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Peak Oil and the Financial Markets: A Forecast for 2008

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At this time of year, we read many financial forecasts for the year ahead. Nearly all of these are written with the "filter" assumption of infinite growth. "Oil production problems are a temporary issue; after a short dip, the economy is likely to continue growing rapidly again. We may have a short recession, but we will soon be back to business as usual." Etc.

I think this filter is fundamentally in error, and leads to a mistaken impression with respect to where the world is headed. The world is changing in a very major way. Oil is in short supply, and this shortage is likely to get larger in the future. The pressure of short supply and rising prices adds a *systematic bias* that the financial community is not recognizing. This bias has as its basis the fact that it is becoming more and more difficult for both people and businesses to pay back loans, because of the rising costs of oil and food. This situation cannot be expected to go away. In fact, it is certain to get worse in years ahead, as oil supplies become tighter.

Besides the systematic bias, there is also a *systemic risk*, arising from the interconnectedness of all of the parts of the economy. This was well described in a post a few days ago called The Failure of Networked Systems. One of the issues in systemic risk relates to the financial system itself. If one party in the financial system fails, it increases the likelihood that other parties in the economic system will fail as well.

Another aspect of systemic risk is the close ties of the financial system to the rest of the economy. One example is the higher oil and food prices mentioned above that lead to a systematic bias toward higher defaults. Another is the fact that the lack of oil can be expected to impede economic growth, making the infinite growth model underlying the current economic system less sustainable, based on the economic model of Robert Ayres and Benjamin Warr. Another linkage is that of oil with ethanol. Higher oil prices leads to increased pressure to produce more ethanol, which further raises food prices, as demonstrated by Stuart Staniford in Fermenting the Food Supply.

(More below the fold)

Background

First, some definitions to go with the introduction, above.

Systematic bias occurs in a system when a process favors a particular outcome. Instead of errors being random, they are consistent and repeatable. One example might be a thermometer that consistently reads high. In the economy, systematic bias occurs when loans experience a greater and greater tendency toward defaults, because of changes in the system (rising oil prices) since the time when the probability of default was originally estimated. As another example, rising oil prices can also cause profits of individual companies to grow more slowly than expected (relative to base period experience) because of a contraction in general economic growth.

Systemic risk is risk relating to the interconnectedness of the system. A push on one part of the system will lead to a pull on another part of the system, leading to unanticipated failures. As an example, the failure of one bank may lead to other banks failing, because of counter party risk. There is significant reason to believe that the interconnectedness of the system is increasing over time, as food becomes used as a fuel, and as financial products become more complex. See The Failure of Networked Systems.

The financial community has designed many models. Some of these are used by "quants" in pricing the newer sliced and diced financial products. Others are used by insurance companies in pricing the risk of defaults on bonds and on mortgages.

The assumption that is made in these models is that historic experience can be used, with only minor adjustments, as a guide for pricing current products. This approach fails to recognize the greater risk now entering the system, due to systematic bias because of rising oil prices, and due to greater systemic risk, because of greater interconnectedness.

One way of describing these models is to say that they assume that defaults are "independent events" -- that is, there is no systemwide bias that would cause more and more defaults. This assumption of independence keeps insurance prices low, and makes the slicing and dicing of packaged securities work. Clearly, with the systematic bias and systemic risk that is now infecting the financial system, these assumptions are no longer valid.

Closely related to the assumption that events are independent is the assumption that distributions are "normal" - that is that they follow the Gaussian distribution. Benoit Mandelbrot has shown in The (Mis)Behavior of Markets that the actual tails of distributions are much "fatter" than implied by the Gaussian distribution. The bias introduced by the oil situation makes the normal distribution even less appropriate. For example, with higher oil prices, the number of defaults on bonds will be much greater than would be predicted, if one simply assumes that a normal distribution applied to past experience will be predictive of future experience.

If one looks at financial theories like the Capital Asset Pricing Model and the Black and Scholes Option Pricing Model, one discovers that they assume normal distributions and statistical independence. These models were not quite right before, because the underlying distributions are not really normal, as shown by Mandelbrot. Now that systematic bias and systemic risk are playing greater roles, the predictive value they had previously can be expected to further decline.

What's ahead?

I don't think we can know precisely. In the material that follows, I give my views as to how the financial situation may unfold in the year ahead, taking into account the issues discussed above.

1. Many monoline bond insurers will be downgraded in 2008, and some may fail.

Bond and mortgage insurers are likely to have difficulty because these coverages are written with the assumption that past default experience can be used as a guide to needed prices. If there is a systematic bias toward higher defaults, as there is today, prices will be too low.

Once bond insurers lose their AAA ratings, their coverage will be of little value. Rating agencies will rate the bonds based on the financial standing of the organization issuing the bond, instead of imputing the insurer's credit rating to the bond. This could mean widespread downgrades of bonds.

Warren Buffet is starting a new bond insurer. Even if this insurer stays strictly with municipal bonds and charges higher rates, I question the long-term viability of the company. It will be difficult to charge a price in 2008 that will reflect the real risk of default five or ten years from now, when oil supply will be much tighter than today.

2. More and more people influential in financial markets will begin to recognize peak oil.

We have already seen how *oil* markets act differently, once the sellers of oil realize that peak oil is not far away. Sellers of oil become more aggressive and demand more favorable terms. They realize that they have leverage, and begin to use it.

In 2008, it seems likely to me that *financial* markets will begin to recognize peak oil as well. Leading economists are now speaking openly about peak oil. On December 15, 2007, the WSJ quoted Alan Greenspan as saying that oil supply peaked lower and sooner than had been contemplated earlier. The Toronto Star quoted Jeff Rubin, chief economist of CIBC World Markets, as saying, "I just don't think we're going to see increases in conventional oil production any more. I think (peak oil) is here." With economists like Greenspan and Rubin talking openly about peak oil, it seems likely that some financial decision-makers will start thinking about the implications of peak oil for loans and other financial products. This seems especially likely if oil production remains relatively flat or declines in 2008.

3. Long term loans, including those for energy companies, are likely to become less available as awareness of peak oil rises.

Once financial markets begin to recognize peak oil, I expect lenders will be more wary of long-term loans, because of uncertainty that these loans will be repaid once world oil production has begun to decline. Interest rates are likely to rise. Marginal borrowers may not be able to find credit at all. All of these effects are likely to make the gridlock in loans progressively greater over time.

The Fed may attempt to lower interest rates, but as defaults grow and lenders become more aware of peak oil, the risk margin for defaults included in interest rates will tend to rise. Thus, the actual interest rates charged to consumers and businesses may not decline, even when the Fed lowers target interest rates.

I don't expect the recognition of peak oil in financial markets to be complete in 2008, especially if a credit crisis causes oil prices to drop. Once peak oil is fully recognized though (most likely when its effects are very apparent, and mitigation is clearly not working), long-term debt may become unavailable, even for governments.

4. There is likely to be a serious recession in 2008, deepening as the year goes on.

Oil and food prices are likely to continue to rise, leaving consumers with less to spend on loan payments and consumer purchases. Interest rate resets will further exacerbate mortgage problems. Defaults on mortgages will increase, and there will be increasing problems on loans of all types--including student loans, credit card debt, auto loans, commercial mortgages, and other commercial loans. Eventually, problems will even spread to state and municipal bonds.

More and more businesses will encounter financial difficulties, leading to defaults on loans. The failing businesses will lay off workers.

With declining home values, tax revenues for municipalities are likely to fall. This may lead to cutbacks in spending, furthering the economic contraction. It also increases the likelihood of defaults on municipal bonds.

5. At least several large banks will fail.

With bond and mortgage insurance downgrades and failures, and more and more defaults on loans of all types, it seems likely that many banks will get into financial difficulty. The FDIC and other government agencies will attempt to solve these problems, but it is not clear that they will be successful. One approach may be to relax capital requirements. Another may be to find a temporary way of valuing loans that does not fully reflect the extent of their problems.

At some point, the FDIC is likely to have to make good on its promised insurance coverage ($100,000 on most accounts, $250,000 on IRA accounts). The FDIC collects insurance premiums from the banks it insures, but if many banks fail, the FDIC does not have enough funds in its account to reimburse bank depositors at the guaranteed level.

I expect that some way around this difficulty will be found--for example, the FDIC may be allowed to borrow an unlimited amount with US government backing. This approach requires willing buyers for the new debt. Another approach might be to use monetary policy to make certain that banks have enough funds to cover withdrawals, even though they appear bankrupt. Either approach would likely be inflationary.

6. The amount of debt available to consumers is likely to decline.

To date, most of the decline in the availability of consumer debt has been in the area of mortgage loans. I expect that during 2008, the availability of other consumer debt will shrink as well. Part of the decline in debt availability is likely to be the direct result of rising default rates. The weakened financial condition of banks is also likely to reduce credit availability. With falling capital, banks will be less able to make loans and may tighten standards on loans they do make. Consumers with credit cards may find their debt limits rolled back. Home equity loan limits may also be lowered.

There is also a possibility that a large bank that issues many credit cards will get into financial difficulty. If this happens, it is not clear that a new lender will be found to issue credit cards to all of the previous card holders. FDIC insurance relates to deposits, not to credit availability, so there is no guarantee of a new credit card. Some individuals, particularly those with poor credit ratings, may find themselves being required to pay off old credit card debt, without any new source of credit.

7. Fannie Mae and Freddie Mac may need government assistance.

With rising default rates, the troubles of Fannie Mae and Freddie Mac are likely to continue. Both are likely to find it difficult to maintain adequate capital, and may need some sort of government intervention, if only to allow them to operate with less capital.

8. A new class of homes -- those "never to be sold" -- will emerge.

In 2008, the pool of buyers for homes is likely to become smaller, in part because of the shift away from the lax lending standards of the recent past. If prospective homeowners are required to prove adequate income to afford the homes they are purchasing, many people will qualify for a much smaller home, or none at all.

As peak oil becomes more apparent, this will further reduce the number of prospective homeowners. One reason is that people will be less able to travel to a summer or winter home, so will need only a single residence, instead of both a summer and winter residence. Another reason is with the high cost of heating oil, gasoline and food, there will be a greater incentive for extended families to live together.

The problem with selling the current number of homes to a progressively smaller number of prospective buyers is that some homes will not find buyers in any reasonable time frame. Some will eventually be torn down, often after being vandalized. As long as mortgages remain readily available, there is a fairly easy way around this difficulty. A prospective seller can take out the maximum mortgage available on a property, before putting it up for sale. Then, if no buyer can be found, the seller can cut his/her losses by mailing the keys to the mortgage company.

I expect that in the next year or two, mortgage companies will begin to realize that homeowners can use mortgages to cut their losses when selling a home. Because of this, I expect that mortgage companies will begin requiring at least a 20% down payment that on home purchases. Those refinancing homes will be limited to a total loan of 80% of the home's value. These practices are likely to further reduce the pool of prospective homeowners, making the sale of homes even more difficult.

9. Politicians will continue to make attempts to help homeowners, and perhaps other types of borrowers.

With rising interest rates, a declining economy, and tighter lending standards, it is unlikely that all the homes that have been built can remain occupied unless the government somehow allows people to remain in homes they cannot afford. If homes are remain unoccupied, there is of course the chance that they will be vandalized, and high-value materials removed.

Government "help" may even spread to other types of loans, such as college loans that cannot be repaid, due to unemployment. All of this government intervention is likely to make purchasers of debt securities very unhappy.

10. The amount of structured (sliced and diced) debt issued is likely to drop to close to zero.

During 2008, it will become increasingly clear that structured debt has too many problems to be a viable method for transferring debt from the issuer to multiple buyers. The mis-pricing noted at the beginning of this article is likely to become more apparent during 2008. This will add to the structured debt's other problems, including lack of front-end underwriting, optimistic bond ratings, high system costs, and reduced yields due to government intervention to help borrowers.

11. Besides banks, many other players in financial markets are likely to find themselves in financial difficulty in 2008.

Besides banks, financial markets include hedge funds, money market funds, insurance companies, pension funds and many special-purpose funds. I would expect difficulties to spread to many of these organizations, for a variety of reasons:

• <u>The value of bonds and of structured debt held by these organizations is likely to decline</u>, as more businesses and individuals have financial difficulty. Also, sales of securities during 2008 will help clarify the true value of some securities. Organizations will be forced to reflect market value, as it becomes clear.

• <u>Credit ratings of many securities are likely to decline</u>, because of financial difficulties of the companies issuing bond insurance. (See Point 1 above.) Insurance companies in particular are likely to find that some bonds no longer meets regulatory requirements. These will need to be sold, often at fire sale prices.

• <u>Sellers of Credit Default Swaps (CDS) are likely to experience large losses.</u> CDSs act like insurance policies against bond defaults. Organizations issuing CDSs have not charged enough to cover the type of systemic increase in risk that is now occurring. Organizations issuing CDSs are likely to find themselves with large losses. Purchasers of CDSs will often find that sellers are not able to make good on their promises.

• <u>Debt is likely to be less available, or available at higher interest rates.</u> Organizations using leverage, such as hedge funds, may find it difficult to maintain the same level of debt, and may even be forced to sell some of their assets, because of the lower availability of credit.

If some of these organizations fail, the extent to which government intervention can be expected is not clear. There is no particular reason to expect government intervention for hedge funds or money market funds. Pension funds and insurance companies have some types of guarantees, but the programs are not set up to handle multiple large failures.

12. The value of the dollar will fall relative to some currencies, causing the relative price of oil to rise.

I expect that Saudi Arabia and other oil-producing Middle Eastern countries will revalue their currencies relative to the dollar, causing the value of the dollar to decline. Because of this revaluation, the cost of oil will rise, despite the sharp economic downturn.

It is not as clear to me how the US dollar will fare relative to other currencies. Europe, Japan, and Canada are likely to have economic difficulties of their own relating to peak oil and to the falling value of homes. The shift among these currencies may be relatively smaller. I would expect the value of the dollar to fall relative to Chinese currency, given China's ability to use coal to produce exports.

13. The stock market probably will decline during 2008.

The combination of a recession and higher interest rates on corporate debt seems likely to result in a serious downturn in stock market values. Financial services companies particularly are likely to do poorly. There is still some possibility of an increase in stock market values, however, because of the large amount of "recycled oil" payments and the inflationary impact of additional governmental debt and lax monetary policy.

14. Prices are likely to rise in 2008 for food and energy products. Prices may decline for homes and non-essential goods and services.

Americans will find that more and more of their income is devoted to food and energy, leaving less for non-essential goods and services and debt payments. This same situation will exist in many countries around the world.

15. There is a chance that some type of discontinuity will make financial conditions suddenly take a turn for the worse.

Will the "wheels come off the economy"? I really don't know.

I think that there are a few things that may help prevent a major disruption during 2008.

First, things tend to happen fairly slowly. The economy has a fairly large amount of momentum, and this will tend to keep things at the current level. It will take a period of months for bond ratings to be lowered, and for this information to filter back to the balance sheets of banks and insurance companies. If some of the bond and mortgage insurers are actually insolvent, this will take even longer to sort out. Some of the potential problems I have alluded to may not appear until 2009 or later.

Second, regulators of various types have the power to change the rules as they go along. Regulators have the ability to overlook non-performing loans, and to lower capital requirements. They can lend money to banks, using as collateral securities most people would consider to be junk. They can create at least a certain amount of new money. In some cases, congressional approval may be required for these approaches, but if the alternative is banks and other businesses failing, congress is likely to go along with any proposed bailout plan.

Third, in order to keep things going, what is needed is to keep *cash* inputs and outputs working. To a significant extent, the problems we are having are balance sheet problems -- values of assets and values of liabilities. I expect to see more of what the Pension Benefit Guaranty Corporation is currently doing - paying benefits, even though liabilities are greater than assets. It may be possible to delay facing the truth a bit longer by optimistically valuing assets, using high discount rates on liabilities, and focusing on cash needed for today's transactions.

Eventually, it seems like something will happen to stop the parade. One possibility is that the United States will no longer find buyers for all the debt it issues. This will probably not happen until there is a general recognition of peak oil. Another is that financial system failures cascade in such a way that it is not possible to continue propping up the system. Another is that hyperinflation will take over. While one of these, or something else adverse may happen, I don't know that such an event will necessarily happen very soon.

Why is information about the financial system important to oil companies, and other companies in the energy field?

Having a functioning financial system is very important from the point of view of our oil production and distribution system. Oil companies need to be able to pay their workers. They need to be able to borrow money to start new projects. They need be able to make contracts with other companies for necessary services, like hiring drilling rigs. They need to be able to purchase oil from overseas, and to be able to pay for it using transaction methods that are not too disrupted. All of these may be problems, if there are too many bank failures, or other serious issues with the financial system. This has the potential to create a negative feedback mechanism which will further limit oil supply.

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