

MUSINGS FROM THE OIL PATCH

January 29, 2013

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Managing Director

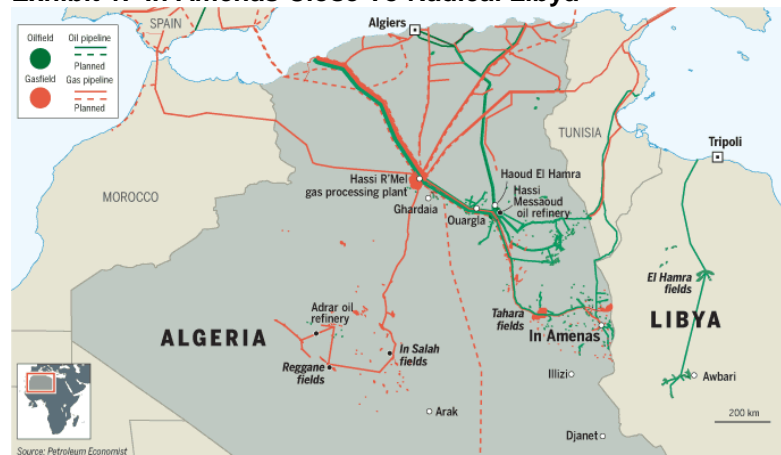
Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks, but periodically events and travel may alter that schedule. As always, I welcome your comments and observations. Allen Brooks

Saudi King's Moves: Sign Of The Future Or Due To Concern?

Two events in the Islamist world during the past several weeks raise questions about the future of terrorism and the petroleum industry

Two events in the Islamist world during the past several weeks raise questions about the future of terrorism and the petroleum industry. The most dramatic event was the terrorist attack at the Tigantourine natural gas facility located at In Amenas, Algeria, approximately 50 miles (85 kilometers) from the Libyan border and an area known as a hotbed of Islamist militant activity. According to preliminary details from Algerian newspaper *Le Soir d'Algérie* as reported by the *Financial Times*, the drama began on the morning of January 16 when a bus carrying workers from the facility compound to a small airfield near the town about 30 miles (50 kilometers) away was attacked. According to witnesses, a shoot-out ensued in which one worker was reportedly killed. About the same time, an all-terrain vehicle was used by another group of terrorists as a car-ram to smash the front gate of the plant.

Exhibit 1. In Amenas Close To Radical Libya



Source: Financial Times

The In Amenas field is huge, producing about nine billion cubic meters of natural gas, about 12% of Algeria's total output and 18% of its gas exports

The In Amenas field is huge, producing about nine billion cubic meters (3.2 trillion cubic feet) of natural gas, about 12% of Algeria's total output and 18% of its gas exports. The gas plant is owned and operated by a consortium of Britain's BP PLC (BP-NYSE), Norway's Statoil (STO-N), and Algerian state-owned energy company, Sonatrach. It employs 600 people according to BP and the employees represent a wide swath of nationalities with Algerian, British, Irish, American, Norwegian, Italian, and Japanese among them.

Exhibit 2. Aerial View Of In Amenas Gas Facility



Source: *Digital Globe/AP, National Geographic*

The terrorists told the hostages that they were affiliated with an organization sometimes known as the Masked Brigade

After separating the foreign workers from the local Algerian workers, who were then let go, the hostage drama escalated as many of these expatriates were forced into vests with explosives attached and watched bombs be planted around the plant. The terrorists, who were thought initially to number between 70 and 100, told the hostages that they were affiliated with an organization sometimes known as the Masked Brigade, or the Battalion of Blood, which is led by Mokhtar Belmokhtar, a veteran of the Afghan fight against the Soviet Union and is notorious for having kidnapped 32 European visitors in Algeria in 2003, holding them hostage and receiving a ransom for their release. He reportedly was in a struggle with another militant leader, Abdel Hamid Abou Zaid, for control over al-Qaeda in the Maghreb. This attack was supposed going to be the coming out party for this new terrorist group.

The attack on the In Amenas facility was launched supposedly in retaliation for the French government's recent attack against al-Qaeda operatives attempting to take over neighboring Mali. Fear of possible repercussions if this attack was not repulsed may be what prompted the swift and apparently uncoordinated military response by Algerian officials. Initially, it was reported that government authorities had recruited notable locals and tribal leaders to

Algerian authorities directed the military to launch a commando raid to free the hostages, either capture or kill the terrorists and defuse any bombs planted

negotiate with the terrorists. At some point, the terrorists, after having let the Algerian locals go, began moving hostages to more secure locations. According to hostages who survived the episode, the terrorists were very comfortable with and knowledgeable about the In Amenas facility suggesting that they either had inside information and support or some of them had actually worked in the plant in the past. Algerian authorities directed the military to launch a commando raid to free the hostages, either capture or kill the terrorists and defuse any bombs planted. The initial raid occurred the next day with a second and final raid two days later. The second raid was necessary since the first raid failed to secure the release of all the hostages.

The recent developments in Algeria may have signaled the next phase of the Arab Spring – more militant attacks against representatives of western countries

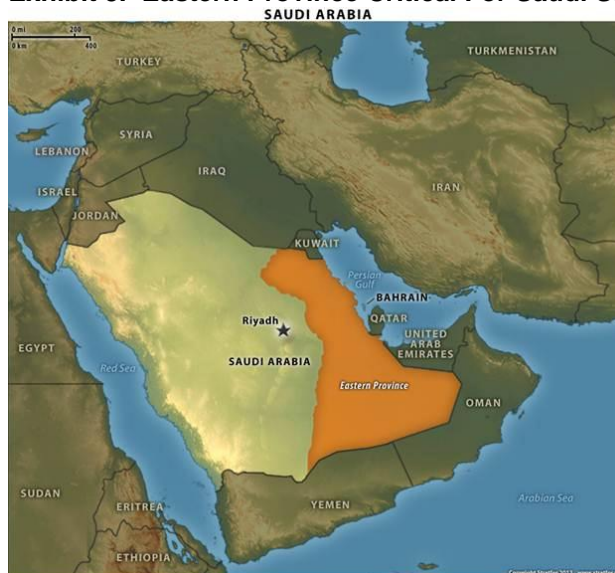
In response to the In Amenas attack, many international oil companies operating in Algeria decided to evacuate their ex-pat employees from the country. These were some of the same companies that had remained in Algeria throughout the decade-long civil war of the 1990s. Earlier, Royal Dutch Shell (RDS-NYSE) had developed natural gas deposits in the country and constructed the nation's liquefied natural gas (LNG) facilities in 1964, shortly after Algeria had fought to secure its independence from France in the early 1960s. The recent developments in Algeria may have signaled the next phase of the Arab Spring – more militant attacks against representatives of western countries. It also highlights a possible new terrorist strategy to strike at the west by attacking and disrupting the global petroleum industry's operations, the lifeblood of western economies.

Saudi Arabia's King Abdullah announced the appointment of Prince Saud bin Nayef as the new Governor of the Eastern Province of the kingdom

We found all the drama and tragedy in Algeria and the ruminations about its meaning relative to the Arab Spring and a possible new terrorist strategy to attack the global petroleum industry infrastructure, the weak underbelly of global economic activity, very interesting in light of a recent announcement out of Saudi Arabia. Literally days before the Algerian attack commenced, Saudi Arabia's King Abdullah announced the appointment of Prince Saud bin Nayef as the new Governor of the Eastern Province of the kingdom. Prince bin Nayef was formerly head of the Crown Prince Court and a special advisor to the Saudi Crown Prince. From September 2003 to July 2011 he was the Saudi Arabian Ambassador to Spain. He was born in 1956 and is the eldest son and one of 10 children, of former Crown Prince Nayef bin Abdulaziz. His mother is Al Jowhara bint Abdulaziz bin Musaid Al Jiluwi, a member of the powerful Jiluwi tribe whose members have been intermarried with those of the House of Saud. His younger brother is Saudi Arabia's Interior Minister Prince Mohammed bin Nayef.

Prince Saud bin Nayef is considered one of the future candidates either for king or crown prince

Prince Saud bin Nayef is considered one of the future candidates either for king or crown prince, the two highest positions in the royal family that rules Saudi Arabia. He represents the leading edge of third-generation leaders of the family to move into a very responsible position. His appointment can probably be seen as a test of his

Exhibit 3. Eastern Province Critical For Saudi Stability

Source: Stratfor

In September 2011, King Abdullah also granted women the right to vote and to run as candidates in the next local vote that is set for 2015

The Eastern Province is one of the most important and challenging governing assignments in Saudi Arabia

ability to lead. There is a lot about the position he will occupy that we will deal with later, but it is important to also point out another recent decree by King Abdullah, which was the appointment of women to the Shura Council.

In this case, King Abdullah issued two decrees. The first announced that women would be appointed to this advisory body for the first time ever. The second decree announced the 150 members of the Shura Council including the 30 women. The men and women will be segregated within the council building. Women will have a special area to sit and worship and will enter and exit through a separate door from the men. This council advises the king on policies and legislation, and this liberalization move follows on the king's 2005 decree that the country would allow municipal elections for the first time. In September 2011, King Abdullah also granted women the right to vote and to run as candidates in the next local vote that is set for 2015. These actions are significant political moves, done mostly to placate social unrest.

The Eastern Province (see Exhibit 3 above) is one of the most important and challenging governing assignments in Saudi Arabia. The province has a strong and militant Shiite Muslim minority. It continues to experience violent demonstrations against the monarchy in sympathy with the Arab Spring movement. These demonstrations have lasted for nearly two years. The province is also home to much of the kingdom's oil production and was the site of militant Islamist attacks against the country's petroleum industry. In February 2006, Saudi Aramco guards repulsed an armed attack by al-Qaeda affiliated with bin Laden against the state-owned oil company's refinery at Abqaiq. Two guards were killed in the attack.

Less than a month later, Saudi military foiled another planned attack on oil producing facilities in the area. The 2006 attacks followed a 2004 attempt against the Yanbu oil exporting facility on the Red Sea on the other side of Saud Arabia.

Exhibit 4. Key Saudi Aramco Oil Facilities



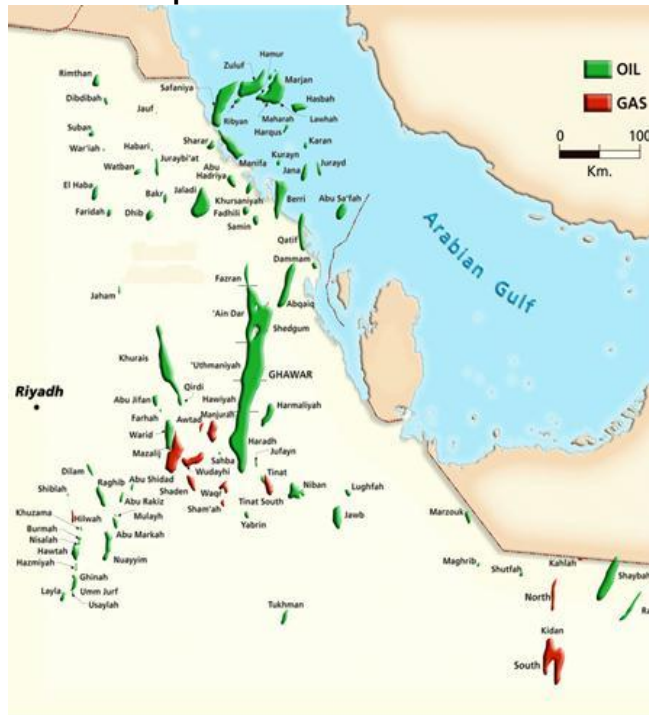
Source: EIA

Their vulnerability to cyber-attack damage was exposed, however, adding another challenge for the global economy to consider

Other than some foiled attack attempts in 2007 and the government's commitment to develop a 35,000 security force to protect Saudi Aramco's oil producing, processing and shipping facilities by 2010, terrorism in the kingdom hasn't re-surfaced, or at least it hasn't been reported. Last fall, 30,000 computer workstations in Saudi Aramco were attacked with a virus that disrupted oil operations, but apparently no serious damage was done to the kingdom's oil operations. Their vulnerability to cyber-attack damage was exposed, however, adding another challenge for the global economy to consider. It is believed the virus that inflicted the Saudi Aramco computers initiated in Iran and was a continuation of the religious and leadership struggle between these regional super-powers.

Last month, we wrote an article in *Musings* discussing the succession issue in Saudi Arabia as it was felt that the health of King Abdullah was rapidly deteriorating. We pointed out that there is a diminishing number of candidates for the two top positions of king

Exhibit 5. Important Oil Fields In Eastern Province



Source: EIA

The implication of these policies and the family structure is that third-generation sons will shortly become candidates for these critical leadership roles

and crown prince due to the aging of the second-generation of the family and the policy that both positions cannot be filled by members from the same segment of the family. The implication of these policies and the family structure is that third-generation sons will shortly become candidates for these critical leadership roles. A generational change in leadership may bring other adjustments. Will new, younger leadership adhere to the same religious and social dogmas of their ancestors? Will they be more or less liberal in their policies toward Saudi Arabia’s population? How will they decide to manage the economy – adhere to a restrictive hydrocarbon-based strategy designed to maximize oil prices or elect to flood the market with oil in order to maximize the country’s income even with low oil prices? Or might the new leaders decide to use the oil wealth to diversify the economy?

Will Saudi Arabia become a terrorist battleground much like it appeared it would be in the middle of the last decade

In that *Musings* article, we termed the upcoming leadership change as a potential Black Swan for energy markets. The change will unleash economic and energy changes, but it also could produce geopolitical shifts, the full implication of which we cannot anticipate. Will Saudi Arabia become a terrorist battleground much like it appeared it would be in the middle of the last decade? Is the Algerian episode a rehearsal for that changed world? Will all of Africa and the Middle East become less stable and boost the risk premium associated with oil and natural gas prices? The list of strategic questions goes on and on.

Everyone should be thinking about how he/she will live in an age of extremely high-priced oil or one awash in cheap oil – each extreme requiring extensive adjustment

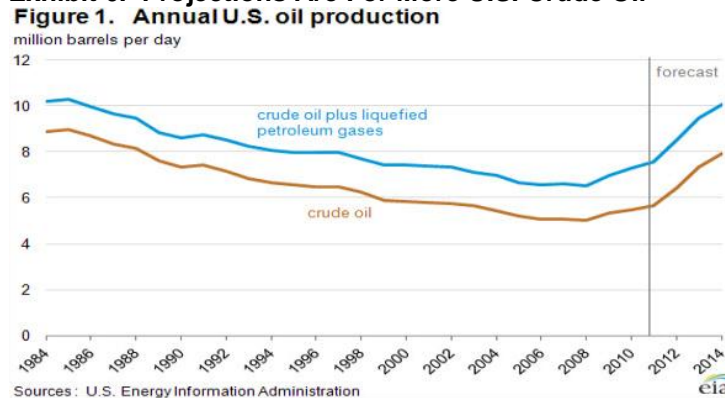
If you are in Washington, London, Bonn or Beijing you should be advancing scenario planning efforts that incorporate these dynamics. It also holds true if you are sitting atop international oil companies. In fact, everyone should be thinking about how he/she will live in an age of extremely high-priced oil or one awash in cheap oil – each extreme requiring extensive adjustment. Thinking about those scenarios and their implications now is much better than waking up one morning to a dramatically altered world. The Boy Scout motto – Be Prepared – is certainly a sound strategy today.

High Oil Prices Drive Continued Shale Investments In U.S.

He pointed out that “high crude prices are encouraging continued US shale gas investments and production, as investors and companies look for favorable returns in the energy sector.”

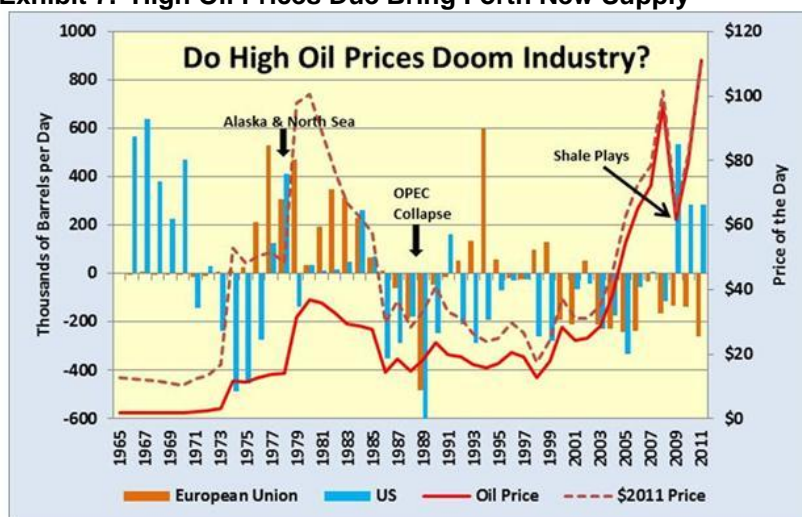
Two weeks ago, the commodities page of the *Financial Times* carried an article with the following headline: “High oil price ‘fuelling’ US shale output.” The headline caught our eye as it resonated with our thoughts about the long cycles of the energy business that we covered in an extensive article in the January 1st edition of the *Musings*. The opening paragraph of the *FT* article identified a growing trend that has become increasingly obvious to energy market observers over the past several years, but which only now seems to be catching the attention of the mainstream media and the public. The paragraph was explaining a point made by the global head of commodities research at Goldman Sachs (GS-NYSE), Jeff Currie. He pointed out that “high crude prices are encouraging continued US shale gas investments and production, as investors and companies look for favorable returns in the energy sector.” The statement is borne out by the crude oil production data for the United States as reported by the Energy Information Administration (EIA) showing it averaged 6.4 million barrels per day (mmb/d) last year, a gain of 800,000 barrels per day. The EIA projected in its *Short-Term Energy Outlook* issued last December that average oil production in the U.S. will climb to 7.3 mmb/d in 2013 and further increase to 7.9 mmb/d in 2014. If the 2014 projection is achieved, it will be the highest average oil output seen in the U.S. since 1988, some 26 years ago.

Exhibit 6. Projections Are For More U.S. Crude Oil



Mr. Currie also made the point that both Russia and Saudi Arabia, the world's two largest oil producers, "needed to realize that the longer the prices of oil stayed up the more money would go into US shale oil and gas projects." This is consistent with the point we made in the January 1st article that when seismic shifts in energy markets occurs, commodity prices will remain either extraordinarily high or low for an extended period until the attitudes of producers change. To demonstrate that point, we prepared the chart in Exhibit 7 showing the annual change in crude oil production experienced in both the U.S. and North Sea regions following historical step-changes in oil prices – both up and down.

Exhibit 7. High Oil Prices Due Bring Forth New Supply



Source: BP, EIA, PPHB

The aide denied the claim that the cut was designed to push up oil prices and reminded them that the country's output is set in response to customer demands

The *FT* article went on to discuss how Saudi Arabia's oil export flexibility has been responsible for keeping global oil prices "steady." With prospects high for further U.S. crude oil production gains and possibly meaningful output increases coming from Iraq, too, Saudi Arabia lowered its oil production in November and December from October's output by 4.9%, to a level of 9.025 mmb/d, which is the country's lowest output in 19 months. Speculation, including from the author of the *FT* article, is the production cut was made to deliberately push global oil prices higher as Saudi Arabia does not publicize details about its oil production levels. When the production cuts were recognized several weeks ago, oil market analysts and reporters claimed it was all about Saudi Arabia wanting higher oil prices. Those claims received a swift rebuttal from an aide to Saudi Arabia's Oil Minister Ali al-Naimi. In an email sent to oil reporters, the aide denied the claim that the cut was designed to push up oil prices and reminded them that the country's output is set in response to customer demands and with those demands lower for the fourth quarter, oil output was adjusted down.

If someone looked at the movement in Brent oil prices during November and December, he might easily assume the output cut was made to push up prices

If someone looked at the movement in Brent oil prices during November and December, he might easily assume the output cut was made to push up prices. During most of November and into early December, Brent oil prices were weakening and drifting down toward \$100 a barrel. That has been the acknowledged price target for Saudi Arabia according to comments made by Mr. al-Naimi early last year. How much of the fall in Brent prices was due to the oversupply of global crude oil versus concerns about future weakness in global economies due to the U.S. fiscal cliff budget negotiations and Europe's ongoing financial difficulties is difficult to determine. However, by mid-December, after the Saudi output reduction would have been felt in the crude oil market, Brent prices rallied back above \$110 a barrel. The nearly \$10 a barrel swing in just days would seem to support the theory that the cut was all about the Saudis wanting higher prices, especially given recent studies suggesting the kingdom's social spending, designed to maintain political stability in the country, necessitated additional income, i.e., more oil revenues likely attained by higher oil prices.

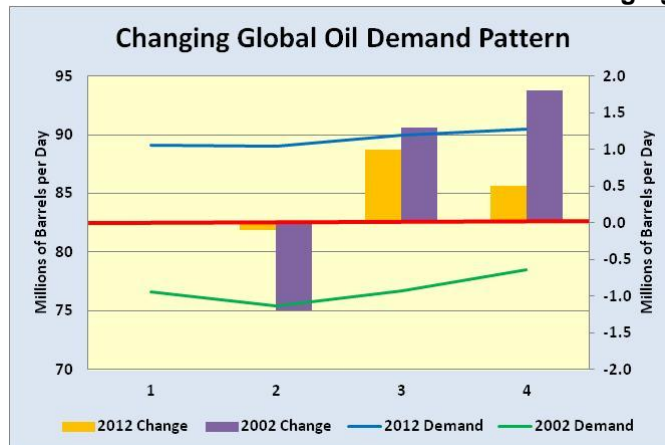
If we examine the comments of Mr. al-Naimi's aide, there is data to support his statement. Importantly, the data also suggests another subtle shift in global crude oil markets that may impact how we must assess future crude oil market and price trends. While a snapshot of oil demand is always fraught with the risk of unusual conditions impacting different periods, the trends we focused on appears to be correct given considerations about shifting oil consumption patterns.

If we examine global oil demand by quarter in 2012 and compare it to the pattern of demand a decade earlier, we find an interesting shift. In 2012, according to the data in the *Monthly Oil Report* issued by the International Energy Agency (IEA), global oil demand in the first quarter was 89.1 mmb/d, which fell by 100,000 barrels per day to 89.0 mmb/d in the second quarter. When summer arrived in the third quarter, oil demand rose by 1.0 mmb/d to 90.0 mmb/d and was projected to climb by only 500,000 b/d in the fourth, or winter quarter. In contrast, a decade earlier, first quarter demand was 76.6 mmb/d falling to 75.4 mmb/d in the second quarter but then rising to 76.7 mmb/d in the third quarter, or essentially equal to the demand of the first quarter. In the fourth quarter of 2002, winter conditions pushed oil demand up to 78.5 mmb/d.

The seasonal swings due to winter weather in the fourth and first quarters have been muted in their impact on overall global oil demand

We have shown the quarterly oil demand levels for those two years in Exhibit 8 (next page), plus we have shown the quarterly change in demand. It is the change in the pattern of quarterly demand between 2002 and 2012 that has driven the shift in Saudi Arabia's production. As Asian oil demand has grown and US and European demand has either fallen or remained flat, the seasonal swings due to winter weather in the fourth and first quarters have been muted in their impact on overall global oil demand. In other words, the more temperate weather of Asia makes quarterly swings in oil demand less pronounced compared to the swings for Europe and North

Exhibit 8. Global Oil Demand Patterns Are Changing



Source: IEA, PPHB

As customer demand falls off in the winter in Asia, Saudi is more likely to reduce its production as the year moves into the winter months

America that experience cold weather. The result is that Saudi’s high production period, which in 2002 used to be October to March in order to ensure sufficient oil for winter demand growth in Europe and North America, is now shifted to the April to September period and warmer summer demand. Said another way, as customer demand falls off in the winter in Asia, Saudi is more likely to reduce its production as the year moves into the winter months. This changing oil supply pattern may make it somewhat harder for Saudi Arabia to build global oil inventories during the historically weak seasonal periods of spring and summer in Europe and North America. This is just another wrinkle in how the global oil market is changing, and how seasonal oil price trends may be misinterpreted.

Shale Revolution Leads To Rebirth Of Rail Transportation

The success in exploiting America’s shale resources has contributed to a resurgence of domestic crude oil production

The Shale Revolution has created numerous challenges for energy thinking – both here in North America and globally. The success in exploiting America’s shale resources has contributed to a resurgence of domestic crude oil production. The most recent weekly U.S. oil production figure, as reported by the Energy Information Administration (EIA), is over seven million barrels per day, the highest level since March 1993. The EIA in its December *Short Term Energy Outlook* forecasts that domestic oil production, which they estimated averaged 6.4 million barrels per day (mmb/d) in 2012 will average 7.3 mmb/d this year and increase further to 7.9 mmb/d in 2014. If the latter target is reached, it will match the highest level of domestic production since 1988.

All this additional oil production means greater volumes need to be transported to the nation’s refineries for processing. The great challenge for our crude oil transportation infrastructure is that much of the new shale production is coming from more remote locations. Figuring out how to ship this growing shale output has become a

The pipeline industry needs to plan to construct larger volume pipelines to haul the oil from the new shale fields to the refineries

major issue since oil that can't reach a refinery has little value. Moreover, due to pipeline limitations, oil producers already are struggling with how to reach the most profitable refineries. That means transportation flexibility is becoming a more significant consideration.

Traditionally, crude oil is moved from producing wells to refining centers via pipelines. When new wells are close to existing producing areas, the infrastructure requirements may only involve constructing a small diameter pipeline from the wells to an interconnection point with a larger capacity pipeline. That is relatively easy to do when the new volumes are not large, but shale oil output is beginning to exceed those limits. It means the pipeline industry needs to plan to construct larger volume pipelines to haul the oil from the new shale fields to the refineries. As shale output is growing rapidly and forecasts call for output to continue to rise, the transportation companies need to try to anticipate what volumes they will be moving in the future in order to construct the appropriately sized pipelines.

The low oil price has significantly helped the few mid-continent refineries in operation that benefit from a low feedstock price and high final product prices

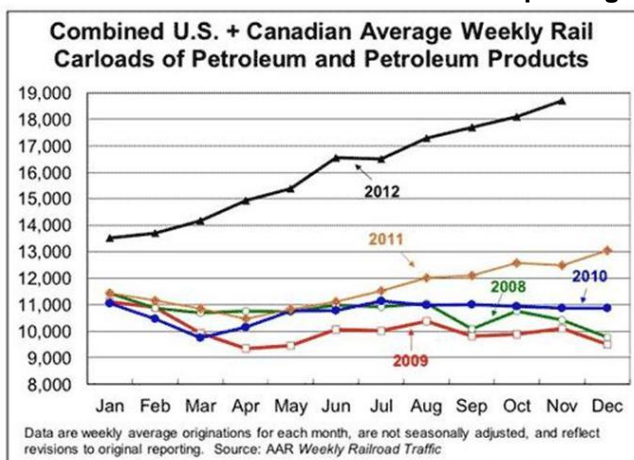
The transportation situation has been further compounded by the glut of oil accumulating in the middle of the country as new Bakken shale output is flowing there along with increased oil imports from Canada. To date, the restriction on moving large volumes of crude oil from the Cushing, Oklahoma storage point to Gulf Coast refineries has resulted in depressed oil prices at that mid-continent site. The low oil price has significantly helped the few mid-continent refineries in operation that benefit from a low feedstock price and high final product prices. The recent reversal and expansion of the Seaway Pipeline will help to correct this geographical supply imbalance and should result in boosting mid-continent oil prices. But this move hasn't solved the problem totally, and won't be a solution if additional oil continues to come from the Bakken formation and Canada.

Railroads are becoming a popular transportation option for shale oil, especially the oil from the Bakken formation in Montana and North Dakota

To try to overcome these problems, the oil industry is reverting back to historical methods of moving oil such as truck, train and barge, or a combination of the three, in addition to pipelines. Railroads are becoming a popular transportation option for shale oil, especially the oil from the Bakken formation in Montana and North Dakota. Recently, Phillips 66 (PSX-N) announced a 5-year contract with Global Partners L.P. (GLP-N) to move Bakken oil to the company's Bayway refinery in New Jersey. Global will use its rail loading, logistics and transportation network to deliver about 50,000 barrels per day to Phillips 66. This is merely one of many new and expanded contracts to move oil production from the Bakken and South Texas Eagle Ford formations to refineries.

The volume of crude oil transported by rail has mushroomed in the past year. (Exhibit 9, next page.) The combined U.S. and Canadian average weekly railcar loadings exploded in 2012, rising by

Exhibit 9. Rail Movement Of Crude Oil Exploding



Source: American Association of Railroads

Union Pacific indicated that it moved 2,000-5,000 carloads of crude oil in 2011 and approached 50,000 units last year

approximately 39%. Union Pacific (UNP-N) indicated that it moved 2,000-5,000 carloads of crude oil in 2011 and approached 50,000 units last year. Value-investor Warren Buffett’s BNSF railroad, a unit of his Berkshire Hathaway (BRK.B-N) conglomerate, saw its petroleum activity grow from 203,735 carloads in 2011 to 353,738 in 2012, a gain of 73.6%. Moreover, the annualized rate in the fourth quarter was 443,000 units, a 25% increase over the 2012 volume, but BNSF has stated publicly its planned volumetric increase in 2013 will be more like 40%.

Even pipeline companies are getting involved in the railroad business by building terminal facilities to offload railcars at receiving points along their pipelines

Even pipeline companies are getting involved in the railroad business by building terminal facilities to offload railcars at receiving points along their pipelines. A consortium of pipeline companies headed by Plains All American Pipeline LP (PAA-N) announced it will spend an estimated \$1 billion on rail projects this year. Enbridge Inc. (ENB-N) is investing about \$160 million to develop a North Dakota rail terminal. When the first stage was completed last September, it was able to transfer 10,000 barrels of crude oil from trucks to rail cars. In the second phase, just commencing construction, the company will double-loop the track for the rail cars allowing tanker cars to wait to be loaded. At full capacity, the terminal will handle 80,000 b/d.

Each unit train can move roughly 65,000 barrels of oil

Union Pacific invested \$50 million in the Permian Basin last year in new rail yards and sidings to enable more efficient movement of trains. Last fall, the rail company was moving 125 unit-trains of crude oil a month, which was growing. Each unit train can move roughly 65,000 barrels of oil. And in Louisiana, Union Pacific has invested \$200 million to expand a crude oil receiving terminal located near several refineries.

Probably the prime beneficiary from the explosion in Bakken production has been BNSF. If one looks at the company’s rail

Exhibit 10. BNSF's Rail Network Touches Western Shales

Source: BNSF Fact Sheet 2012

Most comparisons of transportation options suggest that it costs roughly \$10 a barrel more to move the oil by rail than pipeline

network throughout the western part of the United States, it is not hard to see that it has rail lines reaching into every shale basin. Last year, the company spent \$400 million on new rail terminals and track upgrading in order to capitalize on the shale boom. It is planning on investing \$197 million in track upgrades in Montana and North Dakota this year. Given the close association between Warren Buffett and President Barack Obama, there are often rumblings that the President's rejection of the Keystone XL Pipeline construction permit was in order to not create a cheaper alternative to BNSF. Estimates are that rail transportation charges for Bakken oil can range between \$5 and \$18 per barrel depending on where it is heading. Most comparisons of transportation options suggest that it costs roughly \$10 a barrel more to move the oil by rail than pipeline, but for oil that may be trapped in areas where it sells at \$30-\$40 a barrel discount to Gulf Coast or East Coast oil imports, that extra transportation cost is well worth it to capture the additional coastal-market premium.

The oil was hauled in used whiskey barrels by wagons operated by teamsters from the well sites to trains, which then hauled it to a refinery in New York City

One of the more interesting aspects of this shale oil and railroad saga is to go back into history and see the evolution of oil transportation from the beginning of the petroleum era in the United States. Following the discovery of oil in western Pennsylvania with Col. Edwin Drake's well, the oil was hauled in used whiskey barrels by wagons operated by teamsters from the well sites to trains, which then hauled it to a refinery in New York City. Because of the congestion in the region and the captive market situation, the cost of transporting the oil to the rail depot exceeded the total freight charge from Pennsylvania to New York, according to Ida Tarbell's 1904 History of Standard Oil. To overcome the high tariff due to the monopoly situation, a 9-mile long, wooden pipeline was constructed to move the oil to the rail line, one of the first uses of a pipeline in the U.S. to haul oil.

Another interesting footnote to this transportation story is why we have 42-gallon barrels as the standard measure in the oil industry.

Exhibit 11. 1860s Oil Creek Train Hauls Barrels Of Oil

Source: The Oil Creek Railroad Company, 1860-1868

A 42-gallon tierce full of crude oil weighed about 300 pounds, which was considered to be about as much weight as a man could reasonably wrestle around

It began with England's King Richard III who defined wine "puncheons" as a cask holding 84 gallons and a "tierce" as one holding 42 gallons. These casks were made by "tight" coopers who constructed them under guidelines established by their guild, The Worshipful Company of Coopers. Over the years, puncheons and tierces were transported to America along with all sorts of other casks. By 1700, due to Pennsylvania statute, practical experience and custom, water-tight tierces became the standard container for shipping everything from eels, fish, molasses and whale oil. A 42-gallon tierce full of crude oil weighed about 300 pounds, which was considered to be about as much weight as a man could reasonably wrestle around. Twenty of them would fit nicely on the flat cars used by the railroads (see Exhibit 11 and note the barrels in each flat car). For the industry, bigger casks were unmanageable and smaller ones less profitable. Thus, the 42-gallon cask became the oil industry standard in the 1860s and remains so today.

Railroading of oil has become a growth business once again

Due to the location of shale output, the time lag in planning and then building new pipelines and the existence of convenient railroads with greater flexibility than pipelines to reach the most profitable refineries, railroading of oil has become a growth business once again. It will remain so, as long as new tanker cars can be procured and until production peaks.

Hydraulic Fracturing Issue Encounters Protests And Movies

On Friday, January 11, a 30-day public comment period in New York State on the issue of hydraulic fracturing ended, but not without a certain amount of high-drama. The wife and son of the late Beatles star John Lennon, Yoko Ono and Sean Lennon, led a group of protestors on a visit to the Albany office of New York Governor Andrew Cuomo (Dem) and the Department of Environmental

“Governor Cuomo, please don’t frack New York. Don’t allow our beautiful landscapes to be ruined, or our precious and famous clean water to be dirtied.”

The Governor has been reminded of the economic benefits of shale development from a leading Democrat, former Pennsylvania Governor Ed Rendell (Dem), who allowed development of the Marcellus Shale in his state

Gov. Cuomo says he is working on an overall energy development plan for the state

Conservation. At the latter stop, the duo, who founded Artists Against Fracking last July, delivered 50 boxes reportedly containing 204,000 comments about hydraulic fracturing.

Around the same time, Ms. Ono had an op-ed published in the *Albany Times Union* in which she wrote, “My husband, John Lennon, and I bought a beautiful farm in rural New York more than 30 years ago. Like the rest of our state, this peaceful farming community is threatened by fracking for gas. She went on to say, “Governor Cuomo, please don’t frack New York. Don’t allow our beautiful landscapes to be ruined, or our precious and famous clean water to be dirtied.”

Sean Lennon has made the point that his father’s home, which was purchased for its beauty and serenity, would be threatened by the possible construction of a pipeline to haul natural gas from Northeastern Pennsylvania (the Marcellus formation) to New York City and New England. While he is not stating that the property would be the site of drilling and fracturing activity, but the pipeline would be needed if fracturing was allowed to occur in the region near their home.

Gov. Cuomo has been wrestling with the fracking issue for over a year while watching upstate New York’s economy languish due to fallout from the financial crisis and resulting recession. In his recent State of the State message, Gov. Cuomo made the following point about the problems of that region. “We need an additional focus on upstate New York. There have been decades of decline in upstate New York. When you look at the job growth in upstate New York, frankly, it is sad and troubling.” The Governor has been reminded of the economic benefits of shale development from a leading Democrat, former Pennsylvania Governor Ed Rendell (Dem), who allowed development of the Marcellus Shale in his state, which has contributed significantly to that state’s economic recovery. The economic benefits of shale’s development were recently pointed out by Rachael Colley and Joe Massaro, field directors with Energy in Depth, a public outreach campaign funded by the Independent Petroleum Association of America, who said, “The ‘state’ of New York State is grim. Natural-gas development could be the light at the end of the gloomy tunnel.”

Gov. Cuomo says he is working on an overall energy development plan for the state and suggests that his silence on the issue and reluctance to release an environmental study on the health impacts from hydraulic fracturing should not be taken as a sign that he has reached a decision. He did, however, recently hire Richard L. Kauffman, a former adviser to U.S. Energy Secretary Steven Chu, to serve as New York’s new energy secretary. Some are interpreting the move as an indication that Gov. Cuomo is prepared to take dramatic steps on energy policy.

“If they do this, there will be a class action, and the class action is going to hit everybody who is doing this. It’s going to go on and on and on. Do we want that?”

The Governor should recognize that a decision to support fracturing, even if restricted to just those few New York State counties that border the Pennsylvania shale development activity, will not be popular with many citizens such as those following Ms. Ono and Mr. Lennon. Ms. Ono told supporters and *Rolling Stone* magazine that “If they do this, there will be a class action, and the class action is going to hit everybody who is doing this. It’s going to go on and on and on. Do we want that?”

Having seen the movie during its second weekend of release, we suggest you save your \$8 ticket money

We’re not sure whether Gov. Cuomo was holding off his decision in anticipation that Matt Damon’s movie, *Promised Land* would bring some clarity to the fracking issue. The much anticipated movie, which released a trailer last fall to tease potential viewers about the message of the film, arrived with a whimper – and not many positive reviews. We’ll leave the acting reviews to Hollywood-types, but having seen the movie during its second weekend of release, we suggest you save your \$8 ticket money.

The discussions about hydraulic fracturing are incomplete and largely inaccurate, so one should not hold out hope that the topic would be advanced by the movie

The movie is cute and delivers a twist at the end, which we interpreted as an attempt by Mr. Damon, who both co-authored the script and was the lead actor, to garner sympathy from the anti-fracking people in the audience. It is presented as a morality play with Mr. Damon as the “bad” guy who eventually becomes a “good” guy only to suffer at the hands of both the owners of the land whose mineral rights he is trying to lease and his bosses at Global, the \$9-billion-a-year natural gas company. The discussions about hydraulic fracturing are incomplete and largely inaccurate, so one should not hold out hope that the topic would be advanced by the movie.

He comments on how the landscape looks like Kentucky

In a movie of this type, you would expect some interesting scenes, characters and dialogue. There were a few, but often we wound up shaking our head at the illogical events and explanations or outright mischaracterization of facts. However, we found one scene early in the movie quite funny. As Mr. Damon and Frances McDormand, playing his assistant, were driving through the Pennsylvania countryside on the way to visit a local farmer, he comments on how the landscape looks like Kentucky. We laughed because when we first saw the scenery, my wife leaned over to me and said “it looks like Kentucky,” based on the farmland of the Whiskey Trail that we drove last year on our way to Rhode Island. Having Mr. Damon make the same claim literally seconds after my wife did was very funny.

The new year will certainly not lessen the focus on shale development and the role played by hydraulic fracturing

The new year will certainly not lessen the focus on shale development and the role played by hydraulic fracturing. President Barack Obama’s emphasis on climate change and environmental stewardship in his inaugural address means the federal government will be energized to resolve the science of fracking and set forth a path to a cleaner and cooler environment. For a president focused on his legacy, this mission offers many opportunities to legislate, if not to govern through executive order, Mr. Obama’s preferred way to deal with an uncooperative Congress. Mr. Obama certainly hopes

the message of his second inauguration day will be looked back upon much as how Walter Cronkite used to close his 1950s "You Are There" history shows: "What sort of day was it? A day like all days, filled with those events that alter and illuminate our times ... and you were there."

Demographics And Futurists Seek To Help Auto Business

"The power that U.S. baby boomers have exercised for nearly 50 years over the auto industry is starting to wane – finally."

For those of us of a certain age, the opening paragraph of a *Wall Street Journal* article about the future of the automobile industry, keyed to the opening of the annual North American International Auto Show in Detroit, was a slap in the face. The one-sentence paragraph stated: "The power that U.S. baby boomers have exercised for nearly 50 years over the auto industry is starting to wane – finally." The article went on to highlight how auto company executives with their words and designs were pivoting their new car strategies toward the 20-, 30- and 40-something consumers. So long Baby Boomers, even though this group still represents a large share of America's purchasing power. To demonstrate the fact and how reluctant auto companies are to give up on this group, one only needs to examine General Motors' (GM-NYSE) revival of the "Stingray" name for its flashy seventh-generation Corvette, which turned out to be one of the stars of the auto show.

Exhibit 12. New Stingray Was Hit Of Auto Show



Source: Chelsea Sexton, *Australian Popular Science*

GM is trying to appeal to young sports car enthusiasts who might otherwise buy a Porsche 911 or some other high-end Italian sports car

The new Corvette is designed to be upscale. In designing the car, GM is trying to appeal to young sports car enthusiasts who might otherwise buy a Porsche 911 or some other high-end Italian sports car. At the same time, GM's decision to revive the Stingray name after decades of keeping the name on the shelf is an admission it still seeks to tap into the baby boomer generation's wealth and its nostalgic memories.

Exhibit 13. The Last Stingray Was In 1969

Source: *The "Last" Corvette.com*

That means redesigning everything from dashboard entertainment systems to focusing on fuel-efficiency over horsepower

The advent of dramatically improved engine performance and fuel-efficiency have shifted the buying discussion to 4-cylinder versus 6-cylinder engines

A big change in the automobile business is consumers' desire to downsize the cost of vehicles, especially high end ones

As the auto companies step up their targeting of younger buyers, they are being forced to revamp their vehicles and marketing strategies. That means redesigning everything from dashboard entertainment systems to focusing on fuel-efficiency over horsepower. They are also being forced to adjust their marketing to overcome the image that small cars are inherently "cheap" and less durable.

Some years ago the auto-buying debate was over whether to purchase a car with a V-8 engine or a V-6, with the deciding factor always being the need for passing power on the highway versus the additional cost of the larger engine (initial purchase price plus additional upkeep costs and the more expensive premium fuel). The thought of an underpowered 4-cylinder motor was equated with "cheap," "tinny" or "junk." According to recent newspaper automobile vehicle advice columns, the advent of dramatically improved engine performance and fuel-efficiency have shifted the buying discussion to 4-cylinder versus 6-cylinder engines, as driving tests show nearly equal highway and acceleration ratings, but much greater fuel-savings with the smaller engines.

A big change in the automobile business is consumers' desire to downsize the cost of vehicles, especially high end ones. Both Daimler AG (DDAIY-O) and BMW AG (BMW.DE) showed new models at the Detroit Show that are designed to retail at prices close to \$30,000 or to lease for about \$300 per month, price points believed as entry points for younger affluent car buyers. Even Nissan (NSANY-O) introduced a much lower cost Leaf, its electric vehicle entry, in hopes of jump-starting its sales that have been stalled by the much higher cost of early models. The Leaf S model,

Audi said that in the U.S. 46% of its sales come from Generation X and Y buyers

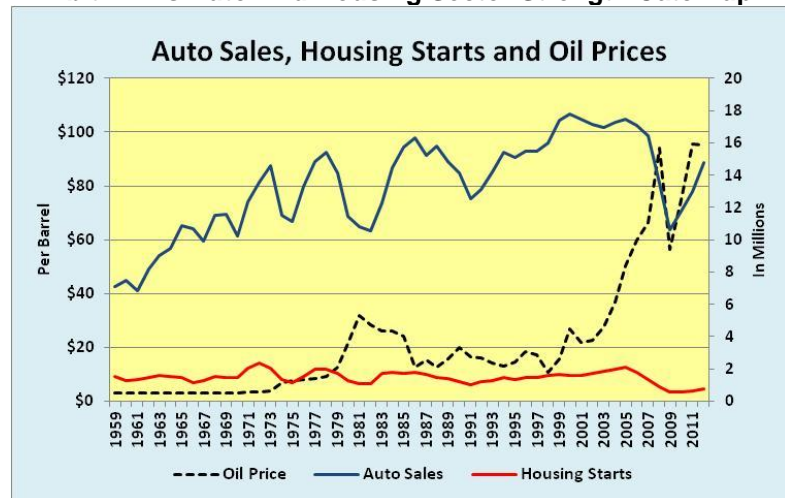
Faith Popcorn of BrainReserve, one of the leading futurists, has identified “single-arity” as a significant emerging trend that will impact manufacturers and retailers

with less trim, will sell for 18% below the price of the SV, the lowest cost earlier model, or at a starting price of \$28,800 before federal and state tax credits.

The adjustments underway in the auto market are partly due to futurists who are guiding companies on the impact of changing demographics on buyer groups and other lifestyle changes. A representative from Audi (AUDVF-O) said that in the U.S. 46% of its sales come from Generation X and Y buyers. By 2020, that ratio is expected to increase to 75%. The vehicle design changes are important as they also help auto manufacturers take their models to newly affluent customers in developing markets such as China and in Latin America.

Futurists who study trends and survey people are identifying other lifestyle changes underway. Faith Popcorn of BrainReserve, one of the leading futurists, has identified “single-arity” as a significant emerging trend that will impact manufacturers and retailers. She believes the rapid rise of single versus married households “will redefine the human experience” and forces numerous changes ranging from tax laws favoring married couples to the design of household appliances, moving them away from giant family machines to “single” machines. She also believes singles will be at the forefront of using robots as companions. This may open up the market for “self-driving vehicles” that are being tested by several companies. There is also a school of thought that suggests younger corporate managers will be more willing to take on greater risk and experiment with product designs compared to older managers.

Exhibit 14. Is Auto And Housing Sector Strength Catch-up?



Source: Ward Automotive, US Census Bureau, EIA, PPHB

These social changes will impact energy markets, may disrupt positive historical trends and conceivably reinforce recent negative consumption trends such as those seen in the driving market and

The recent upturns in auto sales and housing starts seem illogical given the rise in oil prices, but the movements may merely be signaling that the demand upturns are really catch-ups

with gasoline demand. When one looks at long-term patterns for auto sales and new housing starts in the United States – both associated with increased energy demand, their sensitivity to the price of oil cannot be ignored. We recently updated an old graph we used some years ago in discussing trends for these two energy-intensive industries. The recent upturns in auto sales and housing starts seem illogical given the rise in oil prices, but the movements may merely be signaling that the demand upturns are really catch-ups from deferrals brought about by the devastating 2009 recession and that once satiated, demand will dip as oil prices climb higher. These are both interesting and important trends to watch. They tend to support the observation about which all futurists seem to agree, which is that technology may be changing more rapidly than ever but the social changes that ensue obey a different schedule.

WEF Sees Little Change In The Risks World Faces In 2013

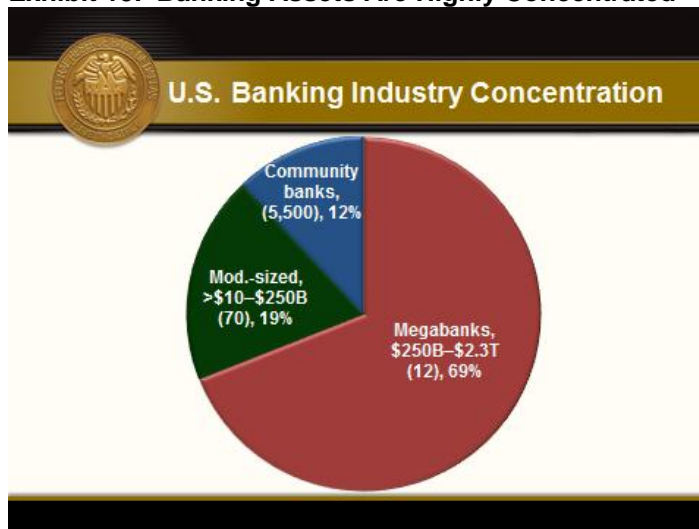
The global risk that topped the list of those likely to manifest over the next decade is “severe income disparity”

The World Economic Forum (WEF) recently completed its week-long CEO and global leadership gabfest in Davos, Switzerland. Prior to the start of the conference, the WEF released its *Global Risks 2013* report, which is based on a survey of over 1,000 experts from industry, government, academia and civil society who were asked to review and rank a listing of 50 global risks. The global risk that topped the list of those likely to manifest over the next decade is “severe income disparity.” Correcting this imbalance in the United States was the centerpiece of President Barack Obama’s re-election campaign last year and involved increasing income taxes on the highest earning Americans. This effort is consistent with the trend to tax wealthy and high-income citizens in many countries such as the move in France that is driving numerous high-profile wealthy citizens to seek citizenship elsewhere to avoid these confiscatory taxes. The latest statistics on the wealth gap among Chinese citizens has received attention as many scholars are questioning the data.

The risk the WEF survey identified as having the highest impact if it were to manifest is “major systemic financial failure.” We are experiencing a high-level debate in this country about our “Too Big To Fail” (TBTF) financial institutions. Richard Fisher, President of the Federal Reserve Bank of Dallas recently gave a speech in which he laid out possibly a better way to regulate the banking sector to prevent the need for and cost of protecting TBTF institutions.

The TBTF banks account for only 0.2% of the universe yet they control 69% of industry assets

Mr. Fisher pointed out that as of the third quarter of 2012, there were roughly 5,600 banks in the United States, with 5,500 community banks with assets of \$10 billion or less. There are another 70+ institutions with assets of \$10-\$250 billion and just 12 with assets of \$250 billion to \$2.3 trillion. The community banks represent 98.6% of the institutions but only 12% of industry assets. The middle group of banks represents 1.2% of the institutions with 19% of assets, while the TBTF banks account for only 0.2% of the universe yet they control 69% of industry assets.

Exhibit 15. Banking Assets Are Highly Concentrated

NOTES: Percentages reflect share of industry assets. Asset size is based on the total assets of a U.S. banking organization (holding company, when applicable) as of Sept. 30, 2012.

SOURCES: Call reports (Federal Financial Institutions Examination Council); FR Y-9C filers (National Information Center, Federal Reserve System).

Source: **Dallas Federal Reserve Bank**

Because these two dozen institutions can never be closed, the involvement of regulators and the government will be significant and costly

As Mr. Fisher highlighted, if any of the 99.8% of banking institutions get into financial difficulties, they would be dealt with through private-sector ownership changes and minor regulatory involvement. He questions why this process is ok for all but the 0.2% of banking institutions. Because these two dozen institutions can never be closed, the involvement of regulators and the government will be significant and costly. As the management teams of these TBTF institutions know they can never be shut down, one has to question where the oversight of their actions comes from. It is this risk that the WEF survey respondents have identified as a potentially significant global risk.

This is interesting given the significant cyber-attack on Saudi Aramco's computer network designed to disrupt its operations last year

What we found most interesting about the WEF report was its table showing the trend in the top five global risks in terms of likelihood of occurrence and the top five in terms of impact since 2007. While most of the current risks have been on the list since 2007, their relative positions have changed over time. We call your attention to two points. First is the similarity of all the risks and their order between 2012 and 2013. Under the terms of likelihood, cyber attacks disappeared from the 2012 list to be replaced with mismanagement of population aging. This is interesting given the significant cyber attack on Saudi Aramco's computer network designed to disrupt its operations last year. Its disappearance is also interesting given how hacking of government, academic and financial computer databases has increased in recent years. The second point was that under the terms of impact, oil price spikes and extreme energy price volatility were represented every year since

That suggests the individuals surveyed, presumably all leaders in industry, government and academia believe we have entered an era of energy abundance

2007 until 2013. That suggests the individuals surveyed, presumably all leaders in industry, government and academia believe we have entered an era of energy abundance, which assumes the current plentiful oil and gas supply is not susceptible to either geopolitical or technical events that could disrupt global energy markets, and in turn the global economy. We find that to be a significant judgment call, especially as it is likely to be translated into government policies and business strategies. In our view this could be one of the riskiest assumptions about the future and businesses should seriously consider alternative scenarios.

Exhibit 16. Global Risks Don't Appear To Have Changed

Top 5 Global Risks in Terms of Likelihood

	2007	2008	2009	2010	2011	2012*	2013*
1st	Breakdown of critical information infrastructure	Asset price collapse	Asset price collapse	Asset price collapse	Meteorological catastrophes	Severe income disparity	Severe income disparity
2nd	Chronic disease in developed countries	Middle East instability	Slowing Chinese economy (<6%)	Slowing Chinese economy (<6%)	Hydrological catastrophes	Chronic fiscal imbalances	Chronic fiscal imbalances
3rd	Oil price shock	Failed and failing states	Chronic disease	Chronic disease	Corruption	Rising greenhouse gas emissions	Rising greenhouse gas emissions
4th	China economic hard landing	Oil and gas price spike	Global governance gaps	Fiscal crises	Biodiversity loss	Cyber attacks	Water supply crises
5th	Asset price collapse	Chronic disease, developed world	Retrenchment from globalization (emerging)	Global governance gaps	Climatological catastrophes	Water supply crises	Mismanagement of population ageing

Top 5 Global Risks in Terms of Impact

	2007	2008	2009	2010	2011	2012*	2013*
1st	Asset price collapse	Asset price collapse	Asset price collapse	Asset price collapse	Fiscal crises	Major systemic financial failure	Major systemic financial failure
2nd	Retrenchment from globalization	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Climatological catastrophes	Water supply crises	Water supply crises
3rd	Interstate and civil wars	Slowing Chinese economy (<6%)	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food shortage crises	Chronic fiscal imbalances
4th	Pandemics	Oil and gas price spike	Chronic disease	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Food shortage crises
5th	Oil price shock	Pandemics	Fiscal crises	Fiscal crises	Extreme energy price volatility	Extreme volatility in energy and agriculture prices	Diffusion of weapons of mass destruction

Source: World Economic Forum

The next *Musings* will be February 19, 2013, due to travel.

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