

Bond Bulletin

May 2017



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Bonds versus Stocks

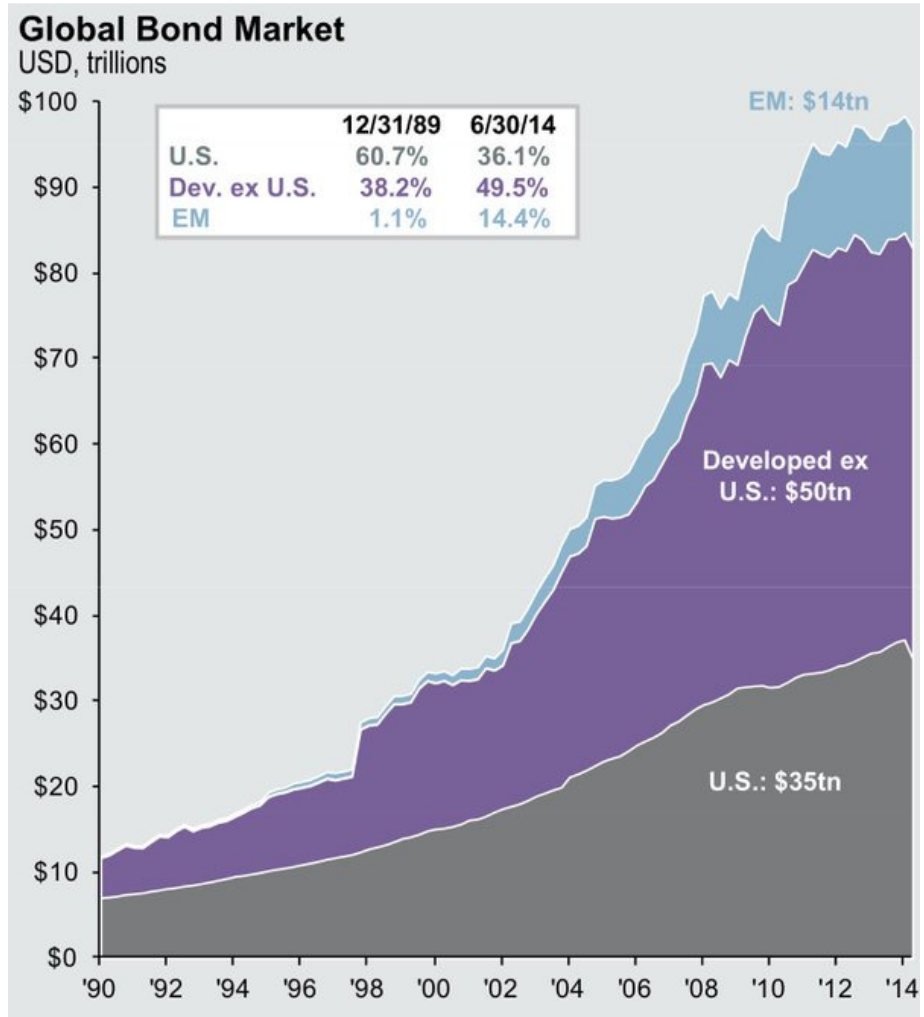
Bonds (also known as “Fixed Income”) are quite distinct from stocks (also known as “Equities”)¹:

	Stocks (Equities)	Bonds (Fixed Income)
Global size	USD 71 trillion ²	USD 100 trillion
Initial investment	Above or below liquidation value	Near liquidation value (new issues)
Reward for risk	Dividend (variable), price gains	Coupon (usually fixed)
Maturity	Unlimited (usually)	Limited (usually)
Capital structure	Bears risk of business failure	Senior claim compared to equity
Volatility	Higher than bonds	Lower than equities
Asset type	Real asset	Nominal asset (gets eaten up by inflation)
Dilution from additional issuance	Possible	Possible
Capital gains	Possible	Generally not (if bought at issuance and held to maturity)
Optionality	Stock = option on value of assets minus liabilities	
Capital preservation	Complete loss of capital possible	Complete loss of capital very unlikely
Influence on management	Shareholders (certain amount of votes needed)	Usually not (exception: bond holder committee in restructuring)
Risk measurement	Volatility (standard deviation of price moves in the past; not a good gauge of future volatility)	Duration (zero coupon bond: maturity = duration; if interest rates rise by 1%-point, bond loses 1% per year of duration)
Impact of economic cycle	Positively correlated (risk assets increase in value as growth expectations go up)	Usually negatively correlated (bond prices increase as yield level decreases as central bank usually cuts interest rates in response to economic slow-down). However bonds and stocks experienced positive correlation from 1985-1999 (+0.5 to +1).
Impact of inflation	Positive as long as company can pass input price increases onto consumers and interest payments do not get out of control	Negative

¹ More details can be found here: http://www.diffen.com/difference/Bond_vs_Stock

² World Federation of Exchanges, 2016 Market Highlights

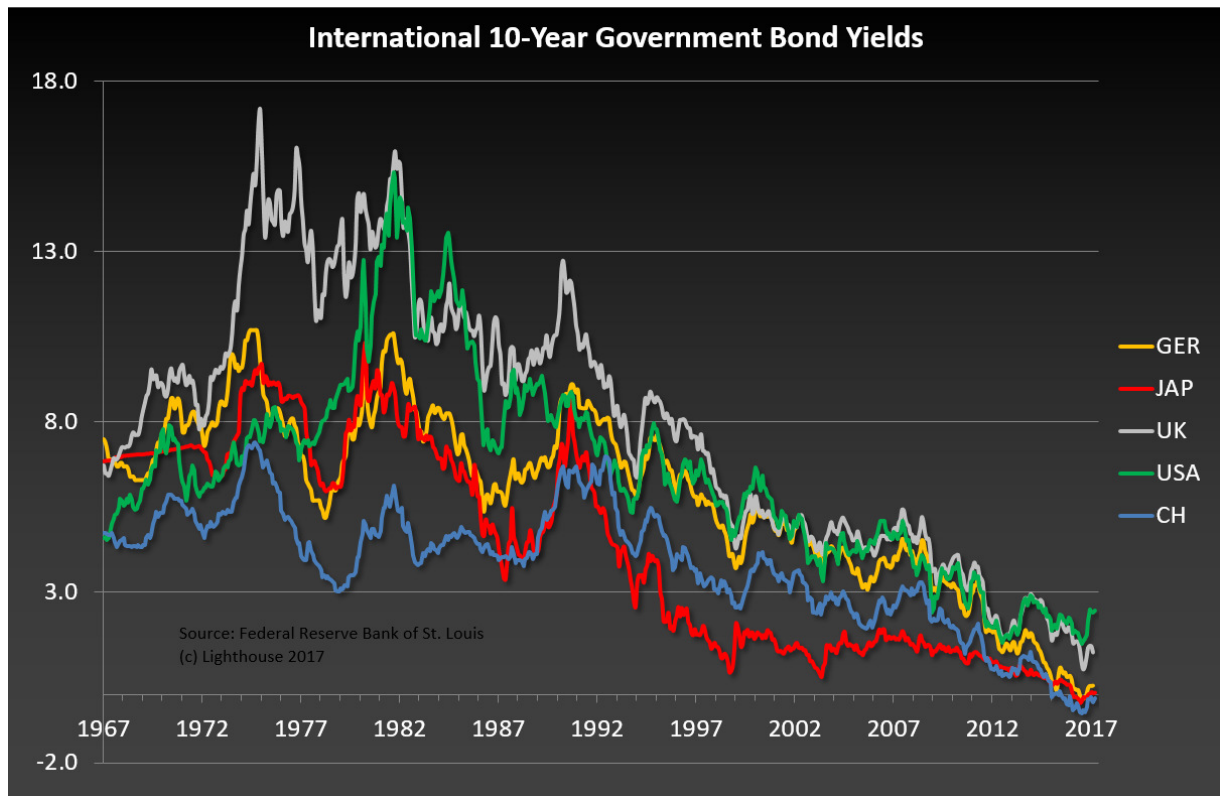
\$100 Trillion Global Bond Market



- The value of global bonds has gone tenfold over the past 25 years
- During the same period, global GDP increased only four-fold
- Emerging Market (EM) bonds outstanding multiplied 115 times (from \$120 billion to \$14 trillion)
- Some growth might have come at the expense of bank loans as securitization trend prevailed
- Overall, growth in debt and unfunded liabilities still outpaces GDP-growth and is hence unsustainable

International Government Bonds

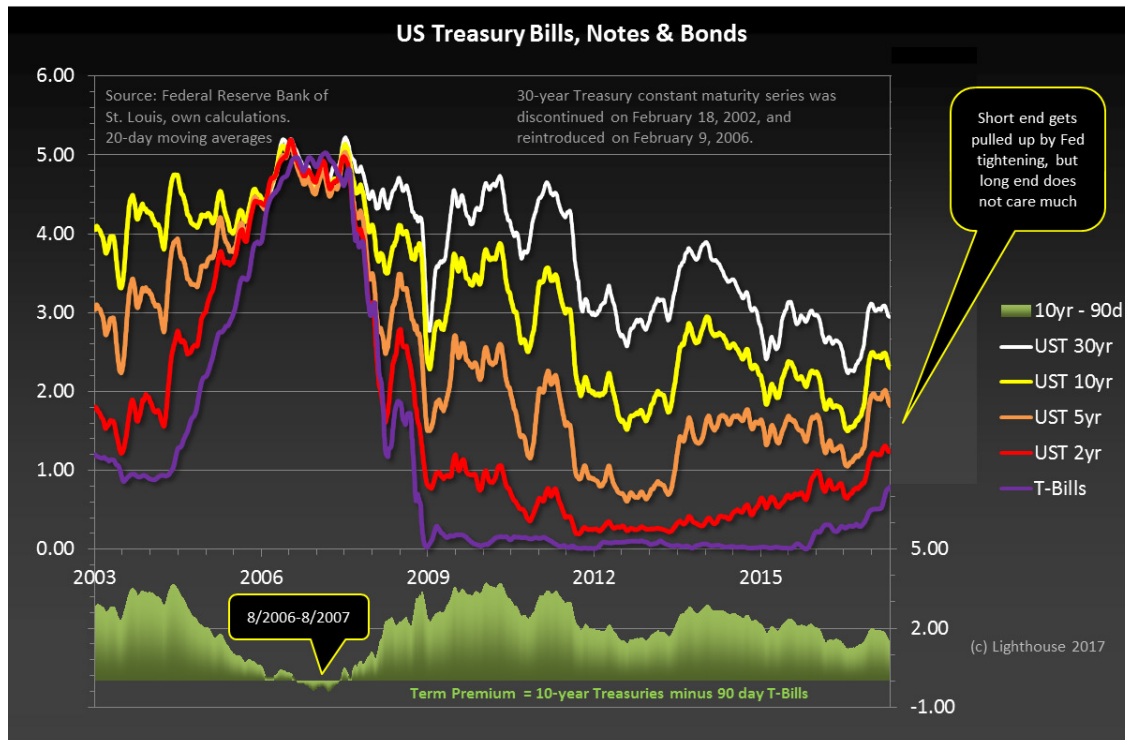
Global bond yields have been declining for the past 35 years, with some even going negative:



- 10-year government bond yields in Germany, Switzerland and Japan dipped into negative territory
- However, this was not the case in the US. The Fed (Federal Reserve Bank) made sure it wouldn't happen as negative short-term rates would have destroyed US Money Market Mutual Funds (with assets of \$3.8 trillion a significant source of funding).
- The Fed kept paying banks 0.25% interest rate on required deposits (IORR) as well as excess deposits (IERR). Excess deposits accumulated as the Fed expanded the monetary base via Quantitative Easing without the banks finding enough credit demand to utilize those balances. US banks currently have \$4.4 trillion balances with the Fed, of which only \$2 trillion are required.
- The ECB (European Central Bank), however, introduced a negative deposit rate (-0.1%) in June 2014, culminating in a rate of -0.4% since March 2016. Large companies like Siemens, who obtained a banking license, preferred parking excess liquidity with the ECB (at a punishing negative rate) rather than have counterparty risk with any European commercial bank.
- Currently EUR 550bn are parked with the ECB (peak EUR 770bn in spring 2012)

US Government Bonds

- With a value of around \$35 trillion, the US bond market is the global leader
- Most bonds are priced relative to US Treasury bonds. Changes in US yields therefore proliferate globally. It therefore makes sense to take a deep look at US Treasuries.



- Treasury *Bills* are short-term (under 1 year), Treasury *Notes* are medium-term (2-, 3-, 5- and 7-year) and Treasury *Bonds* are long-term (30 years).
- TIPS (Treasury Inflation Protected Securities) are sold with 5, 10 and 30-year maturities. The principal is regularly adjusted for inflation. They usually carry a lower interest than regular Treasury Notes and Bonds
- US Treasury Zero Coupon Bonds are sold at a deep discount to par value (100%) and do not pay any interest (entire return via difference of issue price to par)
- The above chart shows how yields for different maturities developed over time
- Usually, the longer until maturity the higher the yield. This is called “term premium”. It compensates investors for the risk of rising interest rates while holding a bond.
- In late 2006 / early 2007 however, short-term yields rose above long-term yields as the Fed hikes interest rates. You can see the negative term premium in the above chart (green area at the bottom). The bond market correctly anticipated a cooling of the economy (which would later force the Fed to cut interest rates). The market told the Fed it was wrong to hike.

Bond Valuation

Treasury Securities (Bills, Notes, Bonds) are (at least until now) considered risk-free. What determines their yield?

The Federal Reserve sets the floor to short-term interest rates. We can deduct a bond yield as the sum of short-term interest rates and a term premium:

Short-term interest rate	+ term premium	= bond yield
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However, the term premium is not constant; as seen before it can even go negative. You could work with a number based on long-term averages or based on your own economic outlook, but there is nothing that says the term premium should be x or y.

Another way to deduct interest rates is to look at the expected rate of inflation.

Real interest rate	+ compensation for inflation	= bond yield
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Investors would not appreciate a bond paying a 5% yield when inflation is at 6% (they would be suffering a loss of 1% in real terms). So usually investors would like to see a positive real interest rate of x plus compensation for expected future inflation of y. Problem: how do you estimate future rates of inflation (as much as 30 years into the future)? We will look at a solution on the following page.

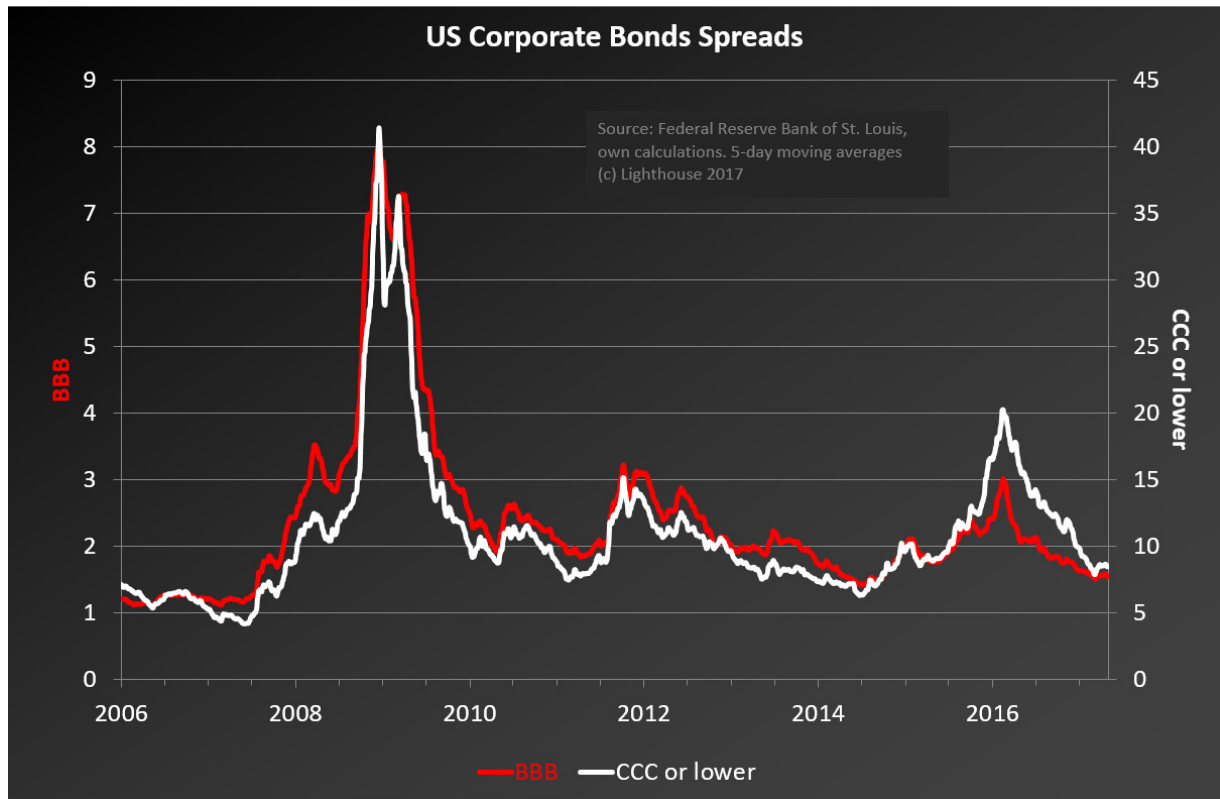
Finally, for any non-US Treasury bond, a risk premium, or spread, will be added to its yield:

US Treasury Yield	+ compensation for company and / or country risk	= bond yield
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BBB-rated corporate bonds currently carry a spread of 1.55%-points while CCC-rated ones need to offer a premium of 8.47%-points over Treasury securities.

The government of Brazil has to offer a premium to US Treasury bonds. For bonds issued in US dollars, the premium is currently around 2.5 – 3%-points. For those issued in Brazilian Real, a premium for currency risk has to be added (Brazil currently pays around 10% for 10-year government bonds in local currency). A corporate issuer from Brazil would then have to add another risk premium on top of that according to its rating.

Spreads



“Spread” is the premium a non-US-government issuer has to pay on top of the yield of a comparable Treasury security.

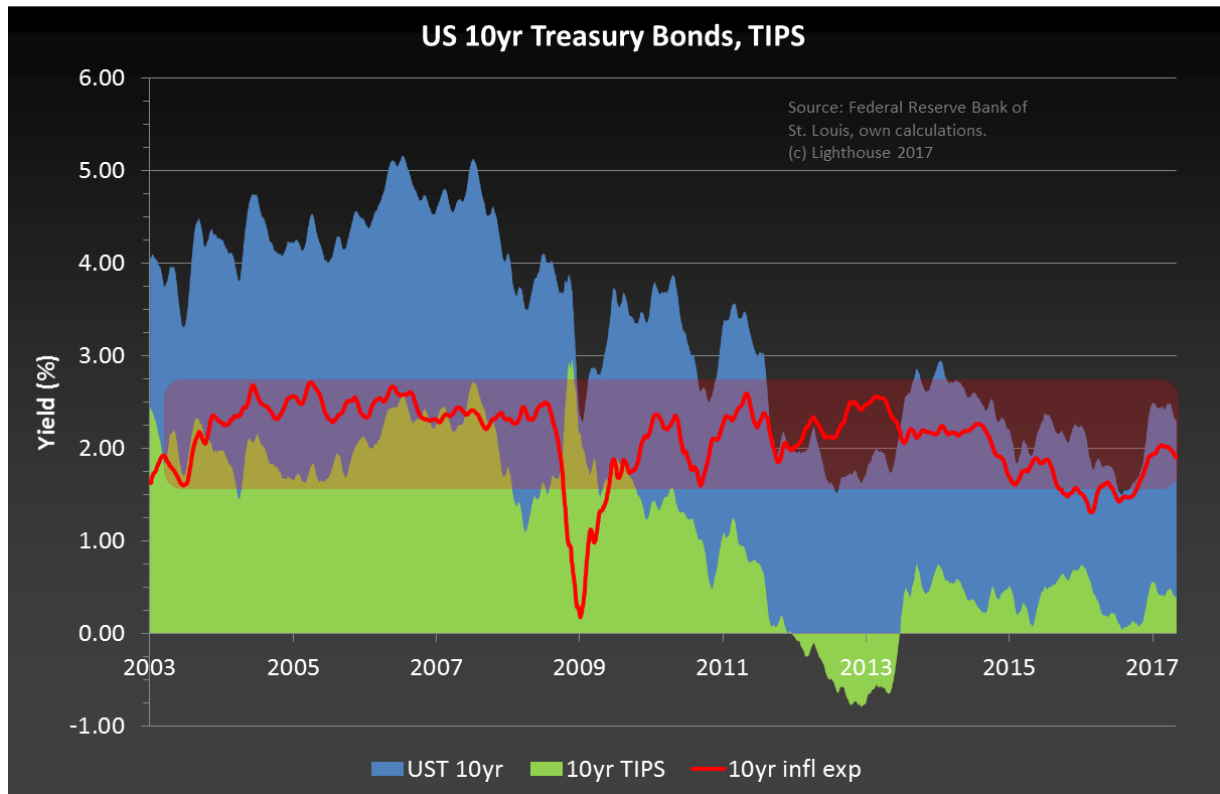
In 2007, for example, a BBB-rated company (barely investment grade, red line) had to offer about 1%-point premium over Treasuries. With 10-year Treasury Bonds at 4.5% that would have meant a 5.5% coupon. During the financial crisis, the spread blew out to over 8%-points (which would have meant double-digit coupons for the same issuer).

Spreads for CCC-rated companies (“junk”) widened even more dramatically (from below 5% to above 40%-points)

The brief spike in spreads in 2016 was mostly due to energy companies as some experienced financial difficulties due to oil prices collapsing from \$100 to \$30 per barrel.

The low-interest rate environment has pushed many investors into risky bonds. This has led to spread compression to near historically low levels.

Expected Inflation



A bond investor can choose between a straight 10-year US Treasury Bond and a 10-year inflation-protected US Treasury Security (TIPS)

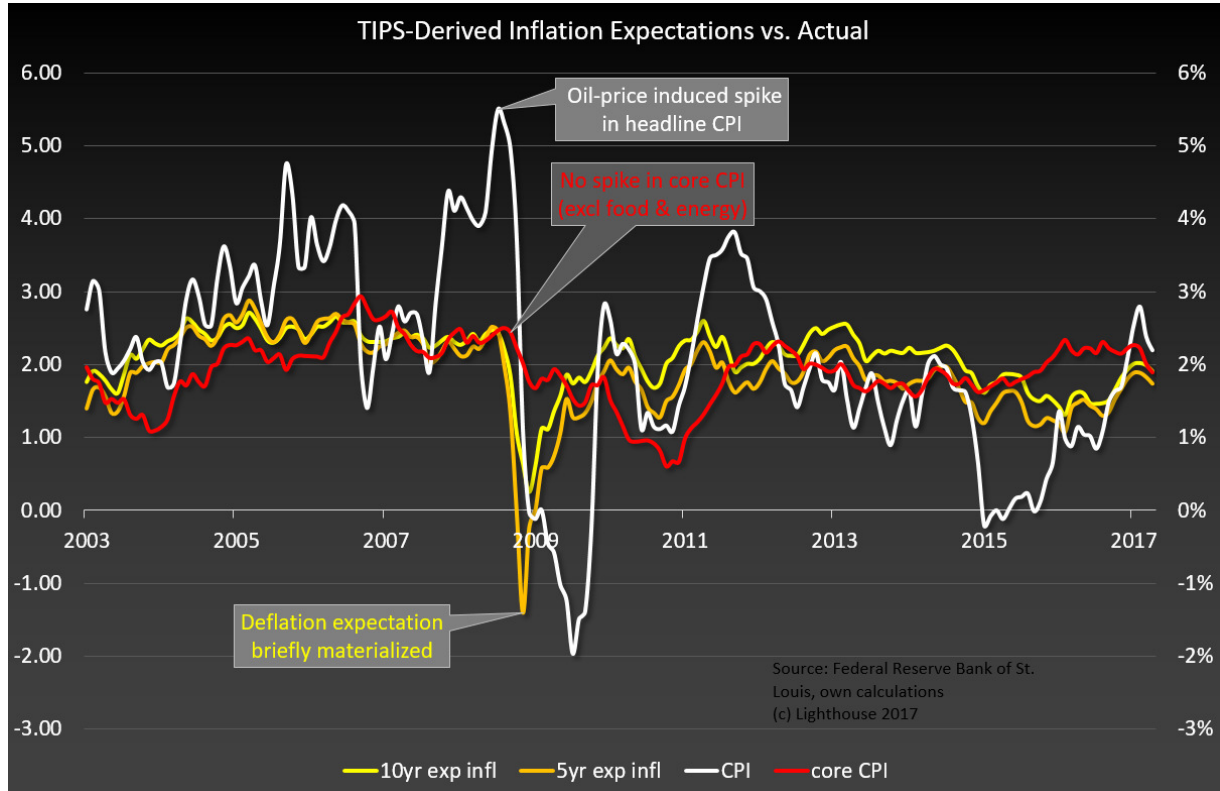
10-year bonds offer 2.3% yield (blue area), 10-year TIPS 0.5% (green area).

The investor will pick TIPS if he expects inflation over the next 10 years to be higher than 1.8% (2.3 – 0.5). This is the so-called break-even rate of inflation, or implied inflation, or expected inflation or TIPS-derived inflation (red line).

Inflation might not turn out as the market expected, but at least it is a number that market participants seem to agree on.

Looking at above chart it is remarkable that inflation expectations have, with a brief exception during the financial crisis, remained in a range of 1.5-2.5%. And this despite the largest monetary experiment in the history of fiat money. It is as if extremely aggressive central bank policies had no noticeable impact on inflation expectations.

How accurate are TIPS-derived inflation expectations?



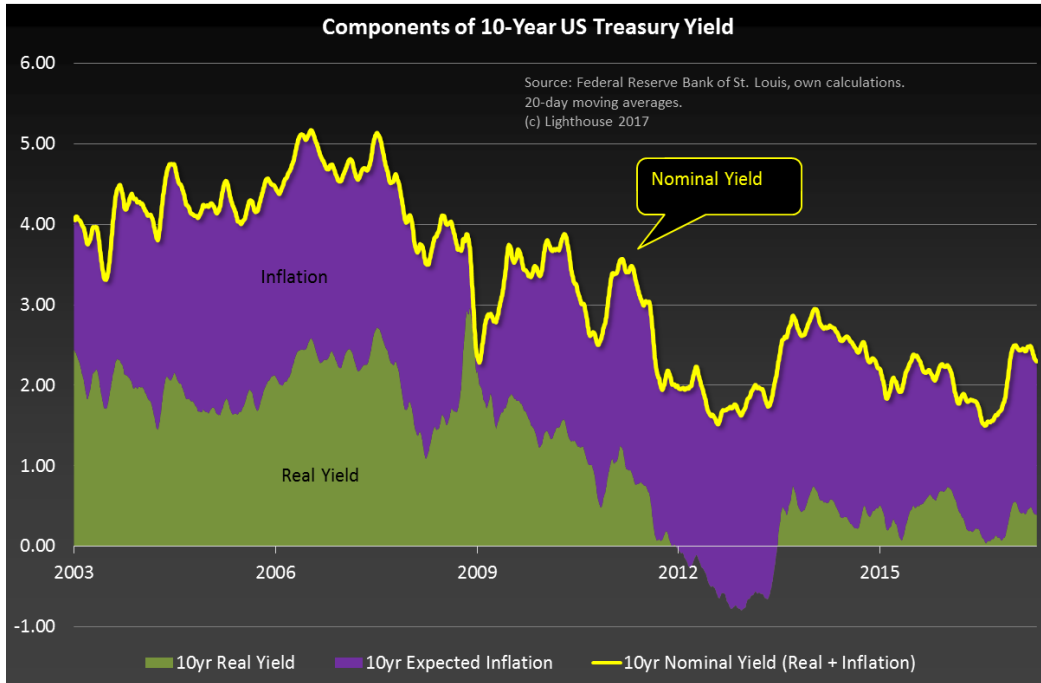
5- and 10-year inflation expectations (orange and yellow) move together pretty closely. When plotted with actual inflation (white) you notice brief spikes to the upside (2008, 2011, 2017) are mostly ignored by inflation expectations. Although TIPS are adjusted based on headline inflation the market seems to “look through” brief spikes created by a jump in energy prices (which is considered transitory). However, the deflationary impact of the Financial Crisis, however brief, was correctly anticipated by TIPS-derived expectations in November 2008.

It should be noted that 5-year inflation expectations are projecting the average over the following five years; so for expectations to be priced correctly in November 2008 the US should have experienced five consecutive years of deflation of more than 1% (or a combination of years with inflation and deflation with similar outcome). This obviously did not happen. One could argue that in November 2008 it was not yet clear central banks would engage in massive monetary stimulus over the coming decade. On the other side, inflation expectations for the next five to ten years as of today are not higher than before the financial crisis. Possible explanations range from the view that the Fed’s actions are not actually helping the economy (hence little inflation) or that without the Fed’s actions we would have experienced serious deflation.

Overall it looks as inflation expectations have no predictive value; they mostly seem to be hugging core inflation developments more or less in real time.

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Even if TIPS-derived inflation expectations seems to have little predictive value we can still squeeze some informational value from dissecting nominal yields into real yield and inflation premium:



As you can see, the Fed's bond purchases depressed nominal yields to such low levels that, after accounting for inflation expectations, real yields dropped into negative territory:



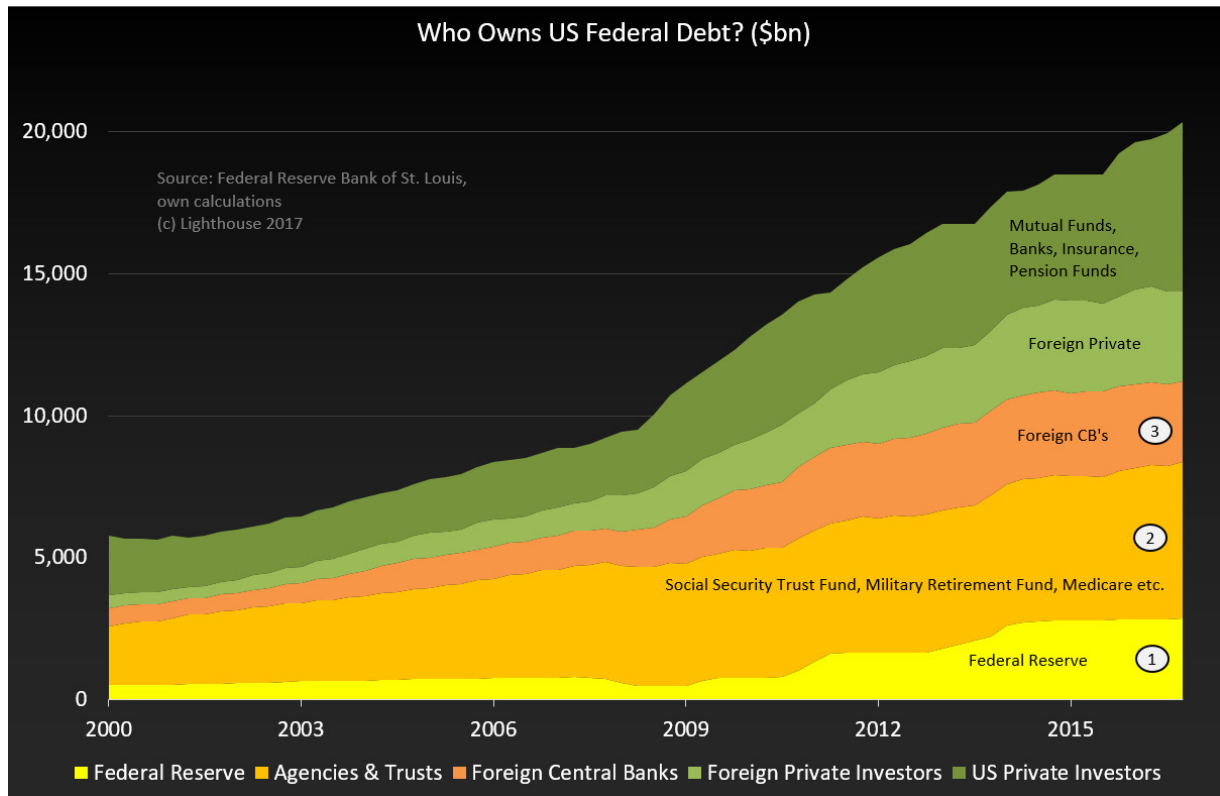
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Why on earth would someone accept a real negative return?

- Buyer expects inflation to exceed level currently priced in
- If TIPS bought near par (100%) and deflation persists bond will be paid back at par (which would be a gain in real terms due to deflation). The principal value of TIPS can decrease in case of deflation, but they are redeemed at par regardless
- Market is simply distorted by Fed bond purchases

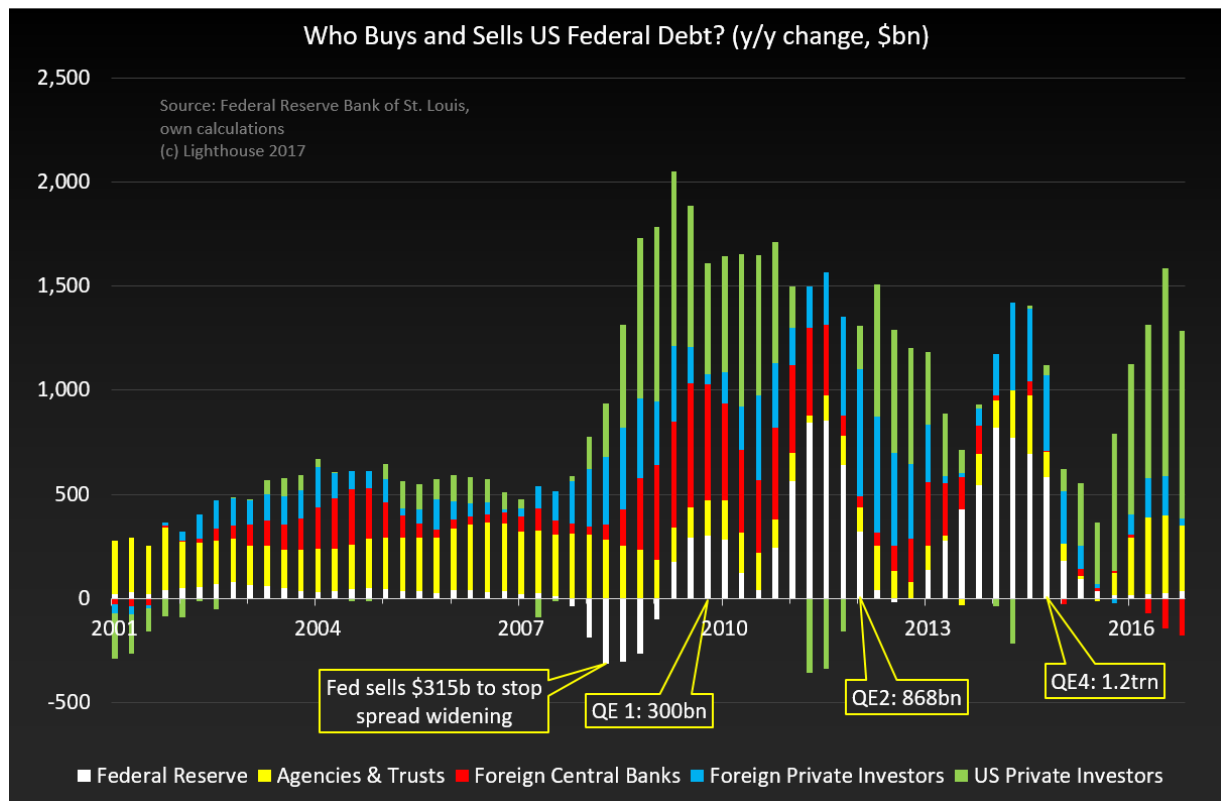
Which leads us to the next big topic: who owns Treasury securities, and what impact does the Fed have?

Ownership of Treasury Securities



- Total US federal government debt stands at \$20 trillion, which turns out to 105% of GDP (\$19 trillion)
- You will notice that holders 1, 2 and 3 (owning together around 56%) are central banks or government-related entities. Those are political bodies; their purchasing decisions are not driven by the same rationale as private investors. Why is that a problem?
- Imagine you were collecting something without much material value, like Pokémon or Panini cards. You buy some, you trade some with your friends, and, based on your experience of exchanging those cards you think you know what they are worth.
- But some weird big buyer is purchasing more and more of those cards. That buyer has unlimited purchasing power. That buyer has now amassed more than half of all cards outstanding, and is buying up to 100% of all news cards being issued.
- How much are your cards really worth? How reliable are the prices you traded at with your friends?
- What happens to the value of your cards once the big buyer stops buying? What if he begins selling?
- What happens when the issuer floods the market with more and more cards, encouraged by elevated prices thanks to support from the big buyer?

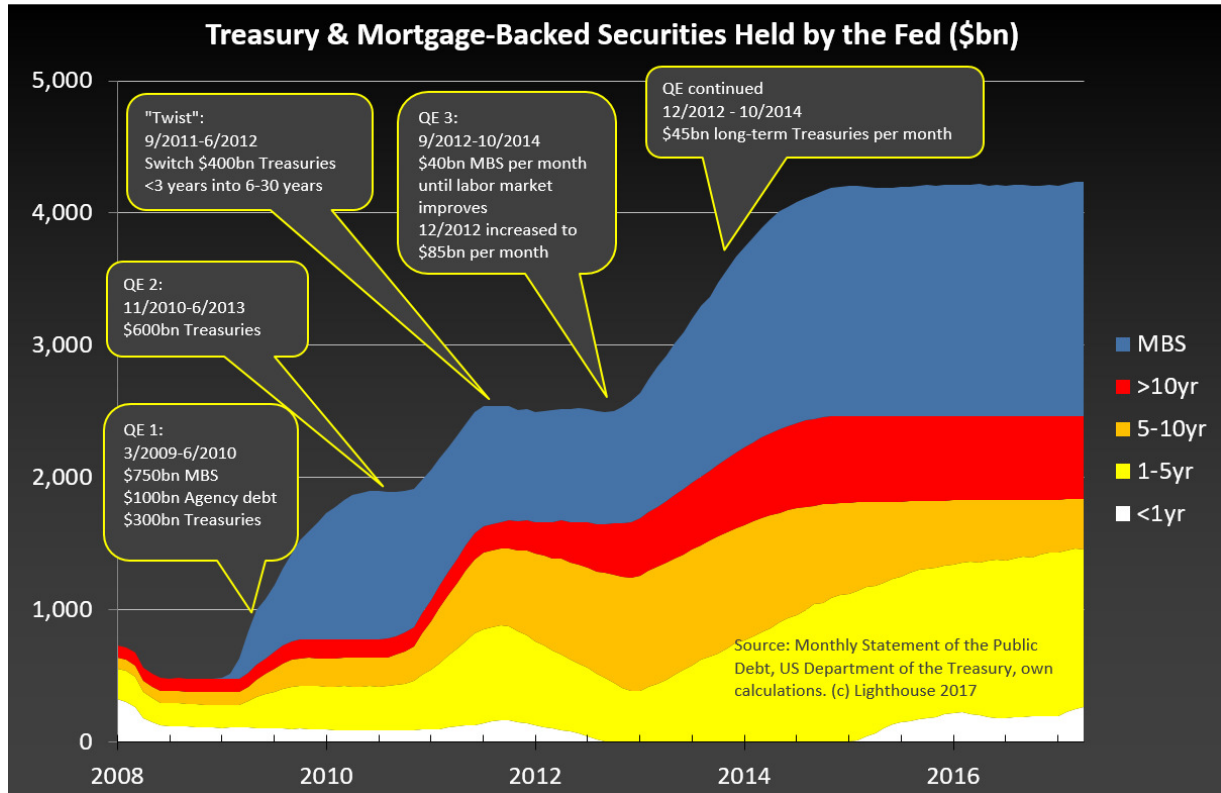
Buyers and Sellers of Treasury Securities



- Until the financial crisis the federal government had budget deficits of \$150 – 400 billion, and, including refinancing, the bond market absorbed around \$400 – 600 billion in supply
- In reaction to the looming financial crisis investors sold risky assets, fleeing into Treasury securities, thereby widening credit spreads. The Fed thought it would be a good idea to sell billions of Treasury securities in order to stop the spread-widening (treating the symptoms, not the cause)
- Of course this didn't help, and the Fed decided to reverse course by 180 degrees by launching QE ("Quantitative Easing"), or buying up Treasury securities.
- Federal deficits ballooned to \$1.4 trillion, leading to an enormous supply of Treasury securities to be sold to the market.
- Foreign central banks (red), foreign private investors (blue) and US private investors (green) also gobbled up Treasury securities in a scramble for supposedly risk-free assets. This helped financing vast budget deficits.
- The Fed tried to 'taper' its bond purchases twice, but each time had to resume with a new plan
- Foreign central banks have turned sellers of Treasury securities recently. Private investors keep buying so far as they do not trust equity markets.
- Any fiscal loosening or economic slowdown in the US would make another round of QE necessary

Fed's Balance Sheet

The Fed's balance sheet has been "blown up" by various installments of "Quantitative Easing":



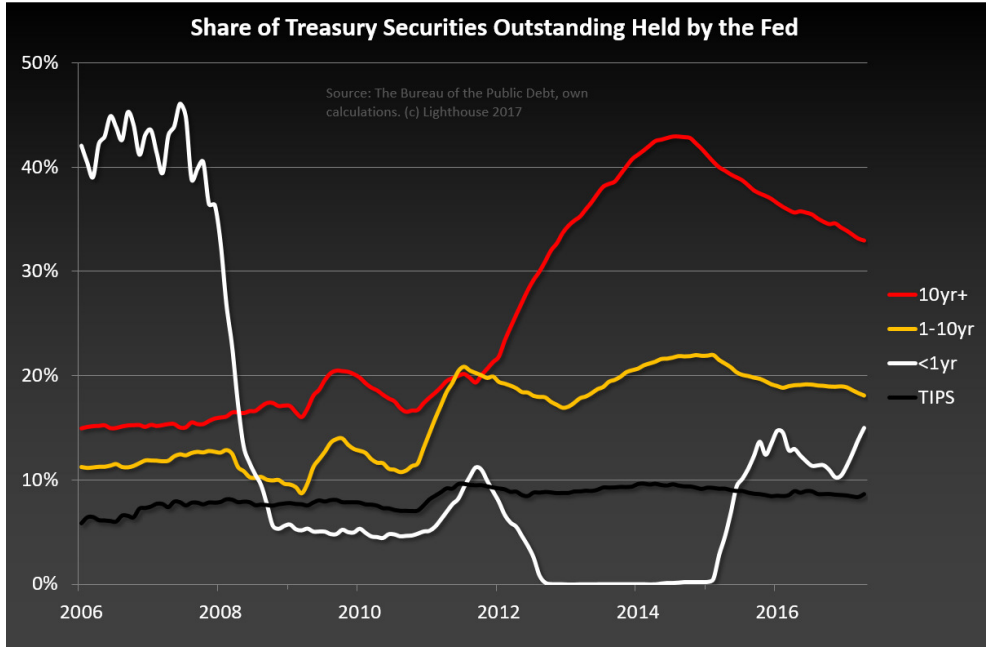
The Fed runs its 4.5 trillion balance sheet with 41 billion of capital, or a leveraged of more than 100:1 (Lehman was levered 31:1 when it collapsed). Now the Fed is not Lehman, and yes, it can print its own money. But printing money and putting it into circulation just increases its liabilities. And the US can become insolvent despite being able to print money; in November 1978 the US had to issue debt in Swiss Francs and Deutschmark in order to support the dollar.

A dollar bill is basically zero-coupon perpetual debt of an insolvent bank:

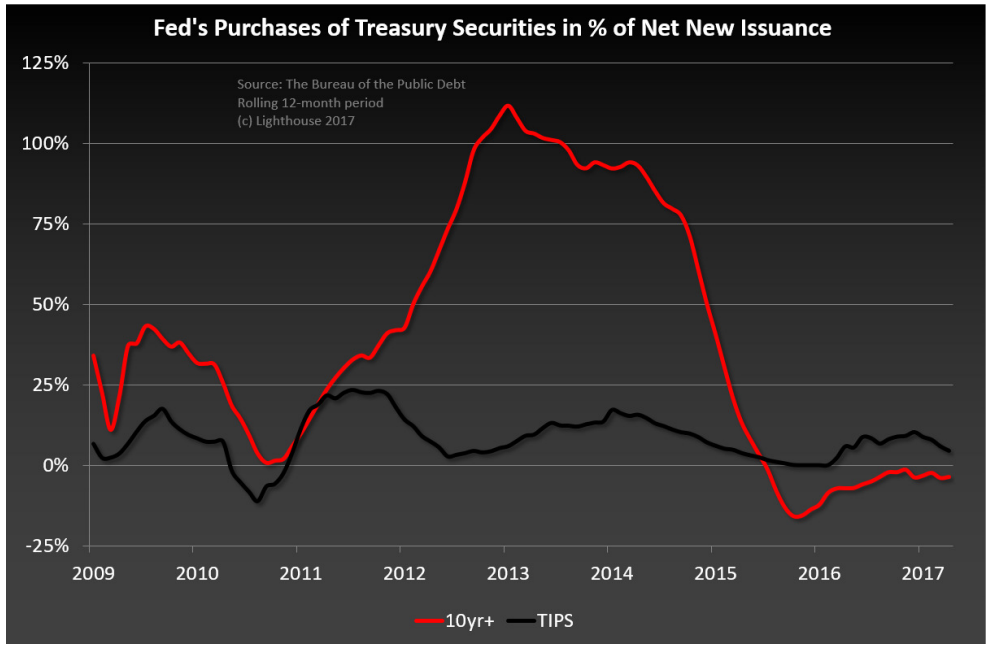
Assets		Liabilities	
Treasury securities	2,465	Currency in circulation	1,500
Mortgage-backed securities	1,769	Deposits by banks	2,500
Gold	11	Other	432
SDR	5	Total liabilities	4432
Other	223	Capital	41
Total assets	4473	Total capital & liabilities	4473

Fed's Influence on Treasuries

At one point the Fed owned as much as 43% of all Pokémon cards – err Treasury Bonds:

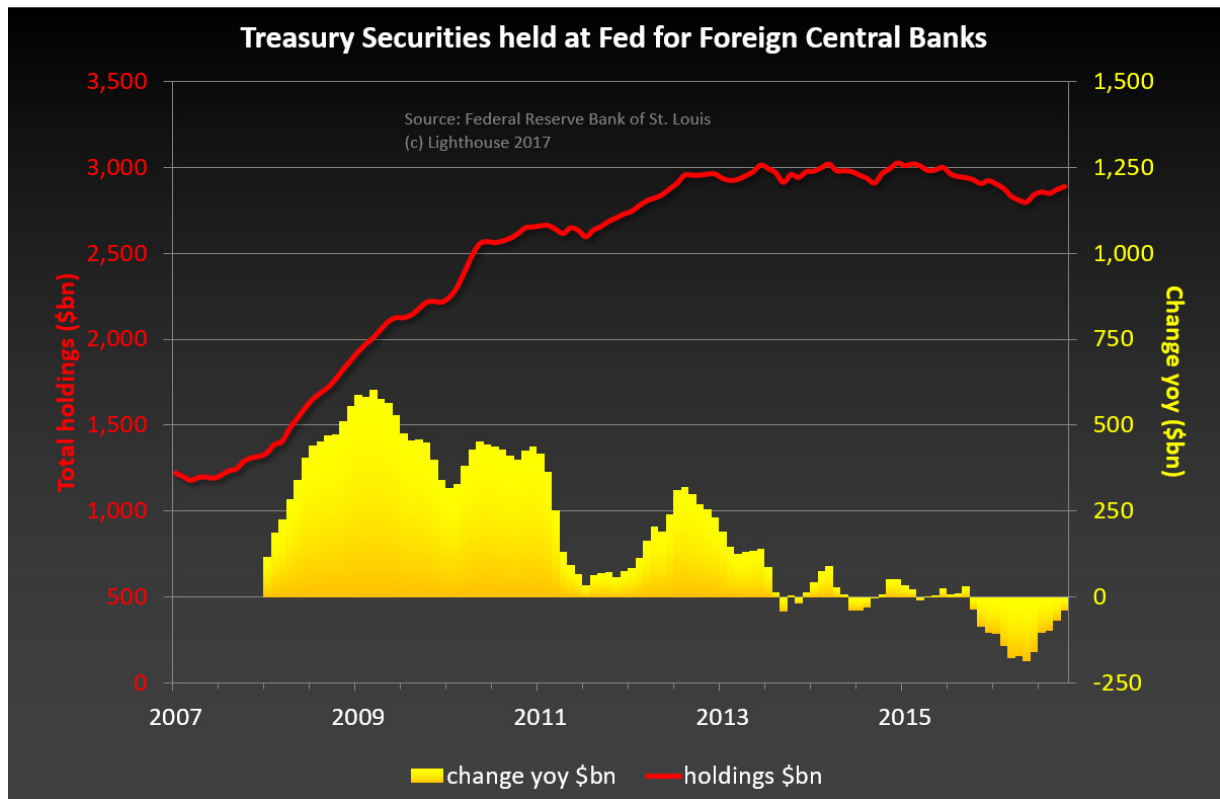


At one point the Fed absorbed more than the net new issuance of Treasury Bonds:



Treasuries held by Foreign Central Banks

Foreign central banks have amassed an equally large pile of Treasury Bonds (\$3 trillion):



China and Japan each own more than \$1 trillion. Even arch-rival Russia at one point owned \$176 billion (thereby helping finance the US budget deficit and hence the excessive military budget).

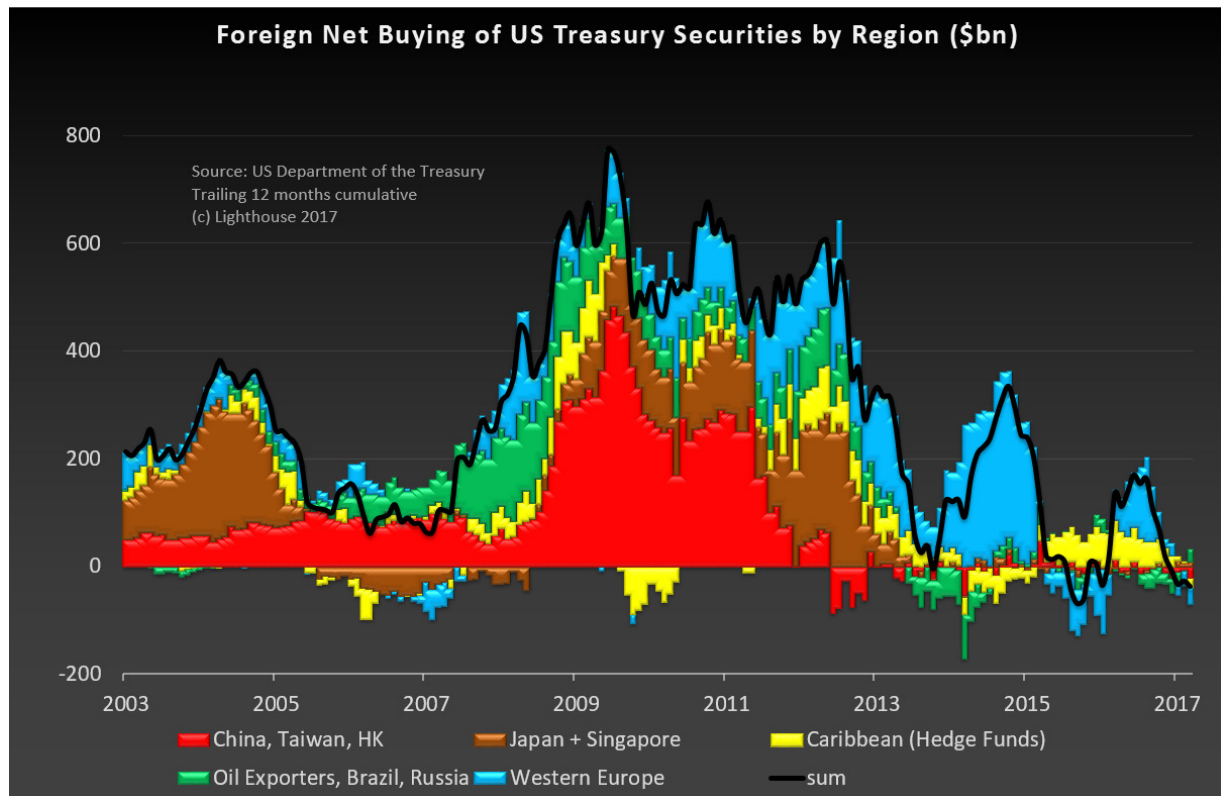
Why did those central banks accumulate so many dollars?

Countries with large positive trade balances export more stuff than they import, hence more money coming in than going out. Since almost all commodities, and especially crude oil, are traded in US dollars an exporter receives dollars. Trade flows are so large that if the country's central bank wouldn't scoop up (at least some of) those dollars its currency would appreciate versus the US dollar. Furthermore, the ascent of China into the WTO (World Trade Organization) in 2001 was apparently made contingent on China's commitment towards recycling of export surpluses into US Treasuries.

Before the birth of the Euro there really was no alternative to the US dollar. After initially being bogged down by war in former Yugoslavia, the Euro tumbled into its worst crisis in 2010. But, despite all predictions to the contrary, the Euro has survived and might offer more political and economic stability than the dollar. But that is a subject for a different report.

Treasury Buying and Selling by Foreign Investors

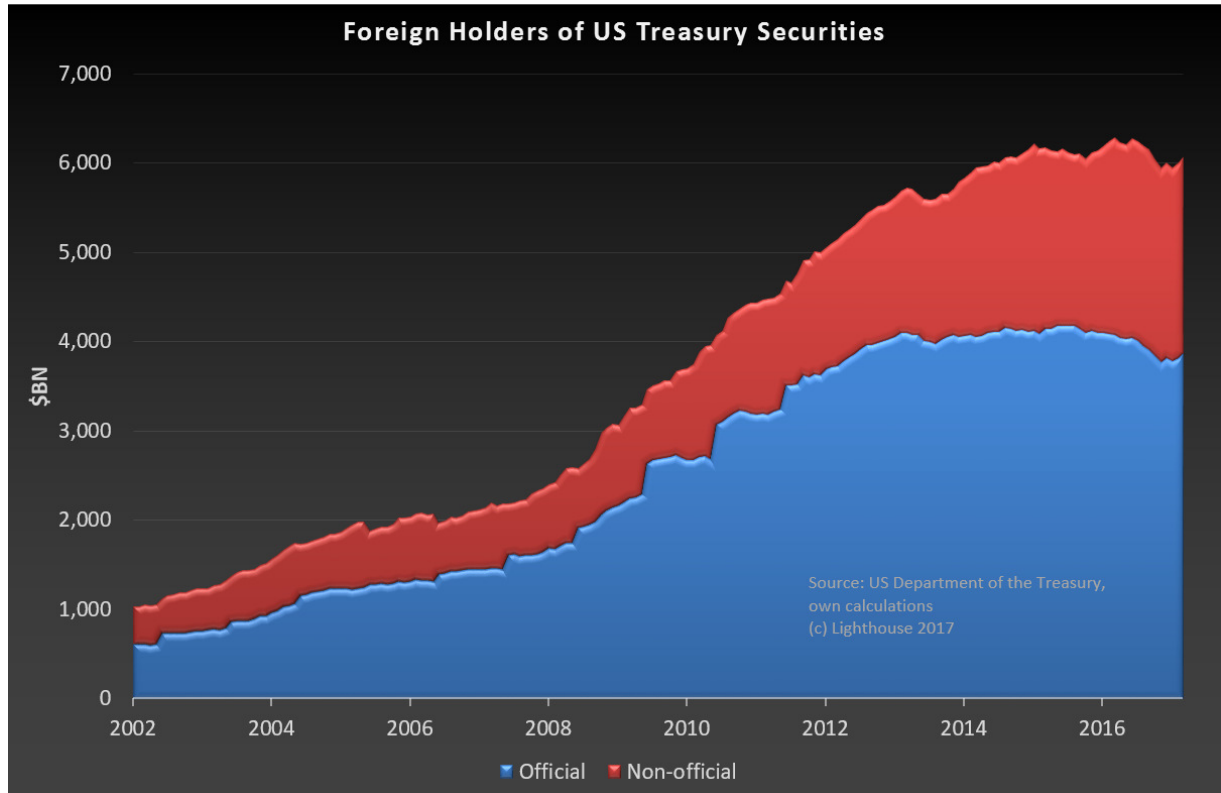
Foreign investors rushed into Treasury securities during the Financial Crisis – but demand is waning:



- After painful experiences during the Asian financial crisis 1997/98 many countries decided a larger stash of foreign exchange reserves was required to better withstand future troubles
- After accumulating more than \$1 trillion in Treasury securities each, China and Japan seem to have reached their maximum appetite for dollar-denominated debt (buying foreign assets against domestic always increases domestic monetary base, which bears the risk of creating inflation and hence social unrest over, for example, food prices).
- Caribbean buyers are mostly hedge funds (incorporated in those locations for tax reasons). Many pursue a strategy called “risk-parity”, where stock portfolios are ‘hedged’ by buying Treasuries. Prices of Treasuries usually rise (yields fall) as stock markets tank. Treasury bonds are negatively correlated with stocks (hence losses in stocks would be compensated by gains in bonds). For the price gains in bonds to match losses in stocks you need to go aggressively long Treasuries (usually 30-year bonds, or work with leverage). The strategy is very popular due to the “positive carry” of your hedge (you are being paid interest on those Treasury bonds as opposed to having to pay insurance premium for, say, put options on the S&P 500 index). However, the negative correlation is not guaranteed to last forever. Should both stocks and bonds fall, disaster can be expected.

Treasuries held by Foreign Central Banks

It looks as if foreign holdings of Treasury securities have peaked:



- “Official” holders include central banks and sovereign wealth funds
- “Non-official” holders include non-US private investors like investment funds or private

What happens if the US economy slows down and / or the fiscal deficit widens again?

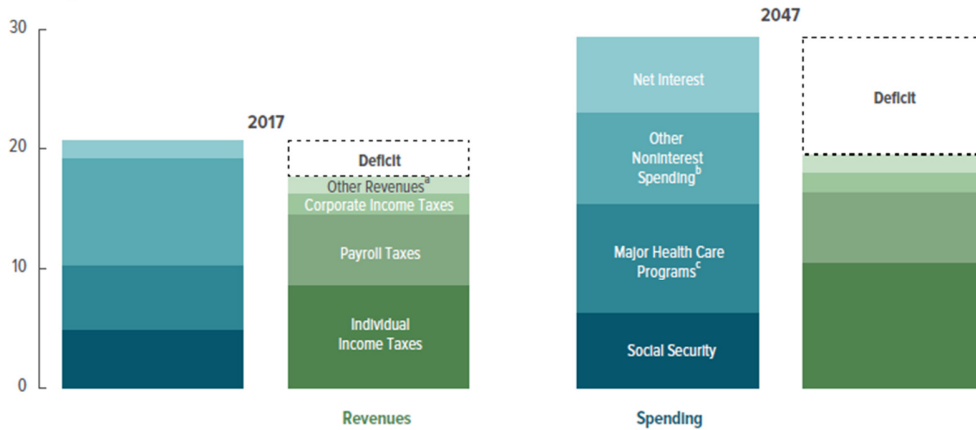
Projections for US Fiscal Deficit and Debt

The CBO (Congressional Budget Office) expects fiscal deficits to explode in the coming years:

Summary Figure 1.

The Federal Budget Under the Extended Baseline

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

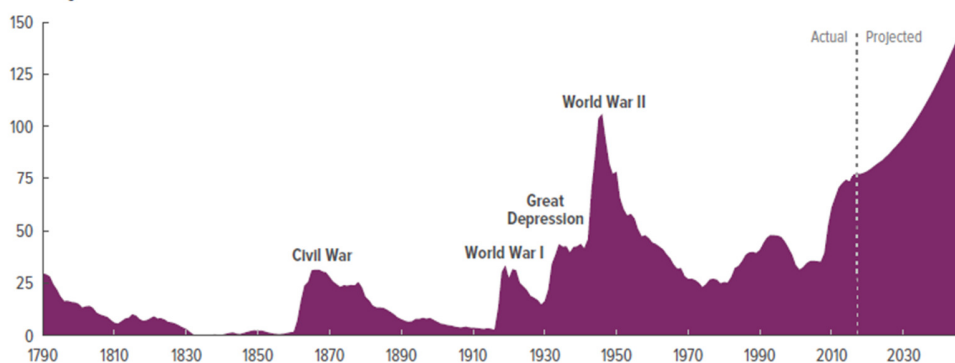
- a. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.
- b. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.
- c. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

- The fiscal deficit is expected to widen to 9.8% of GDP (or \$6 trillion) by 2047
- Debt-to-GDP is predicted to reach 150% (or \$93 trillion):

Figure 2.

Federal Debt Held by the Public

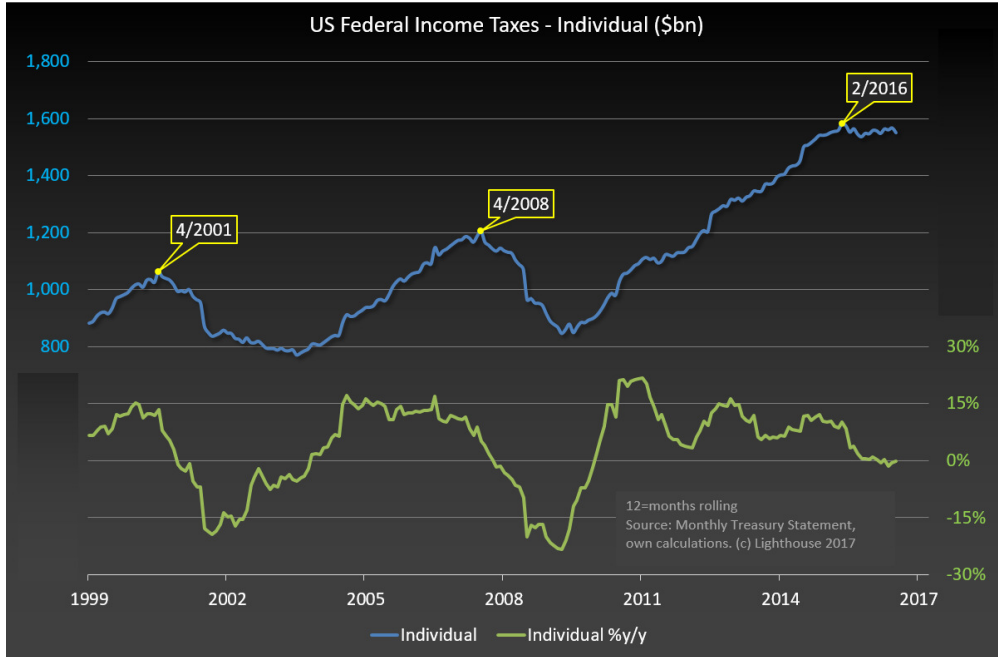
Percentage of Gross Domestic Product



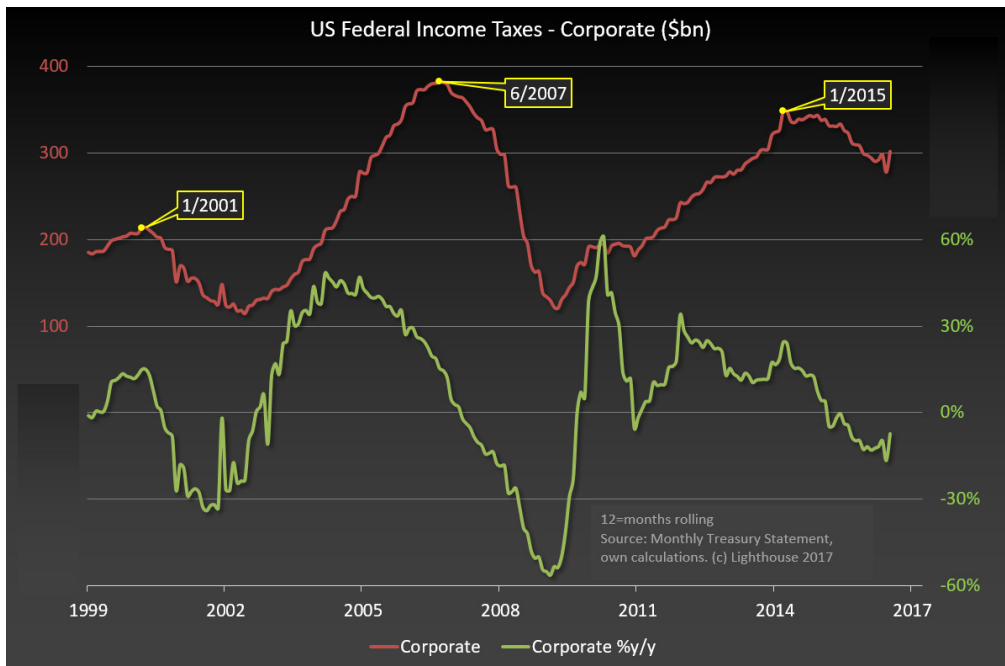
Source: Congressional Budget Office. For details about the sources of data used for past debt held by the public, see Congressional Budget Office, *Historical Data on Federal Debt Held by the Public* (July 2010), www.cbo.gov/publication/21728.

Federal Income Taxes

Individual federal income taxes decline 20-33% during recessions (and seem to have peaked):



Corporate income taxes decline 50-75% during recessions (and seem to have peaked, too):



Conclusions

- Projections for US fiscal deficits are dire; the financing needs will likely overwhelm investor demand
- Recent timid interest rate hikes by the Fed are not driven by fears of an overheating economy but rather by necessity to support the dollar.
- The Federal Reserve will be forced to launch further rounds of “Quantitative Easing” and will continue to accumulate government debt on its balance sheet. This amounts to monetizing the debt.
- The bonds market is unlikely to fail first. A group of banks, the so-called Primary Dealers³, are required to submit bids (offers to buy) Treasury securities at every auction. It is therefore impossible for an auction to fail. Should Primary Dealers lack the cash they have access to the “Primary Dealer Credit Facility” – basically a credit line from the Fed. Primary Dealers will get loans in exchange for collateral (in this case Treasury securities). The amount of loans is limited only by the amount of collateral Primary Dealers can provide. Since they can post freshly acquired Treasury securities as collateral this process is virtually unlimited. In the end the Fed, Primary Dealers and other banks will own most of Treasury securities outstanding and control market prices. For private investors, the “Pokémon – card problem” means they have no clue where bonds would trade at a market price without government intervention.
- If given the choice between inflation and economic melt-down, central banks will always chose inflation. Nobody gets hurt by central banks buying more bonds while millions would lose their jobs if government spending was cut back.
- Since bonds prices will be supported by central banks, the only “outlet” for the market to express its preferences for assets left will be foreign exchange.
- The US dollar is likely to lose its support from foreign private and official investors and fall significantly in value.
- As the dollar currently serves as the world’s reserve currency a new system will have to be designed (but this will be subject of a separate report)

Any questions or feedback welcome.

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³ Primary Dealers as of April 2017: Bank of Nova Scotia, BMO, BNP Paribas, Barclays, Cantor Fitzgerald, Citigroup, Credit Suisse, Daiwa, Deutsche Bank, Goldman, HSBC, Jefferies, J.P. Morgan, Merrill Lynch, Mizuho, Morgan Stanley, Nomura, RBC, RBS, Société Générale, TD, UBS and Wells Fargo

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