



# Financial system fragility

Robert C. Klemkosky

*Emeritus Professor of Finance, Kelley School of Business, 1309 E. Tenth Street, Bloomington, IN 47405-1701, U.S.A.*

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**Abstract** A good financial system is essential for a well-functioning and efficient economy. It allocates capital to its most productive uses and manages risk. However, financial systems are fragile, and this fragility can cause financial crises which usually impact the real economy, as Japan and the United States have experienced. The causes of a financial crisis are many and varied, but commonalities exist. Financial crises usually create long periods of slow economic growth.

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## 1. Fragility: A definition

*Fragile*: something that is breakable, not robust or resilient, and is best handled with care. Fragility certainly pertains to financial systems, as financial crises are quite common throughout the world. In a well-known book, *This Time is Different: Eight Centuries of Financial Folly*, Reinhart and Rogoff (2009) provide empirical data on some of the causes of financial crises over the centuries—and there do appear to be several common causes.

## 2. Functions of a financial system

In capitalistic societies, there are savers who have excess funds to lend or invest. Call them *creditors*. There are others who need to borrow funds to invest or to consume. Call them *debtors*. In advanced financial systems, creditors and debtors are not tied

together; in other words, they do not borrow and lend directly with each other. The bridge between borrowers and savers is financial intermediation, whereby debtors borrow from financial institutions such as banks, who in turn issue financial claims (deposits) to savers. While commercial banks may be the most important of the financial institutions, others also play a vital role in the intermediation process, such as life insurance companies, investment companies, mutual funds, hedge funds, private equity funds, exchange traded funds, money market funds, pension funds, and investment banks. The noncommercial bank institutions are referred to as the ‘shadow banking system’ because they perform many of the same functions as commercial banks but have different rules, regulations, and reporting requirements.

The fundamental function of a financial system is to evaluate and efficiently allocate capital for investment and consumption. It allows for the smoothing of spending and consumption over the longer term. The system also provides an efficient payment mechanism and liquidity, thereby facilitating financial and

E-mail address: [rcklem@indiana.edu](mailto:rcklem@indiana.edu)

economic transactions. In addition, it helps to combine capital at a low cost and allows for risk sharing. Finally, financial institutions exist to pool funds, providing savers with diversification, smaller denominations, expertise, and professional management for monitoring risk and return as well as lower search and transaction costs in lending and investing funds.

Without question, an efficient financial system can be a tremendous contributor to economic vitality. But as economies become more advanced and global, the financial system becomes more complex, adaptive, innovative, and interconnected, both domestically and globally. This vast financial network depends upon good information, transparency, trust, and confidence. There are numerous things that can increase the risk and uncertainty of a financial system and cause a financial crisis.

### 3. Why do we have financial crises?

June 2013 marks the 4-year anniversary of the end of the Great Recession, the longest and most severe in the United States and Europe since the 1930s. It also marks the 5-year anniversary of the start of the most severe financial crisis since the 1930s. Unfortunately, financial crises happen somewhere in the world almost annually. They have been around for centuries and undoubtedly will continue in the future.

What is a financial crisis? It is what occurs when part of the financial system breaks down, causing borrowers—especially savers and investors—to lose faith in the financial institutions and markets. In this environment, creditworthy borrowers can't borrow (what we call a *credit or funding crisis*) and investors can't sell financial assets quickly and easily (*liquidity crisis*). Sometimes only part of the financial system is affected, but in the extreme case, the crisis becomes systemic and the whole financial system is affected (*financial crisis*).

#### 3.1. Too much debt

As mentioned, financial crises may be rooted in myriad and varied factors. One such primary cause is that the financial system takes on too much debt from households, financial institutions, corporations, and even governments—as Greece well knows. This was a major cause of the U.S. financial crisis, as household debt and financial institutions' debt was at historically high levels in 2007. Lax credit or lending standards often result in a credit bubble. This usually happens after a period of moderation, meaning stable economic growth and low interest rates. Lenders and borrowers become overconfident

that the past period of stable economic growth, low inflation, and low interest rates will continue in the future. As a result, lending standards go down and leverage goes up. As the late Hyman Minsky (1978) hypothesized, stability and moderation breeds instability and excess in the financial system as the appetite for risk increases due to misguided confidence. As leverage and risk heighten, the financial system becomes increasingly vulnerable, so that even a small event can have devastating consequences for the financial system and the economy. At the extreme, this risk becomes systemic and throws the financial system into jeopardy.

#### 3.2. Borrowing in foreign currency

Another reason for financial crisis is that households, corporations, financial institutions, and governments often borrow in a foreign currency. When domestic currencies weaken, foreign debt becomes a bigger and bigger burden, and eventually companies and countries may have to default on their debt. This has happened on numerous occasions and usually results in a financial crisis and economic turmoil. This may be exacerbated by high inflation, which could debase a currency and also affect exchange rates.

#### 3.3. Sovereign debt

Recent years have highlighted the role of sovereign debt in creating financial crises, but sovereign defaults have been around for decades. In the 1980s, Mexico, Brazil, Argentina, and other emerging countries defaulted on their debt. Similarly, the Nordic countries had debt problems in the 1990s, followed by the recent Eurozone countries of Greece, Ireland, Portugal, Spain, and Italy.

Two of the primary signals for sovereign debt problems are credit spreads and credit insurance. Investors compare sovereign bond yields to those of Germany or the U.S. to assess the probability of sovereign debt default or some sort of restructuring. As credit default spreads widen, the market places a higher probability on potential default. Investors also pay attention to how much it costs to insure against sovereign debt default in the credit default swap market. We can see, through this mechanism, that markets signal and impose discipline on sovereign debt.

#### 3.4. Asset bubbles

Some financial crises have been due to asset bubbles, which can be defined as collective investor euphoria about some asset class (stocks, real estate, commodities, etc.), or 'irrational exuberance,' as

coined by Alan Greenspan—and the title of a book by Robert Shiller (2000). In a bubble, investors buy an asset not because of underlying fundamental valuation factors, but simply because prices have gone up and are expected to continue to rise. In other words, investors extrapolate past price increases into the future as the only basis for making investment decisions. Once started, the euphoria becomes contagious and pushes asset prices to extremes. In hindsight, bubbles are obvious; during the euphoria they are not, and are difficult to discover. Economic participants constantly wonder if they are seeing a bubble form or a robust economy.

### 3.5. Overconfidence

Most of the financial crises—especially asset bubbles—have a behavioral foundation, such as overconfidence. People consistently overestimate their knowledge, skills, and abilities, creating illusions of control. We overestimate the precision of information and underestimate risk. If successful, we have a tendency to become more overconfident and take on more risk. People also have a tendency to extrapolate the recent past to the future. The human mind is not good at computing probabilities of future events, so the easiest thing to do is just assume past trends will continue. ‘Lemming bias’ can result if everyone assumes that the future will be like the recent past. Lemmings are rodents that would follow each other over a cliff to their deaths; likewise, people are very comfortable going along with the crowd, and take consolation in making or losing money along with everyone else.

Due to the severe aftermath of the recent housing bubble, the Federal Reserve Bank of the United States (the Fed) will undoubtedly pay more attention to any potential future bubbles than it might have otherwise. This will be particularly true if the bubble has been funded by excessive credit, which makes the downside much more dramatic in terms of economic consequences. The bear market in stocks from March 2000 to October 2002 had a much lesser impact on the economy than the housing price collapse of 2007–2009, even though the destruction in wealth that emanated from the former was far greater than that which shook out from the latter—primarily because so much more debt was involved in the housing bubble than the stock market bubble. Leverage can be extremely painful when asset prices are falling.

### 3.6. Large and complex banking systems

Many financial crises occur because of problems in the banking system, which is the most important

financial institution in most countries. Some banks are so large and complex that they are too big to fail, possibly causing systemic risk if they do. Banks also have ‘agency costs’ because managers face incentives to make decisions that are not in line with shareholders or regulators; bank managers can make decisions with heads (they win and get bonuses) and tails (the government loses). Government guarantees and safety nets create a moral hazard problem whereby depositors don’t have to assess the risk of a bank. No matter what happens to the bank, depositors’ money will be refunded.

Banks have a central problem because their funding is short-term and lending or investing is long-term. This works as long as the yield curve is up sloping: short-term rates are less than long-term interest rates. However, if short-term borrowing costs exceed long-term lending or investment rates, the bank will suffer losses. Problems can also arise if short-term debt can’t be rolled over (funding crisis) or longer-term investments decline in value.

### 3.7. Shadow banking system

A financial crisis may also be caused by the shadow banking system: those nonbank financial institutions that carry on many of the same functions as commercial banks. In the U.S. financial crisis, some of the most severe problems emanated from an insurance company (AIG) and investment banks (Lehman Brothers, Bear Stearns). Because of less regulation and perhaps less transparency, risk can spread throughout the shadow banking system and cause a funding crisis or liquidity crisis. Since the whole financial system is interconnected, problems can affect the entire framework and create systemic risk.

### 3.8. Financial innovation

It has been widely accepted that innovation, including financial innovation, is good; however, since the recent financial crisis, there has been some doubt regarding whether all financial innovations are good for the system. Warren Buffett (2002) has called derivatives “financial weapons of mass destruction,” although he later used them extensively at Berkshire-Hathaway. Paul Volcker, former chairman of the Federal Reserve, has also been critical of some financial innovations. As an example, the subprime mortgage market probably would not have developed to the extent it did had it not been for the collateralized debt obligation (CDO). CDOs were portfolios of pooled mortgage-backed securities divided into tranches tiered upon risk or priority of default. They allowed the guarantors of the subprime mortgages to transfer the risk to investors in CDOs. As subprime

default rates increased, this triggered the start of the decline in housing prices and their contagion to the rest of the financial system. So, the innovation of the CDO helped to further develop the subprime mortgage market. Would the financial crisis have happened without the subprime mortgage market? Probably—the housing bubble was pervasive, as was leverage in the system.

### 3.9. Failure of models

Finally, the economic and financial models that were supposed to value securities, measure risk, and forecast economic activity did not work. Especially at fault were bank risk models which did not come close to measuring the risk inherent in some asset holdings, as well as the risk of funding liabilities. Also, the bond ratings agencies gave AAA ratings to the senior tranches of CDOs that certainly did not deserve them. Models require assumptions and empirical data, some of which were erroneous or not available. Since the financial crisis, financial models have lost some of their credibility.

Can financial crises be prevented? History says not, as most regulations are set after the crises have occurred. But it takes more than just writing regulations, disclosure, monitoring, and more capital to prevent a financial crisis. It is an interestingly complicated problem as financial systems become more complex, interconnected, and globalized.

## 4. The Japanese bubble economy

There have been many financial crises in recent decades—Iceland, Greece, Argentina, and a multitude of others had a dramatic impact on the domestic economy—but one of the longest-lasting impacts has been in Japan. In the 1980s, the Japanese economy and financial system were considered by many to be superior to those of the United States; several books supported this hypothesis, such as *Japan as Number One* (Vogel, 1979). The Japanese society was considered different than Western societies in that it was thrifty, more consensus-oriented than individualistic, hierarchical, and definitely non-speculative. The basic argument was that the Japanese distrusted Western-style capitalism and considered their economy superior—and some Western commentators supported this assessment.

The interesting thing about the Japanese financial crisis was that it developed over a relatively short period of time—5 years—even though government policies had been in place for a longer period. However, the consequences of those 5 years have lasted more than 2 decades.

But Japan was not immune to speculative euphoria as was reflected in property, real estate, and the stock markets—all of which were supported by a massive credit bubble and trade surpluses. Much of the speculation was in the corporate sector, reinforced by the household sector. In 1984, corporations were allowed to operate special accounts (*tokkin*) to invest in securities without paying capital gains taxes. Corporate profits from investing in stocks skyrocketed as the stock market soared: the Nikkei stock market index went from 12,800 in 1985 to 38,900 by the end of 1989. Even as corporate operating profits declined or were flat in the latter part of the 1980s, total corporate profits increased as the stock market tripled in 5 years. This created a dangerous feedback loop whereby stock market profits increased corporate profits, thereby heightening stock values and so boosting stock market profits. The loop continued. By the end of 1989, the total market value of Japanese publicly-traded stock exceeded that of the U.S., even though the size of the economy was less than one-third that of the United States. Japanese stock valuations were astronomical in 1989, much worse than the dot.com era in the U.S. in early 2000.

While the stock market was soaring, the real action was in the property markets. Property values in Japan had increased consistently from 1956 to 1986, even more than consumer prices (Chancellor, 1999). Corporations and households believed that property values would never fall as they continued their dramatic ascent in the latter part of the 1980s. Increased stock market and property values fed into the credit markets. Because of the cross-shareholding (*keiretsu*) system, Japanese banks benefited from increased stock market and property values since they were allowed to count profits on these shareholdings against their capital requirements. As Japanese banks increased their property loans, values swelled, boosting bank capital and allowing banks to lend even more. A credit bubble *par excellence* developed based on stock market and property values, the main drivers of corporate valuations. Mostly for real estate, bank and nonbank lending increased more than \$1 trillion in the 5 years ending 1989, representing a tremendous growth in credit (Chancellor, 1999).

By the end of 1989, the market value of Japanese stocks exceeded those of the United States. More amazingly, Japanese property was valued at four times that of property in the U.S. The grounds of the Imperial Palace in Tokyo were supposedly worth more than all of the real estate in California. Japanese real estate investments were not restricted to Japan, as Japanese investors purchased properties such as Rockefeller Center and Pebble Beach.

Japanese investors also set records in the art market, buying Old Masters' works such as Van Gogh's 'Sunflowers' for \$40 million. They invested hundreds of millions of dollars in art.

Individuals participated in these speculative manias as the number of shareholders increased by 36% in the latter half of the 1980s, and many purchased shares and property by borrowing. A nasty combination of corporations, banks, and individuals on a speculative binge was created. Given the magnitude of the binges, the bubble couldn't end quietly and harmlessly—and it didn't. The Nikkei index peaked out at 38,900 in December 1989, eventually falling to under 7,000—a decline of more than 80%. Property values started to decline in early 1990, also eventually dropping 80%, never to recover.

The consequences of the bursting of the stock market and property bubbles were catastrophic for the banking system and the Japanese economy. Banks were saddled with bad loans and the corporate sector was burdened with massive losses and excess domestic capacity. Households also experienced the wealth effect in reverse. Japan has been in a deleveraging and deflationary mode since 1990 and was on the verge of systemic collapse in the late 1990s. While demographic and other issues have also contributed somewhat, Japan has never fully recovered from the collapse of the bubble economy, even after more than 2 decades. Economic growth has averaged just over 1% annually since 1991, and Japan has fallen to the third-largest economy behind China. There is no more talk about Japan as No. 1.

## 5. Bubbles in the U.S.

The United States experienced the same phenomena as Japan but with perhaps less intensity. The credit, housing, and stock market bubbles in the U.S. were 25 years in the making versus the decade or less experienced in Japan.

Some are old enough to remember the 1970's slow-growth economy and high inflation, referred to as 'stagflation.' Paul Volcker was selected as the head of the Fed in 1979 and immediately decided to wring inflation and inflationary expectations out of the U.S. economic system. Via what became known as Volcker's Massacre, in October 1979 he decided to tighten control of the money supply and let interest rates go where they may. Treasury long-term interest rates approached 15% and short-term rates neared 20% in the early 1980s, some of the highest interest rates in U.S. history. And they did go up further. It took a while, but by August 1982, inflationary expectations started to cool and interest

rates began their secular downtrend to today's historically low interest rates.

One consequence of lower interest rates and inflation was massive wealth creation from 1982 to 2007. As interest rates came down, bond prices went up dramatically and trillions of dollars of wealth were created through the bond markets. Likewise, lower interest rates were reflected in lower mortgage rates, and home prices began to rise again, although not out of line with historical trends until 1996 when the housing bubble started. Stocks usually do not do well in high inflation environments, so stock prices had become quite depressed by 1982. The total valuation of publicly-traded U.S. stocks was only \$1 trillion in mid-1982. By March 2000, they were worth \$16 trillion.

The trillions of dollars of wealth created from 1982–2007, and an economy that grew and only experienced two short recessions in 1991 and 2001, resulted in a consumption bubble in the U.S. Consumption increased from 66% of gross domestic product (GDP) to more than 70% over this time period. In terms of percentage this does not sound like an impressive increase, but GDP grew consistently over the 25-year period, masking a very defined explosion in consumer spending. Because the economy was so depressed in 1982, consumption made up a large percent of GDP due to depressed corporate investment. But even with robust corporate investment at period's end, consumption had increased as a share of GDP. Much of the increased consumption was funded by the increased financial wealth as well as by credit. A rise in home equity values also fueled consumption as consumers used home equity like an ATM machine. The end result was a credit bubble of massive proportions. Consumer debt relative to GDP reached an all-time high in 2007.

Another consequence of the wealth creation and associated credit bubble was a financial system bubble. The repeal of the Glass-Steagall Act by the Clinton administration in 1999 allowed commercial banks to move into investment banking. There was also dramatic growth in the shadow banking system. The total financial system doubled in size relative to GDP from 1982 to 2007, and the finance sector accounted for 40% of the profits of the S&P 500. Likewise, compensation in the financial industry increased dramatically.

In addition to the financial system bubble, the long period of moderation characterized by steady economic growth, declining interest rates and inflation, and increasing wealth from 1982–2007 created other problems. These included aggressive risk taking by consumers, corporations (Enron, WorldCom, etc.), and financial institutions. Credit standards became lax, the complexity of the system



increased—especially as the derivatives market grew from nothing in 1982 to \$600 trillion in 2007—and transparency declined. Overconfidence also increased.

All of this credit expansion and wealth creation began to impact home prices in 1996 when they started to increase above historical trend lines: from 1996 to 2006, median home prices more than doubled. Both the Clinton and George W. Bush administrations promoted home ownership. Their administrations and Congress pressured the government-sponsored agencies, Fannie Mae and Freddie Mac, to not only provide mortgage financing but also to provide financing to lower-income individuals and families—thus the advent of the subprime mortgages, which grew from nothing in 1996 to more than \$1 trillion in 2006.

Not even the bursting of the dot.com stock bubble and subsequent bear market from March 2000 to October 2002—when U.S. stocks lost approximately half of their value (\$8 trillion)—could dampen the real estate speculation and the increase in home prices. Ironically, the Fed lowered interest rates to 1% following the stock market crash in order to avoid repeating the Japanese experience after 1990 of deflation and slow economic growth. Home ownership increased from 64% to 68% of those eligible during this period, something most thought was stabilizing for the economy. But the basic assumption was that home prices would not decline, which they had not since the 1930s.

So 2007 found home prices inflated, consumers with too much debt, financial institutions that were too complex and too big to fail, and a financial system that had become not only innovative but also complex and interrelated. Nobody knew where the risks were in the financial system. The long period of credit expansion, excess leverage, and aggressive risk taking was about to end in a dramatic fashion.

The first cracks in the system came from the subprime mortgage market in 2006 as housing prices began to decline and default rates increased; thus, mortgage-backed security prices also declined. Most thought the problem was controllable, as the subprime mortgage market represented less than 10% of the total mortgage market. But home prices in general began to decline, and problems spread to other markets and to most financial institutions—especially the large investment and commercial banks.

The rating agencies downgraded the mortgage-backed securities, which resulted in the fall in value of the CDOs. Commercial banks and investment banks had huge write-offs of these securities, and investors lost confidence in them. Everyone became

worried about counterparty risk, as summed up in the oft-asked question: Where is the risk?

What started out as a small credit crisis became a liquidity crisis, then a financial crisis, then the Great Recession. In the liquidity crisis, investors could not sell assets and borrowers could not fund liabilities, which affected the banks and shadow banks. Credit was not available, so some markets simply froze, creating the credit crisis leading to the run on banks and shadow banks, and the systemic financial crisis. The Federal Reserve and federal government came to the rescue with programs and policies that are still in place 5 years later. They may have prevented a bigger economic problem, but the U.S. still experienced the Great Recession in 2008–2009. The household sector and the financial system both started to delever (pay down debt), which was one reason for the slow-growth economy after the financial crisis.

Who is to blame for the financial crisis? There is plenty of blame to go around and plenty to blame. You could start with the borrower who took on too much debt, real estate speculators, mortgage lenders with lax or no credit standards, bankers who lent and then securitized mortgages, ratings agencies that gave a AAA rating to low-quality mortgages, investors in mortgage-backed securities who relied on the ratings agencies and didn't perform due diligence, bank regulators who were clueless, the Federal Reserve for keeping interest rates too low in the latter part of the housing bubble, and two U.S. presidents and the U.S. Congress for promoting home ownership to those that couldn't afford it. But certainly the leverage in the system exacerbated the problem once housing prices started to fall and collateral prices declined. Calls for more collateral forced margin selling, and the downward spiral began.

If the subprime mortgage market had not developed, would this have prevented a financial crisis? The likely answer is no, as the subprime mortgage market was only about 10% of the total mortgage market.

The peak of the financial crisis was probably the collapse of Lehman Brothers in September 2008. This prompted Congress to pass Troubled Assets Relief Program (TARP), which bailed out the financial system as well as General Motors and Chrysler. In an effort to stop the precipitous economic decline, Congress and the Fed threw many things against the wall. Some stuck, some did not.

As [Reinhart and Rogoff \(2009\)](#) point out, it usually takes an economy 7–8 years to recover from a financial crisis. Consumers have to reduce debt, which they have done to the tune of \$1.3 trillion since 2008; the financial system, especially the banks, has to be stabilized and recapitalized; and

confidence has to be restored so consumers can spend and corporations can invest and hire.

If the U.S. economy follows the norm, it may take another 3–4 years to get out of the slow-growth environment and back to normal growth of 3.5% annually. The president, the Fed, and Congress have little ammunition left, considering the magnitude of our debt and deficits. Given that the world GDP growth has fallen, the problems in Europe, and the slowdown in emerging economies (especially China), the U.S. faces challenging economic problems with few options.

## 6. The next bubble

Some believe that it is difficult or impossible to detect bubbles while they are developing; their argument is that bubbles are obvious only in retrospect. Some believe in efficient, rational markets that reflect all available information and so argue that bubbles simply do not exist. Alan Greenspan, former chairman of the Fed, stated in 2004 that “a national severe price distortion in housing [was] most unlikely” (Krugman, 2010). Ben Bernanke, current Fed chairman, in 2005 stated that home price increases “largely reflect strong economic fundamentals” (Center for Economic and Policy Research, n.d.). Both missed the emerging housing bubble.

### 6.1. China

Where will the next bubble occur? Several possibilities exist, but China seems likely. One common prerequisite of a systemic bubble is excessive credit creation, and China has created a massive amount of credit over the last 5 years—almost \$3 trillion annually, according to *The Wall Street Journal* (Sharma, 2013). This credit and debt has been created through the regular banking system in China, but more so by the shadow banking system. Total private and public debt has grown to 200% of GDP, an extremely high level for a developing country. But just as important as the level of debt and credit relative to GDP is the rate of growth in debt relative to GDP. In China the growth rate has accelerated: since the end of 2008, total credit in China has increased from \$9 trillion to \$23 trillion.

Where has the debt been used? Unlike in the United States, where much of the excess credit was consumed, in China it has been invested primarily in real estate and infrastructure. Investment has increased to 48% of GDP, a record not only for China but for any large economy. Even though consumption has increased, its share of GDP has declined. China’s economic growth rate has fallen to

roughly 7.5% annually, and the government has taken steps to curtail surging real estate prices and bank lending. The question is whether this lower growth rate will allow China to reduce its excessive investment and growth in debt.

*The Financial Times* recently reported that Fitch, one of the three primary bond ratings agencies, has downgraded the sovereign debt of China over concerns about the rapid expansion of credit (Noble & Rabinovitch, 2013). Fitch also warned of the growing risk of a larger shadow banking system and the total amount of credit in China relative to its GDP. The worry is that sovereign resources may be needed to fix potential problems in the financial system. However, as of year-end 2011, China had \$1.3 trillion in foreign currency reserves which could be used to support its banks and financial system.

### 6.2. Bond markets

Another possible bubble is forming in the bond markets. Here we should look not only in developed countries, but also developing countries. In response to the financial crisis and subsequent recession in the United States and Europe, the Fed and European Central Bank took interest rates to historic lows. The monetary tool usually employed by central banks is to adjust short-term interest rates, which the Fed started to reduce in September 2007 and kept reducing until rates approached zero in December 2008. This was a very aggressive move by the Fed, but it didn’t do enough. There was plenty of liquidity in the system, but there was also a lack of confidence by consumers to spend, corporations to invest, and banks to lend.

The Fed started a Quantitative Easing (QE) program in 2008 which entailed purchasing U.S. Treasury bonds and mortgage-backed securities. There has been a QE1, QE2, and QE3—a program still in effect; to date, the Fed has purchased more than \$2 trillion of bonds. The goal of the QE programs was to lower long-term interest rates, thereby stimulating capital investment, and to create confidence through the wealth effect by increasing housing prices, stock prices, and bond prices. Another goal of the QE programs was to increase inflationary expectations so the economy would not fall into a deflationary spiral as did Japan. Many foreign countries thought another objective of the QE program was to devalue the U.S. dollar, making U.S. exports more competitive and imports more expensive, thus stimulating the economy.

The QE programs have resulted in higher home prices and stock prices—The Dow Jones Industrial Average hit a new all-time high in March 2012—and lower long-term interest rates, thus increasing bond

prices. Most bonds in the U.S. (and around the world) trade off U.S. Treasury bonds, such as the 10-year yield, which reached a low of 1.5% annual rate in 2012. 'Trade off' means that bonds worldwide are priced by adding whatever market participants think is the appropriate spread to the underlying Treasury issue which most resembles the bond in question. With short-term rates close to zero, investors had no choice but to chase yields by taking on more risk: interest rate risk by investing in bonds with longer maturities and credit risk by investing in bonds of lower quality.

The result is enormous flows out of short-term money market securities and stocks into bond mutual funds or exchange-traded funds. Since 2007, \$1.4 trillion has been invested in bond mutual funds and exchange-traded funds. Over the same period about \$1.3 trillion has been withdrawn from money market funds and \$500 billion from equity funds. Counting direct purchases and sales as well as other institutions like pension funds, the dollar flows are much larger into and out of the asset classes. The supply of bonds has grown dramatically; the U.S. government alone has issued more than \$5 trillion of bonds over the last 5 years, although the Fed has purchased much of the debt. Corporations have also been issuing a record amount of bonds whether they need the money for immediate corporate usage or not; some are simply taking advantage of lower interest rates. A particular worry is the massive amounts of high-yield (junk) bonds used by corporations with less than investment-grade bond ratings. The Fed may have motivated excessive risk-taking.

How will it all end? Not well for bond investors if long-term interest rates for U.S. Treasury bonds rise toward what many consider a long-run average of 4%–5%. Additionally, do not expect a good outcome if credit quality deteriorates and bond default rates increase. There could be massive losses for bond investors. Many forget about the role bonds play as collateral in the financial system; declining prices would set off calls for more collateral. Many are also worried about increasing inflation because of the massive amounts of liquidity added by central banks and how the Fed will exit its QE programs without causing turbulence in the bond markets. Some Fed governors have already expressed doubt about the effectiveness of current monetary policy. The Fed may find that starting QE programs was much easier than exiting them.

## 7. Protecting the financial system

The history of financial systems, markets, and institutions is not a stable one. Over time the financial

systems of developed countries have become more complex and interconnected. How do governments and central banks manage and monitor this complexity and interconnectedness? The primary way to control the system is through regulation, which can mandate capital and collateral requirements, information disclosure, registration, and a multitude of other rules.

The foundations of the United States regulatory system lay in the Securities Acts of 1933 and 1934. These Acts sufficed for 75 years, until the financial crisis of 2007–2009 prompted the Dodd-Frank Act of 2010. Added to the existing regulatory agencies are the Consumer Financial Protection Bureau and the Office of Financial Research, which is supposed to monitor systemic risk for the Federal Reserve Board.

Will this latest regulatory overhaul keep the financial system stable? It may help for a while, but rules are rules, and eventually ways are found to get around them. But for now it appears the large, complex financial institutions will become less complex; and the too-big-to-fail institutions are being monitored more closely, subject to rigorous stress tests. The trick for regulators will be to permit financial innovation to occur but at the same time to exert enough control to prevent financial crises.

Monetary policy has usually been used to prevent financial excesses from developing; the Fed has increased short-term interest rates when excesses were perceived in financial institutions and markets, the economy, and inflation. Interest rates have been lowered after bubbles burst, markets crash, and recessions start. The Fed has other priorities which sometimes conflict with preventing excesses and bubbles. For example, if a bond market bubble is forming now, the Fed's first priority is jobs and economic growth—as it has already announced it will not lower short-term interest rates until the U.S. unemployment rate falls to 6.5%—so employment and consumer price inflation will likely take precedence over some asset price inflation or credit bubbles. In addition, there has been a so-called 'Greenspan and Bernanke put,' meaning that investors can take on more risk because they know the Fed will always be there to backstop and rescue the system.

Many would argue that additional regulation is not needed; they would rely on the efficiency of markets to monitor and manage risk, harnessing the self-interest of participants to promote the public good. This was Alan Greenspan's philosophy while chairman of the Fed, but he had to repudiate this philosophy before a congressional hearing. Regardless of one's philosophical bent, the financial crisis has brought on more financial re-regulation in the U.S., Europe, and Asia. A new financial system has and will continue to evolve in response to the financial crisis.



Table 1. Potential causes of financial crises

Macroeconomic Level	Government	Bank/Corporate	Individual
	Excess credit creation—leverage	Lax credit standards	Uninformed investors
	Monetary policy	Mispricing of risk	
<i>Government policies</i>		Failure of models, including bond ratings	
	Deregulation or lax regulation	Financial innovation	
	<i>Borrowing in foreign currency</i>		
	<i>Non-transparency</i>		
	<i>Belief in efficient markets</i>		
	<i>Overconfidence</i>		
	<i>Perverse incentives</i>		
	<i>Globalization</i>		
	<i>Interconnected financial system</i>		
	<i>Large complex financial institutions</i>		
	<i>Believing that "It's different this time"</i>		
	<i>Asset bubbles</i>		
	<i>Moral hazard</i>		

## 8. Conclusion

There are many potential causes of financial crisis: government policies and regulators; central banks; the financial institutions within the system, both banks and shadow banks; the corporate sector; and investors.

More specifically, financial crises can be attributed to the following (Table 1). Note that, as I have described heretofore, it is difficult to assign a cause to one 'level' of an economy. But we can and should categorize those causes to help alleviate or minimize crises in the future. I italicize those causes which could be assigned to different levels.

Unfortunately, the U.S. financial crisis was subject to all of these elements, to some degree or another. Like Japan, it has impacted the real economy, imposed hardships on many individuals, and led to more regulation (Dodd-Frank) of financial institutions—especially commercial banks. The financial system will see more changes imposed than any time since the 1930s. Empirical evidence shows it may take several more years to rid the financial system of past excesses; hopefully the duration of the adjustment will not be as long as that which Japan has experienced.

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