



Financial Forecast for 2009, Considering Resource Limitations

Posted by [Gail the Actuary](#) on January 6, 2009 - 11:10am

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Tags: [2009 forecast](#), [bankruptcy](#), [debt unwind](#), [hyperinflation](#), [oil demand](#), [peak oil](#) [[list all tags](#)]

In this post, I consider some major issues contributing to our current financial problems, before making a financial forecast for 2009. These are

1. Why so many asset classes are so highly correlated in times of distress. This chart gives my interpretation of part of the problem.

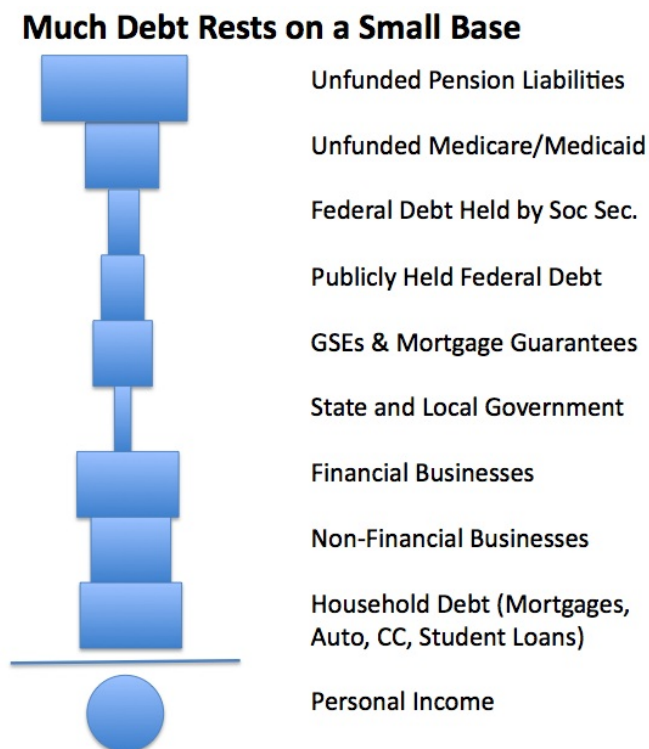


Figure 1

2. Why growth is essential for keeping the current debt-based financial system operating.
3. Where we are now, and the role reduced resources (including peak oil) are likely to play as we go forward.
4. My forecast for 2009.

1. Why so many asset classes are highly correlated in times of

distress.

We keep hearing about plans to stimulate the "consumer" to buy more. Until I stopped to think about it, it wasn't obvious to me that the consumer (or perhaps I should say, ordinary citizen), and his ability to purchase goods and services are key to keeping the whole system going. These connections include:

1. Adequate income is needed for a citizen to repay the debt he already has.
2. Some of the "higher level" debt in the tower in Figure 1 is simply debt from one of the lower levels, recycled on someone else's balance sheet.
3. Revenues from ordinary citizens support the businesses and governments that have loans higher up on the "tower", and are critical to these organizations' ability to repay their own debt.

It is only when the system is under stress, and shortfalls in income of the ordinary citizen start shaking the system, that these connections becomes clearer. Let's look at the debt shown in Figure 1 by layer, starting from the bottom:

Layer 1. Household Debt (Mortgages, auto loans, credit card debt, student loans). Adequate income is needed for citizens to repay these loans. Also, if ordinary citizens have adequate incomes, this helps to keep demand for houses up, which in turn helps to keep the prices for houses up. These higher prices allow citizens to borrow more against their homes, and use this revenue to purchase even more, helping prop up businesses from which they buy goods and services. If the prices of homes drop because of inadequate demand, huge problems develop, as we are now acutely aware.

Layer 2. Debt of Non-Financial Businesses. This would include loans for companies like GM and Ford and mortgage loans for restaurants. It might include debt for casinos, and debt for church buildings. All of these businesses are directly or indirectly dependent on wage-earners having enough money to buy their products, or contribute their Sunday offerings, in order that they can repay their loans. Even if a business only sells its service to other businesses, it is a part of a chain of businesses that at its base is dependent on customers buying its goods and services.

Layer 3. Debt of Financial Businesses. To a significant extent, this is just recycled debt from the first two layers. What happens is that an individual or business borrows from a financial institution, for example a commercial mortgage or credit card debt. The financial institution repackages the debt (sometimes first slicing and dicing it) and lays it off again. If one of the first two layers defaults, then the third layer is likely to default as well.

Layer 4. Debt of State and Local governments. In a way, these governments are service providers. They collect money from their citizens one way or another (property tax, sales tax, tolls on roads, lottery tickets) to pay for the services they provide. If citizens are laid off, or are working for lower paid jobs, they will pay lower taxes to the state. Also, if the citizens don't bid up the prices of houses, it is difficult to collect as high property taxes on them. Some of a state's services, like unemployment compensation and health services for the poor, may increase in bad times.

Layer 5. Government Guaranteed Mortgages. This is just a recycled version of part of

the mortgages in Layer 1, including those held by Fannie and Freddie, and those indirectly guaranteed by Fannie and Freddie. If the Layer 1 mortgages default (or are reduced because of "cram down" provisions), Layer 5 mortgages will almost certainly have problems as well.

Layers 6 and 7. Different Versions of Federal Debt. The Federal Government obtains most of its revenues from taxes of individuals. If citizens are earning less money, it is difficult to continue collecting as much taxes. Some of the taxes come from businesses, but to earn money to pay taxes, businesses have to sell some goods or services to the public. If citizens are short of funds to buy goods and services, the profits of businesses will be lower, and the revenues from taxes on these businesses is likely to be lower as well.

Layer 8. Unfunded Medicare / Medicaid. These are promises made to individuals that will eventually have to be paid for by someone. Ultimately, the funding for these will have to come from taxpayers, which for the most part are ordinary citizens.

Layer 9. Unfunded Pension Plan Amounts. Pensions are funded by a combination of investments in bonds, stocks and other securities. To the extent that these securities have performed poorly, there will be a shortfall in funding. The events of the last year will cause many pension plans to be in poor shape, because they hold debt shown in the tower in Figure 1 and some of it is defaulting. If additional contributions from the organization setting up the pension plan become necessary, these funds will ultimately have to come from a taxpayer (if it is a local government) or a purchaser of goods or services (if it is a business).

The above list relates only to debt and promises to pay, but other financial assets are affected as well. The value of stocks is likely to decrease if people aren't buying a company's goods and services because of inadequate income. Insurance companies will have financial difficulties, because they tend to hold many bonds which decline in value as defaults increase. Hedge funds hold a mixture of asset types, but are also likely to be affected. Derivatives vary in what they cover, but some of these will also be affected by debt defaults related to inadequate consumer income. While this list is not exhaustive, it gives an idea why inadequate income by the ordinary consumer is likely to ripple through the system in many ways.

I would note too that there are a lot of feedback loops in the tower. When things are very good, the feedback loops tend to make things look very, very good (higher wages -> higher spending -> profitable businesses -> more hiring -> rising home prices -> less need for government programs). These same feedback loops work the opposite direction when things are bad (layoffs, for example), making a bad economic scenario truly terrible. The huge tower is also expensive to maintain, and takes resources from productive uses, like building infrastructure and new factories. As more and more layers are added to the tower (like TARP), the tower becomes more and more unstable, and more and more likely to have big reactions to small events.

2. Why growth is essential to keeping the current debt-based financial system operating.

Perhaps the easiest way to see that growth is essential to repayment of debt is to think about the government's borrowing to bail the United States out of our current financial predicament. As with the vast majority of debt, the debt is not really for an investment that will add value in any

real sense (more goods and services manufactured). Instead, it represents time-shifting of payments to the future, with an interest charge for this time shifting. In the case of the government spending, it is not even clear that all of the spending will be particularly beneficial. When previous stimulus checks were sent, some of the money was spent on goods imported from China, helping the Chinese economy. Also, some of the additional borrowing ended up in the pockets of high-paid financial executives who likely will not spend it on another car or house, since they already have more money than they are able to spend.

Think about the additional debt from the perspective of a typical wage-earner. Suppose the typical wage-earner's income is 100 units in 2007, 105 in 2008, 110 in 2009, 115 in 2010, 120 in 2011, and so on. If the government spends the equivalent of 10 units on the bailout (the wage-earner's share of the total), and gives the wage earner 3 units of it back as a stimulus check in 2009, the wage-earner's 2009 income will equal $110 + 3 = 113$ with the stimulus check. It should not be too onerous a task to pay the 10 units back through higher future taxes, since the wage-earner's income will be higher in future years, and he can use part of that increased income to pay the 10 back. With interest, the total amount to be re-paid may amount to 11 or 12 or 13, but even this may not be too onerous, because of rising income. Additionally, there may be the possibility of "rolling the debt forward", and not really repaying it, saving it for society's grandchildren, since it looks like the future is getting better and better.

Suppose on the other hand that the typical wage-earner's income is 100 in 2007, 98 in 2008, 96 in 2009, 94 in 2010, 92 in 2011, and so on. If the government spends the equivalent of 10 units on a bailout, and gives the wage-earner 3 units of it back as a stimulus check in 2009, the 3 units added to the 96 units will bring the wage-earner almost back up to where he was in 2007, (since $96 + 3 = 99$). The difficulty comes in paying back the 10 (or 11 or 12 or 13) units, because these will need to be subtracted from the wage-earner's lower future income, putting him in progressively worse financial shape. Also, the possibility of "rolling the debt forward" is likely to go away, since those buying government bonds will figure out that in 2020, when the typical wage-earner's income is down to 74, the chance of the wage-earner using part of that income to repay the debt from 2009 is pretty poor.

Because of these issues, the amount of debt a declining economy can support is much lower than the amount a rising economy can support. It seems to me that if there is no interest to pay, time shifting works well in a flat economy (as in 5,000 year ago). If there is interest to pay, time-shifting works as long as the growth rate is equal to the "real" interest rate. If there is a long-term decline in the economy, (something never really experienced in the past), time shifting generally doesn't work well.

If an investment truly generates a return rather than simply time-shifts (a factory rather than a mortgage), it may be possible to use debt in a period of economic decline, but interest rates will need to be much higher (quite possibly 15%+) because of a much higher risk of default. Such high interest rates are likely to make most potential investments no longer profitable. As a result, I would expect that the total amount of debt in a declining economy would be much less than today--probably less than 10% of the current total debt load.

3. Where we are now, and the role reduced resources (including peak oil) are likely to play as we go forward.

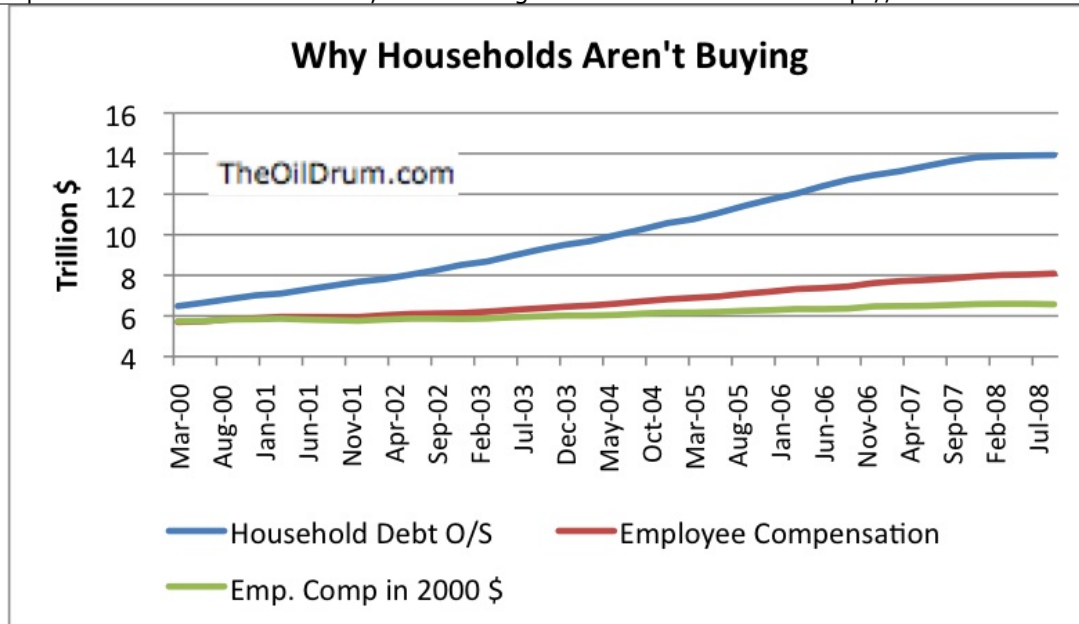


Figure 2. Household debt outstanding and employee compensation since 2000. Household debt from economagic.com. Employee compensation from [US Bureau of Economic Analysis](http://www.bls.gov). Adjustment to 2000 \$ made using US GNP deflator.

This graph gives an indication as to the problem. Employee compensation has been fairly flat since 2000. The situation for many employees is likely quite a bit worse than what the graph would suggest when one considers that (1) the wages I show in 2000 \$ are adjusted using the US GNP deflator, and the actual inflation rate is likely higher, so the trend in wages in 2000 \$ is likely lower than that shown; (2) the increase shown includes population growth of about 1% per year rather than being on a per capita basis; and (3) pay changes have not been the same for all employees. In general, higher paid employees have tended to fare better than the rank and file ([rising Gini Coefficient](#)). Now that major layoffs are starting, the situation is worse than shown on the graph. Taxation policies have tended to reinforce the trend toward lower spendable income for the middle and lower classes, with most tax cuts since 2000 favoring the wealthy.

The reason the economy appeared to do quite well between 2000 and 2007 was the increase in household debt. With greater debt, families were able to buy more from business, keeping businesses profits high. Prices of houses also rose. The higher home prices allowed people to remove more equity from their houses, and use this equity to spend even more. In addition, the stock market was rising in 2002 to 2007, also contributing to the feeling of wealth.

The amount of additional spendable income available from (1) the increasing debt and (2) the money people could take out from the equity on their homes was truly phenomenal. Figure 2 indicates additional debt amounted to about \$1 trillion a year. Also, as the value of homes inflated, people were able to refinance loans and use the additional cash to for buying other goods. The amount of home inflation was of the order of magnitude of \$1 trillion a year, and this was available to homeowners to extract, theoretically making a total of up to \$2 trillion a year. Funds available in these two ways (higher debt and equity extraction) were generally not subject to income tax, so the impact was even greater than if they had been added to wages. Employee compensation during this period was only \$6 to \$8 trillion a year, so the impact was very large.

Figure 2 shows that there was a sharp change, starting in late 2007. The total amount of household debt flattened, cutting out the less credit-worthy from buying more goods. Other factors not shown on the graph also had an effect. The prices of food and energy products rose,

putting a strain on the finances of families, and causing debt defaults. In addition, homeowners were forced to stop padding their spending by taking more equity out from the value of their homes, because by then the value of their homes was falling, rather than rising. All of these factors provided a sharp contrast to the very favorable dynamic that existed when household debt was rising rapidly.

I expect that Greenspan and other financial leaders engineered much of the debt-driven growth in the 2000 to 2007 period when they realized that underlying growth rate was very low. Now we are hitting the "no free lunch" time. The attempt to pump up growth in the 2000 to 2007 period using additional debt could only produce a temporary fix, and that fix is falling apart. The fact that wages weren't really growing much in "real" terms suggests that there was an underlying problem that more and more debt could only temporarily disguise, but could not really fix.

A big piece of the problem is that energy consumption in the US has not been growing very rapidly since 2000, and we know from the [work](#) of Robert Ayres and Benjamin Warr that there is a close tie between energy use, increase in energy efficiency, and economic growth.

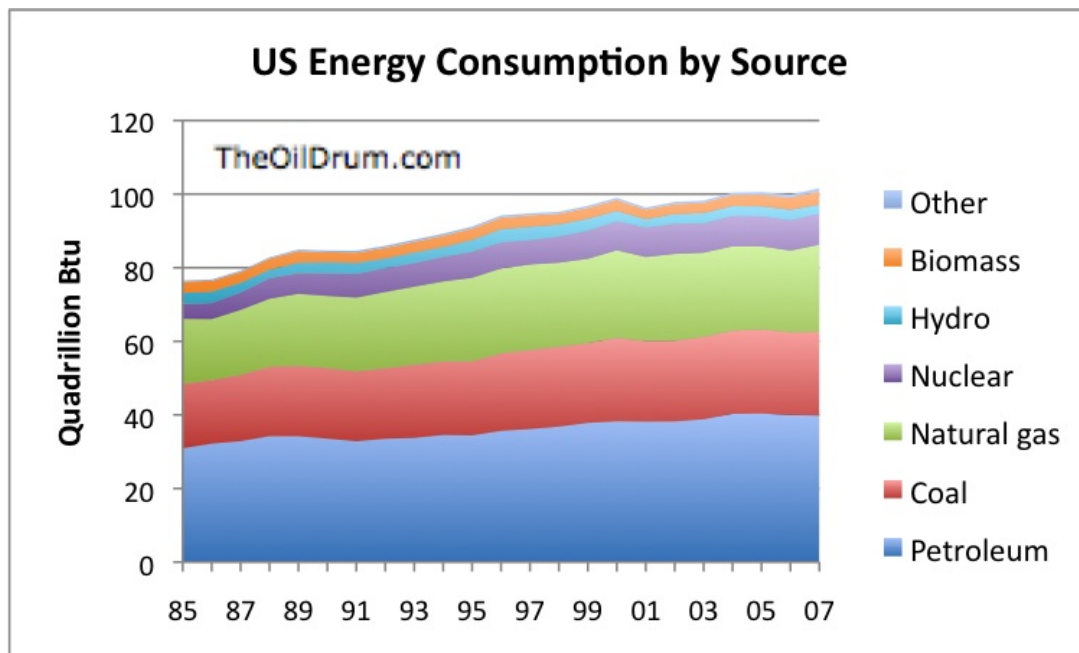


Figure 3. US Energy Consumption in BTUs, based on [EIA data](#). Other (barely visible) includes geothermal, wind, and solar. Biomass includes wood and ethanol.

Between 1985 and 2000, US energy consumption (all fuels combined) grew by an average of 1.7% per year; between 2000 and 2007, US energy consumption grew by an average of 0.4% per year. On a per capita basis, energy consumption was actually declining between 2000 and 2007. Energy consumption through September 2008 is down about 2% from 2007 (about 3% on a per capita basis).

Another part of the problem is that a larger and larger share of US energy consumption has been coming from imports (Figure 4), and the US has been becoming less and less able to pay for these imports, as evidenced by its ballooning balance of payment deficit. If the US had been able to import energy, use the energy to produce products that were worth a great deal more, and export those products, the US would not have had this problem.

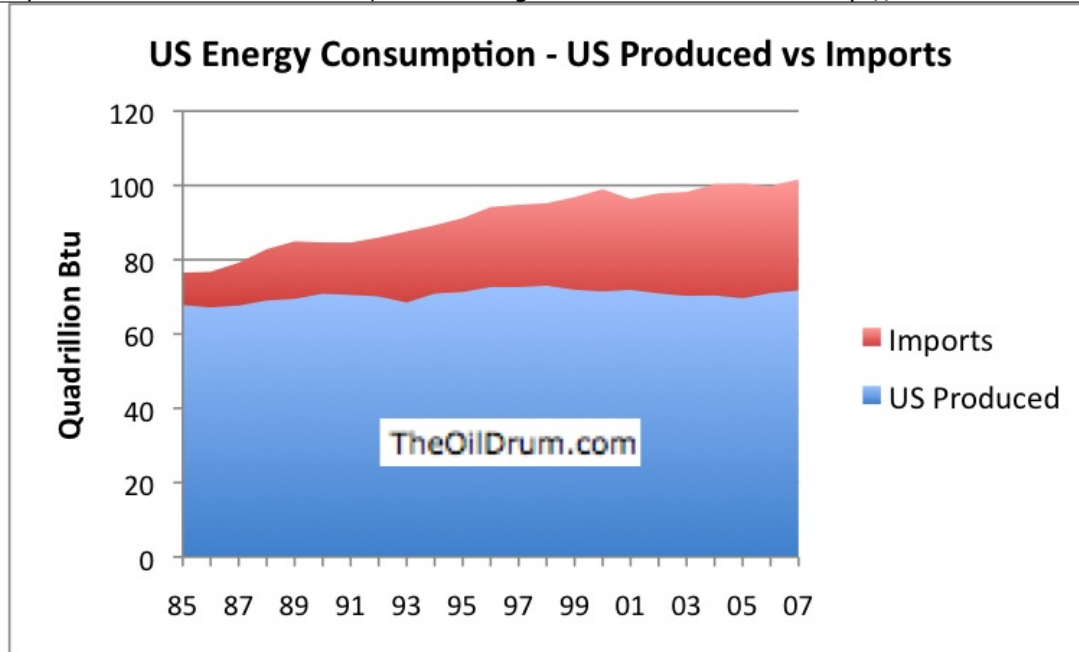


Figure 4. US Energy of all types, split between US produced and imported. Nuclear is treated as US produced, even though the fuel is mostly imported. Based on [EIA data](#).

It appears to me that the US is rapidly reaching "peak energy", whether or not the world is reaching peak energy. What drives this peak is the economics of the situation--we are not producing enough goods and services with the fuels that we are importing to justify their continued importation. Also, even US produced natural gas from unconventional sources is becoming too expensive for the economy to afford. We have been in a type of overshoot in terms of buying more energy products than we really had funds for. The spike in prices for oil this summer helped force the issue. With the higher prices of oil and food, some people at the margin could no longer pay their mortgages, and the situation began to unwind.

Now with the lower prices of energy products, world oil production is starting to drop back. Demand is dropping off, because consumers are not able to borrow as much, and thus cannot buy as many goods and services requiring oil to produce. It is likely that US oil use will drop in years ahead, because of these factors. US natural gas production will also decline, because most of the new sources of natural gas are high priced sources (low Energy Return on Energy Invested sources), and consumers cannot afford the high cost of energy from these sources.

When the US faced a situation with declining energy availability in the 1970s, it was able to make changes to improve energy efficiency and to shift production of heavy goods offshore, and thus mitigate the impact of the decline in energy on economic growth. It seems unlikely that we will be able to do as much this time around. For one thing, the easy solutions have already been implemented. For another, US energy efficiency gains have only been about 2% per year in recent years. It will take capital (which is difficult to obtain now) to even maintain this kind of efficiency growth. Also, oil and gas are becoming more and more difficult to produce, meaning that a greater share of the oil and gas that is produced will need to be used in production of these fuels, leaving less for other uses.

The US economy has barely been growing between 2000 and 2008, apart from debt-induced growth; it has not been growing enough to produce much gain in the compensation of employees. If energy consumption declines from the level it is at today, it is likely that real growth will be even lower than it is today. Based on the discussion in (2) regarding how essential growth is for the

repayment of debt, this suggests that it will be extremely difficult to pay back all of the debt that is currently outstanding. The existence of the close inter-relationship between all of the types of debt shown in Figure 1 suggests that there may be defaults on many of these types of debt simultaneously, and the same factors that caused debt defaults may affect other classes of assets as well.

4. My forecast for 2009.

It looks to me as though that we are due for a debt unwind, and with it a rapid decline in the US standard of living. Exactly what form it will take, and what the timing will be (for example, sudden one month from now or sudden three years from now, or gradual over a longer period), isn't certain. I would expect that many (or most) other economies in the world will be dragged along in this debt unwind and will experience a decline in their standards of living.

As I note in the Section 1 discussing why so many asset classes are correlated in time of stress, the tower of debt (Figure 1) has many feedback loops, and tends to magnify the economy's reaction to events, both favorable and unfavorable. When consumer debt is rising it tends to make the economy look very, very good. When there are layoffs, the interrelationships tend to magnify the impact, making the economic impact much worse. One wonders whether there are tipping points, beyond which it is not really possible for the system to recover--particularly now that the US seems to be at the point of "peak energy" (Section 3), energy is required for growth (Section 3), and growth is required to allow debt to continue (Section 2).

The tower of debt is in some ways deceptive. It can make the economy look mostly OK to the casual observer, until all too quickly, things start to fall apart.

So far, the "fixes" that the US government has been attempting seem mostly counterproductive. Putting government guarantees behind more and more debt (thus stacking Figure 1 higher and higher, with a new TARP layer) just increases the likelihood that the US government will be drawn into the downward spiral. The financial services layer will be less and less needed in years ahead, as our need for debt-based products declines. Bailing it out does not help get additional income to ordinary workers (although it may temporarily protect them from losing their bank account balances).

I expect that essentially all aspects of finances will be affected by the unwind of debt. A huge amount of debt will be defaulted on (or will be forgiven, so that an actual default does not need to occur). Regardless of whether the non-payment occurs because of default or forgiveness, the effect on financial institutions will be the same. Financial institutions such as banks, insurance companies, pension funds, and many hedge funds will find themselves in poor financial condition, because they were depending on the proceeds of this debt repayment to fund what they have promised--bank account balances; insurance policies; pension payments; or hedge fund returns. Institutions guaranteeing debt, such as monoline bond insurers will be particularly hard hit. The FDIC will likely be called on to rescue many failed banks, and will need to find funds from some source (printed money?) to do this.

As the year goes on, I expect each evaluation of where we are to be worse. Banks will report operating losses each quarter. Fannie and Freddie will need more funds than originally thought. TARP will need more funds than original planned. More and more businesses will enter bankruptcy, and more and more governments (states, cities, counties, and countries around the world) will find themselves unable to meet their obligations. There are a huge number of inter-relationships, and the bankruptcies and losses in one area will tend to cause more bankruptcies

Debt of all forms will be very difficult to obtain, except through government sources. The interest rate the US government is currently paying is very low, mainly because of a "flight to quality". If the US government keeps issuing more and more debt, it seems likely that at some point this will change, because buyers will figure out that even if the US is the best of a bad lot, its risk of failure is significantly greater than 0%.

I do not expect a steep rise in the price of oil and natural gas in the next year, because the decline in demand is likely to outpace the decline in production in the short-term. If we look back at Figure 2, I expect that funds available to ordinary citizens will continue to decline in 2009, even considering any stimulus plan. This will happen because employee compensation will decline due to layoffs. Household debt outstanding will also decline (rather than just stay flat, as it has in the past year), because of the poor financial condition of lending institutions, and because with the poor economy, the risk of borrower default will be quite high, discouraging lending. A \$300 billion stimulus program will be tiny in comparison to the boost the economy got in the past from increasing debt and greater refinancing (up to \$2 trillion per year), as the prices of homes increased. With lower incomes, lower (actually net negative) cash flow from borrowing, and only a modest boost from a stimulus program, citizens will have less and less to spend on goods and services.

I think there is a distinct possibility that this could all end very badly. One possibility is that there will be more and more defaults, and the US government will not be able to prop up all of the institutions and will eventually default on its debt. While this seems to be the direction things are headed at the current time, the much more usual outcome is hyperinflation, caused by printing more and more money, wiping out the value of people's savings and pensions. Situations such as these are often accompanied by a new government (including a new constitution), and may even include different country boundaries (for example, Soviet Union after its fall).

Many people have started making preparation for the time when food needs to be produced locally and electricity is often not available. I would not discourage such preparations. While we do not know that the economy will collapse completely, I think such preparations are prudent, in the face of rising risk. Preparation for a major change takes many years, so starting earlier rather than later makes sense. Also, with the tower of debt (Figure 1) and the many feedback loops, the downward spiral can happen more quickly than our prior experience suggests is possible.

To solve our current financial problems, I expect that the United States (and other countries) will ultimately need a new financial system that is much less debt based. Such a system might start simply as ration coupons for food and energy products, and gradually be expanded to replace our current monetary system. Debt forgiveness and derivative write downs will also probably need to be part of the solution, but with the caveat that debt forgiveness and derivative write downs can be expected to have just as adverse an effect on the balance sheets of financial institutions as outright defaults. In conclusion, 2009 looks like to be a very challenging year for the new administration and for the world as a whole.

Last year's forecast: [Peak Oil and the Financial Markets: A Forecast for 2008](#)



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