.6%	12.8%	3.2%	26.5%	15.0%	0.9%
2010	15.0%	12.2%	4.2%	15.1%	14.0%	2.0%
2011	6.5%	11.9%	4.3%	2.1%	13.9%	2.0%
2012	14.7%	12.5%	5.1%	16.0%	15.3%	2.9%
2013	28.8%	12.3%	6.5%	32.4%	15.2%	4.7%
2014	7.7%	10.1%	6.6%	13.7%	12.9%	5.2%
2015	-4.5%	10.5%	5.9%	1.4%	12.8%	5.0%
2016	13.1%	13.7%	6.3%	12.0%	15.2%	5.4%
2017	15.2%	13.9%	6.7%	21.8%	16.0%	6.2%
2018	-13.6%	13.5%	5.6%	-4.4%	14.2%	5.6%
2019	39.8%	30.0%	7.0%	31.5%	24.8%	6.7%
2020**	21.0%	21.0%	7.6%	18.4%	18.4%	7.2%

*Internally SAI estimated BRK portfolio return

**Holdings as 9/30/20; return to yearend

Source: Berkshire Hathaway; Semper Augustus Calculations; Bloomberg Data

Time was required to work off excessive valuations in both Berkshire's stock portfolio, its own shares and in the S&P 500. Despite the incredible ramp in stock prices over the past decade, the index only returned 7.2% annually since 1998 (with dividends included) while Berkshire's stocks returned 7.6%. Beginning the series a year later eliminates the 19% differential in 1999, and instead of beating the market by 0.4% the annual outperformance would be closer to 1.5%. Regardless, 1998 was a bubble in both the Berkshire portfolio and in the market. The ultimate 2000 market peak was yet a bigger bubble. On the backward-looking growth series, the index averaged 15% for the most recent 12 years beginning in the depths of the financial crisis at the end of 2008 through 2020. The 15% stretch of average annual returns, relative hell for many value-oriented and active investors, allowed the returns from 1998 to improve from a negative 1.4% to the aforementioned 7.2%. Wow. Over the 12 years, Berkshire's stocks averaged "only" 13.7%, 1.5% behind the index. Given the 12-year run in the S&P 500, there are now numerous intervals where Berkshire lags (using the reverse compound intervals). It's ahead for the one and two-year periods but then trails for the next 16 reverse annualized periods. There are a whole bunch of people in this industry that would be critical of that fact. Of course, for the 19, 20, 21 and 22-year reverse

annualized periods Berkshire wins again. Then, of course, stretching the table further back Berkshire simply dominates, but the claim is “ancient history.” When we examine the long-term record shortly, Berkshire will be seen to outperform over most periods when measuring the change in book value per share, a metric more in control of management.

When you flip the compounding series on its head and run it forward, however, the story is entirely opposite. I’d mentioned lagging by 19% in 1999 when Coke and the blue chips rolled over. That lag was made up for the next year when the stocks earned 8.6% versus a 9.1% decline in the index. The two-year annualized return at that point was 7.9% versus 6.6% for the S&P. Berkshire then maintains its advantage for the duration, only seeing the index pull up to even for a moment at the end of 2018 at 5.6% annualized for each. Then Apple and Co. zoomed ahead and Berkshire surges again into the lead.

So, which is it? Goat or G.O.A.T.? The bottom line is the various methods used in measuring “performance” are extremely nuanced. The time series chosen to measure performance invariably dictates the outcome. Why does one fund report a one, three and ten-year record while another offers up the one, three and five? It can be grossly manipulated.

The investor understanding that portfolio returns are materially ahead of the businesses and acting on it can add enormous utility. It didn’t take an econometric model to know Berkshire’s stock market holdings by the end of 1997 were extremely overvalued. Then again, most of the investing world was drunk on the Kool-Aid at the time. In retrospect, the critic would ask why Berkshire didn’t sell its stocks if they were so expensive in 1998. Why settle for a two-decade return that would average 5.6% and require Apple’s incredible run to average 7.6% for 22 years? Allow me to digress into the Gen Re acquisition, a subject detailed in past letters but with Berkshire’s stock portfolio, Apple in particular, outpacing underlying business fundamentals is worth a brief recap.

Got Bonds?

Berkshire’s stock portfolio was ridiculously expensive in 1998, matched by the stock market and likewise by Berkshire’s own shares. Alan Greenspan had proclaimed irrational exuberance two years prior, yet everything continued straight up. Coca-Cola, 36% of Berkshire’s stock portfolio by then, traded for nearly 50 times earnings (earnings were not only far from depressed but at an all-time high margin). The captain of USS Berkshire has a thing about not paying taxes beyond those absolute necessary. Knowing your 34-year record of compounding book value per share at 25% and the stock by 29% (both a wee bit more than slightly ahead of the S&P 500’s 12.2% annual gain) is likely headed in reverse, what to do? Sitting on a massively overvalued portfolio, how about buying an insurance company so you can diversify away from insurance? Huh?

Berkshire paid \$22 billion in *stock* for General Reinsurance, of which \$14.5 billion was goodwill. That’s a pretty healthy premium for the tangible equity of an insurance company. Must be a catch. Berkshire issued General Re shareholders 272,200 shares of equivalent A shares at \$80,882 per share, 2.9 times Berkshire’s March 31, 1998 book value. The catch, part of it: Berkshire’s intrinsic worth was only about half that price, meaning Berkshire bought General Re for a little more than \$11 billion, not the \$22 billion headline price.

Berkshire’s use of its overvalued stock as currency was but one important aspect of the deal. The rest of the catch: The stock portfolio was extremely expensive as well. Fully 75% of Berkshire’s \$47.5 billion investment portfolio was invested in very highly appreciated, fundamentally overvalued common stocks. Against a cost basis of \$7.2 billion, the large \$36.2 billion stock portfolio comprised a whopping 115% of Berkshire’s entire book value.

Prior to the acquisition, 90% of Gen Re's investment portfolio was invested in fixed-income securities, typical of most insurer's invested assets. When the portfolios were consolidated, stocks combined at only half of the overall investment mix at year-end 1998, down from a three-quarters weighting in Berkshire's portfolio prior to the deal. Consolidated equities closed 1998 at \$37.3 billion, only \$1 billion more than Berkshire owned alone prior to the deal. The fixed-income balance, however, ballooned to \$31.2 billion, up from \$10.3 billion the year before.

Buying General Re *tripled* the size of Berkshire's insurance float, General Re's float of \$14.9 billion being twice as large as Berkshire's \$7.4 billion. Combined float totaled \$22.7 billion and increased invested assets at Berkshire by more than 50%, bringing an additional \$25 billion into the portfolio. It was an astounding transaction, paying \$22 billion in stock which was worth only about half that and adding \$15 billion in float which financed an additional \$25 billion in investment assets.

By design, in my opinion, stocks as a percentage of Berkshire's book value declined from 115% to only 69%. As a percentage of firmwide assets, the allocation to stocks declined to 30% from 65% without paying a dime in capital gains taxes, then at a rate of 35%.

I remain amazed whenever I go back and look at Berkshire before and after the General Re purchase. In an all-stock deal, Berkshire's shares outstanding increased by 23% while total firm assets increased 75%, excluding goodwill! General Re brought 43% of the assets to the party and received 18% of the combined entity. Yes, paying \$22 billion for General Re's 8.5 billion in equity meant Berkshire paid close to 2.6 times book value in the deal, but remember, adjusting for the valuation premium in the stock meant Berkshire really paid 1.3 times book value.

For context, the Berkshire stock portfolio subsequently "only" earned 7.6% per annum for the next 22 years. The anchor of the overvalued stock portfolio tugged on a mere 30% of assets and 65% of book value instead of 65% and 115% respectively. It took two decades to work the multiple to earnings on the portfolio down by half. In the meantime, the 70% of Berkshire's assets not being dragged under by multiple compression chugged along, literally in 2009 with the acquisition of the railroad. Had Berkshire not "diversified" away from stocks by buying a bond portfolio (effectively at 50 cents on the dollar thanks to the use of its overvalued shares), it would not have had the surplus capital to dividend out of the insurance operation and immediately into MidAmerican, the railroad, etc....

Had Berkshire not done the General Re deal and diversified away from stocks, returns for the next 22 years would have been much more heavily weighted by the stock portfolio. For 22 years Berkshire's stocks compounded at 7.6% while book value advance by 9.7%. Further, gains in Berkshire's stock portfolio are listed below on a pre-tax basis. Accretion in book value from the portfolio is accounted for after-tax. How important was it flipping stocks as a percentage of total firm assets from 65% to 30% in one fell swoop, freeing up capital to divert to businesses earning more than 10% on equity? Next time somebody suggests Berkshire trails the S&P 500 over some irrelevant period, either convey this nugget of trivia, or punch 'em square in the nose. If the latter, it was not my idea.

22 Years at BRK – Returns From 12/31/1998 to 12/31/2020

Gain in Book Value Per Share	9.7%
Gain in Berkshire Hathaway Stock	7.5%
Gain in Berkshire Hathaway Portfolio of Stocks*	7.6%
S&P 500 Total Return	7.2%

* Total return estimated using only disclosed positions in Berkshire's 13-F filings
Bloomberg and Semper Augustus Calculations

The merger strengthened General Re by leaning on Berkshire's capital strength to retain more of its reinsurance business. Prior to the merger, General Re had a stand-alone AAA credit rating, and without Berkshire's diversity and surplus capital relied heavily on the retrocessional market, even turning away attractive business to keep volatility of profits low. General Re's global footprint expanded since the merger, particularly in the last few years. While premium volume at General Re has only recently grown north of the \$6 billion it was writing at the time of the deal, it has paid substantial dividends over the years up to the holding company for deployment elsewhere.

Some observe that Berkshire overpaid for Gen Re given the lack of growth and particularly because Berkshire used its stock for the purchase, which are now trading for more than 4.3 times the price at the time of the acquisition. We couldn't disagree more. General Re was a terrific acquisition that required some cleanup in the early years as the company adopted Berkshire's underwriting discipline. Berkshire also ran off a sizable derivative book at great expense. Underwriting margins were consistently negative in the handful of decades leading up to the merger with combined ratios averaging 102% for every ten-year interval up to 50 years. They have been consistently profitable in the years since.

General Re is better capitalized today than at the time of the 1998 acquisition. The company had a history of underwriting integrity and discipline dating back to 1921 in North America and 1846 in Europe. Under Berkshire, General Re's reputation for integrity and discipline are only stronger. The quality of their written and retained business is superior to what it was as a stand-alone insurer. It is a far better company today as part of Berkshire, a consistent theme among organizations brought under the Berkshire umbrella.

A Bite of the Apple

The General Re acquisition is rehashed because Berkshire may be facing a similar, though less extreme predicament its Apple investment. High class problems involve making too much money too quickly.

Just as Coca-Cola was a huge part of Berkshire's stock portfolio returns in the years leading up to mid-1998, Apple has dominated equity portfolio returns in recent years. Against a cost basis of \$35 billion, Barring any fourth quarter sales, Apple closed 2020 as a \$125 billion position, even after having sold more than \$4 billion of the shares during the first nine months of the year. To put the \$90 billion gain over less than four years in perspective, it represents more than two years of normalized earnings across all of Berkshire at today's run rate.

The initial \$1 billion purchase of Apple was made in the first quarter of 2016, at that size most certainly by one of Berkshire's two portfolio managers, Todd Combs and Ted Weschler. Mr. Buffett piled on and built the holding to Berkshire's largest. The brief history:

Berkshire's Five-Year Ownership of Apple (2016 to 2020)

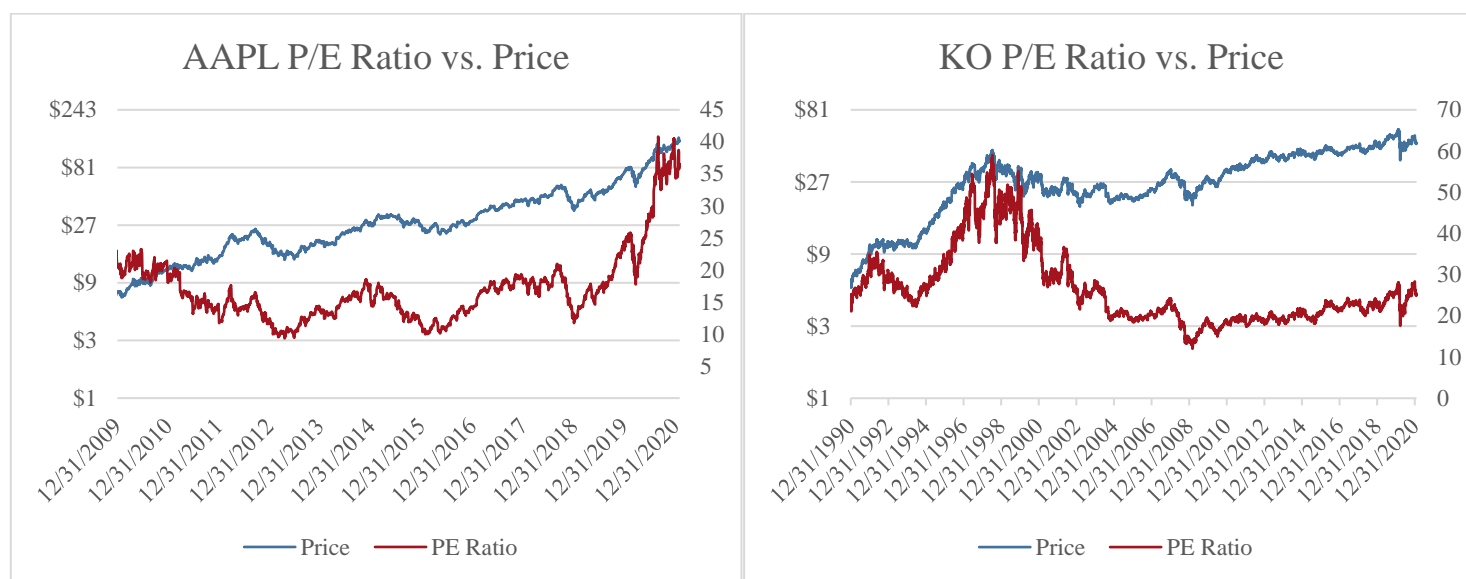
Date	Shares** (millions)	Cost Basis (millions of USD)	Cost Basis per Share	Market Value (millions of USD)	Market Value per Share
Q1 2016*	39.2	\$1,000	\$25.48	\$1,069	27.25
Q4 2016	245.0	6,747	27.54	7,093	28.95
Q4 2017	666.9	20,961	31.43	28,213	42.31
Q4 2018	1021.2	36,044	35.30	40,271	39.43
Q4 2019	1003.5	35,287	35.17	73,667	73.41
Q4 2020***	944.3	33,205	35.16	125,200	132.58

*Initial Buy Combs/Weschler

** All shares adjusted for 4-for-1 split in 2020

***Share count at 9/30. 2020 basis calculated using average cost method

Combining a high-quality growing business with a low purchase price is the recipe for a terrific investment. Case in point is Berkshire's ownership of Coca-Cola through 1998 and with Apple more recently. The trouble is, Mr. Market tends to award a price today for yesterday's performance. Coca-Cola was a rocket from Berkshire's large 1988 and 1989 purchases, plus a smaller 1994 add on. From their 1998 peak, Coca-Cola's returns have gone flat. In fairness, some of the relative weakness is surely attributed to working down the high multiple to earnings. Who knew as well two decades ago the degree to which consumers would thirst for healthier alternatives?



The \$125 billion Apple position at yearend commands a mammoth 47% of the stock portfolio, 28% of Berkshire's book value and 14.4% of total firm assets. By comparison, prior to the General Re acquisition in 1998, Coca-Cola represented 36% of the stock portfolio, 42% of book value and 24% of firm assets. In other words, it's a big damn position.

Who knows at what rate Apple will fundamentally grow going forward? With annual revenues closing in on \$300 billion, just as it's a big holding inside Berkshire, it's a big company. At a \$2.3 trillion market cap, the stock trades for over 35 times earnings net of \$80 billion in net cash. The stock is not as expensive as Coca-Cola was in 1998 but it's far from cheap. Revenue growth is much lower than its Fab 5 compatriots. Apple has bought back a huge 35% of its outstanding shares since 2012, paying between 12- and 16-times earnings. Unbelievable the bargain that existed. The multiple is now double the high side of the range. If for whatever reason revenue or profit growth slows (which both are), the multiple is at risk. Sell? I would, or at least trim the position way back. Recall, however, the helmsman in Omaha has an affinity for not sending more to Uncle Sammie than is absolutely necessary. Assuming the thinking toward Apple is similar as toward Coca-Cola circa 1998, what's the playbook? You sure don't want to spend Berkshire shares trading at 12 times earnings to buy another fixed-income rich reinsurer. Berkshire has a proven history of tax efficiently swapping assets. Hard to see that here. Maybe Tim Cook could buy a chunk of Berkshire's Apple position and swap the App Store. Kidding here, which explains the lack of question mark.

If the Apple position were a subsidiary, it would be Berkshire's 2nd largest to National Indemnity. BNSF by comparison, would be the 3rd largest, controlling \$89 billion in total assets on \$44.5 billion of equity and earning \$7.1 billion in pre-tax income. Assuming \$4.00 in earnings per share in Apple's 2021 year ended this September, Berkshire earns \$3.8 billion, of which \$800 million comes to Omaha as a dividend.

How well Apple can reinvest Berkshire's \$3 billion of retained earnings is an unknown. At \$4.00 per share, Apple will earn \$68 billion and pay \$14 billion of that as dividends. What will they do with the \$54 billion retained? The lay-up of buying your shares at 6% to 8% earnings yields no longer exists at today's 35 price-to-earnings multiple. More dividends? One-off special dividends like Costco distributes when cash builds up? Massive profit is a nice problem for sure and no problem at all if Apple can grow at anywhere near a high-single digit clip for a number of additional years. It will be very difficult to reinvest in the business at the present level of profitability.

From a valuation standpoint, Berkshire's stock portfolio is fairly overvalued, mostly in Apple (and also in BYD, which speaking of rockets now sits as the 6th largest stock portfolio holding – more than \$7 billion as of today against a \$230 million purchase in 2008 courtesy Charlie courtesy Li Lu). BYD trades for 6 times its \$20 billion in revenues, running gross margins at 15% and net margins averaging about 3%. Growth or profitability better pick up or a chunk of Berkshires 30-bagger will see some bases run backward. Shades of the late 1990s for sure. The balance of the stock portfolio seems somewhat rich but not terribly so. It's the behemoth Apple that appears over its skis, with the teenage BYD snowboarder off-trail in gladed-terrain at night. Sell, baby, sell we say. At least trim, baby, trim...but in either case pay no tax...

The Full Record

The first page of Berkshire's annual report and Chairman's Letter presents the annual and compound annual history of Berkshire's returns against the S&P 500. As expected, the longest-running performance measure, annual change in book value per share, made its exit from the page last year. We happen to think book value at Berkshire is still a terribly important measure. Last year's Semper letter delved into an in-depth examination as to why book value remains important at a company like Berkshire. The case won't be restated here but know that much of Berkshire is capital driven. Measuring book value is critical in numerous industries. In insurance it's equity against which insurance premiums are written, and in many cases, regulated. In railroads, pricing rests on the capital of the business as well as on market forces. Monopolistic electric utilities and regulated energy assets earn allowed returns against equity. These are Berkshire's core businesses. The argument that inflation erodes the carrying value of certain assets, understating replacement cost or current value is valid. Pricing in some cases is inelastic, especially in the short term. Further, recognizing that repurchasing shares at premiums to book value, even if made at fair or undervalued prices relative to intrinsic value, will erode book value and book value per share is also valid. Book value is far from a perfect proxy. In Berkshire's case, if it is indeed in share repurchase mode, book value will lose some utility over time. Enough said. Pull out last year's letter for the full pro versus con argument.

Here, however, and as promised, is the full history including the annual change in book value per share. You won't get it from Omaha, but you'll get it here. As with the progressions seen earlier for the period since 1998, the complete table here runs compound growth series forward and backward, from 1965 forward and from 2020 backward. The backward series becomes the 1-year, 2-year, 3-year returns and so forth, back to the 56-year. Viewing results using both compounding series is extremely useful. In both cases, endpoint sensitivity matters.

Pay attention here to the reverse CAGR series backward from 2020. These are the one-year return, two-year return, etc.... The average annual change in book value per share essentially approximates the return on equity over time. **For only one annualized period, the 22-years from 1998 to 2020 was Berkshire's annualized change in book value per share less than 10%.** The Semper expectation presumes Berkshire conservatively earns 10% on equity. Most of the moving parts within the conglomerate earn more. Strong stock market returns since 2008 tilt aggregate returns upward, and if the portfolio is dramatically overvalued, we may see returns move lower as valuations are worked off. In the meantime,

Berkshire has considerably and consistently earned more than 10% on equity. A minor caveat: Nominal attribution to the “excess” profitability north of 10% change in book value per share is calculated against using yearly profit against trailing book value, where return on equity is more logically viewed as profit against *average* annual equity. Said differently, if the businesses earns 10% on average annual equity, the annual change in book value per share *should* be greater than 10%.

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Berkshire's Performance vs. the S&P 500: Annual returns + Growth Rates Forward and Backward

Year	Book Value per Share Growth	CAGR backward from 2020	CAGR from 1965	Market Value per Share Growth	CAGR backward from 2020	CAGR from 1965	S&P 500 Market Value per Share Growth	CAGR backward from 2020	CAGR from 1965
1965	23.8%	18.7%	23.8%	49.5%	20.1%	49.5%	10.0%	10.2%	10.0%
1966	20.3%	18.6%	22.0%	-3.4%	19.6%	20.2%	-11.7%	10.2%	-1.4%
1967	11.0%	18.6%	18.2%	13.3%	20.1%	17.8%	30.9%	10.7%	8.3%
1968	19.0%	18.8%	18.4%	77.8%	20.2%	30.6%	11.0%	10.3%	9.0%
1969	16.2%	18.7%	18.0%	19.4%	19.3%	28.3%	-8.4%	10.3%	5.3%
1970	12.0%	18.8%	17.0%	-4.6%	19.3%	22.1%	3.9%	10.7%	5.0%
1971	16.4%	18.9%	16.9%	80.5%	19.8%	29.1%	14.6%	10.9%	6.4%
1972	21.7%	19.0%	17.5%	8.1%	18.8%	26.3%	18.9%	10.8%	7.8%
1973	4.7%	18.9%	16.0%	-2.5%	19.1%	22.7%	-14.8%	10.6%	5.1%
1974	5.5%	19.3%	14.9%	-48.7%	19.6%	12.5%	-26.4%	11.2%	1.4%
1975	21.9%	19.6%	15.5%	2.5%	21.8%	11.5%	37.2%	12.2%	4.2%
1976	59.3%	19.5%	18.6%	129.3%	22.3%	18.4%	23.6%	11.7%	5.7%
1977	31.9%	18.7%	19.6%	46.8%	20.5%	20.4%	-7.4%	11.5%	4.6%
1978	24.0%	18.5%	19.9%	14.5%	20.0%	20.0%	6.4%	12.0%	4.8%
1979	35.7%	18.3%	20.9%	102.5%	20.1%	24.2%	18.2%	12.1%	5.6%
1980	19.3%	17.9%	20.8%	32.8%	18.6%	24.7%	32.3%	11.9%	7.1%
1981	31.4%	17.9%	21.4%	31.8%	18.2%	25.1%	-5.0%	11.5%	6.4%
1982	40.0%	17.6%	22.4%	38.4%	17.9%	25.8%	21.4%	11.9%	7.1%
1983	32.3%	17.0%	22.9%	69.0%	17.4%	27.8%	22.4%	11.7%	7.9%
1984	13.6%	16.6%	22.4%	-2.7%	16.3%	26.1%	6.1%	11.4%	7.8%
1985	48.2%	16.7%	23.5%	93.7%	16.8%	28.7%	31.6%	11.6%	8.8%
1986	26.1%	15.9%	23.6%	14.2%	15.2%	28.0%	18.6%	11.1%	9.3%
1987	19.5%	15.7%	23.5%	4.6%	15.2%	26.9%	5.1%	10.8%	9.1%
1988	20.1%	15.5%	23.3%	59.3%	15.5%	28.1%	16.6%	11.0%	9.4%
1989	44.4%	15.4%	24.1%	84.6%	14.4%	30.0%	31.7%	10.8%	10.2%
1990	7.4%	14.6%	23.4%	-23.1%	12.6%	27.4%	-3.1%	10.2%	9.6%
1991	39.6%	14.8%	24.0%	35.6%	14.1%	27.7%	30.5%	10.7%	10.4%
1992	20.3%	14.0%	23.8%	29.8%	13.4%	27.7%	7.6%	10.1%	10.3%
1993	14.3%	13.8%	23.5%	38.9%	12.9%	28.1%	10.1%	10.2%	10.3%
1994	13.9%	13.8%	23.2%	25.0%	12.0%	28.0%	1.3%	10.2%	9.9%
1995	43.1%	13.8%	23.8%	57.4%	11.5%	28.9%	37.6%	10.5%	10.7%
1996	31.8%	12.8%	24.0%	6.2%	10.0%	28.1%	23.0%	9.6%	11.1%
1997	34.1%	12.0%	24.3%	34.9%	10.2%	28.3%	33.4%	9.0%	11.7%
1998	48.3%	11.2%	24.9%	52.2%	9.2%	28.9%	28.6%	8.1%	12.2%
1999	0.5%	9.7%	24.2%	-19.9%	7.5%	27.2%	21.0%	7.2%	12.4%
2000	6.5%	10.2%	23.6%	26.6%	9.1%	27.2%	-9.1%	6.6%	11.8%
2001	-6.2%	10.4%	22.7%	6.5%	8.3%	26.6%	-11.9%	7.5%	11.0%
2002	10.0%	11.3%	22.4%	-3.8%	8.4%	25.7%	-22.1%	8.6%	10.0%
2003	21.0%	11.4%	22.3%	15.8%	9.1%	25.4%	28.7%	10.6%	10.5%
2004	10.5%	10.8%	22.0%	4.3%	8.7%	24.8%	10.9%	9.6%	10.5%
2005	6.4%	10.9%	21.6%	0.8%	9.0%	24.2%	4.9%	9.6%	10.3%
2006	18.4%	11.2%	21.5%	24.1%	9.5%	24.2%	15.8%	9.9%	10.5%
2007	11.0%	10.7%	21.3%	28.7%	8.6%	24.3%	5.5%	9.5%	10.3%
2008	-9.6%	10.6%	20.5%	-31.8%	7.1%	22.6%	-37.0%	9.8%	8.9%
2009	19.8%	12.5%	20.5%	2.7%	11.3%	22.1%	26.5%	15.0%	9.3%
2010	13.0%	11.9%	20.3%	21.4%	12.1%	22.1%	15.1%	14.0%	9.4%
2011	4.6%	11.8%	19.9%	-4.7%	11.2%	21.4%	2.1%	13.9%	9.3%
2012	14.4%	12.6%	19.8%	16.8%	13.1%	21.4%	16.0%	15.3%	9.4%
2013	18.2%	12.4%	19.8%	32.7%	12.6%	21.6%	32.4%	15.2%	9.8%
2014	8.3%	11.6%	19.5%	27.0%	10.0%	21.7%	13.7%	12.9%	9.9%
2015	6.4%	12.1%	19.3%	-12.5%	7.4%	20.9%	1.4%	12.8%	9.7%
2016	10.7%	13.3%	19.1%	23.4%	11.9%	20.9%	12.0%	15.2%	9.8%
2017	23.0%	14.0%	19.2%	21.9%	9.3%	21.0%	21.8%	16.0%	10.0%
2018	0.4%	11.1%	18.8%	2.8%	5.3%	20.6%	-4.4%	14.2%	9.7%
2019	23.0%	16.9%	18.9%	11.0%	6.6%	20.4%	31.5%	24.8%	10.1%
2020	11.0% (e)	11.0%	18.7%	2.4%	2.4%	20.1%	18.4%	18.4%	10.2%

Berkshire Hathaway Intrinsic Value Update

Berkshire grew intrinsic value by 11% during 2020. For the first time in years a material proportion of operating profits were directed to share repurchases at extremely favorable prices. Should the share price remain undervalued, retiring sizable quantities of shares will see Berkshire grow prospectively less in dollar terms but more in per share terms. The capital allocation quiver remains fully loaded with the full complement of options. As long as capital markets remain overvalued and private investors flush with cash persist in investing at low yields, share repurchases are a magnificent use of capital.

Our analysis of Berkshire involves several methods. Many Berkshire followers conflate earnings power and balance sheet nuances, often double counting or under counting in places. Our analysis reconciles across methods. Measurement of earning power is preferred, primarily our GAAP adjusted financials and sum of the parts approaches. Both favored methods are joined at the hip, requiring adjustments to the published financial statements. The balance, simple book value per share and the classic two-pronged methods, are reconciling tools, and are also more impacted in the short term by swings in the publicly traded stock portfolio, more than 90% of which is held in Berkshire's overcapitalized insurance group.

Net Income Basis

Net Income Basis – 2020 Year-End Estimated (dollars in billions)

	Pre-Tax Income	After-Tax Net Income
Operating Groups		
Berkshire Hathaway Energy	\$2.6	\$4.5
BNSF *	7.1	6.1
Manufacturing, Service, Retail and Finance *	10.6	8.1
Finance and Financial Products	<u>To MSR</u>	<u>To MSR</u>
Operating Group Subtotal	20.3	18.7
Insurance Underwriting Normalized Gain	3.2	2.6
SAI Pension Expense	<u>-0.6</u>	<u>-0.4</u>
Operating Group Plus Insurance Underwriting	22.9	20.9
Investments		
Investment Income (Insurance and HoldCo)	<u>23.4</u>	<u>21.3</u>
Totals	\$46.3	\$42.1
Cash Tax Rate		9.1%

Source: Semper Augustus

*MSR Group materially depressed in 2020; BNSF moderately depressed in 2020

Profit figures for Berkshire's primary operating groups are derived in concert with our sum of the parts analysis and the normalization of GAAP earnings approach utilized to remove certain aspects of volatility from reported results. One primary nuance not captured when deriving earning power is the degree to which a subsidiary or group is cyclically over or under earning. The Manufacturing, Service and Retail group, which now includes the former Finance and Financial products (leasing mostly) group, was hammered during much of the pandemic year. Much of retail closed entirely for a time. Supply chains suffered and non-essential manufacturing likewise slowed or stopped. In all, the pandemic took a toll on the group, with pre-tax income declining from \$12.3 billion in 2019 to a projected \$10.6 billion. After-tax profit likely declined 15% to \$8.1 billion, salt in the wound of a group with several subsidiaries earning less than would be hoped for even prior to the pandemic. Management will evaluate the sale or closure of some businesses once clear of the economic lockdown. A reasonable assumption is the MSR group is underearning by more than \$2 billion after-tax. A priority ought to be right-sizing the operation and

looking long and hard into whether a much smaller MSR group would be of benefit. Tough decisions for sure. The commentary is not to disparage the people leading or working for underperforming companies. In some cases, businesses simply matured and not kept up. Business is tough. Some companies, Clayton Homes topping the list, are simply knocking the cover off the ball.

Car loadings and revenues were again lower at BNSF during 2020. Volumes were off by double digits during the depths of the economic slowdown. Revenues look to have declined by less than 13%. Redemption with the rails comes with the majority of costs being variable. Profit tends to fall in line with revenue, and 2020 was no different on that front than during the Great Recession in 2008 and early 2009. When revenues were down 20% year over year, and they were for a portion of 2020, profits were down by a like amount. In industries with few variable costs such as airlines, a 20% decline in revenues sends profit deep into the red. On a drop of more than 60% in passenger miles flown for the better part of a year, the bleeding of cash kills the patient very quickly. Thank goodness Berkshire only “leased” its latest venture into the airline industry (and maybe exited prematurely). Expensive for sure but containable. If you are going to be in the transportation world, choo-choo’s are far better to play with. As far as the airline industry is concerned, those lobbying dollars go a long way when directed to folks with access to a printing press.

Berkshire Hathaway Energy is thriving. Already discussed was the enormous capital opportunity in the utility and energy businesses. Retaining capital instead of paying dividends to Omaha and having a bounty of greenfield and expansionary projects producing attractive, regulated returns is a major source of value creation. Much of BHE’s spending on capital projects are tax incentivized, and there is no better group of businesses to seize the opportunity to expand. Tax credits for wind and also solar provide so much benefit to have driven the tax rate downward to where it is laughably deeply negative. Throw in the use of accelerated depreciation for tax purposes, rewarding the spending of capital to the benefit of society, that further drives the cash tax rate well below the GAAP-reported tax rate. The deferred tax liability balance for PP&E exceeds \$30 billion and will march higher in the years to come. An updated reconciliation between cash taxes and GAAP taxes is again included in the appendix.

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Other Methods for Valuing Berkshire

Below is a summary table for our valuation of Berkshire. Prior year estimates remain as presented with no adjustments for actual year-end profit or balance sheet reconciliation from Semper estimates to actual reported results. More detailed data can be found in the Appendix.

2017 Intrinsic Value by Market Cap and Per Share

	Market Capitalization	Price Per A Share	Price Per B Share
Sum of the Parts Basis	\$630 billion	\$383,049	\$255
GAAP Adjusted Financials	595 billion	361,768	241
Simple Price to GAAP Book Value	609 billion	370,247	247
Two-Pronged Approach (Ours)	610 billion	370,895	247
Simple Average	611 billion	371,463	248

2018 Intrinsic Value by Market Cap and Per Share

	Market Capitalization	Price Per A Share	Price Per B Share
Sum of the Parts Basis	\$659 billion	\$401,274	\$268
GAAP Adjusted Financials	668 billion	406,754	271
Simple Price to GAAP Book Value	611 billion	372,046	248
Two-Pronged Approach (Ours)	672 billion	409,190	273
Simple Average	653 billion	397,316	265

2019 Intrinsic Value by Market Cap and Per Share

	Market Capitalization	Price Per A Share	Price Per B Share
Sum of the Parts Basis	\$715 billion	\$438,188	\$292
GAAP Adjusted Financials	754 billion	462,090	308
Simple Price to GAAP Book Value	764 billion	468,218	312
Two-Pronged Approach (Ours)	807 billion	494,751	330
Simple Average	760 billion	465,767	311

2020 Intrinsic Value by Market Cap and Per Share

	Market Capitalization	Price Per A Share	Price Per B Share
Sum of the Parts Basis	\$746 billion	\$486,871	\$325
GAAP Adjusted Financials	801 billion	522,556	348
Simple Price to GAAP Book Value	779 billion	507,925	339
Two-Pronged Approach (Ours)	838 billion	547,179	365
Simple Average	\$791 billion	\$516,133	\$344

Source: Semper Augustus

A simple average of our four valuation methodologies values Berkshire at \$791 billion, up \$31 billion over the estimate a year ago. That's a 4.1% gain. However, on a per-share basis, unless you skipped the earlier dialogue (who would do that given the quality prose) Berkshire's A shares are intrinsically valued at \$516,133 per share, 10.8% above last year's appraisal. Retiring 5.7% of shares outstanding (assuming an additional \$10 billion repurchased in 2020's fourth quarter on top of the \$15.7 acquired during the first nine months) drives per-share value growth in excess of dollar-value growth. Several trees died explaining this earlier but cash out the door reducing equity and not adding offsetting assets will reduce intrinsic value by the *value* of the departing shares. Depending on the price paid for the shares, the gain in per share value will grow more or less quickly. The cheaper you get 'em the more intrinsic value per share is added. Overpay relative to intrinsic value and the share count declines but intrinsic value does so as well.

Presuming Berkshire is now committed to repurchasing meaningful amounts of its stock and maintains its 56-year discipline of only doing so when the shares are materially undervalued, then per-share growth in value will be what matters prospectively (always been the case, really). A decade of maintaining a flat share count allowed valuing the company and progressing intrinsic value in dollar terms. Hopefully no more. Most investors like to see their stocks go up and would cheer for a high enough price, enough so that Berkshire would balk at a repurchase. It's a silly way to think and we feel exactly the opposite. As long as we'll have cash to put to work, whether from process, dividend or deposit, we'd rather see the shares trade *below* fair value. Coming around to this mentality is beyond most investors. Messrs. Munger and Buffett have often stated they'd prefer the shares trade in line with fair value, offering both buyers and sellers equal terms. This concept is anathema in virtually all board rooms worldwide. That said, if Berkshire was a cyclical business and I had a price target at which I wanted to sell it, you'd have just read an entirely different paragraph.

Semper's methods of valuation are described *briefly* below. Past letters delve into more detail of each. In total, Berkshire trades at a considerable discount to intrinsic value. The A and B shares closed 2020 at \$347,815 and \$231.87 per share respectively. Using the average of methods, at \$516,133 and \$344 per share, Berkshire's shares trade at 67.4% of fair value, giving us nearly 50% upside to fair value. Assuming the shares ever again trade there, we'd expect to earn the annual return on equity, presently 10%, plus the accretion of 50% over some period of time. At times during 2020 the shares were as cheap as when we first bought them in early 2000. If in the worst case the business prospectively averages an 8% return on equity, well below the current earning power of three-fourths of the assets and groups, then intrinsic value is only modestly higher than the current bid. In that "unthinkable" scenario, one we contemplate, we should make a bit over 8% per annum. Either way, relative to the stock market, the bond market, the real estate market, the private equity market and surely the money market, you are hard pressed to find the kind of predictable, durable earning power at these prices in many corners of the investing arena.

Of the four methods for valuing Berkshire, the Sum of the Parts Basis approach should be more heavily emphasized in today's environment, though it's presently only 6% lower than a simple average of the four methods. Any valuation figures are not meant to imply any degree of precision. Assumptions go into all. Mathematics and spreadsheets spit out precision, but the investor ought to be thinking in broad strokes.

Sum of the Parts Basis

Sum of the Parts Valuation (dollars in billions)

Operating Groups	December 2018	December 2019	December 2020
Berkshire Hathaway Energy	\$50 - 57	\$50 - 58	\$62 - 72
BNSF	95 - 105	100 - 110	100 - 110
Manufacturing, Service and Retail <i>and now Finance</i>	140 - 150	170 - 180	170 - 180
Finance and Financial Products	30 - 33	To Black Hole	Now in MSR
Operating Group Subtotal	\$315 - 345	\$320 - 348	\$332 - 352
Insurance Underwriting Norm Capitalized Value	33	36	39
Operating Group Plus Insurance Underwriting	\$348 - 378	\$356 - 384	\$371 - 391
Investments			
Insurance Investments	241	330	372
Insurance Investments Valuation Premium/Discount	34	-19	-39
Holding Company Investments (Net of debt)	21	34	32
Investments (Insurance and HoldCo) Total *	\$296	\$345	\$365
TOTAL VALUATION	\$644 - 674	\$701 - 729	\$736 - 756

*Excludes Investments and Cash in Operating Groups
Source: Semper Augustus

The Manufacturing, Service and Retail group includes Berkshire's Finance and Financial Products group as of 2019. Whether to mask decay among some of the MSR subsidiaries by including booming Clayton Homes or simply to simplify consolidated reporting we will never know. In fairness, the finance and leasing businesses are relatively much smaller, which had been the case for some time. Regardless, using appraisals for Berkshire's three operating groups outside of insurance and reinsurance, little progress in growing intrinsic value is seen. Growth juggernauts these are not. Profits at the railroad and most MSR businesses are sent to Omaha, leaving organic growth to fend for itself. Organic growth is losing, but if good returns on equity capital can be maintained without new capital requirements that's not a bad thing at all. The energy businesses are growing in value. They retain earnings and augment growth capital initiatives with traditional gearing.

Berkshire Hathaway Energy

The interjection, "wow," frequents the chicken scratch in the margins of my printed copies of Berkshire and BHE's 2020 quarterly filings where the progress of the regulated electric utilities is discussed. MidAmerican Energy in particular is plowing money into wind projects and receives large production tax credits in doing so. Capital spending outpacing depreciation drives allowed returns higher and makes Berkshire's collection of utility and energy assets the envy of their industry. Coal is materially deemphasized, putting BHE far ahead of the curve in the transition of the grid to renewables. Our infrastructure growth, here and abroad, cannot be fueled exclusively with alternatives, making Berkshire's energy assets in the U.S., Canada and the U.K. increasingly valuable in a world inclined to not make large investments in "dirty" assets. Underinvestment alongside a growing population will make evident the attractiveness of this terrific group. You should expect to see the utility and energy businesses grow and grow in importance to Berkshire's shareholders. While far from "sexy" assets, the collection will generate very good returns in a world of low interest rates for years to come.

Pre-tax profits are apt to be flat over 2020 as power use in many markets declined given the economic slowdown. Manufacturing in particular was weak. Margin, however, is on the rise. Favorable ratemaking and tax credits will drive reported profitability substantially higher. The tax benefit is augmented thanks to use of accelerated depreciation, which depreciates new approved assets more quickly for tax purposes than the assets decay economically. The disparity is captured in a growing deferred tax liability. Cash taxes paid, for the time being, are sizably negative, meaning the BHE subsidiaries are being paid to produce power by taxing authorities. "I'd sure love another helping please, ma'am."

BHE's utility businesses and many of its energy assets are in the western U.S., which enjoys faster population growth. That said, our overall population growth is slower than at any time in our history, and when coupled with a very slow growing economy encumbered with too much debt, power use is not apt to grow enough to make these genuine growth assets. It's the ability to spend capital replacing and refurbishing the current stock of electricity generating and energy transportation assets at healthy regulated returns that make these such attractive investments, especially with Berkshire's structure. Layering on transportation and storage assets like those purchased from Dominion, this is one of the most exciting corners at Berkshire.

An oddity of Berkshire's structure is occasionally within which subsidiaries various investments are made. Two such creatures exist within BHE. In addition to operating an electric utility, MidAmerican energy houses Berkshire's real estate brokerage operations. Home Services of America is rolling up many of the nation's major metro market high-end residential brokerages. Some are formally rebranded as Berkshire Hathaway Home Services (a name with cache that speaks luxury and value at the same time – it should be in marketing) while others retain their original branding. Those will come around. A capital-lite business, the group is now the largest residential real estate brokerage in the nation. Despite the

pandemic, the housing market boomed in 2020. Closed transactions climbed by double digits, with profits furthered by high refinance activity due to record low interest rates. An observation – those that insist that technology will disrupt the traditional brokerage business and drive commissions downward like discount brokers have with retail stock trading, I wouldn't hold your breath. I have a front row seat watching how much work goes into selling a home. The DIY approach leaves money on the table and causes countless headaches. Top agents invest in marketing, do their own staging, coordinate with contractors, inspections and closings. They also manage what has become an enormous regulatory burden. Transacting in residential real estate is far from buying or selling a stock on Robinhood.

Speaking of stocks, MidAmerican also owns Berkshire's investment in BYD. Berkshire's original \$230 million investment in the Chinese manufacturer of electric vehicles and battery technologies soared to \$5.9 billion at yearend and \$7.4 billion here in January. Next to BHE's total assets of \$114 billion and equity of \$40 billion, for the first time the analyst is having to set aside the BYD position from the utility and energy operations. Investments in common stocks are certainly not assets included in the utility rate base! It's kind of incredible. The \$7.4 billion BYD position is carried net of deferred taxes at \$5.6 billion. That's 14% of BHE's total equity! BYD does \$20 billion in revenues, has \$10 billion in net debt, a 14% gross margin and a skinny net margin, the \$100+ billion market cap is perhaps ahead of the business? I don't know. A thirty-bagger in twelve years isn't a bad investment by an electric utility though.

BNSF

The railroad was derailed in 2020 following a weak 2019. Turns out pandemics aren't good for most businesses, rails being far from excepted. Trade and manufacturing collapsed, many industries were stopped cold for a period of time, thus the volume of rail traffic headed lower during 2020. Movement of industrial products will have declined by more than 20% for the year. Activity picked up considerably by yearend but is still below levels prior to the crisis. The trade war with China had already impacted volumes. Coal shipments likewise continued their downward spiral, likely down by more than 30%. Coal is dying here, and from an environment standpoint finding cleaner sources of power makes natural sense (should be saying, "sense of natural gas"). I heard an interesting perspective on the Paris Climate Accord recently, however, which is a head scratcher. I knew that China was allowed to *grow* their coal use through 2030 even though all other signatories to the deal were compelled to cut. What blew me away was that China's allowed increased use of coal will be at a factor of twice current U.S. consumption! In other words, China will add as much coal use over the next ten years as the U.S. uses today. Leveling the playing field?

Not unlike the Great Depression, consumption holds up better than industry and trade during an economic collapse. People need to eat and drink. Consumer product shipments look to have declined by mid-single digits, offset by intermodal which was weak due to weak auto sales. Grain shipments remain the bright spot, as they have for years, rising even in a year when nominal GDP declines. Overall agriculture shipments and rates held up better across the railroad industry.

Even with the weakness in shipping volumes and pricing, the variable-cost nature of the industry lends to profits not falling much faster than revenues. The railroad will still earn more than \$7 billion in pre-tax profit. Net income will fall, but from a cash generating standpoint, the railroad benefits from the use of accelerated depreciation just like utilities. The railroad will generate over \$6 billion in cash, a 12% return on equity on a GAAP reported basis but nearly 14% on a cash basis. Return on capital exceeds 10% in a pandemic. What a great investment struck by Berkshire in 2009.

Modernization in network and assets continues, and like the energy businesses, the rail benefits from its location in the faster growing west. Trade with Asia, depressed for the past three years, stands to grow

over time. The industry was a *huge* beneficiary of the TCJA tax code change at the end of 2017 on myriad fronts.

BNSF is naturally hostage to economic growth but has also been late to adopt logistical efficiencies that its peers already implemented or are in the process of doing so. Specifically, all the major Class 1 rails except BNSF adopted “Precision Scheduled Railroading” which in a nutshell runs trains on a fixed schedule between points on the network, regardless of number of cars, or units. It essentially replaces a hub and spoke method of delivering freight. Observing operating ratio improvement at the competition will likely compel BNSF to adopt PSR despite the growing pains that would come with any major logistical change. It’s likely a more difficult logistical tool to implement in a more geographically distributed footprint, but cost and efficiency benefits are likely to compel adoption.

Manufacturing, Service, Retailing and Finance

The pandemic was unkind to Berkshire’s collection of MSR operating businesses. The group that posted revenues of \$142.7 billion in 2019 will likely see the top line fall 6.2% to \$133.9 billion in 2020. Unlike the railroad, where major expenses like fuel and even labor are variable, much more cost is fixed in many of Berkshire’s manufacturing, service, retail and leasing operations. Pre-tax income looks to decline 14.2% from \$12.4 to \$10.6 billion. I’ve written in past letters that returns on equity of the group declined from nearly 10% in the early 2000s to a range of 6.2% to 7.8% in recent years. Assuming a post-pandemic return to profitability and recoveries in certain subsidiaries like Precision Castparts, returns would still only rise to 7.9% (ignoring the \$10.4 billion after-tax write-down at Precision in 2020). Greg Abel, Vice-Chairman of Berkshire’s non-insurance subsidiaries (and still Chairman at BHE), acknowledged that certain businesses were candidates for review to be sold or closed once the economy recovers. If the aggregate of the MSR group earns roughly 7%, then some portion of businesses naturally earn more, and some earn less. Berkshire has never been quick to cut bait, and in fairness returns are unleveraged, but it’s worth considering whether some subsidiaries might be better off as stand-alone businesses, even with the leverage that well-run private equity operations bring to the table. Then again, in a world of zero interest rates, perhaps an unleveraged 7% return isn’t a bad thing if it’s durable and requires no more than maintenance capital.

Berkshire’s industrial products companies were not spared during the slowdown. Precision has had a rough go since its acquisition. The turbine business was already hamstrung by the decline in energy prices and activity. The pandemic walloped the aerospace industry, particularly in commercial aircraft (defense has been much stronger). Precision’s revenues likely fell by nearly 25%, with pre-tax profit plunging 80%, excluding the \$10 billion goodwill write-down. Headcount was cut 40% though the third quarter. Ouch. In addition to Precision, Lubrizol, Marmon and IMC all took it on the chin but look to have recovered in the second half of the year.

Retailing subsidiaries had wildly different experiences for the year. In total, revenues will only fall by perhaps 2-3% during 2020. Mall-based jewelers closed for several months and don’t have significant direct-to-consumer online platforms. I guarantee that is being worked on. The largest company in the retailing group is BHA Automotive, with 80 auto dealerships. Sales will fall by roughly 4% for the year but given the decline in miles driven from mid-March through late summer, it could have been worse. Not surprisingly, service and repairs fell significantly. The furniture businesses were another story entirely. Locked-down homeowners spent heavily furnishing home offices and modernizing homes. Nebraska Furniture Mart, R.C. Willey, Jordan’s and Star Furniture likely all had record years.

The star of the MSR group continues to be Clayton Homes. Clayton’s revenues should easily top \$8 billion for 2020 and have been growing by more than 20% annually for several years. Clayton will earn close to \$1 billion, coincidentally not only a 12.5% profit margin but also on the order of 12.5% of profit

for the *entire* MSR group. I have no idea how much capital now exists in the business, but Berkshire paid \$1.7 billion for Clayton in 2003 which was doing \$1.2 billion in revenues at the time. With profound weakness at Precision, Clayton is now the largest manufacturing business in the Berkshire fold. It is the largest in the entire MSR group by profits and only lags McLane and its razor-thin margins by revenues. In the last few years, one could characterize McLane's normally tiny margins as nearly non-existent. McLane most definitely falls into the group of companies earning less than 7% on equity. I'll repeat it again for effect, a smaller Berkshire may be a better Berkshire.

Keeping an eye on the MSR group coming out of the pandemic will be worthwhile. In addition to suggesting some subsidiaries are candidates for sale or closure, it will be interesting to see how aggressively Berkshire resets the cost base among companies in the group. Berkshire has not been one to aggressively apply the tourniquet, but with a number of subsidiaries underperforming prior to the pandemic, my guess is all cards are on the table. Would saying, "let the bloodletting begin" be crass?

Insurance

Berkshire's insurance operation is the best in the world, bar none. There isn't a close second. Times like 2020 serve to illustrate that fact.

When the global policy response to the pandemic closes a broad swath of the economy, the investor's focus in property/casualty insurance and reinsurance immediately turns to previously unanticipated losses for business interruption and event cancellation. The University of Washington announced on March 6 that it would send students home for virtual learning. Stanford University quickly followed suit and within a week more than 300 schools had closed. NCAA conference basketball tournaments ended mid-bracket and the national tournament was cancelled. That's big bucks. Restaurants and retail closed their doors. Professional sports leagues stopped. Airlines grounded planes. Never has the global economy ground to a halt so quickly. The industry, particularly the reinsurance side of it, caught a huge break on two fronts in 2020. Had the capital markets not recovered from deep losses suffered in late March and had the second half of the year been a bad one for catastrophes, many in the industry would have suffered mightily. Berkshire was never in peril. Many in the industry were trending toward ventilators.

Reinsurance

Berkshire insures and reinsures against a large and diverse number of loss events. Prior pandemics and epidemics, particularly the SARS outbreak in 2003, heightened the insurance industry's awareness of the risk posed by a widespread global outbreak. Business interruption coverage is often sold as part of a business owner's policy and covers damages to property or equipment. It is a *property* cover. SARS is/was a highly contagious and lethal coronavirus, much more so than COVID-19. The SARS outbreak spread to 29 countries and fortunately killed fewer than 1,000 people, none in the U.S. Despite being a property cover, policy language then often didn't specifically exclude pandemics, viruses and communicable diseases. Even if an outbreak does physically cause the closure of a place of business, a restaurant for example, loss claims are limited to loss of income and remediation over the short period of time to clean and disinfect the property. Subsequent to SARS, most of the industry specifically included exclusions with clarifying policy language.

I don't make a habit of reading insurance policy language. When the degree of activity suspended by the pandemic became apparent, it became clear that insurers would be challenged legally, furthered by some public policy makers suggesting that even though business interruption is a property line that the industry should be responsible for its "fair share" of the cost of business losses. I am grateful to my friends and colleagues in the insurance and legal worlds that added so much color early in the pandemic as the economic downturn unfolded. It became apparent that even though the industry had learned their lesson

with SARS and others, (MERS, H1N1/Swine Flu, Ebola, Zika and the bird flu) there were policies in force with loosely written or non-exclusionary policy language. Several European reinsurers writing in the Lloyd's market in particular were at big risk of loss. Even mighty Berkshire had some exposures that would likely be challenged. In aggregate, given policy limits and Berkshire's extremely diversified book of insurance business, it was going to be in relatively better shape than most from the outset.

Berkshire maintains a stronger capital base than any in the reinsurance industry and is massive in scale. Berkshire's combined statutory surplus (conservatively defined equity or book value) against which it writes business dwarfs all players. At the end of 2019, Berkshire's surplus was \$219 billion. GEICO writes more premium volume than any of Berkshire's insurance companies but requires by far the least amount of capital, no more than \$15 billion. We presume it carries more, but outside of private passenger auto insurance the remainder of Berkshire's insurance "book value" was and is close to \$200 billion. Of that, Berkshire's primary group writes myriad commercial coverages. The largest subsidiary in this group is recently launched BH Specialty. This group of insurers requires more capital per dollar of business written than in auto, but with \$10 billion in annual premiums requires less than 10% of Berkshire's combined insurance capital.

The reinsurance operation at Berkshire, National Indemnity (including retroactive reinsurance and periodic payment annuity) and General Reinsurance, holds and requires the majority of insurance capital. Berkshire Hathaway Reinsurance Group, as the combined entity is now known, will write close to \$20 billion in premium volume in 2020 on surplus of more than \$200 billion. By comparison, the entire global reinsurance industry has combined surplus of roughly \$600 billion (\$700 billion when including alternative capital such as catastrophe bonds and insurance-linked securities). The industry will write roughly \$300 billion in premiums. **Berkshire writes less than 10% of combined reinsurance industry premium volume but has more than one-third of industry equity capital.** If anybody wonders how Berkshire can have so much of its insurance companies' investments in common stocks instead of fixed-income securities, look no further.

Throughout 2020 and into 2021, a running tally of COVID-19 losses as reported by the global reinsurance industry totals over \$30 billion, roughly 5% of industry capital. Munich Re is the second largest reinsurer by shareholder surplus and also by premiums written, writes roughly a dollar of premium for each dollar of shareholder funds on hand. Both measures run in the mid-\$30 billion range. They lead in COVID-19-related losses and loss reserves disclosed to date at \$4.1 billion, more than 10% of firm equity. The Lloyds market sees \$10 billion written on close to \$40 billion in surplus, but as we learned early on would suffer disproportionately for losses due to loosely written policy language. \$3.9 billion at Lloyd's in losses and loss reserves are already been reported, with more to come.

Berkshire's share of COVID-19 losses (so far at least) are predictably absolutely lower than the industry. Through September 30, Berkshire announced a combined \$860 million in pre-tax loss and loss reserve estimate, of which \$688 million was in property/casualty reinsurance and \$172 million in life and health reinsurance. Berkshire writes half of the amount of reinsurance business as Munich Re but to date suffered 20% of Munich's COVID-19 related losses. Berkshire's reinsurance operations will show an underwriting loss in the mid-single digits for 2020, but relative to the enormous insurance capital it barely scratched. The reinsurance industry will lose money on an underwriting basis for the third straight year – 2018 and 2019 were plagued by storms and fires. Of note, the industry held its collective breath during hurricane season in 2020, which despite a large number of named storms didn't produce losses at the levels of the prior two years. A number of reinsurers would have had capital problems had 2020 been a bad year for catastrophe losses. As it was, losses were primarily plagued by the plague. Offsetting underwriting losses, pricing firmed considerably. In the hardening market, Berkshire increased reinsurance premiums written by 33% during the first nine months of 2020. We expect volumes and prices to rise for the time being.

GEICO

GEICO also had an odd year thanks to the pandemic. Private passenger and commercial auto insurers saw the number of miles driven by their insureds fall off a cliff beginning in mid-March. When miles driven decline, the frequency of accidents and losses to pay also falls (offset a bit by an increase in the severity of accidents due to people driving like Mario Andretti – when you are zooming at 200 mph and hit the wall (generally another car), you, your car, the other car, and the other people are more severely damaged, requiring more expensive fixing – NASCAR may be a better example than Mario). Seeing losses as a percentage of premium dollars fall by 20% or more may produce a windfall for a minute but remember that auto insurance is sold on an admitted basis, approved by insurance commissioners in each state. An insurance commission balances insurance company profit (should be reasonable, not excessive) with price paid by insureds. Naturally, windfall profits were either refunded outright to drivers or were refunded with credits against premium paid upon renewal (typical of GEICO's chosen route). From a timing standpoint, the latter part of the first quarter and the entire second quarter of 2020 appeared very profitable, but with credits applied prospectively, premiums measured in dollars were to decline through the first quarter of 2021. With the number of miles driven surging faster than the economy by the second half of 2020 and here in early 2021, diminished premium revenues at GEICO coupled with losses spiking back up to normal levels will drive underwriting results to negative for a half-year period of time.

The most concerning thing going on in auto insurance is the number of drivers who stopped paying premiums. Regardless of motive (couldn't afford the premium, knew abatement was underway, or simply said I'm not paying for something I'm not using), GEICO had paused cancellations of policies for failure to pay from March through May. Thus, few policies were lost during the grace period but cancellations in the third quarter resulted in a nearly 20% increase in lost policies. Overall, GEICO will see a decline in premiums written and earned for the year, but that will be due to the reduction in pricing from premium credits. Overall, policies-in-force will still grow by mid-single digits for the year, true to GEICO's growth curve. The fourth quarter of 2020 and first quarter of 2021 will likely show underwriting losses, but that will be the offset for aberrantly higher profitability during the season of no driving.

BH Primary

Berkshire's Primary Group of insurers will likely underwrite at close to breakeven for 2020, harmed by \$400 million in COVID-19 related losses. Within the group of commercial insurers, the BH Specialty business started from the ground up in 2013 with a management team hired away from AIG, specifically Lexington Insurance, AIG's excess and surplus division. It quickly became the largest company in the Primary group of commercial insurers that write lines such as healthcare malpractice, workers' compensation, commercial auto, general liability, property, and various specialty coverages for small, medium and large clients. The aggregate BH Primary group writes more than \$10 billion in premiums, about 15% of Berkshire's overall premium volume. Berkshire talks about the specialty business as a growth engine. Often when building an insurance operation on a de novo basis, the early focus is on revenue growth. Berkshire's insurance history is one of writing business when it is adequately profitable but knowing when to walk away when it's not, the Kenny Rogers approach if you will. No doubt the pandemic contributed to several points of underwriting cost during the year, but for the prior two years profitability was already trending down. It's worth watching the tension between growth and profit at this subsidiary over the next few years. You couldn't give us enough money today to want to start a de novo insurance underwriter from scratch. The stock market is expensive, interest rates barely exist, and competition, while moderating somewhat given years of losses, remains cutthroat. More importantly, insurance commissioners and ratings agencies would never let a newly admitted underwriter invest reserves mostly in stocks and other long-duration investments. It takes enormous surplus capital to do so. This becomes the single greatest advantage of adding the new specialty business to the fold. If

underwriting can be done profitably, it adds capital to the already overcapitalized insurance war chest at Berkshire.

Overall Insurance Results

Premiums earned look to be roughly \$64.5 billion in 2020, up from \$61.1 billion in 2019. Statutory surplus is estimated at \$242 billion, \$26 billion higher thanks to the 21% gain in the stock portfolio. The combined insurers write less than \$1 in premium per \$3.50 of statutory surplus. GEICO can write \$3 for each dollar of surplus in private passenger auto but tends to write well short of that allowed level we believe. GEICO's premiums earned will total about \$33 billion (down from \$36 billion, but half of all of Berkshire's insurance group premiums. The decline in GEICO's premiums for rebate credits will disappear and we'll see a surge following the first quarter of this year, taking premiums back to 60% of total Berkshire premiums earned. If GEICO writes at 2:1, which would be our bet, surplus at the auto insurer is about \$18 billion, which leaves the balance of \$224 billion for the rest of the group. If you are doing the math, the insurers outside of GEICO will earn premium volume of more than \$31 billion written against a \$224 billion statutory surplus. Float should total \$137 billion at year-end 2020. For the insurer writing 14 cents of premium per dollar of surplus, the surplus capital involved in the operation allows the float balance to be thought of less of as a liability than at other insurers. As mentioned, that's why Berkshire can invest the way it does.

As a side note on the human condition, it is disappointing to see insurance companies report losses for civil unrest. Insured industrywide civil disorder claims exceeding \$2 billion are a record. Hardly a surprise at that. It's a line item I'd never contemplated being material enough to be seen in industry reporting. We can do better.

One final note, there are now three Chinese insurance companies larger than Berkshire's collection of insurers (measured by premium volume, not by capital). Ping An, China Life and People's Group are growing revenues materially faster than any large global underwriters and all three are now among the ten largest insurers in the world. Prior commentary regarding the judging of rhythmic gymnastics applies here. Berkshire is famous for noting that anybody can write a lot of business. What matters is the insurer's ability *and* willingness to pay. Always be wary the fast-growing insurer.

Equity Method Investments

Kraft Heinz – Three tomatoes are walking down the street: pappa tomato, mamma tomato, and a little baby tomato. Baby tomato starts lagging behind. Poppa tomato gets angry, goes over to the baby tomato, and smooshes him...and says, "Catch up."

Berkshire's ownership position in Kraft Heinz reminds me of the Infield Fly Rule in baseball when the second baseman intentionally drops the pop fly, goading the baserunners to advance. In this case, there were two on with no outs. The runner on 2nd cleared third and headed for home. The play at the plate was close. This is when Berkshire and the Brazilians teamed up to buy Kraft, sending the stock up to \$98 per share. Well, the runner was out at home and now the runner that was on first is in a rundown between 2nd and 3rd. Berkshire will either have a runner in scoring position with two outs or be victim of the dreaded triple play. On an easy out. The inning was looking good for a minute.

Kraft Heinz's common shares posted a 14.1% total return for 2020. As an equity method investment, the gain isn't reflected in Berkshire's financial statements. Berkshire owns 325.6 million shares of Kraft Heinz, 26.6% of the outstanding shares. The cash cost basis is \$9.8 billion. Carrying value under the equity method reflects a tax value markup (non-cash) when Heinz bought Kraft, with book carrying value increased quarterly for Berkshire's proportionate share of reported earnings minus dividends received.

Kraft Heinz has also taken writedowns, which Berkshire proportionally reflected. On September 30, equity method carrying value was \$13.1 billion and the market value of the position was \$9.7 billion. The stock plummeted 70% from its 2017 high, closing 2020 at \$34.66 per share. Catch up.

Berkshire has three additional equity method investments, deemed to have significant influence but owning less than 50% of each (and generally more than 20%). Control positions of more than 50% ownership would be consolidated in Berkshire's financial statements, with balance sheet and income statement offsets for noncontrolling interests (which is how the 8.9% of BH Energy that Berkshire doesn't own is treated). Instead, like Kraft Heinz, pro rata profit is added to carrying value, offset by dividends, which reduce carrying value and are taxed. Carrying value for these three businesses was \$4.1 billion on September 30, up from \$3.7 billion at year-end 2019 and \$3.5 billion the year before that. Collectively, Berkshire's share of these three investees is approaching \$700 million, annual returns of approximately 17%.

Pilot Flying J

Pilot Flying J is a great, evolving acquisition. While small inside the whole of Berkshire, Berkshire's ownership will increase from its original 38.6% investment for \$2.8 billion in 2017 to 80% in 2023. The 2017 price paid valued the entire business at \$7.2 billion. With 750 locations across the US and Canada, the travel center business generates \$30 billion in revenues. Pilot Flying J is opening new locations, which, presumably financed internally with retained cash flow. Pilot Flying J's website identifies new location information. Most are smaller format centers located away from the interstate highway system. In late 2019 Pilot Flying J launched the "One9 Fuel Network," which gives drivers and smaller truckers access to personalized credit and consolidated rewards points at smaller locations under the Speedway, Mr. Fuel, Pride and Stamart travel center brands. 250 locations will either be acquired or partnered with, with Pilot Flying J operating the stores. The bulk of the stores are/were under the Speedway umbrella, owned by Marathon Petroleum. Berkshire reports store count for Pilot Flying J jumped from 750 to 950 during the first nine months of 2020. Look for 1,000 total units at yearend. In case you was wonderin', channel 19 is the primary CB trucker channel in North America, good buddy.

Berkadia

Berkshire owns a 50% interest in a commercial real estate loan servicer with Jefferies as the partner and operator. Long-standing clients will remember we had owned Leucadia, run by two outstanding investors, Ian Cumming and Joe Steinberg. The duo had no succession plan, so they bought Jefferies, making the investment bank's CEO Dick Handler the succession plan. Berkadia purchased Capmark Financial Group's mortgage loan and servicing business for \$437 million in 2009. Over the years, Berkshire provided a secured credit facility of \$1 billion, later increased to \$1.5 billion, to fund mortgage loans, servicer advances, purchase servicing rights and to fund working capital. We rounded up summary figures from Leucadia and then Jefferies for their 50% share of carrying values and earnings to infer Berkshire's piece. Updated numbers can be found in the appendix and presume Berkshire's equity share are identical.

Electric Transmission Texas (ETT)

ETT is a joint venture with American Electric Power created in 2007 to construct and manage transmission assets in AEP's territory in Texas. Berkshire's piece of the JV is owned by MidAmerican. The venture operates as a regulated transmission-only utility. Total investments between the partners were announced to total approximately \$7 billion over many years. In 2007 the utility was granted an allowed return of 9.96% by the Public Utility Commission of Texas. It appears combined investment capital totals \$3 billion. A brief summary of AEP's carrying value and income can be found in the appendix, and we'd infer that Berkshire's position would look the same.

Our subsidiary appraisals are conservative, and we have not fully moved multiples upward to capture the full effect of the tax code change. Even without the tax changes, our valuations are very conservative. If the subsidiaries were publicly traded, they would command much higher valuations.

The valuations for each operating group are included in the Net Income Basis table seen at the beginning of this section. More granular data for each reporting group is in the appendix.

Simple Price to GAAP Book Value Basis

Simple Per-Share Price to Book Value Basis- "A" Share Data										
	BVPS	Avg BVPS	1x BVPS	1.2x BVPS *	1.75x BVPS	2x BVPS	High	Low	Range vs. Avg. BVPS	
1994	10,083	9,469	10,083	12,100	17,645	20,166	20,800	15,150		
1995	14,426	12,255	14,426	17,311	25,246	28,852	30,600	20,250	250%	165%
1996	19,011	16,719	19,011	22,813	33,269	38,022	38,000	31,000	227%	185%
1997	25,488	22,250	25,488	30,586	44,604	50,976	48,600	33,000	218%	148%
1998	37,801	31,645	37,801	45,361	66,152	75,602	84,000	45,700	265%	144%
1999	37,987	37,894	37,987	45,584	66,477	75,974	81,100	52,000	214%	137%
2000	40,442	39,215	40,442	48,530	70,774	80,884	71,300	40,800	182%	104%
2001	37,920	39,181	37,920	45,504	66,360	75,840	75,600	59,000	193%	151%
2002	41,727	39,824	41,727	50,072	73,022	83,454	78,500	59,600	197%	150%
2003	50,498	46,113	50,498	60,598	88,372	100,996	84,700	60,600	184%	131%
2004	55,824	53,161	55,824	66,989	97,692	111,648	95,700	81,150	180%	153%
2005	59,337	57,581	59,337	71,204	103,840	118,674	92,000	78,800	160%	137%
2006	70,281	64,809	70,281	84,337	122,992	140,562	114,500	85,400	177%	132%
2007	78,008	74,145	78,008	93,610	136,514	156,016	151,650	103,800	205%	140%
2008	70,530	74,269	70,530	84,636	123,428	141,060	147,000	74,100	198%	100%
2009	84,487	77,509	84,487	101,384	147,852	168,974	108,450	70,050	140%	90%
2010	95,453	89,970	95,453	114,544	167,043	190,906	128,730	97,205	143%	108%
2011	99,860	97,657	99,860	119,832	174,755	199,720	131,463	98,952	135%	101%
2012	114,214	107,037	114,214	137,057	199,875	228,428	136,345	113,855	127%	106%
2013	134,407	124,311	134,407	161,288	235,212	268,814	178,900	136,850	144%	110%
2014	145,619	140,013	145,619	174,743	254,833	291,238	229,374	163,039	164%	116%
2015	154,935	150,277	154,935	185,922	271,136	309,870	227,500	190,007	151%	126%
2016	171,542	163,239	171,542	205,850	300,199	343,084	249,711	187,001	153%	115%
2017	211,750	191,646	211,750	254,100	370,563	423,500	299,360	238,100	156%	124%
2018	212,503	212,127	212,503	255,004	371,880	425,006	335,900	279,410	158%	132%
2019	261,545	237,024	261,417	313,854	457,704	523,090	341,785	287,000	144%	121%
2020^	290,243	275,894	293,698	348,292	507,925	580,486	352,450	239,440	128%	87%

* Berkshire waived restriction on authorized share repurchases below 1.2 times BVPS in 2017

** 27.2% increase in book value for 2017 includes a \$28.2 billion non-cash increase from 2017 TCJA tax code change

^ 2020 Book Value is net of \$10.4B after-tax write-down of PCC. 10.0B pre-tax goodwill and \$600m pre-tax intangibles.

1,640,929 at 12/31/18; price per share \$306,000; MV \$502 B; BV \$348.7B

1,624,958 at 12/31/19; price per share \$339,500; MV \$551.819; BV \$424.791B; IV \$754B

1,532,848 estimated at 12/31/2020; price per share \$347,815; MV \$533.1B; IV \$772B

Source: Semper Augustus; Berkshire Hathaway

Berkshire's shares traded in a range from 0.5 times to 3.0 times book value over the past 56 years. In its earlier years, the lower bound more closely approximated intrinsic value at the time, while three times book value in 1998 most certainly did not. A 1.75 multiple to book value approximates fair value today. In any given year, book value can get ahead of itself or behind, largely due to period volatility in the stock portfolio. It can also get distorted at times such as year-end 2017 when the new marginal tax rate saw deferred tax liabilities rerated downward and deferred tax assets revalued upward. Berkshire properly points out that if it is going to become a large repurchaser of its shares at premiums to book value, then book value and book value per share will decline. Subsequent repurchases at increasing premiums will further and more quickly erode book value.

In a normalized steady state Berkshire conservatively earns 10% on unleveraged net equity. Thanks to the durability and knowability of the earning power we are comfortable with a 75% premium to book as a reasonable valuation. If the sustainable return on equity as projected changes, upward or downward, the valuation would be affected. Likewise, if book value becomes so diminished, it will be properly eliminated as a valuation proxy and look to measure ongoing profitability relative to retained and past profitability.

Two-Pronged Approach

Two-Pronged Basis # (dollars in millions)																	
	Per-Share Pre-Tax Earnings	Per-Share Investments					Per-Share Investments + Capitalized Pre-Tax Earnings					Market Cap		Intrinsic Value		5% UW Capped	Add Cap UW
		10x	12x	13.5x	15.4x ^	plus 10x	plus 12x	plus 13.5x	plus 15.4x^	shares out M	at 10x	at 12x	at 13.5x	at 15.4x^			
2005	2,441	24,410	29,292	32,954	37,591	74,129	98,539	103,421	107,083	111,720	1.541	151,849	159,372	165,014	172,161	10,998	176,012
2006	3,625	36,250	43,500	48,938	55,825	80,636	116,886	124,136	129,574	136,461	1.543	180,355	191,542	199,932	210,559	11,982	211,914
2007	8	80	96	108	123	90,343	90,423	90,439	90,451	90,466	1.548	139,975	140,000	140,018	140,042	15,891	155,909
2008	3,921	39,210	47,052	52,934	60,383	77,793	117,003	124,845	130,727	138,176	1.549	181,238	193,385	202,495	214,035	12,763	215,258
2009	2,250	22,500	27,000	30,375	34,650	90,885	113,385	117,885	121,260	125,535	1.552	175,974	182,958	188,196	194,830	13,942	202,138
2010	5,926	59,260	71,112	80,002	91,261	94,730	153,990	165,842	174,732	185,991	1.648	253,776	273,308	287,958	306,513	15,375	303,333
2011	6,990	69,900	83,880	94,365	107,646	98,366	168,266	182,246	192,731	206,012	1.651	277,807	300,888	318,199	340,126	16,038	334,237
2012	8,085	80,850	97,020	109,148	124,509	113,786	194,636	210,806	222,934	238,295	1.643	319,787	346,354	366,280	391,519	17,273	383,553
2013	9,116	91,160	109,392	123,066	140,386	129,253	220,413	238,645	252,319	269,639	1.644	362,359	392,332	414,812	443,287	18,342	433,154
2014	10,847	108,470	130,164	146,435	167,044	140,123	248,593	270,287	286,558	307,167	1.643	408,438	444,082	470,814	504,675	20,627	491,441
2015(S)	11,562	115,620	138,744	156,087	178,055	148,675	264,295	287,419	304,762	326,730	1.643	434,237	472,229	500,724	536,817	20,647	521,371
2015(B)	11,186	111,860	134,232	151,011	172,264	159,237	271,097	293,469	310,248	331,501	1.643	445,412	482,170	509,737	544,657		
2016(S)	12,532	125,320	150,384	169,182	192,993	168,902	294,222	319,286	338,084	361,895	1.643	483,407	524,587	555,472	594,593	22,941	578,413
2016(B)	11,984	119,840	143,808	161,784	184,554	186,520	306,360	330,328	348,304	371,074	1.643	503,349	542,729	572,263	609,674		
2017(S)	12,289	122,890	147,468	165,902	189,251	190,161	313,051	337,629	356,063	379,412	1.644	514,593	554,995	585,296	623,677	25,199	610,495
2017 (B)	10,320	103,200	123,840	139,320	158,928	202,322	305,522	326,162	341,642	361,250	1.644	502,217	536,145	561,591	593,823		
2018(S)	13,982	139,820	167,784	188,757	215,323	174,846	314,666	342,630	363,603	390,169	1.641	516,345	562,232	596,647	640,239	33,000	673,239
2018(B)	14,414	144,140	172,968	194,589	221,976	188,626	332,766	361,594	383,215	410,602	1.641	546,045	593,350	628,829	673,768		
2019(S)	13,390	133,900	160,680	180,765	206,206	235,822	369,722	396,502	416,587	442,028	1.625	600,783	644,299	676,936	718,277	36,000	754,277
2020(B)	12,677	126,770	152,124	171,140	195,226	253,676	380,446	405,800	424,816	448,902	1.625	618,209	659,408	690,307	729,447		
2020(Se)	14,679	146,790	176,148	198,167	226,057	297,636	444,426	473,784	495,803	523,693	1.533	681,238	726,239	759,990	802,741	36,001	838,742
2020(Be)	14,026	140,260	168,312	189,351	216,000	314,600	454,860	482,912	503,951	530,600	1.533	697,231	740,231	772,480	813,330		

Two-Pronged basis intrinsic value excludes capitalized value for ongoing insurance underwriting profitability, \$2.6 billion currently valued at \$30 billion, or \$18,240 per-share

**Berkshire changed the methodology for calculating both earnings and investments per-share. See "Moving the Goalposts". Semper estimates use our traditional methods.

(S) is our SAI method which excludes underwriting profit and loss from earnings. We exclude cash inn MSR, Finance and Energy/Rail groups and include equities and other investments in non-insurance

(S) Our earnings exclude underwriting profit or loss. Instead we capitalize at 11.5 pretax (was 10x pretax pre 2017 TCJA tax reform) Excluded from table.

(S) As of 2015, we now include, as does Berkshire, warrants, preferreds, equities and fixed from finance group

(S) Underwriting profit at 5% capitalized at 11.5x beginning 2018 and 10x 2017 and prior adds to IV: 2013 18.3B; '14 \$20.6 B; '15 20.7B; '16 22.9B; '17 25.2B; '18(e) 33.0B (\$1,804 per A share '18)

(B) is the new Berkshire methodology beginning 2015 which includes underwriting profit or loss in earnings and now includes cash from MSR, Rail and Energy, and Finance businesses

^ New 15.4 multiple in 2017 applied to earnings reflects 12.4% increase in after-tax earning power from a lower tax rate, requiring a like 12.4% increase in the multiple to pre-tax earnings

(S&B) Excludes KHC and Other Equity Method Investments, Includes OXY preferred and warrant PV begin 2019

Source: Semper Augustus; Berkshire Hathaway

The Two-Pronged Approach begins with two simple figures, per-share pre-tax earnings of all subsidiaries excluding gains and income from marketable securities and a per-share value for all marketable securities. Berkshire provided the two per-share figures for the better part of two decades to help investors assess fair value. Stuff happened and the figures disappeared from the Chairman's letter. The method proves durable but requires some understanding and adjustment of certain data points. The method was covered in detail in our 2016 letter and in the appendix to the 2017 letter. Our method differs from the one used by Berkshire and altered over the years. We add a capitalized value to a normalized underwriting profit margin and would also look to the stock portfolio to determine any degree of material under or overvaluation. It's a nice reconciling tool but required alteration to its original presentation by Berkshire beginning in 1995.

GAAP Adjusted Financials Approach

The GAAP or IFRS statement of earnings can only be a starting point for the investor seeking to measure economic profitability and the capital required to produce it. Reported profits only ever approximate economic profitability by coincidence at Berkshire. At some companies reported profits more closely align with genuine profitability. The majority of companies strive to present their affairs in the most favorable light, even if distortive. Berkshire's financial reporting and the derivation of earning power proves a wonderful case study in how useless financial statements can be without diving deep into the

footnotes and into the moving parts of the business. Berkshire's require so many adjustments that any student of investing should endeavor to understand the steps required in doing so. Our adjustments are by no means authoritative and each can be debated as to merit. Much of the process smooths volatility-distorting aspects that make Berkshire's GAAP consolidated financial statements, particularly the statement of income, worthless.

Primary adjustments to the GAAP financials are:

- Remove realized (and now unrealized) gains and losses on the investment portfolio of the insurance companies and other groups.
- Remove derivative contract gains and losses.
- Add retained earnings of equity investees in the investment portfolio (this is the offset to the removal of realized and unrealized gains and losses). It is a normalizing factor that assumes retained earnings will translate into at least an equal dollar of market value.
- Remove underwriting gains and losses.
- Add a normalized underwriting profit margin.
- Add income for deferred tax liabilities that are created with property, plant and equipment capital expenditures, reflecting the degree to which cash taxes paid are less than reported GAAP taxes.
- Add a portion of any amortization charges against intangible assets created in acquisitions not reflective of economic decay.
- Add the present value of an optionality premium to the portion of cash balances likely to be invested at higher yields in the near to intermediate future.
- Reduce net income to reflect a higher normalized pension expense and cash outlay than assumed.
- Other adjustments that are one-off are made as needed (the above are more recurring in nature).
 - 2020 saw a \$10.6 billion pre-tax and \$10.4 billion after-tax write-down of Precision Castparts. \$10 billion of the charge was a non-tax-deductible reduction of goodwill. The analyst should not be fooled by apparently higher future profitability by ignoring the charge.
 - 2017 required a \$28.2 billion non-taxable downward adjustment to restate net deferred tax liabilities, which increased taxable income by the same non-taxable amount.
 - The equity method treatment of Kraft Heinz required a one-time 2017 downward income adjustment of \$2.9 billion pre-tax, \$1.2 billion after-tax, reflecting investee Kraft Heinz's similar non-cash gain in net income for revaluation of net deferred tax liabilities.

Remove Realized and Unrealized Investment Gains and Losses

FASB rule ASU 2016-1 required the income statement under GAAP accounting to include unrealized gains and losses each quarter in the income statement beginning in 2018. Previously only realized gains and losses were included in income. Unrealized gains and losses were recognized on the balance sheet, net of a deferred tax liability for taxes to be paid if, or when, holdings are sold. Unrealized gains and losses naturally remain a balance sheet item. In periods of price declines, as in 2018 and the first quarter of 2020, declines are offset by a correspondent reduction of the portion of deferred taxes no longer carried as a liability. These unrealized gains and losses are taxed as deferred at 21%, where prior to the 2017 TCJA tax change were taxed at 35%. In other words, investment securities move up and down in price, and the movement in either direction is offset by a 21% tax now, with the net amount impacting shareholder's equity only by the net amount. Deferred taxes mute the impact of stock volatility on the balance sheet.

We remove \$42.5 billion in pre-tax gains and \$33.6 billion after-tax from the projected 2020 income statement, which included both realized and unrealized gains. By September 30, Berkshire had sold \$6.2

billion of common stocks but only realized modest gains of \$666 million. We make no assumptions about realized gains during the fourth quarter, so the entire portfolio gain as estimated is assumed unrealized.

Our treatment always removed realized gains and losses from the income statement. Their timing can be arbitrary and controlled by management. It's not uncommon to see a management book gains to mask a decline in profitability. Numerous companies mastered this trick over the years. Prior to the tax code change, realized gains always helped the reported result. Portfolios could decline in value and managements had the discretion to realize gains large enough to offset or more than offset any unrealized losses. Alternatively, you see subsidiaries or assets sold or accounted for as to be sold and excluded from "adjusted" results. The most redeeming aspect of marking to market unrealized gains and losses for income statement purposes was to limit the hijinks of selecting gains in an investment portfolio to augment results. Companies would book gains and write checks for taxes just to boost short-term profits. There is zero history of Berkshire having done this. Rather, Berkshire historically goes out of its way to avoid paying cash taxes.

Including both realized and unrealized gains and losses in the income statement *is* more economically correct than excluding them as irregular. It's just that inclusion is correct but comes with volatility that can distort operating results. If stock prices reflect the earning power of the business over time, then inclusion of gains and losses, whether realized or unrealized, will be correct – over time. It's "over time" that's the problem. To satisfy the logic for removal, eliminating short-term price volatility, we must offset the removal with a better proxy for tracking economic gains and losses. To serve that purpose, we add the retained earnings not paid as dividends by Berkshire's investees in common stocks.

Add Retained Earnings of Holdings

Offsetting the removal of realized and unrealized gains, add back the portion of profits earned by Berkshire's publicly traded investees not paid as dividends. For 2020 we added back \$10 billion, which is net of assumed taxes paid at 3%. The de minimis 3% rate is used in recognition that taxes owed on realized gains will be paid *later* and probably many years in the future, if ever (it's discounting for the time value of the 21% rate). The deferred tax liability assumes immediate liquidation of the portfolio, taxed at 21%. Berkshire minimizes realized gains paid as cash, and the present value aspect accounts for the difference in our assumption.

The removal of gains and losses as irregular and unpredictable, whether realized or unrealized, requires an offset when assessing earnings power. The offset is the addition to reported earnings of the retained earnings of publicly companies not paid to Berkshire as dividends. Profits retained should (and need to) inure for the ultimate benefit of the shareholder. It is simply a reinvestment of shareholder profits, a choice made by others if you happen to not be in control. This is a normalizing factor that assumes retained earnings will ultimately translate into at least an equal dollar of market value. At Berkshire, these retained earnings are a significant component of Berkshire's overall profitability. The stock portfolio totaled 34% of Berkshire's total assets at yearend, the highest proportion since totaling 65% prior to Berkshire's acquisition of General Re in 1998. As a percentage of overall profit, \$10 billion in retained earnings represents almost a quarter of total normalized profit. As a mental reconciling item, when \$10 billion in retained earnings is added to after-tax dividends received, "earnings" from the stock portfolio total 33.4% of total after-tax earnings, pretty darn close to stocks as 34% of total assets.

2020 was a rollercoaster of year in the stock portfolio. Down by \$90 billion and 37% on March 23 and finishing up 21% to \$287 billion, which is net of \$6.2 billion in sales through September. The rally off the lows totaled more than 80% excluding dividends, all in the midst of the single greatest shock to the economy in our lifetimes. Instead of suffering mental anguish, using the Semper "sleep at night method,"

one can ignore the \$90 billion “loss” and the eventual \$45 billion “gain” (a \$135 billion swing for those keeping track) and simply add \$10 billion for retained earnings for the year. Yawn.

Despite selling \$6.2 billion in stocks through the third quarter, the stock portfolio grew by \$41 billion. These figures exclude Berkshire’s investments in Occidental preferreds and warrants as well as the Kraft Heinz position which is carried using the equity method of accounting. Since it’s publicly traded, the KHC position probably should be included here. Regardless, the retained earnings portion of total company profits actually declined during 2020. Berkshire took a machete to investments in banks and airlines, all with low multiples and high earnings yields (before the pandemic got a hold of them that is). Subsequent purchases in Japanese trading companies and in a basket of pharmaceuticals added back some earning power. Dividends also fell in dollar terms. With declines in dollar earnings and dividends, when coupled with stock prices that raced ahead faster than fundamentals for the year, both retained earnings and dividend yields dropped meaningfully.

Berkshire’s giant holding in Apple can’t hide from this overview. Even though roughly \$4 billion in Apple was sold during the third quarter, barring no further fourth quarter sales the position ended 2020 at \$125 billion, 45% of the portfolio and 14.4% of Berkshire’s total assets! Even with 16.8% earnings per share growth in 2020 and 9.9% sales growth, the 82% gain in the stock without a doubt outpaced fundamental growth, albeit impressive in an economic collapse. Still, at 36 times trailing earnings and 31 times 2021 expected profit (giving them credit for a 19% gain in per-share earnings, why not?), the low 2.8% earnings yield and 0.6% dividend yield definitely have a downward pull now on portfolio totals. A 0.6% dividend sounds puny, and it is considering that since dividends were introduced at the end of 2012 Apple paid out roughly a quarter of profit fairly regularly.

Berkshire owns 944.3 million Apple shares. At the optimistic \$4.40 in 2021 earnings and the current \$0.82 dividend, Berkshire’s share of Apple’s estimated \$75 billion in 2021 profit amounts to \$4.2 billion, up from \$3.5 billion for the past twelve months. At the current run rate, Apple produces 24% of current year portfolio earnings, a much smaller proportion of its 45% portfolio weight. High price? Yes. High growth? Hopefully for the foreseeable future, that is until Berkshire cozies up to the concept of paying taxes or finds some assets to take in exchange for shares. “Tim, Warren. Have I got a deal for you?”

Berkshire’s Stock Market Investments, Dividends and Retained Earnings

	12/31/17	12/31/18	12/31/19	12/31/20
Market Value **	\$170 B	\$173 B *	\$237 B ^	\$278 B ^
Earnings	\$9.5 B	\$13.5 B	\$14.8 B	\$14.4 B
Dividends	\$3.7 B	\$3.7 B	\$4.5 B	\$4.3 B
Retained Earnings of Investees	\$5.8 B	\$9.8 B	\$10.3 B	\$10.1 B
Earnings Yield (E/P)	5.6% (P/E 17.8x)	8.0% (P/E 12.4x)	6.1% (P/E 16.3x)	5.2% (P/E 19.3x)
Dividend Yield	2.2%	2.2%	1.9%	1.5%
Retained Earnings Yield	3.4%	5.8%	4.2%	3.6%
Dividend Payout Ratio	39%	27%	30%	30%

* Berkshire paid \$24.4 billion for net additions to the stock portfolio in 2018; \$8.0 B 1st 3Q’s of 2019

** Market Value here includes stocks in insurance group plus \$5.1 billion at 12/31/18 in rail and finance groups, \$6.2 billion at 2017. MV excludes market value KHC at \$10.4 billion in 2019, \$14.0 billion at 2018 and \$17.9 billion at 2017. KHC earnings are picked up as equity method. KHC economic cost basis is \$9.8 billion. Balance sheet cost is \$17.4 billion now \$13 billion.

** Market Value estimated for 12/31/18 and assumes no net 4Q purchases

^ Excludes Occidental preferreds and warrants \$10.8 B 2019 and \$8.2 B 2020 and KHC

Source: Semper Augustus

It's an interesting thing to review the progression of this table. I've left the three prior years in for reference. Over the past two years the portfolio is more than \$100 billion larger than it was just two years ago. In the meantime, portfolio earnings have advanced by only \$900 million. This shouldn't warm the cockles of your heart. It tells me that a lot of good things need to keep happening at Apple. A misstep may cause some reevaluating by Mr. Market. What an unusual two years. The portfolio opened 2019 at 12.4 times earnings. The 40% portfolio gain in 2019 followed by last year's 21% advance moved more than the needle. Two years ago, Berkshire's banks traded at 10 times earnings and Apple traded at 13 times. That's 13 times. What a run – but why do I feel like some of our margin of safety has eroded?

Remove Derivative Contract Gains and Losses

Realized and unrealized gains and losses on derivative contracts are removed from GAAP earnings along with those on investment securities.

Berkshire wrote a series of put option contracts just prior to the financial crisis with several life insurance companies as counterparties. The life insurers write a type of annuity that guarantee a smaller percentage of the gain on named stock market indices accompanied by a base minimum annual return and a guarantee of either no loss or a loss capped at a certain percentage. Naturally the insurers lose big if the stock indices decline, and so look to hedge their downside exposure. For a price, Berkshire provided the protection. The options written were European style, meaning they are payable only at the expiration of the option, which in the case of those Berkshire wrote were all well over ten years. Berkshire received \$4.9 billion upfront as a premium between 2004 and 2008 and unwound 8 of the original contracts in 2010 at a gain of \$222 million. A number of the contracts subsequently expired worthless, which means Berkshire keeps the entire premium, plus the gains and income on invested float, and pays no losses. The majority of contracts are already expired. The balance will expire by February 2023 and contain no collateral posting requirements. The liability was \$968 million at the outset of 2020, down from \$2.5 billion a year earlier. On March 31 the liability had skyrocketed to \$2.6 billion and had fallen to \$1.6 billion by September 30. The liability reflects the undiscounted value of the amount they would have to pay out today calculated using the Black-Scholes option pricing formula to determine fair value. Declining European markets and surging volatility combined to balloon the liability as the market fell. Thanks to the fourth quarter rally in stocks, the liability will be much lower by yearend, I'm guessing to \$700 million.

Each quarter, Berkshire includes an unrealized gain or loss in the income statement to reflect any increase or decrease in the liability amount as the indices move up and down. When markets rise, Berkshire records a profit, as was the case during 2019 and 2020. When they decline, as they did in 2018 and during 2020's first quarter, they show a loss. The gains and losses are non-cash and taxes on gains are carried as deferred, because as mentioned, Berkshire only pays at expiration.

We think it is extremely unlikely that Berkshire would incur a loss on these remaining contracts. The options were written "at the money," meaning the strike price was set at the market price of the indices at the time the contracts were written. The strike for all four (three were European indices) were written at a time when the S&P traded for no higher than 1,400. Changes in the currencies underlying the contracts also bear on potential losses, but with the massive surge the prospects of remote is extremely slim. Of course, the derivative contracts didn't look so good at the depths of the crisis – at year-end 2008, the liability on the contracts outstanding at the time was \$10 billion with a notional value of \$37 billion. The notional value would be the amount owed to the insurance companies if each stock market index was at *zero* at expiration.

We've always believed writing the contracts was brilliant, a great risk assumed. The length of the contracts and the fact that retained earnings over a long enough period invariably push share prices

upward provided margins of safety. With the options being European style, the indices would have to be *below* the strike price on the *exact day* of exercise. These contracts were originally written with 12 to 19 years to maturity. Sure, markets were negative in price for more than 12 years before, and in fairness the options were written close to a cyclical/secular peak, but they would have to be negative on the specific day, *and* the contracts have staggered maturities.

From a cash standpoint, Berkshire received \$2.1 billion (down from \$3.6 billion a year ago) premium from the remaining options upfront. The proceeds, a portion considered as float, are invested and produce income and gains. If the contracts expire worthless, Berkshire keeps the entire \$2.1 billion. If the indices are all at zero, the maximum payout is \$12.4 billion.

There does remain a minute chance that Berkshire pays at expiration on some of the remaining index put contracts. It's not a zero chance. We saw how quickly assets can lose value in March. Stock markets were negative for periods of 12 years or more in our markets several times. Japan remains materially underwater since 1989, which is extraordinary. Our markets were negative from 2000 to 2012, traded consistently below 1966's high until 1982, and took 25 years to regain 1929's peak. With the strikes written at the money, to lose would require declines of 50% to 70% from now to the precise day of expiration. We believe writing the index puts were great wagers by Berkshire – a permanent collection of \$4.9 billion in put option premium, the use of the entire \$4.9 billion for 12 to 17 years and losses risked that would never be paid.

Adjust Earnings to Reflect Accelerated Depreciation Tax Treatment for Capital Expenditures

Berkshire spends enormous sums on capital expenditures, much of which takes place in its energy and railroad businesses. Deferred tax liabilities are created on qualifying investments in property, plant and equipment. Companies like railroads and utilities are incentivized to make infrastructure investments for the public good. The use of accelerated depreciation for tax purposes arises from higher depreciation of fixed assets allowed for tax purposes in the early years of amortizing an asset's life, made up for with lower tax-deductible depreciation expense in later years. The higher early depreciation results in lower taxes paid in the early years and consequently higher taxes in later years. The future higher taxes are carried on the balance sheet as a deferred liability. It's a present value benefit, and we adjust net income upward reflecting the benefit.

The 2017 TCJA tax code change more broadly expanded the allowed use of accelerated depreciation to most industries, instead of limited to those such as rails and regulated utilities. The code change allows for depreciable assets (excluding structures) to be expensed in one year instead of being amortized over many years, effectively accelerated depreciation on steroids for many businesses. Equipment must have been purchased after September 27, 2017 and by December 31, 2022 (with an additional year for longer production property and certain aircraft). The immediate 100% expensing is reduced by 20% annually beginning in 2023 and is to be phased out entirely after 2026. Regulated *public* utilities were largely excluded from the new benefit – having already applied the tax treatment, albeit over more years. With the change in the tax rate to 21% from 35%, regulators logically made downward adjustments to customer electricity rates or to the rate base to maintain allowed returns on equity. Said differently, the tail of lower future depreciation expense had been determined using a 35% rate. The new lower rate would have unfairly benefited a utility at the expense of the customer.

The recent election brings proposals to alter or eliminate many aspects of the tax changes introduced by TCJA. An early end of accelerated depreciation for non-rail and utility industries may transpire. We don't expect a change to current treatment for utilities (who already used the tax method but were compelled to refund or lower prospective rates due to the change in the tax rate applied to the carried deferred tax liability). As of now it's too early to have any color on prospective changes.

For 2020 after-tax net income is increased by \$1.7 billion, with the deferred tax liability for property, plant and equipment growing to more than \$30 billion.

Over the last three years, the use of accelerated depreciation benefitted not only the railroad, but also Berkshire's other non-regulated businesses that in many cases are also now enjoying the tax benefit of accelerated depreciation where previously they weren't. Berkshire's non rail and energy businesses will have spent about \$14 billion on capital expenditures, with much of that qualifying for one-year expensing. As assets depreciate over their actual useful lives, approximated by depreciation charges in the GAAP income statement, the beneficial tax benefit eventually runs its course, and in the later years of an asset's useful life, an even higher effective tax rate than the marginal rate will be applied for the tax books. Total capital expenditures will be \$15 billion in 2020 against GAAP depreciation expense of \$8.4 billion. BH Energy and the rail will spend \$7.5 billion and \$3.7 billion respectively, \$7 billion above depreciation. Some of the capex is genuinely spent on maintenance, but in the case of the energy businesses largely increases the rate base, against which regulated utilities are allowed to earn up to an established profit on equity.

Berkshire will continue spending large amounts of capital expenditures, much of which drives down the current cash tax bill. The appetite for capital expenditures above maintenance outside of the rail and energy businesses is likely to wane over the course of the phaseout beginning in 2023. For the next two years we should see large expenditures barring the passage of unfavorable tax legislation.

Remove Underwriting Gains and Losses; Add a Normalized 5% Underwriting Profit

Underwriting profits can be extremely volatile from year-to-year, not unlike stock prices. Our method for valuing Berkshire's insurance operations removes reported underwriting profits and replaces them with a normalized 5% pre-tax underwriting profit on premiums earned. It's a similar approach to removing investment gains and losses and replacing them with the retained earnings of the stock market holdings. The volatility of the underwriting cycle is stripped in favor of estimating what we think is a sustainable and achievable profit earned *over time*. Our 5% pre-tax underwriting estimate is a blended rate *over time* across all of Berkshire's insurers and types of business written. Under time is emphasized via an example. Catastrophe reinsurance can produce large underwriting gains for many years. A single year of large losses producing an underwriting loss must be averaged among the majority of years with gains.

The low interest rate environment makes underwriting at a profit imperative. Berkshire enjoys unusual advantages thanks to surplus capital built over the years. It can retain more business than its competitors and maintain much larger allocations to common stocks. Surplus capital derived from best-in-class underwriting and higher returns from longer duration investment assets allowed dividend and capital distributions to the holding company and into its non-insurance businesses. We'll closely watch developments like GEICO's growing market share and the progress of the new specialty business. We may well alter our profit assumption. A more conservative approach would assume breakeven underwriting over time, which strips \$39 billion from the capitalized value of underwriting profit that gets included in our appraisal of Berkshire's intrinsic value.

Berkshire has a history of including, then excluding, then including then dropping altogether underwriting profit in their dual yardstick method of calculating intrinsic value from 1995 to 2015. Our method of removing volatility and replacing it with what we think Berkshire will earn on underwriting allows us to determine the worth of the insurers, and the business at large, without having to think about the degree to which insurance profits are under or over a "normal" level of underwriting for a year or period of years.

When we analyze property casualty insurers and reinsurers, we spend a lot of effort trying to determine sustainable underwriting margins, which can be positive or negative depending on the type of insurance written and the economic climate, particularly with interest rates, inflation, capital required and competitive capacity.

Berkshire's collection of insurers will likely report an underwriting profit in 2020 unless the fourth quarter produces a sizable underwriting loss, which can be a current year loss or adverse reserve development from prior period's insurance written. Through September 30, the insurers earned a collective underwriting profit of about 2.1%, less than half of our long-term target. 2019 saw a 0.5% underwriting gain versus 3.5% in 2018 and a loss of 6.5% in 2017. 2016's margin was 4.6%, close to target. The three years through 2019 were marked by higher-than-average catastrophe losses, largely from hurricanes and California wildfires in all three years, Asian typhoons in 2018 and 2019, wildfires in Australia in 2019 and a Mexican earthquake in 2017. Despite four years of underwriting below our long-term estimate, aggregate profitability exceeds most industry participants across the lines that Berkshire insures. Beyond underwriting, Berkshire's outsized allocation of insurance reserves and capital to common stocks has driven overall profitability far ahead of peers.

For 2020, the first step of removing actual underwriting profit eliminates an estimated after-tax \$1.2 billion from GAAP earnings. The next step of adding our 5% normalized pre-tax underwriting profit adds \$3.0 billion pre-tax and \$2.6 billion after-tax underwriting profit on \$64.5 billion in anticipated premiums earned, up from \$61.2 billion in 2019. The quarter just ended lacked major catastrophes, so reported underwriting profit may come in higher than projected. Berkshire's reported COVID-19 related losses will likely modestly increase.

Add a Portion of Intangibles Amortization Expense to Income

Economic earnings are increased by \$1.1 billion to reflect the amortization of intangibles created in acquisitions that do not economically decay. Berkshire recognizes this reality each year, formerly in a supplemental presentation in the Chairman's letter and beginning last year in the MD&A segment presentation of the Manufacturing, Service and Retail group in the 10-K. Unlike many public companies, Berkshire does not present a pro-forma or supplemental set of financials excluding various expenses. The goodwill and intangibles footnote make clear the types and amounts of intangibles being amortized. The balance of intangibles being amortized with no economic decay is now much larger and growing. We had been adding back 80% of the amortization charge for intangibles, which resulted in economic earnings being roughly \$600 million higher after-tax than GAAP profits for 2010 to 2015. We are now adding back 90% of the intangibles charge thanks to ongoing amortization and a lack of recent acquisition activity.

Gross intangibles were \$42.1 billion on September 30, 2020. Accumulated amortization is only \$10.5 billion. In addition to trademarks, intangible assets such as trade names and customer relationships generally lose little, if any, economic value over time.

Add an Optionality Premium to a Portion of Cash Balances

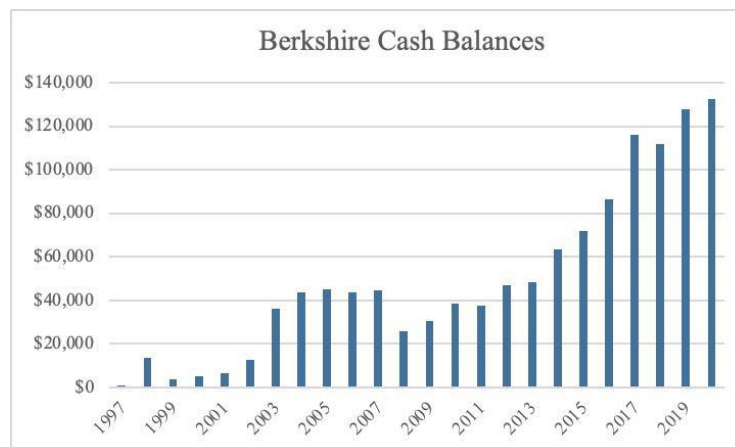
We make a material upward adjustment to Berkshire's reported profits that assumes much of Berkshire's cash will be put to good use, and reasonably soon. The adjustment adds \$5.5 billion to GAAP earnings, a not insignificant 12% of \$44.5 billion in normalized earnings. The upward adjustment is earnings based only. It does not double count marketable securities or firm assets in a balance sheet analysis. The base assumption is that a portion of invested assets in cash are earning less than they will over time. Depending on whether higher-yielding investments are made and at what yields makes the adjustment worthy of critique, in whole or in part.

Berkshire watchers are acutely aware of the company's burgeoning cash hoard – cash earning nearly nothing today in U.S. Treasury bills. The cash balance will total roughly \$133 billion at yearend, a decline from September 30 reflective of expected share repurchases and the closing of a portion of assets purchased from Dominion with cash.

At U.S. T-bill rates of 0.1%, pre-tax interest is now a whopping \$13 million. Interest rates on bills were 1.5% a year ago and 2.4% the year before that. At 2% Berkshire would be earning nearly \$2.7 billion on its cash balances. Call the drop to \$13 million material. Berkshire would undoubtedly prefer a higher earning opportunity set, making our expected \$25 billion in share repurchases at earnings yields between 8% and 10% at the time of purchase an extremely favorable use of cash.

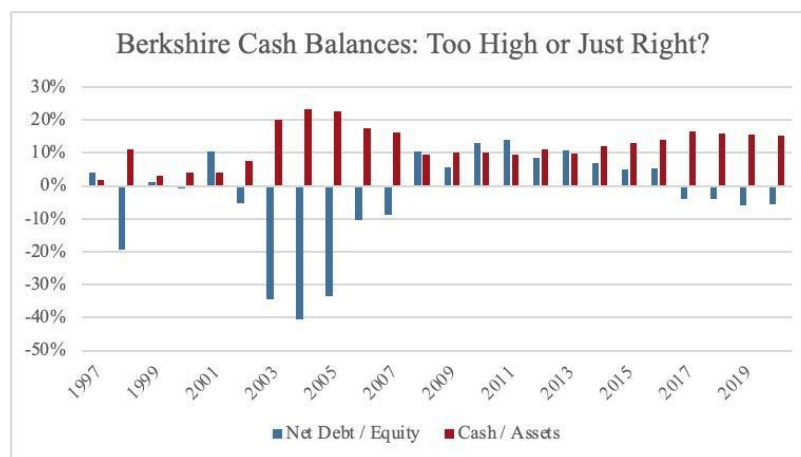
Berkshire states it will maintain cash on hand of \$20 billion as a permanent reserve. That leaves \$113 billion (excluding cash used in the railroad, utility and energy businesses) for investment in longer duration assets.

Below is an updated chart of Berkshire's cash position from 1997 through our 2020 estimate.



Source: Berkshire Hathaway; Semper Augustus

The chart above takes the shape of a ski jump, causing anxiety among Berkshire watchers. “Oh, the hole burning in my pocket.” However, in the context of cash relative to the entire balance sheet, the apparently too-conservative posture is seen in a different light.



Source: Berkshire Hathaway; Semper Augustus

Berkshire's \$133 billion cash balance (excludes cash held at BHE and BNSF) is within a normal range when measured against equity and assets since the General Re deal. Cash today is 12% of total firm assets, down from 15% a year ago. At 12%, cash as a percentage of total assets precisely matches its average since 1997. How about firmwide leverage? Berkshire maintains a net unleveraged but not too-cash-heavy capital structure. Net debt to equity is -3% today, reflective of modestly more cash on hand than balance sheet debt.

Progression of Berkshire Stock Portfolio as a Percent of Book Value and Assets

Year	Stocks	Cost Basis	Unrealized Gain/Loss	Realized Gain	Net Purchases	Net as % of Avg	Equity	Stocks as % of Equity	Total Assets	Stocks as % of Assets
1997	\$36,248	\$7,207	\$29,041	\$1,106	-\$1,302	-3.6%	\$31,455	115%	\$56,110	65%
1998	37,265	7,044	30,221	2,415	-2,823	-7.7%	57,403	65%	122,237	30%
1999	37,008	8,203	28,805	1,247	-691	-1.9%	57,761	64%	131,416	28%
2000	37,619	10,402	27,217	4,499	-2,725	-7.3%	61,742	61%	135,792	28%
2001	28,675	8,543	20,132	1,488	-2,806	-8.5%	57,950	49%	162,752	18%
2002	28,363	9,164	19,199	918	416	1.5%	64,037	44%	169,544	17%
2003	35,287	8,515	26,772	4,129	6,765	21.3%	77,596	45%	180,559	20%
2004	37,717	9,056	28,661	3,471	-578	-1.6%	85,900	44%	188,874	20%
2005	46,721	15,947	30,774	5,408	6,392	15.1%	91,484	51%	198,325	24%
2006	61,533	22,995	38,538	2,635	5,395	10.0%	108,419	57%	248,437	25%
2007	74,999	39,252	35,747	5,509	11,057	16.2%	120,733	62%	273,160	27%
2008	49,073	37,135	11,938	-7,461	3,300	5.3%	109,267	45%	267,399	18%
2009	59,034	34,646	24,388	787	-1,056	-2.0%	131,102	45%	297,119	20%
2010	61,513	33,733	27,780	2,346	-1,621	-2.7%	157,318	39%	372,229	17%
2011	76,991	48,209	28,782	-830	1,497	2.2%	164,850	47%	392,647	20%
2012	87,662	49,796	37,866	3,425	-712	-0.9%	187,647	47%	427,452	21%
2013	117,505	56,581	60,924	6,673	4,689	4.6%	220,959	53%	484,624	24%
2014	117,470	55,056	62,414	4,081	1,118	1.0%	239,239	49%	525,867	22%
2015	136,017	68,412	67,605	10,347	1,473	1.2%	254,619	53%	552,257	25%
2016	150,432	75,628	74,804	8,304	-11,596	-8.1%	282,070	53%	620,854	24%
2017	195,840	84,476	111,364	2,128	814	0.5%	348,296	56%	702,095	28%
2018	186,764	112,667	74,097	291	24,427	12.8%	348,703	54%	707,794	26%
2019	258,527	120,140	138,387	1,585	4,306	1.9%	424,791	61%	817,729	32%
2020	296,786	115,429	181,357	-13,901	-6,158	-2.2%	444,898	67%	869,604	34%

Source: Berkshire Hathaway; Semper Augustus Calculations

Net purchases and realized gain for 2020 through September 30. All others through yearend.

It's this historical perspective that allows doubt to creep into the method for assuming a higher return on much of the cash balance. The counterpoint is most of the debt on the consolidated balance sheet is held in the railroad and the energy businesses. The debt in these groups is *not an obligation* of Berkshire – it's standalone to the subsidiary and not hypothecated to the parent. It's also geared at a proper level for those business. If you hold those two subsidiaries aside from consideration, then the rest of Berkshire is quite liquid and has room to invest a substantial portion of cash reserves.

Last year's letter contained this line, "For now, we expect a large portion of not only today's cash, but ongoing free cash flows generated by operations, to be invested at higher yields (including via share repurchases) over the near to intermediate term." That's precisely how 2020 played out.

The premise is that Berkshire will invest a portion of its T-bill and cash balance in higher yielding assets. The field of opportunity includes partial ownership of publicly traded companies (stocks), a control or shared equity interest in privately held businesses, or various iterations of higher yielding fixed-income or equity hybrid securities, such as warrant investments made since the financial crisis, most recently in Occidental Petroleum. The field of investment candidates includes Berkshire's own shares when acquired at low prices (high earnings yields).

The method begins with Berkshire's \$137 billion total cash on hand and assumes any portion held by the operating subsidiaries is integral to their operations and will persist as working capital. We estimate cash held at BNSF, BHE and the MSR&F group total \$30 billion. The rail and energy cash balances were known on September 30. The MSR&F cash is an estimate assumed to offset total debt held in the group of \$26 billion, inferred by reconciling numerous data points in Berkshire's quarterly and annual filings.

Our estimate of a "permanent cash reserve" exceeds a figure mentioned by Berkshire. Where Berkshire stresses \$20 billion as effectively "escrowed," we assume the business will always maintain a cash reserve equal to one-years' worth of insurance losses actually payable as cash, \$37 billion in 2020. If we were running Berkshire that's what we would do. So, from \$137 billion we subtract the \$37 billion and also the assumed \$30 billion at the subs. The remaining \$70 billion thus in our mind is cash earmarked for deployment. Should an elephant come along, Berkshire can take balance sheet cash well below our assumed figure. Any dip can be replaced quickly with the extraordinary cash produces by the operation each year. Berkshire also has enormous borrowing capacity.

Our long-running assumption is that the hurdle at Berkshire is a 10% rate of return. This number would have been much higher in past years when guns were used to shoot fish in barrels and barrels actually contained fish that could be shot without a seasonal license and catch (shot) limit. Because we don't expect the \$67 billion to be put to work immediately but instead over some period of time, time factor brings the present value of investments made at 10% back to 7% pre-tax. From 7% we subtract the prevailing T-bill rate, now the aforementioned shriveled 0.1%. What is lost in actual interest earned when rates decline is made up with opportunity cost and vice versa.

We assume Berkshire's hypothetical opportunity cost pickup on cash balances is taxed at the current dividends received deduction rate of 10.5%. The hypothetical 6.9% improvement over bills nets to a 6.2% after-tax yield pickup.

Is it aggressive assuming a return that's not being earned currently? We don't think so. When Berkshire invests in Occidental preferreds at 8%, callable later at a premium (plus warrants), there is very little net yield pickup versus our 6.9% optionality premium to bills. Similarly, when common stocks are purchased Berkshire picks up the earnings yield, not counting whatever happens to the share price or future growth. Apple at 13 times earnings is a 7.7% earnings yield. Of course, the annual gain on the Apple investment *far* exceeds both the earnings yield *and* the Semper opportunity cost yield. With more Apples the Semper 7% looks rather puny. Share repurchases are retired at Berkshire's earnings yield. Bought at 12.8 times 2020's cyclically depressed normalized earnings yield 7.8%. The "income" picked up with the method breaks down if investable cash lingers permanently, a real risk if the two-decade range for cash to assets or net debt to equity are any guide.

Reduce Net Income to Reflect Higher Normalized Pension Expense

The pension adjustment methodology we've used for two decades was covered in past letters. Here we'll just overview the earnings adjustment for Berkshire in 2020. If you are in the game of buying companies with large legacy defined benefit plans, I encourage you to read our old letters. In a nutshell, we generally apply a 4% assumed rate of return on the fair value of pension assets versus Berkshire's 6.4%, and run the difference as an annual expense through the income statement. We do the same by amortizing the collective pension underfunded status of \$2.2 billion over ten years, assuming a full funding over a decade. The combination suggests Berkshire will commit an additional \$616 million pre-tax and \$487 million after-tax to its pension funds annually. These figures use 2019's published financials. This adjustment is immaterial enough that we don't try to figure out what 2020's plan will look like until the 10-K is released at month's end. Given the combined plans' more than 50% allocation to stocks and with the strong stock market, the underfunded status ought to drop to perhaps \$2.0 billion or lower. It's hard to

make headway because combined plan assets of \$16.5 billion distribute annual benefits of more than \$1 billion, requiring every inch of assumed return. Low interest rates combine with rich stock prices to make our very long-standing 4% assumed return conservatively realistic, even with a company such as Berkshire which regularly assumes lower expected investment returns than most.

Our method is *far* from actuarially correct but has proven reliable. What the method has done is kept us out of old businesses where the pension plan rivals the business in size and importance. It captures the huge one-off funding that takes place periodically, with the CFO suggesting analysts *ignore* the \$2 billion we just borrowed and “invested” in the pension. No, no, no. Rather, \$200 million ought to have been contributed annually for a decade. With nearly all plans failing to achieve their return assumptions for the past twenty years, needless to say it’s been a useful tool. Overall, the pension situation has improved for investors. The number of companies with defined benefit plans is lower and return assumptions have come down from approximately 9% to 6.5%. With some companies it’s a big deal. When interest rates require a microscope to identify and stock markets are at levels consistent with historical secular peaks, the issue is worth considering for the investor in companies with pension fund obligations.

Other Non-Recurring Adjustments

From time-to-time additional adjustments are necessary. Non-tax adjustments at year-end 2017 for the TCJA can be seen in the four-year summary table below. One adjustment irregularly occurs if the stock portfolio trades at a level we find dramatically overvalued or undervalued, where market value is adjusted with a discount or premium. This adjustment does not impact our earnings-based approach.

2020 required a non-cash adjustment reflecting a non-cash, non-tax-deductible write-down of \$10 billion in Goodwill at Precision Castparts plus another \$400 million after-tax charge against other intangibles. These “expenses” are properly dismissed as non-operating but cannot be ignored. The analyst cannot ignore the write-down and apply current and future profitability against a now lower equity balance, crediting the sinning management that overpaid for the assets requiring the charge. “Thou shalt not forget the price paid for an acquisition.” Fortunately, you’d have to look and keep looking for these charges at Berkshire over the 56 years present management has run the place. They don’t exist. By contrast, the companies comprising the S&P 500 charge 15% of operating profits each year on average since 1984. Ignore the expense as non-cash, waxes the soothsaying CEO, but let me show you our magnificent return on equity. Lest you think the charges are immaterial, in 2020 alone write-offs and write-downs will amount to 21% of operating earnings, shrinking book value of the index by 2.8%. I highly recommend taking a meat cleaver to the 15% return on equity of the index (using 2019 peak earnings, not 2020’s depressed numbers). They ain’t as good as they says they is.

The final periodic adjustments made, and here they do reflect earning power, are if a business or group is under earning or over earning relative to normalized potential. For several years, Burlington Northern and a handful of the manufacturing and industrial businesses were adjusted upward because current profitability was depressed. These subsidiaries improved back to a normalized steady state as of 2018. The pandemic harmed many of the MSR businesses badly and we assume profits among these businesses are depressed by more than \$2 billion. In the case of the railroad, some business stands to weaken in perpetuity, coal being an obvious example. To the extent sustainable alternatives and natural gas replace coal, other areas of Berkshire stand to benefit. The trade war and pandemic jointly worked against the railroad. Combining the modestly depressed profits with the more severely impacted earnings at MSR, we’d markup normalized GAAP adjusted after-tax profitability by a combined additional \$2.9 billion.

The final adjustment under consideration to Berkshire’s GAAP financials (and beyond) is the degree to which the improved profitability thanks to the TCJA tax changes will phase out, expire and be competed

away. We attempt to capture the decline in the benefit in our sum of the parts method for calculating Berkshire's intrinsic value.

Summary of GAAP Adjustments to Economic Earnings

After-Tax GAAP Adjustments to Economic Earnings: 2020 Expected (in billions)				
	2017	2018	2019	2020 (e)
Normalized Recurring GAAP Adjustment to Economic Earnings				
Add retained earnings of equity investees, taxed at 3% (1/7th of new 21% federal rate)	5.3	10.0	10.0	10.0
Add income for DTL's created with PP&E capex to reflect cash tax<GAAP tax	1.4	1.4	1.7	1.7
Add 90% of amortization charge for intangibles (was 80%)	0.9	0.9	0.9	1.1
Add optionality premium for near/intermediate investments with cash>(1-year insurance losses + cash at subs)	2.7	2.3	3.8	5.5
<u>Reduce net income to reflect higher normalized pension expense</u>	<u>-0.5</u>	<u>-0.5</u>	<u>-0.4</u>	<u>-0.4</u>
Normalized Recurring GAAP Adjustment to Economic Earnings (before removing realized g/l)	\$ 9.9	\$ 14.1	\$ 16.0	\$ 17.9
Periodic or Irregular in Amount or One-Time Adjustments to GAAP Net Income				
Remove realized and unrealized gains/losses, including from derivative liabilities	-1.4	17.7	-57.4	-34.7
Remove reported underwriting gain/loss	2.2	-1.6	-0.3	-1.2
Add normalized 5% underwriting profit	2.1	2.2	2.4	2.6
Berkshire TCJA Adjustment one-time non-cash	-28.2			
Kraft Heinz TCJA Adjustment one-time non-cash	-1.7			
Write-down after-tax of PCC 2020 (\$10B goodwill and \$0.4B net intangibles)				10.4
Total Periodic or Irregular in Amount or One-Time Adjustments to GAAP Net Income	\$ (27.0)	\$ 18.3	\$ (55.3)	\$ (22.9)
GAAP Net Earnings (From Income Statement)	\$ 44.9	\$ 4.0	\$ 81.4	\$ 46.3
Total Adjustment (assumes no 4Q18 gain/loss on investments or irregular underwriting gain/loss)	\$ (17.2)	\$ 32.4	\$ (39.3)	\$ (5.0)
Semper Adjusted Net Income; Economic Earnings ^*	\$ 27.8	\$ 36.4	\$ 42.1	\$ 41.3

* Does not reflect degree to which subsidiary earnings or securities are under or over valued (roughly \$2.9 billion depressed in rail and industrial for 2020)

^ May not sum due to rounding

2017: Will require exclusion of net income created by reducing DTL's for new 21% tax rate. Probably \$37 million in GAAP income that is not economic.

Source: Semper Augustus; Berkshire Hathaway and Subsidiary SEC Filings

Some years see our adjustment factors add to reported GAAP earnings and other years require subtraction. The process eliminates the reported volatility that comes with owning a large portfolio of common stocks as well as the period-to-period swings in underwriting profitability among a diverse group of insurers. We capture the degree to which some intangibles do not decay in value; whether or when Berkshire will invest its cash reserves and into how much incremental earning power; the proper economic versus accounting treatment of insurance “float”; the difference between reported and cash taxes actually paid, now and prospectively. The process gets us to a durable appraisal of earning power.

The methods and granular estimates we use in our process are open to debate. Berkshire is so diverse that the number of adjustments required to arrive at an understanding of durable earning power makes for quite an exercise. An equally important method for valuing Berkshire is through an analysis of its individual parts, or at least large clusters of parts. Perhaps it's because so much time is spent thinking about the drivers of value that our sum of the parts analysis reconciles so closely with the GAAP adjustments made to the rolled up consolidated financial statements. The accounting adjustments applied to the whole also apply individually to the segments. The analyst can choose to modify the assumptions used at each step or can dismiss the method entirely. We use the GAAP adjusted approach to reconcile against the other methods used to discern what we believe is a conservative appraisal of Berkshire Hathaway.

Why share the approach in what is now a letter read beyond our clients and a handful of friends and peers? First, it's important that our clients understand how we view measurement of earning power at what has been our largest holding for more than two decades. Second, any concern that a public presentation of the approach would drive the stock up to fair value and make the shares unbuyable has been proven not a concern. Given the persistent discount in recent years it seems Berkshire isn't much more than an ugly stepsister, which suits us fine. In the meantime, I'll spend a week at the outset of each year deep in the weeds, bashing my head trying to get the numbers to make sense.

SUMMARY

“There must be some kind of way outta here...” – Bob Dylan

Thank you, Bob. Some 100 pages in, again, the realization set in that *The Point of No Return* is more than a triple entendre. The bear emerges from hibernation ready to not be in the cave. I genuinely enjoy the six weeks required to pen the annual letter. Writing in-depth is cathartic and forces introspection and outside-the-box thinking beyond the ongoing research and investment process. Every year I learn new things and believe to have a better perspective. I’m better for it and our clients are better for it as well. The family? They get more of me than they can handle over the remaining 46 weeks of each year. While I look forward to the researching, writing, editing, the music and even the solitude, by mid-February I am the bear.

The process requires 24/7/42. Day 43 would break me. Six weeks of writing nightly into the wee hours, some mornings after sunrise. Few calls, fewer meetings, no travel, no restaurants, no sports (NFL playoffs excepted), no vino. A little Chablis and left-bank Bordeaux at the finish line and it’s back to the real world. The pandemic was an unexpected and unwelcome return last year. By the end of the process, I look forward to seeing the real office, clients and friends, managements of the companies we own, and the sun! Seeing so many super people in New York, Boston, Chicago, LA, Zurich, all over, certainly what’s now nearly five days in Omaha is a relief each year. The most unwelcome sight was the same four walls. Better than prison for sure, but like all of you I’m ready to return to normality. Sitting down to the computer on January 2 this year was not the same as in years past. I’m certainly banking on the return to this keyboard next January to come as the more typical respite, meaning I hope to see many of you in the meantime!

Berkshire’s shares gained all of 2.4% in 2020. While the boo-birds squawked, intrinsic value grew by at least its expected rate. The company repurchased a material number of shares at meaningful discounts to intrinsic value. Capital spending finds attractive use in the energy business, not only via acquisition but by capital expenditures at healthy regulated returns. Debt at the railroad, energy businesses and at the holding company has been lengthened at laughably low interest rates. All in, the scale of repurchases approached an entire year’s worth of operating profit. Should the shares remain at the present wide discount to value, ongoing share repurchases imply a smaller Berkshire but an even better Berkshire. In the meantime, we own a diversified, durably predictable business earning an unleveraged 10% return on equity capital trading at an incredibly low price relative to intrinsic value. Judicious use of leverage, extremely conservative accounting, outstanding governance are all rare qualities. To have them all in one place at today’s price suggests reliably predictable healthy returns for years. The stock will not be our best investment, but it is the most knowable. As our base measure of opportunity cost, it’s a nice hurdle.

Coupling market valuations with the somber “point of no return” theme paints a fairly grim picture. The disappointment from four decades of lack of leadership among our elected officials and central bankers is palpable. Throwing debt on top of a debt bubble creates an untenable situation. Deflation is the natural outcome of an overbuilt credit stock. With no one in power conditioned to tolerate austerity and living within our means, financial collapse and hyperinflation enter the discussion about what’s possible and increasingly probable. The Semper process always gravitates to businesses of high-quality trading at low prices. The dual margin of safety approach serves us well and should do so in the years to come. Maintaining relative purchasing power becomes more and more the imperative. It’s not a fun message. Knowing the paths before us, but not knowing which one we inevitably take requires and will bring to bear all of the experience and judgement we’ve hopefully accumulated. Know that our attention remains undivided.

We can't extend enough thanks to all of the friends, colleagues and peers that make doing what we do every day so enjoyable. The team here at Semper is exceptional and a joy to work with. All are committed to the task at hand. We owe even greater thanks to our clients. Shepherding your capital comes with enormous responsibility and we will never approach our role as stewards with anything but our undivided care, attention and respect. We are humbled by your continued confidence.

Huge thanks for the time you willingly devote to the annual letter. Your comments and feedback are always welcome. We look forward to catching up over the year. It will be nice to see everyone live and in the flesh, uh, in person rather. Enough with video calls and filters posing as professionals. I am not a cat.

Chablis or bust...

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APPENDIX

Appendix A

Key Business Segment Information – Berkshire Hathaway 2020 Expected

Berkshire Hathaway Energy (91.1% owned)		BNSF	
Revenues	\$20.4 B	Revenues	\$20.5 B
Pre-tax Income (excludes gain/loss BYD and invest.)	\$2.6 B	EBIT	\$8.1 B
Net Income (GAAP, net of non-controlled interest)*	\$3.8 B	Pre-tax Income	\$7.1 B
Net Income (adjusted for cash taxes)	\$4.5 B	Net Income (norm tax rate now 24.5%)	\$5.34 B
Reported Tax Rate (derived MD&A-not cash adjusted)	-47.5%	Net Income (cash tax adjusted)	\$6.1 B
Cash Tax Rate (deferred taxes exceed reported tax)	-37.5%	Goodwill (BNSF SEC and STB filings)	\$14.9 B
Goodwill (From BHE 10Q, 10K, AltaLink & NPG Interim)	\$9.9 B	Equity (estimated from STB and GAAP filings)	\$44.5 B
Deferred Tax Liability (Including \$1.7B for investments)	\$13.2B	Total Assets	\$89 B
Depreciation and Amortization	\$3.1B	Debt (ex-lease)	\$23.2 B
Capital Expenditures (Mgt. Estimate)	\$7.0 B	Cash	\$2.0 B
BYD and Other NDC Trust Stocks (69%/31% 2019)	\$6.6 B	Interest	1.04 B
Equity (including BYD and NDC)	\$40.2 B	After-Tax Interest	\$0.81 B
Equity (excluding \$5.5 B investments net of DTL)	\$34.3 B	Deferred Tax Liability	\$14.7 B
Berkshire Equity After Non-Controlling Interest	\$36.6 B	Equities as an Investment (None now)	n/a
Total Assets (including BYD and Investments)	\$113.5 B	Depreciation and Amortization	\$2.5 B
Debt	\$46.5 B	Capital Expenditures	\$3.6 B
Cash	\$2.3 B	ROE GAAP Net Income	12.0%
Interest	\$2.0 B	ROE Adjusted for Cash Taxes	13.8%
After-Tax Interest	\$1.5 B	ROC Net of Cash	10.5%
ROE GAAP w/ % DTL (includes \$9.7 billion goodwill)	11.0%	Estimated Value	\$105-115 B
ROE (adjusted for cash taxes)	12.9%	Implied P/E (on net adjusted for cash taxes)	17
ROC Net of Cash	7.6%		
Estimated Value (Net of Non-Controlling Interest)	\$57-67 B		
Implied P/E	15-16		
MSR Businesses + Finance & Financial Products (Consolidated at 12/31/18)		HoldCo	
Revenues	\$133.9 B	KHC 26.7%; 325,422m shares (bs cost \$17.4 w/d to \$13.8B; cash cost \$9.8 B)	\$11.286
Pre-tax Income	\$10.6 B	Other Equity Method (PFJ, Berkadia, ETT(in BHE))	\$4.100
Net Income at 23% assumed tax rate	\$8.1 B	Itochu, Mitsubishi, Mitsui, Sumitomo, Marubeni)	\$7.137
Profit margin	6.0%	Diageo	\$0.656
Goodwill (net of 2020 PCP \$10B write-down)	\$31.8 B	IAG - AU	\$0.292
Other Intangibles (net of 2020 PCP \$600m write-down)	\$29.2 B	Other Non-13-F Holdings (total \$14.438B 2020e)	\$6.353
Total Assets	\$202.9 B	Cash (MSR cash assumed to offset MSR debt)	\$22.525
Equity (Write-down 10.0 and 0.6 PCC 2020)	\$117.4 B	TOTAL HOLDCO ASSETS	\$52.349
DTL (Unallocated estimate)	\$9.9 B	Debt (Interest Paid MSR 66.8% of MSR + Not segment allocated)	\$19.700
Depreciation of Tangible Assets	\$3.5 B	Deferred Tax Liability	\$0.300
Capital Expenditures	\$4.9 B	HoldCo Net Assets	\$32.349
Total Debt (allocated interest expense Ins & Other & Ur	\$26.0 B	KHC Eq Method Earnings (increase cost basis; (e) full 21% tax difference)	\$1.230
Cash (Offset to Debt; Balance to HoldCo)	\$26.0 B	Divs KHC (reduce basis of investment: \$521m can't count here but taxed)	\$0.000
Interest	\$0.8 B	Additional KHC Deferred Tax Liability/Asset not on BS	\$0.000
After-Tax Interest	\$0.662 B	Other Equity Method Earnings (\$683m 2019 increases basis)	\$0.682
ROE	6.9%	Dividends of equities (recorded as income at subs)	\$0.222
ROTE (excluding goodwill & other intangibles)	14.3%	Interest Income	\$0.023
ROC Net of Cash	7.4%	Retained Earnings of Holdco Stocks and BHE Stocks	\$0.543
Estimated Value	\$170-180 B	Optionality of holdco cash + MSRF \$48.514B; now 7% net of T-Bill	\$3.347
Implied P/E	18	Interest Expense (not allocated to subs)	-\$0.394
		Normalizing Net Pension Expense for GAAP Adjustment	-\$0.439
		Net Investment Income Pre-Tax	\$5.214
		Net Investment Income After-Tax	\$4.345
		Estimated Value (Investments - HoldCo Debt)	\$32.3 B
Insurance Operations		Insurance Investments (December 31, 2020 estimated)	
Premiums Earned (Excludes Retroactive Premiums Earned)	\$64.5 B	Equity Securities	\$257.8 B
Statutory Surplus (Equity) 129/13&14, 124/15, 136/16, 170/17, 162/18, 216/19)	\$241.8 B	Fixed Income Securities	\$19.5 B
Book Value GAAP at December 31, 2017	\$256 B	OXY Pfd/Warrants Included in Equities \$8.169 9/30	\$8.2 B
		Cash (62.8 '16, 73.3 '17)	\$84.1 B
Float (84 2014, 88 B 15, 91 B 16, 114.5 B 2017, 123 18, 129 19)	\$137 B	Other (BYD is BHE + NDT's)	\$2.4 B
Losses Paid (2015 24.5 B, 2016 27 B, 30 B 2017, 2018 33.8B; 2019 37.1B)	\$37.2 B	Total Investment Assets (\$26.1 Y/E 2019)	\$372.0 B
Expected After-Tax Underwriting Gain 2020:	\$1.2 B	Investment Income and Earnings (to reconcile)	
Normalized Underwriting Margin: 5% Pre-tax	\$3.2 B	Dividends (annualized at 12/31 estimated)	\$4.1 B (1.54% div yield)
Normalized Underwriting Net Profit	\$2.6 B	Retained Earnings of Common Stocks	\$10.0 B (3.76% REY)
Capitalized Value from Underwriting ***	\$39 B	Total Earnings of Common Stocks	\$14.1 B (18.3 p/e; 5.47% EY)
Goodwill (Other Intangibles immaterial)	\$15.3 B	Divs on OXY (paid as shares and sold)	\$0.8
DTL (Unassigned on group BS, DTL \$22.2B 9/30 incl. non-ins)	\$39.2 B	Interest on Fixed Income and Cash	\$0.084 B
Insurance Estimated Value		Total Pre-Tax Earnings of Investments (\$17.3B 2019)	\$15.0 B
Total Investment Assets	\$372 B	Optionality of Cash > One-Year Losses Paid #	\$3.2 B
Equity securities valuation premium/discount 15% 2020 (-19B 2019)	-39 B	Pre-tax Earnings with Optionality of Surplus Cash **	\$18.2 B
Capitalized Value from Underwriting	\$39 B	Paid and Hypothetical Taxes (11.0% blended; RE of stocks 3%)	\$1.3 B
Estimated Value	\$372 B	Investment Net Income	\$17.0 B

Source: Semper Augustus

Appendix B – Capital Expenditures and Depreciation; Deferred Tax Liabilities

CAPITAL EXPENDITURES AND DEPRECIATION; DEFERRED TAX LIABILITIES																			
(Dollars in millions)																			
Berkshire Total (All Operating Businesses)																			
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 (E)	Total	
Capital Expenditures	1,278	2,195	4,571	5,373	6,138	4,937	5,980	8,191	9,775	11,087	15,185	16,082	12,954	11,708	14,537	15,979	15,000	145,970	
Depreciation	941	982	2,066	2,407	2,810	3,127	4,279	4,683	5,146	5,418	6,215	6,673	7,411	7,719	8,386	8,747	8,386	77,010	
Difference	337	1,213	2,505	2,966	3,328	1,810	1,701	3,508	4,629	5,669	8,970	9,409	5,543	3,989	6,151	7,232	6,614	68,960	
BHE																			
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018(e)	2019 (E)	2020 (E)	Total	
Capital Expenditures			2,423	3,513	3,936	3,413	2,593	2,684	3,380	4,307	6,555	5,876	5,090	4,571	6,241	7,364	7,530	61,946	
Depreciation			949	1,157	1,128	1,246	1,262	1,333	1,440	1,577	2,177	2,451	2,560	2,548	2,830	2,947	3,073	25,605	
Difference	-	-	1,474	2,356	2,808	2,167	1,331	1,351	1,940	2,730	4,378	3,425	2,530	2,023	3,411	4,417	4,457	36,341	
BNSF																			
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018(e)	2019 (E)	2020 (E)	Total	
Capital Expenditures							1,829	3,325	3,548	3,918	5,243	5,651	3,819	3,256	3,116	3,608	3,700	37,313	
Depreciation							1,221	1,480	1,573	1,655	1,804	1,932	2,079	2,304	1,890	2,350	2,384	18,288	
Difference	-	-	-	-	-	-	608	1,845	1,975	2,263	3,439	3,719	1,740	952	1,226	1,258	1,316	19,025	
BHE + BNSF																			
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018(e)	2019 (E)	2020 (E)	Total	
Capital Expenditures			2,423	3,513	3,936	3,413	4,422	6,009	6,928	8,225	11,798	11,527	8,909	7,827	9,357	10,972	11,230	99,259	
Depreciation			949	1,157	1,128	1,246	2,483	2,813	3,013	3,232	3,981	4,383	4,639	4,852	4,720	5,297	5,457	43,893	
Difference	-	-	1,474	2,356	2,808	2,167	1,939	3,196	3,915	4,993	7,817	7,144	4,270	2,975	4,637	5,675	5,773	55,366	
DEFERRED TAX LIABILITIES *																			
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 **	2018	2019 (E)	2020 (E)		
Investments	11,020	11,882	14,520	13,501	4,805	11,880	13,376	11,404	16,075	25,660	26,633	36,770	27,669	24,251	17,765	32,134	29,200		
Def Ch Reinsurance Assumed	955	828	687	1,395	1,373	1,385	1,334	1,449	1,392	1,526	2,721	2,798	2,876	3,226	2,970	2,890	3,200		
PP&E	1,201	1,202	4,775	4,890	7,004	8,135	24,746	28,414	29,715	32,409	34,618	36,770	39,345	26,671	28,279	29,388	30,000		
Goodwill and Intang												2,770	11,344	7,204	7,199	7,293	7,200		
Other	1,174	1,165	2,591	2,743	4,024	4,236	5,108	6,378	6,485	6,278	6,396	4,555	5,550	3,216	3,187	3,144	3,100		
Total	14,350	15,077	22,573	22,529	17,206	25,636	44,564	47,645	53,667	65,873	70,368	83,663	86,784	64,568	59,400	74,849	Annual Update		

Source: Semper Augustus

Appendix C – Cash and GAAP Tax Reconciliation

CASH TAXES AND GAAP TAXES																			
	Cumulative	2020e	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Earnings Before Tax	404,462	60,300	102,696	4,001	23,838	33,667	34,946	28,105	28,796	22,236	15,314	19,051	11,552	7,574	20,161	16,778	12,791	10,936	12,020
GAAP Taxes **	110,173	13,200	20,904	-	321	6,685	9,240	10,532	7,935	8,951	6,924	4,568	5,607	3,538	1,978	6,594	5,505	4,159	3,805
Net Income *	294,289	47,100	81,792	4,322	17,153	24,427	24,412	20,170	19,845	15,312	10,746	13,494	8,441	4,994	13,213	11,015	8,528	7,308	8,151
Tax Rate	27.2%	21.8%	20.4%	-8.0%	28.0%	27.4%	30.1%	28.2%	31.1%	31.1%	29.8%	29.4%	30.6%	26.1%	32.7%	32.8%	32.5%	32.6%	31.7%
Current Taxes	71,347	3,620	5,818	5,176	3,299	6,565	5,426	3,302	5,168	4,711	2,897	3,668	1,619	3,811	5,708	5,030	2,057	3,746	3,346
Deferred Taxes	38,826	9,580	15,086	-	5,497	3,386	2,675	5,106	4,633	3,783	2,213	1,671	1,939	1,919	1,833	886	475	2,102	459
Total Tax	110,173	13,200	20,904	-	321	6,685	9,240	10,532	7,935	8,951	6,924	4,568	5,607	3,538	1,978	6,594	5,505	4,159	3,805
Current as Percent of Total Tax	64.8%	27.4%	27.8%	-1612.5%	49.3%	71.0%	51.5%	41.6%	57.7%	68.0%	63.4%	65.4%	45.8%	192.7%	86.6%	91.4%	49.5%	105.0%	87.9%
Deferred as Percent of Total Tax	35.2%	72.6%	72.2%	1712.5%	50.7%	29.0%	48.5%	58.4%	42.3%	32.0%	36.6%	34.6%	54.2%	-92.7%	13.4%	8.6%	50.5%	-5.0%	12.1%
Current Tax Rate	17.6%	6.0%	5.7%	129.4%	13.8%	19.5%	15.5%	11.7%	17.9%	21.2%	18.9%	19.3%	14.0%	50.3%	28.3%	30.0%	16.1%	34.3%	27.8%
Deferred Tax Rate	9.6%	15.9%	14.7%	-137.4%	14.2%	7.9%	14.6%	16.5%	13.1%	10.0%	10.9%	10.2%	16.6%	-24.2%	4.4%	2.8%	16.4%	-1.6%	3.8%
Total Tax Rate	27.2%	21.9%	20.4%	-8.0%	28.0%	27.4%	30.1%	28.2%	31.1%	31.1%	29.8%	29.4%	30.6%	26.1%	32.7%	32.8%	32.5%	32.6%	31.7%

* Before earnings attributable to noncontrolling interests

** GAAP Taxes for 2017 exclude one-time nontaxable gain of \$28,200 for TCJA; Offset is deferred taxes as reported were (24,814) adjusted to \$3,386; the \$24,814 is a reduction of net DTL's

2020 Write-down Precision Castparts: \$10 billion Goodwill (not tax deductible); \$400 million after-tax other intangibles

Source: Semper Augustus

Appendix D -- Reported Segment Profit by Berkshire's JV Partners

Year	Berkadia Net Income	Berkadia Distributions	Carrying amount of Equity and Loans	Year	ETT Net Income	Carrying amount of ETT Investment	
2009	\$20.8	\$0.0	\$240.0	2007			
2010	\$16.2	\$29.0	\$475.1	2008			
2011	\$29.0	\$23.6	\$193.5	2009		\$53.5	Project Completion date 2017. Estimated cost, \$3.1 billion (9.96% ROE)
2012	\$38.0	\$37.6	\$172.9	2010		\$110.3	
2013	\$84.7	\$69.0	\$182.6	2011		\$223.5	
2014	\$101.2	\$72.9	\$208.5	2012	\$41.0	\$353.7	Project Completion date 2022. Estimated cost, \$3.05 billion (9.96% ROE)
2015	\$78.1	\$89.6	\$191.0	2013	\$53.0	\$455.0	
2016	\$94.2	\$100.8	\$184.4	2014	\$84.7	\$527.0	
2017	\$93.8	\$67.4	\$210.6	2015	\$86.4	\$609.8	
2018	\$80.1	\$41.0	\$245.2	2016	\$97.4	\$725.5	
2019	\$88.2	\$65.1	\$268.9	2017	\$82.0	\$664.0	
				2018	\$62.0	\$666.0	
				2019	\$66.0	\$695.0	Estimated cost, \$3.38 billion (9.6% ROE)

Appendix E – MSR and Finance Summary Figures

Manufacturing, Service and Retail Summary Figures - 2003 to 2020 (Dollars in billions)

Assets	2020E	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Cash and Equivalents	\$25,989	\$25,121	\$13,519	\$13,519	\$8,073	\$6,807	\$5,765	\$6,625	\$5,338	\$4,241	\$2,673	\$3,018	\$2,497	\$2,080	\$1,543	\$1,004	\$899	\$1,250
Accounts and Notes Receivable	\$52,973	\$49,945	\$13,197	\$11,756	\$11,183	\$8,886	\$8,264	\$7,749	\$7,382	\$6,584	\$5,396	\$5,066	\$5,047	\$4,488	\$3,793	\$3,287	\$3,074	\$2,796
Inventory	\$19,361	\$19,852	\$16,793	\$16,187	\$15,727	\$11,916	\$10,236	\$9,945	\$9,675	\$8,975	\$7,101	\$6,147	\$7,500	\$5,793	\$5,257	\$4,143	\$3,842	\$3,656
Other current assets	?	?	\$1,039	\$1,039	\$1,039	\$970	\$1,117	\$716	\$631	\$550	\$625	\$752	\$470	\$363	\$342	\$254	\$262	
Total current assets	\$98,323	\$94,918	\$44,548	\$42,501	\$36,022	\$28,579	\$25,382	\$25,035	\$23,129	\$20,431	\$15,720	\$14,856	\$15,796	\$12,831	\$10,956	\$8,776	\$8,069	\$7,964
Goodwill and other intangibles	\$60,955	\$72,219	\$70,611	\$71,503	\$71,473	\$30,289	\$28,107	\$25,617	\$26,017	\$24,755	\$16,976	\$16,499	\$16,515	\$14,201	\$13,314	\$9,260	\$8,362	\$8,351
Fixed assets	\$35,855	\$21,438	\$23,947	\$19,694	\$18,915	\$15,161	\$13,806	\$19,389	\$18,871	\$17,866	\$15,421	\$15,374	\$16,338	\$9,605	\$8,934	\$7,148	\$6,161	\$5,898
Other assets#	\$6,357	\$8,215	\$3,183	\$3,183	\$3,183	\$4,445	\$3,793	\$4,274	\$3,416	\$3,661	\$3,029	\$2,070	\$1,248	\$1,685	\$1,168	\$1,021	\$1,044	\$1,054
Total assets	\$202,897	\$210,022	\$130,879	\$136,881	\$129,593	\$78,474	\$71,088	\$74,315	\$71,433	\$66,713	\$51,146	\$48,799	\$49,897	\$38,322	\$34,372	\$26,205	\$23,636	\$23,267
Liabilities and Equity																		
Notes payable	n/a	n/a	\$2,054	\$2,054	\$2,054	\$2,135	\$965	\$1,615	\$1,454	\$1,611	\$1,805	\$1,842	\$2,212	\$1,278	\$1,468	\$1,469	\$1,143	\$1,593
Other current liabilities	\$28,976	\$27,611	\$12,464	\$12,464	\$12,464	\$10,565	\$9,734	\$8,965	\$8,527	\$15,124	\$8,169	\$7,414	\$8,087	\$7,652	\$6,635	\$5,371	\$4,685	\$4,300
Total current liabilities	\$28,976	\$27,611	\$14,518	\$14,518	\$14,518	\$12,700	\$10,699	\$10,580	\$9,981	\$16,735	\$9,974	\$9,256	\$10,299	\$8,930	\$8,103	\$6,840	\$5,828	\$5,893
Deferred taxes	\$9,900	\$10,000	\$10,100	\$10,100	\$12,044	\$3,649	\$3,801	\$5,184	\$4,907	\$4,661	\$3,001	\$2,834	\$2,786	\$828	\$540	\$338	\$248	\$105
Term debt and other liabilities	\$25,989	\$25,121	\$10,943	\$10,943	\$10,943	\$4,767	\$4,269	\$4,405	\$5,826	\$6,214	\$6,621	\$6,240	\$6,033	\$3,079	\$3,014	\$2,188	\$1,965	\$1,890
Total liabilities	\$64,865	\$62,732	\$35,561	\$35,561	\$37,505	\$21,116	\$18,769	\$20,169	\$20,714	\$27,610	\$19,596	\$18,330	\$19,118	\$12,837	\$11,657	\$9,366	\$8,041	\$7,888
Non-controlling interests	n/a	n/a	\$579	\$579	\$579	\$521	\$492	\$456	\$2,062	\$2,410	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Berkshire equity	\$117,380	\$121,457	\$105,030	\$100,741	\$91,509	\$56,837	\$51,827	\$53,690	\$48,657	\$36,693	\$31,550	\$30,469	\$30,779	\$25,485	\$22,715	\$16,839	\$15,595	\$15,379
Income Statement																		
Revenues	\$133,919	\$142,675	\$131,000	\$126,533	\$120,059	\$107,825	\$97,689	\$95,291	\$83,255	\$72,406	\$66,610	\$61,665	\$66,099	\$59,100	\$52,660	\$46,896	\$44,142	\$32,106
Operating expenses*	\$122,499	\$129,332	\$120,335	\$117,026	\$111,383	\$100,607	\$90,788	\$88,414	\$76,978	\$67,239	\$62,225	\$59,509	\$61,937	\$55,026	\$49,002	\$44,190	\$41,604	\$29,885
Net interest expense	\$662	\$416	\$265	\$264	\$214	\$103	\$109	\$135	\$146	\$130	\$111	\$98	\$139	\$127	\$132	\$83	\$57	\$64
Pre-tax income	\$10,620	\$12,365	\$10,500	\$9,243	\$8,462	\$7,115	\$6,792	\$6,742	\$6,131	\$5,037	\$4,274	\$2,058	\$4,023	\$3,947	\$3,526	\$2,623	\$2,481	\$2,157
Income taxes	\$2,548	\$2,927	\$2,540	\$3,035	\$2,831	\$2,432	\$2,324	\$2,512	\$2,432	\$1,998	\$1,812	\$945	\$1,740	\$1,594	\$1,395	\$977	\$941	\$813
Net Income	\$8,072	\$9,438	\$7,960	\$6,208	\$5,631	\$4,683	\$4,468	\$4,230	\$3,699	\$3,039	\$2,462	\$1,113	\$2,283	\$2,353	\$2,131	\$1,646	\$1,540	\$1,344
Profit Margin	6.03%	6.62%	6.08%	4.91%	4.69%	4.34%	4.57%	4.44%	4.44%	4.20%	3.70%	1.80%	3.45%	3.98%	4.05%	3.51%	3.49%	4.19%
Return on Equity	6.88%	7.77%	7.58%	6.16%	6.15%	8.24%	8.62%	7.88%	7.60%	8.28%	7.80%	3.65%	7.42%	9.23%	9.38%	9.77%	9.87%	8.74%
Return on Tangible Equity	14.31%	19.17%	23.13%	21.23%	28.10%	17.64%	18.84%	15.07%	16.34%	25.46%	16.89%	7.97%	16.01%	20.85%	22.67%	21.72%	21.29%	19.12%
Return on Capital	7.44%	8.11%	8.03%	6.59%	6.19%	8.73%	9.09%	8.48%	7.82%	8.20%	7.25%	3.59%	7.06%	9.36%	9.36%	9.59%	9.59%	8.79%

*Including depreciation of \$605 in 2003

#Other Assets: Total from Consolidated BS - Segment Identifiable Assets + Goodwill

2020 Equity Write-down \$108 PCP and Other Intangibles Write-down \$600 million

Source: Semper Augustus; Berkshire Hathaway
Includes Finance and Financial Products Beginning 2018
2016 to 2020 contain numerous estimates

Appendix F – Semper Augustus Investments Group Historical Returns

Composite Performance

Year End	Gross of Fees	Net of Fees	Gross of Fees Equities Only*	MSCI All Country World Index	S&P 500
1999**	29.9%	29.5%	29.1%	27.5%	19.9%
2000	26.8%	26.4%	30.7%	-14.0%	-9.1%
2001	20.8%	20.1%	23.1%	-15.9%	-11.9%
2002	-15.5%	-16.0%	-22.0%	-19.0%	-22.1%
2003	21.8%	20.7%	38.2%	34.6%	28.7%
2004	9.2%	8.2%	16.3%	15.8%	10.9%
2005	6.2%	5.6%	7.4%	11.4%	4.9%
2006	14.2%	13.4%	18.4%	21.5%	15.8%
2007	3.8%	3.1%	3.1%	12.2%	5.5%
2008	-20.3%	-21.3%	-21.6%	-41.9%	-37.0%
2009	22.0%	21.0%	27.9%	35.4%	26.5%
2010	12.8%	11.8%	14.4%	13.2%	15.1%
2011	6.9%	6.2%	7.1%	-6.9%	2.1%
2012	6.5%	5.7%	6.8%	16.8%	16.0%
2013	15.5%	14.7%	17.3%	23.4%	32.4%
2014	4.6%	3.9%	5.2%	4.7%	13.7%
2015	-8.7%	-9.3%	-10.3%	-1.8%	1.4%
2016	22.1%	21.3%	27.7%	8.5%	12.0%
2017	13.5%	12.7%	18.0%	24.6%	21.8%
2018	-1.3%	-2.0%	-1.4%	-8.9%	-4.4%
2019	20.4%	19.6%	23.6%	27.3%	31.5%
2020	11.2%	10.4%	11.9%	16.8%	18.4%

Firm Overview:

Semper Augustus Investments Group, LLC claims compliance with the Global Investment Performance Standards (GIPS®). For the purpose of complying with GIPS, SAI defines itself as Semper Augustus Investments Group, LLC, an independently registered investment adviser. For purposes of determining firm assets under management, SAI includes all discretionary and non-discretionary assets as well as all fee paying and non-fee paying.

Composite Description:

The Semper Augustus Fundamental Intrinsic Value Equity consists of portfolios managed for Semper Augustus' clients according to the firm's published investment philosophy. Semper Augustus employs a fundamental value investment strategy, identifying companies earning free cash returns in excess of a realistic estimate of the firm's cost of capital. Our firm defines risk as a permanent loss of capital, not as volatility around some mean. Portfolios have generally contained fewer than 30 holdings and are often concentrated in a small handful of businesses with high business quality and share prices at a significant discount to conservative appraisals of intrinsic business value. These dual margins of safety are crucial to the investment process, and lend themselves to generally long holding periods and low portfolio turnover. During periods of high volatility, turnover can be opportunistically higher. Investments are made across all market capitalizations, in both domestic and globally headquartered businesses. Our firm makes international investments in businesses domiciled in industrialized countries where the rule of law is strong and accounting standards are high. We are benchmark agnostic. Industry weightings are not a consideration. The composite includes the income and performance derived from various option-writing strategies in some client accounts. Allocations to cash are a byproduct of the investment process and not a permanent allocation. To be included in the composite, accounts must meet certain thresholds of equity securities purchased by SAI. This method generally excludes accounts that are managed as "balanced" accounts and client accounts that have not met the required threshold for inclusion. Cash and equivalents have been significant holdings at times.

Index Return Information:

The MSCI ACWI returns are gross of any fees required to replicate the index and are also pre-tax. The index is theoretically passive (unmanaged) but in reality, replication requires trading costs and some management fees. Fundamental Intrinsic Value Equity may differ materially from the index as the Fundamental Intrinsic Value Equity owns concentrated positions and the MSCI ACWI has a bias towards large cap stocks. Fundamental Intrinsic Value Equity has included varying investments in small, mid and large cap stocks in addition to investments in cash and short-duration fixed income securities. The MSCI ACWI is broadly used as an investment benchmark. The MSCI ACWI index is the benchmark for Fundamental Intrinsic Value Equity.

The S&P 500 returns are gross of any fees required to replicate the index and are also pre-tax. The index is theoretically passive (unmanaged) but in reality, replication requires trading costs and some management fees. The Fundamental Intrinsic Value Equity may differ materially from the index as the Fundamental Intrinsic Value Equity owns concentrated positions and the S&P 500 has a bias towards large cap stocks and holds only U.S. domiciled companies. Fundamental Intrinsic Value Equity has included varying investments in small, mid and large cap stocks, both foreign and domestic, in addition to investments in cash and fixed income securities. The S&P 500 is broadly used as an investment benchmark and is presented in this document to provide a clear measure of how the strategy did against the general stock market.

Composite Return Details:

Supervised assets are defined as assets acquired by SAI in client accounts based on the discretion granted in client agreements. This process involves the establishment of a model security and the dates whereby the security is held. For securities received into an account prior to or after the model period; directed purchases by a client; or corporate actions arising from non-model securities; these securities have been excluded from the supervised assets. SAI must have initiated the trade or the security was a model security when transferred into an account for its performance to be included in the composite.

Returns are presented both gross of management fee and net of management fees and performance fees and include the reinvestment of all income. The composite was created on March 1, 2018. The U.S. Dollar is the currency used to express performance.

Returns are presented net of all commissions and any margin interest expense incurred in the management of portfolio accounts. Actual returns will be reduced by investment advisory fees and any other expenses that may be incurred in the management of the portfolio accounts. The collection of fees produces a compounding effect on the total rate of return net of management fees.

Gross of Fees Equities Only: Represents the actual performance of all equity securities included in the composite, including reinvested dividends. It is a pure equity only return and does not have any cash equivalents or fixed income securities included.

Actual returns will be reduced by investment advisory fees and other expenses that may be incurred in the management of the account. The collection of fees produces a compounding effect on the total rate of return net of management fees. As an example, the effect of investment management fees on the total value of a client's portfolio assuming (a) quarterly fee assessment, (b) \$1,000,000 investment, (c) portfolio return of 8% a year, and (d) 1.00% annual investment advisory fee would be \$10,416 in the first year, and cumulative effects of \$59,816 over five years and \$143,430 over ten years. The annual composite dispersion presented is an asset-weighted standard deviation. To obtain a GIPS Composite Performance Report and/or the firm's list of composite descriptions, please contact Chad Christensen at csa@semperaugustus.com. GIPS® is a registered trademark of CFA Institute. CFA Institute does not endorse or promote this organization, nor does it warrant the accuracy or quality of the content contained herein.

Past performance is not indicative of future results.

* This is supplemental information
** Inception Date February 28th, 1999

