

State of Utah Federal Funds Commission Economic Risk Analysis



Prepared by:

Kevin D. Freeman, CFA
Freeman Global Holdings, LLC
January 2016

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PURPOSE

The purpose of this effort was described as Risk Analysis in the contract and legislative language.

Risk Analysis means an economic risk analysis that:

- a) Identifies the most likely and substantial risk that could cause the state of Utah to experience a reduction in the amount or value of federal funds it receives;
- b) Assesses, for each identified risk, the probability that the risk will actually occur;
- c) Assesses the direct and indirect impacts to the state of Utah, given the occurrence of each identified risk, including the amount or value of the reduction in the federal funds to the state; and
- d) Identifies and recommends methods that state can employ to avoid, minimize, and monitor the impacts of each identified risk.

Please note that we have categorized risks by type and provided a subjective estimate of probability. The list is compiled based on judgment rather than modeling or other methods. This effort is not intended to be predictive as none of the risks identified may come to fruition. The purpose is, however, to identify potentially catastrophic risks and describe potential impacts with a cursory review of possible mitigation opportunities. Basically, this is a preliminary disaster preparation guide, subject to modification and adaptation with the influence of new information. The strong suggestion is for regular review and revision as circumstances change.

As per the agreement, this analysis is “scaled back and somewhat more generalized than the RISK ANALYSIS described in the PROPOSAL under the basic (minimum) bid.” As a result, the primary issue of Federal Fiscal Risks is covered followed by a review of specific threat categories. In regard to specific threats, only general impacts are discussed. For convenience, where key points are cited, the citation is to a web address rather than formal notation. All web addresses were verified in December 2015 or January 2016.

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ECONOMIC RISK ANALYSIS

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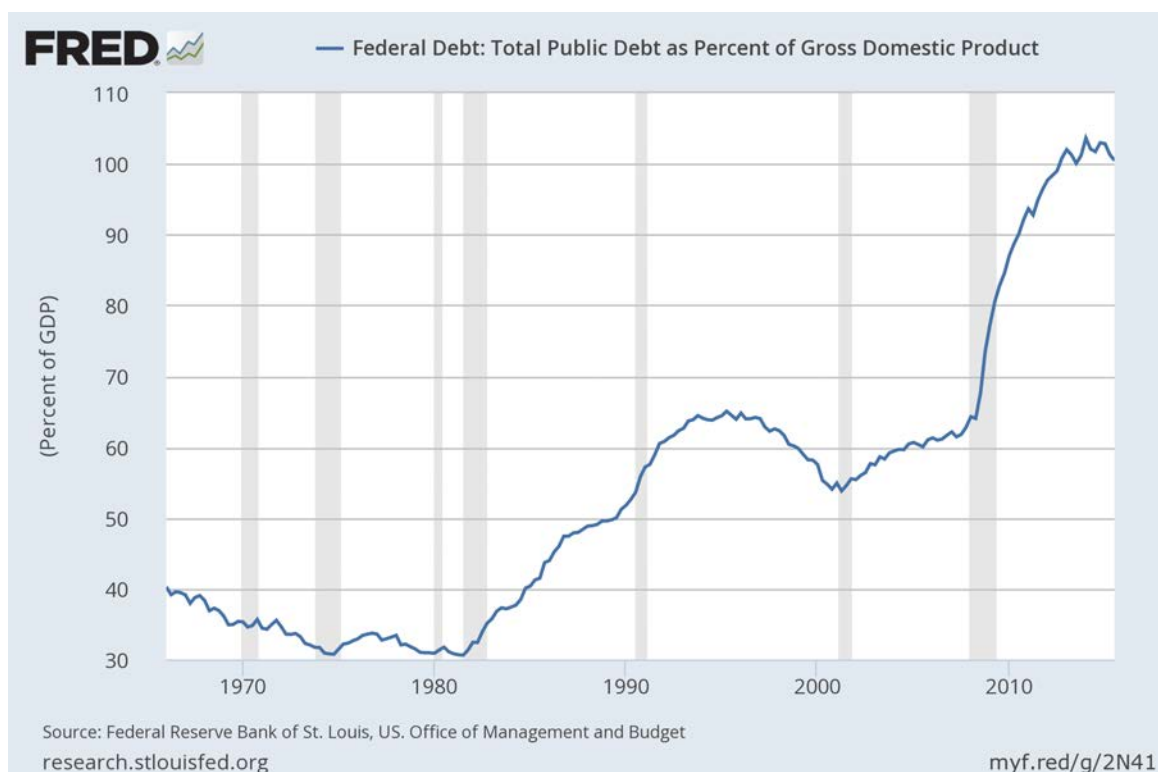
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Fiscal Risks: The Primary Issue

The United States has an unprecedented Federal debt, now approaching \$20 trillion in terms of official government reporting. To be more precise, as of this writing (December 12, 2015), the actual reported Federal debt was \$18.784 trillion¹, up from \$18.113 trillion as recently as August 2015.² The reported debt, however, differs from practical debt in two important ways.

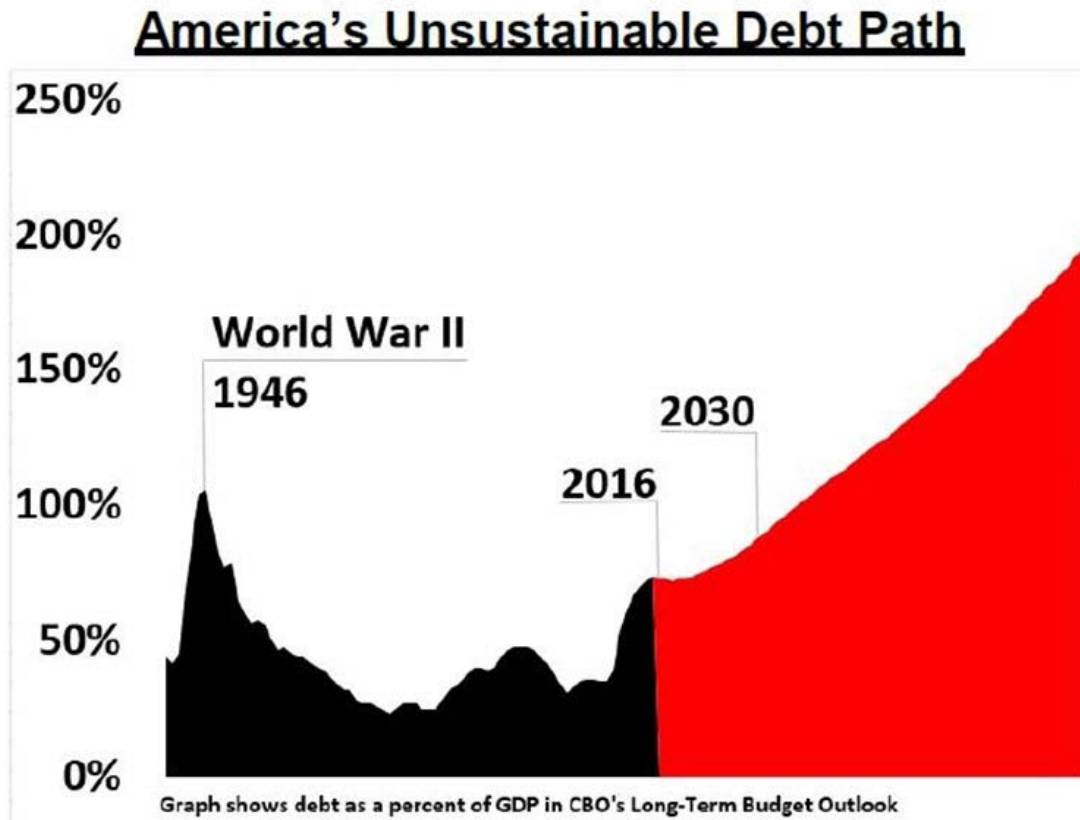
First, the reported number includes intra-governmental debt that many would argue should not count toward debt concerns. By subtracting the intra-governmental debt, the total external debt drops to around \$14 trillion as of November 2015 according to the U.S. Treasury.³ This is a significant adjustment. On an unadjusted basis, the reported Federal debt now exceeds 100% of GDP for the first time in decades as shown in the following chart produced by the St. Louis Federal Reserve Bank.⁴



High Debt-to-GDP ratios have been correlated with severe recessions and fiscal crises.⁵ And the United States not only has the highest total reported debt of any nation but also is among the nations with the highest debt-to-GDP ratios.⁶ On an adjusted basis, however, the Debt-to-GDP ratio falls well below the 100% threshold, allowing many to dismiss or at least sharply reduce their concerns over Federal debt.⁷ Others disagree and feel that all debt, including intra-governmental debt, should be included in the calculation.⁸

Fiscal Risks: The Primary Issue

Even with this adjustment, however, the debt problem remains significant. According to the non-partisan Congressional Budget Office (CBO), the growth in debt is on an unsustainable path (as shown in the following chart of external debt, not including intra-governmental borrowing).⁹



Source: First Budget, Fix the Debt and the Concord Coalition, 2014.

From the 2015 CBO report:

The long-term outlook for the federal budget has worsened dramatically over the past several years, in the wake of the 2007–2009 recession and slow recovery. Between 2008 and 2012, financial turmoil and a severe drop in economic activity, combined with various policies implemented in response to those conditions, sharply reduced federal revenues and increased spending. As a result, budget deficits rose: They totaled \$5.6 trillion in those five years, and in four of the five years, they were larger relative to the size of the economy than they had been in any year since 1946. Because of the large deficits, federal debt held by the public soared, nearly doubling during the period. It is now equivalent to about 74 percent of the economy's annual output, or gross domestic product (GDP)—a higher percentage than at any point in U.S. history except a seven-year period around World War II.

Fiscal Risks: The Primary Issue

If current law remained generally unchanged in the future, federal debt held by the public would decline slightly relative to GDP over the next few years, CBO projects. After that, however, growing budget deficits—caused mainly by the aging of the population and rising health care costs—would push debt back to, and then above, its current high level. The deficit would grow from less than 3 percent of GDP this year to more than 6 percent in 2040. At that point, 25 years from now, federal debt held by the public would exceed 100 percent of GDP.

Moreover, debt would still be on an upward path relative to the size of the economy. Consequently, the policy changes needed to reduce debt to any given amount would become larger and larger over time. The rising debt could not be sustained indefinitely; the government's creditors would eventually begin to doubt its ability to cut spending or raise revenues by enough to pay its debt obligations, forcing the government to pay much higher interest rates to borrow money.¹⁰

It is important to keep in mind that these fiscal concerns are serious even after adjusting out intra-governmental debt.

Unfortunately, while the first adjustment provides at least a small amount of solace, the second adjustment substantially increases the concern.

Reported debt is based on outstanding current obligations in the form of Treasury issuance but ignores any promised or future obligations. Under existing accounting law, corporations are required to account for future obligations (committed to be paid but not currently being paid) but the Federal Government is exempt from this requirement.¹¹ Many economists suggest that the total Federal debt, when calculated under GAAP (Generally Accepted Accounting Principles) would be measured in the hundreds of trillions of dollars rather than tens of trillions. One such economist is Laurence J. Kotlikoff, Professor of Economics at Boston University. In Congressional testimony in February 2015, Professor Kotlikoff made the case that the total fiscal gap between long-term Federal government income and long-term obligations currently rests at \$210 trillion.¹² As a result, he makes the following pronouncement:

Let me get right to the point. Our country is broke. It's not broke in 75 years or 50 years or 25 years or 10 years. It's broke today. Indeed, it may well be in worse fiscal shape than any developed country, including Greece.¹³

There are serious implications from this reality that for the most part remain unrecognized at present. The risks contained in this reality overshadow and underscore virtually all other concerns to be addressed.

Including both the Congressional Budget Office projections and the Kotlikoff analysis, under the present course of events, a fiscal crisis appears virtually inevitable that will directly impact the State of Utah in one of several different ways

Fiscal Risks: The Primary Issue

(or a combination thereof). Without a course change, the probability is estimated to be close to 100%.

Four Possible Impacts

1. Fiscal/Financial Crisis

First, a fiscal crisis could directly threaten any Federal transfers to Utah or any other state. At present, such a crisis seems unimaginable because the United States Federal Government retains the ability to borrow money as needed to finance any deficit. This capacity, however, will inevitably come into question either from the sheer magnitude of the debt as the CBO alleges or some external influence as will be defined further in this analysis. Regardless of the source or trigger, a fiscal crisis could result in a suspension or serious reduction in transfers to states including Utah.

The suspension of transfers could be the result of internal political developments to address a possible crisis or external mandates associated with a global bailout of the United States. While unprecedented, at least in modern times, for the United States to be subject to such foreign mandates, they are a regular part of bailout programs offered to sovereign nations. The onerous terms offered to Greece are the most recent example.¹⁴ In such an instance, the IMF or other body overseeing a bailout would require radical changes to spending, transfers, or taxation policy. The dictating body would likely severely restrict transfers to the states.

Without a bailout, there is also the possibility of Federal default, which likely would be substantively worse. The unmanaged defaulting on debt at the magnitude of current or projected levels would result in a collapse of the economy, hyperinflation, or outright war on an unprecedented global scale. Under these circumstances, Utah and other states should not expect Federal support.

2. Rapid reduction in spending

It is also possible that a political change could result in reduced Federal spending in an attempt to avert a looming financial crisis. While this would be preferable by far to an uncontrolled crisis, it is obvious that Federal transfers would be restricted. According to Professor Kotlikoff, spending would have to be reduced between 37.7% and 46.5% to be sustainable with the amount depending upon when the cuts were implemented.¹⁵ [Note: This analysis excludes the cost of debt service. In other words, if interest rates rise from present levels as expected, the need for cuts to eliminate the fiscal gap will be proportionally higher. As an example using round figures, based on an estimated \$20 trillion debt, every 1% increase in interest rates adds \$200 billion of interest cost annually. As an example of how high interest rates can rise in the United States, it is relevant to know that the peak was 20% in 1979 and 1980 as measured by the Fed Funds rate.¹⁶ The current Fed Funds rate range is 0.0 to 0.25%.]

3. Substantial increase in taxation.

Another alternative that has been proposed to avert crisis has been for the Federal government to increase taxation to rates that could eliminate the long-term fiscal gap. The needed tax increase ranges from 58.5% if implemented immediately to 77% if implemented 30 years from now.¹⁷

Table 1 Percentage Revenue Increase or Cut in Spending (apart from debt service) Needed to Eliminate U.S. Fiscal Gap for Different Adjustment Starting Year		
Start year	Revenue Increase	Cut in Spending
2015	58.5	37.7
2025	64.4	40.4
2035	70.4	43.2
2045	77.0	46.5

Source: calculations by Laurence Kotlikoff based on CBO's 2014 Alternative Fiscal Scenario

Again, this analysis ignores the cost of debt service. All other things being equal, a rise in interest rates would require additional revenue collection to cover the additional cost. As previously stated, \$20 trillion in debt results in \$200 billion per year of additional spending for every 1% increase in interest rates. Therefore, higher interest rates would require further tax increases.

Many economists believe that large tax increases would slow the economy.¹⁸ This would thus have indirect impacts on Utah.

4. Alternative strategies or circumstance-altering factors

Beyond spending cuts and tax increases, there are a wide variety of alternative strategies to deal with the looming fiscal crisis. These would generally require political changes. As an example, any increase in growth would greatly alter the fiscal gap. Efforts such as reduced regulation, stimulus, development of new technologies, geopolitical changes, or even tax cuts have the potential to alter the growth equation. In other words, there are some currently unexpected potentially positive factors that could favorably impact the long-term fiscal equation. An

Fiscal Risks: The Primary Issue

examination of these hopeful factors is beyond the scope of this analysis but should be considered in regard to policy development.

The bottom line is that multiple leading experts as well as the non-partisan Congressional Budget Office are convinced that if the current course remains unaltered, there will be a fiscal crisis that would impact Utah in dramatic ways through a reduction in the amount or value of federal funds received.

This analysis will examine multiple external risk factors that could substantially and negatively impact federal fiscal conditions even worsening the current treacherous trajectory. The risk factors will be divided into the following (non-mutually exclusive) categories:

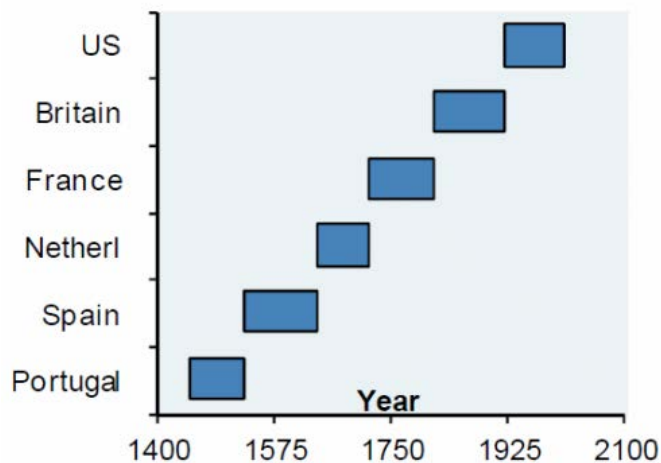
- I. Currency risks**
- II. Cyber risks**
- III. Capital Market Risks**
- IV. Global Market Risks**
- V. Economic Warfare**
- VI. Terrorism**
- VII. Open Warfare**
- VIII. Political Risks**
- IX. Natural Disaster**

I. Currency Risks

The Issue

Globalization has increased the importance of currencies to unprecedented levels. During this period, the American dollar has reigned as the single most important and primary reserve currency. While the dollar has clearly demonstrated longevity, it is a fact that no currency has maintained that status over the very long term (as shown in the chart from JP Morgan via ZeroHedge).¹⁹

(c37) Reserve currency status does not last forever



There are two risks with currency. One is the risk of a currency war in which ironically the strongest currency can be the loser. The second is currency collapse, which has opposite but likewise serious implications. At present, the dollar appears to be quite strong as shown in the Federal Reserve chart.²⁰

I. Currency Risks



This strength relative to other currencies poses at least temporary risk to the American economy with the potential for economic slowdown and hampered exports.²¹ Exports account for about half of corporate profits for larger companies (such as those represented in the S&P 500).²² Utah exports totaled over \$12 billion in 2014.²³ This amount was significantly less than previous years, however, dropping from over \$19 billion in 2012.²⁴ The decrease was due in large part to lower commodity prices, especially gold.²⁵ In the event of further dollar strength, there is a serious risk of a further collapse in commodity pricing.²⁶

A strong dollar also directly impacts tourism. According to a quote in *The Economist*:

In fact, for every one-percentage-point increase in the dollar's value (as measured by the real trade-weighted exchange rate), foreigners' travel spending drops by half a percentage point. And those cutbacks happen immediately after the shock to the exchange rate....[I]t doesn't look like Americans spring for foreign vacations when the dollar is strong. Yet foreigners do notice a strong dollar, and they respond by traveling less or spending less when they do come.²⁷

This is a consideration of importance to Utah as international tourism plays an important role in the Utah economy.²⁸ Overall, (foreign and domestic) tourists increased Utah's economy by billions of dollars.²⁹ This has added an estimated \$1 billion and growing in annual tax revenue.³⁰

While current dollar strength is relatively manageable, a true currency war could potentially trigger a deflationary spiral that might prove devastating.³¹ Unfortunately, very recent actions by global central banks suggest that a true currency war might be a possibility.³² The last time the world experienced a true global deflation was the Great Depression.³³

I. Currency Risks

Perhaps the greatest concern of a currency war is that it can be the exclusive result of external factors. The Federal government can attempt to mitigate local damage but doing so would exacerbate the global problem. If the United States were to undertake efforts to devalue the dollar, other nations would likely respond with further devaluations creating a vicious circle. The only potential remedy would be diplomacy and coordination of Central Bank policy.

Although the specific impact would be difficult to quantify, a currency war and deflation would nevertheless prove devastating. One positive offset would be that the Federal government would retain borrowing ability and thus could be a reliable source of support for the Utah budget. Of course, this would increase dependence and thus magnify future concerns.

State-led mitigation efforts for a currency war/deflation would include a focus on domestic business rather than exports. Those industries that benefit from cheaper imports and new technologies can thrive during periods of deflation.

Currency Crisis

The opposite of a currency war with a stronger dollar would be a currency crisis where confidence in the dollar was seriously undermined.

There's no doubt that as of this writing, the American dollar remains the most desired major currency on the planet.³⁴ And, since mid 2014, the dollar has actually strengthened substantially despite earlier and widespread predictions to the contrary.³⁵ Yet, current strength is no excuse for complacency. In fact, the forces arrayed against the dollar have been increasing as have the tactics being implemented to end dollar dominance. It is hard to imagine that another currency could upend the Greenback at this moment. As many economic problems as we have, other nations seem to have more.

The Euro is in crisis.³⁶ Russia is in dire straights.³⁷ China has a serious debt problem and is internally far weaker than most can imagine.³⁸ The Middle East has to deal with lower oil prices, threatening the social spending that has supported stability.³⁹ The Japanese economy is requiring even greater stimulus and government policy favors a weaker Yen.⁴⁰ While growth has been historically anemic in America, at least there is growth.⁴¹ So, on the surface, the expectation is for the dollar to remain strong and perhaps strengthen even further in the immediate future.⁴²

Beneath the surface, however, there is a great deal of activity that raises concern. Traditional dollar hegemony was built on a few simple foundational supports. First of these is that the Western financial system has been dollar based for the past seven decades since the end of World War 2.⁴³ Second oil has traded almost exclusively in dollars since the advent of the Petrodollar.⁴⁴ Finally, United States military dominance has undergirded the dollar's preeminence.⁴⁵ Unfortunately, each

I. Currency Risks

of these pillars is currently being questioned. In addition, enemies and potential adversaries of the United States have active plans to undermine the pillars in an effort to undermine the dollar.

The first pillar, the dollar-based financial system, has aged. As noted earlier, the current system was established seven decades ago built at Bretton Woods, granting the dollar an outsized impact on global economics. While representing less than a quarter of the world's GDP, the United States holds sway over foreign exchange, currency reserves, and bank deposits (as shown in the following chart from *The Economist*).⁴⁶ Even the institutions created and funded by the United States such as the IMF, World Bank, and United Nations have argued that this system needs to be updated or revised.^{47, 48, 49}



Beyond the natural tendency toward change, there are also active efforts to replace the Western system with the express intention of disrupting dollar hegemony. For example, with Russian support, China has developed alternative transaction systems as well as an Asian development bank, which many believe to be a potential IMF/World Bank challenger.^{50, 51} While the United States opposed the Asian bank diplomatically, most American allies joined the effort against Washington's wishes.⁵² This suggests the degree to which American monetary power has already been undermined despite recent dollar strength.⁵³ Unfortunately, this has been developing for some time. There was building resentment even among allies at the American approach of using access to the dollar as a weapon of economic warfare. European banks, for example, were caught laundering money for the Iranian regime and subject to billions of dollars in fines.⁵⁴ Internal memos depicted serious resentment.⁵⁵ Even Secretary of State Kerry has publicly admitted that the removal of the dollar as reserve currency was "bubbling out there" (his description).⁵⁶

I. Currency Risks

Resentment among adversaries and enemies has run even higher. Since as early as 1998, elements in Russia have discussed replacing the dollar as the world's reserve currency.⁵⁷ This has since been a core focus of Vladimir Putin.⁵⁸ It has also been a focus for al Qaeda and ISIS.^{59, 60}

China, in particular, has expressed the desire to "de-Americanize the world" by removing the dollar as reserve currency.⁶¹ This has been a long-term goal of more belligerent elements in China as an action step to undermining American power.⁶² Even seemingly moderate elements joined the chorus in 2013 with the government shutdown and the risk of a default on Treasury debt repayment. The Communist leadership decided at that time that they no longer wished to be held hostage by American political disputes.⁶³ More recently, the Chinese have begun to sell down their dollar-based reserves.⁶⁴

The second pillar underneath dollar hegemony has been the role of the petrodollar. Since the early 1970s, all oil transactions have been priced in dollars.⁶⁵ In addition, oil exporters have tended to hold the proceeds in the form of U.S. Treasury instruments. With falling oil prices, however, the total transaction volume requiring dollars has declined sharply. At the same time, oil exporters have had to draw down on dollar holdings to supplement lost income.⁶⁶

Even without malicious intent, the fact that oil prices have fallen from over \$100 per barrel to under \$35 per barrel with little change in volume would reduce the demand for American dollars by approximately two-thirds.⁶⁷ Next, add in the need to sell dollar reserves by cash-strapped exporters and it's easy to see that the petrodollar support has been severely reduced. Finally, there is a growing recognition of the petrodollar's once dominance status being diminished by Russia and China.⁶⁸ These nations have struck multiple energy deals (valued at one point as high as \$400 billions in U.S. terms) using their own currencies and avoiding the American dollar.⁶⁹

The third major pillar supporting the dollar has been American military superiority and support. Other nations have quietly allowed American dollar hegemony with the assumption that the United States stood prepared to provide military assistance around the world. In recent years, however, it has been perceived that the American military has pulled back from its role as global peacemaker.⁷⁰ At the same time, U.S. military dominance has appeared to recede.⁷¹

While there should be limited expectation of an imminent dollar crisis, there should be serious long-term concern. The factors undergirding the dollar are short term in nature, built around relative strength in our economy or foreign weakness. These issues tend to be cyclical. On the other hand, the longer-term pillars have each been undermined in recent times. It is tantamount to removing a solid foundation and replacing it with sand. The change may only be noticed when the storms come.

I. Currency Risks

Assessment of Probability

The odds of an impactful currency risk are relatively high and primarily an issue of timing. The risk of an outright currency war appears to have increased.⁷² Global cooperation could reduce this risk but attention appears to be more focused on climate change than currency at the moment. Assessing the various factors involved would suggest that the odds of a significant currency war within the next decade could be estimated as high as 20% in the current environment.

Over the very long term, the odds of the dollar losing status as the primary reserve currency are better than 75% (and approaching 100%). The primary question has to do with timing and whether the loss of such status was gradual and managed, or abrupt. In terms of a catastrophic loss of the dollar's status due to abrupt timing, crisis, or malicious attack, the odds are subjectively estimated at 15-20% within the next decade. [For perspective, those are approximately the same odds as in Russian roulette with a six-chambered revolver.]

Assessment of Impacts

Direct impact from a currency war would include a significant reduction in exports and tourism-related revenues. A revenue loss of 50% or more in these categories would certainly be possible. Econometric modeling might prove beneficial in more properly assessing the direct impact. Indirect impacts would include the potential for severe recession to depression, further reducing state revenues in other areas including sales tax.

One potential positive offset in a likely currency war would be that the Federal government would have tremendous borrowing power due to heightened demand for Treasury bonds in the corresponding deflation.⁷³ It would likely use that power to borrow and spend, including a ramp up in transfers to states in an attempt to offset the deflation. The primary risk would therefore be of increased dependency on Federal transfers. Another potential positive offset would be that operational costs would drop from deflation.

In the case of a currency crisis or dollar collapse, the impacts would be opposite and more direct. Federal funds could be sharply curtailed, as the government would be unable to fund the deficit let alone the rollover of existing debt. Future borrowing in dollars would be unlikely and any bailout offered to the Treasury likely would have severe restrictions. Even as state revenues would be hindered, resulting inflation would drive required expenditures to substantially higher levels.

Because these circumstances are somewhat unprecedented for the largest economy in the world, it is difficult to quantify the specific impacts although they would no doubt be quite substantial.

I. Currency Risks

Avoidance and Minimization

There is very little that Utah can do directly to avoid currency issues other than influencing Federal-spending policy through the political process. The main problem is the Federal debt and the consequences of that debt enhance the risks of both currency warfare and currency collapse.

In terms of minimization, Utah has taken at least a small step toward currency soundness with the Utah legal tender act.⁷⁴ This provides a limited alternative currency for transaction in the case of a dollar collapse. Unfortunately, building a viable alternative currency in a single state would be extremely difficult even in normal times. Working in a state consortium, however, would increase the potential for success. One such opportunity might be to coordinate with the state of Texas, the second largest state economy (ranked only behind California) representing \$1.65 trillion of annual activity.⁷⁵ Texas would be the world's 12th largest economy in the world if measured on a stand-alone basis.⁷⁶ Texas is developing a bullion depository and the issuance of a currency backed by precious metals.⁷⁷ An analysis of how this might work to mitigate currency risks is beyond the scope of this effort. Nevertheless, it is something that could be explored.

Monitoring

Federal Reserve and other government agency reporting will provide a continuing flow of information in regard to currency movement. Financial market reporting will provide regular updates as well. Ultimately, monitoring the markets themselves will be of the greatest value. The key will be to interpret the data and separate the noise from actual trends. A forecasting firm with a background in economic warfare could provide useful and ongoing monitoring. The evaluation of trends requires subjective analysis.

II. Cyber Risks

The Issue

Another serious and even more likely threat comes from cyber crime, theft, terrorism, and warfare. There are two underlying realities that are essential to understanding the Cyber threat. First, there are no perfectly safe systems. This means that breaches are inevitable. Second, the spectrum of risks is incredibly wide, ranging from minor annoyance to total calamity.

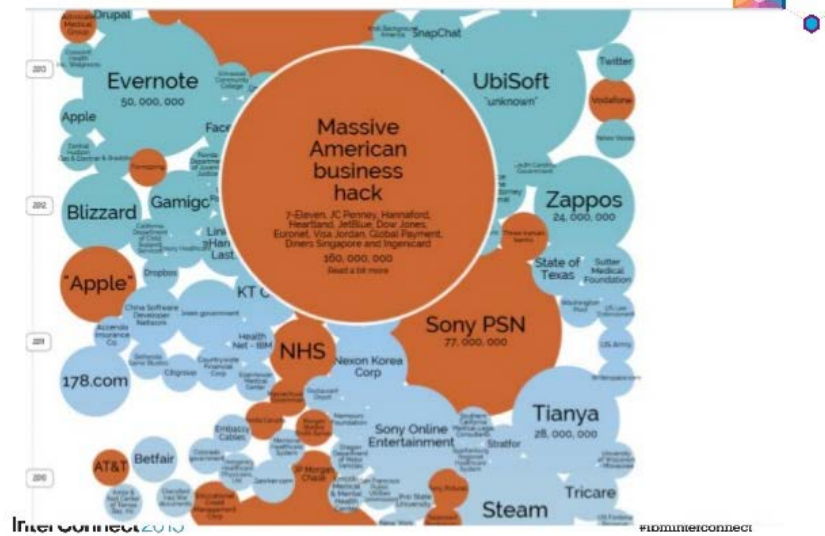
The massive number of reported breaches even in seemingly secure facilities underscores the first reality, that no system is perfectly safe. Reported substantive breaches have occurred at government facilities including:

- The Office of Personnel Management⁷⁸
- The White House⁷⁹
- The State Department⁸⁰
- The CIA Director⁸¹
- Department of Defense⁸²
- NSA⁸³
- The Marine Corps⁸⁴
- The Navy⁸⁵

In the private sector, every major corporation has been hacked although some may not yet be aware.⁸⁶ The lengthy list includes all types of companies and all types of breaches. An example is shown in the following graphic:⁸⁷

II. Cyber Risks

The who's who of the world's biggest data breaches <http://www.informationisbeautiful.net/visualizations/worlds-biggest-data-breaches-hacks/>



The fiscal threat from cyber attack ranges based on the target, the nature, and the success of the attack. Relatively minor breaches will have minimal consequences. But the potential for systemic breaches is ever present according to experts.

General Keith Alexander, former head of the NSA and Cyber Command made a startling admission on national television:

On the CBS program 60 Minutes tonight, National Security Agency (NSA) director Gen. Keith Alexander admitted that "a foreign national could impact and destroy a major portion of our financial system" by placing a virus in our computer systems "and literally take down the U.S. economy" if the virus was spread around.

Alexander told CBS in blunt terms that "right now it would be difficult to stop (the virus attack) because our ability to see it is limited."⁸⁸

Due to the interconnected nature of modern society, a cyber attack on Wall Street would necessarily impact Utah regardless of any cyber protections the state may undertake. The destruction of the banking system could be catastrophic. Without electronic funds transfer for example, Federal funding to the states would collapse. The economy would have to resort to barter and bullion.⁸⁹ Something similar would take place if the stock market infrastructure failed. We know that Russians targeted NASDAQ with a "digital bomb."⁹⁰

And, the risk is not limited to the financial sector. Any critical infrastructure could be hacked with tragic consequences.

According to current NSA Director Admiral Mike Rogers:

II. Cyber Risks

China and "probably one or two" other countries have the ability to invade and possibly shut down computer systems of U.S. power utilities, aviation networks and financial companies, Admiral Mike Rogers, the director of the U.S. National Security Agency, said on Thursday.

Testifying to the House of Representatives Intelligence Committee on cyber threats, Rogers said digital attackers have been able to penetrate such systems and perform "reconnaissance" missions to determine how the networks are put together.

"What concerns us is that access, that capability, can be used by nation-states, groups or individuals to take down that capability," he said.⁹¹

Hackers for hire can further proliferate cyber weaponry to terror groups and others.⁹² We know that Iran has hacked a good amount of our critical infrastructure.⁹³ We are also aware that ISIS has been attempting to hack our electric grid.⁹⁴ Most experts believe that it may be simply a matter of time before one of these attacks becomes successful at one level or another. Currently attacks happen approximately every four days.⁹⁵

The Associated Press provided a chilling account of the grid's vulnerability in a December 21, 2015 story:

Security researcher Brian Wallace was on the trail of hackers who had snatched a California university's housing files when he stumbled into a larger nightmare: Cyberattackers had opened a pathway into the networks running the United States power grid.

Digital clues pointed to Iranian hackers. And Wallace found that they had already taken passwords, as well as engineering drawings of dozens of power plants, at least one with the title "Mission Critical." The drawings were so detailed that experts say skilled attackers could have used them, along with other tools and malicious code, to knock out electricity flowing to millions of homes.

Wallace was astonished. But this breach, The Associated Press has found, was not unique.

About a dozen times in the last decade, sophisticated foreign hackers have gained enough remote access to control the operations networks that keep the lights on, according to top experts who spoke only on condition of anonymity due to the sensitive nature of the subject matter.

The public almost never learns the details about these types of attacks — they're rarer but also more intricate and potentially dangerous than data theft.

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Information about the government's response to these hacks is often protected and sometimes classified; many are never even reported to the government.

These intrusions have not caused the kind of cascading blackouts that are feared by the intelligence community. But so many attackers have stowed away in the largely investor-owned systems that run the U.S. electric grid that experts say they likely have the capability to strike at will.

And that's what worries Wallace and other cybersecurity experts most. "If the geopolitical situation changes and Iran wants to target these facilities, if they have this kind of information it will make it a lot easier," said Robert M. Lee, a former U.S. Air Force cyberwarfare operations officer. "It will also help them stay quiet and stealthy inside."

In 2012 and 2013, in well-publicized attacks, Russian hackers successfully sent and received encrypted commands to U.S. public utilities and power generators; some private firms concluded this was an effort to position interlopers to act in the event of a political crisis. And the Department of Homeland Security announced about a year ago that a separate hacking campaign, believed by some private firms to have Russian origins, had injected software with malware that allowed the attackers to spy on U.S. energy companies.

Many believe that more established nations with the capability such as China and Russia might refrain from destructive attacks unless provoked due to fear of retaliation. The perceived greater risk is that rogue nations such as North Korea or Iran or terror groups such as ISIS would undertake attack regardless of retaliation potential.⁹⁶ While the tactics might differ, the results can be equally devastating.⁹⁷ It is important to note that the Ukrainian power grid was disrupted by cyber attack and many believe the perpetrator was Russia.⁹⁸

If the electric grid were shut down for a year or more, many experts and Congressional studies indicate that it would be a nation-ending event with the potential loss of American life as high as 90%.⁹⁹ Obviously, in such a case, there is little that could be done to mitigate the devastation. Federal funding could be reduced sharply or eliminated in such a disaster, as resources would be severely taxed.

Even without causing massive death, a takedown of any of our nation's critical infrastructures could be nation ending as our society has become so dependent on them. There are 16 critical infrastructures and most are vulnerable to cyber attack at one level or another.¹⁰⁰ Additional Federal assistance would certainly be needed in such cases. There are multiple examples of successful infrastructure hacking. One is a New York dam that was seriously breached by Iranian hackers.¹⁰¹ This single attack sums up the extreme risks of foreign hackers taking control of our critical infrastructure faced across the board.¹⁰²

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Of course, this is not just an American problem. It is an international crisis as evidenced by recent disclosure that China was behind a massive cyber attack on the Australian government. Major systems and even the defense sector appear to have been compromised.¹⁰³

In at least one respect, the current cyber threat may benefit Utah's economy with a flow of federal funds in development of the controversial massive NSA data facility located within the state (even if many Utah residents oppose it).¹⁰⁴

Assessment of Probability

There is a 100% chance of continuing cyber breach based on existing circumstances. The question becomes at what point such a breach could threaten Utah's fiscal situation. To date, all cyber attacks have proven manageable but the frequency and magnitude of the attacks is increasing. A more serious attack is considered inevitable according many experts expecting a "financial Pearl Harbor."¹⁰⁵ Because technology is rapidly evolving for both attackers and defenders, it is difficult to determine with precision the probability of a catastrophic attack.¹⁰⁶ A subjective estimate might be for a 25% potential for a massive and impactful cyber breach within the next decade. This would be defined as a breach that would shutdown one or more critical infrastructures for a week or longer.

Assessment of Impacts

Cyber attacks range from a nuisance to systemic. Depending on the nature and target of the attack, all flows of funds could be shutdown, funds systematically siphoned, or catastrophic attack with life and death consequences.

Avoidance and Minimization

There is very little that a single state can do to avoid risks of a cyber breach at the Federal or private sector level outside the state. Inside Utah, however, the state can undertake proactive efforts to reduce the threat. A full cyber security review of state agencies is warranted. In addition, Utah should develop, implement, and mandate cyber hygiene training for all state employees and contractors. A large percentage of breaches is the result of the violation of basic safety protocols at individual work stations. One spectacular example includes a breach at a county tax assessor-collector office in rural Texas that resulted in the illicit transfer of tens of millions of dollars in property tax collections over a weekend. The breach was traced to a single employee who had inadvertently surfed to an unsafe website based on a link in a phishing message.

Another worthy strategy for consideration would be a Cyber Civil Defense program designed to educate residents on basic security and responses. This program could be offered as a public service in conjunction with the private sector to minimize

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costs. Training could include the National Guard in accordance with their regular training and security mandates. Such a project is under development as the Cyber Minuteman Project and includes a "see something, say something" reporting capability. Further details can be supplied if desired.

Because Utah has a strong and growing technology industry, the state could also award grants and contracts to address the cyber threat, taking a national leadership role in an emerging industry of critical importance.

In terms of minimization, Utah is better prepared than most states. Stored food and water are essential for survival in the event of a critical infrastructure failure. The large Mormon population has a cultural affinity for preparedness measures.^{107,108} In addition, private employers such as Overstock.com, a Salt Lake City based corporation has publicly announced preparation measures for their employees.¹⁰⁹

The state could take measures to require minimum preparation efforts for employers within the state or even households to maintain certain minimum emergency procedures to be put in place.

While beyond the scope of this analysis, it is recommended that each of the 16 critical infrastructures be individually and formally reviewed in regard to threat, risk, and impact of failure from cyber attack or other failure point.

Monitoring

Multiple private sector companies offer threat-monitoring capabilities although the breadth of the Internet makes full real-time monitoring of all threats and their evolution virtually impossible. With Federal cooperation, and given the large NSA data collection facility, it might be possible to create a public/private task force tailored more directly to Utah's needs. The FBI offers the Infragard program that has demonstrated successful public/private cooperation in monitoring and reporting near real-time threats.¹¹⁰ A concerted effort could be made to better integrate Utah residents and businesses into this and similar programs for information sharing.

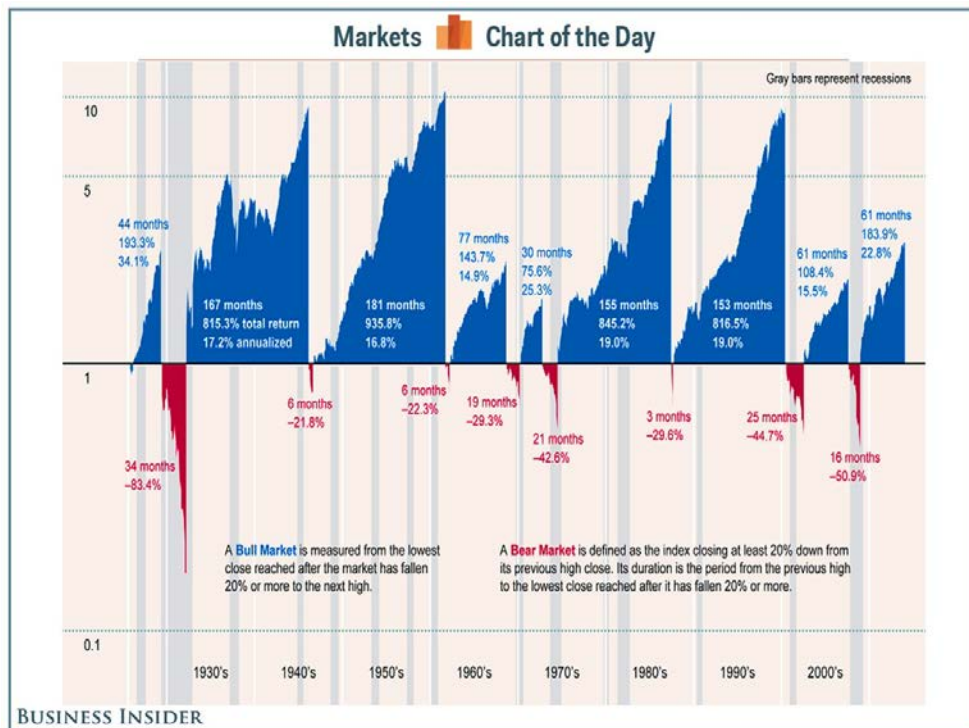
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The Issue

Capital markets fluctuate. It is their nature. At present, both the debt and equity markets have enjoyed lengthy periods of prosperity. The Dow Jones Industrial Average increasing from a low of approximately 6,500 in early 2009 to over 18,000 five years later.¹¹¹ Likewise, the bond markets have enjoyed historically low interest rates, augmented by extraordinary support from Federal Reserve policy.¹¹² History demonstrates that these seemingly favorable conditions are not permanent.

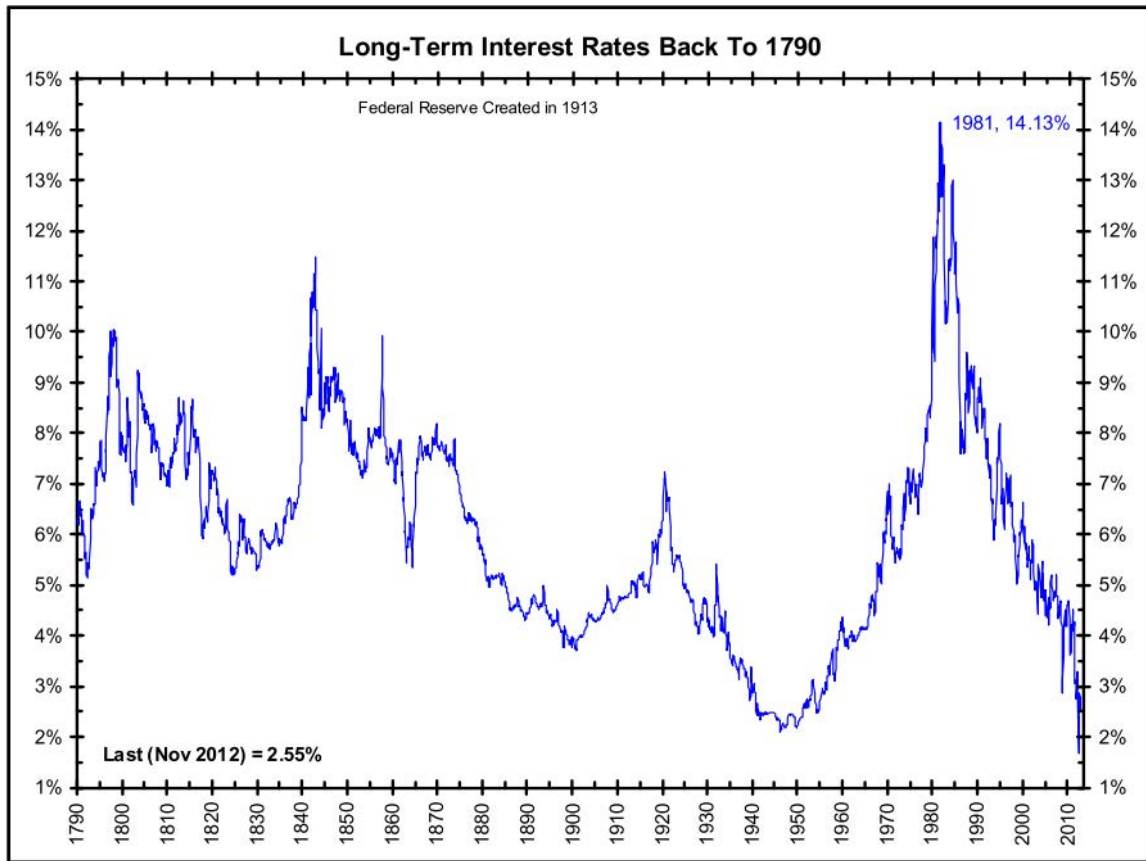
A prolonged decline in equity prices (commonly referred to as a bear market) could directly impact Utah in multiple ways including state revenue, diminished economic growth, or Federal funds support. Rising interest rates could hamper state funding, slow economic development, or reduce the Federal government's ability to borrow and transfer to the state.

The best way to demonstrate the impact of these risks would be a review of the historical record. Multiple prolonged bear markets provide some insight into the impact of sharply lower equity prices. One good example may be 1973-75. Similarly, the bond collapse of 1979-1981 might provide insight regarding the impact of rapidly rising interest rates. The follow chart from Business Insider illustrates the cyclical nature of stock prices.¹¹³



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Interest rates also move cyclically but typically over longer periods. This can be seen in the chart from Ritholtz.¹¹⁴



Interest rates have been at abnormally low levels in the United States. Because lowering interest rates has been a policy tool for the Federal Reserve, the fact that rates are already low has led some to suggest that the Fed's policy efforts may be out of traditional ammunition.¹¹⁵

A more formal econometric modeling of state revenues and expenditures in relationship with dramatic changes in stock and bond valuations would likely offer strong insights into the possible threat of deteriorating capital markets.

The reality is that capital markets are in uncharted territory. Based on the collapse of 2008-09 and the subsequent unprecedented response of the Federal Reserve and other global central banks, both our stock and bond markets are near all-time highs. Many experts, however, believe that the valuations are artificial.¹¹⁶ As the Federal Reserve begins to normalize interest rates, this artificial support will be withdrawn. Some market watchers believe that this will precipitate a financial crisis.¹¹⁷

Regardless of whether or not the withdrawal of stimulus triggers a financial crisis, the simple fact is that the current economic condition is not normal which creates

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another risk. Historically, the Fed and other government efforts have been used to minimize or otherwise offset the impact of a financial crisis.¹¹⁸ Some experts believe that those capabilities have now been exhausted.¹¹⁹ The Federal Reserve has limited remaining monetary tools. And, given the historically large Federal debt, the ability to add additional fiscal stimulus sufficient to produce recovery is questionable at best.¹²⁰ As a result, the next crisis may not be met with an effective recovery plan following the previous pattern. Some have suggested that the Fed move toward negative interest rates in which lenders pay others to borrow capital. These are extraordinary measures and expected to create serious dislocations if employed.¹²¹

Beyond normal cyclical risks, there is evidence that foreign nations and terror groups have targeted our financial system as a point of potential systemic weakness.¹²² Cyber remains perhaps the most likely point of attack in the markets but it is not the only vulnerability. The system itself has been built innovation upon innovation and rests on an antiquated foundation rather than being engineered from the ground up with security protocols in place. [These issues will be discussed in greater detail in the section on Economic Warfare.]

Finally, continued financial innovation based on creating profit opportunities creates its own unique risks. For example, during the housing boom, financial companies created a variety of derivative instruments designed to mitigate the risks of mortgage lending. Mortgage lenders would “securitize” their loans into packages that financial alchemists would divide and into tranches in an attempt to separate out the risks. Unfortunately, while single instruments may have functioned as intended, the combination of these efforts created new and unexpected risks threatening the entire system.

Despite a near-consensus awareness that derivatives were at the heart of the 2008-09 financial collapse, the total size and complexity of financial derivatives has increased dramatically as shown in the chart from Forbes.¹²³ The sheer size of this market is overwhelming.

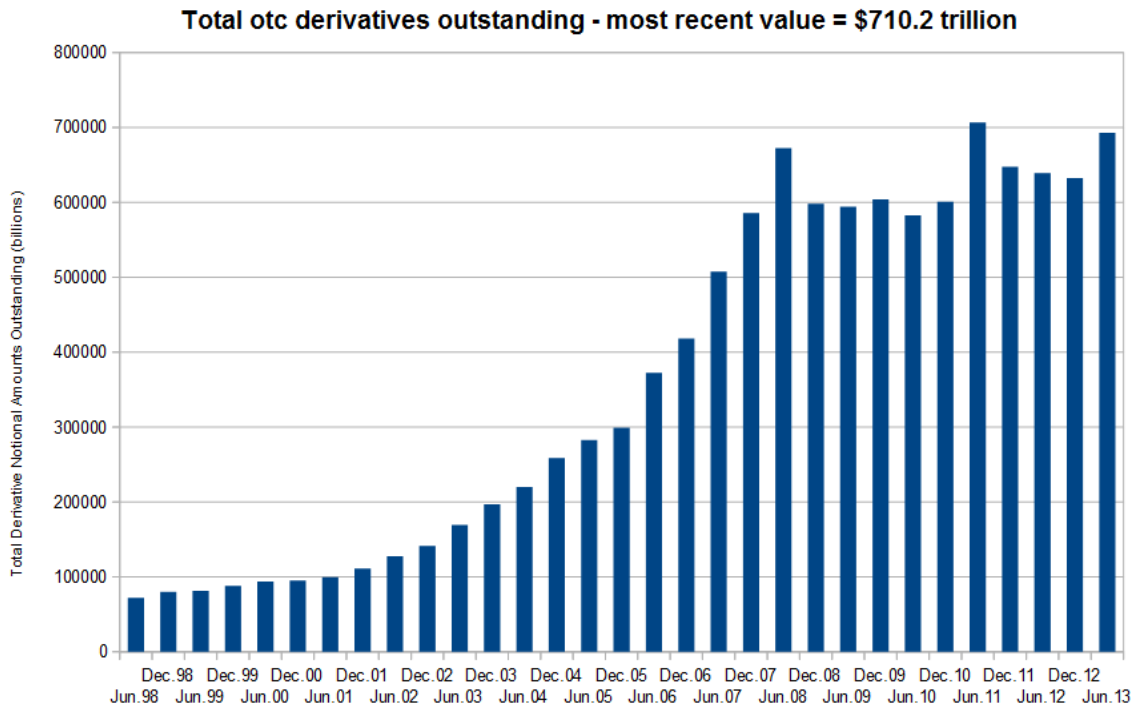
All of the elements that went wrong in 2008 are far bigger and potentially more harmful today than they were in 2007. The banks are bigger, the derivatives markets are bigger, and the Fed’s balance sheet has grown from \$800 billion to over \$4 trillion.

Let’s look at the size of the risk exposure. The Bank for International Settlements reported that the global over-the-counter derivatives markets amounted to about \$638 trillion in 2012, nearly ten times the annual gross domestic product (GDP) of the entire world, which was \$65 trillion.

America’s largest bank, JPMorgan Chase, has derivative holdings worth more than \$74 trillion in total notional value, while its balance sheet is estimated to be \$2.5 trillion. The derivative holdings of JPMorgan alone are more than three

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times the total value of the entire U.S. stock market, which is estimated at \$23 trillion.¹²⁴



Source: Pater Tenebrarum at Acting Man blog¹²⁵

It is assumed that the vast majority of these derivative contracts will offset one another and be settled out without incident. However, in the midst of a crisis, even a small failure rate could swamp the entire economy.¹²⁶ The risk is one of counterparties.¹²⁷ In 2008, for example, many players used derivatives to offset risks to their position. A primary counterparty was AIG, which had to be bailed out by the Federal Government to maintain system solvency.¹²⁸ Given the growth of the derivatives market relative to existing capital, the next crisis may prove unmanageable.¹²⁹ In 2002, Warren Buffett described derivative instruments as financial Weapons of Mass destruction.¹³⁰ He reiterated this view in 2015.¹³¹

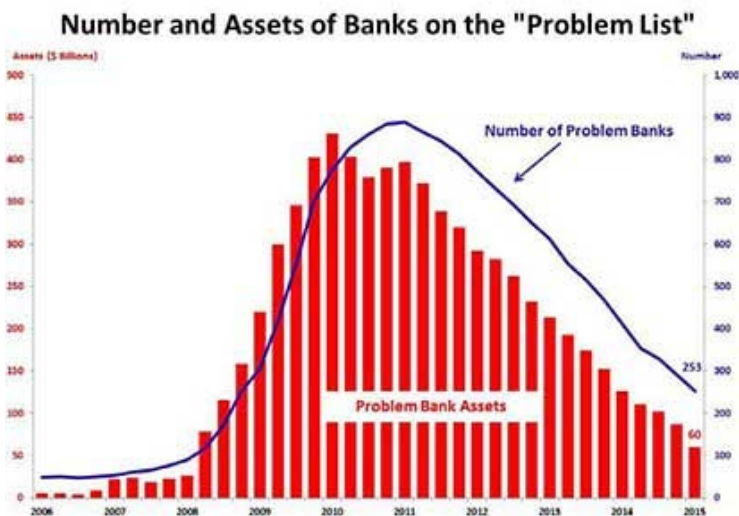
Most observers agree that the banking system has demonstrated structural reform expected to be better suited to weather the next banking crisis. In the event of one or more major banking failures, however, the entire system is jeopardized. One illustration of this is the fact that the FDIC maintains only a small percentage of the assets they insure.

As of March 31, 2015 there were 6,419 FDIC insured banking institutions with FDIC insured deposits of \$6.34 trillion. The FDIC Deposit Insurance Fund (DIF), which protects insured depositors from loss when a bank fails, had a balance of only \$65.3 billion at March 31, 2015 for a reserve ratio of 1.03%. Current law

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requires the FDIC to rebuild the DIF to a minimum reserve ratio of 1.35% by 2020.¹³²

It is true that the number of problem banks has declined since the height of the crisis. It is also true that the number of FDIC problem banks was at an all-time low in 2006, just before the beginnings of the financial crisis.¹³³ This suggests that a low number of problem banks is not necessarily a predictor of future soundness.



A failure of the stock, bond, banking, or commodity markets could create a fiscal implosion that would threaten Utah's finances. This could be the natural result of cyclical factors complicated by a weakened financial condition. Or it could be something more cataclysmic, precipitated by new financial instruments such as the derivative explosion.

Assessment of Probability

The issue is not so much whether there will be a financial crisis. That is inevitable. The first question is how deep the next crisis will be. The second question is whether or not there will be a response (and how effective that response might be). On average, a minor financial crisis occurs approximately every seven years.¹³⁴ Historically, serious financial crises occur with regularity but have typically been generational in nature. Because the determination of severity is somewhat subjective, rankings of the worst crises in history differ by historian. Nevertheless, they tend to cover the same basic events. One example, based on Niall Ferguson's book, *Ascent of Money*, details the 10 largest crises beginning with the Medici Bank failure of 1494.¹³⁵ Over the course of approximately 500 years there were at least 10 systemic financial crises around the world. The listing is incomplete, of course, as other lists include additional risk periods but often they are tied to similar events. One thing becomes obvious with every list, however. The frequency has increased

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over time. This is a natural result of globalization, interconnectedness, and the increasing sophistication of systems.¹³⁶

In addition, many argue that the modern response to mitigate crisis actually sows the seeds for the next crisis. Case in point, many believe that the “dot-com” bubble bursting led the Federal Reserve to keep interest rates lower for longer, which provided the seeds for the housing bubble.¹³⁷ Some argue that the regulatory response is creating conditions for the next crisis.

Consider this from Gilles Hilary, INSEAD Professor of Accounting and Control, The Mubadala Chaired Professor in Corporate Governance and Strategy:

But what started as sound regulatory principles degenerated quickly into a blizzard of detailed regulations. One simple example is the number of pages in the Basel banking regulations. Basel I had 30 pages, Basel II had 347 pages and the latest iteration, Basel III is a staggering 616 pages. The Volcker rule, which broadly prohibits banks from making speculative investments, started as an 11 page long memorandum but is already 1,000 pages long now. With more rules to comply with and the increasing complexity of those rules, compliance is becoming a much harder task.

To make matters worse, regulators are not working in a globally integrated framework, leading to many different national rules for companies to comply with, many which stretch across borders, some which are inconsistent with each other. This is having detrimental effects on companies that may just have an association with the host country’s regulations and creates additional systemic risk. BNP Paribas, one of the biggest European banks, was destabilised when its Swiss subsidiary failed to comply with a piece of U.S. legislation that was triggered by the mere fact it transacted in U.S. dollars.

Firms have responded to this onslaught of legislations by dedicated an increasing amount of resources to compliance. Last autumn, HSBC said it was hiring 3,000 more compliance officers. JPMorgan is hiring a similar number to try to stop the flood of fines coming its way. Some two thirds of compliance practitioners expect their team’s budget to grow this year, according to a survey by Thomson Reuters Accelus. But no matter how much they try, firms seem to lose the compliance challenge. General Motors, one of the biggest industrial corporations in the world, admitted in its annual report lacking ‘expertise’ to ensure compliance with pronouncement on accounting for derivatives....

Ironically, the regulatory process that started in the aftermath of the last financial crisis may be sowing the seeds of the next one. Volumes of regulation, critically analysed by legal and financial experts and supervised by over-extended regulators are unlikely to be sufficient to maintain the integrity of the financial system. The development of compliance-centric procedures is not

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conducive of good risk management. It gives an illusion of control over an increasingly complex and integrated system. Ironically, it perhaps reinforces the root causes of the previous crisis. The starting point of the next financial crisis is still unknown. But it is highly likely that when it comes, fear and uncertainty will send shockwaves through a more complex and connected world.¹³⁸

Others suggest that the unprecedented Central Bank easing of monetary policy has created conditions for the next crisis as explained in an article written by Thorsten Polleit, honorary professor at the Frankfurt School of Finance & Management and adjunct scholar of the Ludwig von Mises Institute:

A policy of QE does not pave the way to recovery, it is sowing the seeds of an even bigger crisis going forward – in terms falling output and employment, rising political and social calamity, and the destruction of the purchasing power of money.¹³⁹

The suggestion, therefore, is that the response to the previous crisis likely exacerbates the next one and may speed its arrival. Such a crisis could arrive as early as 2016, seven years after the peak of the last one, or could be forestalled by another seven years or more. Regardless, however, a future financial crisis is inevitable.

One author, Jim Rickards, has followed financial crises since his role at Long Term Capital Management, the epicenter of a Wall Street threat in 1998.¹⁴⁰ He has noted that the Long Term Management challenge was solved with a bailout by Wall Street banks. Ten years later, Wall Street banks had to be bailed out by Central Banks. He now predicts that the Central Banks themselves will have to be bailed out by the International Monetary Fund (IMF) in the next crisis:

Why are you so concerned with respect to today's financial markets?

In 1998 Wall Street bailed out a hedge fund. But in 2008 the government bailed out Wall Street. This time it wasn't a hedge fund that was in trouble, it was all the major banks. We all heard about «Too Big To Fail» – well, those banks that were too big to fail in 2008 are even bigger today. They have a larger percentage of the total bank assets and far more derivatives. This is true around the world. The central banks are bigger, too. The whole system is bigger and more leveraged today than it was in 2008, which is setting us up for the next crisis.¹⁴¹

This progression is a logical one but essentially assumes that the plan to fix the last bubble bursting is to create a new bubble. Over the next decade, it is estimated that the potential for a serious and impactful financial crisis in the United States is approximately 30%.

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Assessment of Impact

There are three possible outcomes and each has a different type of impact. In addition, other external factors can and will have a directly affect any financial crisis, potentially altering the specific impacts experienced. This could be natural disaster or man-made calamity such as economic or physical warfare. All other things being equal, however, we see three possible impacts from the next financial crisis:

1. There could be a washout of debt, essentially a mass depression with tremendous economic difficulty.
2. There could be hyperinflation and a collapse of the monetary system
3. There could be an extended “muddle through” period whereby policy responses would prove somewhat effective but with a muted recovery.

In many respects, the current financial recovery has been orchestrated by the Federal Reserve and is essentially walking a tight wire with risks of depression on one side and hyperinflation on the other.¹⁴²

Financial Crisis Induced Depression: Washout of Debt, Wipeout of Financial Assets

One of the most serious possible impacts of a coming financial crisis would be a wipeout of financial assets. Stocks, bonds, and even bank deposits decline. Banks would close, or be bailed out potentially by depositors. While The FDIC insures deposits up to \$250,000, there are legal provisions for depositors to lose a portion of their deposits in the event of failure.¹⁴³ The FDIC has been very successful to date in preventing major bank runs during periods of crisis.¹⁴⁴ There are limits, however, to FDIC capabilities. At present, only a small fraction of total deposits are held on reserve for bank bailouts. Unless there was a systemic bank run, this effort will likely remain successful, preventing contagion. In the event of a system-wide calamity, the FDIC reserves would quickly disappear. The FDIC would then have to turn to the Federal Government, which would already be dealing with financial troubles of its own. Any financial crisis would diminish Federal tax revenue while increasing the need for Federal support spending, no doubt impacting Utah in multiple ways.

Conceptually, such a crisis could result in a deflationary depression. While the 1930s experience suggests that deflation and depression can be linked, this is not always true empirically.¹⁴⁵ However, in the event of a depression induced by financial crisis, deflation is an expected outcome.¹⁴⁶ The value of money rises rapidly in deflation as the available supply diminishes. *The Economist* provided a brief description of the impacts of deflation:

Why do economists so dread falling prices?

One common explanation is that in anticipation of falling prices, consumers delay purchases, causing them to fall still further. This argument is a

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simplification; it can be made with equal power in reverse to argue that inflation will inevitably run upwards as consumers bring purchases forward to avoid being stung later. But the argument hints at the right problem: deflation's effect on interest rates. Generally speaking, the interest rate reflects the price of consumption today relative to consumption tomorrow. When interest rates are high, savings are worth more tomorrow, and vice-versa. The return in money terms (the rate advertised by banks) is called the "nominal" interest rate. But inflation also matters. Subtracting expected inflation from the nominal rate produces the real interest rate—the expected return after inflation—which is what people respond to in most models of the economy.

Low inflation or deflation constrains this crucial variable. The nominal interest rate cannot fall below zero, because that would mean reducing savers' bank balances every month, and would prompt them to withdraw their deposits from banks and stash cash under the bed. Together with inflation, this puts a floor on the real interest rate too. If inflation is low and real rates can't fall far enough to boost demand and perk up prices, demand will weaken still further. This is the dreaded deflation trap. There are other problems, too. Lower-than-expected inflation increases the real burden of debts. Lenders benefit, but because they are more likely to save than borrowers, demand is sapped overall. Deflation also increases rigidity in the labour market. Workers are resistant to wage cuts in cash terms, but inflation lets firms cut real wages by freezing pay in nominal terms. Deflation, by contrast, makes this problem worse.¹⁴⁷

Financial Crisis Induced Hyperinflation: Currency Collapse

Based on the effectiveness of the policy response, a financial crisis can also induce hyperinflation. This situation has occurred in Latin America, Africa, Asia, and Europe in the past century. In fact, there are 56 recorded hyperinflation episodes as shown in The Hyperinflation Table (Source is CATO, compilation by Hanke and Krus).¹⁴⁸ Hyperinflations measure the change in prices on a daily basis rather than annually. [The Hyperinflation Table is compiled in a systematic and uniform way. Most importantly, it meets the replicability test. It utilizes clean and consistent inflation metrics, indicates the start and end dates of each episode, identifies the month of peak hyperinflation, and signifies the currency that was in circulation, as well as the method used to calculate inflation rates.]

Hyperinflations are not usually gradual. Rather, conceptually they begin more like a dam filling and then bursting all at once.¹⁴⁹ They typically begin with excessive money supply creation. Initially, the money supply is restrained by low velocity, meaning it is hoarded rather than exchanged. The result is that the money supply continues to grow rapidly but it appears to have a diminishing effect in the marketplace.

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THE HYPERINFLATION TABLE

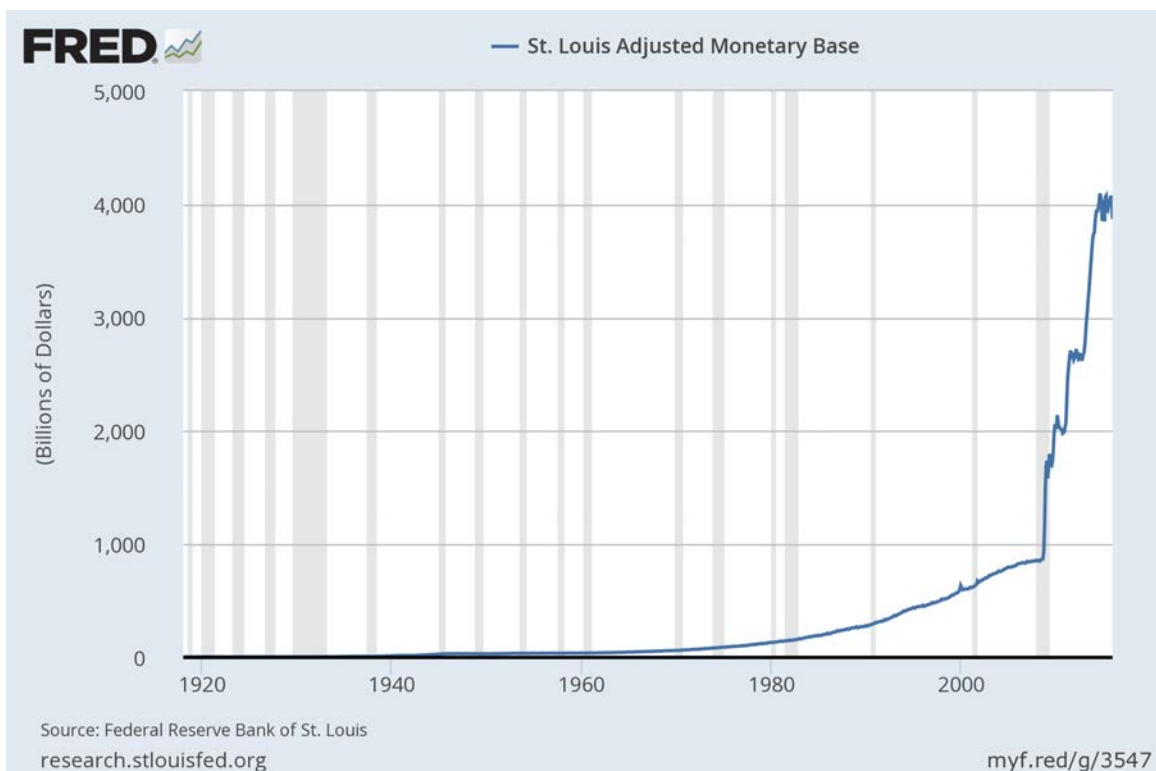
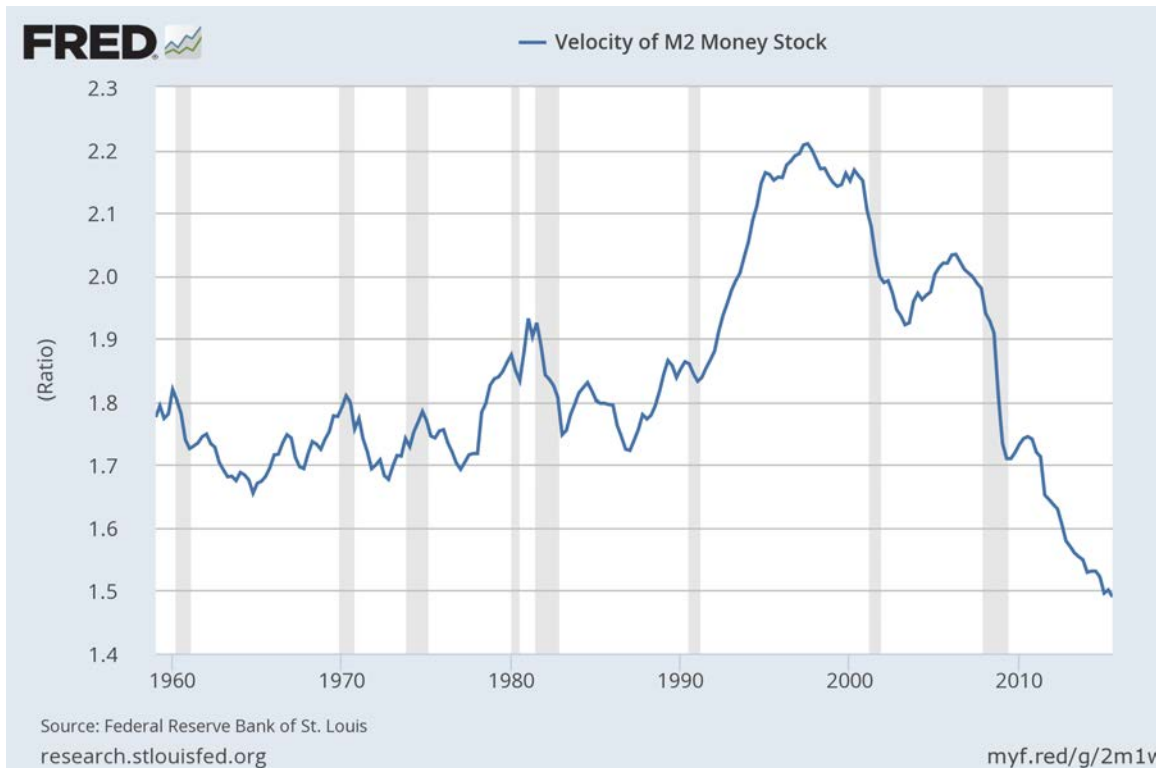
LOCATION	START DATE	END DATE	MONTH WITH HIGHEST INFLATION RATE	HIGHEST MONTHLY INFLATION RATE	EQUIVALENT DAILY INFLATION RATE	TIME REQUIRED FOR PRICES TO DOUBLE	CURRENCY	TYPE OF PRICE INDEX
Hungary ¹	Aug. 1945	Jul. 1946	Jul. 1946	4.19 × 10 ¹⁶ %	207%	15.0 hours	Pengő	Consumer Implied Exchange Rate*
Zimbabwe ²	Mar. 2007	Mid-Nov. 2008	Mid-Nov. 2008	7.96 × 10 ¹⁰ %	98.0%	24.7 hours	Dollar	Consumer
Yugoslavia ³	Apr. 1992	Jan. 1994	Jan. 1994	313,000,000%	64.6%	1.41 days	Dinar	Consumer
Republika Srpska† ⁴	Apr. 1992	Jan. 1994	Jan. 1994	297,000,000%	64.3%	1.41 days	Dinar	Consumer
Germany ⁵	Aug. 1922	Dec. 1923	Oct. 1923	29,500%	20.9%	3.70 days	Papiermark	Wholesale
Greece ⁶	May. 1941	Dec. 1945	Oct. 1944	13,800%	17.9%	4.27 days	Drachma	Exchange Rate‡
China§ ⁷	Oct. 1947	Mid-May 1949	Apr. 1949	5,070%	14.1%	5.34 days	Yuan	Wholesale for Shanghai
Free City of Danzig ⁸	Aug. 1922	Mid-Oct. 1923	Sep. 1923	2,440%	11.4%	6.52 days	German Papiermark	Exchange Rate**
Armenia ⁹	Oct. 1993	Dec. 1994	Nov. 1993	438%	5.77%	12.5 days	Dram & Russian Ruble	Consumer
Turkmenistan†† ¹⁰	Jan. 1992	Nov. 1993	Nov. 1993	429%	5.71%	12.7 days	Manat	Consumer
Taiwan ¹¹	Aug. 1945	Sep. 1945	Aug. 1945	399%	5.50%	13.1 days	Yen	Wholesale for Taipei
Peru ¹²	Jul. 1990	Aug. 1990	Aug. 1990	397%	5.49%	13.1 days	Inti	Consumer
Bosnia and Herzegovina ¹³	Apr. 1992	Jun. 1993	Jun. 1992	322%	4.92%	14.6 days	Dinar	Consumer
France ¹⁴	May 1795	Nov. 1796	Mid-Aug. 1796	304%	4.77%	15.1 days	Mandat	Exchange Rate
China ¹⁵	Jul. 1943	Aug. 1945	Jun. 1945	302%	4.75%	15.2 days	Yuan	Wholesale for Shanghai
Ukraine ¹⁶	Jan. 1992	Nov. 1994	Jan. 1992	285%	4.60%	15.6 days	Russian Ruble	Consumer
Poland ¹⁷	Jan. 1923	Jan. 1924	Oct. 1923	275%	4.50%	16.0 days	Marka	Wholesale
Nicaragua ¹⁸	Jan. 1986	Mar. 1991	Mar. 1991	261%	4.37%	16.4 days	Córdoba	Consumer
Congo (Zaire) ¹⁹	Nov. 1993	Sep. 1994	Nov. 1993	250%	4.26%	16.8 days	Zaire	Consumer
Russia†† ²⁰	Jan. 1992	Jan. 1992	Jan. 1992	245%	4.22%	17.0 days	Ruble	Consumer
Bulgaria ²¹	Feb. 1997	Feb. 1997	Feb. 1997	242%	4.19%	17.1 days	Lev	Consumer
Moldova ²²	Jan. 1992	Dec. 1993	Jan. 1992	240%	4.16%	17.2 days	Russian Ruble	Consumer
Russia / USSR ²³	Jan. 1922	Feb. 1924	Feb. 1924	212%	3.86%	18.5 days	Ruble	Consumer
Georgia ²⁴	Sep. 1993	Sep. 1994	Sep. 1994	211%	3.86%	18.6 days	Coupon	Consumer
Tajikistan†† ²⁵	Jan. 1992	Oct. 1993	Jan. 1992	201%	3.74%	19.1 days	Russian Ruble	Consumer

LOCATION	START DATE	END DATE	MONTH WITH HIGHEST INFLATION RATE	HIGHEST MONTHLY INFLATION RATE	EQUIVALENT DAILY INFLATION RATE	TIME REQUIRED FOR PRICES TO DOUBLE	CURRENCY	TYPE OF PRICE INDEX
Georgia ²⁶	Mar. 1992	Apr. 1992	Mar. 1992	198%	3.70%	19.3 days	Russian Ruble	Consumer
Argentina ²⁷	May 1989	Mar. 1990	Jul. 1989	197%	3.69%	19.4 days	Austral	Consumer
Bolivia ²⁸	Apr. 1984	Sep. 1985	Feb. 1985	183%	3.53%	20.3 days	Boliviano	Consumer
Belarus†† ²⁹	Jan. 1992	Feb. 1992	Jan. 1992	159%	3.22%	22.2 days	Russian Ruble	Consumer
Kyrgyzstan†† ³⁰	Jan. 1992	Jan. 1992	Jan. 1992	157%	3.20%	22.3 days	Russian Ruble	Consumer
Kazakhstan†† ³¹	Jan. 1992	Jan. 1992	Jan. 1992	141%	2.97%	24.0 days	Russian Ruble	Consumer
Austria ³²	Oct. 1921	Sep. 1922	Aug. 1922	129%	2.80%	25.5 days	Crown	Consumer
Bulgaria ³³	Feb. 1991	Mar. 1991	Feb. 1991	123%	2.71%	26.3 days	Lev	Consumer
Uzbekistan†† ³⁴	Jan. 1992	Jan. 1992	Jan. 1992	118%	2.64%	27.0 days	Russian Ruble	Consumer
Azerbaijan ³⁵	Jan. 1992	Dec. 1994	Jan. 1992	118%	2.63%	27.0 days	Russian Ruble	Consumer
Congo (Zaire) ³⁶	Oct. 1991	Sep. 1992	Nov. 1991	114%	2.57%	27.7 days	Zaire	Consumer
Peru ³⁷	Sep. 1988	Sep. 1988	Sep. 1988	114%	2.57%	27.7 days	Inti	Consumer
Taiwan ³⁸	Oct. 1948	May 1949	Oct. 1948	108%	2.46%	28.9 days	Taipei	Wholesale for Taipei
Hungary ³⁹	Mar. 1923	Jul. 1924	Jul. 1923	97.9%	2.30%	30.9 days	Crown	Consumer
Chile ⁴⁰	Oct. 1973	Oct. 1973	Oct. 1973	87.6%	2.12%	33.5 days	Escudo	Consumer
Estonia†† ⁴¹	Jan. 1992	Feb. 1992	Jan. 1992	87.2%	2.11%	33.6 days	Russian Ruble	Consumer
Angola ⁴²	Dec. 1994	Jan. 1997	May 1996	84.1%	2.06%	34.5 days	Kwanza	Consumer
Brazil ⁴³	Dec. 1989	Mar. 1990	Mar. 1990	82.4%	2.02%	35.1 days	Cruzado & Cruzeiro	Consumer
Democratic Republic of Congo ⁴⁴	Aug. 1998	Aug. 1998	Aug. 1998	78.5%	1.95%	36.4 days	Franc	Consumer
Poland ⁴⁵	Oct. 1989	Jan. 1990	Jan. 1990	77.3%	1.93%	36.8 days	Zloty	Consumer
Armenia†† ⁴⁶	Jan. 1992	Jan. 1992	Jan. 1992	73.1%	1.85%	38.4 days	Russian Ruble	Wholesale
Tajikistan ⁴⁷	Oct. 1995	Nov. 1995	Nov. 1995	65.2%	1.69%	42.0 days	Tajikistani Ruble	Wholesale
Latvia ⁴⁸	Jan. 1992	Jan. 1992	Jan. 1992	64.4%	1.67%	42.4 days	Russian Ruble	Consumer
Turkmenistan†† ⁴⁹	Nov. 1995	Jan. 1996	Jan. 1996	62.5%	1.63%	43.4 days	Manat	Consumer
Philippines ⁵⁰	Jan. 1944	Dec. 1944	Jan. 1944	60.0%	1.58%	44.9 days	Japanese War Notes	Consumer
Yugoslavia ⁵¹	Sep. 1989	Dec. 1989	Dec. 1989	59.7%	1.57%	45.1 days	Dinar	Consumer
Germany ⁵²	Jan. 1920	Jan. 1920	Jan. 1920	56.9%	1.51%	46.8 days	Papiermark	Wholesale
Kazakhstan ⁵³	Nov. 1993	Nov. 1993	Nov. 1993	55.5%	1.48%	47.8 days	Tenge & Russian Ruble	Consumer

LOCATION	START DATE	END DATE	MONTH WITH HIGHEST INFLATION RATE	HIGHEST MONTHLY INFLATION RATE	EQUIVALENT DAILY INFLATION RATE	TIME REQUIRED FOR PRICES TO DOUBLE	CURRENCY	TYPE OF PRICE INDEX
Lithuania ⁵⁴	Jan. 1992	Jan. 1992	Jan. 1992	54.0%	1.45%	48.8 days	Russian Ruble	Consumer
Belarus ⁵⁵	Aug. 1994	Aug. 1994	Aug. 1994	53.4%	1.44%	49.3 days	Belarusian Ruble	Consumer
Taiwan ⁵⁶	Feb. 1947	Feb. 1947	Feb. 1947	50.8%	1.38%	51.4 days	Taipei	Wholesale for Taipei

III. Capital Market Risks

Since the financial crisis of 2008, the velocity of money has fallen dramatically, while the Federal Reserve has rapidly increasing the monetary base.



III. Capital Market Risks

Very little systemic inflation has been produced as a result. In the event of an additional crisis that results in further monetary expansion, the risk of increased velocity might spill over into escalating inflation.

Muddle-Through Period

A third outcome that avoids the extreme of depression or hyperinflation would be what is described as a “muddle through” economy.¹⁵⁰ One example of this would be “stagflation.” It would not have extremes in either direction but rather a combination of both. Stagflation combines a stagnant economy with accelerated inflation rates. This is essentially what happened in the United States during the late 1970s. Real growth was stagnant but consumer prices rose, partly in response to an energy supply shock in 1973 and partly due to delayed effects of rapid monetary growth.¹⁵¹

A sluggish economy without consumer inflation occurred in Japan after their financial crisis. In late 1989, the Japanese stock market peaked and then crashed.¹⁵² Economists refer to the period that followed as “the lost decade.”¹⁵³ The malaise has actually extended far beyond a decade, however, and in many ways continues today. Despite tremendous monetary stimulus and hefty government spending, the Japanese economy has not recovered to any real degree. Moderate deflation and stagnant economic growth have remained in place.¹⁵⁴

Of the three outcomes, the muddle through might have the longest lasting effect but would also be the most benign for Utah.

Avoidance and Minimization

Because financial crises will most likely be external to Utah, there is little that can be done to fully avoid issues other than exerting political pressure through elected representatives. In terms of minimization, however, there are clearly strategies that can be employed. Minimizing debt and reduced spending could provide reserve funds that would prove helpful in a crisis-induced depression or stagflation.

In the case of hyperinflation or monetary collapse, Utah could expand the legal tender act and innovate means of offering gold and silver as currency. Electronic evidence of holdings in a state-sponsored depository could serve as an alternative for exchange. Such a plan has been contemplated by Texas and could be repeated.¹⁵⁵

By making gold and silver available for regular, daily transactions by the general public, the new law has the potential for wide-reaching effect. Professor William Greene is an expert on constitutional tender and said in a paper for the Mises Institute that when people in multiple states actually start using gold and silver instead of Federal Reserve Notes, it would effectively

III. Capital Market Risks

*nullify the Federal Reserve and end the federal government's monopoly on money.*¹⁵⁶

Monitoring

The Federal Government has a number of agencies that regularly monitor economic statistics. Their reports are provided to the financial press and almost immediately disseminated to the financial markets. Utah could assign this function to one or more Universities, hire a consulting firm, or appoint one or more staff members to provide regular reports on fiscal health and conditions. In addition, the legislature could require a Fiscal Risk Commission to hold regular hearings and provide ongoing reports.

IV. Global Market Risks

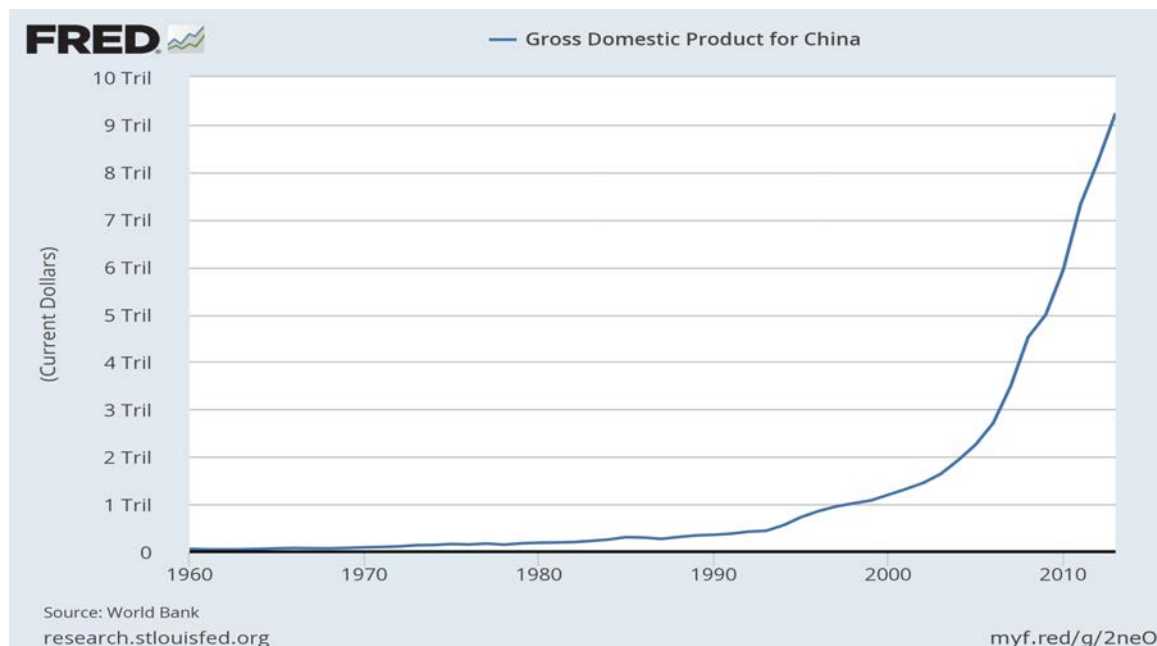
The Issue

An external financial market shock is at least as likely, if not more likely than a domestic one. The situation in Greece beginning in 2010 highlighted the vulnerability and interconnectedness of global markets. Greece is a relatively small economy and the total debt relatively minor when compared to the world as a whole. Nevertheless, a serious dislocation in Greece threatened a domino reaction across Europe that could have plunged the world into financial chaos.¹⁵⁷ This assessment will review the risks by region (ranked by threat likelihood and impact).

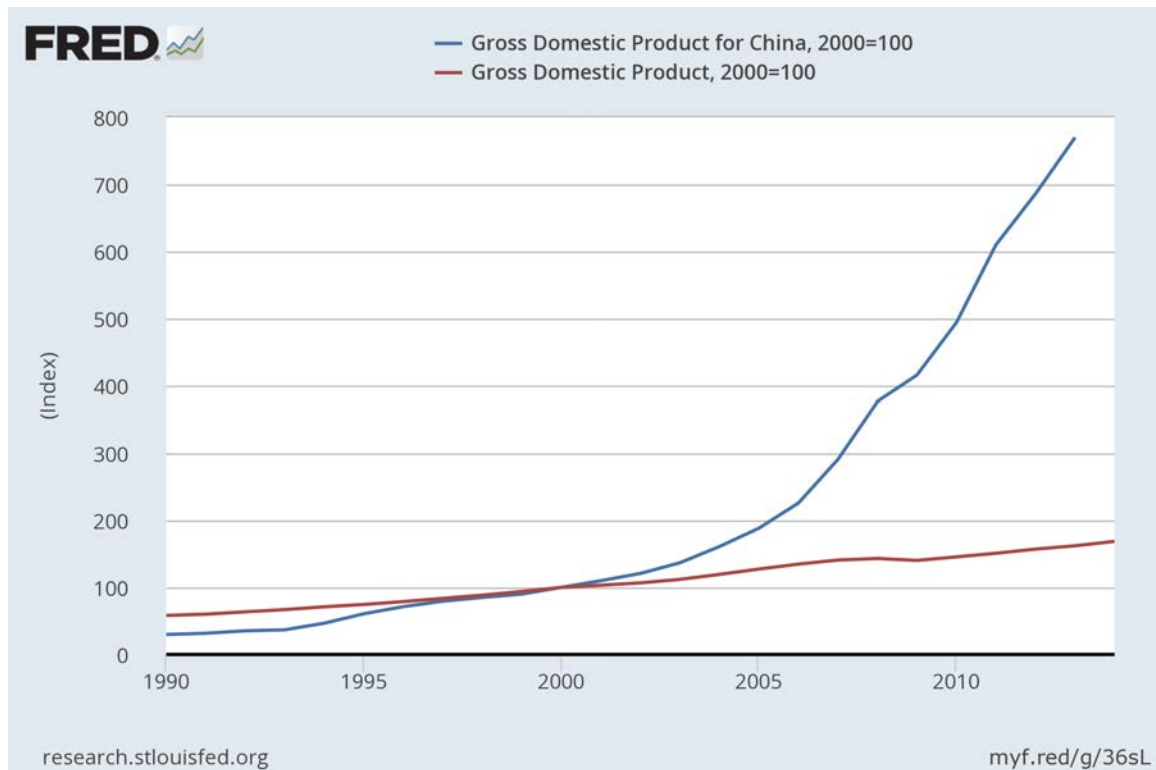
A. China

The threat from crisis in a larger nation such as China is even more significant. Unfortunately, it also seems to be increasingly likely. China's market and economy have been manipulated for more than a decade. Recently, however, there have been signs that the ability to further manipulate is fading.

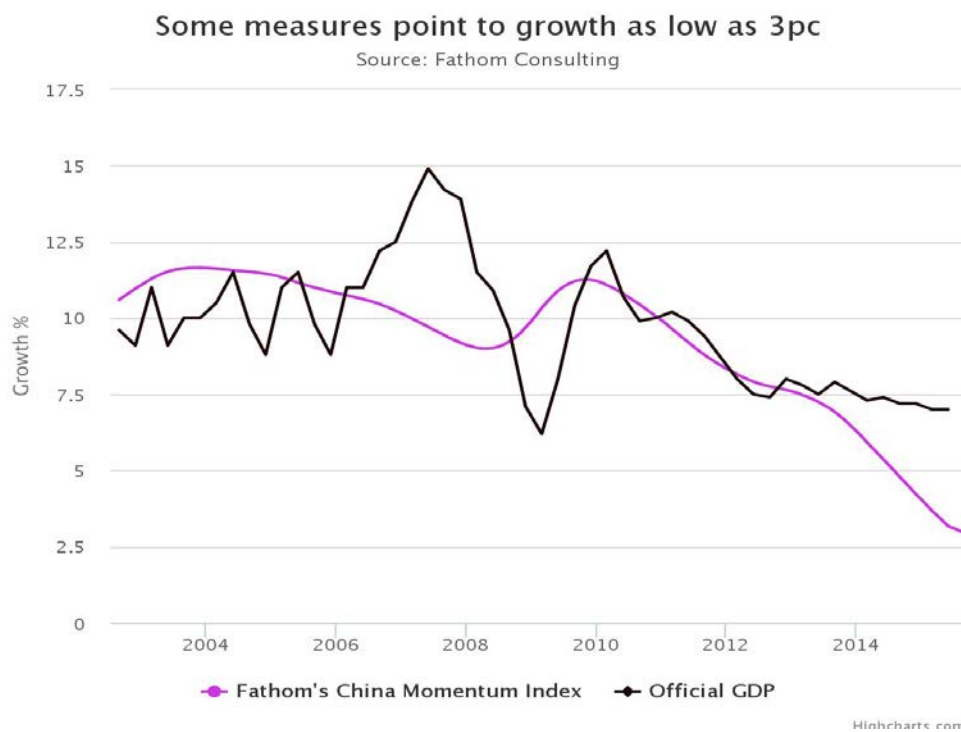
The Chinese economy has grown remarkably this century as shown in the charts from the Federal Reserve (shown in current exchange rates).¹⁵⁸ Not only has the Chinese economy grown tremendously in absolute terms, but also it has grown remarkably when compared to the growth of the American economy. And, according to the IMF, China's economy actually surpassed that of the United States in 2014.¹⁵⁹ Of course, this was based on a few assumptions including government statistics and estimates of currency purchasing power that may not be holding true.¹⁶⁰



IV. Global Market Risks



Even the official estimates of Chinese growth have declined but remain far above non-official estimates.¹⁶¹



IV. Global Market Risks

This discrepancy is significant because global investment and our own foreign policy have been made based on official Chinese economic reports and IMF/World Bank statistics. Now, even Chinese officials have begun to admit that the high growth numbers were, at least to some degree, “fudged.”¹⁶²

The Chinese stock market has reflected this uncertainty since mid-2015 and many believe this is a signal that the Chinese bubble is bursting. Worse still, at least the initial spillover effects of Chinese market drops impacted every market around the world.¹⁶³ Some believe that this is only the initial impact, as the unwinding of Chinese debt will ultimately prove to be massively deflationary.¹⁶⁴



Economist.com

Source: The Economist ¹⁶⁵

The Greek contagion was contained, at least temporarily by the European Union, working in a nation with a common cultural heritage and similar economic and political system. In addition, there was no threat from a Greek military. If China were to implode, however, none of these benign conditions are involved. It is unlikely that China would submit to the type of economic reforms and oversight of

IV. Global Market Risks

Western financial institutions. Even Greece was reluctant to adopt the austerity package.¹⁶⁶ Greece only represents 0.26% of the world's economy. Using the same measure, China is 63 times larger at 16.32%.¹⁶⁷ Admittedly, this measure is based on flawed statistics as discussed earlier. Even making substantial adjustments to improve the data, there is no doubt that China's impact on the global economy is substantially larger than Greece.

Assessment of Probability

There is a good deal of confusion regarding whether or not China will be able to contain economic turmoil sufficiently to prevent a global crisis. Certainly the leadership has failed recently in preventing a market crash.¹⁶⁸ This is a communist nation that tightly controls its populace. One historic example is the ability to limit the number of children per family through a "one child" policy.¹⁶⁹ With a planned economy and a strong authority, some believe China will be able to manage through any crisis.¹⁷⁰

Despite internal troubles, the Chinese retain about \$3.3 trillion in net currency reserves (the world's largest stockpile) that can be used to offset difficulties.¹⁷¹ This is clearly unique as no other major nation has anything close in reserve. In fact, no other nation even tops \$500 billion.¹⁷² Chinese reserves have fallen at a rapid pace (declining about \$600 billion in 2015) and this has sparked concern.¹⁷³

The government had been pursuing reforms and a transition from an export-driven economy to one led by consumption and domestic growth.¹⁷⁴ Global weakness caused export revenue to fall much more rapidly than expected, however, exposing internal weakness.¹⁷⁵ This in turn has forced currency devaluation.¹⁷⁶ Until that point, the prevailing faction had been pursuing a stable Yuan in an attempt to become a primary reserve currency for the world.¹⁷⁷ A weaker Yuan strengthens exports but makes the transition to domestic consumption more difficult. There are competing factions within the communist party regarding whether to pursue a strong Yuan or weak Yuan. At present, the weak Yuan crowd appears to be winning but this may be more a reflection of economic reality than long-term strategy.

Complicating all of this is the fact that China is not a monolith.¹⁷⁸ There are hardline factions, such as the military (PLA), that seek to enforce Chinese dominance through any and all means possible.¹⁷⁹ There are also factions such as the business community that are pushing for global cooperation. Over time, the hardliners would seek to displace the American dollar as global reserve currency (something that will be discussed in the section on Economic Warfare). This does not mean, however, that this faction would oppose a weaker Yuan temporarily to capture global market share. Likewise, the reformer group would allow a weakened Yuan as long as it was free-floating to reflect economic reality.

IV. Global Market Risks

Thus, the probability of impactful risk will be determined by the nature of the internal political response as much as the economic realities:

If China's long-term economic woes are purely structural, the country's prospects are not necessarily dire. Effective reforms could reallocate resources more efficiently to make the economy more productive. But the success of these reforms critically hinges on the nature of the Chinese state and its political institutions. Sustained wealth generation can only take place in states where political power is constrained by the rule of law, private property rights are effectively protected, and there is wide access to opportunity. In states dominated by a small ruling elite, the opposite happens: Those in control of political power become predators, using the coercive instruments of the state to extract wealth from society, defend their privileges, and impoverish ordinary people.¹⁸⁰

The choice for China is essentially repression or reform. At present, the repression forces seem to have the advantage: Judging by the policies and measures taken by the current CPC leadership, the party seems intent on betting against history. In the past three years, the party has greatly intensified repression. Among its most notable steps, the CPC has aggressively tightened censorship of the internet, social media, and the press, passed a national security law designed primarily to curtail non-governmental organizations and ensure regime security, destroyed hundreds of church crosses to restrict religious freedoms, strengthened ideological control on college campuses, and arrested dozens of human rights lawyers and civic activists on trumped-up charges. In many ways, the level of repression today is higher than any time since the Tiananmen crackdown.

Equally worrisome but more dangerous is Beijing's escalating appeal to Chinese nationalism. The CPC has all but abandoned Deng Xiaoping's low-profile and non-confrontational foreign policy in favor of a more muscular external strategy that has brought China on a collision course with the United States. Evidence of Beijing's renewed appeal to nationalism and its assertive foreign policy can be found in the staging of a first military parade celebrating Japan's defeat in World War II (even though the CPC played at most a marginal role in the war), a propaganda campaign celebrating the "China Dream" (the essence of which is the revival of China as a great power), a near-explicit demand for parity with the United States (couched in Beijing's call for a "new type of great power relationship"), relentless cyber-attacks against U.S. government and commercial establishments, and provocations and brinksmanship in the East and South China Seas (establishing a controversial Air Defense Identification Zone over disputed Senkaku/Diaoyu Islands and mass land reclamation and island-building in the disputed waters of the South China Sea).¹⁸¹

IV. Global Market Risks

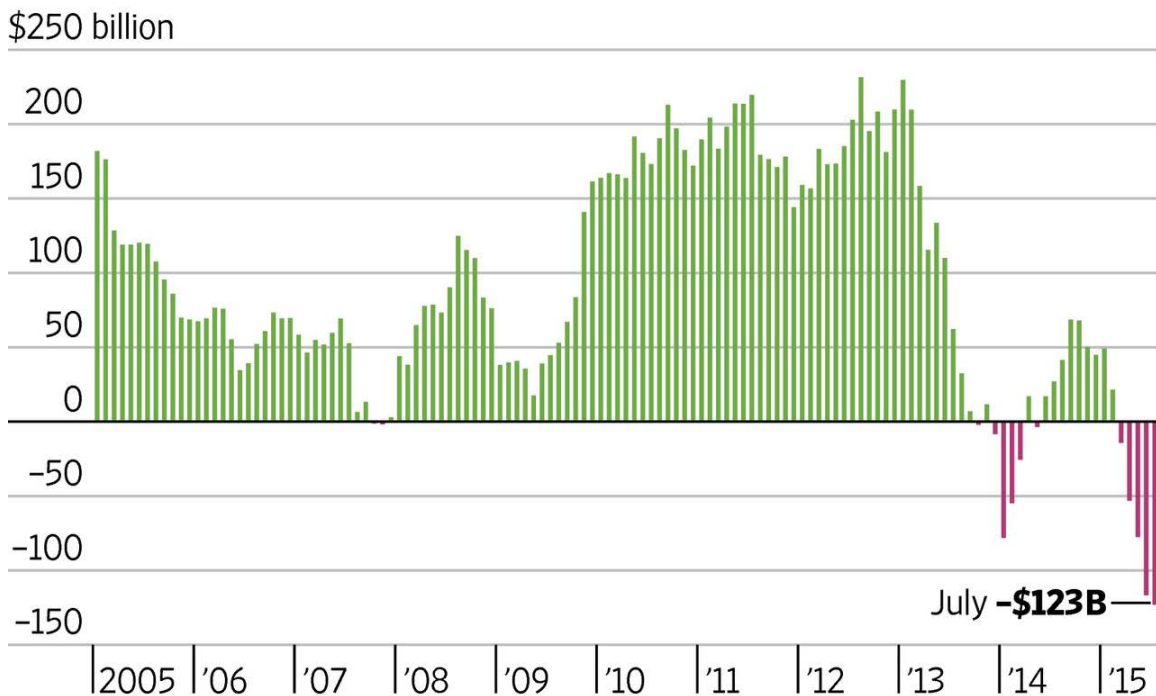
Eventually, these struggles will be reflected in financial markets as well as potentially in diplomatic and military moves. When you put it all together, there is perhaps a 30% probability that Chinese economic troubles are uncontained and meaningfully impact the American economy without causing geopolitical conflict. The risks of geopolitical conflict would override the economic turmoil and will be discussed separately. The combined risks of conflict and economic turmoil approach 50%.

Assessment of Impacts

A Chinese implosion could be considered the worst possible global economic crisis emanating from a single nation. One of the most likely impacts would be a trade war, including a currency war (as discussed previously).¹⁸² Another likely outcome would be the increased likelihood of currency war. Finally, a desperate China could begin to dump their holdings of American Treasury bonds. We've already seen that begin to happen as shown in the chart from *The Wall Street Journal*.¹⁸³ This exacerbates the risks already discussed.

The Tide Turns

Net foreign official purchases of U.S. Treasury notes and bonds,
12-month rolling sums



Source: Deutsche Bank

THE WALL STREET JOURNAL.

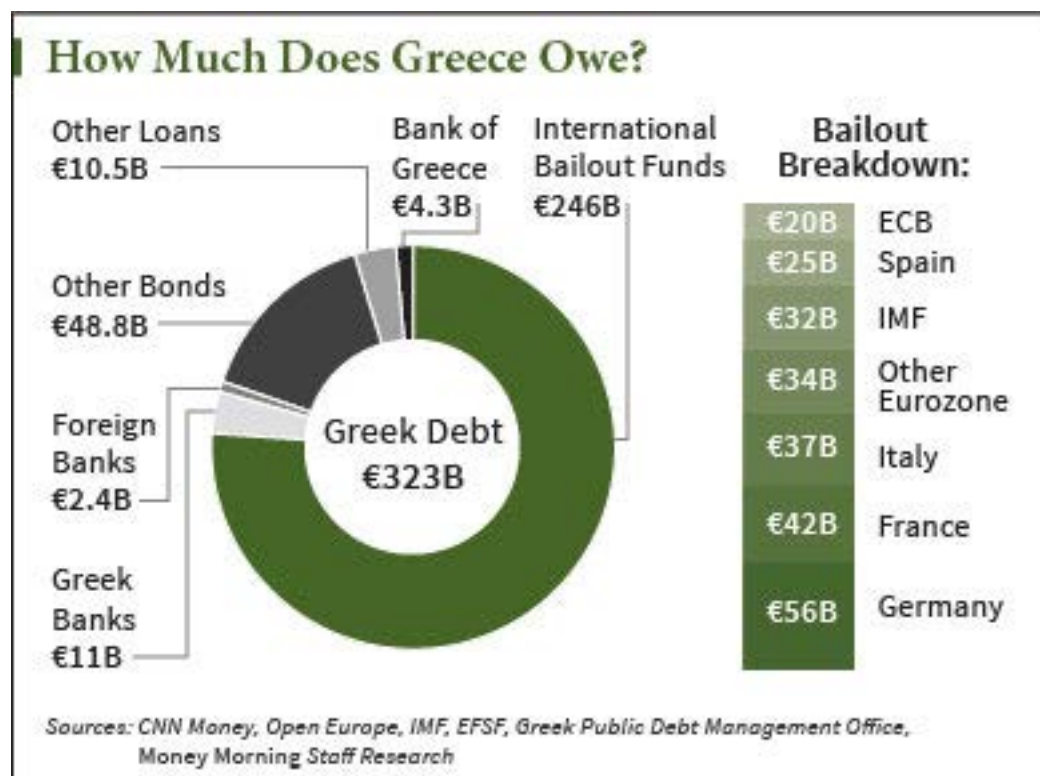
IV. Global Market Risks

B. Europe

Next in order of magnitude would be a failure in Europe or collapse of the Euro. The concern with Greece is based on contagion fears and the possibility of failures in other nations such as Spain, Portugal, Italy, and Ireland dragging down France and the Germany.¹⁸⁴ A collapse in Europe would be as devastating as one in China. In addition, there are growing concerns that the current migrant crisis could overwhelm the European system already strained by weak economies and debt problems.¹⁸⁵

At the heart of European concern is the fact that the Euro is a political currency, not representing common language or economy.¹⁸⁶ Milton Friedman warned against the Euro's creation based on the reality that competitive nations with differing agendas and conflicting policies would render it unworkable.¹⁸⁷ His warnings were prescient. Some believe that Greece's problems might require a complete restart of the European banking system.¹⁸⁸

The essential problem is Greek debt. Following the financial crisis, Greece admitted in late 2009 that it had structurally hidden the magnitude of debt by regularly understating deficits.¹⁸⁹ Total Greek debt is about 323 billion Euro (about \$350 billion depending on exchange rate) as shown in the chart.¹⁹⁰



IV. Global Market Risks

The New York Times offered insights on the Greek crisis in a November 9, 2015 article:

How does the crisis affect the global financial system?

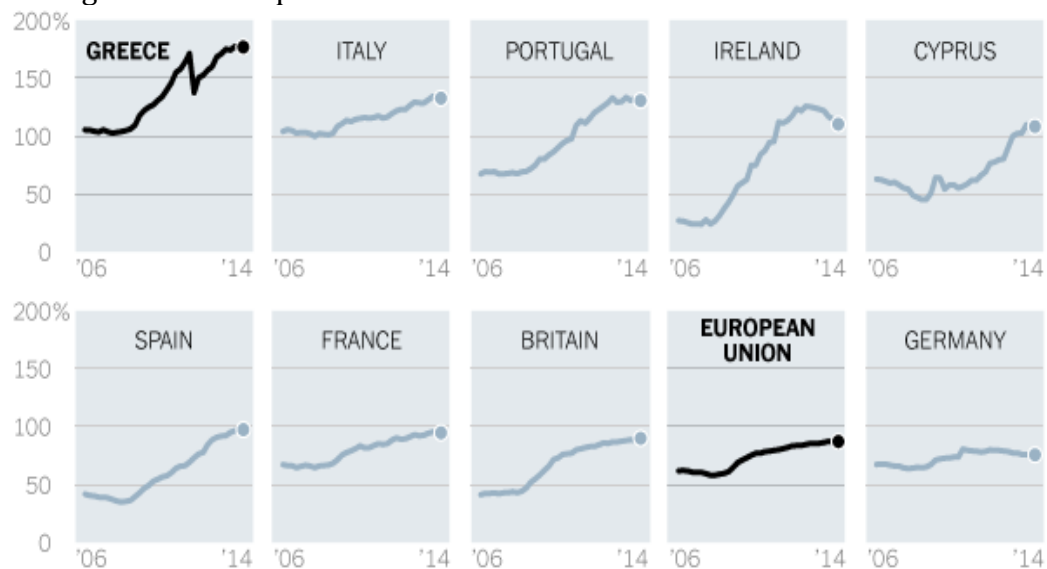
In the European Union, most real decision-making power, particularly on matters involving politically delicate things like money and migrants, rests with 28 national governments, each one beholden to its voters and taxpayers. This tension has grown only more acute since the January 1999 introduction of the euro, which now binds 19 nations into a single currency zone watched over by the European Central Bank but leaves budget and tax policy in the hands of each country, an arrangement that some economists believe was doomed from the start.

Since Greece's debt crisis began in 2010, most international banks and foreign investors have sold their Greek bonds and other holdings, so they are no longer vulnerable to what happens in Greece. (Some private investors who subsequently plowed back into Greek bonds, betting on a comeback, regret that decision.)

And in the meantime, the other crisis countries in the Eurozone, like Portugal, Ireland and Spain, have taken steps to overhaul their economies and are much less vulnerable to market contagion than they were a few years ago.

Debt in the European Union

Gross government debt as a percentage of gross domestic product plotted through the fourth quarter of 2014.



Source: Eurostat¹⁹¹

IV. Global Market Risks

While \$350 billion is certainly manageable and a small fraction of American Federal Debt of near \$20 trillion, this is only part of the problem. The Greek economy has imploded, requiring ongoing and continuing subsidy. At the same time, the Greek people have rejected austerity measures, leading to riots and even a rejection of bailout offers.¹⁹² A bailout without reform would provide moral hazard encouraging other troubled economies to disregard austerity and encouraging contagion.¹⁹³

At the heart of the problem, the European Social Model is failing.¹⁹⁴ The Greek problems have simply isolated one of the primary symptoms. Overall, though, Europe remains in significant difficulty and will require massive long-term restructuring. From the Hoover Institution:

The E.U.'s economic woes have many causes, but intrusively regulated economies and outsized government spending on generous social welfare transfers are two of the most important. Despite the rebuke of such policies delivered by the recession, government spending as a percentage of GDP has actually increased in the E.U., from 45.5 percent in 2007 to 49 percent in 2013, even as many Europeans decry the harsh "austerity" measures called for by countries like Germany. Greece, the E.U member increasingly in danger of being forced to exit the monetary union and thus risk its unraveling, has nonetheless raised its government spending from 46.8 percent in 2007 to 59 percent in 2013.

As Josef Joffe of Germany's Die Zeit newspaper summarized in January, "These ailments are deeply embedded in economies that lag behind on investment, innovation and competitiveness . . . Europe as a whole is beginning to look like Greece writ large. But the long-term data whisper to Europe as well as to Greece: Reform or decline."¹⁹⁵

There are two complicating factors. The first is that the European Central Bank has focused on "kicking the can down the road," essentially alleviating short-term symptoms but potentially exacerbating the long-term problem.¹⁹⁶ The massive monetary stimulus provided by the ECB has not created inflation but has shifted bank debt and sovereign debt to Central Bank holdings.¹⁹⁷ In addition, it has not yet sparked an economic rebound. The dilemma of the ECB is similar to that faced in the United States with similar risks of financial crisis. The outcome could be depression, hyperinflation, or muddle through.

The second problem is demographic in nature. Europe is an aging society. It's only a matter of time before this aging trend makes reform impossible. From The New York Times:

According to the United States Census Bureau's International Database, nearly one in five Western Europeans was 65 years old or older in 2014. This is hard enough to endure, given the countries' early retirement ages and pay-as-you-go pension systems. But by 2030, this will have risen to one in four. If history is any

IV. Global Market Risks

*guide, aging electorates will direct larger and larger portions of gross domestic product to retirement benefits — and invest less in opportunity for future generations.*¹⁹⁸

Birth rates are far too low to reverse this problem. As a result, European leaders have turned to immigration as a solution.¹⁹⁹ This leads to the second complicating factor. The populace at large views immigrants coming in as a cultural threat to Europe.²⁰⁰ Terrorists view immigration plans as an opportunity for infiltration.²⁰¹ In addition, immigrants will add to the debt burden over the short term even if, under the best of circumstances, they might alleviate a longer-term issue.²⁰² There is a big question as to whether Europe will be able to financially survive until the long-term.²⁰³ Immigration turmoil creates political risks that also threaten the European Union experiment.²⁰⁴

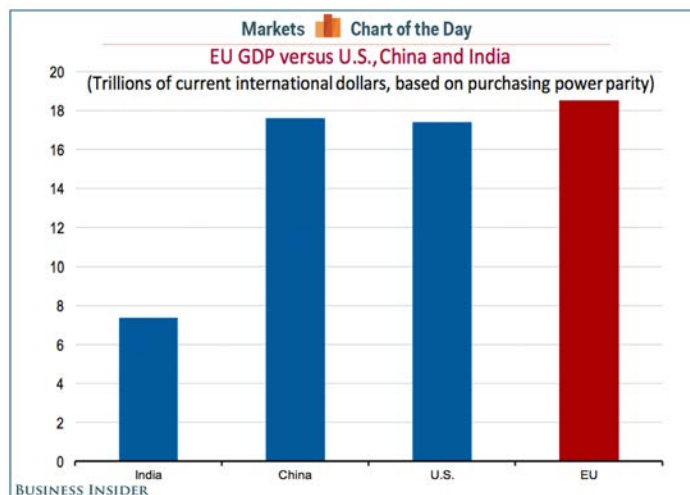
True reform of the welfare state and a reduction in excessive regulation might be able to revive the European economy.²⁰⁵ The primary question is whether or not the political changes brought on by the immigration crisis will support or deny reform.

Assessment of Probability

Europe is in failure. The solution has been to kick the can down the road, hopefully buying time for a global economic recovery. The risks have increased with Chinese weakness. As a result, the risk of a serious financial crisis in the next decade is above 50%.

Assessment of Impact

A European financial crisis would impact America. In fact, the European Union is approximately the size of that of China and the United States by official estimates (using purchasing power parity).



Source: Business Insider²⁰⁶

IV. Global Market Risks

Thus, a serious European crisis would have similar impact as a Chinese collapse. The primary difference has been that until recently expectations for Chinese growth were significantly higher. Thus a slowdown there would provide greater disappointment overall.

As with China, a European crisis has multiple potential repercussions. One possible impact would be a significantly stronger dollar combined with exported deflation.²⁰⁷ This could be a prelude to a global currency war. It also could be the beginnings of a global depression. The Europeans do not hold large amounts of U.S. Treasury bonds so a selloff in reserves is less likely an issue. There is a risk, however, of an American-led rescue that could further add to the U.S. debt.²⁰⁸ And, a global contagion would trigger a domestic financial crisis with the possible impacts described earlier.

C. Other Global Financial Risks

There are also stress points in the Middle East, Asia, Latin America, and Russia. A serious crisis in any of these areas could trigger problems elsewhere. On a combined basis, these areas approximately match the risks of China, Europe, and the United States.

The Middle East

The three primary risks of the Middle East are the oil price war, terrorism, and the Sunni-Shia conflict. Each of these will be discussed under different headings. However, it should be noted that Middle Eastern Sovereign Wealth Funds do have significant U.S. Treasury holdings, estimated at \$225 billion.²⁰⁹ A crisis could cause liquidation, which would have serious implications. According to the IMF, for example, Saudi Arabia could be in financial trouble in as soon as five years.²¹⁰ Other oil exporters are even more desperate.²¹¹

Asia (ex China)

Japan and India represent the world's third- and fourth-largest economies. India has a rapid growth rate while Japan has been in lethargy for a quarter century.^{212, 213} A serious slowdown in India would be an unexpected global surprise and could cause negative economic ripples. A slowdown in Japan would have fewer contagion risks as the world has been conditioned for sluggishness. Overall, however, it seems more likely that Japan and India would be victims of global crisis rather than the cause. Likewise, other major Asian powers are more likely victims of Chinese turmoil than the cause of problems.

IV. Global Market Risks

Latin America

Latin American economies have struggled along with most emerging markets. Brazil, Venezuela, Mexico, and Argentina all have difficulties that are being addressed by financial inflation and a slump in commodity prices. The net result is stagflation across the region. While growth is expected to remain extremely low, inflation across the region is expected to average about 17.5% (and as high as 150% in Venezuela).²¹⁴ Despite the economic turmoil, Latin America is also more likely a victim rather than cause of contagion.

Russia

Russia is facing but apparently surviving a host of economic difficulties exacerbated by low oil prices.²¹⁵ While these concerns are serious, the global impact is dwarfed by concerns in other areas. In addition, the Russian people appear prepared to weather the downturn.²¹⁶

Assessment of Probability

The risk of economic crisis emanating from the other global financial markets is less significant than risks from China and Europe, estimated at 10%. There are, however, significant risks in terms of economic warfare, terrorism, and outright conflict.

Assessment of Impacts

The impact of financial crisis in the other areas would have limited additional impact. A contagion is more likely to impact these economies than be caused by them.

Avoidance and Minimization

For the state of Utah, avoidance and minimization strategies for foreign financial crisis are basically the same as the corresponding response for a similar domestic crisis. For example, any foreign crisis that weakens the dollar will require the same remediation as a domestic crisis that weakens the dollar. The same theory applies to each type of financial crisis threat.

Monitoring

As with the domestic economy, the Federal Government has a number of agencies that regularly monitor global economic statistics. Their reports are provided to the financial press and almost immediately disseminated to the financial markets. Utah

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could assign this function to one or more Universities, hire a consulting firm, or appoint one or more staff members to provide regular reports on fiscal health and conditions. In addition, the legislature could require a Fiscal Risk Commission to hold regular hearings and provide ongoing reports.

V. Other Economic Warfare

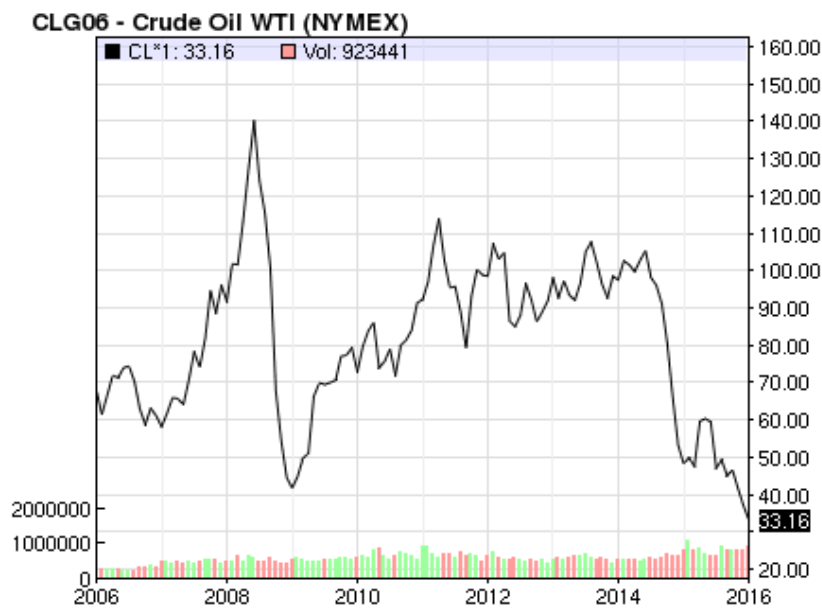
The Issue

Three of the top forms of economic warfare have already been discussed. One would be cyber attack, another traditional currency warfare, and a third, efforts to destroy a competitor's currency. Beyond these, there are multiple other types of economic warfare. This section will discuss three areas as illustrative of other risks. These are oil price war, stock market attack, and trade wars.

A. Oil Price War

Oil is said to be the lifeblood of the global economy.²¹⁷ High oil prices can prove devastating to growth. Very low prices can be a threat as well, however, as it hampers global economic activity, especially in oil producing nations. The consequences are especially pertinent to the United States as the oil trade is primarily conducted using dollars. As previously discussed, the drop in oil prices has reduced the demand for petrodollars by approximately two-thirds. This has effectively removed one of the key supports under the dollar as reserve currency. Worse still, oil producing states may be forced to sell Treasury holdings to raise capital to offset the drop in oil revenues.

Oil prices (measured by West Texas Intermediate crude) have dramatically fluctuated over the past decade as shown in the chart below from NASDAQ.²¹⁸



V. Other Economic Warfare

There is reason to believe that the financial markets, at least in part, manipulated the peak in prices in early 2008. It appears that market manipulation resumed in 2009, driving prices as high as \$100 per barrel.

Consider this from GlobalEconomicWarfare.com:

We have shown how speculation can push oil prices higher. This has been attested to by the Chairman Emeritus of the MIT Economics department, a Saudi Oil Minister, the CEO of Exxon Mobil, and a top oil trader. We have discussed how it could even be profitable for OPEC to goose the oil markets through buying futures. According to Goldman Sachs, adding one million barrels of “paper” oil through buying in the futures’ market would add about 10 cents per barrel to the price of oil. A rough estimate is that such an investment would cost about \$10 million. give or take. But, the corresponding price increase would result in \$3 million per day in higher oil revenues for OPEC members. There is an argument that as little as \$1 billion properly focused could push prices substantially higher. And, OPEC-based Sovereign Wealth Funds have trillions of dollars to use. All of this just demonstrates that the economics can work out to keep oil prices higher. Goldman Sachs estimated that the price per barrel is almost \$24 higher with futures trading than it would be without. The Exxon Mobil CEO estimates that 40% of the price per barrel is from financial market speculation. When you factor in that oil-producing nations understand this, you have to assume they would use the financial markets to keep prices artificially high. They have the motive, the means, and the opportunity.²¹⁹

Things changed in mid 2014, however. After oil prices remained between \$80 and \$110 per barrel for nearly five years, the Saudis changed strategy and began to pressure prices lower by expanding production and alerting the markets to their plans. As reported in GlobalEconomicWarfare.com in December 2014:

Some claim that the Saudis have allowed (and even encouraged) the oil price collapse to crater our fracking efforts. This was threatened by Prince Al Waleed bin Talal in 2011 and is backed by recent comments from the Saudi Oil Minister who said that “OPEC Must COMBAT the Shale Industry.” Beyond that, there is also a belief that the Saudis want to use lower prices to punish Russia and Iran for their role in supporting Syria’s Assad. Finally, some have argued that the Saudis have promoted lower prices to get a “cheating OPEC” in line. There’s no doubt that the OPEC nations have each gone over quota. Letting prices collapse is one way of reinvigorating discipline.

A few things are certain. The Saudis do have the ability to impact oil prices either through jawboning or by outright reduction in output. As the swing producer, Saudi Arabia can threaten and accomplish a tightness in supply. Conversely, they can promise or produce an excess supply. This gives them a good deal of pricing power.²²⁰

V. Other Economic Warfare

The Saudis have admitted to playing a market share strategy with intention of damaging if not destroying the American shale industry as well as Russia and Iran.²²¹ This goal is to damage competitors, increase market share, and then raise prices to maximize long-term revenues. Even though the strategy seems to have backfired, the Saudis have doubled down as indicated in a January 2, 2016 post at GlobalEconomicWarfare.com:

Saudi Arabia is financially hurting but has been pumping like crazy. In fact, the Saudis have been directly responsible for 1.5 million barrels per day of extra production this year. This is significant because the entire oversupply (in excess of global daily demand) is projected to have been 1.4 million barrels per day in the fourth quarter of 2015. In other words, the Saudis are responsible for almost all of the oversupply that has cratered oil prices. They have done this despite the fact that the Saudis require substantially higher oil prices to meet budget needs. As we have noted before, and by their own admission, this Saudi strategy was designed and purposed to bankrupt the American shale industry and keep us dependent on foreign oil over the long run.²²²

Assessment of Probability

The Oil Wars are already underway and have been for some time. The probability of their continuation is approaching 100%. The more important question has to do with the long-term impact.

Assessment of Impacts

The impacts of the oil war were discussed in an October 24, 2015 issue of GlobalEconomicWarfare.com:

For one thing, we can be pleased that our domestic shale industry has survived. But, is there lasting damage? Only time will tell because the real damage isn't to know-how or equipment. The real damage is to capital formation. Will funding for oil development dry up? Will production curves collapse as shale wells deplete? Some are worried but others not. Perhaps we can start and stop the industry as conditions warrant.

The second concern is the destabilization of the Middle East. ISIS has been far more successful than anyone expected. Throw in risks to the House of Saud and things could turn really bad. On the other hand, it is Russia who looks stronger by filling a vacuum seemingly left by unsuccessful American policy. Russia has clearly enhanced her position vis-a-vis the United States. The Saudis have actually increased ties to Russia, as have the Egyptians. It seems that Arabs are looking for help anywhere other than the United States. There are rumblings that even Israel has begun to view Putin as a potentially more reliable ally than President Obama. Russia has acted in Syria while we look weak.

V. Other Economic Warfare

A third concern is that the emerging markets are being devastated by collapsing commodity prices, led by oil. Once “bright star” economies have been crushed leading to potential global instability.

The fourth and potentially greatest risk is that low oil prices have had the unintended consequence of seriously undermining the petrodollar. This would be disturbing enough on a stand-alone basis. But it comes at a time when China has been dumping their American Treasury Bonds as well. Some view the Chinese drawdown of holdings to be just a normal consequence of their slowing economy. They point to a need to defend the Yuan. Others, however, noticed that in August, the Chinese attempted to offer an alternative reserve currency and the IMF said “not yet.” Since then, however the Chinese have made strides in gaining IMF approval. As China has sold American dollar-denominated bonds, they have added to gold holdings. This suggests that there is more at play than they needed the cash. We believe the Chinese approach is, at least in part, linked to a long-term strategy of displacing dollar hegemony. Certainly the Russians have been pushing that direction.

The Saudis have had to sell as well but so far, we’ve seen few negative repercussions. But we should not take comfort just yet. Global financial markets can be funny things. They can go on in a single direction for quite a while seemingly content only to suddenly begin to worry about something with massive reversals. Greece wasn’t a problem until it was. The U.S. housing bubble seemed to be “no big deal” in late 2007 when the Dow Jones Industrial Average was hitting all-time record highs. Then, a few Wall Street bank failures and the market suffered the swiftest and most severe drop since the great depression. In about eighteen months the Dow fell from 14,100 to 6,500. We saw a similar collapse at the start of this millennia when the tech bubble burst and the world suddenly realized that “clicks” on websites didn’t deserve multi-billion dollar valuations without any economic basis in reality.

Without foreign buying from China, Saudi Arabia, Russia, and the emerging markets, where will we sell American debt? Consider that we’ve just wiped out many of our best customers. The collapse in oil prices may doom the petrodollar recycling effort and diminish the world’s need or appetite for American dollars. If you can buy oil in other currencies, you don’t have to own Treasury bonds. If you can buy cheap goods from China in other currencies, the need for dollars is even less.²²³

B. Stock Market Attack

A cyber attack on markets has already been discussed. There are other mechanisms for attacking financial markets as a means of economic warfare. In 2008, there was suggestion of a structured bear raid by the Russians designed to cause panic by attacking Fannie Mae and Freddie Mac.²²⁴

As noted earlier, this is a means of financial warfare:

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When the two PLA Colonels wrote Unrestricted Warfare in 1999, they listed “a single man-made stock market crash” as one of three specific new-concept weapons for the 21st Century. They called it financial warfare.

We have been warning about market manipulation for several years, first in our report for the Department of Defense and then in the New York Times Best-Seller, Secret Weapon. Yet, most in the intelligence and defense community know little about the financial markets. And, those who understand the markets generally know little about defense. Unfortunately, our enemies have studied both.²²⁵

The methods can range from naked short selling to Exchange Traded Fund manipulation. Here is a description of Naked Short Selling:

As a refresher, naked short selling is selling shares of a stock and then failing to deliver them to the buyer. This would seem to be fraud with the exception that the system creates a sort of IOU and keeps track so that at some point the short seller will have to “cover” his sale by buying back the shares. The seller hopes to buy back at a lower price, thus pocketing the profit from selling high and buying lower. This is similar to traditional (non naked) short selling with one key distinction. Traditional short selling requires that the seller “borrow” shares first. In this case, there is not a failure to deliver because the shares are legally borrowed. There is an IOU created but it is well understood by all parties and the number of IOUs is limited by the number of shares available for borrow. All readers should please understand that we are not against traditional short selling. This is a normal and potentially beneficial part of the market. But, we stand firmly against naked shorting.

What’s wrong with naked shorting? In isolation, probably very little. An occasional failure to deliver on a sale has the same impact on share prices as a traditional short sale with borrowed stock. The problem, however, is that the act of borrowing shares provides a limitation factor. You can only borrow as many shares as there are available to lend. In the case of naked shorting, however, there is no such limit. The created IOUs essentially become the equivalent of counterfeit shares that flood the market. At the same time, the mass selling dampens demand because on Wall Street, mass selling suggests that something is wrong and new buyers are scared away. Thus, in large enough amounts, naked short selling simultaneously increases supply and dampens demand, which results in falling prices according to the laws of supply and demand.

Is this significant? Well, according to research we reported in the book (pages 118-119) Secret Weapon (www.secretweapon.org), about half of the decline (Dr. Trimbath says between “30 and 70%”) in Lehman Brothers share price was exclusively caused by “failed to deliver” selling (naked short selling). That

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doesn't include the psychological impact responsible for further panic selling. The amount of naked short selling in Lehman increased 57-fold in 2008 from the peak in 2007. Even former SEC Chairman Harvey Pitt referred to this mass naked shorting activity as "Fraud." The amount of naked short selling in September 2008 was 1,600 times greater than it had been just three months earlier, leading to Lehman's collapse. Even George Soros later admitted that unlimited short selling was a key cause of Lehman's collapse leading to the entire market meltdown (page 142). The SEC was so panicked by these facts at the time that they issued emergency bans on short selling of major financial institutions (page 147).

Memories are short, however, and Wall Street has returned to a more normal state. Now, conventional wisdom holds that Lehman was destined to fail and short selling helped it get there faster—something many even view as beneficial. None of this changes the facts, however. It was naked short selling that brought Lehman down and naked short selling is basically fraudulent. These things cannot be glossed over because as we have demonstrated, naked short selling is one of several "Secret Weapons" that can be used to target and bring down an economy. Even the former Prime Minister of Malaysia acknowledged as much after witnessing the effect first hand in Asia (page 58).

The main argument against the idea that naked short selling is a problem is based on the fact that it is already illegal (with a few exemptions, one being proposed by and named after Bernie Madoff and the other an allowance for Sharia Compliant Finance). Surely, if this were a problem, the SEC would have already addressed it. This argument falls apart for three reasons, one of which is a recent news item:

1) First, there are exemptions and these have been so broad that they rendered the restriction almost meaningless. The Madoff exemption, for example, allowed market makers to naked short sell, presumably to facilitate liquidity. Unfortunately, due to naked sponsored access rules (pages 153-155), this also meant that almost anyone could get an exemption at will.

2) Even outside of the exemptions, the practice was so pervasive that there were 5,000 complaints to the SEC according to the SEC Inspector General. Despite this, there were no enforcement actions and over 97% weren't even investigated.

3) Finally, the SEC has brought charges against a manipulative naked short selling scheme as announced on January 31, 2012 (<http://www.sec.gov/news/press/2012/2012-22.htm>). This is big news but stems from activity that took place nearly six years ago (in 2006). It does prove the point that such activity can and did happen. It also demonstrates how long it takes for such activity to be dealt with in a regulatory context. Lehman Brothers was dead and buried in a matter of days, nearly taking our entire

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*economy down with it. If we are dealing with criminals, maybe a six-year time window is acceptable. In the case of financial terrorism, however, six days is unacceptable let alone six years. There were reports that Lehman was targeted by Middle Eastern funds because it was a "Jewish investment bank."*²²⁶

In regard to ETF manipulation, there was evidence provided in January 2015 that alleged Russian spies were seeking ways to destabilize financial markets. From Mother Jones in January 2015:

The FBI Just Arrested an Alleged Russian Spy Who Wanted to Know How to Trigger an Economic Meltdown

The accused spook was investigating how to "destabilize" financial markets. —Nick Baumann on Mon. January 26, 2015 6:04 PM PDT

On Friday, federal prosecutors in New York filed a complaint accusing three men, Evgeny Buryakov, Igor Sporyshev, and Victor Podobnyy, of spying for Russia. Buryakov, who was arrested in the Bronx on Monday, allegedly posed as a Russian bank official while working for Russia's intelligence service, the SVR. According to the 26-page complaint, which was unsealed Monday, Buryakov had a good reason to choose that cover: He was interested in learning about high-speed Wall Street trading, automated trading algorithms, and "destabilization of markets."

*This is a real threat. As I reported in 2013, markets have become dramatically faster in the years since the collapse of Lehman Brothers. Automated trading algorithms can buy and sell financial products in less time than it takes you to blink. Markets move way too fast for regulators to monitor. On August 1, 2012, rogue computer code at Knight Capital ran for 45 minutes before anyone at the firm could stop it. By the end of the day, the company was insolvent. And that was just "a canary in the mine," says Michael Greenberger, a University of Maryland law professor and former regulator at the Commodity Futures Trading Commission (CFTC). The big worry is trading algorithms causing "a series of cascade failures," warns Bill Black, another former regulator. "If enough of these bad things occur at the same time, financial institutions can begin to fail, even very large ones."*²²⁷

There has been a good deal of suspicious activity involving ETFs in connection with various market declines. Thus it was not a surprise to those who study economic warfare when The Justice Department complaint against the alleged Russian spies included a transcript of intercepted telephone conversations that suggested planning to attack Exchange Traded Funds. A portion of the transcript is shown below.²²⁸

V. Other Economic Warfare

IS: Yes.

EB: I'll try. . . . Should I call you?

IS: Yes, call me.

EB: If you will not pass by me?

IS: No, I will not.

40. Approximately 20 minutes later, IGOR SPORYSHEV, the defendant, called EVGENY BURYAKOV, a/k/a "Zhenya," the defendant, and the following conversation, which was intercepted by the FBI, occurred:

EB: Well, I thought about it. I don't know whether it will work for you but you can ask about ETF. . . . E-T-F. E, exchange.

IS: Yes, got it.

EB: How they are used, the mechanisms of use for destabilization of the markets.

IS: Mechanism - of - use - for - market - stabilization in modern conditions.

EB: For destabilization.

IS: Aha.

EB: Then you can ask them what they think about limiting the use of trading robots. . . . You can also ask about the potential interest of the participants of the exchange to the products tied to the Russian Federation.

41. Based on my training, experience, and participation in this investigation, I believe that, in this conversation, IGOR SPORYSHEV, the defendant, asked for, and obtained from, EVGENY BURYAKOV, a/k/a "Zhenya," the defendant, questions of interest to the Russian economic intelligence community that were to be used by others associated with the News Organization. SPORYSHEV began the conversation by asking for help ("I need help"). SPORYSHEV said that a request came down from leadership, which I believe to be a reference to the SVR leadership, to pass three questions regarding the New York Stock Exchange to the News Organization ("[The News Organization] wants very much . . . it came down from the top, but they need three questions with regard to the New York Exchange").

42. In a notable departure from every other intercepted

There are other means of market manipulation as well but the impacts are all similar. The net result is a market crash as discussed in the Capital Market Risks section. The potential perpetrators of such an attack include Russia, China, North Korea, Iran, and terror groups.

V. Other Economic Warfare

Assessment of Probability

The probability of an attempted attack on our financial markets is better than 50%. The probability of a successful attack is another issue as markets are naturally resilient. Bargain hunting often follows declines, mitigating the problems over time. Manipulations are thus self-correcting. Nevertheless, when combined with cyber efforts, a stock market crash could be devastating. The probability of a successful attack over the next decade could exceed 20%.

Assessment of Impacts

Whether from a cyber attack or financial crisis, a stock market crash would hamper Federal Revenues, exacerbate the deficit and debt, and drive the need for additional state funding. Quantifying the impact is difficult.

C. Trade War

In the backdrop of slowing global economies and looming deflation, nations often turn to trade wars to gain market share. Some could argue that the oil wars are simply a commodity trade war. Trade wars with manufactured products are also possible.

The traditional definition of a trade war involves tariff policy, which is a defensive response to another nation's trade (limiting the import of goods).²²⁹ Dumping products on another nation, especially if priced below the other nation's cost of production, can also be a form of trade war.²³⁰ The response to dumping can be to raise tariffs.

At the end of 2015, The Economist noted activity that suggested a trade war was beginning:

NOT so long ago, observers were agog at the sheer quantities of materials produced by China's miracle economy. One newspaper reckoned that China had made more cement in two years than the United States did in the entire 20th century. But the days of double-digit economic growth are over, and many basic industries have ended up with massive overcapacity. As more and more of that spare capacity finds its way on to the world market, it looks likely to fuel a protectionist backlash.

The most striking case is steel. China produces roughly half of the world's annual output of 1.6 billion tonnes. Analysts at UBS, an investment bank, reckon that this year it will produce 441m tonnes more than it will consume. With prices slumping, China's 101 biggest steel firms lost some \$11 billion during the first ten months of this year, according to one estimate, roughly twice what they made in profits last year. Unsurprisingly, they are seeking to

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export their unwanted product, even at a loss. Official data released this week confirm that China has, in the 11 months to November, exported over 100m tonnes of steel for the first time (see chart). China's exports are now bigger than the total steel production of any country apart from Japan.



Economist.com

The American steel industry's lobbyists have begun clamouring for action to stop what they consider illegal dumping of subsidised product. In Europe, an industry already suffering from cuts and closures is pushing the European Commission not to grant China "market economy" status, a legal designation that would make it harder to hold back the tide of Chinese imports.

Chinese officials are unbowed. President Xi Jinping, during his recent state visit to Britain, claimed that his country has already made big cuts in steelmaking capacity. On December 9th China threw more fuel on the fire by cutting export taxes on several types of steel. A trade war may be brewing, and steelmen are on the front lines.²³¹

V. Other Economic Warfare

Assessment of Probability

Given the global economic stress, the odds of a trade war have increased dramatically over the past few years. This is especially the case in light of highly partisan political cycle.²³² An estimate of probability reasonably might be as high as 30% over the next decade.

Assessment of Impacts

The impact to Utah would be through a challenge to exports. A trade war could reduce export revenue by as much as 50% in certain categories. From 2011 to 2014, Utah's total exports fell by approximately 35%, dropping from almost \$19 billion to \$12.3 billion.²³³ A further 50% decline could cause another \$6 billion decrease. While the previous decline was largely due to a drop in gold, the next round of declines could impact across the board including manufacturing. This would directly impact state tax revenues.

Avoidance and Minimization

For the state of Utah, avoidance and minimization strategies for Economic Warfare depend to a large degree on actions at the Federal level. Securities regulations for the major exchanges are Federal as is international trade policy.

In terms of Naked Short Selling, Utah could push for use of the Blockchain technology for evidence of ownership as pioneered by Utah-based Overstock among others.²³⁴ If implemented, this technology would reduce or even eliminate loopholes that lead to one path of market manipulation. In addition, the Utah Division of Securities could consider adopting, strengthening, or enforcing rules against naked short selling and ETF abuse. The legislature could adopt different laws to curb the potential for manipulation. An attempt was made that direction in 2006 but did not prove effective after serious lobbying from the Securities Industry Association.²³⁵ Interestingly, this previous effort failed approximately one year before the market peaked, just prior to the worst financial crisis of modern times.

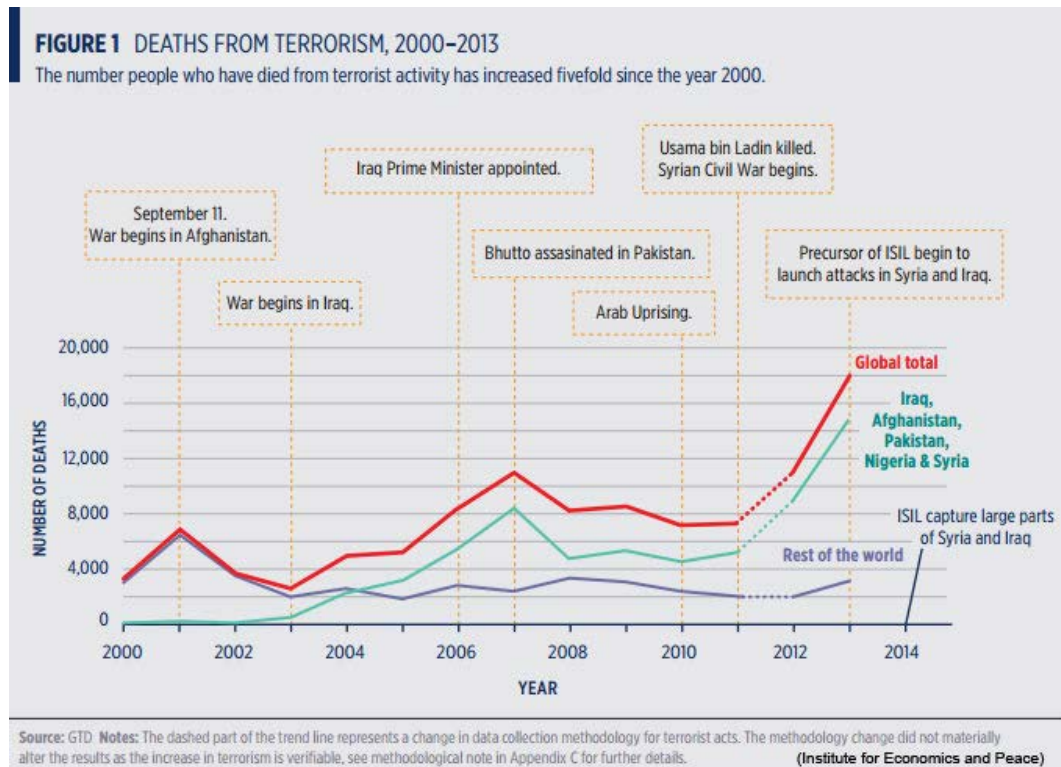
In regard to trade wars, the State could promote Utah products.

Monitoring

It is suggested that the State of Utah hire a monitoring firm to provide quarterly updates on issues of Economic Warfare as well as a warning service. This is a unique specialty and not covered by traditional sources.

VI. Terrorism

Terrorism takes a tremendous human toll. Deaths from terror-related incidents are tragic and increasing over time as noted in *Journalist's Resource*:



The estimated number of deaths from terrorism worldwide rose from 3,329 in 2000 to 32,685 in 2014, according to a November 2015 analysis by the Institute for Economics and Peace. The vast majority of lives lost to terrorism in 2014 — 78 percent — took place in the five countries where most terrorism activity occurred: Iraq, Nigeria, Afghanistan, Pakistan, Syria. More than half of incidents claimed were attributed to Boko Haram and the Islamic State (ISIS or ISIL). However, 93 countries experienced at least one terrorist event in 2014, including France, Australia and Austria.²³⁶

Beyond the human tragedy, however, there are legitimate concerns that the rise in terrorism could dampen economic activity. Conversely, many believe that sluggish economies may increase the risks of terrorism.²³⁷ Overall, however, it is believed that traditional terror incidents, especially when infrequent, inflict little long-term damage on diverse economies.²³⁸

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After the 2015 Paris attacks, Michael Babad at the Globe and Mail provided an overview of thoughts regarding the economic and market impacts of terrorism:

I asked several observers about what to expect in a suddenly volatile environment. Here's what they and others say:

"The economic implications are mixed. The French government will increase spending on police and the military to fight the IS. Other European countries may well join France in its fight against the terror. Depending on how expansive the euro zone countries could go, the [European Central Bank] could be brought in to deal with a totally unexpected development on the fiscal leg. It is too early to talk about a shift in the ECB policy outlook, yet a significant rise in government spending could well temper [ECB chief Mario] Draghi's unorthodox plans. It is, however, clear that the recent developments lead the way for further depreciation in the euro. On the back of the geopolitical developments, the ECB's December meeting could surprisingly differ from what the market has positioned for." --Ipek Ozkardeskaya, London Capital Group

"At a time when global economic growth is slowing, the attacks in Paris and the uncertainty that has rippled out from that do not augur well for economic activity leading into year-end. We can speculate as much as we like about what the potential impact of recent events is likely to be but the effect on consumer confidence is likely to be considerable ... The fact is that the European Central Bank was already considering further action at its December meeting even before last Friday's tragic events, and in the aftermath of that the only question now really revolves around how much further stimulus they do. This in turn could well influence any decision the Fed makes on raising rates next month, given that the risks of hiking now at a time when uncertainty has increased could well prompt further instability." --Michael Hewson, CMC Markets

"The net impact will depend heavily on just how frequent incidents happen. Generally speaking, the economy is fairly resilient, and the vast majority of people will simply get back to business and their daily life. And, thus, there tends to be little net impact. However, it can put sand in the gears, and this episode could thicken the borders in Europe. As well, if there are more incidents ahead, it could also prompt some to simply go out less, stay home more, and generally dampen activity. As for the markets, clearly they are sensitive to news and events, but tend to adjust quickly and move on." --Douglas Porter, BMO Nesbitt Burns

"The raid on terrorist suspects in Paris is clearly keeping markets on edge ... Investors, especially those in France, want to be able to draw some kind of line under Friday's terrorist attack by finding those responsible and bringing them to justice. Unfortunately, in the light of the bomb scare in Hanover, even if the perpetrators of the Paris attack are caught, other terrorists are waiting in the

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wings. The risk is that terrorist attacks become more frequent, menacing European society and providing an ongoing source of uncertainty in financial markets.” --Jasper Lawler, CMC Markets

“The aversion to risk is what we see in the wake of Paris attacks. French President François Hollande declared war against the Islamic State, meaning that tensions are not ready to end. News of the Paris raid this morning and the diversion in Paris-U.S. flights keep the market tense. The event risk is constantly present since the Paris attacks and sharp price moves in the equity complex is well on the Christmas menu.” --Ms. Ozkardeskaya ²³⁹

Following the attacks, the Bank of France did suggest that the economic growth of the city would be diminished, dropping from 0.4% for the quarter to 0.3% as previously forecast, a decline of about \$543 million.²⁴⁰ This is substantial but far below the costs associated with 9/11 as explained by Investopedia:

Costs of Terrorism

According to International Monetary Fund (IMF) researchers Barry Johnston and Oana Nedelescu in their 2005 paper "The Impact of Terrorism on Financial Markets," acts of terrorism inflict direct and indirect economic costs. The direct economic costs are shorter-term in nature and include the destruction of life and property, responses from emergency services providers, restoration of systems and infrastructure, and the provision of temporary living assistance. The indirect costs of terrorism can be significantly larger as they affect the economy in the medium term by undermining consumer and investor confidence.

Terrorism can also have a long-term cost by reducing productivity because of increased security measures, higher insurance premiums, and the increased costs of financial and other counterterrorism regulations. To appreciate just one aspect of these incalculable costs, consider the billions of hours expended by millions of passengers in airport security lines over the years. The lost time is the price paid for rigorous security checks developed after the 9/11 attacks.

Economic Impact of 9/11

In their paper, Johnston and Nedelescu cite an Organisation for Economic Co-operation and Development (OECD) study that estimated the direct costs resulting from the 9/11 attacks at only \$27.2 billion. However, other estimates of the economic impact of 9/11 place the total cost at orders of magnitude higher than the OECD estimate.

A decade after 9/11, the New York Times published a survey of estimates of the true economic costs of the attacks. The total cost of 9/11 was pegged at a staggering \$3.3 trillion...As the New York Times notes, it was the U.S. response,

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including the War on Terror, which accounts for 95 percent of these costs. The economic toll from actual damage due to the attacks is estimated at \$178 billion.²⁴¹

Since 9/11, the vast majority of attacks have been traditional efforts involving bombs and guns. If those continue at a somewhat random pace, it is likely that the economic impact has already been assumed. In the case of a non-traditional attack, however, the economic consequences could prove devastating according to some experts. Non-traditional attacks are a security nightmare and unpredictable in regard to timing. These include cyber attacks on infrastructure (already covered) but could also involve physical attacks, or nuclear attacks. Any is potentially nation ending if successful.

An example of extreme terrorism would be an attempt to destroy one or more critical infrastructure sectors. According to the Department of Homeland Security (DHS):

There are 16 critical infrastructure sectors whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.²⁴²



This report has already covered the Cyber aspect which is a necessary component but also potential vulnerability across sectors. Also, the report has covered the

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banking and finance sector as it might relate to possible financial crisis. It has not, however, addressed non-cyber, man-made threats to other sectors. Perhaps the best example of this risk might be the electricity grid in the energy sector.

From the DHS (some items shown in bold to add emphasis although this is not shown in the original report):

*The U.S. energy infrastructure fuels the economy of the 21st century. Without a stable energy supply, health and welfare are threatened, and the U.S. economy cannot function. **Presidential Policy Directive 21 identifies the Energy Sector as uniquely critical because it provides an “enabling function” across all critical infrastructure sectors.** More than 80 percent of the country's energy infrastructure is owned by the private sector, supplying fuels to the transportation industry, electricity to households and businesses, and other sources of energy that are integral to growth and production across the nation.*

Sector Overview

*The energy infrastructure is divided into three interrelated segments, including: electricity, petroleum, and natural gas. **The U.S. electricity segment contains more than 6,413 power plants (this includes 3,273 traditional electric utilities and 1,738 nonutility power producers) with approximately 1,075 gigawatts of installed generation.** Approximately 48 percent of electricity is produced by combusting coal (primarily transported by rail), 20 percent in nuclear power plants, and 22 percent by combusting natural gas. The remaining generation is provided by hydroelectric plants (6 percent), oil (1 percent), and renewable sources (solar, wind, and geothermal) (3 percent). The heavy reliance on pipelines to distribute products across the nation highlights the interdependencies between the Energy and Transportation Systems Sector.*

***The reliance of virtually all industries on electric power and fuels means that all sectors have some dependence on the Energy Sector.** The Energy Sector is well aware of its vulnerabilities and is leading a significant voluntary effort to increase its planning and preparedness. Cooperation through industry groups has resulted in substantial information sharing of best practices across the sector. Many sector owners and operators have extensive experience abroad with infrastructure protection and have more recently focused their attention on cybersecurity.²⁴³*

Outside of cyber, there are two known means of taking down the electric grid. One is through well-placed physical attacks. An example of this occurred in early 2013:

In April 2013, gunmen opened fire on a California power substation near San Jose. A total of 17 transformers were damaged at a facility that provides power to most of the Silicon Valley.

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While local law enforcement called it an act of vandalism, the former chairman of the Federal Energy Regulatory Commission declared it, “the most significant incident of domestic terrorism involving the grid that has ever occurred.”

The incident received little media attention at the time, even though some viewed it as a possible precursor to an even more serious attack. More recently, someone cut two fiber optic cables in Livermore, California, near San Jose on Sept. 14. That followed a similar incident in the same town in July, when three fiber optic cables were cut, knocking out phone and TV service in the area. In all, there have been about a dozen such attacks in the region in the last year.

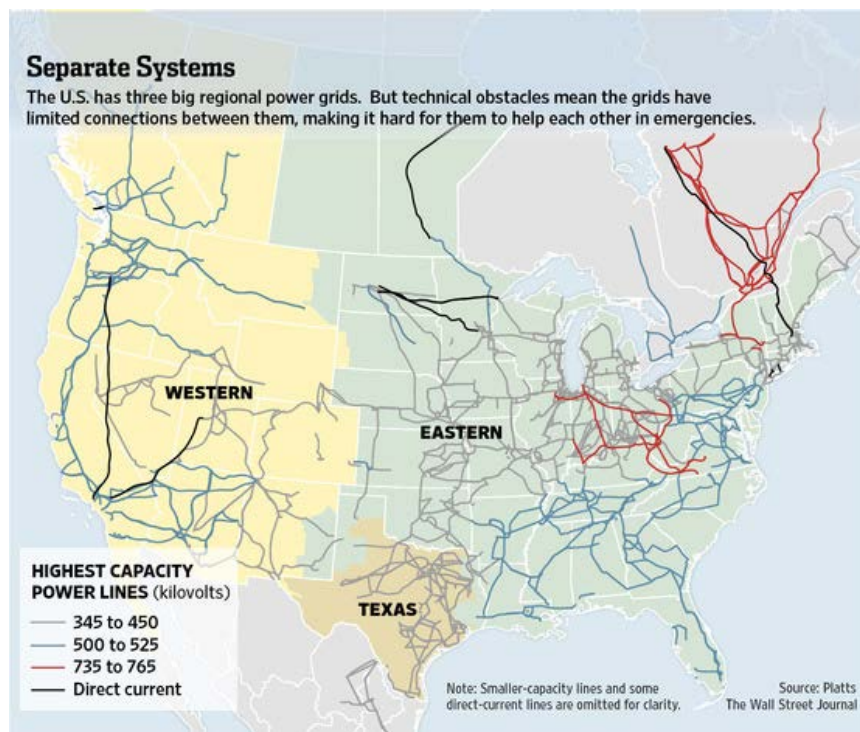
Are these incidents random acts, or could they be the operational blueprint designed to bring down major electrical grids in the United States? If so, experts say it could trigger a cascading failure across the entire U.S. power system that would leave millions of Americans fighting to survive.²⁴⁴

[It is important to note that physical attacks can also be directed at the fiber networks that carry Internet and communications traffic.²⁴⁵]

The reason that this attack is considered serious is based on the interconnected vulnerability of the power grid. For example, a successful takedown of just nine substations (like the one near San Jose that was attacked) could be sufficient to trigger a nationwide blackout.

According to *The Wall Street Journal*:

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The U.S. could suffer a coast-to-coast blackout if saboteurs knocked out just nine of the country's 55,000 electric-transmission substations on a scorching summer day, according to a previously unreported federal analysis.

The study by the Federal Energy Regulatory Commission concluded that coordinated attacks in each of the nation's three separate electric systems could cause the entire power network to collapse, people familiar with the research said.

A small number of the country's substations play an outsized role in keeping power flowing across large regions. The FERC analysis indicates that knocking out nine of those key substations could plunge the country into darkness for weeks, if not months.

"This would be an event of unprecedented proportions," said Ross Baldick, a professor of electrical engineering at the University of Texas at Austin.

No federal rules require utilities to protect vital substations except those at nuclear power plants. Regulators recently said they would consider imposing security standards.²⁴⁶

Considering the fact that squirrels have the capacity to cause serious outages (there were over 600 animal-caused serious outages in 2015), it should be obvious that focused terrorists could inflict far greater damage.²⁴⁷

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The problem is that many substations lack anything other than the most basic physical security. According to a *USA Today* report:

An examination by USA TODAY in collaboration with more than 10 Gannett newspapers and TV stations across the country, and drawing on thousands of pages of government records, federal energy data and a survey of more than 50 electric utilities, finds:

- *More often than once a week, the physical and computerized security mechanisms intended to protect Americans from widespread power outages are affected by attacks, with less severe cyberattacks happening even more often.*
- *Transformers and other critical equipment often sit in plain view, protected only by chain-link fencing and a few security cameras.*
- *Suspects have never been identified in connection with many of the 300-plus attacks on electrical infrastructure since 2011.*
- *An organization funded by the power industry writes and enforces the industry's own guidelines for security, and decreased the number of security penalties it issued by 30% from 2013 to 2014, leading to questions about oversight.*

Jon Wellenhoff, former chairman of the Federal Energy Regulatory Commission, said the power grid is currently "too susceptible to a cascading outage" because of its reliance on a small number of critical substations and other physical equipment.

Between 2011 and 2014, electric utilities reported 362 physical and cyberattacks that caused outages or other power disturbances to the U.S. Department of Energy. Of those, 14 were cyberattacks and the rest were physical in nature.

Among the incidents:

- *In 2011, an intruder gained access to a critical hydro-electric converter station in Vermont by smashing a lock on a door.*
- *In 2013, a gunman fired multiple shots at a gas turbine power plant along the Missouri-Kansas border.*
- *Also in 2013, four bullets fired from a highway struck a power substation outside Colorado Springs.*

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No suspects were apprehended in those three incidents. Federal data show such attacks are not rare within the sprawling, interdependent network of transformers, power lines and other equipment that make up the electrical grid.

Often, such incidents are shrugged off by the local police who initially investigate.

In March 2013, security officers at the Jacksonville Electric Authority in Florida noticed a man climbing a fence surrounding St. Johns River Power Park, which produces energy for 250,000 northern Florida households.

The man fled when approached, Jacksonville Electric Authority spokeswoman Gerri Boyce said, and was later observed trying to enter a second facility. He fled again and was never caught.

Nobody filed a police report, according to Jacksonville Sheriff's Office documents.²⁴⁸

To be successful in taking down the grid, physical attacks would have to be well timed and coordinated. Other than planning, though, very little sophistication would be required, especially if explosives were involved.

Another serious threat to the grid and modern communications is the risk of EMP or ElectroMagnetic Pulse. Former Director of Central Intelligence, R. James Woolsey and former EMP Commission member, Dr. Peter Vincent Pry provided a description of this threat in an Op-Ed for *The Wall Street Journal*:

In a recent letter to investors, billionaire hedge-fund manager Paul Singer warned that an electromagnetic pulse, or EMP, is "the most significant threat" to the U.S. and our allies in the world. He's right. Our food and water supplies, communications, banking, hospitals, law enforcement, etc., all depend on the electric grid. Yet until recently little attention has been paid to the ease of generating EMPs by detonating a nuclear weapon in orbit above the U.S., and thus bringing our civilization to a cold, dark halt.

Recent declassification of EMP studies by the U.S. government has begun to draw attention to this dire threat. Rogue nations such as North Korea (and possibly Iran) will soon match Russia and China and have the primary ingredients for an EMP attack: simple ballistic missiles such as Scuds that could be launched from a freighter near our shores; space-launch vehicles able to loft low-earth-orbit satellites; and simple low-yield nuclear weapons that can generate gamma rays and fireballs.

The much neglected 2004 and 2008 reports by the congressional EMP Commission—only now garnering increased public attention—warn that "terrorists or state actors that possess relatively unsophisticated missiles

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armed with nuclear weapons may well calculate that, instead of destroying a city or a military base, they may gain the greatest political-military utility from one or a few such weapons by using them—or threatening their use—in an EMP attack."

The EMP Commission reports that: "China and Russia have considered limited nuclear-attack options that, unlike their Cold War plans, employ EMP as the primary or sole means of attack." The report further warns that: "designs for variants of such weapons may have been illicitly trafficked for a quarter-century."

During the Cold War, Russia designed an orbiting nuclear warhead resembling a satellite and peaceful space-launch vehicle called a Fractional Orbital Bombardment System. It would use a trajectory that does not approach the U.S. from the north, where our sensors and few modest ballistic-missile defenses are located, but rather from the south. The nuclear weapon would be detonated in orbit, perhaps during its first orbit, destroying much of the U.S. electric grid with a single explosion high above North America.

In 2004, the EMP Commission met with senior Russian military personnel who warned that Russian scientists had been recruited by North Korea to help develop its nuclear arsenal as well as EMP-attack capabilities. In December 2012, the North Koreans successfully orbited a satellite, the KSM-3, compatible with the size and weight of a small nuclear warhead. The trajectory of the KSM-3 had the characteristics for delivery of a surprise nuclear EMP attack against the U.S.

What would a successful EMP attack look like? The EMP Commission, in 2008, estimated that within 12 months of a nationwide blackout, up to 90% of the U.S. population could possibly perish from starvation, disease and societal breakdown.

In 2009 the congressional Commission on the Strategic Posture of the United States, whose co-chairmen were former Secretaries of Defense William Perry and James Schlesinger, concurred with the findings of the EMP Commission and urged immediate action to protect the electric grid. Studies by the National Academy of Sciences, the Department of Energy, the Federal Energy Regulatory Commission and the National Intelligence Council reached similar conclusions.²⁴⁹

Some would consider an EMP the ultimate cyber threat and others a form of warfare. The discussion is included in this section primarily because some experts deem it unlikely that a major nation would carry out an EMP attack for fear of retaliation. A rogue state or independent terror group might be able to acquire the capability. So an act of terror cannot be ruled out.

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From The Heritage Foundation:

The USA Today has a much-needed article out today on the vulnerability of our nation to Electromagnetic pulses (EMP). Unfortunately the author doesn't seem to understand the limitations of deterrence against a terrorist EMP attack. The USA Today reports:

...

One complication for rogue nations or terrorists contemplating a high-altitude nuclear blast is that such an attack requires a missile to take the weapon at least 25 miles high to trigger the electromagnetic pulse. For nations, such a launch would invite massive nuclear retaliation from the USA's current stockpile of 5,000 warheads, many of them riding in submarines far from any pulse effects.

But who would the U.S. retaliate against? And the technological barriers to producing an effective EMP attack are shrinking everyday. The Heritage Foundation's Jena Baker McNeil explains:

For countries less dependent on modern technologies and electronics, including both rogue states like Iran and North Korea as well as stateless terrorist groups, EMP provides a potential way to attack the United States through asymmetric means. EMPs could be used to circumvent America's superior conventional military power while reducing vulnerability to retaliation in kind. It would certainly not be impossible for a terrorist organization, especially if state-sponsored, to acquire or construct an unsophisticated ballistic missile (non-working Scuds are reportedly available on the open market for \$100,000) and use it in an EMP attack against America. Such a missile could be launched from a freighter in international waters and detonated in the atmosphere over the United States without warning.

Heritage's James Carafano sketches out how a coordinated "Scud in a bucket" attack might unfold:

Iran's Shahab-3, an advanced Scud variant, seems capable of traveling 1,000 kilometers and carrying as much as a 10-kiloton warhead. It couldn't reach Washington from Tehran, but then, it wouldn't have to. Iran could easily extend the missile's reach simply by moving it to a commercial freighter and firing it from nearby using an improvised vertical launch tube disguised as cargo.

In many ways, Scud in a bucket is the ultimate weapon. It could sail close to U.S. waters without being subject to inspection by the Coast Guard or Customs. The enemy could fire the missile and scuttle the ship, leaving no record of who launched the attack.

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If Iran has one missile and nuclear weapon, it might have two. It could detonate one over New York in a low-altitude air burst that would kill up to a half-million and cripple Manhattan forever.

Iran could fire a second at high altitude over the mid-Atlantic states, creating an electro-magnetic pulse that would take down a large portion of the national grid and plunge Washington, D.C., into permanent darkness.

Why on earth should America's leaders leave our country open to this kind of threat? A better solution would be to require the Navy to develop a test program for sea-based interceptors with the capability to intercept and destroy ballistic missiles carrying EMP weapons prior to detonation.

Our nation's infrastructure is also in need of hardening to minimize the damage from natural EMPs from the sun, but there is no reason we should leave ourselves vulnerable to man made disaster's as well.²⁵⁰

Other terror threats could include poisoning the water supply, mass coordinated shootings, mass bombings, (including "dirty bombs" with nuclear material), transportation attacks (planes, trains, and highways), suicide attacks, mail attacks, and biological warfare.²⁵¹

The risk of other terror threats should be viewed as quite serious as noted by House Homeland Security Chairman Michael McCaul, author of *Failures of Imagination: The Deadliest Threats to Our Homeland--and How to Thwart Them*. Chairman McCaul identifies nightmare scenarios that could devastate life and property.²⁵²

Assessment of Probability

Terror attempts are increasing in frequency and, over time, in sophistication. Fortunately, prevention efforts have also increased, limiting the number of successful attacks to date. Many experts believe, however, that it is only a matter of time before a "Pearl Harbor" level attack succeeds.^{253,254} The potential for such a serious terror attack successfully impacting the economy in a significant manner over the next decade is estimated at 20%. This includes all types of serious terror incidents although the odds of any specific incident are certainly lower.

Assessment of Impacts

A power blackout lasting a year or more is assumed to be a nation-ending event.²⁵⁵ As such all Federal funds would cease entirely. This would be viewed as among the most dire possible circumstances. Lesser terror incidents would naturally have lower impacts, depending on their nature and severity. Attacks that center on Utah would, of course provide direct economic hardship. Attacks against the transportation infrastructure would likely impact tourism. In the event of an attack

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against Utah, however, there would likely be additional Federal Funds available rather than a reduction.

Avoidance and Minimization

The state of Utah no doubt has emergency preparedness provisions for the potential of terrorism. In regard to the most catastrophic risks, however, Utah should consider requiring providers of electric power to develop action plans to physically protect facilities within the state as well as an EMP response plan which would include grid hardening. Maine has begun this process.²⁵⁶ Utah's Federal representatives should be encouraged to support national legislation to protect the power grid as well.

Monitoring

Utah currently has terror monitoring capabilities and a Critical Infrastructure Protection Coordinator and SIAC (Statewide Information and Analysis Center) that monitors and reports on threats to infrastructure.²⁵⁷ This group should be examined regarding capability and resourcing and supported as needed.

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Another serious risk is the start of a new war. War is inevitable, whether it appears as a regional conflict or more concerning, as another world war. Even as the United States has seemingly withdrawn from major efforts in the Middle East, the risks of coming conflict appear to be growing significantly. In addition, more than at any point in the past two decades, the world is polarizing along a number of geopolitical fault lines.

This report will provide a general description of potential war scenarios. Each has the risk of escalation into global conflict.

A. East vs. West

An argument can be made that the Cold War has already restarted. The invasion of parts of the Ukraine by Russia and the Western response demonstrated that the uneasy cooperation among former superpowers had been lost. Russia's courting of China away from westernization has been underway for several years. As China's economy has dramatically slowed and Western investment begun to pull out, the risk has increased.

As previously documented, elements in Russia close to Vladimir Putin suggested a disengagement from an American-led world as early as 1998 (as reported by The Wall Street Journal in 2008):

MOSCOW -- For a decade, Russian academic Igor Panarin has been predicting the U.S. will fall apart in 2010. For most of that time, he admits, few took his argument -- that an economic and moral collapse will trigger a civil war and the eventual breakup of the U.S. -- very seriously. Now he's found an eager audience: Russian state media.

In recent weeks, he's been interviewed as much as twice a day about his predictions. "It's a record," says Prof. Panarin. "But I think the attention is going to grow even stronger."

Prof. Panarin, 50 years old, is not a fringe figure. A former KGB analyst, he is dean of the Russian Foreign Ministry's academy for future diplomats. He is invited to Kremlin receptions, lectures students, publishes books, and appears in the media as an expert on U.S.-Russia relations.

But it's his bleak forecast for the U.S. that is music to the ears of the Kremlin, which in recent years has blamed Washington for everything from instability in

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the Middle East to the global financial crisis. Mr. Panarin's views also fit neatly with the Kremlin's narrative that Russia is returning to its rightful place on the world stage after the weakness of the 1990s, when many feared that the country would go economically and politically bankrupt and break into separate territories.



A polite and cheerful man with a buzz cut, Mr. Panarin insists he does not dislike Americans. But he warns that the outlook for them is dire.

"There's a 55-45% chance right now that disintegration will occur," he says. "One could rejoice in that process," he adds, poker-faced. "But if we're talking reasonably, it's not the best scenario -- for Russia." Though Russia would become more powerful on the global stage, he says, its economy would suffer because it currently depends heavily on the dollar and on trade with the U.S.²⁵⁸

While the rhetoric would normally be dismissed, especially coming from an official in a failing government (as Russia was in 1998), the fact that the claim persisted for a decade provides some level of concern. Then, when you add a possible attempt to coerce China into an economic attack against the United States in 2008, it becomes clear that these could be serious intentions. From the BBC:

There is a cynicism in the relationship between Russia and the US, being played out in the Crimean crisis, which is deep, rooted in history and shows that the

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triumph of capitalism over communism wasn't the end of the power game between these two nations.

The depth of mistrust between the two was highlighted in the interview given by Hank Paulson, the former US treasury secretary, for my recent BBC Two documentary, How China Fooled The World. The excerpts I am about to quote never made it into the film, because they weren't relevant to it. But they give a fascinating understanding of the complex relationship between Washington and Moscow.

Mr Paulson was talking about the financial crisis of the autumn of 2008, and in particular the devastation being wreaked on Fannie Mae and Freddie Mac, the two huge underwriters of American mortgages - huge financial institutions that had a funny status at the time of being seen by investors to be the liability of the US government, which in legal reality were not exactly that.

This person told me that the Chinese had received a message from the Russians which was, 'Hey let's join together and sell Fannie and Freddie securities on the market'

Here is Mr. Paulson on the unfolding drama:

"When Fannie Mae and Freddie Mac started to become unglued, and you know there were \$5.4tn of securities relating to Fannie and Freddie, \$1.7tn outside of the US. The Chinese were the biggest external investor holding Fannie and Freddie securities, so the Chinese were very, very concerned." Or to put it another way, the Chinese government owned \$1.7tn of mortgage-backed bonds issued by Fannie Mae and Freddie Mac, and it was deeply concerned it would incur huge losses on these bonds.

Mr. Paulson: "I was talking to them [Chinese ministers and officials] regularly because I didn't want them to dump the securities on the market and precipitate a bigger crisis.

"And so when I went to Congress and asked for these emergency powers [to stabilise Fannie and Freddie], and I was getting the living daylights beaten out of me by our Congress publicly, I needed to call the Chinese regularly to explain to the Central Bank, 'listen this is our political system, this is political theatre, we will get this done'. And I didn't have quite that much certainty myself but I sure did everything I could to reassure them."

In other words, China had lent so much to the US that Mr. Paulson needed to do his best to persuade its government and central bank that China's investment in all this US debt would not be impaired.

Now this is where we enter the territory of a geopolitical thriller. Mr. Paulson:

"Here I'm not going to name the senior person, but I was meeting with someone... This person told me that the Chinese had received a message from the Russians which was, 'Hey let's join together and sell Fannie and

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Freddie securities on the market.' The Chinese weren't going to do that but again, it just, it just drove home to me how vulnerable I felt until we had put Fannie and Freddie into conservatorship [the rescue plan for them, that was eventually put in place]."

For me this is pretty jaw-dropping stuff - the Chinese told Hank Paulson that the Russians were suggesting a joint pact with China to drive down the price of the debt of Fannie and Freddie, and maximize the turmoil on Wall Street - presumably with a view to maximizing the cost of the rescue for Washington and further damaging its financial health.

Paulson says this guerrilla skirmish in markets by the Russians and Chinese didn't happen. But this kind of intelligence from China on Russian desire and willingness to embarrass the US in a financial sense may help to explain - in a small way - why President Obama shows little desire to understand Crimea as seen by Mr Putin. And maybe if the US is being a bit more robust than the EU in wanting to impose economic and financial sanctions on Russia, that may not all be about America's much lesser dependence (negligible dependence) on Russian gas and oil.²⁵⁹

After the 2008 turmoil, rhetoric from Russia against the United States has increased sharply. Putin has called America a parasite.²⁶⁰ And, over time, the Chinese have joined the Russian view at least to some extent, demanding a "de-Americanization" of the world.²⁶¹

Until very recently, the Western financial system was so integral to the entire world that the thought of another world war seemed impossible. Over the past few years, however, the Russians and Chinese have developed alternative systems designed to replace American financial hegemony (as discussed in earlier sections).²⁶² Now, Russia is claiming that American financial dominance is increasing, rather than decreasing the risks of war:

Top Russia Public Intellectual: Western Financial System Is Driving It to War

Nikolai Starikov believes the unsustainable nature of amoral finance capitalism is driving western countries to a catastrophic war, which he sees as an existential threat to peace for Russia and the rest of the world. Right or wrong, he is an indicator of what thousands or millions of Russians believe.²⁶³

Starikov's contention is that continued American financial dominance is tantamount to an act of war in itself and argues that Russians should prepare to respond.

Russia and China have rapidly advanced their military capabilities, beefing up as the United States is scaling back.²⁶⁴ Top military leaders admit that Russia is a major threat according to the Chairman of the Joint Chiefs:

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Russia presents the greatest threat to U.S. national security and its behavior is "nothing short of alarming," Marine Corps General Joseph Dunford told lawmakers on Thursday as they weighed his nomination to become chairman of the Joint Chiefs of Staff.

Dunford also added his voice to those Pentagon officials who have supported providing lethal arms to Ukraine to help it defend itself from Russia-backed separatists, a step that President Barack Obama has so far resisted.

"My assessment today, senator, is that Russia presents the greatest threat to our national security," said Dunford, the Marine Corps commandant, who is expected to swiftly win Senate confirmation to become the top U.S. military officer.

Relations between Moscow and the West have plunged to a post-Cold War low since Russia's intervention in Ukraine upended assumptions about the security of NATO's eastern flank.

"If you want to talk about a nation that could pose an existential threat to the United States, I'd have to point to Russia. And if you look at their behavior, it's nothing short of alarming," he said.²⁶⁵

Russia has ramped up rhetoric sharply as demonstrated by this July 8, 2015 report in Sputnik News:

The current relations between the United States and Russia are at their lowest point since the end of the Cold War. Modern Russia is not the Soviet Union; that's why Washington should cool down its aggressive rhetoric towards Russia.

If the United States continues its hostile policy towards Russia, Washington might face a war with Russia. This time, it's not going to be just another proxy war on some other country's territory, but a full-scale war on American soil, US journalist Jack Hanick wrote for the Observer.

This is a huge foreign policy mistake, Hanick said, adding that the United States will pay dearly for its hawkish approach and for not respecting Russia.

"If new hostilities start, Russia will not let the war be a proxy war where the US supplies weapons and advisors and lets others do the 'boots on the ground' combat. Russia will take the war to the US," Hanick argued. He added that Russians understand that the US might not handle a full-on war on its own soil, because the last time Americans fought on their home turf was during the Civil War.²⁶⁶

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The Pentagon may have validated at least some of Russia's bluster as noted in an August 14, 2015 article in *The Daily Beast*:

Pentagon Fears It's Not Ready for a War With Putin

The U.S. military has run the numbers on a sustained fight with Moscow, and they do not look good for the American side. A series of classified exercises over the summer has raised concerns inside the Defense Department that its forces are not prepared for a sustained military campaign against Russia, two defense officials told The Daily Beast.

Many within the military believe that 15 years of counter-terrorism warfare has left the ground troops ill prepared to maintain logistics or troop levels should Russia make an advance on NATO allies, the officials said.²⁶⁷

The Chief of Naval Operations has likewise increased concerns regarding China, according to Navy Times on January 12, 2016:

The Navy is talking tougher about China than just a few months ago.

As the Navy's top officer enters his fourth month on the job, a shift in tone is underway. In public remarks and his strategic guidance, Chief of Naval Operations Adm. John Richardson has called China a competitor, grouping the country with Russia, and has talked openly of China's development of weapons systems designed to counter the U.S. Navy.

That's a different tack than his predecessor, who advocated on building military-to-military relationships with China as a means of getting its rising military to be a responsible partner.

For nearly 25 years, since the fall of the Soviet Union, the U.S. Navy has ruled the seas, but not anymore, Richardson warned.

"That era is over," Richardson said in a Monday speech at the National Press Club in Washington, D.C. "Today, both Russia and China have advanced their military capabilities to be able to act as global powers. Their goals are backed by a growing arsenal of high-end war fighting capability ... much of which is focused on our vulnerabilities."²⁶⁸

The American people and the American markets have retained a belief in U.S. military dominance and would likely be shocked to realize that war is not only possible but also that America might not be as superior as expected. The Russians, by contrast, have been preparing for war on a global scale.

After courting China, Russia began to make inroads in other emerging markets, starting with the BRICS nations (Brazil, Russia, India, China, South Africa).²⁶⁹ A very

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recent example is Thailand, once considered an important Western ally until a recent military coup.^{270, 271} Similarly, China has made significant inroads into Africa, even building a strategic military base on the continent.²⁷² The bottom line is that the risks of an East vs. West war have escalated significantly. The idea of depending on Western financial hegemony is no longer valid. And, the East has significantly increased military capabilities while the West has reduced its military.

B. Islam's Internal Conflict—Shia vs. Sunni

A second conflict can be seen in the internal struggle of Islam. The stakes are higher than before, however, as Middle East instability has increased and the major nations have increased military capabilities. This conflict has been seen as between Saudi Arabia (representing Sunni) and Iran (representing Shiite). The conflict is evident in Syria, with the potential for proliferation far beyond the Syrian border.²⁷³ In addition, recent political activity has increased the risk of conflict.²⁷⁴

Some defense experts warn that Saudi Arabia may be at risk, not from Iran as much as perhaps from ISIS (which is Sunni). The reason (or at least the claim)? Because the Saudis have not been strong enough in supporting Sunni principles. Form Real Clear Defense:

Saudi Arabia has always faced unique demographic and socio-economic challenges. Out of a population of approximately 28 million people, immigrants make up nearly a third of entire population and over three-quarters of the labor force. Approximately 70% of the population is under the age of 30, and within that age group, unemployment is close to 30%. Nationals and non-nationals alike live under Sharia law with strict Wahhabi principles dictated by the royal family and the religious leadership of the ulema, which often cause strains within the immigrant population as well as the native population. While some within the kingdom push for modernization, the ultra-conservatives consistently call for increased rigidity in religious practice, causing friction within the royal family and the Saudi population as a whole. The recent ascension of King Salman last year has only added fuel to the fire as the internal politics of the royal family add another layer of uncertainty, opening the door for terrorist groups who might take advantage of the instability.

Saudi Arabia is also suffering a major hit to its largest source of income - with 80% of its budget revenues coming from oil production, Saudi Arabia has been massively affected by dropping oil prices, running some of its highest deficits in history. The kingdom has also traditionally depended on its constant influx of oil wealth to supply high-paying government jobs to key supporters, but with the rapidly dropping oil prices, Saudi Arabia may lose its ability to maintain popularity through employment opportunities. Saudi Arabia's massive wealth will undoubtedly survive the instability, but the oil crisis adds to a growing list

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of uncertainties plaguing the country. These circumstances not only encourage terrorist organizations to view Saudi Arabia as prime real estate, but also create an environment in which the young, unemployed Saudi citizens themselves might fuel the fire of insurgency.

HISTORY OF INSURGENCY

Ever since Saudi Arabia allowed the U.S. to station permanent bases on its territory in 1990, it has faced an increasingly radical conservative Wahhabi faction that has objected to any sort of friendly relations with the Western world. Ultra-conservatives have consistently held this relationship with the U.S. as a point of contention (Osama Bin Laden was one such dissident), and that radical base has been responsible for the majority of terrorist attacks within the kingdom. Saudi Arabia has recently clamped down on insurgency within its borders by revamping its counterterrorism efforts, while at the same time attempting to address future threats by making it a punishable crime for Saudis to fight abroad. However, these actions may be too little too late.

EXTERNAL PRESSURE

In addition to internal pressure due to widespread unemployment, a massive immigrant population and falling oil prices, Saudi Arabia faces multiple challenges from external sources as well. Saudi Arabia's involvement in Yemen is steadily draining resources and political good will. The Iranian nuclear deal was perceived as a loss and a sign of weakness for Saudi Arabia and the Sunni community, which has always fought to contain its Shia neighbor. ISIS has already targeted Saudi Arabia for its ties to the US, and in response the government has been driven to arrest almost 100 people in 2015 alone for suspected ties to ISIS. These perceived weaknesses and flaws in the Saudi government provide ideal material for an insurgency seeking a common enemy, and ISIS may seize that opportunity in the event that it is pushed out of its current strongholds.

But why Saudi Arabia specifically? The foreign fighters in Syria and Iraq come from all over the world – Libya is currently a bastion of ISIS support, as are multiple other locations throughout the Middle East and North Africa. Why would Saudi Arabia suffer the brunt of a relocation?

Saudi Arabia has the potential to be a unifying enemy, with enough ties to the West to fuel radical censure but without the stability of most Western countries to counter an insurgency movement. It provides a platform for recruitment with its youthful population and high unemployment, and at the same time allows for foreign outreach through its massive immigrant population. The Saudi government itself is stretched thin operating in Yemen and contributing military resources to Syria, all while suffering blows to its economy from dropping oil prices. The royal family is caught between a rock and a hard place,

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risking censure from radical conservatives if it modernizes and popular discontent if it pushes more stringent Wahhabism on its population. Critically, Saudi Arabia is home to two of the most holy sites of Islamic culture, Mecca and Medina, which makes it a natural rallying point. All of these factors make Saudi Arabia an ideal location for insurgency, and suggest that Saudi Arabia will suffer the consequences when ISIS' power is depleted and its fighters scatter beyond Iraq and Syria.

It is unlikely that ISIS will ever be truly eliminated. More likely it will continue on in some modified form, moving locations and continuing attacks on a smaller scale and under different names. But the dispersed fighters will seek to find a rallying point to reconsolidate their power, and Saudi Arabia provides the optimal environment. While ISIS deserves our full attention at present, we must also consider the repercussions of its decline and watch for new challenges that will emerge as a consequence in other regions.

[Article written by Schuyler Moore, analyst at an aerospace & defense consulting firm based in Washington, D.C. She previously studied international relations at Harvard University, and has published work on subjects regarding the Levant, Middle East and Central Asia in The National Interest and The Diplomat. Prior to her current position, she worked with the National Defense University in Washington, D.C. The views expressed in this article do not reflect the policy or position of any official organization.]²⁷⁵

C. Radical Islam vs. Western Civilization

A third issue is the simmering conflict between radicalized Islam and the West. Dubbed “the global war on terror,” this is actually a clash of civilizations.²⁷⁶ ISIS is the most recent manifestation to threaten the West.²⁷⁷ And the threat is greater than most imagine as explained by a Reuters article (November 18, 2015):

Islamic State has become an existential threat to the West

By John Lloyd November 18, 2015

The Europeans have — it's not news — tended to be snooty about the Americans. Especially the French, but the attitude is ingrained even in the “special relationship” with the UK.

In interviews with intelligence service people, mostly retired, for a project for the Reuters Institute, I often heard that senior British officers had thought the phrase “War on Terror” to be a stupid one, and that they never used it. It was not a war, they believed. The struggle was not “existential.” It was a serious challenge from serious militants: hard, vicious but finite.

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It's different now. Francois Hollande, the Socialist president of France, has said that the slaughter in Paris last Friday evening was "an act of war." Pope Francis, at a commemoration service for the 100,000 Italian soldiers killed in the World War One (his grandfather was one of the soldiers who survived) said that "one can speak of a third war, one fought piecemeal, with crimes, massacres, destruction."

The Europeans aren't being snooty anymore: Paris, Friday, Nov. 13, 2015, has brought Europe together in an agony of anger — so much, that it is the U.S. president who feels compelled to remind us that we should have a duty of welcome to refugees from Syria.

And there's another switch. Vice President Joseph Biden, speaking on Monday in Los Angeles, said "I say to the American people: There is no existential threat to the United States. Nothing ISIS can do could bring down the government, could threaten the way we live."

But the man who commanded the British armed forces from 2010 to 2013 thinks that's mere complacency. General David Richards said at a history festival in June this year that the threat is existential and "that we need to approach this issue of Muslim extremism as we might approach World War Two back in the 1930s." In a recent book, he's said to have told the British prime minister that he lacked the courage to take the fight to Islamic State, being too obsessed with wishing to appear liberal.

There are three main reasons why Richards is right and Biden wrong. First, for some three decades, the nightmare of politicians and secret services has been that rogue states, and/or terrorist groups, would acquire weapons of mass destruction. It runs through "At the Center of the Storm," the memoir of George Tenet, CIA director from 1996-2004. It kept successive presidents, from Clinton through Bush to Obama, awake at night; prompted their interventions abroad and (in Obama's presidency) the heavy use of killer drones. It has meant that the National Security Agency (NSA) has now incomparably the largest budget of any intelligence service anywhere, so that the first "chatter" which reveals that the nightmare has real flesh can be detected.

Islamic State might be the organization to put flesh on that nightmare, because it has the money and can buy the expertise to make WMD. An investigation last month by the Financial Times found that in the areas of Iraq it controls, ISIS has "a sprawling operation almost akin to a state oil company that ... recruits skilled workers, from engineers to trainers and managers and produces about 34,000-40,000 barrels per day. The oil is sold at the wellhead for between \$20 and \$45 a barrel, earning the militants an average of \$1.5m a day."

Put together money, expertise and an Islamist-nihilist philosophy, and you have a weapon of huge destructive power, pointing at both the West and the East.

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Second, Islamic State is funding a large increase in its cyber warfare capability. George Osborne, the British chancellor, said on Tuesday that "ISIS' murderous brutality has a strong digital element. At a time when so many others are using the Internet to enhance freedom and give expression to liberal values and creativity, they are using it for evil."

Determined cyber attacks mounted by experts in cryptography could disable health and power systems, air traffic controls, nuclear power stations and much else: the human costs could quickly run into the tens of thousands, if closely coordinated.

Third, ISIS, more than any other of the Islamist groups, has the power to attract large numbers of young Muslims — men and women — to come to Syria and Iraq to fight with them, or to remain in the countries in which they were born and become an enemy within these states. The glamour of death, murder and "revenge" seems a powerful draw — amplified, it seems, by the hours many of the young jihadists spend before a screen replete with images of "Crusaders" and Jews murdering Muslims. There is thus a potentially active network of supporters in most of the Western countries, either radicalized or the future targets of radicalization. And there is no way, outside of a locked-down authoritarian state, for all of them be monitored all the time.

The safeguards of a democratic society bounded by the rule of law place limits: a member of France's internal secret service, the Direction Générale de la Sécurité Intérieure, told the Le Monde reporter Jacques Follorou that, "You have to prioritize, if the lads don't commit any crime, its complicated to justify phone taps. You can't put people on whom you have no evidence under 24-hour surveillance."

This is not quite like any other war; nor can it be fought with previous wars' weapons. Ranged against Islamic State is the military might of the United States, the European states and, now, Russia. Surely, with the military and intelligence technology at their disposal, they can destroy a force, which seeks to bring down 21st century civilization and substitute for it a mediaeval theocracy?

Yet working for the theocrats is the sluggish reluctance of the liberal, consumer societies of the West to gear up for war; to surround themselves with new security systems which will inhibit travel and entertainment; to lose or reduce the liberal safeguards which have been regarded as indispensable. Working for them, too, is a hatred so pure that young men can stride among the bodies of other young men, and women, and shoot those who moved — then blow themselves up. Working for them is the lack of our comprehension about how serious they appear to be.

VII. Open Warfare

*This, I think, adds up to war: and an existential threat. A threat to our existence, our way of life.*²⁷⁸

Assessment of Probability

War is inevitable. The question then is the degree, manner, and timing. It appears that the risks of a serious conflict have increased in recent years. Over the last century, there were two World Wars involving the United States in separate decades and another six serious but more limited conflicts. Based on this, a reasonable estimate might be for a 10-20% chance of a major war involving the United States over the next decade and perhaps 50% for serious but more limited conflicts.

Assessment of Impacts

It is difficult to estimate the impact of smaller or regional warfare. In some ways, small wars could be considered beneficial to the economy, creating economic opportunity. A large-scale modern war is extremely difficult to define, however. If nuclear, it could prove nation ending. A non-nuclear conflict could result in massive military mobilization and spending. Assuming that financing could be obtained for the debt and deficits, even a global conflict could prove beneficial for economic growth.²⁷⁹

Avoidance and Minimization

Very little can be done at the state level to either avoid or minimize the impact of war other than prudent fiscal management. The state could encourage the local defense industry to focus on preparation for 21st century warfare. The state could also prepare for the risks of an oil supply disruption.

Monitoring

The state could contract to receive regular geopolitical and national security reports to inform the legislature.

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There are numerous political risks to consider that could seriously impact Utah. This effort will focus on four as examples for consideration. They are Government Shutdown, Excessive Regulation, Immigration, and Treaties that Diminish State Sovereignty.

A. Federal Government Shutdown

Utah has experience with Federal Shutdown as recently as October 2013. The White House, in a November 2013 report, summarized the following economic impacts:

The October 2013 Federal government shutdown was the second longest since 1980 and the most significant on record, measured in terms of employee furlough days. Outside experts estimate that the shutdown will reduce fourth quarter Gross Domestic Product (GDP) growth by 0.2-0.6 percentage points. The Council of Economic Advisers estimates that the combination of the government shutdown and debt limit brinksmanship may have resulted in 120,000 fewer private-sector jobs created during the first two weeks of October.

This report examines the economic, budgetary, and programmatic costs of the government shutdown. These costs include economic disruption, Federal employee furloughs, programmatic impacts, other costs to the Federal budget, and impacts on the Federal workforce.

Economic Disruption

Independent forecasters estimate that the shutdown will lower fourth quarter real GDP growth by 0.2-0.6 percentage points, or \$2-\$6 billion in lost output. Most of these estimates of the shutdown's economic costs are model-based projections, which incorporate only the shutdown's effects on the flow of government spending. As a result, they may not fully account for the direct economic disruption that resulted from the shutdown of government services important to the functioning of the private economy.

The Federal government shutdown:

· Halted permitting and environmental and other reviews, delaying job-creating transportation and energy projects. For example, the Bureau of Land Management (BLM) was unable to process about 200 Applications for Permit

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to Drill, delaying energy development on Federal lands in North Dakota, Wyoming, Utah, and other states.

· Hindered trade by putting import and export licenses and applications on hold. For example, because the Treasury Department's Alcohol and Tobacco Tax and Trade Bureau was unable to issue export certificates for beer, wine, and distilled spirits, more than two million liters of U.S. products were left sitting at ports unable to ship.

Impacts and Costs of the October 2013 Federal Government Shutdown

· Disrupted private-sector lending to individuals and small businesses. During the shutdown, banks and other lenders could not access government income and Social Security Number verification services. Two weeks into the shutdown, the Internal Revenue Service (IRS) had an inventory of 1.2 million verification requests that could not be processed, potentially delaying approval of mortgages and other loans.

· Halted Federal loans to small businesses, homeowners, and housing and healthcare facility developers. The Small Business Administration (SBA) was unable to process about 700 applications for \$140 million in small business loans, and the Federal Housing Administration (FHA) was unable to process over 500 applications for loans to develop, rehabilitate, or refinance around 80,000 multifamily rental units.

· Delayed the Alaskan crab fishing season, costing fisherman thousands of dollars in lost revenue. Because the National Oceanic and Atmospheric Administration (NOAA) was unable to apportion harvest levels, the start of the season was delayed for three to four days. The fishing industry estimates these delays cost fisherman thousands of dollars of lost revenue per day, since days lost at the beginning of the season cannot be made up later.

· Disrupted tourism and travel by closing national parks and the Smithsonian. The National Park Service (NPS) estimates that the shutdown led to over \$500 million in lost visitor spending nationwide, a significant economic hit to communities surrounding national parks and monuments.

· Significantly impacted small businesses that contract with the Federal government. Compared with the same period last year, small business contracts with the Department of Defense (DOD) dropped by almost one-third during the shutdown, and spending dropped 40 percent.

· Delayed aircraft purchases and deliveries by closing the Federal Aviation Administration (FAA)'s Aircraft Registry. The General Aviation Manufacturers Association estimates that this delayed 156 aircraft deliveries valued at \$1.9 billion.

· Delayed Food and Drug Administration (FDA) approval of medical products, devices, and drugs. This delayed businesses in moving products to market.

· Deprived businesses of important information about the state of the economy.

During the shutdown, Federal statistical agencies were unable to release data and reports ranging from the October jobs report and the Consumer Price

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Index to the Energy Information Administration's reports on petroleum, diesel prices, heating oil, and natural gas storage. Businesses count on these data to make investment, pricing, and other decisions.²⁸⁰

Obviously of note for Utah in this summary is the mention of the National Park Service (with the large national parks in the state) as well as the halting of permitting for energy development on Federal lands. Unfortunately, with a majority of the state under Federal control, issues such as this one are uncontrollable. This is a good example of political outcomes that could directly impact state revenues.

Interestingly, there has been some discussion in China that the Federal Government's large-scale ownership of property might be used as collateral.²⁸¹ While it seems unlikely that the Federal Government would agree to such provision, except in the case of a massive financial crisis, this does demonstrate the risks involved with such a large percentage of a state under Federal control. It also demonstrates another element of risk potentially associated with any Federal financial crisis.

B. Excessive Federal Regulation

Another political risk comes from the ever-increasing burden of regulation. 2015 was a record year in this area as noted by The Hill:

2015 was a record-setting year for the Federal Register, according to numbers the Competitive Enterprise Institute in Washington, D.C., released Wednesday.

This year's daily publication of the federal government's rules, proposed rules and notices amounted to 81,611 pages as of Wednesday, higher than last year's 77,687 pages and higher than the all-time high of 81,405 pages in 2010 — with one day to go in 2015.

In a blog post on the libertarian think tank's website, the group's vice president for policy, Clyde Wayne Crews, said there have been 3,378 final rules and regulations among the pages of the Federal Register this year. Some of the major final rules included the Environmental Protection Agency's Clean Power Plan and its Waters of the United States rule, as well as the Federal Communications Commission's net neutrality order. He said another 2,334 proposed rules were issued in 2015 and are at various stages of consideration. On top of that, President Obama issued 29 executive orders and 31 executive memorandums, among them were agency directives to expand paid family and medical leave and overtime pay.

To combat what he considers to be overregulation, Crews said Congress should repeal the certain statutes, require congressional approval for big rules and enforce maximum requirements set forth in the Administrative Procedure Act.

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"The House of Representatives passed the REINS Act (Regulations from the Executive In Need of Scrutiny) to do that, but the Senate seems disinclined to pass it and force President Obama's promised veto," he wrote in his blog. "If Congress isn't willing to force Obama to explain why unelected should make laws, it must be because the Republican Congress isn't willing to end over-delegation."²⁸²

This was on top of an estimated \$181 billion worth of regulations imposed in 2014.²⁸³ Utah's estimated burden for new regulations in 2014 was \$356 million according to estimates by the American Action Forum, far below the \$7.9 billion for California and the \$6.5 billion for Texas.²⁸⁴ Many economists believe that the increasing burden of regulation is at least somewhat responsible for the slower than expected economic recovery.²⁸⁵

It's not just new regulations that are a concern, however. A George Washington University professor believes that the effect is cumulative and worsening:

In an article titled "Considering the Cumulative Effects of Regulation," Director of the Regulatory Studies Center and Professor at George Washington University, Susan E. Dudley suggests that requiring agencies to analyze the expected impact of new regulatory requirements, while important, "may not account for the cumulative effect of regulations on society or specific sectors of the economy." Dudley argues that even if "individually justified," new regulatory requirements "may have cumulative effects imposing undue, unduly complex, or inconsistent burdens."

The article addressed how the cumulative impacts of federal regulations are not only costly but burdensome to businesses and economic growth. Dudley suggested regulatory agencies should explicitly consider costs and benefits of existing regulations in the affected sector and examine actual impacts to supplement the ex-ante estimates. Rather than conducting economy-wide studies, she pointed out, it could be more effective to study certain classes of regulation or the burdens felt by certain sectors as a way to yield important insights. Dudley also recommended examining the total cost of regulations on society as a whole and investing in developing better tools for understanding the aggregate impact of regulations.²⁸⁶

Beyond hampering recovery and slowing the economy, there is also a risk that regulation will actually trigger the next financial crisis. At least that's the opinion of Steve Schwarzman of The Blackstone Group as explained in an Op-Ed for *The Wall Street Journal*:

After the financial crisis, a focus on safety and soundness was good medicine for the financial system. New bank liquidity and capital policies, among other

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initiatives, strengthened a debilitated patient. The banking system is now stronger, with more liquid assets and better underwriting standards.

Despite good intentions, however, politicians and regulators constructed an expansive and untested regulatory framework that will have unintended consequences for liquidity in our financial system. Taken together, these regulatory changes may well fuel the next financial crisis as well as slow U.S. economic growth.²⁸⁷

The difficulty is that many of the regulations imposed do not allow for a representative voice because they are crafted by unelected bureaucracies as noted by Utah Senator Mike Lee and reported in *Breitbart*:

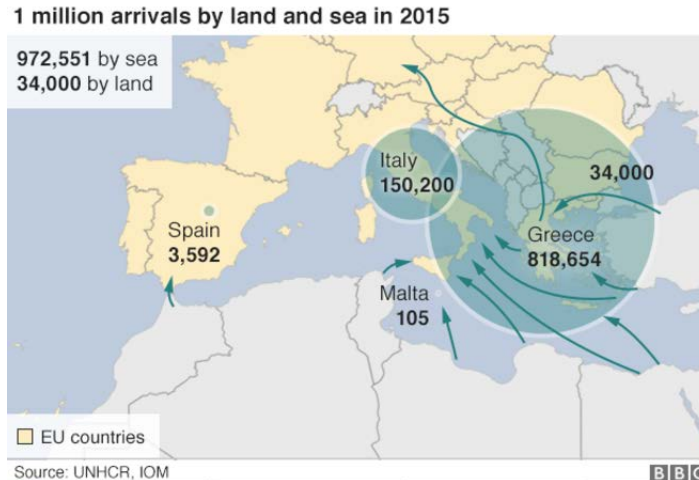
Lee keeps two stacks of documents in his office. One, the smaller, consists of all laws passed in Congress last year and is but a few inches tall. The other, eleven and a half feet tall, 80,000 pages long, consists of last year's federal register. The federal register is the "cumulative index of all new regulations that are issued each year by our executive branch bureaucracy," he described. "Legally binding documents." Lee: "80,000 pages of law produced each year. These laws are produced not by men and women who are elected for a limited number of years to make laws; they're issued by executive branch bureaucrats who don't work for you, who can't be fired by you and don't really work for anyone, at least directly, who is subject to an election."²⁸⁸

The risk is difficult to quantify because Federal decisions could either force Utah to conform to the bureaucracy or lose all or part of allocated Federal funding.²⁸⁹ Adhering to the regulation risks efficiency and success. Violating it risks a loss of funding.

C. Forced Immigration

A recent political issue has to do with refugee resettlement. This is an extremely sensitive issue in Europe where about a million migrants arrived in 2015.²⁹⁰

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There is a tremendous economic cost associated with migration at this level. European leaders seem to favor this effort presumably based on the need for future labor given low birth rates.²⁹¹

One thing is certain, however. The larger political bodies are forcing an immigration policy on smaller ones. Mayors in many cities oppose resettlement.²⁹² Yet, those who oppose the top-down program have been told they have little choice.²⁹³ The same is true for the United States. Even if a state governor opposes Federal plans, refugees will be resettled according to Federal planning as explained in Think Progress:

More than half a dozen state governors have come out against President Obama's plans to relocate several thousand Syrian refugees within the United States. Some have pledged to actively resist settlement of these refugees. Texas Gov. Greg Abbott (R), for example, signed a letter to Obama that begins "as governor of Texas, I write to inform you that the State of Texas will not accept any refugees from Syria in the wake of the deadly terrorist attack in Paris." Louisiana Gov. Bobby Jindal (R) issued an executive order instructing all "departments, budget units, agencies, offices, entities, and officers of the executive branch of the State of Louisiana" to "utilize all lawful means to prevent the resettlement of Syrian refugees in the State of Louisiana while this Order is in effect."

*The problem for Jindal, Abbott and the other governors opposed to admitting refugees, however, is that there is no lawful means that permits a state government to dictate immigration policy to the president in this way. As the Supreme Court explained in *Hines v. Davidowitz*, "the supremacy of the national power in the general field of foreign affairs, including power over immigration, naturalization and deportation, is made clear by the Constitution." States do not get to overrule the federal government on matters such as this one.*

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Just in case there is any doubt, President Obama has explicit statutory authorization to accept foreign refugees into the United States. Under the Refugee Act of 1980, the president may admit refugees who face “persecution or a well-founded fear of persecution on account of race, religion, nationality, membership in a particular social group, or political opinion” into the United States, and the president’s power to do so is particularly robust if they determine that an “unforeseen emergency refugee situation” such as the Syrian refugee crisis exists.

This power to admit refugees fits within the scheme of “broad discretion exercised by immigration officials” that the Supreme Court recognized in its most recent major immigration case, Arizona v. United States. Indeed, in describing the executive branch’s broad authority to make discretionary calls regarding immigration matters, Arizona seemed to explicitly contemplate the circumstances that face President Obama today. The United States may wish to allow a foreign national to remain within its borders, the Court explained, because the individual’s home nation “may be mired in civil war, complicit in political persecution, or enduring conditions that create a real risk that the alien or his family will be harmed upon return.”

Moreover, the Court explained, America could suffer severe foreign policy consequences if the executive does not enjoy broad discretion over immigration matters. “The dynamic nature of relations with other countries,” Justice Anthony Kennedy explained in his opinion for the Court in Arizona, “requires the Executive Branch to ensure that enforcement policies are consistent with this Nation’s foreign policy with respect to these and other realities.”

Hines offered a similar warning about the close tie between immigration and foreign relations, explaining that immigration policy must be set by the national government and not by 50 different state governors because the entire United States can suffer when a foreign nation reacts adversely to our treatment of immigrants. “Experience has shown that international controversies of the gravest moment, sometimes even leading to war,” Justice Hugo Black wrote in his 1941 opinion for the Court, “may arise from real or imagined wrongs to another’s subjects inflicted, or permitted, by a government.” Thus, the Court concluded, “the regulation of aliens is so intimately blended and intertwined with responsibilities of the national government that where it acts, and the state also acts on the same subject, ‘the act of congress, or the treaty, is supreme; and the law of the state, though enacted in the exercise of powers not controverted, must yield to it.’”

To be clear, states still retain the power to deny their own resources to the federal government, so they could potentially make settlement of refugees more difficult than it would be if the states cooperated. Nevertheless, an act of Congress — the Refugee Act of 1980 — has given Obama broad discretion to allow refugees to be admitted into the United States. The states of Texas, Louisiana and others must yield to that act.²⁹⁴

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By comparison to what's happening in Europe, resettlement in the United States has been modest.²⁹⁵ This does not preclude future efforts, however, that could be increasingly significant. Forced refugee resettlement has been associated with a host of civil problems.²⁹⁶

Beyond refugees, there is also the American immigration issue. Immigration policy is considered the sole province of the Federal Government. But the costs are imposed on the states in large part as noted in a study by The Heritage Foundation:

Unlawful immigration and amnesty for current unlawful immigrants can pose large fiscal costs for U.S. taxpayers. Government provides four types of benefits and services that are relevant to this issue:

- *Direct benefits. These include Social Security, Medicare, unemployment insurance, and workers' compensation.*
- *Means-tested welfare benefits. There are over 80 of these programs, which, at a cost of nearly \$900 billion per year, provide cash, food, housing, medical, and other services to roughly 100 million low-income Americans. Major programs include Medicaid, food stamps, the refundable Earned Income Tax Credit, public housing, Supplemental Security Income, and Temporary Assistance for Needy Families.*
- *Public education. At a cost of \$12,300 per pupil per year, these services are largely free or heavily subsidized for low-income parents.*
- *Population-based services. Police, fire, highways, parks, and similar services, as the National Academy of Sciences determined in its study of the fiscal costs of immigration, generally have to expand as new immigrants enter a community; someone has to bear the cost of that expansion.*

The cost of these governmental services is far larger than many people imagine. For example, in 2010, the average U.S. household received \$31,584 in government benefits and services in these four categories.

The governmental system is highly redistributive. Well-educated households tend to be net tax contributors: The taxes they pay exceed the direct and means-tested benefits, education, and population-based services they receive. For example, in 2010, in the whole U.S. population, households with college-educated heads, on average, received \$24,839 in government benefits while paying \$54,089 in taxes. The average college-educated household thus generated a fiscal surplus of \$29,250 that government used to finance benefits for other households.

Other households are net tax consumers: The benefits they receive exceed the taxes they pay. These households generate a "fiscal deficit" that must be

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financed by taxes from other households or by government borrowing. For example, in 2010, in the U.S. population as a whole, households headed by persons without a high school degree, on average, received \$46,582 in government benefits while paying only \$11,469 in taxes. This generated an average fiscal deficit (benefits received minus taxes paid) of \$35,113.

The high deficits of poorly educated households are important in the amnesty debate because the typical unlawful immigrant has only a 10th-grade education. Half of unlawful immigrant households are headed by an individual with less than a high school degree, and another 25 percent of household heads have only a high school degree.

Some argue that the deficit figures for poorly educated households in the general population are not relevant for immigrants. Many believe, for example, that lawful immigrants use little welfare. In reality, lawful immigrant households receive significantly more welfare, on average, than U.S.-born households. Overall, the fiscal deficits or surpluses for lawful immigrant households are the same as or higher than those for U.S.-born households with the same education level. Poorly educated households, whether immigrant or U.S.-born, receive far more in government benefits than they pay in taxes.

In contrast to lawful immigrants, unlawful immigrants at present do not have access to means-tested welfare, Social Security, or Medicare. This does not mean, however, that they do not receive government benefits and services. Children in unlawful immigrant households receive heavily subsidized public education. Many unlawful immigrants have U.S.-born children; these children are currently eligible for the full range of government welfare and medical benefits. And, of course, when unlawful immigrants live in a community, they use roads, parks, sewers, police, and fire protection; these services must expand to cover the added population or there will be “congestion” effects that lead to a decline in service quality.

In 2010, the average unlawful immigrant household received around \$24,721 in government benefits and services while paying some \$10,334 in taxes. This generated an average annual fiscal deficit (benefits received minus taxes paid) of around \$14,387 per household. This cost had to be borne by U.S. taxpayers. Amnesty would provide unlawful households with access to over 80 means-tested welfare programs, Obamacare, Social Security, and Medicare. The fiscal deficit for each household would soar.

If enacted, amnesty would be implemented in phases. During the first or interim phase (which is likely to last 13 years), unlawful immigrants would be given lawful status but would be denied access to means-tested welfare and Obamacare. Most analysts assume that roughly half of unlawful immigrants work “off the books” and therefore do not pay income or FICA taxes. During the interim phase, these “off the books” workers would have a strong incentive to

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move to “on the books” employment. In addition, their wages would likely go up as they sought jobs in a more open environment. As a result, during the interim period, tax payments would rise and the average fiscal deficit among former unlawful immigrant households would fall.

After 13 years, unlawful immigrants would become eligible for means-tested welfare and Obamacare. At that point or shortly thereafter, former unlawful immigrant households would likely begin to receive government benefits at the same rate as lawful immigrant households of the same education level. As a result, government spending and fiscal deficits would increase dramatically.

The final phase of amnesty is retirement. Unlawful immigrants are not currently eligible for Social Security and Medicare, but under amnesty they would become so. The cost of this change would be very large indeed.

As noted, at the current time (before amnesty), the average unlawful immigrant household has a net deficit (benefits received minus taxes paid) of \$14,387 per household.

- During the interim phase immediately after amnesty, tax payments would increase more than government benefits, and the average fiscal deficit for former unlawful immigrant households would fall to \$11,455.*
- At the end of the interim period, unlawful immigrants would become eligible for means-tested welfare and medical subsidies under Obamacare. Average benefits would rise to \$43,900 per household; tax payments would remain around \$16,000; the average fiscal deficit (benefits minus taxes) would be about \$28,000 per household.*
- Amnesty would also raise retirement costs by making unlawful immigrants eligible for Social Security and Medicare, resulting in a net fiscal deficit of around \$22,700 per retired amnesty recipient per year.*

In terms of public policy and government deficits, an important figure is the aggregate annual deficit for all unlawful immigrant households. This equals the total benefits and services received by all unlawful immigrant households minus the total taxes paid by those households.

- Under current law, all unlawful immigrant households together have an aggregate annual deficit of around \$54.5 billion.*
- In the interim phase (roughly the first 13 years after amnesty), the aggregate annual deficit would fall to \$43.4 billion.*
- At the end of the interim phase, former unlawful immigrant households would become fully eligible for means-tested welfare and health care benefits under the Affordable Care Act. The aggregate annual deficit would soar to around \$106 billion.*

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- *In the retirement phase, the annual aggregate deficit would be around \$160 billion. It would slowly decline as former unlawful immigrants gradually expire.*
- *These costs would have to be borne by already overburdened U.S. taxpayers. (All figures are in 2010 dollars.)*

The typical unlawful immigrant is 34 years old. After amnesty, this individual will receive government benefits, on average, for 50 years. Restricting access to benefits for the first 13 years after amnesty therefore has only a marginal impact on long-term costs.

If amnesty is enacted, the average adult unlawful immigrant would receive \$592,000 more in government benefits over the course of his remaining lifetime than he would pay in taxes.

Over a lifetime, the former unlawful immigrants together would receive \$9.4 trillion in government benefits and services and pay \$3.1 trillion in taxes. They would generate a lifetime fiscal deficit (total benefits minus total taxes) of \$6.3 trillion. (All figures are in constant 2010 dollars.) This should be considered a minimum estimate. It probably understates real future costs because it undercounts the number of unlawful immigrants and dependents who will actually receive amnesty and underestimates significantly the future growth in welfare and medical benefits.

The debate about the fiscal consequences of unlawful and low-skill immigration is hampered by a number of misconceptions. Few lawmakers really understand the current size of government and the scope of redistribution. The fact that the average household gets \$31,600 in government benefits each year is a shock. The fact that a household headed by an individual with less than a high school degree gets \$46,600 is a bigger one.

Many conservatives believe that if an individual has a job and works hard, he will inevitably be a net tax contributor (paying more in taxes than he takes in benefits). In our society, this has not been true for a very long time. Similarly, many believe that unlawful immigrants work more than other groups. This is also not true. The employment rate for non-elderly adult unlawful immigrants is about the same as it is for the general population.

Many policymakers also believe that because unlawful immigrants are comparatively young, they will help relieve the fiscal strains of an aging society. Regrettably, this is not true. At every stage of the life cycle, unlawful immigrants, on average, generate fiscal deficits (benefits exceed taxes). Unlawful immigrants, on average, are always tax consumers; they never once generate a "fiscal surplus" that can be used to pay for government benefits

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elsewhere in society. This situation obviously will get much worse after amnesty.

Many policymakers believe that after amnesty, unlawful immigrants will help make Social Security solvent. It is true that unlawful immigrants currently pay FICA taxes and would pay more after amnesty, but with average earnings of \$24,800 per year, the typical unlawful immigrant will pay only about \$3,700 per year in FICA taxes. After retirement, that individual is likely to draw more than \$3.00 in Social Security and Medicare (adjusted for inflation) for every dollar in FICA taxes he has paid.

Moreover, taxes and benefits must be viewed holistically. It is a mistake to look at the Social Security trust fund in isolation. If an individual pays \$3,700 per year into the Social Security trust fund but simultaneously draws a net \$25,000 per year (benefits minus taxes) out of general government revenue, the solvency of government has not improved.

Following amnesty, the fiscal costs of former unlawful immigrant households will be roughly the same as those of lawful immigrant and non-immigrant households with the same level of education. Because U.S. government policy is highly redistributive, those costs are very large. Those who claim that amnesty will not create a large fiscal burden are simply in a state of denial concerning the underlying redistributive nature of government policy in the 21st century.

Finally, some argue that it does not matter whether unlawful immigrants create a fiscal deficit of \$6.3 trillion because their children will make up for these costs. This is not true. Even if all the children of unlawful immigrants graduated from college, they would be hard-pressed to pay back \$6.3 trillion in costs over their lifetimes.

Of course, not all the children of unlawful immigrants will graduate from college. Data on intergenerational social mobility show that, although the children of unlawful immigrants will have substantially better educational outcomes than their parents, these achievements will have limits. Only 13 percent are likely to graduate from college, for example. Because of this, the children, on average, are not likely to become net tax contributors. The children of unlawful immigrants are likely to remain a net fiscal burden on U.S. taxpayers, although a far smaller burden than their parents.

A final problem is that unlawful immigration appears to depress the wages of low-skill U.S.-born and lawful immigrant workers by 10 percent, or \$2,300, per year. Unlawful immigration also probably drives many of our most vulnerable U.S.-born workers out of the labor force entirely. Unlawful immigration thus makes it harder for the least advantaged U.S. citizens to share in the American

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*dream. This is wrong; public policy should support the interests of those who have a right to be here, not those who have broken our laws.*²⁹⁷

Overall, Federal immigration and refugee policies can have a major impact on individual states with little recourse against unfavorable policies (other than on a limited basis through state representation in the legislative process).

D. Foreign Treaties

Another political risk is that the Federal government has power over legally binding treaties. While this is a contentious issue, it is widely understood that legally enacted treaties become the law of the land unto which states must abide. There are very real questions regarding how deep that power extends.²⁹⁸

The issue becomes very complex and concerning when considerations arise in regard to lengthy agreements such as the Trans-Pacific Partnership (TPP).²⁹⁹ Some press reports suggest that this agreement would reduce sovereignty in multiple ways. Opponents of the agreement on the left side of the political spectrum fear foreign corporations receiving preferential treatment.³⁰⁰ Groups on the right of the political spectrum fear that the TPP would allow foreign entities to take control of American land and resources, suing in American courts to enforce rights granted by the treaty even against national security interests.³⁰¹ Worse still, there are suggestions that foreign interests could obtain rulings outside American courts by appealing to foreign tribunals as explained by *Breitbart News*:

The text of the Obama administration's Trans Pacific Partnership (TPP) trade deal between the United States and 11 other countries reverses policies that were originally put into place to prevent a foreign takeover of the nation's infrastructure, argues political consultant Curtis Ellis, who adds that the deal threatens U.S. national security interests.

Ellis explained:

Previous U.S. trade pacts stated in no uncertain terms that the national security interests of the United States are determined solely by the U.S. government and supersede any provisions of the pacts. The U.S. government had unfettered power to protect our national security interests, as it deemed necessary – even if its actions might violate the terms of a trade agreement.

But the Trans-Pacific Partnership agreement reverses this precedent. As a result, other countries could claim our national security interests violate the T.P.P. agreement and force the U.S. to pay billions of dollars in damages.

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Ellis says that Chapter 11 in the more than 5,000-page trade deal provides foreign investors with special rights to acquire U.S. land, businesses, natural resources and investments.

“Under Chapter 28 and Chapter 29, these foreign investors could do an end-run around U.S. courts and sue the U.S. before an international panel, known as an investor-state dispute tribunal, if they feel American law violates their ‘rights’ under the TPP,” Ellis argues.

Currently, the Committee on Foreign Investment in the United States (CFIUS) reviews pending foreign investments in the U.S. to determine if they pose a threat to national security and can recommend the president shut down investments deemed a threat. Under previous trade agreements, foreign investors would have no recourse.

But under the T.P.P., the Sultan of Brunei, the billionaire autocrat who rules his T.P.P. country under Sharia law, could sue for billions of dollars if CFIUS denied his bid to buy a company providing security to U.S. ports and airports.

He would bring his case before a foreign tribunal that could force taxpayers to award him compensation for “lost profits.” The tribunal, staffed by three unelected lawyers hailing from anywhere in the world, would have the power to second-guess the U.S. government on what constitutes a threat to our national security.

Additionally, the Islamic Sultanate of Brunei — a country that’s a party to President Obama’s trade agenda — has outlawed Christmas and threatens to place offenders in prison.

Ellis points to an event in 2006 that supports his concerns within the TPP.

According to Ellis, Dubai Ports World (DPW), an enterprise of the United Arab Emirates, sought to purchase a company in 2006, which operated six U.S. ports. During that time, Ellis says, “Congress intervened to block the sale after Coast Guard officials raised the possibility of significant security risks,” but he argues that the 2006 “controversy came in the midst of congressional debate over the U.S.-Oman Free Trade Agreement.”

Ellis’s concerns with TPP is that the TPP, like the Oman pact, gives foreign investors special rights to own and operate U.S. businesses and an option to sue if they feel their rights are violated. He adds that the public outcry in 2006 blocked the sale.

Following the Dubai Ports World controversy, language was added in a footnote to all U.S. trade agreements to shut down any second-guessing of U.S.

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security interests by trade tribunals. The footnote makes clear the U.S. has sole discretion in determining its essential national security interests.

The critical footnote to the “Security Exception” Article 22.2 of the Peru Free Trade Agreement, Article 21.2 of the Panama FT, Article 22.2 of the Colombia FTA and Article 23.2 of the Korea-US FT reads: “For greater certainty, if a Party invokes [the “Security Exception] Article in an arbitral proceeding initiated under [Investment] Chapter or [Dispute Settlement] Chapter, the tribunal or panel hearing the matter shall find that the exception applies.”

“In plain English, it says if the U.S. invokes national security, that’s final – no foreign ‘trade’ tribunal could overrule it,” Ellis told Breitbart News.

According to Ellis, the TPP eliminated this “crucial stipulation.”

“As a result, any company operating in a T.P.P. country could drag the U.S. before an extrajudicial foreign tribunal and demand taxpayer compensation if our government prevented it from buying a crucial American asset based on national security grounds,” he explains.

Ellis argues that without a footnote to “Article 29.2, one of the TPP’s trade dispute tribunals could substitute its judgment for that of our own government with respect to what is considered an essential security interest of the U.S.”

“The TPP also includes an Annex 9-H which states that a government’s decision on whether to approve a given foreign investment in its territory is not subject to challenges before an investor-state dispute tribunal,” he stressed.

Australia, Canada, Mexico and New Zealand each listed their own foreign investment review laws, according to Ellis. However, the U.S. did not do so.

Breitbart News reached out to the United States Trade Representative’s office about Ellis’s concern but did not receive comment.³⁰²

The potential threat from treaties is another example of political risks.

Assessment of Probability

There will be political risks and they will increase over time. Whether or not the risks rise to the level of a true threat is the issue. Political risks forced Federal standards in the mid-19th century with the threat of the sword over the issue of slavery. It is far more likely that political risks will prove a drag on growth along with the threat that non-compliance would cause a direct loss of Federal funding for one or more programs. Overall, the expected threat level is moderate and the probability of a very serious threat is 20% or less over the next decade.

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Assessment of Impacts

It is difficult to imagine the circumstances under which a total loss of Federal funding would result from defiance of Federal mandate or other political risks. In fact, it seems more likely based on history that Federal funds would be provided in increasing amounts albeit tied with multiple additional strings. There is reason for concern regarding bureaucratic regulation that would prove binding on the state.

Avoidance and Minimization

The first effort should be made legislatively through Utah's Congressional delegation. Efforts should be made to join with like-minded states to pushback against any regulations or efforts seen as unfair to Utah. In addition, Utah can sue in Federal court any agency that appears to be crossing legitimate lines of authority.

In regard to immigration, Utah can enact a provision from the Constitution found in Article I Section 10:

*No State shall, without the Consent of Congress, lay any duty of Tonnage, keep Troops, or Ships of War in time of Peace, enter into any Agreement or Compact with another State, or with a foreign Power, or engage in War, unless actually invaded, or in such imminent Danger as will not admit of delay.*³⁰³

If Utah were to determine that undocumented immigration rose to the level of invasion, the state could raise an army in a compact with other states.³⁰⁴

Monitoring

The state should work closely with federally elected representatives to monitor political developments that might impact Utah.

IX. Natural Disaster

The Issue

On balance, a natural disaster that impacts the state of Utah would most likely result in increased Federal funding rather than a reduction. Having said that, there are certainly some extreme disaster risks that could prove existential. In addition, a serious disaster in areas outside Utah could cause a reapportioning of state funding that would impact the state. Four possible disasters will be briefly discussed for illustrative purposes.

A. Climate Change

While manmade global warming is considered by some to be “settled science,” others see it as controversial.³⁰⁵ Climate Change, however, is absolutely certain and well accepted if you remove the consideration of source (manmade vs. natural). And, the Administration has stated multiple times that the threat of climate change is greater than the risk of terrorism.³⁰⁶ The Department of Defense has submitted concerns that climate change is a very serious national security threat:

The report reinforces the fact that global climate change will have wide-ranging implications for U.S. national security interests over the foreseeable future because it will aggravate existing problems such as poverty, social tensions, environmental degradation, ineffectual leadership, and weak political institutions that threaten domestic stability in a number of countries.

The report finds that climate change is a security risk because it degrades living conditions, human security, and the ability of governments to meet the basic needs of their populations. Communities and states that are already fragile and have limited resources are significantly more vulnerable to disruption and far less likely to respond effectively and be resilient to new challenges.³⁰⁷

Without delving into the politics surrounding the issue, it should be acknowledged that there are serious risks in regard to a changing climate whether or not human activities are involved. This has been true throughout history based on solar and volcanic activity. A prime example may be a massive volcanic eruption in El Salvador in 535 AD that resulted in a global famine impacting Britain. Interestingly, at least one historian believes that this occurred during the era of legendary King Arthur.³⁰⁸ A massive ash cloud from an Icelandic volcano caused mass disruption in 2011.³⁰⁹

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Assessment of Probability

Climate change is naturally inevitable. Whether or not human activity is the cause of climate change is the larger question. The next question is how quickly economic impacts may be felt.

Assessment of Impacts

The impact of climate change is also the subject of serious debate. However, there is general consensus that natural change suddenly occurring could result in billions of dollars in damage. Others estimate that manmade climate change could cost trillions of dollars.³¹⁰

Avoidance and Minimization

Climate change avoidance and minimization is the subject of much debate. The United Nations suggests a framework for addressing manmade climate change.³¹¹

Monitoring

The National Oceanic and Atmospheric Administration is charged with monitoring climate change.³¹²

B. Earthquake

Another natural disaster with global reach is the threat of earthquakes. Utah is not immune. In fact, some estimate that a major earthquake is due for the state (as reported in Deseret News):

But those geological records show the Wasatch fault has a major earthquake every 350 to 400 years, Dougherty said. The region's last? About 350 years ago.

So that's why Bob Carey, operations chief for the Utah Division of Emergency Management, lives and breathes earthquake emergency preparedness.

"There's a big one — that 7.0 — lurking out there; the rock record shows us that," Carey said.

If a severe earthquake hits in the Salt Lake City segment of the Wasatch fault, it would cause the worst structural and economical devastation, with greatest loss of life, injury and housing displacement, Carey said. The shaking would result in hazardous material spills, numerous landslides, scarps (ledges that

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could be almost 10 feet high), and even fluid-like land activity, or liquefaction, in areas near water tables, Koper said.

Hundreds of aftershocks would also impact the area, including a 6.0-magnitude earthquake that's expected within a day of the initial shock, Carey said.

In the scenario, the Federal Emergency Management Agency's loss-estimation software, HAZUS, considers 12 counties — from Box Elder, Cache and Rich in the north, to as far south as Juab, Utah and Wasatch—which are all expected to be directly impacted if a quake's epicenter strikes Salt Lake County.

Such an event would “definitely be an economic killer,” Carey said. The state would incur about \$32 billion in structural loss and the subsequent economic fallout.

“Recovery is going to be excruciatingly slow,” he said. “It's stunning. It's so big; you almost don't know where to start.”³¹³

Assessment of Probability

Based on geographical records, the odds of a major earthquake in Utah could be better than 50% over the next five decades. Experts, however, do not believe that a major earthquake can be timed with any precision.

Assessment of Impacts

The estimated structural loss and economic fallout is about \$32 billion.

Avoidance and Minimization

While major earthquakes cannot be avoided, there are strategies that can be employed to minimize the damage including the retrofitting of buildings and adopting disaster preparedness measures.

Monitoring

The US Geological Service maintains an earthquake monitoring effort.³¹⁴

C. Pandemic

Another natural disaster risk is pandemic. A recent Blog posting by former Treasury Secretary Larry Summers describes the issue:

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I was privileged this morning to deliver keynote remarks at the release event for the Global Health Risk Framework Commission report on “The Neglected Dimension of Global Security: A Framework to Counter Infectious Disease Crises”. The commission, convened by the National Academy of Medicine and chaired by Peter Sands, has delivered a very important report on what I think is the issue with the highest ratio of seriousness to policy preparation in the global system. Indeed, for reasons I sketched in my remarks, I believe the threat to global well-being from pandemics over the next century is comparable to the threat from global climate change.

I began by expanding on why I think pandemics are such an important issue. The global mortality rate from the flu pandemic of 1918 was 7000 times as large as from the recent Ebola outbreak. AIDS profoundly changed the human experience in Africa. No one knows the probability of a recurrence of these kinds of disasters. History is too short to permit reliable estimates and in any event conditions are rapidly changing because of scientific improvements on the one hand, and huge increases in global interconnection on the other.

In the context of the Global Health 2035 report that Dean Jamison and I developed, we considered the economic benefit of mortality reduction using approaches derived from economic theory. We noted that the well established fact that people demand higher pay to accept riskier jobs demonstrates that reduced mortality risk has economic value. And we further showed that these benefits are very large relative to standard estimates of the economic impact of health interventions.

In related work, Dean and I with Victoria Fan calculate the potential cost of a 1918 flu recurrence, discounted by its chance of happening. We expect to publish this work soon. On plausible assumptions we find an expected flu cost approaching \$1 trillion a year going forward into the 21st century. This underscores the urgency of doing all that can be done to counter pandemic risks.

Eisenhower famously said that “in preparing for battle, I have always found that plans are useless but planning is indispensable”. So also with the pandemic threat, which is what makes the GHRF report so important. I have three main takeaways from its consideration of the Ebola experience and its stock-taking of the current global architecture.

First, this is an area where the urgent has crowded out the profoundly important. In too many countries, pressing near term needs and budgetary pressures have prevented the establishment of necessary infrastructures for public health. Such resilient health systems would be a high payoff investment even if catastrophe never comes and would be transformative if and when catastrophe comes.

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Second, the international system needs to do more to clarify responsibilities and authorities when the next emergency comes and to put in place financial mechanisms for rapid action. Given the nonlinear exponential character of pandemic processes this is of the highest urgency.

Third, there is a need for more and better science both ex-ante and ex-post after a pathogen is identified. I will never forget my friend Barry Bloom, former Dean of Harvard's School of Public Health, asking me how I would prefer to have spent money in the 1950s: on scholarships for iron lungs or on supporting Salk and Sabin. There is much here that science could be doing but currently is not. Given that profiting hugely in time of pandemic is unacceptable, markets provide insufficient incentives for gaps to be filled. As such, pre-emptive research is fundamentally important.³¹⁵

Assessment of Probability

Despite advances in medical science, many believe the risk of pandemic has increased due to urbanization and mass transportation. Pandemics are very difficult to predict because they begin with random events.³¹⁶ Having said that, it has been approximately 100 years since the Spanish Flu of 1918. A serious outbreak could come at any time or not for decades.

Assessment of Impacts

According to a 2006 report on a study of epidemiologists:

In that study, 90% of them said they thought there would be a pandemic within their children's or grandchildren's lifetimes, where:

- *1 billion people would get sick*
- *165 million would die*
- *There would be a global recession and depression*
- *There would be \$1-3 trillion cost to the economy³¹⁷*

Avoidance and Minimization

Utah Department of Health has a website dedicated to helping minimize the pandemic risk.³¹⁸

Monitoring

Utah Department of Health monitors pandemic risks.

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D. Solar Flare/Coronal Mass Ejection

Perhaps the most concerning of natural disasters is the risk of solar flare that creates a “Carrington-level” event. This would essentially be a natural EMP. From National Geographic:

On February 14 the sun erupted with the largest solar flare seen in four years—big enough to interfere with radio communications and GPS signals for airplanes on long-distance flights.

As solar storms go, the Valentine's Day flare was actually modest. But the burst of activity is only the start of the upcoming solar maximum, due to peak in the next couple of years.

"The sun has an activity cycle, much like hurricane season," Tom Bogdan, director of the Space Weather Prediction Center in Boulder, Colorado, said earlier this month at a meeting of the American Association for the Advancement of Science in Washington, D.C.

"It's been hibernating for four or five years, not doing much of anything." Now the sun is waking up, and even though the upcoming solar maximum may see a record low in the overall amount of activity, the individual events could be very powerful.

In fact, the biggest solar storm on record happened in 1859, during a solar maximum about the same size as the one we're entering, according to NASA.

That storm has been dubbed the Carrington Event, after British astronomer Richard Carrington, who witnessed the megafare and was the first to realize the link between activity on the sun and geomagnetic disturbances on Earth.

During the Carrington Event, northern lights were reported as far south as Cuba and Honolulu, while southern lights were seen as far north as Santiago, Chile. (See pictures of auroras generated by the Valentine's Day solar flare.)

The flares were so powerful that "people in the northeastern U.S. could read newspaper print just from the light of the aurora," Daniel Baker, of the University of Colorado's Laboratory for Atmospheric and Space Physics, said at a geophysics meeting last December.

In addition, the geomagnetic disturbances were strong enough that U.S. telegraph operators reported sparks leaping from their equipment—some bad enough to set fires, said Ed Cliver, a space physicist at the U.S. Air Force Research Laboratory in Bedford, Massachusetts.

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In 1859, such reports were mostly curiosities. But if something similar happened today, the world's high-tech infrastructure could grind to a halt.

"What's at stake," the Space Weather Prediction Center's Bogdan said, "are the advanced technologies that underlie virtually every aspect of our lives."

Solar Flare Would Rupture Earth's "Cyber Cocoon"

To begin with, the University of Colorado's Baker said, electrical disturbances as strong as those that took down telegraph machines—"the Internet of the era"—would be far more disruptive. (See "The Sun—Living With a Stormy Star" in National Geographic magazine.)

Solar storms aimed at Earth come in three stages, not all of which occur in any given storm.

First, high-energy sunlight, mostly x-rays and ultraviolet light, ionizes Earth's upper atmosphere, interfering with radio communications. Next comes a radiation storm, potentially dangerous to unprotected astronauts.

Finally comes a coronal mass ejection, or CME, a slower moving cloud of charged particles that can take several days to reach Earth's atmosphere. When a CME hits, the solar particles can interact with Earth's magnetic field to produce powerful electromagnetic fluctuations. (Related: "Magnetic-Shield Cracks Found; Big Solar Storms Expected.")

"We live in a cyber cocoon enveloping the Earth," Baker said. "Imagine what the consequences might be."

Of particular concern are disruptions to global positioning systems (GPS), which have become ubiquitous in cell phones, airplanes, and automobiles, Baker said. A \$13 billion business in 2003, the GPS industry is predicted to grow to nearly \$1 trillion by 2017.

In addition, Baker said, satellite communications—also essential to many daily activities—would be at risk from solar storms.

"Every time you purchase a gallon of gas with your credit card, that's a satellite transaction," he said.

But the big fear is what might happen to the electrical grid, since power surges caused by solar particles could blow out giant transformers. Such transformers can take a long time to replace, especially if hundreds are destroyed at once, said Baker, who is a co-author of a National Research Council report on solar-storm risks.

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The U.S. Air Force Research Laboratory's Cliver agrees: "They don't have a lot of these on the shelf," he said.

The eastern half of the U.S. is particularly vulnerable, because the power infrastructure is highly interconnected, so failures could easily cascade like chains of dominoes.

"Imagine large cities without power for a week, a month, or a year," Baker said. "The losses could be \$1 to \$2 trillion, and the effects could be felt for years."

Even if the latest solar maximum doesn't bring a Carrington-level event, smaller storms have been known to affect power and communications.

The "Halloween storms" of 2003, for instance, interfered with satellite communications, produced a brief power outage in Sweden, and lighted up the skies with ghostly auroras as far south as Florida and Texas.

(Also see "'Nightmare' Star Flares Dim Odds for Alien Life?")

Buffing Up Space-Weather Predictions

One solution is to rebuild the aging power grid to be less vulnerable to solar disruptions.

Another is better forecasting. Scientists using the new Solar Dynamics Observatory spacecraft are hoping to get a better understanding of how the sun behaves as it moves deeper into its next maximum and begins generating bigger storms. (See some of SDO's first sun pictures.)

These studies may help scientists predict when and where solar flares might appear and whether a given storm is pointed at Earth.

"Improved predictions will provide more accurate forecasts, so [officials] can take mitigating actions," said Rodney Viereck, a physicist at the Space Weather Prediction Center.

Even now, the center's Bogdan said, the most damaging emissions from big storms travel slowly enough to be detected by sun-watching satellites well before the particles strike Earth. "That gives us [about] 20 hours to determine what actions we need to take," Viereck said.

In a pinch, power companies could protect valuable transformers by taking them offline before the storm strikes. That would produce local blackouts, but they wouldn't last for long.

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"The good news is that these storms tend to pass after a couple of hours," Bogdan added.

Meanwhile, scientists are scrambling to learn everything they can about the sun in an effort to produce even longer-range forecasts.

According to Viereck, space-weather predictions have some catching up to do: "We're back where weather forecasters were 50 years ago."

Assessment of Probability

Some experts suggest the risks of a devastating solar flare event at approximately one in six per decade, essentially the odds of Russian roulette.³¹⁹ Lloyds of London estimated that a major solar storm could impact earth approximately every 100 to 250 years.³²⁰ The last such storm took place in the 1850s, so the risk period is clearly in play.

Assessment of Impacts

The impact of a Carrington level event would be as devastating as an EMP blast directed against North America. There could be up to 90% loss of life and complete economic devastation.³²¹

Avoidance and Minimization

Utah should enact legislation mandating EMP/Solar Flare protection and encourage the United States to do so as well. While expensive, the cost of protection is not astronomical according to the Secure the Grid Coalition:

The Congressional EMP Commission, since disbanded, spent eight years developing a plan to protect all infrastructures from EMP – a plan that would also mitigate threats from cyber-attack, sabotage, and natural disasters – that could be implemented in 3-5 years at a cost of \$10-20 billion.

The Congressional EMP Commission estimated in 2008 it would cost \$2 billion to harden the grid's critical nodes (i.e., roughly 2,000 large and medium-sized transformers and their associated SCADA systems, etc.) Modest when compared with the unimaginably high costs associated with trying to remediate after an EMP event. Yet, it has been an excuse for inaction.³²²

Monitoring

There are a number of efforts to monitor solar flares. Stanford is one example.³²³

CONCLUSIONS

Since the financial crisis of 2008, there has been a growing concern regarding the global economy, debt levels, derivatives, and a variety of other cyber-economic threats. Rapidly advancing Federal debt combined with substantive state and local dependence on Federal transfers have created a potentially harmful situation in the event of renewed economic difficulty. Since the start of 2009, total Federal reported debt (excluding unfunded liabilities) has grown from around \$10 trillion to almost \$20 trillion. Unfunded Federal liabilities are estimated in the hundreds of trillions of dollars. At the same time, stress on the global economy has increased even as derivatives exposure has remained at all-time high levels also measured in the hundreds of trillions of dollars. Various nation states have embarked on a path of direct competition including currency warfare, cyber warfare, and financial warfare. Each of these has the potential to directly impact the state of Utah.

Geopolitical risks of terrorism and outright warfare are increasing with clear economic consequences. The ever-present risk of natural disaster may actually be increasing. The growth of regulation, Federally sponsored treaties, political showdowns leading to shutdown, and even immigration policies all have the potential to create serious and ongoing risks that can impact Utah.

It is thus prudent for the state to identify and begin to analyze the potential risks and threats.



Kevin D. Freeman, CFA
Freeman Global Holdings, LLC

kevin@freemanglobal.net
(866) 737-272

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**Kevin D. Freeman, CFA + Freeman Global Holdings, LLC
kevin@freemanglobal.net + (866) 737-2728**