Split Rock Capital Management

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March 31st, 2019

To: All Investors
Re: Annual Letter 2018, Letter to Investors

Dear Investors:

In 2018 Split Rock Capital Management returned -2.68% net of fees.[1] Our annualized return since inception is 8.80% vs 9.52% for the S&P 500 (dividends included). $100,000 invested at inception has grown to approximately $129,340 vs. $131,950 if invested in the S&P 500 (dividends included).

Year	S&P 500[2]	Split Rock *(Gross)*[3]	Split Rock *(Net)*[4]
2015[5]	1.18%	(0.42%)	(0.47%)
2016	11.96%	13.19%	12.19%
2017	21.87%	19.47%	18.47%
2018	-4.41%	-1.68%	-2.68%
Cumulative Return Since Inception	**31.95%**	**32.39%**	**29.34%**
Annualized Return Since Inception	**9.52%**	**9.64%**	**8.80%**

***Please refer to the disclosures (1 to 5) at the end of this letter as well as the disclaimer on the page 47**
***All results have not been audited**

Summary

> "[In the Fall of 2008] The Fed was looking in the rear-view mirror and past CPI inflation, instead of looking down the road at the TIPS spreads. That's why they were so slow to react. **I want the Fed to turn on its headlights**." – Scott Sumner[6]

In our 2016 Annual Letter we explained how we think interest rates will remain low, partially because of the buildup of both public and private debt in the economy. As a result of the prolonged low interest rates that we forecasted for the next many years or even decades ahead, we viewed equities as either fairly valued or even mildly cheap as defined by the equity risk premium.[7] In our 2017 Annual Letter we maintained our high level prediction, however we revised our thinking as to why interest rates would remain low. While debt certainly puts downward pressure on rates, we were wrong to ignore the power of central banks. If a central bank is determined enough, it can overcome these deflationary debt forces and effectively make rates rise to whatever level they please. That said, we don't think the Fed will act aggressively and we therefore believe that rates will remain low. We remain bullish on equities and see stocks as either fairly valued or even mildly cheap. We remain 100% long equities.

For a much more detailed analysis of these topics, please refer to our earlier letters (or even better, read the many writings of Scott Sumner who deserves credit for many of these ideas). In our letters we discuss exactly how the Fed can raise rates to whatever level they please. Counter to the common claim that money has been too easy, we instead believe that **money was too tight from 2008 until ≈ 2017** (it's about right at the moment, with nominal G.D.P. growing at 4-5%, though long rates at or below 2.5% imply the market is skeptical that the Fed will continue acting aggressively enough going forward).[8] Specifically, the many pundits who were claiming that QE would cause inflation were only looking at the increase in the *supply* of money. They failed to realize that the *demand* for money had risen even faster (hence no inflation).[9] In addition, many failed to distinguish between *permanent* money printing and *temporary* money printing. Printing $10 trillion tomorrow, but at the same time promising to remove that $10 trillion in one years' time, will likely result in very little inflation. Conversely, promising to leave the $10 trillion in the system permanently will almost certainly cause a huge amount of inflation immediately (monetary policy does not work with a lag – market expectations of future Fed policy are reflected almost immediately).[10] We contend that QE was more of the temporary sort (a view which has been partially vindicated with the Fed's recent quantitative tightening). If the Fed had promised to print more *permanent* money, then the recovery would had been quicker and more robust. Counterintuitively, it also would have also led to a *less* bloated central bank balance sheet, as countries with the weakest growth tend to have the largest central bank balance sheets (i.e. Japan).[11] A central bank can either print a small amount of *permanent* money (which will practically guarantee robust nominal growth), or it can print much more *temporary* money (which may or may not stoke nominal growth). To increase nominal growth, relatively small amounts of new permanent money printing are needed, as an increase in money velocity does most of the work to increase growth (that is assuming the central bank properly manages expectations).[12] Increasing nominal growth rates commonly (thought not always) increases real growth rates as well, and vice versa: large drops in nominal growth rates commonly have adverse effects on real growth rates (as we saw in 2009).

We continue to argue that if the Fed had targeted nominal G.D.P. instead of relying on its congressionally imposed dual mandate, it is possible that the worst of the 2008 financial crisis could have been avoided.[13] Specifically, the temporary inflation in 2008 (a result of a supply side oil issues) led the Fed to remain too tight going into the worst of the crisis. While nominal rates dropped in late 2008 (leading most to conclude the Fed was easing), *real* interest rates actually *rose* at the beginning of the crisis, implying the Fed was too tight. A credible nominal G.D.P. level target, via a market dictated futures market, would've avoided this misreading of the inflation numbers.[14] That said, the Fed could have performed much worse (as it did in the Great Depression), **so the Fed (and Treasury) deserve a significant amount of credit for avoiding a much worse financial collapse in 2008.**

Looking forward, we predict that the approximately 1.75% productivity growth + 2% inflation + 0.5% population growth will result in long term average nominal G.D.P. growth of around 4.25%. Historically, it has not been uncommon for long-term treasury bond yields to hover about 1% or even 2% below nominal G.D.P. growth (which implies bond yields staying consistently below 3.25% going forward). For much of the 20th century, nominal G.D.P. was in the 6.5% to 6.75% range, with bond yields around 5%. This had a dampening effect on equity multiples when compared to the low bond yields we predict for the 21st century. Pundits claiming that current multiples are above their historic average fail to realize the *increase* in multiples that should result from *lower* projected growth going forward. Assuming the historical CAPE ratio was approximately 16 in the 20th century, we wouldn't be surprised if

the CAPE ratio averages 25 or above for the remainder of the 21st century. **Lower growth = higher multiples.**[15] A higher percentage of assets in tax advantaged accounts, lower trading costs, as well as changes in the tax code, may also contribute to *higher* multiples going forward.

In Chapter 1 of this year's letter we cover various subjects including a multitude of reasons why higher multiples going forward may be justified. In Chapter 2 we dive into nominal G.D.P. and look at a few examples of how unexpected changes in the growth rate of nominal G.D.P. can cause problems in both the stock market as well as the real economy. For a (only slightly less wonky) economics discussion, refer to Chapter 3, where we take a look at real G.D.P. per capita around the globe (as well as a discussion on socialism vs. capitalism). In the final chapter we cover various topics including: modern monetary theory (MMT), artificial intelligence, demographics, and the recent trade disputes.

These annual letters have tended to focus more on the macroeconomic picture and less on our specific investment ideas. For the time being we plan to continue our practice of discussing very little about our individual investments, except to say that we are presently focused on U.S. value-oriented equities. There is no mandate that we invest solely in these types of securities, or that we must remain 100% long equities. At times we will invest in a wide variety of financial instruments. We are currently invested in equites because, at this time, we believe equities are the most attractive investment available.[16]

Finally, regarding our annual letters, while we try to be as accurate as possible, we also sympathize with Warren Buffett:

> "I am also reasonably fast at typing but poor in the accuracy department and find it easier just to plow ahead rather than correct, knowing I am always writing to those who will find a little deciphering an interesting but easy challenge"[17]

Sincerely,

Jim Bowerman
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Chapter 1: General Stock Market Thoughts

Let's first look at a table reproduced from data by Ed Yardeni which lists all 10% corrections in the stock market since 1961. We explain the "Years Given Up" metric on the next page. Drops that occurred, completely or partially, in a recession are listed in red.

Figure 1: List of Stock Market Corrections of 10% or more (1961 – 2018)[18]

Peak Date	Trough Date	Price at Peak	Price at Trough	Percent Drop	"Years Given Up"
12/12/1961	6/26/1962	72.6	52.32	-28.0%	3.6
8/22/1962	10/23/1962	59.8	53.49	-10.5%	3.9
2/9/1966	10/7/1966	94.1	73.2	-22.2%	3.0
9/25/1967	3/5/1968	97.6	87.72	-10.1%	2.9
11/29/1968	5/26/1970	108.4	69.29	-36.1%	8.6
4/28/1971	11/23/1971	104.8	90.16	-13.9%	6.1
1/11/1973	10/3/1974	120.2	62.28	-48.2%	13.6
11/7/1974	12/6/1974	75.2	65.01	-13.6%	13.7
7/15/1975	9/16/1975	95.6	82.09	-14.1%	11.2
9/21/1976	3/6/1978	107.8	86.9	-19.4%	13.1
9/12/1978	11/14/1978	107.0	92.49	-13.6%	12.9
10/5/1979	11/7/1979	111.3	99.87	-10.2%	11.4
2/13/1980	3/27/1980	118.4	98.22	-17.1%	11.9
11/28/1980	8/12/1982	140.5	102.42	-27.1%	13.9
10/10/1983	7/24/1984	172.7	147.82	-14.4%	1.4
8/25/1987	12/4/1987	336.8	223.92	-33.5%	1.8
1/2/1990	1/30/1990	359.7	322.98	-10.2%	2.5
7/16/1990	10/11/1990	369.0	295.46	-19.9%	3.6
10/7/1997	10/27/1997	983.1	876.99	-10.8%	0.4
7/17/1998	8/31/1998	1186.8	957.28	-19.3%	0.9
7/16/1999	10/15/1999	1418.8	1247.41	-12.1%	0.8
3/24/2000	10/9/2002	1527.5	776.76	-49.1%	5.7
11/27/2002	3/11/2003	938.9	800.73	-14.7%	6.1
10/9/2007	3/9/2009	1565.2	676.53	-56.8%	12.8
4/23/2010	7/2/2010	1217.3	1022.58	-16.0%	12.4
4/29/2011	10/3/2011	1363.6	1099.23	-19.4%	13.6
5/21/2015	8/25/2015	2130.8	1867.61	-12.4%	1.5
11/3/2015	2/11/2016	2109.8	1829.08	-13.3%	2.1
1/26/2018	2/8/2018	2872.9	2581	-10.2%	0.3
9/21/2018	12/24/2018	2940.9	2346.6	-20.2%	1.9

We notice a few things: 1) a recession does not always cause a big drop in stock prices (i.e. 1990), and 2) big drops in stock prices can occur outside of recessions (i.e. 1987). It is not necessarily beneficial to be able to accurately predict recessions.[19] While it would certainly be useful to exactly time the start and end of every recession, we believe that, in practice, those who correctly call most recessions also have quiet a few (usually unmentioned or forgotten) false positive calls as well. That is, while these pundits may have correctly called the last 5 of 5 recessions, they also likely had many other recession warnings that turned out to be false alarms. The old saying "economists have predicted 9 of the last 5 recessions" comes to mind. To illustrate just how hard it is, think back to all the folks who correctly called the housing bust. How many of them correctly adjusted and took advantage of the 2009 to present bull market? (hint: very few, if any). Was it a matter of these folks having the correct foresight, or was it that these recessions naturally filtered out and selected a group of constantly bearish individuals and made their predictions appear a bit better than deserved? A broken clock is right twice a day.

While there was certainly some skill involved in predicting the 2008 financial crisis, our goal is to stay neither constantly bullish nor constantly bearish (instead we hope to adapt to the current market environment). Given the positive long term trend in the stock market (see Figure 2 on next page), we view false positive recession calls (i.e. incorrectly moving to cash because of an ultimately incorrect thesis that stocks will drop) as much worse than having to weather the occasional collapse in stock prices.[20] Relating back to the above Ed Yardeni table, we are perfectly fine riding down most of the stock market drops in the Figure 1 above, as long as we capture the upside of the bull markets.[21]

As promised, we'd also like to discuss the right most column in the Figure 1 as well. We added this column to provide another perspective when looking at stock market crashes. While not always useful, it can be helpful to look at how many years are "given up" from a stock market crash. For example, the severe 2009 stock market collapse brought the S&P 500 down to 666. 666 was first hit (on the way up) in 1996, so in a sense, the 2009 stock market collapse "gave up" 2009-1996 = 13 years' worth of gains. Of course valuations in 1996 matter also. If the market fell to 1500 tomorrow, that would represent "giving up" 19 years' worth of gains (going back to 2000), though certainly the high valuations during the tech bubble in 1999/2000 would skew the "years given up" calculation. For reference, the Great Depression "gave up" 61 years' worth of gains, with equities dropping all the way back to a level first seen in 1871![22]

Moving next to yield curve inversions, we refer to the great article by Charlie Bilello titled: The Relationship Between The Yield Curve And The Stock Market. In the linked article we can see from Charlie's graphs that the yield curve does seem to be a decent indicator of stock market drops. But the narrative that the yield curve predicts recessions may not be that helpful for stock prices. Again, a recession doesn't necessarily entail a collapse in stock prices. Furthermore, in order to take advantage of this you'd have to time the collapse and catch a falling knife, something we are not confident in doing. All else being equal, we'd prefer to invest in environments were the yield curve is not inverted or flat, but instead fairly steep.[23] That said, as we explained above, with the upward bias in the stock market, we can't just be "slightly sure" that a signal is accurate.[24] We need to be *very sure* that when we go to cash, that a stock market collapse is highly likely to occur. Based on the great Jeremy Siegal graph, reproduced in figures 2 and 3 below, an investor being accurate 51% of the time is not nearly good enough because the underlying trend of being long equities is worth 4-8% per year more than being in cash.[25] The odds are not in your favor when you move to cash and the opportunity costs are real.

Figure 2: Nominal Returns, Various Assets (1815 – 2018)[26]

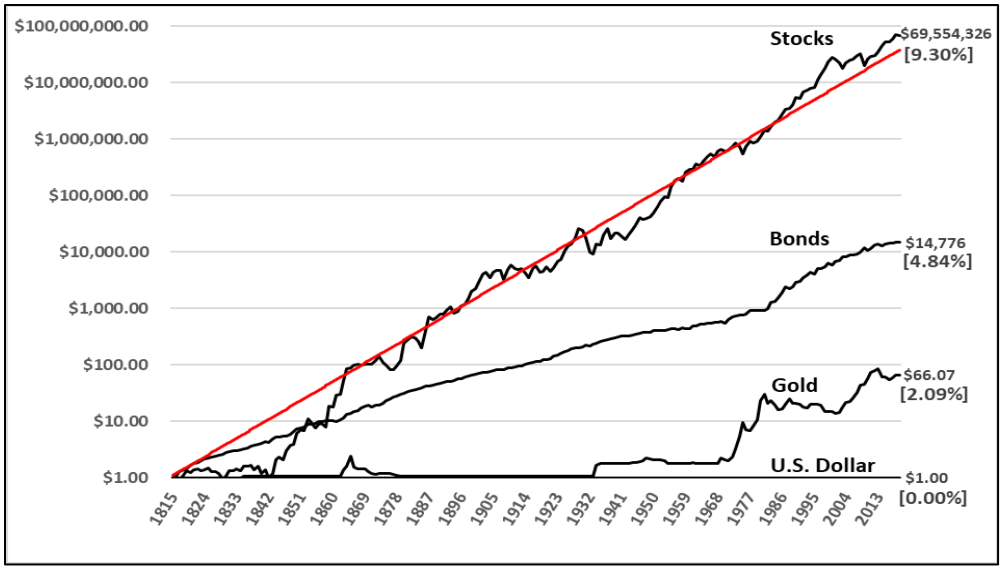
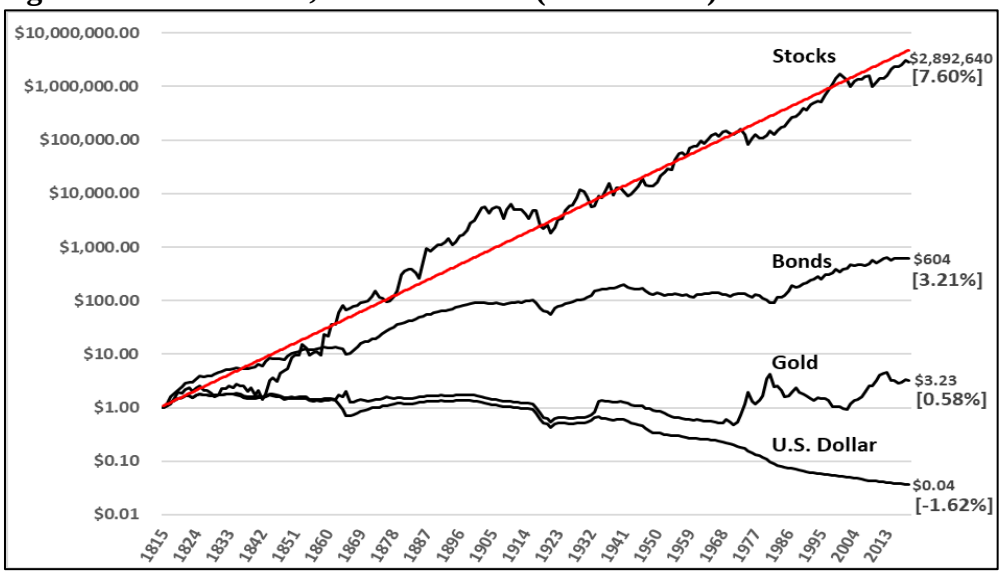


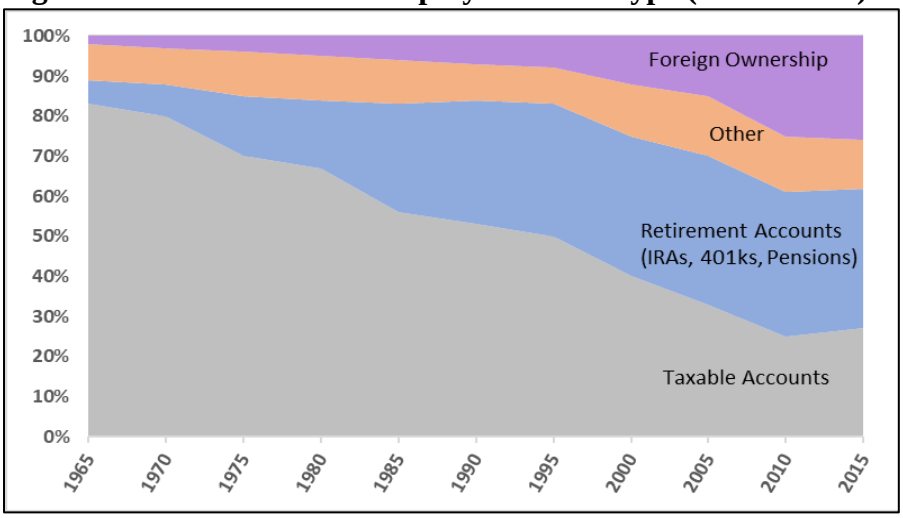
Figure 3: *Real* Returns, Various Assets (1815 – 2018)[27]



in both Figures 2 and 3 above, dollar amounts on right axis represent value of $1 invested in 1815 and held continuously until 2018 (proceeds reinvested where relevant). Percentages below these dollar amounts represent average annual return from 1815 to 2018. "Bonds" refers to 10-year Treasuries.

Higher Stock Multiples Going Forward? We would guess that stock multiples going forward will be higher than they have been in the 1900 to 2000 era. There are many reasons for this, one of which is that the market has gotten more efficient over time. Furthermore, many investments in the past were in taxable accounts. The recent rise of tax free or tax deferred accounts means that investors should be willing to pay *more* for a given investment. As shown in the figure below, the rise of tax deferred accounts has been substantial since 1965.[28]

Figure 4: U.S. Stock Ownership by Account Type (1965 – 2015)[29]



Another factor leading to higher multiples going forward, is the projected slower growth in nominal G.D.P. From 1900 to 2000, nominal G.D.P. averaged about 6.4% (1.3% population growth, 3.1% inflation, 2% productivity growth), with bond yields averaging about 5% during that time frame. Going forward, we would guess that nominal G.D.P. will average 4.25% (1.75% productivity growth + 2% inflation + 0.5% working age population growth). Under such a scenario, bond yields staying below 3.25% wouldn't be surprising. All else being equal, stocks will trade at higher multiple in a 3.25% bond yield environment vs. a 5% bond yield environment (as existed from 1900 to 2000). These yields will vary significantly over the short run, but on average, we expect 1) multiples to be higher and 2) earnings growth (which tends to follow nominal G.D.P.) to be lower going forward.[30] These two factors may cancel each other out over the short run and lead to similar stock returns as we've seen in the past over even a medium time frame. However, over the longer term, despite higher multiples, total stock market returns should go *down* as nominal G.D.P. adjusts downward. Finally, trading costs as high as 2-3% per year in the past (vs. close to 0% today) may have kept multiples lower in the past vs. going forward.

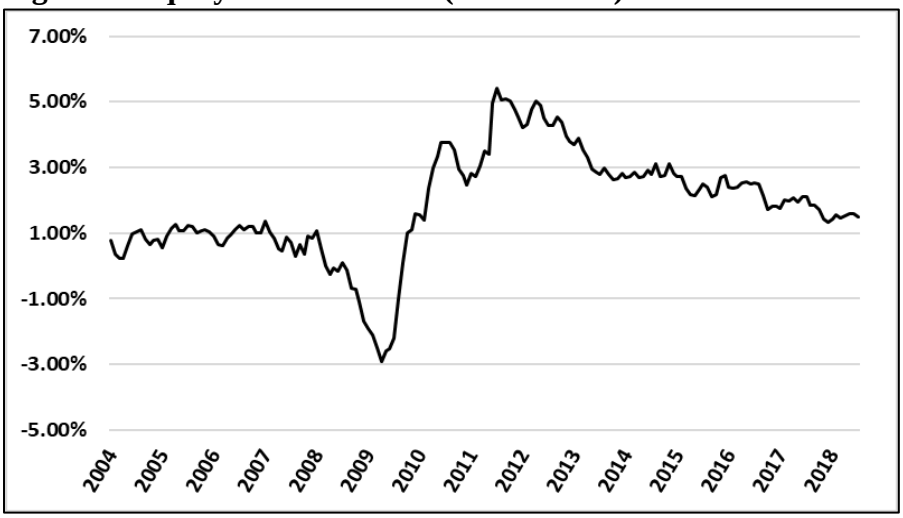
To better illustrate the differences between the past and future investment environments, we've listed Figure 5 below, which estimates various economic and investing metrics over the two hypothetical nominal G.D.P. growth regimes we listed above. There's much that could be said and argued about regarding the below numbers, but for the sake of brevity we present the below table without further comment, noting that the below numbers are simply decent approximations/guesses for various metrics under the two differing economic regimes.

Figure 5: Economic Metrics Under Different Growth Regimes[31]

Metric (Annualized unless otherwise listed)	1915 to 2000	2000 to 2100 (estimates)
N.G.D.P. Growth	6.75%	4.25%
Base Money Growth	4.71%	4.25%
M2 Money Growth	6.90%	4.25%
Population Growth	1.28%	0.50%
N.G.D.P. per Capita (Approximates Wages)	5.47%	3.75%
Inflation	3.37%	2.00%
Real G.D.P. Growth	3.38%	2.25%
Real G.D.P. per Capita	2.10%	1.75%
Average 10-Year Nominal Bond Yield	5.45%	2.95%
Real Yield on Cash	-3.37%	-2.00%
Average P/E Ratio (Assuming 0% ERP)	18	34
Increase in Nominal Earnings for S&P 500	5.45%	2.95%
Increase in Real Earnings for S&P 500	2.08%	0.95%
Increase in Nominal Book Value for S&P 500	4.98%	2.48%
Increase in Real Book Value for S&P 500	1.61%	0.48%
Increase in Nominal Sales for S&P 500	4.59%	2.09%
Increase in Real Sales for S&P 500	1.22%	0.09%
Total Return for S&P 500	≈11%	≈7%

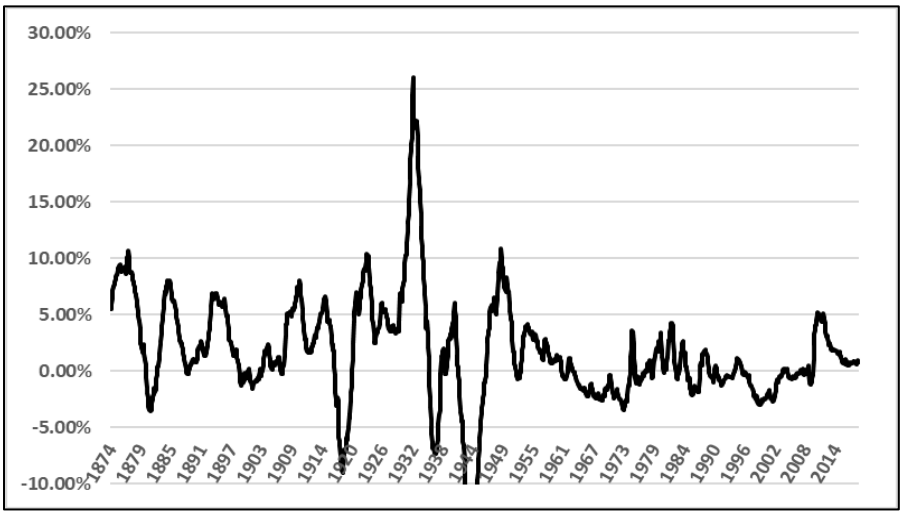
Next, we'd like to update the equity risk premium (ERP) graph we showed in our 2016 Annual Letter. We note that at that time, in January 2016, interest rates were 2.09%, the P/E ratio was 20.85 and the ERP was 2.71%. Currently the 10-year Treasury bond yields 2.41%, the P/E ratio is 21.17, and the ERP is 2.31%.[32] Based on this metrics, stocks are modestly less attractive than when our 2016 letter was published.

Figure 6: Equity Risk Premium (2004 – 2018)[33]



Finally, we present a new chart showing a variation of the above chart. As we noted earlier, while interest rates tend to follow nominal G.D.P. growth, over the short turn, these two rates can differ. To present a different (not necessarily more accurate) view of the ERP, in the below chart we replace interest rates with nominal G.D.P. growth rates (3-year smoothed average) to give better historical context. In the below chart, ERP = Earnings yield for equities – growth rate of nominal G.D.P.[34]

Figure 7: Equity Risk Premium: Using N.G.D.P. growth instead of 10-year Treasury Yields (1874 – 2018)[35]



Chapter 2: Recent Federal Reserve Actions and Analysis

> "**Macroeconomics is basically about sticky wages and prices, and why *nominal shocks have real effects.*** Macroeconomists also talk about other issues, but it's the nominal shock/sticky price problem that requires a separate field. Otherwise macro is just applied price theory, i.e. classical economics." – Scott Sumner[36]

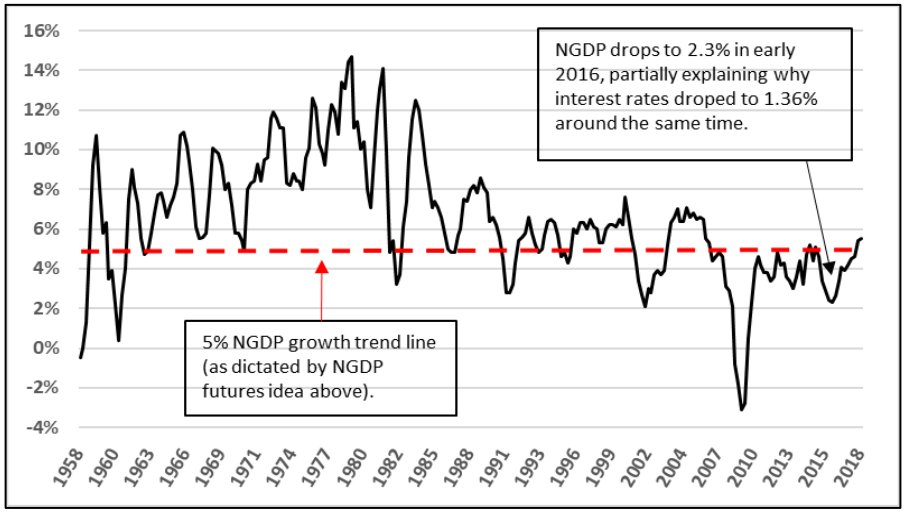
In our 2017 Annual Letter we discussed the concept of having the Fed switch from its current dual mandate to a more market oriented approach centered around nominal G.D.P. level targeting.[37] Our preferred plan, popularized by economist Scott Sumner, involves setting up an nominal G.D.P. futures market, and having the Fed conduct open market purchases when nominal G.D.P. futures drop below 5% future growth (and open market sales when futures are above 5% per year future nominal G.D.P. growth).[38] As Sumner puts it,

> "I happen to *favor making the dollar convertible into nominal G.D.P. futures contracts* as a way of stabilizing nominal G.D.P. growth expectations at a low and stable rate. Milton Friedman favored a stable money supply growth rate, but late in his career (after velocity bounced around) endorsed a policy of stabilizing market expectations of inflation in the indexed bond market. These systems would allow the market, not the Fed, to determine the appropriate level of money for the economy's needs."[39]

This would take a lot of the guesswork and charades out of current Fed policy.[40] As has been the case for many years, Fed statements are meticulously combed over for even slight changes in wording. At the recent December 2018 meeting, analysts noted how the wording "expects" was changed to "judges" and the wording "declined" was changed to "remained low".[41] This strikes us as insane and not an ideal way to guess at future Fed moves. In the nominal G.D.P. futures market mentioned above, there would be very little guess work. The market would know exactly what the Fed was going to do given the current futures prices for nominal G.D.P.[42] Furthermore, we wouldn't have to rely on the expertise of Fed officials to guess at the future path of the economy.[43] We'd instead trust the opinion of thousands of financially incentivized individuals in the market. That's nothing against Fed officials; we wouldn't be any better at making money in this nominal G.D.P. futures market, but we believe that the market as a whole would be more accurate than any one person/entity (including the Fed).[44]

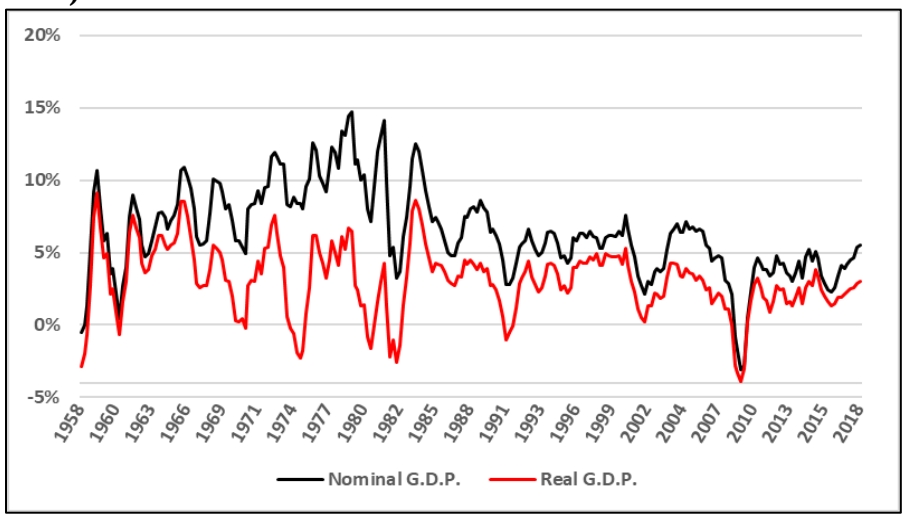
Looking at nominal G.D.P. over the past 60 years (Figure 8 below), we can see the wild volatility in nominal G.D.P. that results from having only a select few experts decide on monetary policy. It's our belief that if the market as a whole could determine the path for nominal G.D.P., that the below graph would have much less fluctuations. Instead of the volatile black line (actual N.G.D.P.) in the graph below, under an N.G.D.P. futures regime, we'd have something close to the stable horizontal red line in the graph below. Furthermore, it's not only when nominal G.D.P. growth turns negative, as in 2009, that we should be worried.[45] Despite staying positive, nominal G.D.P. growth slowed significantly many times over the past half century. Growing at close to 12% annually in 1973, the economy slowed to less than 8% growth by 1975 (the stock market fell by close to 50% during this same time frame). This type of fluctuation adds uncertainty to many business processes. For example, business contracts assuming 12% nominal G.D.P. growth will be priced differently than contracts that assume 8% nominal G.D.P. growth. These fluctuations in growth rates caus needless uncertainty and waste in business and the economy. The economy would be much more efficient if businesses could be reasonably certain that nominal G.D.P. would grow at 5% a year consistently going forward. Businesses could more accurately predict future sales volume, borrowing costs, etc. if growth rates were more stable.

Figure 8: YOY Growth in U.S. Nominal G.D.P. (1958 – 2018)[46]



As we stated in our 2017 Annual Letter, while keeping nominal G.D.P. growth constant won't prevent all stock market collapses, it will make many such corrections much less severe. *Would Lehman Brothers have failed if nominal G.D.P. growth hadn't turned negative?* We can't be certain but having nominal G.D.P. turn negative certainly bankrupt some companies that otherwise would've survived, had nominal G.D.P. growth stayed in the 4-5% range. Finally, a constantly fluctuating nominal G.D.P. growth rate could potentially lead to a reduction in productivity and real G.D.P. (largely as a result of sticky wages)[47] [48] Conversely, even a high but steady growth rate of nominal G.D.P., of say 7%, would likely prevent the severe dip in real G.D.P. that we saw in 2009 (see Figure 9 below).[49] Economic actors can adjust to even somewhat high rates of inflation of say 4-6%, as long as it is constant and predictable. Again, it is the fluctuations that cause most of the issues and which cause real G.D.P. to dip negative.[50]

Figure 9: YOY Growth in U.S. Nominal G.D.P. and Real G.D.P. (1958 – 2018)[51]



Nominal G.D.P. and Inflation during the 2008 Financial Crisis: In 2008 the Fed made the understandable mistake of worrying about inflation and high oil prices. However, in this case, the oil price rise was a supply side issue, not a demand side issue, which therefore made it unlikely that the rise in oil prices would cause any lasting inflation.[52] Furthermore, at the time, deflation was a much bigger worry with Fed policy remaining too tight (as evidenced by *real interest rates rising into the worst of the financial crisis*). Nominal G.D.P. level targeting would've largely avoided these problems.[53] Under nominal G.D.P. targeting, an economy will occasionally experience say 4% inflation if real G.D.P. temporarily slows down. However, this inflation will drop back down once real G.D.P. rises again.[54] Under a 5% nominal G.D.P. target, inflation is likely to average about 3%, with real G.D.P. averaging a bit over 2%.[55] A lower 4% (or even 3%) nominal G.D.P. target could also work. The main point not the actual target growth rate, but instead the Fed's commitment to staying on that growth path during a recession or during times were inflation pressures rise.

In the 1970s, sticking to a nominal G.D.P. target would've required substantial will power on the Fed's part in order to crush inflation. Despite the difficulties, it would've been beneficial to "tap the breaks" early on in the late 1960s or early 1970s.[56] Instead the Fed kicked the can down the road and let inflation rise to over 14% (nominal G.D.P. also rose to 14%). Even in 1978, *with inflation running at over 8%, interest rates were not raised*.[57] [58] A properly adhered to 5% nominal G.D.P. target would've avoided the 1970s inflation as well as prevented the worst of the 2008-2009 deflation.[59] We disagree with the idea that oil or other non-monetary factors caused the rise in inflation. Monetary policy is almost entirely responsible for the 1970s inflation.

In October 1979, Fed Chairman Paul Volcker held an unusual Saturday conference (dubbed "The Saturday Night Massacre"), were he stated that, in order to tame inflation, he would raise rates a full percentage point (to 12%).[60] This sent a clear message to the market that the Fed was serious about inflation. It would take another couple of years for the message to truly sink in, but this example demonstrates the importance of forward guidance and expectations when setting inflation targets. Today we have the opposite problem. The market doesn't believe the Fed is serious about raising growth rates, despite its asymmetric inflation goal of 2%. What we need is the opposite of a Saturday Night Massacre. We need what we'll call a "Saturday Night Jubilee", were the Fed clearly states it will leave rates flat (or even unexpectedly drop short term rates) until inflation runs well above 2%. A shock to market expectations is needed (see Scott Sumner's "hot potato effect" and "musical chairs" analogy).[61] [62] Until this is done, the market will continue to keep calling the Fed's bluff. Interest rates, economic growth, and money velocity will remain low.[63]

Of late, nominal G.D.P. has been growing at over 5%, which may imply a too loose monetary policy. However backward-looking numbers are not as good of an indicator as forward numbers. We would view the high 2018 nominal G.D.P. growth rate as a onetime anomaly and would predict nominal G.D.P. to grow around 4% going forward, as the temporary boost from tax cuts, etc. wares off.[64] While the recent addition of a "symmetric" inflation target is welcomed, there is reason to doubt the Fed's commitment to this asymmetric target.[65] [66] Given the lower expected growth going forward, we largely agree with Larry Summers who recently questioned the recent decision by the Fed to raise rates:

> "with respect to price stability, the Fed has a 2% inflation target and it looks like for the 9th year in a row, we are going to fall below that 2% inflation target. Moreover, the Fed emphasizes that it's a symmetric 2% target, so inflation should be above 2% as often as its below 2%. If, at a moment when we have 3.7% unemployment, a moment when we're in the 10th year of an economic expansion, if that's not the moment when we should be above the 2% inflation target, in support of symmetry, I don't know when that moment would ever come? And yet inflation is declining, that's why I find it so surprising that the Fed's judging it imperative to raise rates."[67]

Some have suggested that fiscal policy is the way to go. In looking at countries that have tried massive fiscal deficits, but who also have not made clear that the monetary injections are indeed permanent, we commonly see a canceling out effect.[68] Fiscal policy can almost always be cancelled out by monetary policy.[69] Furthermore, appropriate monetary policy can almost always negate the need to run fiscal deficits. Furthermore, monetary policy leaves market participates to spend the money, which in theory leads to a more efficient allocation of resources vs. fiscal policy which can potentially lead to many wasteful pet projects being built, simply in the name of getting money out into the system.[70] Indeed, massive fiscal deficits, as well as bloated central bank balance sheets, are usually a sign of failed monetary policy and central bank officials who have failed to managed expectations. With a

properly implemented nominal G.D.P. target, very little fiscal deficits are needed, and central bank balance sheets usually will remain small relative to G.D.P.[71]

In Figure 10 below, we list nominal G.D.P. growth in various countries since 2006. We see very few countries are reaching the low end of our preferred goal of 4% NGDP growth. Also listed in the table is a new metric, nominal G.D.P. per capita. In theory, a country with population growth of 6% a year, could run into trouble with even a 5% nominal G.D.P. target. For this reason, we would (slightly) prefer to have a target focused on nominal G.D.P. per capita. We'd aim for around a 4% target (1.75% productivity + 2.25% inflation or so). In most developed countries this isn't a critical issue since population growth is quiet low.

Figure 10: Economic Growth in Various Countries/Regions (2006 – 2018)[72]

Country	Population	Inflation	Nominal G.D.P.	Nominal G.D.P. Per Capita	Real G.D.P.	Real G.D.P. Per Capita
United States	0.8%	1.9%	3.3%	2.5%	1.4%	0.6%
China	0.5%	2.7%	14.1%	13.6%	11.4%	10.9%
Japan	-0.1%	0.3%	0.2%	0.4%	-0.1%	0.1%
European Union	0.3%	1.7%	2.2%	2.0%	0.4%	0.3%
United Kingdom	0.7%	2.2%	3.1%	2.4%	0.9%	0.1%

Regarding the low real G.D.P. per capita numbers in most of the countries above, we aren't too worried about slow growth for even a decade or two. As we showed in previous letters, U.S. real G.D.P. per capita is still at or above its long-term trend since the 1700s. This period of low productivity growth is likely accounting for previous periods of higher than normal growth in real G.D.P. per capita. Furthermore, we remain pleased with the various long term trends in technological progress (such as Cost per GFLOPS, DNA sequencing costs, etc.).[73]

Raise Rates Now to Lower them Later? Recently, many have also begun to argue that we should raise rates now so that we can lower them again in the future when a recession comes along. This strikes us as odd. It's a bit like saying you're going to gain 50 pounds now so you can lose 20 pounds later.[74] Sure you lost 20 pounds, but net, you're still worse off and 30 pounds heavier. In addition, countries like Japan have begun to explicitly target the 10-year yield (Japan kept it at a 0% target).[75] This may appear to lock in easy monetary policy, but that is only when looking at the first order effects of these targets. If you look at the second order affects, one can see that setting a 0% target may actually lock in *tight* monetary policy going forward.[76] If one only looks at the easing affect of setting rates below their current yield, then it appears that a 0% target is easy. However a 0% target (on long bonds) also risks locking in low growth expectations, as the market realizes that the second growth gets above 0%, the central bank will stop printing money and may even tighten.[77] In theory, a central bank could set (long duration) bond yield targets at *higher* rates, say 4%, and then promise to do OMO until long duration bonds reach those yields.[78] This policy however is not ideal for a few reasons, and a nominal G.D.P. target would be more preferable.[79]

Finally, we move on to the fallacy that low rates signify easy money. Many have claimed that 0% interest rates mean the Fed has been easing, but they have ignored equilibrium interest rates.[80] If an economy is contracting at say 5% a year, then even 0% rates may be too tight.[81] As an overly simplistic example, we constructed a few scenario's in the table below and list out whether money is likely to be easy or tight in each scenario:

Figure 11: Interest Rates vs. Economic Growth Rates

		Interest Rates	
		0%	4%
Economic Growth Rate (Nominal)	-5%	Tight	Tight
	10%	Easy	Easy

Most would agree with the claim in the bottom left quadrant: that is, monetary policy is generally easy when rates are 0% but the economy is growing at 10%. However, the 2008-2009 recession is more akin to the top left quadrant, where, despite rates being at 0%, monetary policy was too tight because the economy itself was contracting rapidly. The lesson here is to not judge monetary policy solely based on nominal interest rates.[82] [83] We are concerned that even the current Fed Chairman still believes that money was easy in 2009-2015 period.[84] Our main lesson from the 2008 to 2016 period is that money was too tight, despite low interest rates.[85] If another recession comes, and policy makers continue to believe that "low rates = easy money", then we may experience the same zero lower bound issues we saw in 2009 and the years after.[86] [87] We'd add that monetary policy is not impotent when rates hit zero (if ever), however if Fed officials aren't aware of their own power, then the Fed's impotency may become a self-fulfilling prophecy.[88]

Scott Sumner eloquently expands on why interest rates don't tell you much about monetary policy:

> "The problem is that higher interest rates can be produced by both easier and tighter monetary policy. And easier and tighter monetary policy have opposite effects on prices and output. So I'm sorry, but it's still a meaningless debate. It's not that there is a right or wrong answer; there is no coherent question. Monetary policy can shift the LM curve, the IS curve, or both. Consider this analogy: A debate over whether high oil prices increase or decrease global oil consumption. The debate is meaningless. Price has no effect. Here's how the issue should be discussed:
>
> A. An Arab oil embargo caused higher prices and lower consumption in 1974.
>
> B. Booming Chinese auto sales caused higher oil prices and higher consumption in 2007.
>
> *Prices are not a cause of anything; they are an effect. And interest rates are a price*. So please stop these silly posts discussing the impact of a change in interest rates. Talk about the effect of expansionary and contractionary monetary policies—that's an interesting question."[89] [90]

As we mentioned in last year's letter, since the monetary base ("MB") is much smaller than M2, it is critical to realize that while the Fed can only directly control MB, it is the Fed's signals about future monetary policy that primarily drives the economy. To illustrate, if the Fed suddenly signals that it will not expand the MB at all in the future, the velocity of money (M2/MB) would drop quickly and do most of the contracting in the economy (after all, MB would've remained constant). Conversely, if the Fed suddenly signals that it will change course and begin printing more money in the future, velocity will rise much faster than any minor increase in the MB. This illustrates the importance of Fed expectations and hopefully illustrates that minor moves in the Fed Funds Rate (or even relatively minor moves in the change in MB via QE) are not the primary transmission mechanisms of monetary policy. To the extent that QE or changes in Fed Funds Rate affect the economy, it is mainly because these changes are interpreted by the market as not so much affecting the economy directly right now, but instead show the Fed is serious about changing course from its previous monetary policy regime going forward. What truly drives the economy is when the market looks as a small change in Fed Funds Rate (or even relatively small amounts of new QE) and interprets it as a significant change in the future path of monetary policy. ***It is expectations of future changes in monetary policy that is paramount*** **(not the minor changes in Fed Funds Rate/QE at present).**

If one looks only at the first order effects of, say a new round of QE, one could potentially incorrectly assume that, since the Fed is buying more bonds, that yields would drop and prices would rise. However, if one looks instead at the much more important 2nd order affects, it becomes apparent that the new round of QE likely signals that the Fed is committed to easing policy in the future (more so than it has in the past). In this scenario it is likely that the market will realize this and therefore yields would *rise* (as they did with the various episodes of QE in the past decade). Conversely, many assume that the upcoming quantitative tightening ("QT") will lead to high bond yields. This may be true, but in our estimation, it is also entirely possible that an aggressive episode of QT would signal to the market that the Fed is not completely committed to growing the nominal economy going forward, and therefore *QT could lead to a drop in bond yields.*

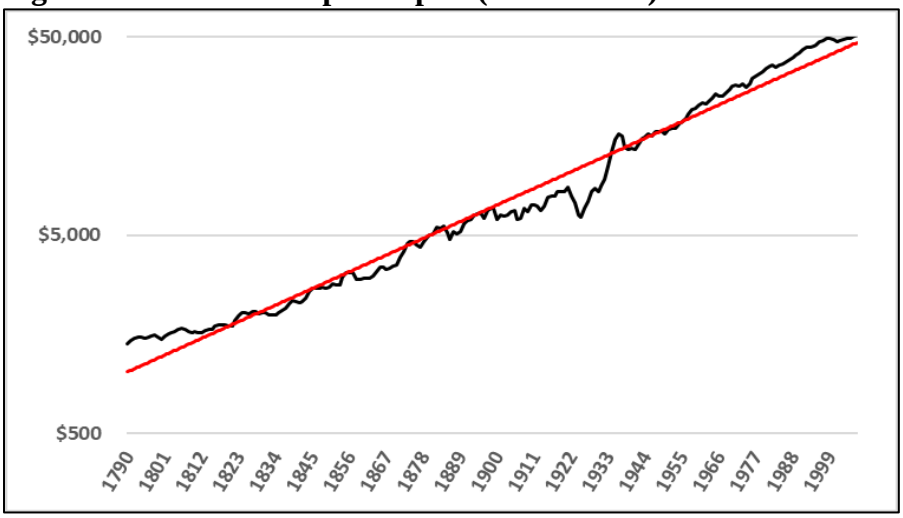
Sumner lists a relevant example:

> "On January 3rd, 2001 the Fed cut it's target rate from 6.5% to 6.0%, which was a bigger cut than expected. Stocks soared 5% on the news. (Even more, as the announcement was not 100% unexpected.) Does anyone seriously think that stock investors give a damn about the fed funds rate over the next 6 weeks? Of course not! Obviously, the market was reacting to the signal the Fed was sending about future monetary policy. The Fed was showing a surprisingly strong determination to mitigate the post-tech bubble slump. We did have a recession, but it was surprisingly mild. Unemployment peaked at a mere 6.3% and we never saw even two consecutive quarters of falling real G.D.P.
>
> If you don't believe me, consider the following. While short rates fell slightly, long term bond yields rose dramatically on the news. The income and inflation effects at work. And long term interest rates are presumably of more interest to stock investors. Thus it wasn't lower rates causing the stock surge, it was higher expected nominal G.D.P. (and real G.D.P.) growth, triggered by expectations of a more expansionary future monetary policy."[91]

Chapter 3: Sharing a Dark Corner of the American Experiment

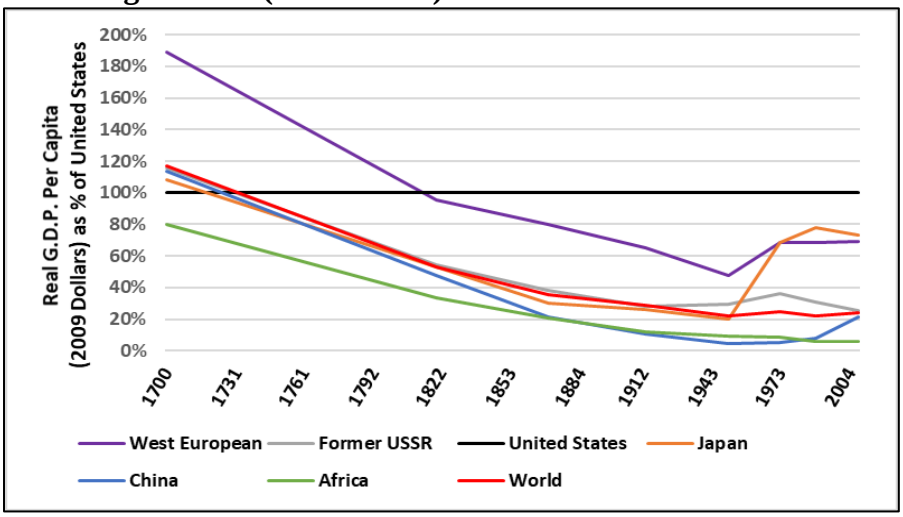
In every letter so far, we've mentioned one of the more important development metrics: real G.D.P. per capita. Measured over time, we believe this is one of the best metrics to judge the wellbeing of a society as well as its general economic progress. In past letters we've mainly explored the trends in this metric in the United States. In this letter we'll look at this metric across the globe and how it has changed over time. We begin by reposting the United States real G.D.P. per capita as a reference. It's important to note the trend in this graph because later on we'll take this same upward sloping line and lay it horizontal and use it to compare how other countries have done relative to the U.S. over time.

Figure 12: Real G.D.P. per Capita (1790 – 2016)[92]



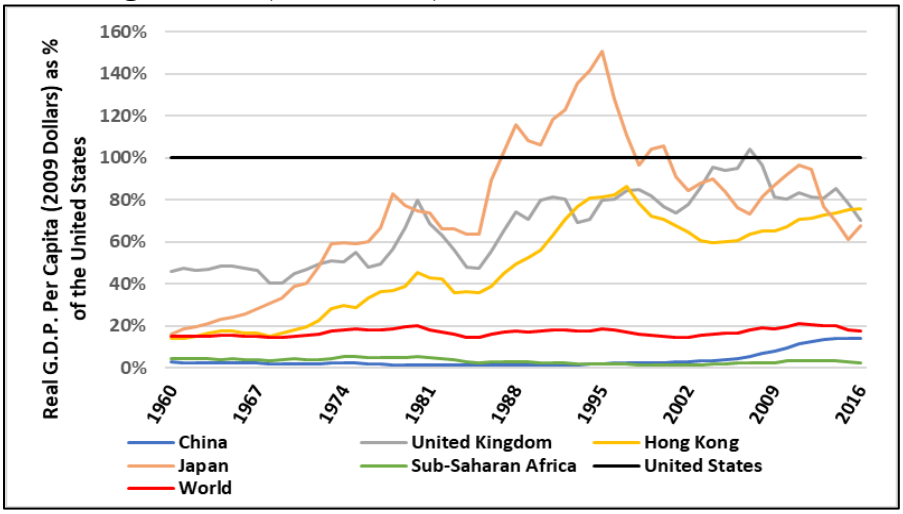
Noting the steady 1.75% per year increase over time and how this results in massive increases of wealth per person over time, we next shift to comparing how other countries have done *relative to the U.S.* over the past few centuries. Again, the flat U.S. line in Figure 12 below is the same line upward slopping line in Figure 11 above. The above graph is an absolute metric, the below graph is a *relative metric* (horizontal baseline = U.S.).

Figure 13: Real G.D.P. per Capita, Various Countries as a Percentage of U.S. (1700 – 2008)[93]



We can see that many countries started out close to the U.S. in terms of real G.D.P. per capita. Some less fortunate countries also started at about 40% of the U.S. numbers in 1700. Since that time however, we can see that on a relative basis, unfortunately, some of these countries have not kept up with the U.S. That said, most of these other countries have still done fantastically well on an absolute basis and most people around the world are much better off now than they were in 1700. Keep in mind that the flat, seemingly uninspiring, U.S. line above represents an approximately 5,000% increase in living standards since 1790![94] We should note that the data is spotty for portions of the above graph, however if we look at data after 1960 (Figure 14 below), the data gets much more consistent:

Figure 14: Real G.D.P. per Capita, Various Countries as a Percentage of U.S. (1960 – 2016)[95]



Japan immediately stands out in Figure 14. In the late 1980s there was a worry that the U.S. would be permanently over taken by the higher Japanese growth rate. Since then however, the trends have come back down to about average. Going forward we'd guess that Japan and the U.S. have about the same growth rates.[96] Many of the other currently rich countries should also maintain similar growth rates going forward.[97] That said, it important for these leading countries to continue to do what got them there: maintain good a rule of law, as well as maintain good institutions and creating an environment where human ingenuity can flourish.[98] We also note a frustrating lack of progress for the world as a whole. We are hopeful that, with steady progress by organizations like the Gates foundation, as well as with help from citizens and leaders of the individual countries, that Africa can move up the income ladder going forward. The recent trends in China should give Africa and the rest of the world hope. While China made no progress in catching the United States during the era of Mao, since Deng Xiaoping began making the Chinese economy more open and capitalist in 1978, the Chinese have been making steady progress and catching up to the United States. Our best guess is that China continues to slowly catch up to the United States over the next century, after which time, China's growth in terms of real G.D.P. per capita will begin slowing (eventually matching the United States rate as the two countries real G.D.P. per capita numbers converge).[99] That said, China should be particularly weary of falling into the middle-income trap.[100]

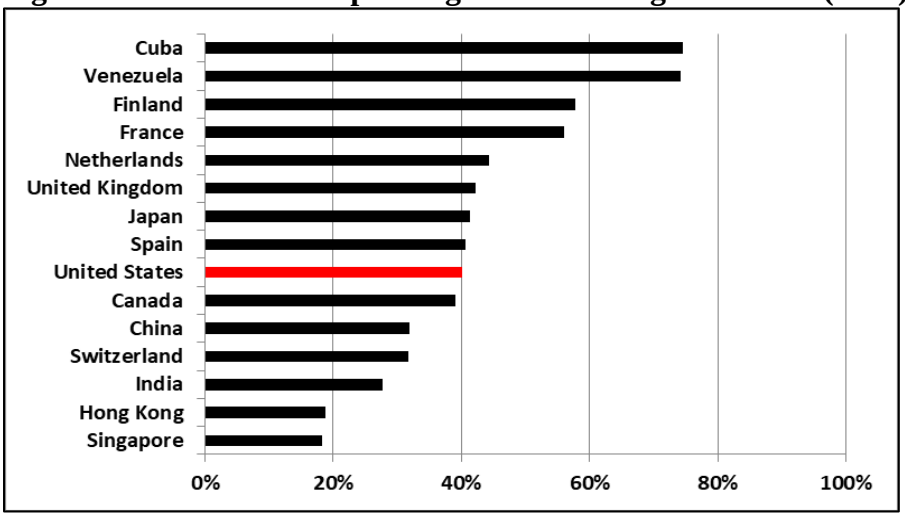
For readers wondering if high economic growth rates necessarily translate into high stock returns, we refer to the great article "The Truth about Emerging Market Growth" by Cris Sholto Heaton. In the article, we notice that high nominal G.D.P. growth doesn't seem to correlate well with stock returns (See chart in article titled: "Nominal GDP growth vs stock market total return USD terms annualized, 1969-2011"). That said, nominal G.D.P. growth in emerging markets did have some predictive power regarding stock returns. However, the last two graphs in the article are from 1987-2011 and 2002-2011 respectively, which is a bit too short of a time frame to draw any major conclusions from. Furthermore, we aren't confident in our ability to predict which countries will have high nominal G.D.P. growth going forward. The r-squared of .6, while somewhat predictive, is still lower than we'd like. As we mentioned earlier, for us to move out of U.S. equities (given the long history of spectacular U.S. equity returns) we can't be just "a little sure" that a new asset class will outperform. We must be extremely sure and an r-squared of .6 simply won't do.

Moving on, if we look at real G.D.P. per capita, we notice a *negative* correlation with stock returns, as mentioned by Almanacist in the article titled: "The link between economic growth and stock market returns". However, Almanacist does show a positive correlation between real G.D.P. and stock returns in their second graph in the article above. We again however state that the we aren't confident enough to draw any meaningful conclusions and will therefore stick with U.S. equities for the time being.

Government Spending and Economic Freedom Scores

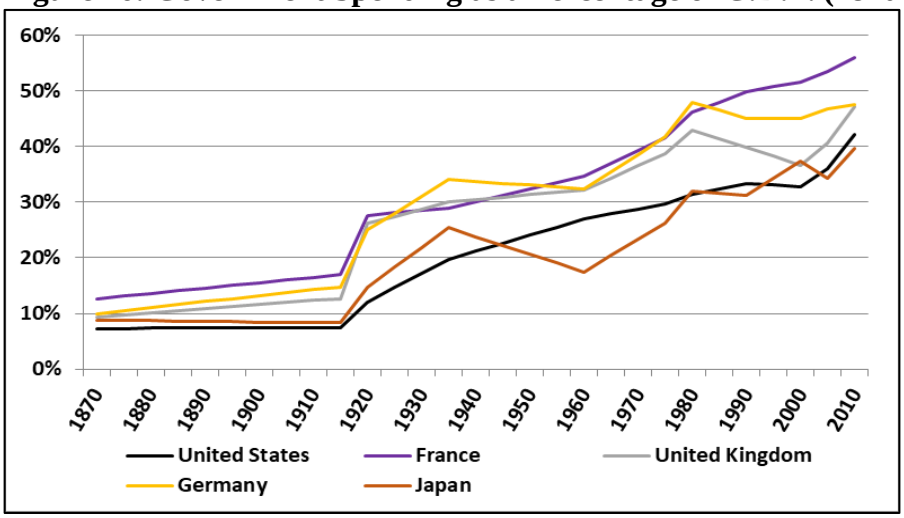
In this subsection, we'll take a look at government spending across the globe. Of late, there's been much debate between the definitions of "socialism" and "capitalism", with hard lines being drawn on either side. Instead of choosing sides, we'd instead like to look at some data and suggest that the gulf between the socialist countries and the capitalist countries is not that different in practice. It's commonly stated that many European countries are socialist, whereas the United States is more capitalist. Many cite the size of government as a main differentiating factor, however when we look at the actual data, we notice that many European governments spend at a *similar rate* to that of the United States.

Figure 15: Government Spending as a Percentage of G.D.P. (2017)[101]



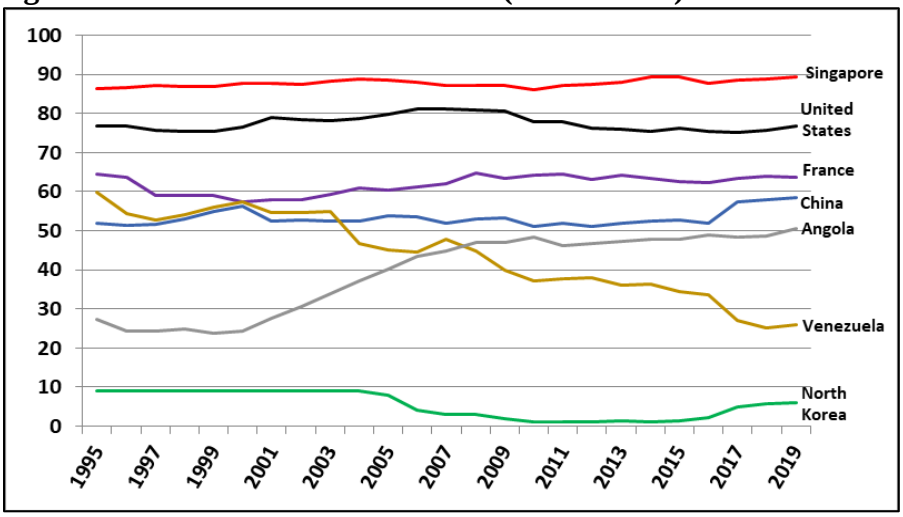
In Figure 16 below, we note how the size of government has changed overtime for various countries. Both world wars, as well as the Great Depression, had material impacts on government spending around the globe.

Figure 16: Government Spending as a Percentage of G.D.P. (1870 – 2010)[102]



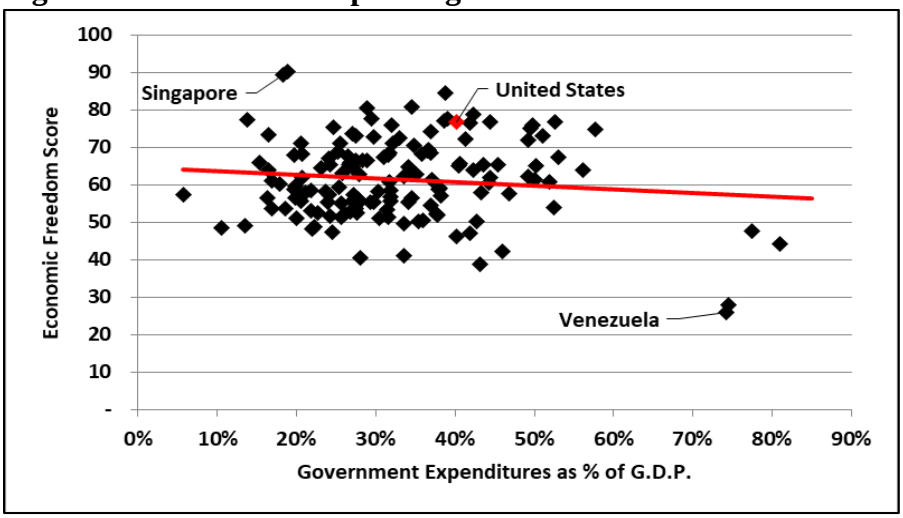
While the raw size of government is important, it's also critical to look at the various institutions within a given government. The Economic Freedom Score is one way to measure these institutions across various criteria. While a higher score doesn't always imply a more capitalist society (at an individual level), when looking at a *group* of countries, a higher economic freedom score will indeed tend to imply a more capitalist society (Singapore is an example that is commonly cited as closely approximating the capitalist ideal). In Figure 17 below, we list the Economic Freedom Score for various countries since 1995 (noting the improvement by Angola and the deterioration of Venezuela during this time period).

Figure 17: Economic Freedom Score (1995 – 2019)[103]



One might assume that countries with smaller government spending would have higher Economic Freedom Scores. However, when we look at the data, it doesn't seem to appear that way (at least in the aggregate). Note: while we place a trendline in red on the next 3 figures, it's not a tight fit, and we must therefore remain careful when drawing conclusions.

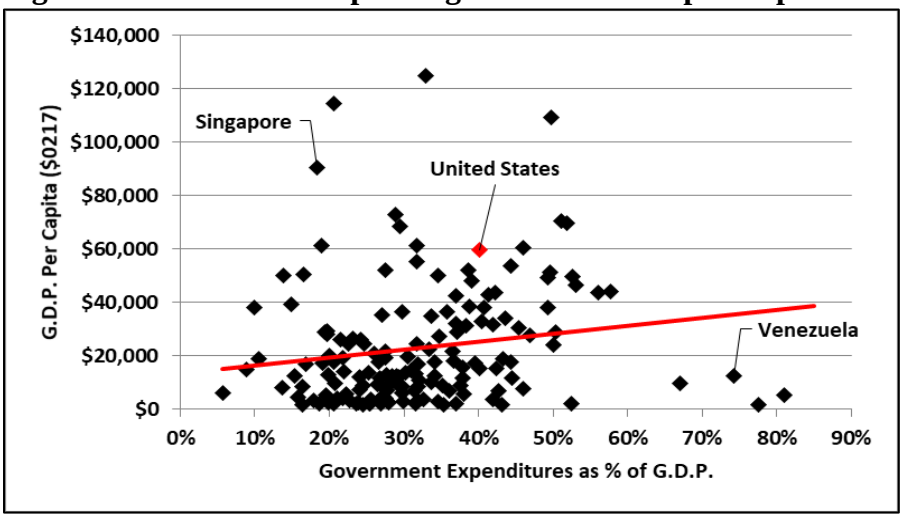
Figure 18: Government Spending vs. Economic Freedom Score[104]



The astute reader might next wonder if there is any relationship between government spending and real G.D.P. per capita? In this case we find a slight *positive* relationship between the two metrics (see Figure 19 below). That is to say that, countries with higher income per person tend to have *more* government spending relative to G.D.P. That said, it is unclear whether higher government spending *causes* higher income (or whether it's simply a *correlation*, and instead, as countries get richer on a per person basis, they tend to increase government spending for programs

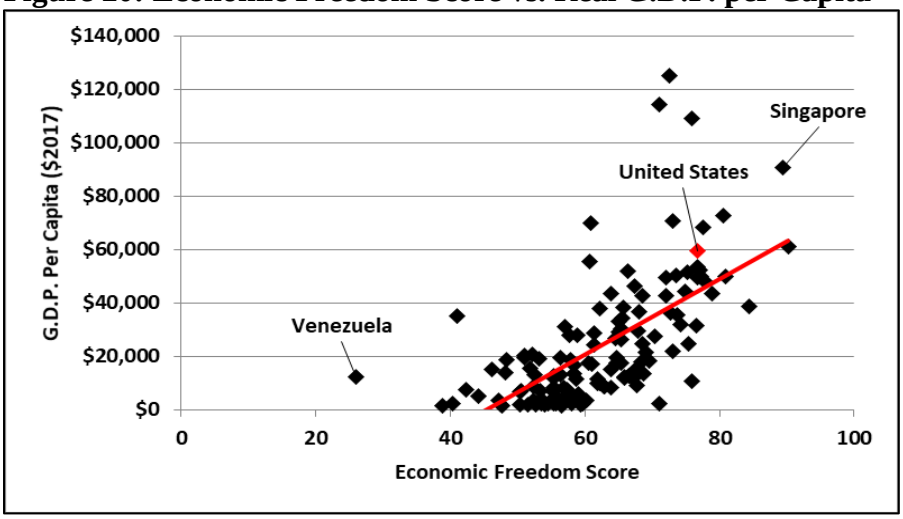
such as Social Security, etc.). We'd note that the socialism (loosely defined here as 30% to 60% government spending as a percentage of G.D.P.) doesn't seem to have an obvious/adverse effect on human wellbeing. The United States, France and the Nordic countries would all fall into this "socialism" category as we define it. However, as we can see in Figure 19 below, citizens do seem to start to suffer as a country moves from socialism to communism (communism being loosely defined as government spending as a percentage of G.D.P. of over 75% - see Cuba, North Korea and Venezuela – in Figure 19 below).

Figure 19: Government Spending vs. Real G.D.P. per Capita[105]



Next, we'll look at the relationship between income per person and a country's Economic Freedom Score (Figure 20 below). This relationship does seem to be predictive, however we again note that the *causes* of human well being are not necessarily completely encompassed in the Economic Freedom Score, and that part of the relationship in the graph below could be mere *correlation*.[106] To readers who are interested in exploring these concepts further, we highly recommend The Birth of Plenty by William Bernstein.[107]

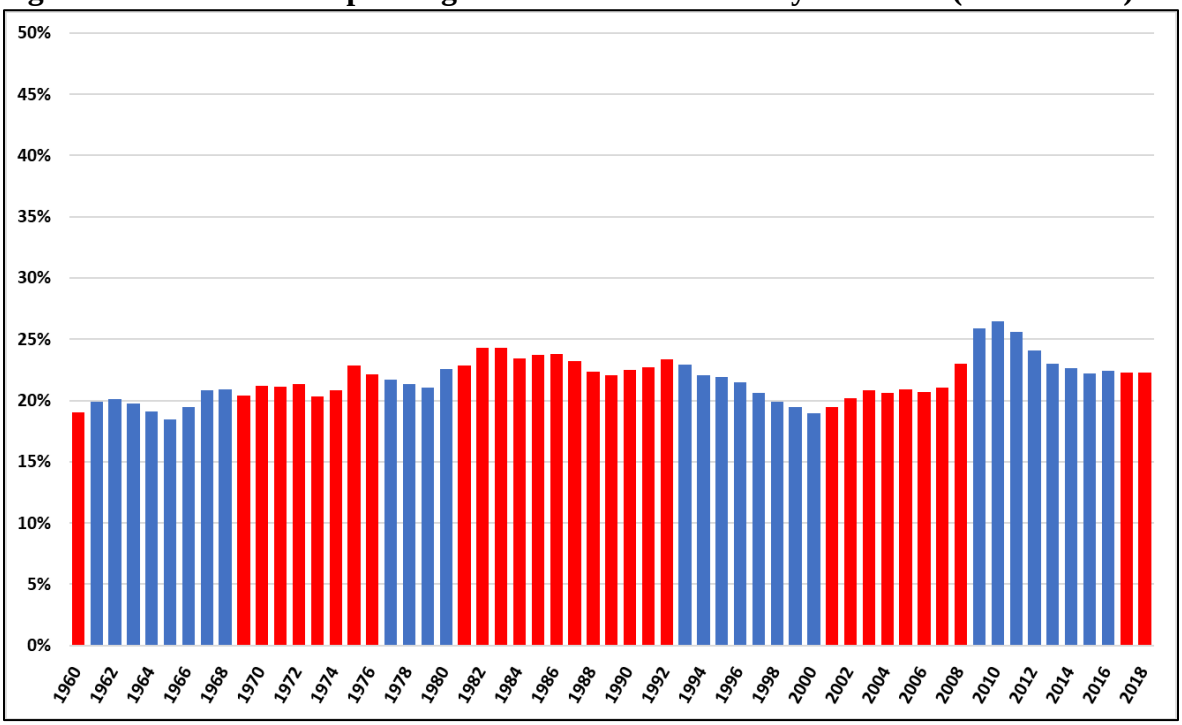
Figure 20: Economic Freedom Score vs. Real G.D.P. per Capita[108]



United States Federal Government Spending by Political Party

In this subsection we'll move back to a more U.S. centered view and examine how the size of government varies based on the which political party is in charge. We'll bury the lead right away: *we are skeptical that there is much of a difference between either political party on the fiscal front* (there are certainly differences in social values between the two parties, but we don't cover those in this letter as we don't have any particularly unique insights or expertise on social issues). Taking inspiration from graphs created by others, we'll first take a look at government spending since 1960, and highlight how these values change based on the which party wins the presidency. For the rest of this subsection, red lines indicate Republican, whereas blue lines indicate Democrat. Also note that Figures 21 -23 below, include only federal spending. The U.S. number in Figure 15 above is different because Figure 15 includes state and local spending, in addition to federal spending.

Figure 21: Government Spending as a Percent of G.D.P. by President (1960 – 2018)[109]



We fail to see much of a trend based on which political party controls the presidency. In politics, there is a lot of talk about small government vs. big government. However, when we look at the data, we find that most of the supposed ideological differences melt away when practically implemented. **Neither of the two major U.S. political parties spends significantly more or less than the other.** Regarding financial markets, politics at the margin don't seem to matter much and, at least since 1960, there hasn't been any substantial changes in U.S. government spending based on which party is in charge. If we had to hazard a guess, we'd guess that government spending will be about the same going forward. For those who are interested in seeing whether control of the Senate or the House of Representatives affects government spending, we've provided those two figures on the next page (noting that, as with the presidency, there also doesn't seem to be much of a pattern).

Figure 22: Government Spending as a Percent of G.D.P. by *Senate* Control (1960 – 2018)[110]

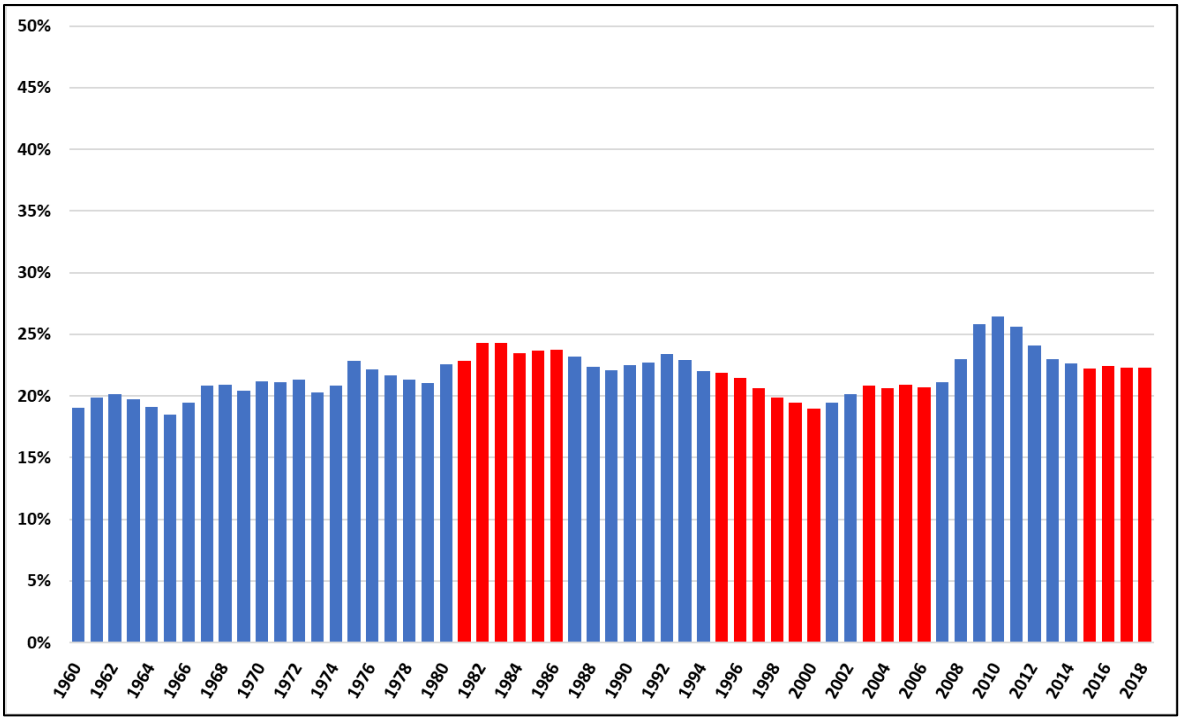
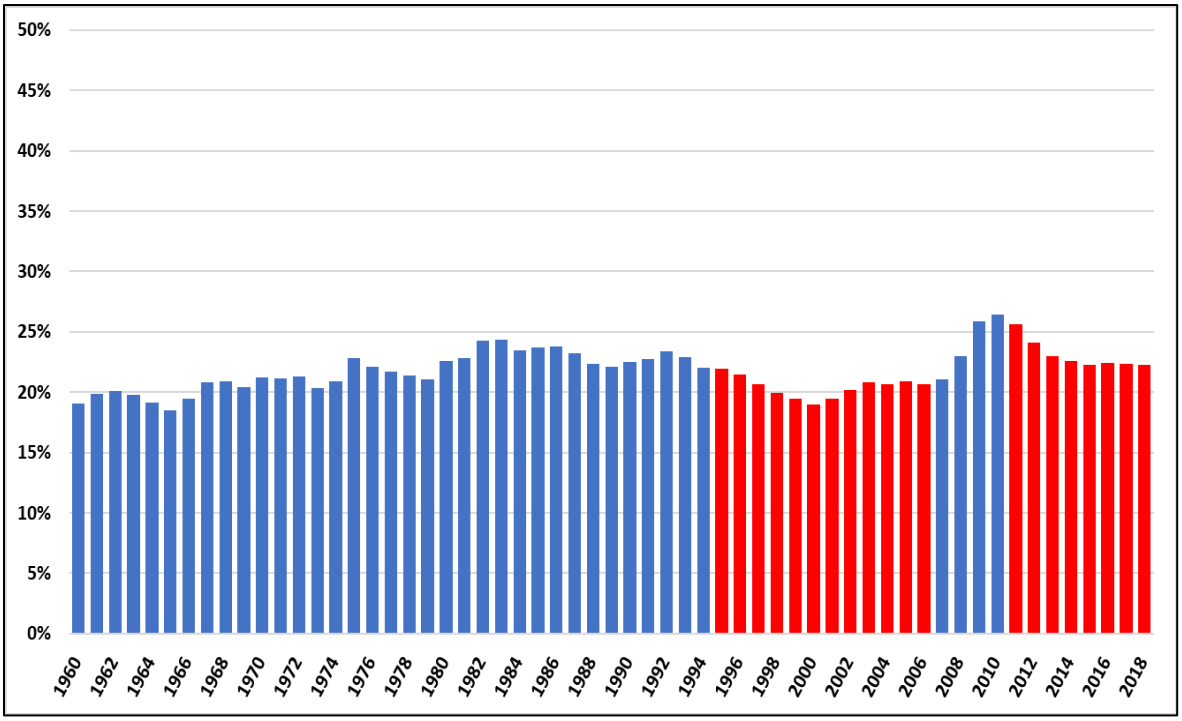


Figure 23: Government Spending as a Percent of G.D.P. by *House* Control (1960 – 2018)[111]



Chapter 4: Odds and Ends

In this section we'll quickly go over some other market insights that didn't fit in other sections of the letter

- Artificial Intelligence has been all the rage lately. We are far from experts on the subject, but our high-level view is that AI won't affect our investment process much at all. Our investment approach is slow and steady. Many times, we are analyzing scenarios with only 2 or 3 analogous events in the past 100 years. In general, AI does best with many data points. We would guess that AI may have some benefit for short term traders, where there are millions of datapoints (thousands of securities, measured thousands of times per hour/day/etc. over many decades results in a lot of potential datapoints). However as one moves up to weekly or monthly time frames, the number of datapoints drops significantly. As one moves up to our preferred 1 to 5 year time frame, the number of data points drops even further. We remain open to changing our mind on the matter, but currently we have no plans to implement AI, as we are not day traders, and instead analyze investments over a much longer time frame. Someday AI may be able to tell us what happens when the Fed engages in QE, but we wouldn't bet on that anytime soon.

- While we didn't directly address Modern Monetary Theory (MMT) in our previous letters, we covered many of the relevant points. Our main critique of MMT (and most other schools of economic thought) is that it seems to not distinguish between temporary and permanent money printing. This leads MMT proponents to incorrectly diminish the importance of deficits. MMT proponents note that, despite the large increase in MB, we haven't seen much inflation of late. Many go on to argue that deficits should be much larger and are unlikely to cause large bouts of inflation. While this is possible, it is also possible that large constant deficits will cause inflation. The main point missed is that the Fed is in charge. If the market expects the Fed to monetize the debts by printing permeant money, then inflation will likely result. If instead the deficits are temporary (i.e. either the Fed doesn't play ball or Congress/Treasury simply runs a temporary deficit followed by a proportional surplus) then inflation is unlikely. **The expected future path of permanent money supply is what is critical. Fiscal policy and deficits almost always take a back seat to monetary policy.** In addition, monetary policy injections are usually less wasteful compared to large fiscal deficits (which can be spent on pet projects, etc.).

- Many pundits claim that easy money causes stock bubbles. This is a complicated issue, but to play devil's advocate, we'd like to look at monetary policy and stock bubbles in the 1970s.[112] As we mentioned earlier, the 1970s were a period of loose monetary policy. Nominal G.D.P. was growing in the double digits which caused interest rates to rise. While nominal S&P 500 earnings growth was indeed higher than it otherwise would've been, this easy money also put significant downward pressure on stock multiples. As nominal G.D.P. rose, so too did bond yields. As we learned from previous letters, when bonds yields rise above a certain point, it commonly puts downward pressure on stock multiples. Indeed, we saw some of the lowest S&P 500 P/E ratios of the century during this time of high inflation and easy money in the 1970s. Conversely, under the moderate monetary conditions of the late 1990s (when nominal G.D.P. was growing at a much more controlled 5-6% range) we saw one of the biggest stock bubbles in history. It isn't always so easy to equate easy money with high equity valuations. We'd also argue that in some circumstances, printing money benefits the poor more than the rich and that *money printing can therefore occasionally bring inequality down*.[113] This goes against the commonly held belief that QE only helped the rich.[114]

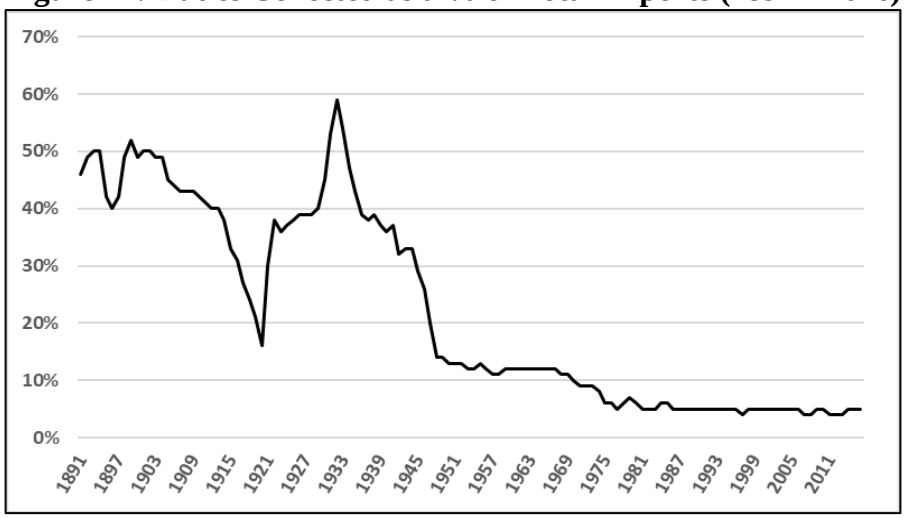
- While we think the conversation around income inequality is warranted and beneficial, **we'd like to see further focus on consumption inequality**.[115] A recent graph by the economist shows, that while income inequality has been rising, the picture is a bit different after accounting for transfers and taxes.[116] Finally, when looking at consumption vs income inequality, we notice when accounting for consumption, inequality isn't quite as bad as the income inequality metrics would imply.

  Many argue for a universal basic income. Depending on how it is setup, this could result in many people having no income at all for tax purposes, and instead getting a large tax rebate to help them pay for day to day expenses. In theory, many people could live quite well while having no income. While the

resulting *income inequality* metrics would paint a dire situation, the *consumption inequality* metrics would paint a more positive (and accurate) picture. Consumption metrics would show that, while many people had no income, they were still able to live a decent life and *consume* the many things needed to live a decent life. While we won't discuss it much here, we'd also like to see much or all of the income taxes in this country replaced with a (progressive) consumption tax for many of the same reasons listed above. A billionaire who spend 90% of her money on yachts and paintings should be taxed differently than a billionaire who simply saves all her income from year to year and donates 90% of her wealth to charity when she dies.

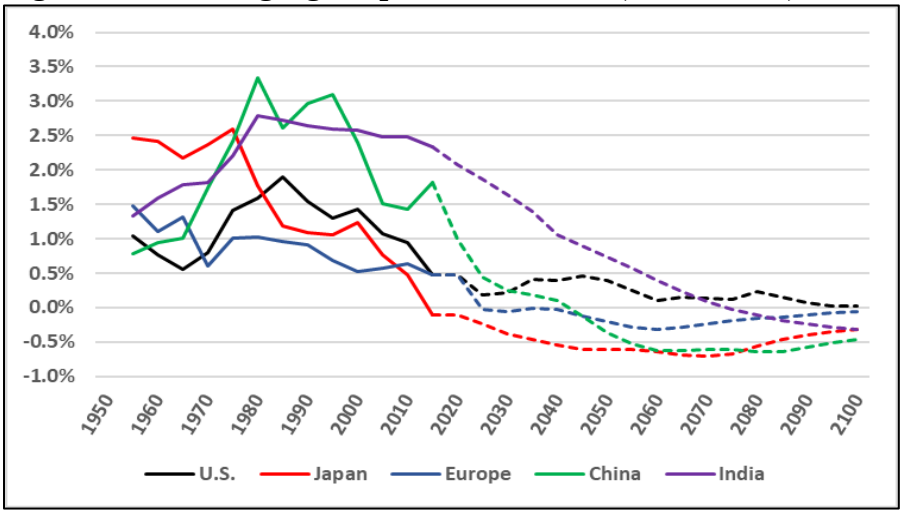
- While we are concerned with the recent tariff talk, some perspective is in order.[117] Tariffs of 25% on $250 billion of goods, would equate to about $62 billion. This would bump tariffs up from 1.5% to 5% of total imports. While this more than tripling of tariffs is certainly not ideal, when looking at the below chart, we see tariffs were much higher in the past. If it stops at 5%, we don't foresee huge negative consequences. If the tariff disputes rise above 5% of total imports, then it could cause problems.

Figure 24: Duties Collected as a % of Total Imports (1891 – 2016)[118]



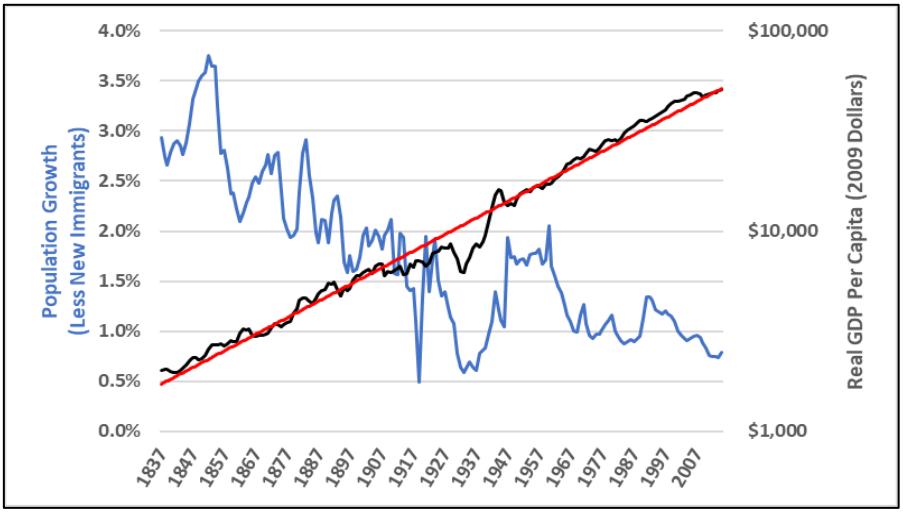
- In these final few bullet points, we'll discuss a bit more on demographics. In our 2017 Annual Letter we looked at projected population growth rates in the United States out to 2100. Here we will look at the projected growth rates of some other countries, this time looking at *working age* population growth (working age population growth dropping from 1.5% in the 1990s to 0.5% today may partially explain why interest rates dropped from 5-6% in the 1990s to 2-3% today).

Figure 25: Working Age Population Growth (1955 – 2100)[119]



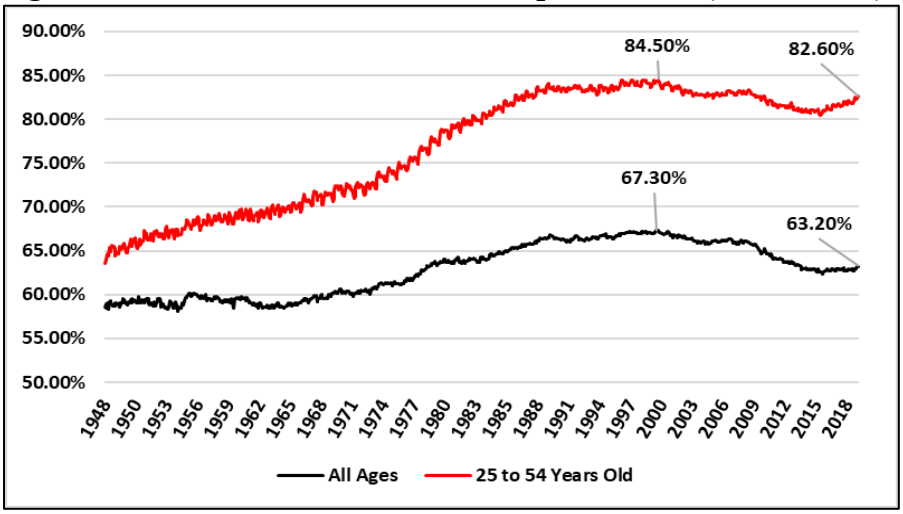
We can see that India is expected to grow at significantly higher rates than the other countries. While this won't directly affect the real G.D.P. per capita metrics we discussed earlier, it will increase the growth rate for the country a whole (which has important implications for global political influence, military strength, etc.). That said, an important point to mention is that, as countries become richer on a per person basis, they tend to have less children. The U.S, in the 1800s, had similar growth rates to modern day developing countries when their incomes were comparable to the developing countries income of today. We'd expect many developing nation's population growth rates to slow as they become richer.

Figure 26: Population Growth Tends to Slow as a Country Becomes Richer[120]



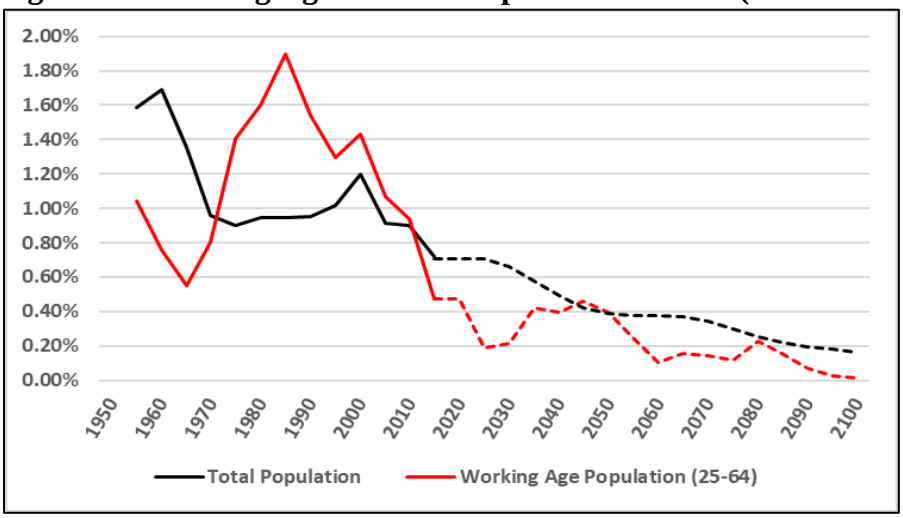
- Much has been made of the decline in the labor force participation rate (black line below) since the peak in 2000. However, when we look at the labor force participation rate from ages 25-54 (red line in Figure 27 below), we such much less of a decline. This implies that demographics are playing a major role in the reduction in the number of workers. Other factors such as regulations, etc. also play a role, but likely much less of a factor when compared to the impacts from changing demographics that we noticed in Figure 25 above. In addition, we are encouraged by the recent rise in participation rates since 2015.

Figure 27: Civilian Labor Force Participation Rate (1948 – 2019)[121]



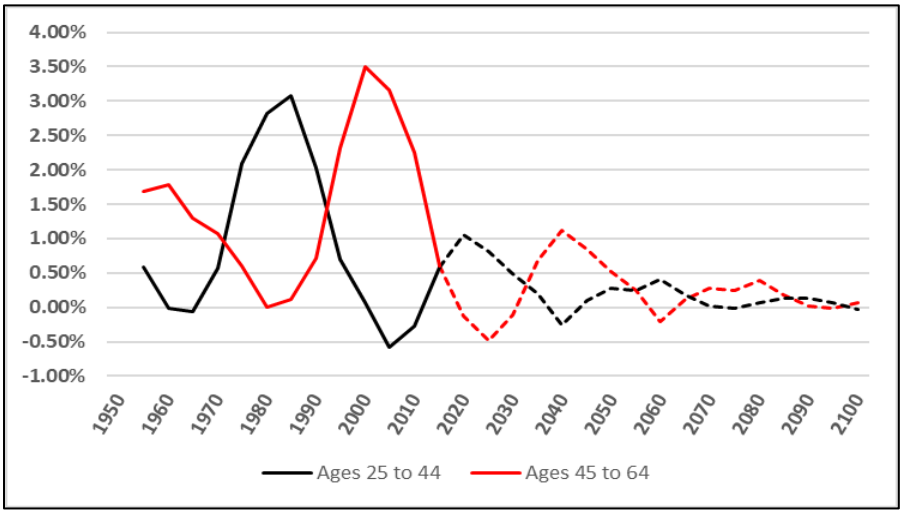
- For reference, Figure 28 below shows how working age population and total population differ in the U.S. going forward. A low working age population relative to total population implies an aging population for the U.S. We see a similar pattern in many countries around the world going forward.

Figure 28: Working Age vs. Total Population Growth (1955 – 2100)[122]



Next we look at the age distribution of the United States (credit for the chart goes to Ed Yardeni in his highly recommended book, Predicting the Markets: A Professional Autobiography). We note the peak in older workers in the late 1990s, with the next such peak of older workers occurring in the late 2030s.

Figure 29: Population Growth: Ages 25-44 vs. 45-64 (1955 – 2100)[123]



What does this mean for productivity and stock market bubbles? Could we expect productivity to peak in 2030s and have another stock market bubble in 2030s? This would match well with Buffet's past writings on stock market cycles: starting in 1964 with 17 years of flat stock prices followed by 17 years or rising stock prices (34 year cycle in total from 1964 to 1998). That said, this is far from a prediction on future productivity numbers or future stock prices and will have no bearing on our future investment choices. We simply list the graphs here as interesting metrics to note.[124]

Footnotes and Sources

[1] Assumes a 1% annual management fee. Not included in these calculations is an approximately $200 charge per account per year for fixed costs (minimum account fees, trading commissions, etc.). Split Rock Capital Management runs various separately managed accounts. While the strategy is the same, due to differing start dates, etc, the various accounts can have differing holdings and therefore differing performance numbers. While over the long term we expect these differences to even out, over the short run that can vary meaningfully. That said, on inception date, we started an initial portfolio (our *only* account at the time) which we have always, and will continue to use, as our tracking portfolio. To maintain consistency, and remove any selection bias, all historical performance numbers are from solely this account, regardless if the other accounts outperform or underperform this main tracking account in the past or going forward.

[2] Includes dividends. Please note that these "S&P 500" numbers use SP500TR. The performance numbers may very slightly from the official S&P 500 performance numbers listed elsewhere on a year to year basis. However, over time, the differences should cancel out. For example, our SP500TR numbers for 2016 was 21.87% which was slightly above the official 21.83% for the S&P 500. However, in 2018 the differences largely evened out, with our SP500TR reporting a return of -4.41% while the official S&P 500 return was -4.38%. The differences in annual returns are largely canceled out over the entire 2-year time frame, and we expect differences between the two performance metrics to be even less of longer periods of time.

Also please note: Split Rock Capital Management runs various separately managed accounts. While the strategy is the same, due to differing start dates, etc., the various accounts can have differing holdings and therefore differing performance numbers. While over the long term we expect these differences to even out, over the short run that can vary meaningfully. That said, on inception date, we started an initial portfolio (our *only* account at the time) which we have always, and will continue to use, as our tracking portfolio. To maintain consistency, and remove any selection bias, all historical performance numbers are from solely this account, regardless if the other accounts outperform or underperform this main tracking account in the past or going forward.

[3] Assumes a 1% annual management fee. Not included in these calculations is an approximately $200 charge per account per year for fixed costs (account fees, trading commissions, etc.). Split Rock Capital Management runs various separate accounts. While the strategy is the same, due to differing start dates, etc., the various accounts can have differing holdings and therefore differing performance numbers. While over the long term we expect these differences to even out, over the short run that can vary meaningfully. That said, on inception date, we started an initial portfolio (our only account at the time) which we have, and will continue to use, as our tracking portfolio. To maintain consistency, and remove any selection bias, all historical performance numbers are from solely this account, regardless if the other accounts outperform or underperform this main tracking account.

[4] Assumes a 1% annual management fee. Not included in these calculations is an approximately $200 charge per account per year for fixed costs (account fees, trading commissions, etc.). Split Rock Capital Management runs various separate accounts. While the strategy is the same, due to differing start dates, etc., the various accounts can have differing holdings and therefore differing performance numbers. While over the long term we expect these differences to even out, over the short run that can vary meaningfully. That said, on inception date, we started an initial portfolio (our only account at the time) which we have, and will continue to use, as our tracking portfolio. To maintain consistency, and remove any selection bias, all historical performance numbers are from solely this account, regardless if the other accounts outperform or underperform this main tracking account.

[5] Partial year only; from inception date of 12/15/2015 to 12/31/2015.

[6] Source: https://www.themoneyillusion.com/how-conventional-wisdom-gets-formed/

[7] In our 2016 letter we looked at the low interest rate environment during the great depression to the 1960s. We suggested that today's low environment could last for a similar length of time. We'd add here that in the 1950s working age population growth was much higher than today (see Figures 28 and 29). With lower working age population growth now, that suggests that rates could remain lower for longer (compared to the 1930 to 1966 period)

[8] Scott Sumner: "The problem is that really, really tight money looks like really, really easy money to the average guy (and politician)." Source: http://www.themoneyillusion.com/breaking-news-from-japan/

*More up to date projections show nominal G.D.P. growing less than 4% out to 2020: http://ngdp-advisers.com/ngdp-forecast-client/

[9] If a central bank permanently increases the *supply* of reserves by 1000x immediately, then the *demand* for those reserves will drop a lot which means velocity will rise and inflation will likely result. The demand for reserves is not static and depends on the *supply* (and expected future supply) of reserves.

[10] It is likely that the Fed promising to inject $500 billion into the economy and leave it there permanently will cause MORE inflation than if they inject $10 trillion but promise to remove it in one day. We aren't in such an extreme scenario now, but it's a though experiment that illustrates that if you manage expectations you don't need to inject much money. If you'd don't manage expectations, then even big injections won't cause inflation and you'll be left with the bloated central bank balance sheets that we currently have around the globe.

[11] Scott Sumner: "[I] also went to the University of Chicago. We were taught that when money is very tight, as in the 1930s, the Fed's balance sheet will be very large as a share of G.D.P. And when money is very easy, as during the German hyperinflation, the balance sheet will be small as a share of G.D.P. Indeed I seem to recall that the German Reichbank's balance sheet fell to less than 1% of G.D.P. in late 1923." Source: http://www.themoneyillusion.com/stock-markets-say-the-darndest-things/

"But modern central banks no longer "monetize the debt", they swap interest-bearing reserves for interest-bearing bonds. If interest rates rise they'll either have to sell off the debt (which increases the stock of net debt held by the public) or pay interest on the debt (and remember that central banks are de facto part of the government), or let hyperinflation occur." Source: https://www.themoneyillusion.com/keynesians-should-have-supported-the-2014-japanese-tax-increase/

SRCM commentary: You'd think that eventually an economy can get used to a lower nominal G.D.P. growth rate (money is neutral in the long run). However, even Japan, which has had the most time to adjust (going on 30 years!) still has too low nominal G.D.P. growth. One of their main problems is their high debt levels, which, if they got nominal G.D.P. growing at 3% or higher, the debt burden would be greatly reduced. It seems that even 30 years may not be enough time to adjust to low nominal G.D.P. growth, especially where debt levels are high. (See Summer comment: http://www.themoneyillusion.com/market-monetarism-is-gaining-ground/

[12] Scott Sumner: "The second and more powerful (Fed) tool is sometimes called "communication" or "signaling." The basic idea is that while the Fed can no longer cut short term interest rates, they can signal an intention to adopt an easier monetary policy in the future, when rates are no longer zero. This will lead to expectations of more rapid growth in demand, which will make people and businesses more willing to spend money today. For instance, people are more likely to buy homes if they think the price of houses will rise over time. And companies are more likely to invest in new facilities if they expect more rapid growth in future years." Source: https://finance.yahoo.com/blogs/the-exchange/qe3-won-t-solve-problems-start-232409336.html

[13] This could be bad for active managers, as some active managers are able to take advantage of the market volatility, however we still favor a nominal G.D.P. target for the good of society, despite some active managers potentially being hurt.

[14] As mentioned in previous years, a nominal G.D.P. level target implies a symmetric target, where any undershoot in nominal G.D.P. in year 1 results in an a proportional overshoot the next year (and vice versa). In theory, nominal G.D.P. could grow at 4% one year, and 6% the next year under a symmetric target. Without the symmetric target, any undershoot of say 4% in year one, would not be match with an overshoot, and instead nominal G.D.P. growth would only reach 5% in year 2, leaving nominal G.D.P. below target when looking at the entire 2-year period.

[15] Higher margins don't increase P/E multiples. Usually it is only earnings growth that increases multiples. A low margin business (if earnings/revenue are growing quickly) could have high multiples (i.e. Amazon). Conversely you could have a high margin business that has low earnings and revenue growth which trades at low multiples (many banks of late remain quite profitable, while having relatively slow revenue growth). That said, businesses with high ROIC and even better, return on incremental invested capital commonly trade with higher multiples. "the higher a company's ROIC, the less cash flow they need to reinvest to achieve a given level of growth." Source: http://archive.is/TGdDi#selection-1017.55-1017.160 ; https://www.investopedia.com/ask/answers/021315/how-do-i-calculate-incremental-return-investment-capital.asp

To get a true projection of earnings growth, we need to look not only at ROIC but how big the opportunity set is (see quotation later in this footnote). A business with an ROIC of 500% is great, but if the market gets saturated when revenues hit $1M, then the opportunities are limited, and valuations will be lower vs. the same 500% ROIC but with a market saturation point at $1 billion. "As I've mentioned before, a company will see its intrinsic value will compound at a rate that roughly equals the product of its ROIC and its reinvestment rate (leaving aside capital allocation, which can increase or decrease value per share as well). **Intrinsic Value Compounding Rate = ROIC x Reinvestment Rate**. There are other factors that can create higher earnings (pricing power is one big example), but

this simple formula is helpful to keep in mind as a rough measure of a firm's compounding ability." Source: http://basehitinvesting.com/calculating-the-return-on-incremental-capital-investments/
"The better the reinvestment opportunities, the higher the reinvestment rate should be. If a company has unlimited opportunities to earn 50% returns, management better be plowing every cent back into the company, and reporting $0 EPS (assuming investments are expensed). Some companies have a high return project, but limited capacity. A new factory may cost $5M, with 50% returns. But the business generates $20M a year… what do you do with the other 15M? Assuming the other 75% is returned, that's only 12.5% growth. Lots of opportunities to deploy capital are just as important as the Return on Invested Capital." Source: https://www.haydencapital.com/wp-content/uploads/COBF_Incremental-ROIC.pdf#page=7
SRCM Commentary: With all this said, no metric can completely predict the future and ROIC (and ROIIC) is far from an exception. Predicating an individual companies' earnings growth 5-10 years out will always be at least partly art, and never 100% science.

[16] Much has been made lately of the fact the dividend yield on stocks has now dropped below the 10 year treasury yield. Many claim that when this happens, it means the market is overvalued. We would disagree. There are two logical errors here: first, the dividends a company pays out does not necessarily reflect its earning strength. As an extreme example, Berkshire Hathaway pays no dividends, yet its earnings remain strong (it retains all its earnings). Are we to assume that whenever the 10-year treasury yield is above 0%, that Berkshire Hathaway is overvalued? Earnings are much more important than dividends. Secondly, dividends have a tendency to rise over time for the S&P 500, almost like a constantly increasing coupon, while the coupon on a 10-year treasury is fixed. Again, it is our view that dividends and yields on treasuries are (usually) not very useful in valuation models (except at extremes, which we don't believe we are at now)

[17] Source: http://thomashawk.wpengine.netdna-cdn.com/BuffettRaikes.pdf

[18] Sources: https://www.yardeni.com/pub/sp500corrbeartables.pdf ; https://finance.yahoo.com/quote/%5EGSPC/history?period1=-315601200&period2=1550725200&interval=1wk&filter=history&frequency=1wk (uses *weekly* historical stock market data from yahoo finance)

[19] Especially when looking at taxable accounts, the hurdle for breaking even can be as high as a 20% - 50% drop in stock prices because of taxes owed when selling. Goldman Sachs explains further: "We acknowledge that current valuations are expensive; in fact, by definition, at the 9th decile they are quite expensive. However, underweighting equities solely based on expensive valuations has been a losing strategy even when valuations have crossed into the 10th decile. The hurdle for underweighting equities is even higher when one incorporates the impact of transaction costs and taxes. For example, equities would have to drop by more than 20% for investors in a high tax bracket to overcome the drag of federal, state and local tax payments if they had invested during the trough of the market in 2009. More realistically, equities would have to drop by more than 15% for such taxpayers if they had invested continuously from 1994 through 2007." Source: https://www.goldmansachs.com/what-we-do/investment-management/private-wealth-management/intellectual-capital/isg-outlook-2014.pdf#page=17

[20] Many say that there are no called strikes in investing. It's our opinion, that most of the time, moving to cash is actually the equivalent of a called strike. Waiting on the sidelines in cash incurs real opportunity costs most of the time, given that the stock market rises about 8-9% a year over the long run. Staying in cash likely means that you'll never get in and will wait forever for the big stock market crash. Of course there are rare times where this is true, however we prefer to err on the side of being fully invested most of the time.

[21] "We acknowledge that current valuations are expensive; in fact, by definition, at the 9th decile they are quite expensive. However, underweighting equities solely based on expensive valuations has been a losing strategy even when valuations have crossed into the 10th decile. The hurdle for underweighting equities is even higher when one incorporates the impact of transaction costs and taxes. For example, equities would have to drop by more than 20% for investors in a high tax bracket to overcome the drag of federal, state and local tax payments if they had invested during the trough of the market in 2009. More realistically, equities would have to drop by more than 15% for such taxpayers if they had invested continuously from 1994 through 2007." Source: https://www.goldmansachs.com/what-we-do/investment-management/private-wealth-management/intellectual-capital/isg-outlook-2014.pdf#page=17

[22] Based on monthly stock prices in Shiller link below. Of course, the higher dividend rate in the past make comparisons to modern day stock collapses, a bit harder. Dividends collected during those 61 years would've eased the pain slightly, but that said, it's still an interesting metric to look at. Source: http://www.econ.yale.edu/~shiller/data/ie_data.xls

[23] Scott Sumner predicts flat yield curves going forward: "If I'm right that the US will achieve its first ever non-inflationary soft landing, then I'd expect a pretty flat yield curve to be the new normal. There'd still be a slight tendency for an upward slope, but not much." Source: https://www.themoneyillusion.com/are-normal-yield-curves-actually-normal

[24] Sumner: "Recessions are really hard to predict, and this is one reason why yield curves don't invert very strongly before recessions. I'm not sure if there is any literature on that" Source: https://www.themoneyillusion.com/lost-in-translation-3/#comment-387309

[25] Being right 51% of the time would work in situations with almost unlimited betting opportunities. However the 10-20 or so recessions we see every century, make 51% too low of a bar

[26] Sources: Stock Data from 1815 to 1925, select "annual series": https://som.yale.edu/faculty-research/our-centers-initiatives/international-center-finance/data/historical-newyork ; Stock Data/Bond Data from 1928 to 2018: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histretSP.html ; Bond data (1815 to 1857: p.41, "The First Eighty Years of the US Bond Market" by Edward F. McQuarrie ; gold data: http://onlygold.com/Info/Historical-Gold-Prices.asp ; bond data (various dates): p. 282, "A History of Interest Rates, 4th Edition" by Sidney Homer ; http://www.econ.yale.edu/~shiller/data/ie_data.xls

[27] Sources: Stock Data from 1815 to 1925, select "annual series": https://som.yale.edu/faculty-research/our-centers-initiatives/international-center-finance/data/historical-newyork ; Stock Data/Bond Data from 1928 to 2018: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histretSP.html ; Bond data (1815 to 1857: p.41, "The First Eighty Years of the US Bond Market" by Edward F. McQuarrie ; gold data: http://onlygold.com/Info/Historical-Gold-Prices.asp ; bond data (various dates): p. 282, "A History of Interest Rates, 4th Edition" by Sidney Homer ; http://www.econ.yale.edu/~shiller/data/ie_data.xls

[28] Treasury bonds are taxable and changes in federal tax rate could affect ERP calculation compared to early times

[29] Source: https://www.taxpolicycenter.org/taxvox/only-about-one-quarter-corporate-stock-owned-taxable-shareholders

[30] A significant amount of sales for the S&P500 comes from outside the US. In theory, if there was rapid population growth in these other countries, then sales and earnings for S&P 500 companies could grow significantly faster than nominal G.D.P. in the United States. However, as we will see in Figure 25, population growth rates around the world are not projected to be significantly higher than in the United States going forwards (higher future population growth rates in India and Africa will tend to be cancelled out by lower growth rates in other areas like Europe, China and Japan).

[31] Uses monthly averages. Sources: https://www.measuringworth.com/datasets/usgdp/ ; http://www.econ.yale.edu/~shiller/data/ie_data.xls

[32] Treasury bonds are taxable and future changes in federal tax rate could affect ERP calculation
Source: http://www.econ.yale.edu/~shiller/data/ie_data.xls

[33] One has to be careful when using the ERP as we define it. In 2009, earnings dropped much more than stock prices, so the E/Y dropped very low (causing the ERP to spike, incorrectly implying that stocks were expensive).
Source: http://www.econ.yale.edu/~shiller/data/ie_data.xls

[34] Note: Growth figures during World War I and World War II are a bit skewed, so some caution should be used when looking at these periods.

[35] Sources: http://www.econ.yale.edu/~shiller/data/ie_data.xls ; https://fred.stlouisfed.org/series/GDP

[36] Source: http://www.themoneyillusion.com/macro-showing-how-nominal-shocks-have-real-effects/

[37] This is a 5% growth target. If by some chance, nominal G.D.P. grew at only 4% for a year or two, then it would need to grow in the 6% range for a year or two in order to get back on trend.

[38] Regarding "long and variable lags" in monetary policy, Fed Chair, Jerome Powell has recently said "The economic effects of our gradual rate increases are uncertain, and may take a year or more to be fully realized''. We disagree and instead think that monetary effects are realized almost instantly. People say inflation takes a while to show up (i.e. if there is a lot of inflation but CB stops printing money now, people say it will take a while for inflation to fall). Vice versa people say that even money printed now won't result in immediate inflation. But look at Montenegro in 1999...the second they adopted the Euro, inflation dropped immediately. There were no "long and variable lags". The market is smart and can sense a central banks intention a mile away. Markets will act immediately, and inflation or deflation shows up right away based on markets expectations of future central bank policy. Before joining the euro in 2002, Montenegro had inflation of 25% or more. By 2004, a short while after it joined the Euro, Montenegro's inflation rate was 0%! Source: https://tradingeconomics.com/montenegro/inflation-cpi ; https://en.wikipedia.org/wiki/Montenegro_and_the_euro

[39] Source: http://www.themoneyillusion.com/an-open-letter-to-conservatives/
[40] Scott Sumner: "The Fed would actually peg the price of NGDP futures (perhaps 1 year or 2 year contracts) at the target level of NGDP. This would be analogous to pegging gold prices under the gold standard. Thus if the Fed wanted NGDP to be 4% higher in one year, they'd offer to buy and sell unlimited NGDP futures contracts at that price." | | "It's essentially like a gold standard, except operating under the working assumption that macroeconomic stability is better provided by NGDP expectations rising smoothly at 4%/year, than by the price of gold stabilized at $35/oz" | | " If you set the NGDP target path low enough the Fed has to buy up much of the economy, as base demand becomes huge". Source: https://www.themoneyillusion.com/fed-policy-is-bankrupt/
[41] Source: https://www.cnbc.com/2018/12/19/heres-what-changed-in-the-december-fed-statement.html
[42] Sumner: "When I advocate something like QE or negative interest on reserves, I often get people complaining that this will not boost bank lending, or that we shouldn't even be trying to boost bank lending. It almost makes me want to tear out my hair. What in the world does banking have to do with monetary policy? Yes, it may or may not boost bank lending, but it doesn't matter, as monetary policy is about the hot potato effect. And yes, the Fed should not be trying to boost lending, any more than it should try to boost sales of microwave ovens. NGDP is what matters." Source: https://www.themoneyillusion.com/monetary-policy-is-not-about-banking/
"The endogenous money crowd often argues that reserves don't constrain bank lending. At the level of individual banks they are correct, although they often draw incorrect conclusions from this observation, especially at the macroeconomic level, where the overall money supply may not be endogenous. For instance, in 1936-37 the base was partly constrained by the size of the monetary gold stock. Nonetheless, it's true that if a bank sees a good loan opportunity, it can make the loan and worry about getting reserves later, perhaps by selling off bonds, or perhaps by borrowing in the fed funds market. " Source: https://www.themoneyillusion.com/why-monetarism-matters/
[43] Scott Sumner: "Here's an example. On January 3rd 2001 the Fed cut it's target rate from 6.5% to 6.0%, which was a bigger cut than expected. Stocks soared 5% on the news. (Even more, as the announcement was not 100% unexpected.) Does anyone seriously think that stock investors give a damn about the fed funds rate over the next 6 weeks? Of course not! Obviously **the market was reacting to the *signal* the Fed was sending about future monetary policy**. The Fed was showing a surprisingly strong determination to mitigate the post-tech bubble slump. We did have a recession, but it was surprisingly mild. Unemployment peaked at a mere 6.3% and we never saw even two consecutive quarters of falling real G.D.P. If you don't believe me, consider the following. While short rates fell slightly, long term bond yields rose dramatically on the news. The income and inflation effects at work. And long term interest rates are presumably of more interest to stock investors. Thus, it wasn't lower rates causing the stock surge, it was higher expected nominal G.D.P. (and real G.D.P.) growth, triggered by expectations of a more expansionary future monetary policy." Source: https://www.themoneyillusion.com/monetary-policy-always-works-for-the-wrong-reason/
[44] We particularly like the anecdotes in the book (pages 6, 253) titled: "The Wisdom of Crowds" by James Surowiecki. Often, averaging the guesses of a large crowd when guessing on say the number of jelly beans in a jar or the weight of an Ox, leads to a very accurate prediction. Indeed, the average is usually much more accurate than any one person. An analogy to the stock market is that the market is usually more right than any one individual, which makes consistently beating the market very difficult. In a similar way, we don't think one person would be able to consistently make money on the NGDP futures market, however the futures market as a whole would be much more accurate than any one individual (including those members of the Fed).
[45] Source: https://fred.stlouisfed.org/graph/?g=kU57
There isn't a perfect correlation but we see that as nominal G.D.P. impulse turns negative (blue line dropping), we see in many cases that unemployment (red line) rises as it did in 1968-1970, 1973-1975, 1979-1982, and 1990-1992. There is a bit of delay in employment being affected. Usually unemployment peaks a bit after the worst parts of a recession/stock low . Q4 2009 saw the peak unemployment rate in the Financial crisis, but the worst part of recession was when nominal G.D.P. turned negative from late 2008 through Q2 2009). So unemployment peaked a few quarters AFTER the worst of the Great Recession. We see this delay in the charts below as well, with the red line peaking a bit after the biggest drop in blue line. | | Expanding on unemployment, while it has been low lately, the employment ratio is still very low (many who are not working are not classified as unemployed). That said, it still possible these people could eventually come back into the work force. This could have a mildly depressing effect on wages (keeping wages lower than would otherwise be implied by the low unemployment rate). That said, as we explained in our 2017 Annual Letter, we are very skeptical of any long-term relationship between unemployment and inflation (i.e. we aren't huge proponents of the Philips Curve). | | To further discredit the Philips curve, we note that Japanese unemployment has fallen steadily from a interim peak of 5.7% in 2009 to low of 2.3%

in 2018. Yet during this same time frame, counter to what the Philips curve would imply, inflation has remained relatively muted (rising only slightly from -0.5% in 2009 to 0.5% in 2018) Source: https://fred.stlouisfed.org/graph/?g=mNGz

[46] Source: https://fred.stlouisfed.org/series/GDP

[47] Regarding the EU: the ECB can only buy 1/3 of any one countries' outstanding bonds. This is a handcuff the ECB has given itself. The market knows that the ECB is not serious about doing "whatever it takes". Whatever it takes, would be the ECB saying, "we will buy 100% of any countries bonds, then (if inflation and NGDP growth is still low) we will move to buying individual stocks, etc. if needed". The market knows the ECB won't do this and is calling the ECB's blue. As a result, most ECB actions are neutralized and more ineffective than they otherwise would be. Reference: Page 589 in "EuroTragedy: A Drama in Nine Acts" by Ashoka Mody. | | Further SRCM commentary: No wonder the ECB had a lackluster recovery. The ECB only had an inflation target (not unemployment target) before 2015. "The European Central Bank's charter does not prohibit it from taking unemployment and other factors into consideration when setting interest rates. But unlike the Fed, which has a broad mandate to fight inflation, contain unemployment and ensure moderate borrowing costs, the European Central Bank is required to make price stability its top priority, incorporating other concerns only if they do not interfere with the prime directive. Mario Draghi, the president of the central bank, has sidestepped that restraint by arguing that the bank could not guarantee price stability unless it considered joblessness and other issues, like the state of the banking system." | | "'his mandate is always the same, namely price stability in the euro area," he said. "But the instruments had to change.' All of the major central banks expanded their monetary policy arsenals after the financial crisis. In March, the European Central Bank followed a precedent set by the Fed and began buying tens of billions of euros worth of government bonds, a form of money printing intended to raise inflation closer to the official target of nearly 2 percent and stimulate the eurozone economy." Source: https://www.nytimes.com/2015/05/25/business/international/european-central-bank-expands-mandate-as-it-struggles-to-keep-zone-intact.html

[48] Scott Sumner: "The bottom line is that **nominal G.D.P. doesn't matter very much if wages are flexible. If they are sticky (and they are) it becomes all-important**." Source: https://www.themoneyillusion.com/an-argument-against-overabundance-and-for-a-progressive-consumption-tax/

SRCM Commentary: we'd add that during a recession, firms could in theory, cut nominal wages and not have to fire anyone. But partially **because of sticky wages (and the money illusion)**, firms instead choose to lay off some works and keep the nominal wages of the remaining works flat or close to flat. If wages were cut across the board, instead of laying people off, it's possible that unemployment could remain low even when NGDP growth goes negative as it did in 2008. In theory this is possible, but again, because of sticky wages, this is unlikely in practice. Instead, the much more likely scenario is that a number of people are laid off and unemployment rises when NGDP falls.

[49] Diving deep into productivity numbers: real G.D.P. per working age adult (15-64) has rise by 1.066% per year since 2008. Real G.D.P. per actual usually employed full time person has risen by 1.089% per year since 2008. Real G.D.P. per hours worked by full-time and part-time employees, has risen by 0.89% per year since 2008. It remains to be seen whether these numbers will stay this low going forward. For Source see links above for each individual percentage.

[50] Ignoring sticky wages, it's possible for real G.D.P. to grow at the steady state of 2.25% under nominal G.D.P. targets of say -3%, 0%, 5% or even 10% (above 10% and we'd worry about the corrosive effects of inflation). In practice, sticky wages would make both the -3% and 0% nominal G.D.P. targets difficult (but its possible workers would adjust). If workers did adjust to nominal wage cuts (but real wage raises), then real G.D.P. growth could be +2.25%, while nominal G.D.P. grew at -3%. The main thing is for the nominal G.D.P. *impulse* (2nd derivative of nominal G.D.P.) to be set to 0% (i.e. flat, non-volatile growth rate of nominal G.D.P.). As an example, in the 1896 election, McKinley (a hard money advocate) defeated Bryan (who wanted more inflation and was arguing against the gold standard) and therefore ushered it what seemed to be an error or harder money and lower nominal growth. Many were voting for Bryan, and while he didn't win, it shows some of the difficulties that can arise from low growth economy. Surprisingly, right after the election, gold was discovered in Alaska. The gold supply more than doubled from 1890 to 1914. Source: Kindle location 7745, "Morgan: American Financier" by Jean Strouse

*Regarding the gold supply, George Selgin has some good information on why a more deflationary currency such as gold, may not have been the prime driver behind the many financial crisis that occurred during the gold standard era: "More than any other factor, *unit banking* made the U.S. economy vulnerable to panics. It limited banks' opportunities for diversifying their assets and liabilities. It made coordinated responses to panics more difficult.

Finally, it forced banks to rely heavily on correspondent banks for out-of-town collections, and to maintain balances with them for that purpose. Correspondent banking, in turn, contributed to the "pyramiding" of bank reserves: country banks kept interest-bearing accounts with Midwestern city correspondents, sending their surplus funds there during the off season. Midwestern city correspondents, in turn, kept funds with New York correspondents, and especially with the handful of banks that dominated New York's money market. Those banks, finally, lent the money they received from interior banks to stockbrokers at call." | | "the panic of 1907 demonstrated the evils inherent in the concentration of reserve funds in New York City." | | "*Nationwide branch banking, by permitting one and the same bank to operate both in the countryside and in New York, would have avoided this dependence of the entire system on a handful of New York banks, as well as the periodic scramble for legal tender and ensuing market turmoil*." Sources: https://www.cato.org/publications/policy-analysis/new-yorks-bank-national-monetary-commission-founding-fed ; https://twitter.com/GeorgeSelgin/status/1090955660102111232

[51] Source: https://fred.stlouisfed.org/graph/?g=n3Yw

[52] Many people want to maintain stable prices. While a decent goal, we'd instead argue for stable spending growth rates. This allows us to absorb supply shocks (and demand shocks). If the oil supply is suddenly cut off, this could put upward pressure on prices, but the Fed should not act on this non-monetary imbalance. Instead the Fed should keep nominal G.D.P. growing at 5% which will dampen many of the adverse effects from the rise in oil prices.

[53] "In my view the two views can only be reconciled if we stop viewing easy and tight money as points along a line, but rather as multidimensional variables: Monetary policy stance = S(level, rate). A change in monetary policy reflects a change in one or both of these components of the S function. You can have a rise in the price level, but no change in the trend rate of inflation. You can have a rise in the trend rate of inflation, with no change in the current (flexible price) equilibrium price level. The beauty of the thought experiment with the yen is that it makes it much easier to see this distinction. You can imagine once and for all change in the exchange rate, as when the dollar went from $20.67 an ounce to $35.00 an ounce in 1933, and then stayed there for decades. Or you can imagine a change in the trend rate of the exchange rate, as in my crawling peg example. Or you can imagine both occurring at once." Source: https://www.themoneyillusion.com/neo-fisherism-missing-markets-and-the-identification-problem/

[54] In addition, we'd argue that populist leaders commonly are elected when deflation is present and growth is sluggish. We can see the rise of populists in Europe, the U.S. etc. Even Hitler was not elected during the inflationary period in German history, but instead elected under a *deflationary* environment. Setting a nominal G.D.P. target could minimize the negative effects (and likelihood) of populists getting elected.

[55] Many have noted that real interest rates were higher in the past. This is true, but population growth was higher in the past as well, so real G.D.P. was higher. Therefore, just as nominal interest rates correlate to nominal G.D.P., so do real interest rates correlate with real G.D.P. If real G.D.P. goes from 10% to 2% we'd expect real interest rates to fall as well. Saying "real interest rates were 10% in the past, so they will get back to 10% soon" seems unlikely to be true if real G.D.P. has since dropped from 10% to 2% over a similar time frame.

[56] In our opinion there was considerable errors made by the Fed in the was huge incompetence at the fed in the 1970s. Arthur Burns was Fed chair from 1970 to 1978 and was then followed by Fed Chair William Miller. Miller thought inflation was not under his control and that it was due to other, non-monetary factors. It's hard to imagine the current Fed being so blind to the causes of inflation, if it were ever to start rising (however this may be wishful thinking on our part, as many are still confused by the outsized impact of the deflationary forces we've seen in the last decade). Ed Yardeni explains further on Page 298, "Predicting the Markets" by Ed Yardeni. | | Milton Friedman: "I agree that there are social costs of anti-inflation measures, but I would say they are more properly described as a social cost of having started on the inflation. Once you are sick it is likely to be painful to cure yourself and it is likely to be even more painful not to cure yourself. And that, as I see it, is our situation. Once you have inflation it is certainly going to be painful to cure it. There is no way of stopping an inflation that I know of, or any body knows of, which will not involve a temporary period of relatively high unemployment and relatively low output. That is certainly true. But there is no way of continuing an inflation which will not involve an even longer period of high unemployment and low output. So I do not believe that you really can put it in terms of relative costs of unemployment and inflation any longer." Source: https://miltonfriedman.hoover.org/friedman_images/Collections/2016c21/1975australia.pdf#page=25

[57] "By some accounts, Arthur Burns poured gasoline on inflation, while G. William Miller lit the match. Miller succeeded Burns as Fed chairman on March 8, 1978 but served only 17 months, until August 6, 1979. Inflation was accelerating. Miller remained eerily laid back, believing that the inflation spiral was a transient phenomenon, so he opposed raising interest rates." | | "The situation only got worse after he gave several interviews the day before the

April 1979 FOMC meeting, expressing his view that there was no need to raise interest rates. Press leaks revealed that Miller's dovish stance against inflation was opposed by key administration officials who wanted the Fed to raise interest rates, including Treasury Secretary W. Michael Blumenthal and Charles Schultze, the chairman of the CEA. In any event, during Miller's brief tenure, the federal funds rate rose from 6.72% to 10.72%." Source: Page 297, "Predicting the Markets" by Ed Yardeni

[58] Milton Friedman on the benefits of inflation (to politicians), are not long lasting: "A fourth effect, when and if it becomes operative, will go even farther, and definitely mean that a higher rate of monetary expansion will correspond to a higher, not lower, level of interest rates than would otherwise have prevailed. Let the higher rate of monetary growth produce rising prices, and let the public come to expect that prices will continue to rise. Borrowers will then be willing to pay and lenders will then demand higher interest rates—as Irving Fisher pointed out decades ago. This price expectation effect is slow to develop and also slow to disappear. Fisher estimated that it took several decades for a full adjustment and more recent work is consistent with his estimates. These subsequent effects explain why every attempt to keep interest rates at a low level has forced the monetary authority to engage in successively larger and larger open market purchases. They explain why, historically, high and rising nominal interest rates have been associated with rapid growth in the quantity of money, as in Brazil or Chile or in the United States in recent years, and why low and falling interest rates have been associated with slow growth in the quantity of money, as in Switzerland now or in the United States from 1929 to 1933. As an empirical matter, low interest rates are a sign that monetary policy has been tight—in the sense that the quantity of money has grown slowly; high interest rates are a sign that monetary policy has been easy—in the sense that the quantity of money has grown rapidly. The broadest facts of experience run in precisely the opposite direction from that which the financial community and academic economists have all generally taken for granted." Source: https://miltonfriedman.hoover.org/friedman_images/Collections/2016c21/AEA-AER_03_01_1968.pdf#page=5
SRCM Commentary: We'd argue that, in theory, inflation will can always be somewhat beneficial to politicians. As a simple example, imagine a govt with no central bank (only a treasury). No taxes are collected either, and all government expenditures (assume size of government is equal to 20% of G.D.P.) are paid for entirely with new money. In this case, even though the market knows that the money supply will grow at 20% a year, the politicians still get to decide who is the first to receive that new money, so will still benefit indefinitely, at least to some degree. Hyperinflation need not be the end result. 20% annual inflation indefinitely is, at least technically, possible. The government in this simple example, would have no debt either.

[59] In general, the Fed leaned toward rescuing specific institutions and printed whatever money those institutions needed. In order to keep a lid on inflation, the Fed began paying interest on reserves which counteracted much from the pure monetary stimulus one would expect from such a large increase in the monetary base. If no IOR had been paid, inflation would likely have been higher. Some argue that the Fed should focus solely on the monetary stimulus aspects and ignore the bad banks. They argue for printing enough money to keep nominal G.D.P. on a 5% trend, but don't worry much about or trying to rescue specific institutions. We are somewhere in between but would like to see a bit less on the IOR front in order to let the monetary stimulus truly do its work (more so back before 2016 when the economy was relatively more depressed). While we share the anger at some bank CEOs who took one sided bets that they couldn't lose (i.e. government bails them out if their bets turn belly up, but pocket the upside if these bets work out), we'd like to argue that punishing the banks for these sins can also lead to problems. While we'd like CEO compensation to be changed to include more claw backs, etc., it's important to note that "sticking it to the banks themselves" and letting the banks go bankrupt will likely hurt main street as well. It's difficult to let the major banks all go bankrupt without it affecting the average family on main street. That said, we'd view keeping nominal G.D.P. on a 5% path as much more important than "too big to fail" issues (though they are somewhat intertwined, as keeping nominal G.D.P. on a steady growth path leads to less bank failures). While banks failing in 2009 certainly caused problems, the bigger issue in our mind was that nominal G.D.P. fell at least 10% below trend. Nominal G.D.P. actually contracted at 3% a year in 2009.

[60] It should be noted that Jimmy Carter appointed Paul Volcker. Usually Volker and Ronald Reagan get the credit, but surely some credit goes to Jimmy Carter for appointing Volcker. Source: Page 13, "Predicting the Markets" by Ed Yardeni

[61] Scott Sumner: "As always, monetary policy is 98% expectations, and 2% concrete steps. What are those expectations about? They are about future concrete steps, i.e. future changes in the supply of base money, relative to changes in the demand for base money." Source: https://www.themoneyillusion.com/josh-hendrickson-on-the-problem-with-moneyless-nk-models/

[62] Scott Sumner: "So the current path of inflation is very heavily influenced by expectations. But expectations must be about something and, in this case, they are about future changes in the monetary base (and future changes in the demand for base money.) If we ignore expectations, then we can say the "hot potato effect" drives the long run relationship between changes in the money supply and changes in the price level. Once we bring expectations into the picture, then it's the expected future hot potato effect that mostly explains current inflation." Source: http://www.themoneyillusion.com/money-and-inflation-part-5-its-almost-all-about-expectations/
"The best way to study monetary economics is to first focus on the **hot potato effect** in order to understand why monetary policy impacts nominal aggregates in the long run. Then study the **musical chairs effect** to understand why shocks to nominal aggregates impact employment and output in the short run. The reaction of asset prices to monetary policy (while important) is a distraction that does more to confuse than illuminate for a student first trying to understand monetary economics. It's the icing on the cake." | | "To summarize the entire model:

1. M —> nominal G.D.P. (hot potato)
2. nominal G.D.P. —> real G.D.P. (musical chairs)
3. M and nominal G.D.P. and real G.D.P. all affect real asset prices (liquidity effect, inflation effect, real income effect)
4. Asset prices also affect nominal G.D.P."

Source: http://www.themoneyillusion.com/money-and-asset-prices-the-liquidity-effect-as-epiphenomenon/
SRCM commentary: We should also note that velocity tends to call the Fed's bluff in both inflationary and deflationary environments. As we mentioned in our 2017 Annual Letter, while velocity can't rise or fall in one direction forever, it is possible for velocity to operate in a quite a wide band. Many times, when inflation gets its start with the monetary base growing above trend. From there, the market slowly realizes this trend and begins to spend money more rapidly, increasing velocity, with economic actors treating money like a hot potato in the expectation of future inflation. This rise in velocity acts as a multiplier effect on the monetary base increase and increases inflation above and beyond what would be implied if one is just looking at the increase in MB. Conversely, during a period of deflation, initially the MB *supply* may not increase enough to match the change in *demand* for money (causing velocity to drop). However, this *drop* in velocity can also have a multiplying effect, making the deflation worse than would be implied when looking only at MB. As economic actors begin to expect deflation, they begin to hoard money, which depresses velocity and can lead to a deflationary spiral. It's important to note, that a central bank can overcome any of these scenarios, but it requires significant action. As velocity either increases (during inflation) or decreases (during deflations) it simply requires the central bank to be more aggressive and clearer on its absolute intentions to do whatever it takes to bring inflation/deflation back to normal.
[63] Scott Sumner believes the Fed will do better in the next recession: "I don't think he would have been as effective as Bernanke. But we've learned a lot since 2008, and it's quite likely that either Bernanke or Powell would be more effective in the next recession than the Fed was in 2008." Source: http://www.themoneyillusion.com/the-moment-of-maximum-danger/#comment-4294714
[64] While some efforts have been made to create a market to forecast nominal G.D.P., most of these markets (like Hypermind) only predict 2 years out at the most. Our ideal forecasting market would forecast nominal G.D.P. growth for the next 3, 4 or 5 years, in order to smooth out any one time anomalies in nominal G.D.P. growth such as we saw in 2018 as a result of the tax stimulus. Nominal G.D.P. grew around 5% in 2018 but it remains unclear if this pace will be kept up, or if nominal G.D.P. growth will drop to below 4% after tax cuts, etc. are factored in.
[65] Scott Sumner: "My prediction is that the Fed will not immediately switch to nominal G.D.P. targeting. Rather when we are about to enter the next recession, the Fed will use nominal G.D.P.LT as a temporary expedient to create more stabilizing expectations, citing the research of Michael Woodford and others. When and if it is successful, they will quietly forget about the old inflation-targeting regime, and we'll be in a new world of nominal G.D.P. targeting. And then I can finally retire and read all those novels piling up on my shelf . . . Thank God!" Source: https://www.econlib.org/tate-lacey-sees-hints-of-ngdp-targeting-in-powells-remarks/
[66] Not only is inflation difficult to measure, unemployment can only be measured by looking backwards, whereas a nominal G.D.P. futures market would be real time and even forward looking. Furthermore, nominal G.D.P. incorporates both inflation and unemployment in one metric. Scott Sumner explains further: "This episode illustrates the danger of basing Fed policy on estimates of the natural rate of unemployment (Un). The Fed cannot accurately estimate the natural rate in real time, and hence it's an exceedingly poor guide to policymakers. The lesson is not "next time do a better job estimating unemployment", it's "stop trying to estimate unemployment, and start focusing on variables than you can measure, like nominal G.D.P." Under nominal G.D.P. level targeting, there is no need to even measure the unemployment rate—it plays no role in monetary policymaking. Unfortunately, the

Fed is forced to rely on natural rate estimates as long as it targets inflation under a dual mandate approach, as the unemployment rate helps it to determine how much "catch-up" they need to do after a policy miss. One of the advantages of nominal G.D.P.LT is that the Fed is no longer forced to try to do the impossible—estimate unemployment." Source: https://www.themoneyillusion.com/beckworth-interviews-ozimek/
"The inflation targeting approach favored by new Keynesians doesn't work well today because inflation is no longer closely correlated with output gaps. In contrast, NGDP is closely correlated with output gaps, and hence central banks should target NGDP, not inflation." Source: https://www.themoneyillusion.com/the-phillips-curve-and-interest-rate-targeting-are-dead-what-next/

[67] Source: https://youtu.be/eFKBUbj_-6Y
SRCM Commentary: Also inflation and M2 are slowing in early 2019, so we aren't too worried about inflation.

[68] Japan has run huge fiscal deficits since 1990 (which has caused total debt to balloon) and yet inflation remains low. Any deficits they have had have not been financed with permanent money printing. Furthermore, Japan has had low unemployment for the past few years (2.5% recently) and yet inflation remains low (further disproving the Phillips curve)

[69] We'd disagree with Ray Dalio's recent claim that monetary policy has limits. In practice, monetary policy can cause unlimited growth, and we are no where near "out of bullets" regarding monetary policy. Source: January 2019, Bloomberg video: "Dalio, Weber on Rethinking Global Financial Risk: Davos Panel" (8m45s to 9m50s) https://www.youtube.com/watch?v=jGNDxvkOpZs

[70] The typical way to stoke growth via fiscal policy is to run large deficits, issue a ton of bonds and have the Fed hopefully buy those bonds (assuming the Fed cooperates. If they don't buy the bonds, then those bonds won't stoke much growth and could potentially mean the treasury would default). Fiscal policy involves the potential of wasteful public spending in the name of stoking growth (i.e. "let's build a bridge to nowhere, at the very least it will create jobs" or "let's have the US govt pay a bunch of folks dig ditches and then fill them up again, at least they'll be working"). Conversely, monetary policy involves the Fed increasing its balance sheet and simultaneously injecting reserves into the economy. Money is injected into the economy and, like water in a bunch of cracks, usually finds the most efficient paths and is allocated with relatively little waste. Counter to most claims that monetary policy is wasteful and enriches bankers, monetary policy is the most equitable way to stoke growth and helps all classes of society (as we outlined earlier, it even helps low income workers more than the rich, as higher growth, while increasing earnings, also decreases stock multiples)
Scott Sumner: "I favor the Fed directly interacting with bond dealers, not banks. It actually doesn't matter very much how money is injected, as long as it isn't highly wasteful, such as buying real goods or highly risky assets.'" Source: https://www.themoneyillusion.com/second-reply-to-david-andolfatto/#comment-273730

[71] We think the money at Fed may be left to expire and rolled off. Many say "isn't that permanent money?". Yes, it's permeant but we should clarify that it's permanent money ABOVE trend that really matters if you want to cause a rise in inflation. Assume MB grows at 6% per year. In order to see a rise in inflation you'd have to print permanent money *above* that 6% trend. In the case of QE, the Fed simply printed 10 years' worth of money immediately, however the amount of money in 20 years will be the same with or without QE and hence we aren't permanently above the inflation trend. The Fed front loaded the money printing, but didn't permanently raise the long term trend in MB so inflation remains low.

[72] Sources: https://fred.stlouisfed.org/series/GDP ;
https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal) ;
https://en.wikipedia.org/wiki/Historical_GDP_of_China ; https://fred.stlouisfed.org/series/JPNNGDP ;
https://fred.stlouisfed.org/series/CPMNACSCAB1GQEU28 ; https://fred.stlouisfed.org/series/UKNGDP ;
https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=CN-JP-GB-US-EU

[73] Other interesting graphs at the following website: http://www.singularity.com/charts/page70.html ;
https://learn.genetics.utah.edu/content/precision/time/

[74] Scott Sumner: "Raising interest rates reduces the Wicksellian equilibrium interest rate. That gives the Fed less room to cut rates in the future. The Fed does monetary stimulus by cutting rates below the equilibrium rate. The lower the equilibrium rate, the less room there is to use conventional monetary stimulus." Source:
http://www.themoneyillusion.com/martin-feldstein-on-fed-policy/

[75] Japan has a significant portion of its population on the state pension which pays out fixed amounts. This may put political pressure on the BOJ to keep inflation low (a higher inflation rate could hurt pensioners). That said, when there are hints of Japan doing permanent money printing, stocks tend to rise: "Japanese equities rallied 48% during

the four months that followed a speech of Shinzo Abe's (then only a candidate for prime minister) in November 2012 calling for the BOJ to deliver unlimited monetary easing. Likewise, Japanese equities returned 24% over the month and a half following the actual announcement of quantitative easing by the BOJ in April 2013." Source: https://www.goldmansachs.com/what-we-do/investment-management/private-wealth-management/intellectual-capital/isg-outlook-2015.pdf#page=60

[76] Despite inflation of only 1% and low bond yields, the BOJ Governor, Haruhiko Kuroda, showed a lack of commitment to truly stoking growth and inflation when he recently said, "Japan's economic activity and prices are no longer in a situation where decisively implementing a large-scale policy to overcome deflation was judged as the most appropriate policy conduct, as was the case before". Source: https://www.marketwatch.com/story/bank-of-japans-kuroda-says-large-scale-monetary-easing-no-longer-the-best-policy-2018-11-04

[77] Under the current monetary regime (i.e. not nominal G.D.P. futures), of course a central bank should target and even lower *short-term rates* to ease policy. The mistake comes when the bank tries the same low target on longer term rates which are much more forward looking. Setting the *short-term rate* at 0% may not bake in low growth expectations going forward, since the short rate isn't influenced by long term monetary policy expectations. But setting the *long-term rate* at 0% risks having the central bank create a self-fulfilling prophecy of low growth many years into the future.

Scott Sumner: "What do you think would happen if the Fed pegged gold prices at $100,000/oz at the zero bound? Obviously we'd get immediate hyperinflation. On the other hand, promising zero interest rates forever might lead to expectations of a Japanese-style malaise. The only way your claim would make sense is if nominal interest rates were the only transmission mechanism for monetary policy. But Mishkin's textbook lists something like 10 mechanisms, and he missed a whole bunch" | | "In the real world monetary policy obviously does affect the natural interest rate, because it affects the business cycle. The bottom line is that while any policy I propose is consistent with a certain path of interest rates over time, there is almost no chance that the central bank could discover that path, without targeting something else, like NGDP futures prices. If they try to target rates directly, they may do OK at positive rates (via the Taylor Principle), but they'll fail miserably at the zero bound, because the future interest rate commitments they would need to make are far to complicated to model. The market can't tell whether a promise of zero rates forever is easy money or promising to be like Japan. At that point you need to switch to something else, such as exchange rates or NGDP futures targeting. Or even QE" Source: https://www.themoneyillusion.com/seeing-lu-mountain/

[78] Scott Sumner: "1) Interest rates are not a reliable indicator of monetary policy. I've said that 100 times. 2) nominal G.D.P. growth is a reliable indicator of monetary policy. I've said that 100 times. 3) Long term nominal interest rates are strongly correlated with both the growth rate of nominal G.D.P., and the level of nominal G.D.P. relative to trend. I also make this point quite often. So if nominal G.D.P. is reliable, and long term rates are strongly correlated with nominal G.D.P., why are they not reliable? Because other factors also affect long term rates. Trends in global savings/investment, etc. Still, long term rates are often a good indicator of whether money has been tight." Source: http://www.themoneyillusion.com/further-comments-on-interest-rates-and-monetary-policy/

[79] Scott Sumner: "An interest rate peg can lead to hyperinflation or hyper-deflation precisely because it can lead to upward or downward spirals in the monetary base" Source: https://www.themoneyillusion.com/john-cochrane-on-the-stability-of-interest-rate-pegging/

"Interest rates are the opportunity cost of holding cash" Source: https://www.themoneyillusion.com/yes-interest-rates-really-do-impact-the-demand-for-money/

[80] Commonly referred to as the Wicksellian Natural Rate of Interest

[81] Many claim the 0% interest rates were "free money", yet never mention the corresponding growth rate of the economy. In a sense, there is more "free money" floating around if 1) interest rates are at 5% but economic growth is at 10% vs. say 2) interest rates are at 0% but economic growth is at -5%.

[82] If printing money reduces unemployment from 20% to 3%, then the growth in real G.D.P. could outweigh any growth in the money supply. In this way, printing money could *increase* interest rates. That said, if unemployment is at 3%, it's much less likely that a huge increase in the money supply will help increase real G.D.P., as there already isn't much slack in the economy with such a low unemployment rate.

[83] Rising rates doesn't necessarily mean tight monetary policy either. If the economy grows faster than rates are rising, then it's possible that rates may not be rising fast enough, and as a result, despite the rising rates trend, policy may be too easy.

[84] Source: FOMC Press Conference December 19, 2018

[85] Confusion can arise as a result of the technical mechanisms of money printing. To clarify out thinking, imagine a world were money was simply handed out to citizen. There was no middle step of a bank buying bonds in exchange for reserves (as happens now under the current regime of OMO-Open Market operations). Instead, let's assume that $500 was printed and handed to each person every year. Money would clearly get out into the system and there would be no direct effect on interest rates since the government doesn't need to buy or sell any bonds in order to maintain the money in circulation. Over time of course, other bonds such as corporate bonds, government bonds etc. would certainly be subject, in an indirect way, to how much money was handed out to the citizens, but again there would be no direct link as exists under OMO. We hope that by looking at that non OMO example, it becomes clear that the direct downward pressure on yields during OMO plays a very minor role on yields when compared to the effect that future growth expectations have on yields. Imagining a world without open market operations (and instead directly handing money to citizens – i.e. only a treasury with no debt and no central bank) makes this link between future growth expectations and yields all the more clear.
Scott Sumner: "Low real interest rates are not a problem, they are simply a market outcome." Source: https://www.themoneyillusion.com/the-global-shift-to-services-and-high-tech/
[86] That said, policy during the 2008-2009 period could certainly have been worse. We liked George Bushes quote of: "If we're really looking at another Great Depression," he recalls saying, "you can be damn sure I'm going to be Roosevelt, not Hoover" Source: http://www.washingtonpost.com/wp-dyn/content/article/2010/11/10/AR2010111006303.html?noredirect=on
[87] Scott Sumner: "I don't care if currency is only 1% of all financial assets. Give me control of the stock of currency, and I can drive the nominal economy and also impact the business cycle. Cut the value of currency by 90% via OMOs, and you will raise the nominal G.D.P. 10-fold, and prices 10-fold, and wages 10-fold, and the nominal stock of all assets by 10-fold." Source: https://www.themoneyillusion.com/what-is-money-what-is-inflation/
SRCM commentary: Regarding banks not lending at the zero lower bound, a few things could be done, starting with adjusting IOR rate, possibly making it negative, so that banks are incentivized to lend more. Furthermore, since banks must predict the rate of economic growth, setting and following through on a nominal G.D.P. target would induce banks to lend more at a given interest rate. Making nominal G.D.P. growth stable allows banks to better predict the future value of their loans. Banks adjust their interest rates based on future economic growth (among other factors). If they aren't lending, it's because rates are too high relative to future growth prospects. To increase lending, you must either increase growth prospects (which a nominal G.D.P. target does well) or reduce rates or some combination of the two. Especially in Europe, where rates are already low, we think increasing growth prospects is the preferred route to take. Blaming the banks for a lack of borrowing is futile in our opinion.
[88] Scott Sumner: "Promising zero rates as far as the eye can see is like promising failure for as far as the eye can see, because zero rates occur in depressed economies." Source: http://www.themoneyillusion.com/beautiful-models-and-inconvenient-facts/
Sumner in February 2013: "For the year, Bullard predicted gross domestic product (GDP) growth at 3.0 percent. It's not going to happen. Ironically one of the reasons it's not going to happen is because James Bullard thinks it is going to happen." Source: https://www.themoneyillusion.com/thats-not-your-job-mr-bullard/
SRCM commentary: In addition, the ECB constantly revising down growth forecasts is a bit like saying "I'm likely only going to the gym 5 times this year". It's fine to forecast it, but the very fact of saying it could cement in the low expectations. Saying something like "I'm going to the gym three times a week" would be much better, especially since you can control it. Similarly, the ECB can control growth. They can get higher growth if they want it, so forecasting lower growth and then complaining about lower growth is perplexing and self-perpetuating.
*The Fed Chair, in December 2018 Press Conference (at 4:10), oddly states that the Fed will "continue gradually withdrawing the extraordinary support for the economy that had been in place for almost 10 years". The belief that policy has been easy, when both inflation and nominal G.D.P. have been well below trend, shows a fundamental misunderstanding of the monetary policy transmission mechanisms. Source: https://www.youtube.com/watch?v=e_t-CuKEAhA&t=250
[89] Source: http://www.themoneyillusion.com/in-economics-price-changes-dont-have-any-effect-they-are-effects/
[90] Scott Sumner expands on the transmission mechanism of monetary policy: "I don't use the traditional money multiplier approach, which is the MB causes M2 which causes nominal G.D.P.. My view is that long run expected changes in MB cause long run expected changes in nominal G.D.P., which causes current nominal G.D.P., which causes current M2. So there is some endogenous money in my view". Source: http://www.themoneyillusion.com/no-we-cant/

"Thus the entire "endogenous money" issue is often misunderstood. It doesn't mean that money growth is unimportant; it just means that if you are targeting something other than money, then money growth is determined by your target. In other words, don't say, "money growth didn't cause X, as it's endogenous". Your interest rate, or exchange rate, or inflation target caused money growth to cause X. Money growth is still the "real thing", even if you don't see it in sophisticated models by Michael Woodford." Source: https://www.themoneyillusion.com/endogenous-money-and-the-qtm-4/

[91] Source: https://www.themoneyillusion.com/monetary-policy-always-works-for-the-wrong-reason/

[92] Source: https://www.measuringworth.com/datasets/usgdp/

[93] Note: Some data points are smoothed and uses Split Rock Capital Management estimates. Sources: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD ; http://www.nationmaster.com/country-info/stats/Economy/GDP-per-capita-in-1820# ; https://www.measuringworth.com/ ; https://en.wikipedia.org/wiki/List_of_regions_by_past_GDP_(PPP)_per_capita ; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JP-SG-US-GB-CN-KR-IN-FR-DE ; http://www.nationmaster.com/country-info/stats/Economy/GDP-per-capita-in-1820# ; https://en.wikipedia.org/wiki/List_of_regions_by_past_GDP_(PPP)_per_capita#1%E2%80%932008_(Maddison)

[94] Much has been written on why some countries have gotten richer than others in the past 300 years. We are certainly no experts on the matter, but find the ideas of Jared Diamond, in his book "Guns, Germs and Steel", to be interesting. In addition, Paul Kennedy, in his book "The Rise of Fall of Great Power" also presents some thought-provoking ideas. Finally, in his books "The Accidental Superpower" and "The Absent Superpower", Peter Zeihan summarizes some the geographic advantages that the United States has been blessed with. We summarize some of their thoughts below, noting that we don't necessarily agree with all the below ideas, but find them worth noting:

"Farming and domesticating animals provide social stability that is lacking in hunter-gatherer societies. Labor specialization enables certain groups to develop weapons. Major portions of Eurasia had a natural advantage in developing agriculture and domesticating animals because of geography and the presence of plants and animals that could be easily domesticated. The landmass of Eurasia, laid out on an east-west axis, allowed for the sharing of crops, animals, and ideas. The Americas, stretched out on a north-south axis, traverse various climate zones and geographic boundaries that discourage trade. The diversity and density of Eurasian populations created an immunity to germs that would later wipe out the more isolated populations of the Americas." Source: http://archive.is/a8zFA

"People domesticated fourteen large mammals before A.D. 1900. Diamond calls these animals the Ancient Fourteen, and he considers them the most important domestic animals because many of them pulled plows, provided transport, gave milk, and so on. || None of the Ancient Fourteen come from North America, Australia, or Sub-Saharan Africa. One comes from South America, and thirteen come from Eurasia." Source: http://archive.is/cbeGh

"Continents that are spread out in an east-west direction, such as Eurasia, had a developmental advantage because of the ease with which crops, animals, ideas and technologies could spread between areas of similar latitude. Continents that spread out in a north-south direction, such as the Americas, had an inherent climatic disadvantage. Any crops, animals, ideas and technologies had to travel through dramatically changing climatic conditions to spread from one extreme to the other. Technologies such as gunpowder were able to migrate 6,500 thousand miles from China, where they originated, to Western Europe, where they reached their apogee, in a matter of centuries. The wheel, on the other hand, developed in southern Mexico, never even managed the 500-mile journey south to the Andes." Source: http://archive.is/cVaCC

"Some have argued that coastlines, mountains and valleys may help us understand something as fundamental as the differing historical paths taken by Europe and China. Chinese civilization was founded on the domestication of irrigation-dependent crops. Rice grows in the wild along riverbanks and in swampy regions where the grasses enjoy year-round partial submersion. In order to replicate this environment, the earliest Chinese farmers had to construct fairly complex systems of irrigation, supplied by the Yangtze and Yellow rivers. This, it is argued, influenced the development of two social phenomena. First, the establishment of a central social organization and hierarchy, founded upon the construction and maintenance of irrigation networks. Second, because of the geographic distribution of the Yellow and Yangtze rivers – flowing almost parallel to one another, from central China to the pacific coast – Chinese civilization grew organically outwards, from one central-east heartland – a heartland which controlled the mechanics of irrigation. European civilization, on the other hand, was founded upon the domestication of rainfall-dependent crops – wheat and barley, which will grow anywhere, as long as it rains for part of the year. This, Diamond argues, allowed farming communities, villages, towns and eventually cities to emerge autonomously, all across Europe. There was never any need for a central authority to control irrigation across the continent. Instead,

from its very inception, European society was destined to become fragmented – independent, autonomous and competitive." Source: http://archive.is/cVaCC
China also was a wide open plain, whereas Europe had many mountain ranges which made centralization of authority in China much easier than in Europe, where decentralization was more common. Europe had many competing factions and rulers because the varying geography made it difficult to control the entire continent.
"One of the most important results of human domestication of farm animals was a transfer of diseases between animals and people. Smallpox, flu, plague, and many other diseases stem originally from infections in farm animals. This is significant because, according to Diamond: 'The winners of past wars were not always the armies with the best generals and weapons, but were often merely those bearing the nastiest germs to transmit to their enemies.'" Source: http://archive.is/nMZBx
"A key element in China's retreat was the sheer conservatism of the Confucian bureaucracy—a conservatism heightened in the Ming period by resentment at the changes earlier forced upon them by the Mongols. In this "Restoration" atmosphere, the all-important officialdom was concerned to preserve and recapture the past, not to create a brighter future based upon overseas expansion and commerce." | | "Printing was restricted to scholarly works and not employed for the widespread dissemination of practical knowledge, much less for social criticism. The use of paper currency was discontinued. Chinese cities were never allowed the autonomy of those in the West; there were no Chinese burghers, with all that that term implied; when the location of the emperor's court was altered, the capital city had to move as well." | | "To a distinct degree, the fierce response to the Shi'ite religious challenge reflected and anticipated a hardening of official attitudes toward all forms of free thought. The printing press was forbidden because it might disseminate dangerous opinions." | | "The sheer rigidity of Hindu religious taboos militated against modernization: rodents and insects could not be killed, so vast amounts of foodstuffs were lost; social mores about handling refuse and excreta led to permanently insanitary conditions, a breeding ground for bubonic plagues; the caste system throttled initiative, instilled ritual, and restricted the market; and the influence wielded over Indian local rulers by the Brahman priests meant that this obscurantism was effective at the highest level." Source: Pages 7-13 in "The Rise of Fall of Great Power" by Paul Kennedy
"For this political diversity Europe had largely to thank its geography. There were no enormous plains over which an empire of horsemen could impose its swift dominion; nor were there broad and fertile river zones like those around the Ganges, Nile, Tigris and Euphrates, Yellow, and Yangtze, providing the food for masses of toiling and easily conquerable peasants. Europe's landscape was much more fractured, with mountain ranges and large forests separating the scattered population centers in the valleys; and its climate altered considerably from north to south and west to east. This had a number of important consequences. For a start, it both made difficult the establishment of unified control, even by a powerful and determined warlord, and minimized the possibility that the continent could be overrun by an external force like the Mongol hordes. Conversely, this variegated landscape encouraged the growth, and the continued existence, of decentralized power, with local kingdoms and marcher lordships and highland clans and lowland town confederations making a political map of Europe drawn at any time after the fall of Rome look like a patchwork quilt. The patterns on that quilt might vary from century to century, but no single color could ever be used to denote a unified empire. Europe's differentiated climate led to differentiated products, suitable for exchange; and in time, as market relations developed, they were transported along the rivers or the pathways which cut through the forests between one area of settlement and the next. Probably the most important characteristic of this commerce was that it consisted primarily of bulk products—timber, grain, wine, wool, herrings, and so on, catering to the rising population of fifteenth-century Europe, rather than the luxuries carried on the oriental caravans. Here again geography played a crucial role, for water transport of these goods was so much more economical and Europe possessed many navigable rivers." Source: Page 17 in "The Rise of Fall of Great Power" by Paul Kennedy
"The political and social consequences of this decentralized, largely unsupervised growth of commerce and merchants and ports and markets were of the greatest significance. In the first place, there was no way in which such economic developments could be fully suppressed. This is not to say that the rise of market forces did not disturb many in authority. Feudal lords, suspicious of towns as centers of dissidence and sanctuaries of serfs, often tried to curtail their privileges. As elsewhere, merchants were frequently preyed upon, their goods stolen, their property seized. Papal pronouncements upon usury echo in many ways the Confucian dislike of profit-making middlemen and moneylenders. But the basic fact was that there existed no uniform authority in Europe which could effectively halt this or that commercial development; no central government whose changes in priorities could cause the rise and fall of a particular industry; no systematic and universal plundering of businessmen and entrepreneurs by tax gatherers, which so retarded the economy of Mogul India. To take one specific and obvious instance, it was

inconceivable in the fractured political circumstances of Reformation Europe that everyone would acknowledge the pope's 1494 division of the overseas world into Spanish and Portuguese spheres—and even less conceivable that an order banning overseas trade (akin to those promulgated in Ming China and Tokugawa Japan) would have had any effect. The fact was that in Europe there were always some princes and local lords willing to tolerate merchants and their ways even when others plundered and expelled them; and, as the record shows, oppressed Jewish traders, ruined Flemish textile workers, persecuted Huguenots, moved on and took their expertise with them. A Rhineland baron who overtaxed commercial travelers would find that the trade routes had gone elsewhere, and with it his revenues. A monarch who repudiated his debts would have immense difficulties raising a loan when the next war threatened and funds were quickly needed to equip his armies and fleets." Source: Page 18 in "The Rise of Fall of Great Power" by Paul Kennedy

While this competitive interaction between the European states seems to explain the absence of a unified "gunpowder empire" there, it does not at first sight provide the reason for Europe's steady rise to global leadership. After all, would not the forces possessed by the new monarchies in 1500 have seemed puny if they had been deployed against the enormous armies of the sultan and the massed troops of the Ming Empire? | | For the explanation of this shift one must again point to the decentralization of power in Europe. What it did, above all else, was to engender a primitive form of arms race among the city-states and then the larger kingdoms. | | By the same token, this free-market system not only forced the numerous condottieri to compete for contracts but also encouraged artisans and inventors to improve their wares, so as to obtain new orders." Source: Page 22 in "The Rise of Fall of Great Power" by Paul Kennedy

"This, finally, was the greatest reason why the dynamic continued to operate as it did: the manifold rivalries of the European states, already acute, were spilling over into transoceanic spheres. Try as they might, Spain and Portugal simply could not keep their papally assigned monopoly of the outside world to themselves, the more especially when men realized that there was no northeast or northwest passage from Europe to Cathay. Already by the 1560s, Dutch, French, and English vessels were venturing across the Atlantic, and a little later into the Indian and Pacific oceans—a process quickened by the decline of the English cloth trade and the Revolt of the Netherlands. With royal and aristocratic patrons, with funding from the great merchants of Amsterdam and London, and with all the religious and nationalist zeal which the Reformation and Counter-Reformation had produced, new trading and plundering expeditions set out from northwest Europe to secure a share of the spoils. There was the prospect of gaining glory and riches, of striking at a rival and boosting the resources of one's own country, and of converting new souls to the one true faith; what possible counterarguments could hold out against the launching of such ventures?" Source: Page 29 in "The Rise of Fall of Great Power" by Paul Kennedy

"it was a combination of economic laissez-faire, political and military pluralism, and intellectual liberty—however rudimentary each factor was compared with later ages—which had been in constant interaction to produce the "European miracle." Because that mix of critical ingredients did not exist in Ming China, or in the Muslim empires of the Middle East and Asia, or in any other of the societies examined above, they appeared to stand still while Europe advanced to the center of the world stage." Source: Page 30 in "The Rise of Fall of Great Power" by Paul Kennedy

"This is not to say, however, that the financial element always determined the fate of nations in these eighteenth-century wars. Amsterdam was for much of this period the greatest financial center of the world, yet that alone could not prevent the United Provinces' demise as a leading Power; conversely, Russia was economically backward and its government relatively starved of capital, yet the country's influence and might in European affairs grew steadily" Source: Page 86 in "The Rise of Fall of Great Power" by Paul Kennedy

"In all three cases—1) the balance of transport 2) deepwater navigation 3) and industrialization—the United States enjoys the physical geography most favorable to their application. Two facts stand out. First, since the root of American power is geographic and not the result of any plan or ideology, American power is incidental. Even accidental." Source: Page 9 in "The Accidental Superpower: The Next Generation of American Preeminence and the Coming Global Disorder" by Peter Zeihan

"The Nile could support riverine traffic in a way that the Tigris, Euphrates, and Indus—cursed with faster currents, less reliable seasonal flows and winds, and omnipresent sandbars—never could. The key is the difference between the ease of internal versus external transport. Just as the difficulty of external transport inhibited invasion for centuries, allowing the Egyptians to wallow in splendid isolation, the ease of transport within so facilitated governance that Egypt was able to consolidate into a single kingdom more than five thousand years ago. For the first millennia and a half of Egyptian history, outsiders simply could not penetrate into the Egyptian core. Yet within the Nile valley, the Egyptian government had very little trouble moving manpower, resources, the tools of governance,

and even giant blocks of stone around within its riverine-based system." Source: Page 18 in "The Accidental Superpower: The Next Generation of American Preeminence and the Coming Global Disorder" by Peter Zeihan
"The world's greatest river network—that of the Mississippi and its six thousand miles of navigable tributaries—directly overlies the world's largest piece of arable land, the American Midwest. The Intracoastal Waterway services the entirety of the Southeast as well as the plains of Texas. The Sacramento River and San Francisco Bay take care of California's Central Valley, and the Columbia and Snake service the agriculturally useful regions of Washington and Oregon. With the exception of the western fringe of the Great Plains that lies in the shadow of the Rockies, no American agricultural region is more than 150 miles from a navigable waterway. This allows the capital, agricultural, and transport bounty to reach the vast bulk of the American population. Of the United States' 314 million people, some 250 million of them live within 150 miles of one of the country's navigable waterways." Source: Page 52 in "The Accidental Superpower: The Next Generation of American Preeminence and the Coming Global Disorder" by Peter Zeihan
"The United States isn't technically an island, but the inability of Canada or Mexico to threaten it by land makes it an island functionally. As an island-continent it simply has a greater quantitative ability to leverage deepwater technologies than anything the British on their mid-sized island could manage." Source: Page 61 in "The Accidental Superpower: The Next Generation of American Preeminence and the Coming Global Disorder" by Peter Zeihan
Peter Zeihan is also very skeptical about China in the future, citing issues with demography, rivers that are prone to flooding (which requires large central governments to manager irrigation), etc.

[95] Sources: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD ; http://www.nationmaster.com/country-info/stats/Economy/GDP-per-capita-in-1820# ; https://www.measuringworth.com/ ; https://en.wikipedia.org/wiki/List_of_regions_by_past_GDP_(PPP)_per_capita ; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JP-SG-US-GB-CN-KR-IN-FR-DE ; http://www.nationmaster.com/country-info/stats/Economy/GDP-per-capita-in-1820# ; https://en.wikipedia.org/wiki/List_of_regions_by_past_GDP_(PPP)_per_capita#1%E2%80%932008_(Maddison)

[96] People have been worried about the US falling behind for many years now. It never comes to fruition. We were particularly struck when watching a recent documentary in which, Michael Azerrad, interviewed in 1991 said, "This is the first American generation that will make less than their parents will. It's a tough time to grow up in…". Does this sound familiar? We aren't taking away from the hardships then and now, but we do think the doomsday predictions for the U.S. economy will not prove to be accurate. Source: "The Nineties", Episode 3 (4m23s) https://www.imdb.com/title/tt7141002/?ref_=ttep_ep7
Another example comes during the Kennedy presidency in the early 1960s. Form that time we note the follow quote (again noting the similarities to today's political rhetoric): "The question of whether the president (John F. Kennedy) is doing his job right is one of the most difficult that we've had to get judgments on. The changes in the times have made our political structure no longer viable; made it unable to produce results unless there's some terrible crisis to force action". There's always been something to worry about, and yet in all these times we've recovered and gone on to improve the lives of the average citizen over time. Source: "Bobby Kennedy for President", Episode 1 (45m15s) https://www.imdb.com/title/tt8207684/?ref_=ttep_ep1 lon
Hell, even during the Moon Landing broadcast it was noted "People have the audacity to say there's not much new going on these days [laughing]. I think that one's erased for a long time". Source: "CBS Coverage of Apollo 11 Lunar Landing"

[97] Paul Krugman noted in 2011 that French G.D.P. Per hour worked was 98.8% of the U.S. (Very similar and much closer than pure G.D.P. or G.D.P. per capita figures would suggest). Related to this Krugman post, Scott Sumner noted: "Given that French employment is much more heavily concentrated in prime age workers, I'd expect higher hourly productivity in France. I wonder how productivity varies controlling for age and ethnicity? That's not to say the supply-side model explains everything." Sources: https://krugman.blogs.nytimes.com/?s=french+productivity+2011 ; https://www.themoneyillusion.com/how-to-think-about-france/

[98] To illustrate the detrimental effects of overly restrictive zoning laws (and the effect on productivity that these restrictive zoning laws have) we note the following passage: "In the United States, Melo et al. show that the productivity effect of accessibility, measured by an increase in wages, is correlated to the number of jobs per worker accessible within a 60-minute commuting range. Productivity increases as accessibility does due to the following: when individuals are able to optimize individual labor decisions, firms have the most productive people in jobs, and aggregate output increases. Beyond 20 minutes of travel time, worker productivity still increases, but its rate decays and practically disappears beyond 60 minutes. Both papers demonstrate that workers' mobility—their ability to

reach a large number of potential jobs in as short a travel time as possible—is a key factor in increasing the productivity of large cities and the welfare of their workers. Large agglomerations of workers do not ensure high productivity in the absence of worker mobility. Therefore, the time spent commuting should be a key indicator in assessing the way large cities are managed." Source: Kindle location 1145, "Order without Design: How Markets Shape Cities" by Alain Bertaud.. Also see footnote 94 regarding the book "Guns, Germs and Steel".

[99] We aren't confident enough that China real G.D.P. per capita will match US by 2100. We're maybe 20%-60% sure, but that's not high enough to base investment decisions on.

[100] Scott Sumner handicaps the odds: "Beijing's official GDP per capita is $16,150, but the actual figure is probably closer to $30,000, in PPP terms. I would put the odds of Beijing/Tianjin/Yangtze Delta/Pearl River Delta getting stuck in the middle-income trap at roughly zero. But those regions represent 15% of China. For the rest of Han China, I'd say the odds are 3%. For western China, 20%." Source: https://www.themoneyillusion.com/report-from-china/

[101] Source: https://en.wikipedia.org/wiki/List_of_countries_by_government_budget

[102] Source: https://www.economist.com/special-report/2011/03/17/taming-leviathan

[103] Source: https://www.heritage.org/index/explore?view=by-region-country-year&u=636874609016370077

[104] Sources: https://en.wikipedia.org/wiki/List_of_countries_by_government_budget ; https://www.heritage.org/index/explore?view=by-region-country-year&u=636874609016370077

[105] Sources: https://en.wikipedia.org/wiki/List_of_countries_by_government_budget ; https://data.worldbank.org/indicator/ny.gdp.pcap.cd

[106] Military spending, universal health care, etc. all have varying impacts on government spending in these countries. Some countries may, to a degree, replace military spending with health care expenses, etc. Many smaller countries rely on larger countries to provide security. Income figures in some countries are also skewed as a result of large amounts of natural commodities that are found in some countries (oil in Saudi Arabia and Norway being commonly cited examples).

[107] In "The Birth of Plenty" Bernstein outlines four criteria which he claims are necessary for economic growth: 1) Secure property rights 2) acceptance and implementation of the scientific method 3) an open capital marketplace to fund inventions and business ventures 4) rapid transit of information and rapid cheap methods to transfer physical goods

[108] Sources: https://data.worldbank.org/indicator/ny.gdp.pcap.cd ; https://www.heritage.org/index/explore?view=by-region-country-year&u=636874609016370077

[109] Sources: https://en.wikipedia.org/wiki/Divided_government_in_the_United_States ; https://fred.stlouisfed.org/graph/?g=nsF2

[110] Sources: https://en.wikipedia.org/wiki/Divided_government_in_the_United_States ; https://fred.stlouisfed.org/graph/?g=nsF2

[111] Sources: https://en.wikipedia.org/wiki/Divided_government_in_the_United_States ; https://fred.stlouisfed.org/graph/?g=nsF2

[112] In addition, regarding income inequality, we'd also like to see most income inequality analysis examine not only income inequality but **consumption inequality**. In theory, someone could have very low income but still consume quite a lot. Conversely, someone could have very high income but consume very little (and donate the balance to charity). We'd like to see a gradual move away from taxing income and toward taxing consumption, with a progressive consumption tax being a good goal to strive for ("Bill Gates: Don't tax my income, tax my consumption"). In the linked video, Gates also argues for a progressive consumption tax and outlines why he thinks taxing income isn't as good as progressively taxing consumption. Finally, we'd like to see the time frames for these various analysis be more carefully selected. Many times, pundits start graphs that conveniently buttresses their point. Starting inequality analysis in 1980 is not the best route when you consider that the early 1980s saw the highest interest rates in American History. We've shown previously, how important interest rates are to asset valuations, and given how the rich tend to own a high percentage of these assets, a period (like 1980 to 2018) that saw such drastic declines in interest rates, would unsurprisingly also likely see a rise in inequality. Judging any government program, politician, etc. starting in 1980 is likely to bias any conclusion that results (assuming these programs/politicians had very little to do with the main cause in the rise of inequality: i.e. the lowering of interest rates). Finally, it's not always clear that inequality is the main metric we should be looking at. Absolute levels of poverty are more important in our opinion. At an extreme, if interest rates shot to 30% tomorrow, inequality could very well go down. Unfortunately, so too would absolute levels of poverty rise. We wouldn't welcome such a scenario despite the drop in inequality.

[113] Consider two scenarios starting in 2008:

> 1) Not much permanent money is printed. Nominal G.D.P. grows at 3% a year. Bonds likely yield 2% or so, PE ratios rise to above 30 or even 40. Wages for low wage employees rises only with nominal G.D.P. at 3% a year. Sticky wages likely mean that unemployment rises, and likely hits the poor much harder. Inequality rises quite a lot, as 1) stock multiples increase, disproportionally helping the rich, while 2) wages for low income workers remain stagnant because of sticky wages and low nominal G.D.P. growth.
>
> 2) The Fed sets a clear 5% nominal G.D.P. target, and prints enough permanent money to meet that goal. Bonds stay around 4%. This keeps PE ratios moderate (in the 20-25 range). The rich do decent in the stock market, but not as well as they would have done if multiples had risen to above 30 as in scenario 1. Sticky wages are less of an issue because nominal G.D.P. growth is kept above a minimum level. As a result, unemployment doesn't rise very much. Wages for low income workers continue to grow because nominal G.D.P. is growing at a healthy rate. Inequality is much less than in scenario 1 because: 1) stocks multiples don't explode because of low interest rates 2) wages for lower income worker remain moderate/high because of solid nominal G.D.P. growth.

Which scenario would you prefer? We'd go with scenario 2, showing that sometimes, money printing can actually help the poor more than the rich, and can indeed, sometimes money printing can *lower* inequality.

[114] Scott Sumner: " Here's how things actually work. The government prints up a million $100 bills at virtually zero cost. The bills are used to buy $100 million worth of Treasury securities. The existing stock of currency sees its purchasing power fall by $100 million in the long run. So the government gains a profit of $100 million, which economists call "seignorage." Existing money holders see a loss of $100 million in purchasing power (in the long run.) That's because someone has to pay any tax. And it's a wash for the person or bank selling bonds to the government; they get $100 million in one asset, and give up $100 million in another. " | | "This is a good example of the fallacy of composition. In aggregate, the total level of nominal purchases is constrained by the amount of currency in circulation. But not at the individual level. Hence being the first to get the new money doesn't confer any advantage at all–as the new money has no more purchasing power than the existing money. A dollar is a dollar—and a $100 bill is a $100 bill. " | | "To summarize, it makes my brain hurt to try to understand how anyone could think it matters who gets the Fed injections first, assuming the new money is sold at fair market prices. Needless to say I can't rule out the theoretical possibility that G-S gets some sort of sweetheart deal and earns above fair market commissions on OMOs in Treasury bonds. If so then that's a scandal that needs to be investigated. But it would hardly be the basis for a serious theory of the macroeconomic effects of monetary policy. It would be like claiming the Federal government doesn't really control the monetary base because the North Koreans produce some $100 bills as well. True, but nearly irrelevant." | | "Some of the smarter commenters tried to convince me that money is non-neutral. My entire blog is devoted to the proposition that money is non-neutral–I don't need convincing. But that has no bearing on the claim that the effect of money policy depends on who "gets" the money first. Non-neutrality in the labor and goods markets comes from sticky wages and prices, and non-neutrality in debt defaults comes from sticky nominal debt." Source: https://www.themoneyillusion.com/it-really-really-really-doesnt-matter-who-gets-the-money-first-part-2/

"People need to pay attention to the distinction between the micro level and the macro level. Bill Gates does not refrain by buying a Ferrari today because he doesn't happen to be holding any base money. His nominal demand for goods and services is based on his nominal wealth. If the Fed buys $100 million in bonds from Gates and pays him cash, he doesn't feel energized to go out and buy goods and services (his nominal wealth is unchanged), rather he puts the money in the bank and then invests it elsewhere. Of course the aggregate NGDP will rise a tiny bit, and for that reason everyone, including Gates, will spend a tiny bit more on goods and services." Source: https://www.themoneyillusion.com/at-the-individual-level-nominal-purchasing-power-is-determined-by-nominal-wealth-at-the-aggregate-level-nominal-purchasing-power-is-determined-by-the-supply-and-demand-for-base-money/

[115] Bill Gates discussing a consumption tax in the video: "Bill Gates: Don't tax my income, tax my consumption"

[116] Original Economist article: https://www.economist.com/united-states/2017/01/07/inequality-or-middle-incomes-which-matters-more

[117] Scott Sumner: "It's a myth that CA surpluses are some sort of "imbalance" that markets would correct if only governments would stop manipulating the currency. Is Massachusetts manipulating the US dollar? Indeed, without recent Chinese "manipulation", the yuan would fall and their CA surplus would expand even further. To their credit, the smarter Keynesians understand that the CA surpluses actually reflect saving/investment differentials, and can

only be attacked with government policies aimed at reducing that imbalance, i.e. with tax cuts and/or higher government spending. But in that case, Massachusetts is just as guilty as the Germans or the Dutch. Maybe someone should put sanctions on Massachusetts's products until my home state starts running a Puerto Rican-style fiscal policy." Source: https://www.themoneyillusion.com/current-account-deficits-dont-matter/

[118] Source: https://www.usitc.gov/documents/dataweb/ave_table_1891_2016.pdf

[119] Sources: https://esa.un.org/unpd/wpp/Download/Standard/Population/ (pick "Population by Age Groups - Both Sexes") ; https://fred.stlouisfed.org/series/LFWA64TTUSM647S#0

[120] Sources: http://www.migrationpolicy.org/programs/data-hub/charts/Annual-Number-of-US-Legal-Permanent-Residents ; https://www.measuringworth.com/datasets/usgdp/

[121] Sources: https://fred.stlouisfed.org/series/CIVPART ; https://fred.stlouisfed.org/series/LNU01300060

[122] Sources: https://esa.un.org/unpd/wpp/Download/Standard/Population/ (pick "Population by Age Groups - Both Sexes") ; https://fred.stlouisfed.org/series/LFWA64TTUSM647S#0

[123] Sources: https://esa.un.org/unpd/wpp/Download/Standard/Population/ (pick "Population by Age Groups - Both Sexes") ; https://fred.stlouisfed.org/series/LFWA64TTUSM647S#0

[124] More of Ed Yardeni's thoughts: "Demography is a drag. During the 1980s, I argued that productivity growth would remain depressed by the influx of young and inexperienced Baby Boomers. But I predicted that it would rebound as they became more experienced. That worked out. Now, it's possible that productivity growth is weighed down again by the influx of young, inexperienced Millennials into the labor force at the same time as experienced Baby Boomers are retiring. This implies that as the Millennials become more experienced, productivity growth should rebound." Source: Page 102, "Predicating the Markets" by Ed Yardeni. | | "In addition, in the early 1980s I concluded that demographic factors might contribute to lowering inflation and bond yields. I argued that the influx of young adult Baby Boomer workers during the 1980s would reduce wage inflation. The downside was that these new entrants into the labor force were inexperienced, so their productivity might be low, but it likely would improve as they aged." Source: Page 341, "Predicating the Markets" by Ed Yardeni.
SRCM commentary: There are clear limits to this type of analysis, inflation took off in the 1960 to 1980 period, when (like now) the number of young workers was rising (see the black line going up in graph above). However, we've yet to see inflation take off this time around (as we argued earlier, it's not primarily demographics that cause inflation, but instead it is monetary factors and the central bank which are the drivers of inflation). In addition, there was a onetime bump in works as woman entered the work force in the 1950 to 1980 period (something that can't happen again). It remains to be seen whether, when millennials are at their wealthiest, whether a stock market bubble forms in the late 2030s or early 2040s. This type of analysis is, at best, mildly interesting, and unlikely to be of any practical importance going forward.

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