

The Gold Price: To print, or not to print, that is the question.

Forecasting the gold price is a notoriously difficult task given its multiplicity of uses in society. However, like any other scarce good, its price will ultimately be determined by two things: (1) its relative scarcity (defined as changes in the world's gold inventory); and (2) the quantity of money (if we are forecasting in US dollars, then US money supply) available to buy gold. But as is evident in the analysis below, it's the quantity of money part of the equation that dominates. In the words of Irving Fisher, taken from his 1927 book, *The Money Illusion*:

Most people have the idea that when the price level rises the rise is due wholly or chiefly to an actual scarcity of the individual goods concerned, and that, when the price level falls, the fall is due wholly or chiefly to an actual superabundance of the individual goods concerned... But there is no justification whatever for such ideas; they are chiefly due to our old friend the Money Illusion which hides from us the money side of the market, so that we look only at the goods side, - usually the wrong side to look at. As a matter of historical fact, we seldom, if ever, find a case of noteworthy inflation or deflation which is not both relative and absolute. The money stream is found to vary greatly, while the goods stream varies comparatively little, especially per capita...¹

I would also add to this, an extract from a Ron Paul² speech to the U.S. House of Representatives on April 25, 2006:

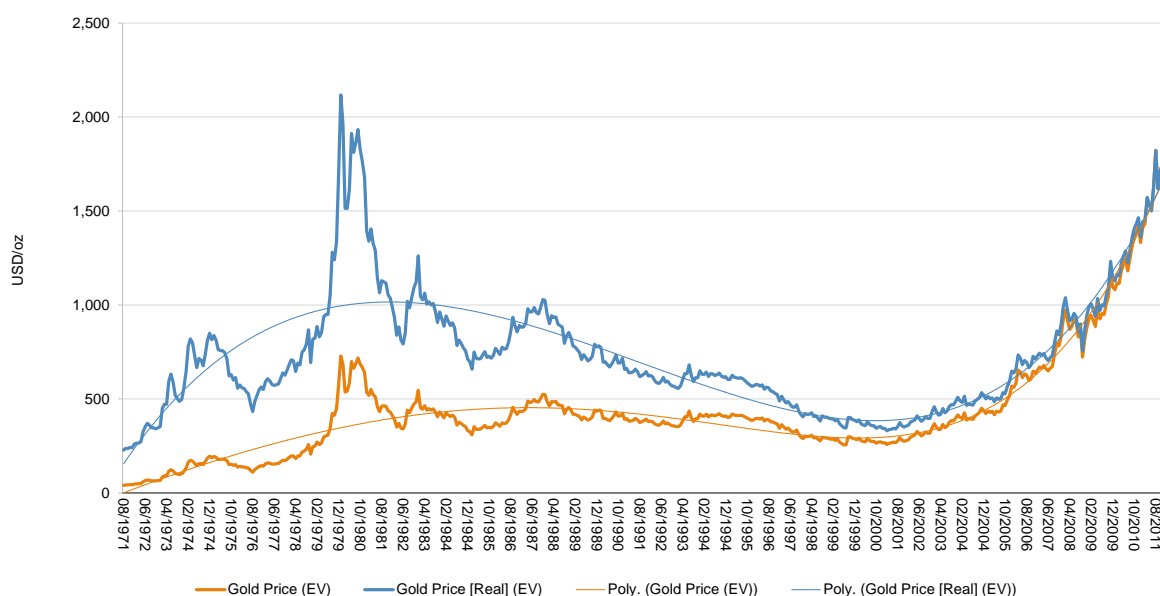
Holding gold is protection or insurance against government's proclivity to debase its currency. The purchasing power of gold goes up not because it's a so-called good investment; it goes up in value only because the paper currency goes down in value... A recent headline in the financial press announced that gold prices surged over concern that confrontation with Iran will further push oil prices higher. This may well reflect the current situation, but higher gold prices mainly reflect monetary expansion by the Federal Reserve. Dwelling on current events and their effect on gold prices reflects concern for symptoms rather than an understanding of the actual cause of these price increases. Without an enormous increase in the money supply over the past 35 years and a worldwide paper monetary system, this increase in the price of gold would not have occurred.³

I propose therefore that forecasting the gold price is not really about forecasting the gold price *per se*. It's more about forecasting the quantity of money used to measure the price of gold.

Historic Gold Price

The chart below shows the nominal and real⁴ gold price (monthly) back to August 1971 when the US dollar was de-coupled from the gold price with the break-down of the Bretton Woods monetary system.

Chart 1 - Nominal and Real Gold Price



When looked at in nominal terms (the orange line) the gold price hit its all-time (month-end) high of US\$1,823, at the end of August 2011. But in real terms (the blue line), this figure was still below the high reached at the end of January 1980 of US\$2,118.

¹ Irving Fisher, *The Money Illusion*, (2011, Wilder Publications, Blacksburg USA), p.25.

² Ron Paul has been the U.S. Congressional Representative for Texas since 1997, and a three-time candidate for President of the United States, as a Libertarian in 1988, and as a Republican in 2008 and 2012. He is an outspoken critic of American foreign and monetary policies, known for advocating certain libertarian positions and opposing his own party on certain issues.

³ <http://www.lewrockwell.com/paul/paul319.html>

⁴ Inflated using the US CPI based on the 31/01/2012 gold price.

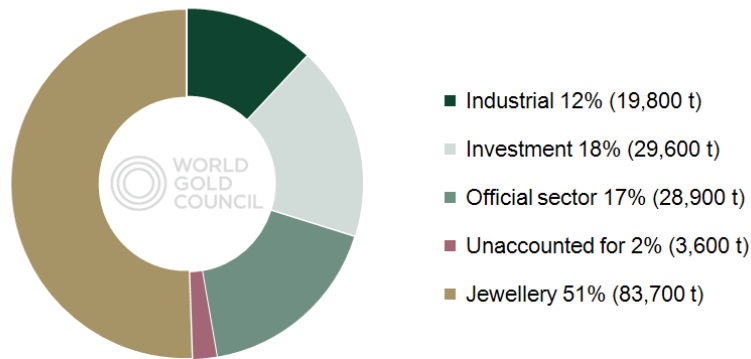
However, this chart does not tell the whole story for gold, especially in the context of my opening remarks.

Global Gold Inventory

At the end of 2009, the World Gold Council⁵ estimated that the above-ground stock of gold was 165,600 metric tons (mt), (see Chart 2).

Chart 2 – Holders of Gold Inventory

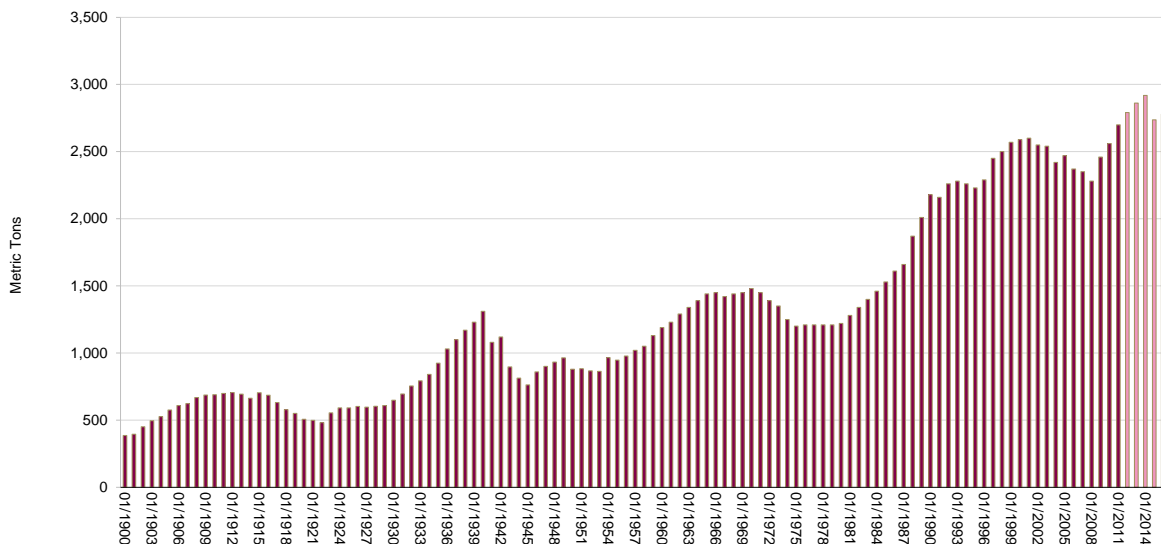
Above-ground stocks, end 2009 (total: 165,600 tonnes)



Source: GFMS

If we combine this Gold Council inventory point estimate with world gold production data from the U.S. Geological Survey⁶ (crimson bars on Chart 3), with our gold production forecasts⁷ (pink bars on Chart 3), we can calculate global gold inventory each year back to the end of 1899 (from the end of 2009), and forward to the end of 2016 (see chart 4).

Chart 3 - Global Gold Production

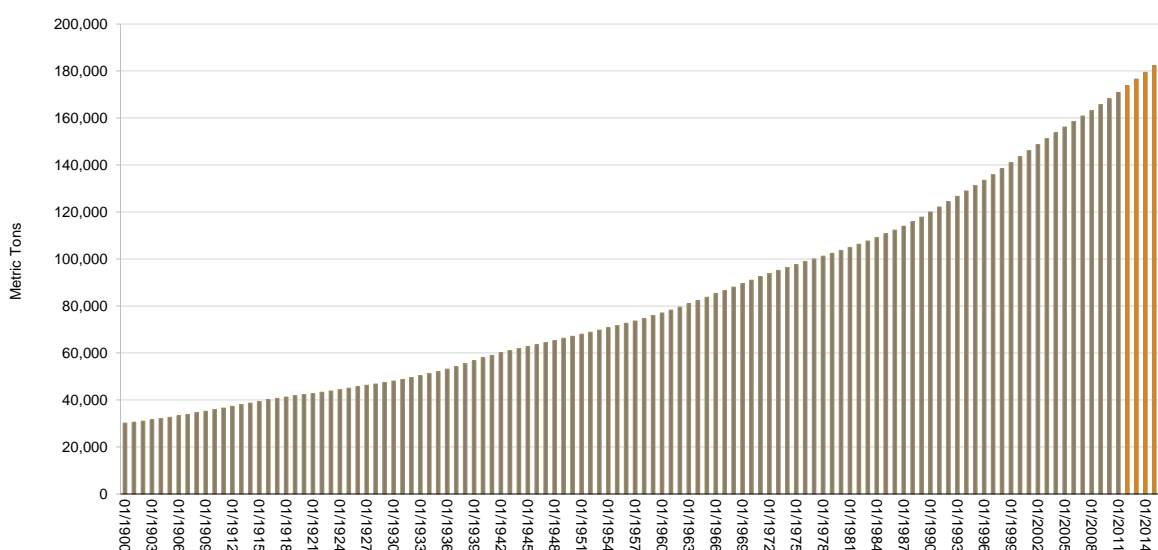


⁵ http://www.gold.org/investment/why_how_and_where/why_invest/demand_and_supply/

⁶ <http://search.usgs.gov/results.html?cx=005083607223377578371%3Ab5ixbbpqp0&cof=FORID%3A11&q=gold+proction&sa=Go>

⁷ Based on exponential trend estimates using historical gold production from 1900 to 2011 (x50%); and “Gold supply/demand: Total mine production”, Peter Richardson, *Global Metals Playbook*, Morgan Stanley, 17/01/12, p.40 (x50%).

Chart 4 - Global Gold Inventory



US Money Supply

Given we are measuring the gold price in US dollars; let's now consider the relative scarcity of US dollars. This is best done by looking at US money supply figures. But the question is which US money supply figures? Should we look at a narrow measure of money supply, such as the money base? Or, a broader measure of money supply, such as M2⁸?

There is much debate in financial markets on this issue, with many (although not all) economic and strategy commentators favouring a broader, rather than, a narrower measure of money supply. However, my intuition would be to use the money base. The reason being that in the long-term only governments and central banks can create money. Consider the following explanation taken from a book written by George Cooper, called *The Origin of Financial Crises*:

Economics has a long tradition of borrowing concepts from the physical sciences; when it comes to private sector credit creation there is a useful analogue in the modern theory of quantum physics. The German Nobel Prize-winning Physicist Werner Heisenberg worked out that nature did not always respect the principle of conservation of energy. Prior to Heisenberg's discovery it was believed that energy could never be created or destroyed, but only re-arranged. Heisenberg realised that for very short periods of time the law of conservation of energy could be violated. Energy could be borrowed for short times, and bizarrely, this energy could be used to make particles of a previously unknown type – known as antimatter. In nature it turns out that pairs of matter antimatter particles can pop into existence, live for a short time, and then recombine back into nothingness. Provided it all happens fast enough no one is any the wiser.

So what, you may ask has all this to do with money supply? Cooper goes on to explain:

Private sector credit creation works like Heisenberg's matter antimatter pairs. Money and debt are created in pairs, from nothing, live for a while and then vanish when they recombine. Taking out a loan creates a money-debt pair, paying off the loan destroys a money-debt pair.

Recognising that private sector credit creation works through generating money and debt in combination is important in two respects. Firstly, it helps make it clear that private sector banking cannot be (directly) responsible for permanent ongoing inflation. Secondly, it helps clarify why some central banks worry so much about money supply growth; money growth also means debt growth, and it's the debt that causes financial instability.

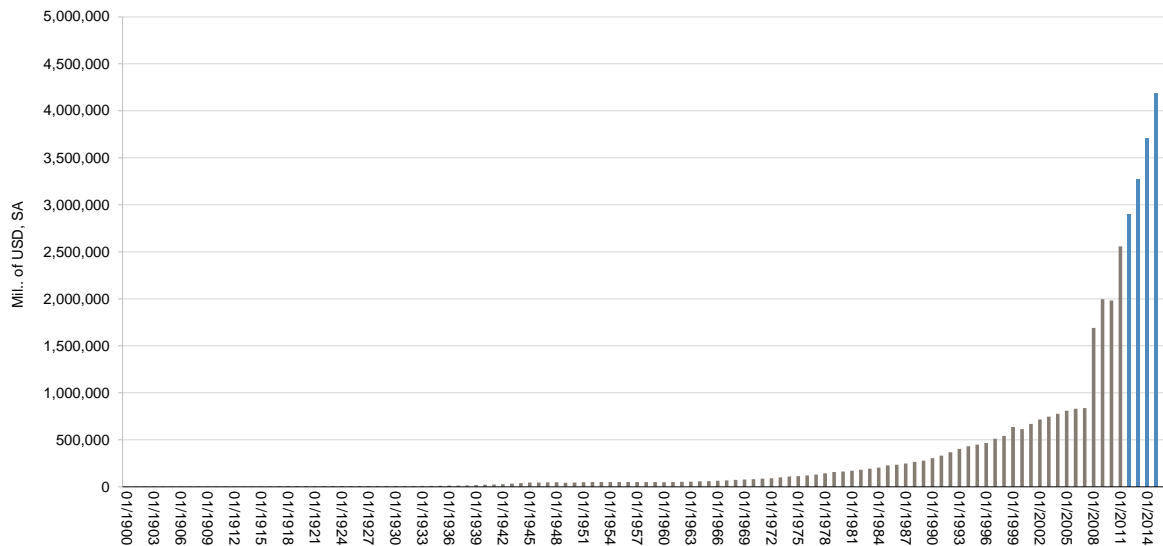
Today there is widespread misconception that private credit creation causes inflation. The truth is rather more subtle than this. As credit is being created – loans made – an inflationary impulse is generated, however when the credit is destroyed again – loan repaid – a deflationary impulse is generated. Provided loans are being made and destroyed at roughly equal rates the inflationary and deflationary impulses will tend to cancel, leaving prices stable. However, if either credit creation or credit destruction becomes dominant at any point, then respectively a temporary inflation or deflation will be generated.

⁸ The US Federal Reserve (Fed) ceased publication of M3 data in 2006. When the Fed announced in 2005 that they would cease publishing M3 statistics, they explained that M3 did not convey any additional information about economic activity compared to M2, and thus, "has not played a role in the monetary policy process for many years". Some US politicians have spoken out against the Fed's decision to cease publishing M3 statistics and have urged the U.S. Congress to take steps requiring the Fed to do so. Congressman Ron Paul claimed that "M3 is the best description of how quickly the Fed is creating new money and credit. Common sense tells us that a government central bank creating new money out of thin air depreciates the value of each dollar in circulation."

US Money Base

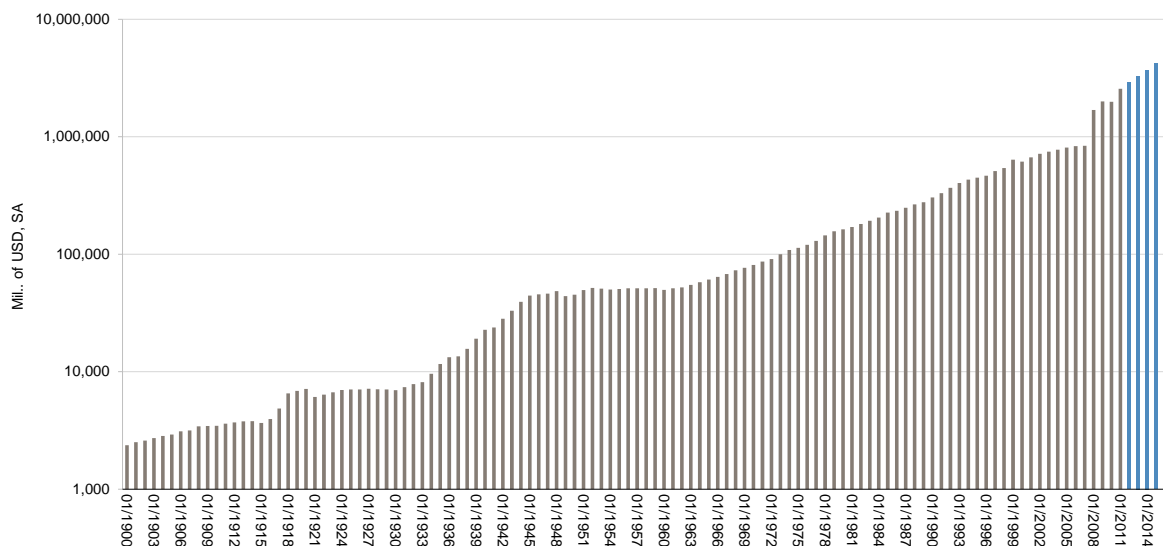
Chart 5 below shows the US money base back to 1900 and my forecasts out to 2016.

Chart 5 - US Money Base



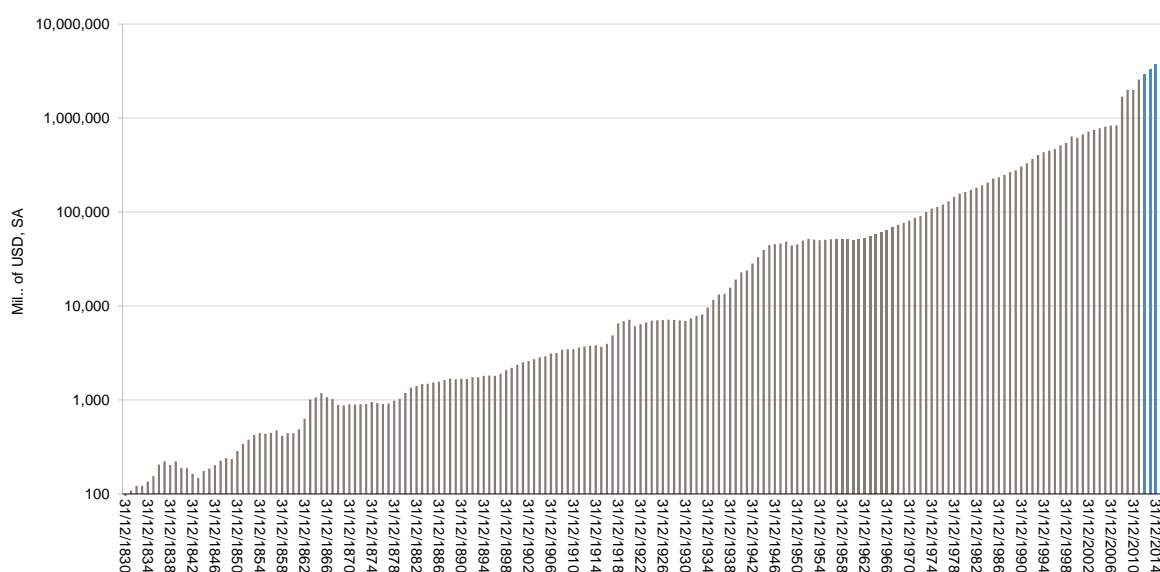
To make it a bit easier to understand the periodic relativities of this chart, I also present the same chart in a log10 form below (see Chart 6).

Chart 6 - US Money Base from 1900 (log10)



There are a few things we can note from these charts. Firstly, fiat money has no real world constraint to its expansion, especially in the absence of a physical restriction – e.g. gold, silver, or some other, standard; and that's why it can expand so rapidly. Secondly, whenever the US Government has faced fiscal difficulties over the last 185 years, caused by wars or financial disasters, their response has always been to print new money (see Chart 7):

Chart 7 – US Money Base from 1830 (log chart)



- From 1829 to 1837 the money base increased by 139% from \$93m to \$222m – the result of a combination of: the collapse of the Second Bank of the United States, Mexican bimetalism (which drove Mexican silver out of Mexican circulation and into America where it was legal tender), legal tender law, the introduction of fractional reserve banking, and state government deficit spending. These events dramatically increased the money and credit supply, decreased interest rates, and led to erroneous investment decisions which ended with the Panic of 1837. The deflation which followed the panic resulted in a reduction in the money base of 26% by 1842. Over the entire period the money base increased by 76%, which was modest compared to later periods of money supply expansion.
- From 1858 to 1865 the money base increased by 184% from \$415m to \$1.2b – the result of funding the American Civil War. After the Civil War ended in 1865 the money base was reduced by 26% by 1869, resulting in a net increase of 110% over the entire period.
- From 1915 to 1920 the money base increased by 94% from \$3.7b to \$7.1b – the result of the lead up to, subsequent US involvement in, and aftermath of, WWI.⁹ This was followed by a 14% contraction in money supply in 1921, resulting in a net increase of 66% over the entire period.

However, compared to what was to come, these previous periods of monetary expansions were mere foreplay. It wasn't until 1929, when the monetary fun really began:

- From 1929 to 1948 the money base increased 587% from \$7.1b to \$48.4b – the result of dealing with the consequences of stock market crash of 1929, and banking crises in 1930, 1931 and 1933. This was then followed by funding Roosevelt's New Deal in the early/mid 1930s, the rapid economic expansion of the late 1930s, and the US involvement in WWII.¹⁰ There was a small 9% contraction in money supply in 1949, resulting in a net increase of 524% across the entire period.

This now brings us to the global financial crises and the current US fiscal and economic challenges. From 2007 to 2011 the money base has increased by 205% from \$838b to \$2.6t. However, I doubt this is the end of this chapter of US economic and monetary history. So how much more money will the US need to print? This is not an easy question to answer, but I will make the following points: (1) the biggest beneficiary of low or negative real interest rates in any economy are the debtors in that economy; and (2) the US Federal Government is now a massive debtor – and a debtor with its own money printing machine. Therefore, looking at US Federal Government debt is not a bad place to start to help answer this difficult question.

⁹ "Though the money stock grew throughout the period from 1914 to 1920, the factors accounting for the rise were quite different: (1) before entry into the war on April 6, 1917; (2) during the period of active participation in the war when government expenditures greatly exceeded tax receipts; and (3) during the price boom that occurred subsequently, when government receipts equalled or exceeded expenditures." In the first period, purchases in the US by new allies, here thereto financed largely by shipments of gold, sales of foreign-held securities, etc. In the second period, though taxes were raised, government receipts fell far short of expenditures during the period of active warfare and continued to do so after the Armistice in November 1918 and through the remainder of fiscal 1919." Milton Friedman, Anna Jacobson Schwartz, *A Monetary History of the United States 1867-1960* (1963, New York, Princeton University Press), pp.189-231.

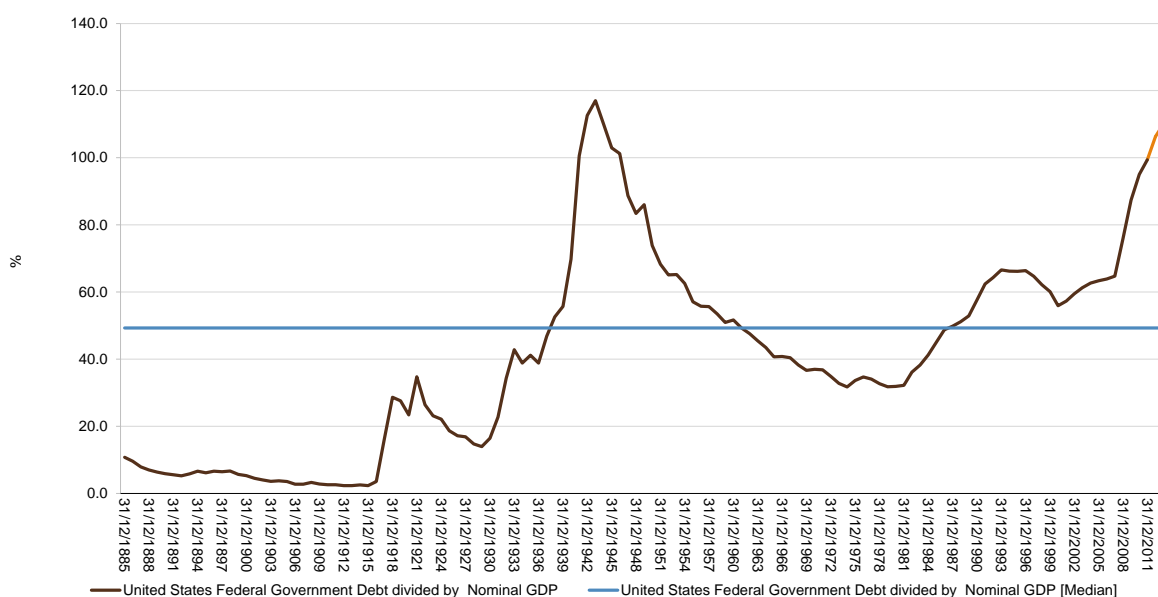
¹⁰ Op. cit., pp. 240-585.

US Federal Government Debt

From 2007 to 2011 the US Federal Government debt as a percentage of US nominal GDP (henceforth referred to as the *debt ratio*) has increased about 35 percentage points, from 64.8% to 99.5% (see Chart 8 below), and reportedly to over 100% in the last couple of weeks¹¹. The last time the US Federal Government had such a large debt ratio was in the early 1940s, when it reach 117%, and it took 19 years to reduce this debt back to the long-term median.

Chart 8 also shows a continued forecast rise in the US debt ratio to 110% from 2011 to 2013 (the orange line) based on forecasts from the US Congressional Budget Office.¹² The blue line on Chart 8 shows the median US debt ratio of 49% from 1915 to 2011.

Chart 8 – US Federal Government Debt to Nominal GDP



So what does this debt ratio mean for US money supply? If you believe that the US Federal Government has a debt problem, then there are only a couple ways to fix this problem: (1) default to reduce the quantum of the debt; and/or (2) increase net nominal income to service and repay the debt. There are two ways to achieve the latter: (1) higher taxes and/or lower government spending; and/or (2) higher inflation.

It's hard to imagine the US defaulting given that all its debt is denominated in US dollars and the US dollar is still considered the global reserve currency. So that leaves the latter – increasing net nominal income with higher inflation. In a democratic political system it is very painful to increase taxes and/or lower government spending (i.e. commonly referred to as austerity), especially in difficult economic environments – just take a look at the current civil unrest in Greece. It can also be counter-productive in a weak economy as we have seen from the impact of the austerity measures on European economic growth, and especially the economic growth of countries such as Greece, Spain and Portugal.

It is also very difficult to engineer higher real economic growth as this in the long term is largely a function of productivity improvements and population growth. So that leaves the US Government with only one easy lever to pull – the inflation component of nominal economic growth.

But how do you engineer higher inflation? As Milton Friedman says, "Inflation is always and everywhere a monetary phenomenon..."¹³ Therefore, assuming the velocity of money is mean reverting over time, then increasing money supply at a faster rate than the real production of goods and services is a sure fire way to increase the inflation¹⁴ component of nominal income.

¹¹ This figure is based on US Federal Government debt figures from the US Treasury as at 23/02/12 and divided by US 4Q2011 nominal annualised GDP.

<http://www.treasurydirect.gov/NP/NPGateway>

¹² *The Budget and Economic Outlook: Fiscal 2012 to 2022*, US Congressional Budget Office, 31 January 2012.

¹³ "Inflation is always and everywhere a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output. A steady rate of monetary growth at a moderate level can provide a framework under which a country can have little inflation and much growth. It will not produce perfect stability; it will not produce heaven on earth; but it can make an important contribution to a stable economic society." Milton Friedman, *The Counter-Revolution in Monetary Theory*, (1970).

¹⁴ My definition of inflation is much broader than the sample measure of goods and services inflation quoted in US consumer price index figures. It refers to goods and services, as well as asset price, inflation. It's interesting to note that in the first couple decades of the 20th century, the Federal Reserve Bank of New York measured inflation using a general index compiled from the prices of goods, property and services of all descriptions, not only commodities, wholesale and retail, but stocks, bonds, real estate, wages, rents, and freights. Op. cit., Fisher, p.17.

If you accept these arguments, then we are still left with another question: How much does US money supply have to increase to deal with the current US Federal Government debt problem? One way to answer this question is to look to the last US Federal Government debt and money supply cycle which was similar in size to the current cycle. This was the cycle from 1929 to 1962.

From 1929 to 1943 the US debt ratio increased from 14% to 117%, and then fell to 48% in 1962. Over this entire period the money base increased by 640%. Each 1 point decrease in the debt ratio from its peak in 1943 required a 9% increase in the money base (i.e. $640\% \div 69\% = 9\%$) over the entire period from 1929 to 1962.

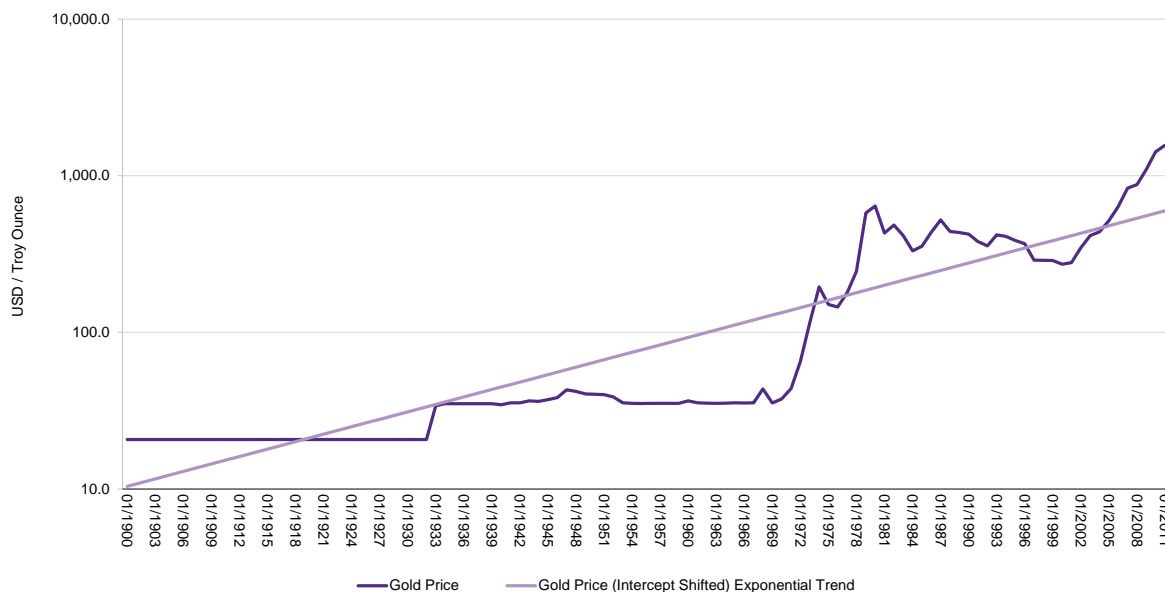
The next question to answer is: What debt ratio will the US Federal Government target in the future? This is also difficult question to answer, but for a debtor with the ability to print money to repay its debts, I suggest it could be any figure it wants (with, of course, inflationary consequences). For the purpose of this analysis I have chosen the long-term historical median figure of 49% (from 1915 to 2011). This figure is shown as the blue line on Chart 8.

From the forecast peak of the US debt ratio in 2013 of 110%, the US debt ratio is projected to fall by 61 percentage points to 49%. Combining this figure with 9:1 ratio above, it follows that the US needs to increase its money base by 563% from \$838b to \$4.7t, to reduce its debt ratio back to 49%. From 2007 to 2011 the US money base has already increased from \$838b to \$2.6t. Therefore, from current levels the US will need to increase the money base by a further \$2.2t to \$4.7t

Forecasting the Gold Price

We now have the two key sets of figures we need to forecast the gold price: (1) expected changes in world gold inventory; and (2) expected changes in the US money base. All we need to do now is find an equilibrium starting gold price from which to apply to the fundamental changes in these figures. In statistical analysis, it is often said that if you find the right bookends you can empirically prove almost any story you want. In an attempt to overcome this statistical bias it is important to use both representative data and to go as far back as possible (which can often be conflicting goals). However, the problem with gold is that for much of the last 110 years its price has been fixed¹⁵. To overcome this problem I've plotted a trend line (see Chart 9) through the historic gold price series and calibrated it to two important historic gold revaluation events: (1) 1933 when the US dropped the gold standard; and (2) the few years following the breakdown of the Bretton Woods Agreement in 1971.

Chart 8 – Estimation of Equilibrium Gold Price



¹⁵ The *Gold Standard Act* (1900) established gold as the only standard for redeeming paper money, stopping bimetalism (which had allowed silver in exchange for gold). The *Act* fixed the value of the dollar at 25 8/10 grains of gold at 90% purity, equivalent to 23.22 grains (1.5046 grams) of pure gold. The *Gold Standard Act* confirmed the nation's commitment to the gold standard by assigning gold a specific dollar value (just over \$20.67 per Troy ounce). On April 25, 1933 the United States dropped the gold standard. After the Second World War, a system similar to a Gold Standard and sometimes described as a "gold exchange standard" was established by the *Bretton Woods Agreements*. Under this system, many countries fixed their exchange rates relative to the U.S. dollar. The U.S. promised to fix the price of gold at approximately \$35 per Troy ounce. Implicitly, then, all currencies pegged to the dollar also had a fixed value in terms of gold. Under the administration of the French President Charles de Gaulle up to 1970, France reduced its dollar reserves, trading them for gold from the U.S. Government, thereby reducing U.S. economic influence abroad. This, along with the fiscal strain of federal expenditures for the Vietnam War and persistent balance of payments deficits, led President Richard Nixon to end the direct convertibility of the dollar to gold on August 15, 1971, resulting in a breakdown of the Bretton Woods System.

This exercise implies a gold price in equilibrium towards the end of 1919 – about the half-way point of the first US gold standard era. Therefore, I use the gold price of \$20.67 at the end of 1919 as the starting price for my fundamental analysis.

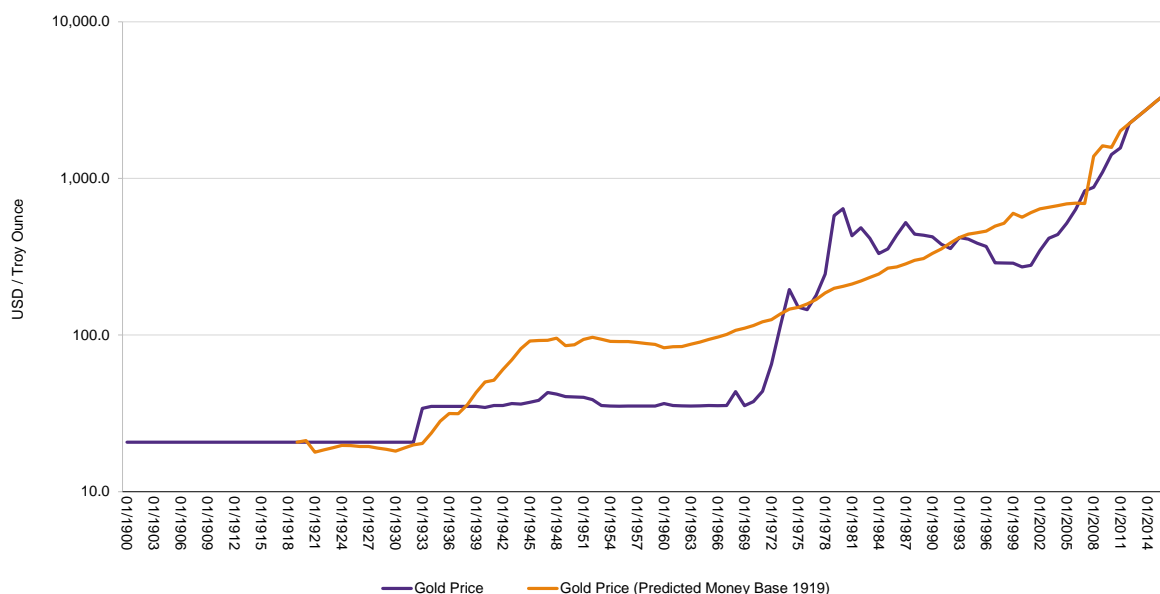
In my gold price model, all future gold prices from the 1919 equilibrium price are a function of changes in world gold inventory relative to changes in the US money base, using the following formula:

$$GP_{t0} = GP_{t-1} - GP_{t-1} \times (GI_{t0} \div GI_{t-1} - 1) + GP_{t-1} \times (MB_{t0} \div MB_{t-1} - 1)$$

Where: *GP* = gold price; *GI* = world gold inventory; and *MB* = US money base.

The output of this model (the orange line) is shown Chart 9.

Chart 9 – Actual Gold Price v. Predicted Gold Price (log10)



There are some interesting past, present, and future observations that we can make from Chart 9:

1. French President Charles de Gaulle clearly made the right decision reducing France's US dollar reserves in the late 1960s, trading them for gold from the U.S. government.¹⁶ Clearly the US cheated on the Bretton Woods Agreement: between 1945 and 1970 the US money base increased by 82% from \$44.5b to \$80.9b; whereas the US Treasury's stock of gold reserves decreased 49% from 17,848mt in 1945 to 9,070mt in 1970.¹⁷ Over the same time period world gold inventory only increased by 45% from 2,012mt to 2,924mt.
2. The gold price increase from US\$279 at the end of 2001 to US\$1,564 at the end of 2011 was justifiable for two reasons: (1) in 2001 the gold price was trading 54% below its equilibrium price¹⁸ in 2001; and (2) the US money base increased by 205% between 2007 and 2011 from \$838b to \$2.6t. Note that my equilibrium gold price for the end of 2011 was US\$2,012.
3. For the US Federal Government to take its debt ratio back to its long term median level of 49%, then based on the last debt and monetisation cycle (from 1929 to 1962), the US Federal Government will need to increase its money base by a further 85% over the next 5 years. Given our forecasts for world gold production (and the resulting expansion of global gold inventory over the next 5 years) this implies a gold price US\$3,456 by the end of 2016.

¹⁶ It was a shame for the French that US President Richard Nixon stopped convertibility of US dollars for gold at \$35oz in 1971!

¹⁷ Timothy Green, *Central Bank Gold Reserves: An historical perspectives since 1845*, World Gold -Council, (November 1999), pp.17-18.

¹⁸ This equilibrium figure is calculated using my gold price model.

Conclusion

Gold is a *store of wealth* like fiat currencies, but unlike fiat currencies it is finite and real. It also a *medium of exchange* when confidence is lacking in fiat currencies. Gold's utility is not that of an investment that yields a cash flow return, as some would argue¹⁹, but rather its utility is as a fiat money substitute.

Predicting the US dollar gold price is much less about predicting gold supply and non-monetary demand, and much more about predicting increases in the US money supply. A third round of quantitative easing (QE3)²⁰ by the US Federal Reserve sometime 2012 is likely to increase the US money base by another ~\$0.3t, which should propel the gold price to around US\$2,250 by the end of 2012²¹. However, if the US Federal Government wants to reduce its debt ratio down to a more long-term sustainable level, then there is likely to be more substantial quantitative easings in the next several years. This will also mean much more financial repression to help ensure that as many savers as possible share the painful effects of inflation.

The moral of this story is simple: **Never lend money to a large debtor with a printing press!**

Investment Perspective

From a portfolio perspective, we believe that higher inflation in the future will favour companies with real assets (as opposed to paper assets) and/or strong competitive advantage that allows them to pass through increased input costs into higher selling prices.

Epilogue

The views expressed in this paper are those of the author and only contribute to JCPIP's gold price forecasts as opposed to defining these forecasts. There are several other people within JCPIP's extended Resources Team whose own independent views also contribute to JCPIP's gold price forecasts to varying degrees. As at the publication date of this paper (05/03/2012), JCPIP's gold price forecast for the end of 2014, for example, is US\$1,837, compared to my forecast of US\$2,787.

¹⁹ Warren Buffet's Letter to Berkshire Shareholders, Berkshire Hathaway Inc. (25/02/2012, pp.18-19).
<http://www.berkshirehathaway.com/letters/2011ltr.pdf>

²⁰ This QE3 is likely to be directed at buying US residential mortgages.

²¹