The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

What connections are there between debt, oil prices, and personal income?

Posted by Gail the Actuary on May 7, 2010 - 10:27am
Topic: Economics/Finance
Tags: debt, disposable personal income, economic crisis, personal income [list all tags]

I was looking at the ratio US debt to US disposable personal income together with some other graphs of oil supply and oil prices, and realized that maybe there is a connection between debt, oil prices and personal income. In this post, I show a few graphs, and offer my conjectures as to what may be behind the relationships. You may agree with me, or perhaps you can offer some different ideas as to what happened in the past, and what may be ahead.

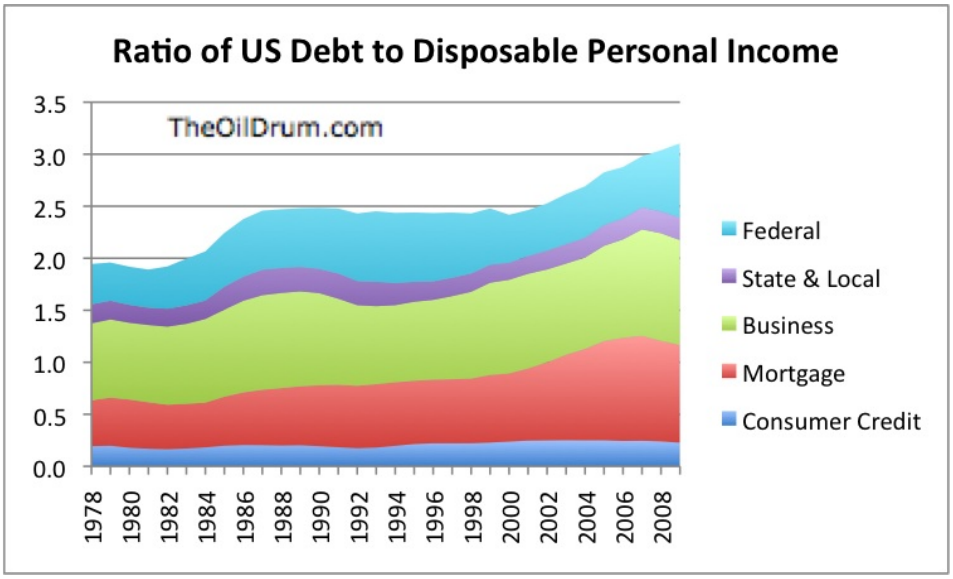

Figure 1 -Ratio of US Debt (based on Z.1 Data of the Federal Reserve) to Disposable Personal Income (based on data of the US Bureau of Economic Analysis)

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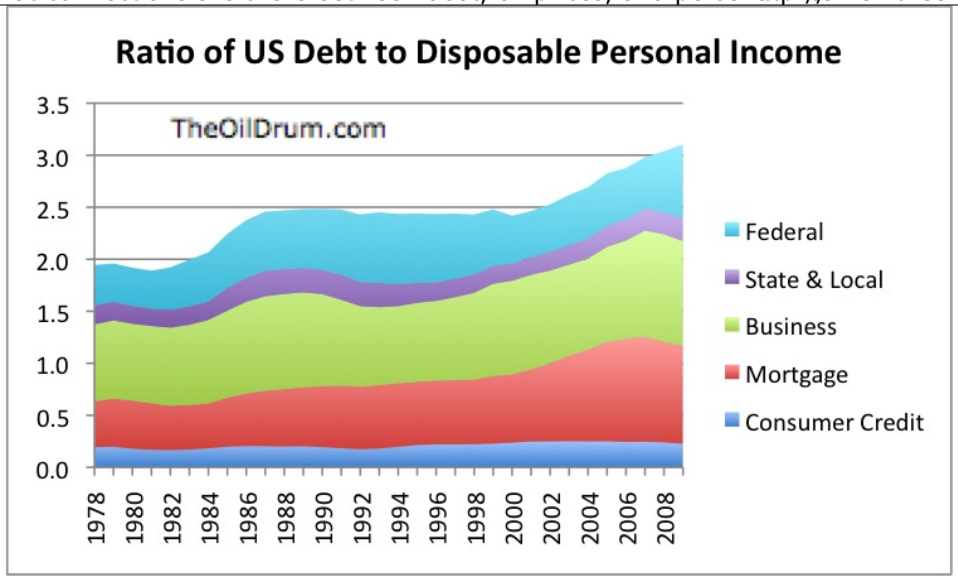

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1981 -1987

Let's start with the 1981-1987 period. I have always wondered how the US was able to add all kinds of nuclear facilities, ramp up coal production, and improve auto mileage, back at the time oil consumption dropped in the early 1980s. Maybe the answer was more debt! At that time, there were some low-hanging fruit--switching out of petroleum based electrical power plants, to nuclear and coal, and downsizing vehicles. It takes capital to do all of these things. Perhaps the big increase in debt in the 1981 to 1987 period was at least partially a response to this need. We might have had our own special period, (relating to the decline in quantity of oil used) if weren't for the availability of more debt.

If one looks at crude oil production, shown in Figure 2, it dipped in the same period as the ramp-up in new debt--about the 1981 to 1987 period.

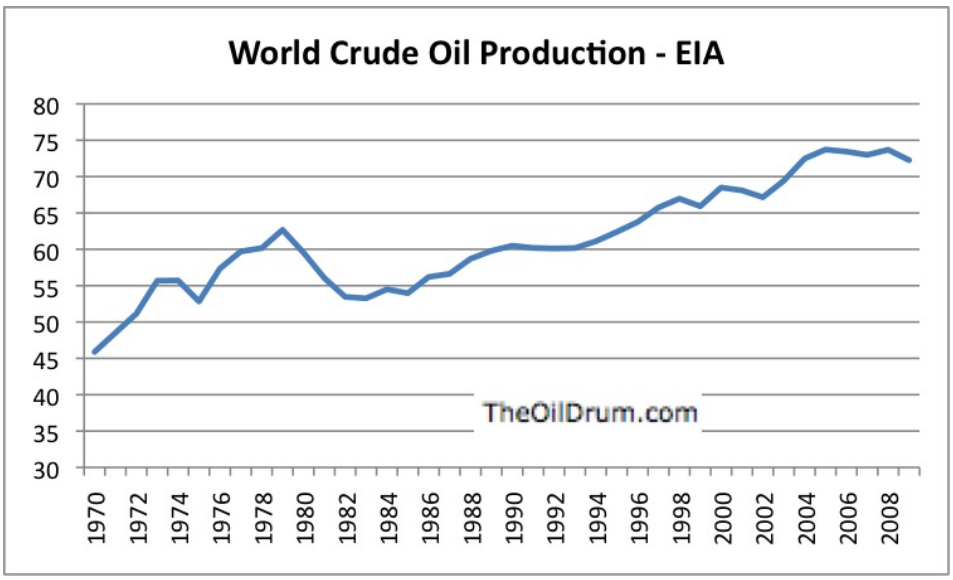

Figure 2 - World Crude Oil Production, based on EIA International Petroleum Monthly Data

One can think of average personal disposable income in terms of the number of barrels of oil it would buy.

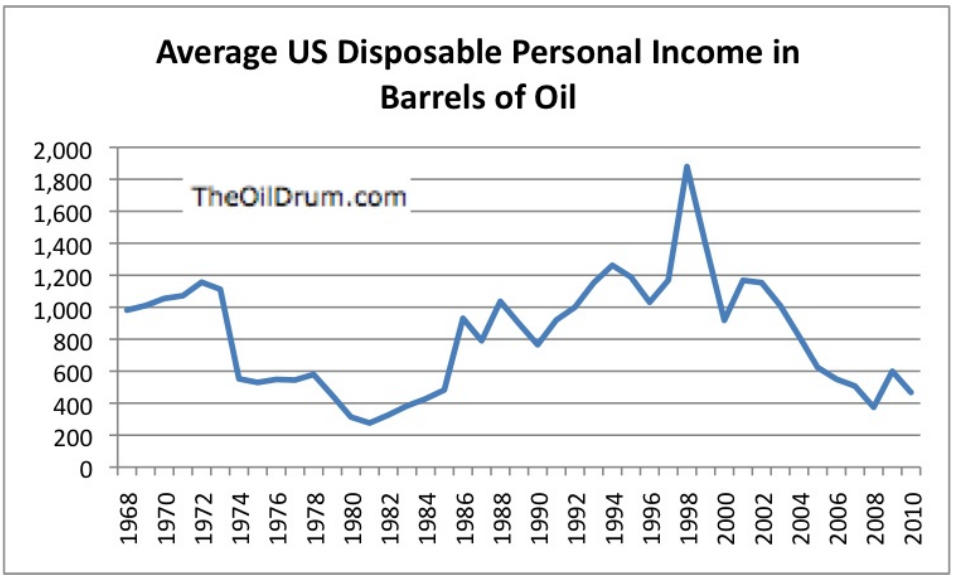

Figure 3 - Number of barrels of crude oil that the average per capital income would buy, calculated by dividing average disposable personal from income BEA by the average price of a barrel of oil from EIA, based on the average price paid by US refiners for this oil. 2010 is partial year.

Back in 1981, oil was very expensive, in terms of the disposable personal income of Americans. But it gradually got much cheaper in the 1981 to 1987 period, as debt was ramped up. Part of this may have been other energy sources that were ramped up to help substitute for oil helped reduce the real demand for oil, and thus bring down its price.

1987 to 1999

Between 1987 and 1999, world crude oil consumption grew. This was especially the case at the beginning of the period and closer to end of the 1987 to 1999 period, as can be seen from Figure 2. Oil became more and more affordable in terms of personal income, as shown in Figure 3.

I think of this as the time of the big stock market price run up. With more and more personal income, in terms of oil, it was possible to support a dot-com boom, without even adding much debt.

2000 to 2006

The stock market bust and recession of 2000 corresponded with a drop in people's purchasing power, in terms of oil, as one can see from Figure 3. To try to fix / disguise this problem, another huge ramp up in debt was engineered, as can be seen on Figure 1. While there was growth in oil production at the beginning of the 2000-2006 period, increased demand, particularly from China and from oil exporting countries tended to act to raise prices, even as production rose.

2006 - 2010

My expectation for 2006 onward can be summed up in this graph I have shown previously.

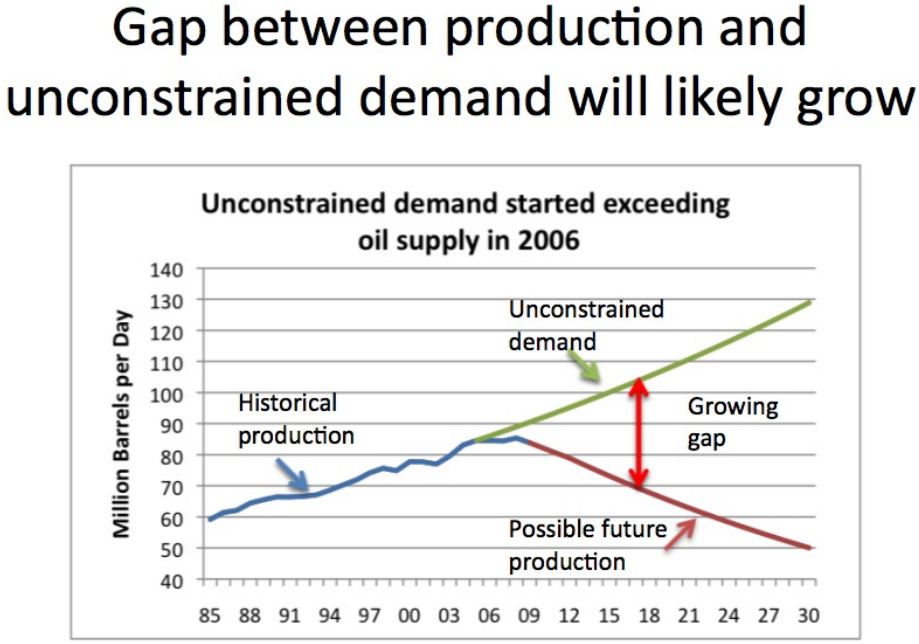

Figure 4 - Expected Gap Between Oil Demand, Unconstrained by Price or Credit Issues, and Supply.

In the absence of a restriction in supply caused by high prices or by inadequate credit availability, one would expect world oil demand to grow as shown in the green unconstrained demand line. But with less oil available, something had to "give". A lot of people originally thought the result would be higher and higher price, but we have seen that there is a second cutback in demand that works as well--a cutback in credit availability. So somehow supply and demand are kept together. The result can look as much like peak demand as peak supply.

Rune has shown a graph showing that indeed, OECD consumption was restricted in this period, as prices rose.

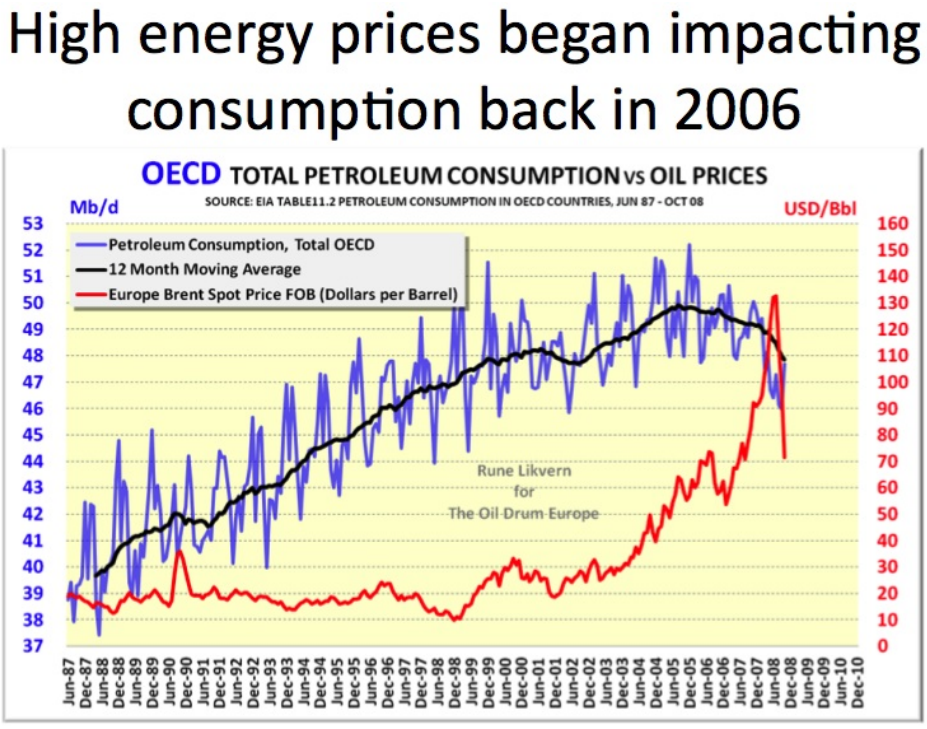

Figure 5 - Graph by Rune Likvern showing impact of high oil prices on OECD consumption.

And if we look at average per capita disposable personal income, in 2005 dollars, as calculated by the BEA, we find it flattens out in this period:

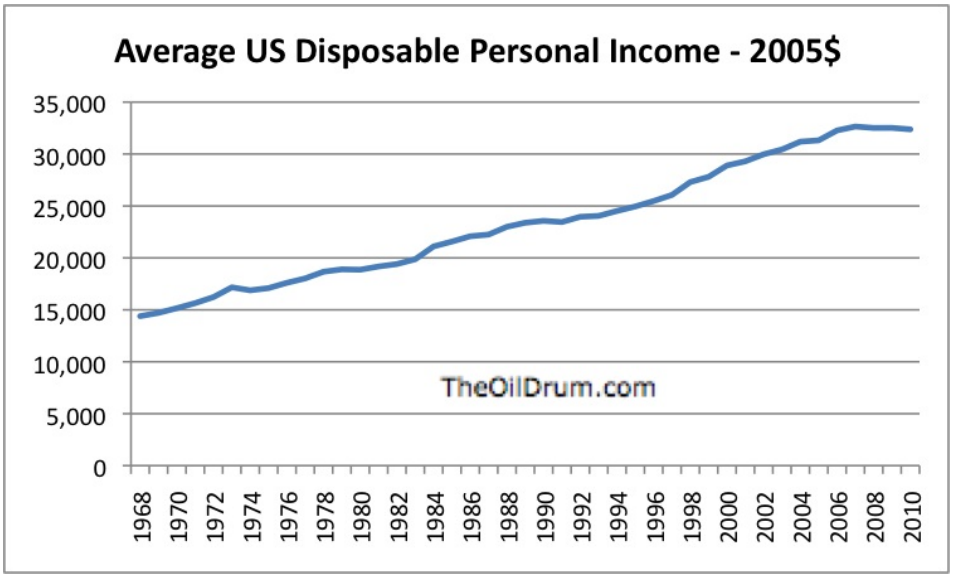

Figure 6 - Average per capita personal disposable income in 2005 dollars.

Not too surprisingly, with very low purchasing power in terms of oil (see Figure 3), and dropping oil consumption, people were not able to keep up their big purchases, and the price of houses started to drop.

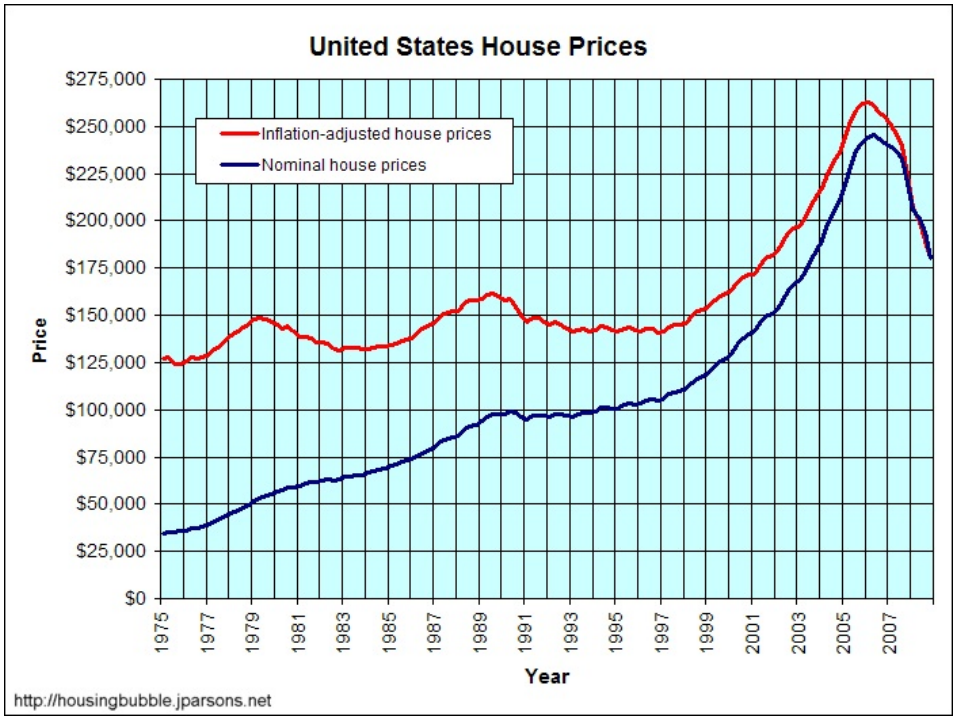

Figure 7 - Average housing price, from jparsons. net

Looking back at Figure 1, which I have repeated as Figure 8, we can see that recently consumer

and business debt has dropped, but government debt has continued to grow.

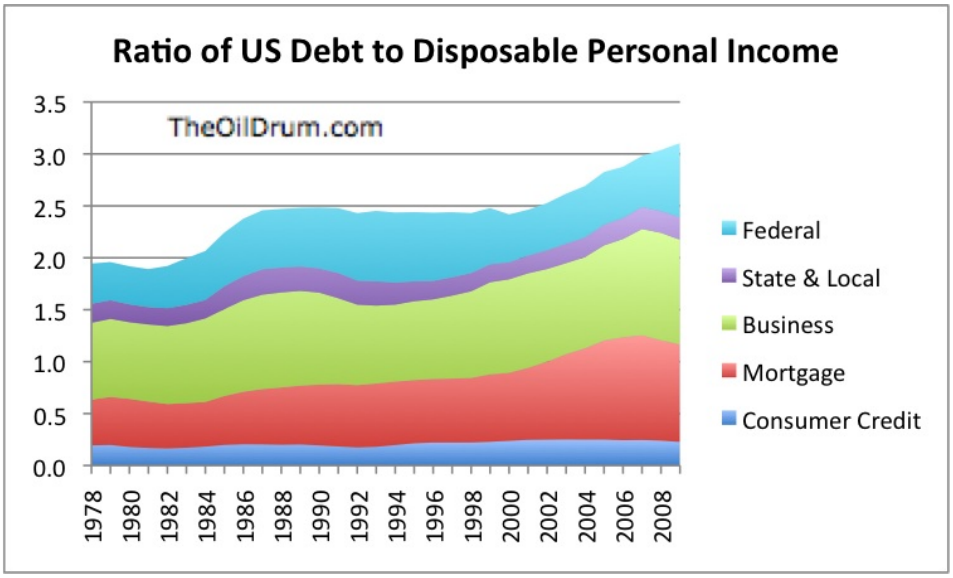

Figure 8 -Ratio of US Debt (based on Z.1 Data of the Federal Reserve) to Disposable Personal Income (based on data of the US Bureau of Economic Analysis)

What is ahead?

It is hard to see how this whole situation can resolve nicely.

With oil production likely to stay low, the problem with flat personal disposable incomes is likely to persist. This in turn is likely to make it difficult for governments to increase their revenues. (I have shown US figure, but there are no doubt parallels in other parts of the world.) If they cannot increase their revenues, they likely will not be able to repay their debts. So debt defaults around the world are likely not too far away--especially for the countries in worse-than-average condition.

Theoretically, oil production could continue to rise if there were enough investment. For example, one could theoretically ramp up oil sands production, plus oil shale production, and maybe even add some coal to liquid production. But to do something of this sort would require a huge amount of additional capital, and this in turn would require even more debt. Dennis Meadows of "Limits to Growth" fame has said the limiting variable in our current predicament is capital. It looks to me as if we are at this point running up against this limit, certainly from the point of borrowing for capital. Real capital, created by net energy, has likely been declining for years.

What thoughts do others have on these issues? Is there an easy way out?