Crash Course
or the Cascade of Financial Woes
By
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Sailors know that rising wind speeds frequently signal wild weather. Increasing stresses are signalling that markets are near a decisive inflection point. Sailors also know that wave energy increases with wind speed not linearly but to its fourth power. The forces in a financial crisis are similar.

The conditions for a crisis are now firmly established. There is overvaluation of financial assets combined with significant leverage. Low growth and deflation mean that the macro-economic underpinning of financial markets is weak. Risk taking and patterns of investment are excessively reliant on central banks for liquidity and suppression of volatility. Changes in market structure, such as new capital and liquidity regulations as well as reliance on collateral, provide conditions in which problems will spread rapidly.

While the timing of the inevitable crisis is not known, there are a number of possible triggers, including currency volatility, sovereign or corporate debt defaults or policy errors. To paraphrase German author W.G. Sebald writing in *Vertigo, "imperceptible detail*" will decide everything.

Nutty Shares…

Over the last 5 to 6 years, mispricing of assets has reached epidemic proportions.

Global equities prices have increased strongly. Sell side analysts anticipate further gains, arguing that the falls of August 2015 and early 2016 represent a healthy correction. Since 2009, the US equity market has risen strongly with the main market indices having tripled over the period and are now at or near record levels. Euro-zone stocks have reached their highest level in 15 years. Equity market volatility is also low.

The rise is underpinned primarily by financial engineering and liquidity.

US stock buybacks have reached 2007 levels and are running at around US$500 billion annually. When dividends are included, companies are returning around US$1 trillion per annum to shareholders, close to 90 percent of earnings. Additional factors affecting share prices are mergers and acquisitions activity and also activist hedge funds, which have forced returns of capital or corporate restructures.

The major driver is liquidity, in the form of zero interest rates and quantitative easing ("QE"). According to one estimate, over 80 percent of equity prices are supported in some way by QE.

Stock prices have risen as the rate at which future earnings and dividends are discounted back to the present has fallen dramatically. The equity risk premium has increased as result of lower interest rates. Citibank analysts argue that the equity risk premium is now over 5 percent, well above the historical average of 3 percent. As equity becomes more expensive relative to debt, companies 'de-equitise', substituting debt for equity, reducing the quantum of available shares boosting prices.

Recent rises in equity markets have been helped by the fact that globally central bank purchases of government bonds is above new issuance. This implies further falls in term rates and increases the equity risk premium, which will boost share prices. Over time, if the equity risk premium reverts to its long term average, then share prices may move higher with each 0.50 percent equating to a rise of 20-30 percent.

Higher stock prices are supported by improved earnings. But on average 70-80 percent of the improvement has come from cost cutting rather than revenue growth. Since mid 2014, profit margins have stagnated and may be falling.

A key factor is currency volatility. The higher US dollar is pressuring American corporate earnings. A 10 percent rise in the value of the dollar equates to a 4-5 percent decline in earnings. But a slowdown in the rise of the US dollar which alleviates pressure on American industry will affect other markets adversely. Rallies in European and Japanese stocks have been driven, in part, by the fall in the value of the Euro and Yen respectively.

Lower commodity, especially energy prices, will affect resource firm earnings. In the US, wage rises, such as the symbolic Walmart pay increase and higher minimum wages in some states, as well as some shortages in skilled labour may also erode profit margins. The major concern is weak global demand with lack-lustre growth in Europe and Japan and deterioration in emerging markets.

The lack of revenue improvements and deceleration in earnings growth mean that recent price increases reflect multiple expansion; that is high price/earnings and price/ book ratios.

The S&P500 now trades at around 17-18 times forward earning, a level which is historically expensive and only exceeded during the 1999-2000 tech bubble. Overvaluation is also evident on other measures such as the ratio of market capitalization/nominal GDP and the S&P 500 price/revenue ratio. Market cap/GDP ratio is currently about 1.29. This compares to a pre-bubble norm of just 0.55. It is also well above secular lows such as 1982 of about 0.33. The S&P 500 price/revenue ratio is currently about 1.80. This compares to a pre-bubble norm of 0.8. It is also well above secular lows taking the ratio to about 0.45. As analyst John Hussman has pointed out these statistics assume nominal GDP and corporate revenues will grow at an unlikely 6% nominal rate perpetually.

Other markets are also priced above historical levels.

The frothy environment is also evident in other behaviours. Investors chasing revenue and earnings growth have pushed up sectors such as technology and bio-technology, which has been the best performing sector for a number of years. Reminiscent of the earlier tech boom, of the 150 companies that make up the Nasdaq Biotech Index (NBI), only 41 had positive earnings with just 5 representing over 80 percent of earnings.

Over 80 percent of new initial public offerings were for companies with no earnings. A significant component of activity has been private equity investors taking advantage of high valuations to sell holdings.

Given the size of the US market and the tendency for investors to use cross market value benchmarks, a correction of overvalued American stocks is likely to have significant implications for equity market globally.

Nuts Everywhere…

Other asset classes show similar stresses. Government bonds globally, unless distressed like Greece, Ukraine or Venezuela, trade at artificially low rates. Over US$7 trillion of sovereign debt globally now trades at negative yields. Economies representing around one quarter of global economic activity now have some degree of negative interest rates.

The overvaluation is driven by central banks. US Fed Vice Chairman Stanley Fischer observed that staff calculations indicated that current programs had reduced 10 year Treasury yields by about 1.10 percent. But with central banks globally likely to continue or even expand liquidity support programs, it is possible that rates may stay low for an extended period or even fall further.

The perverse environment caused David Rosenberg, chief economist and market strategist at Gluskin Sheff, to muse about the strange phenomenon of investors buying low or zero yielding bonds for capital gains and purchasing shares for income. With risk on government bonds increasing, equity analysts argued that investment in shares was preferable to bonds as they offered better protection from a rise in risk free rates.

The lack of returns in government bonds has driven overvaluation in credit markets. Investors have taken on additional risk, moving into corporate bonds. In the US alone, the estimated net inflow into bond funds has been US$1.2 trillion. The investment-grade corporate bond market, as measured by a Bank of America Merrill Lynch index, has increased to US$4.8 trillion. The increased investment has driven rates ever lower, with the average falling under 2.9 percent in early 2015.

With rates on investment grade corporate debt declining, investors have invested increasingly in higher yielding non-investment grade and emerging market debt, including by ever more exotic issuers for Africa or Asia. Mispricing is common with below 4 percent coupons on single-B-rated (i.e. highly speculative) bonds. In 2015, as a result of the ECB's QE program, the yield on around 50 percent of BB rated bonds (i.e. not investment quality and speculative) fell below 2 percent. Even structured credit has regained popularity as desperate investors chase returns.

The risk return relationship has deteriorated with investors no longer being compensated for the true default risk. Given the very low absolute rates, investors are also increasingly exposed to higher interest-rates. A 1 percent rate rise will result in around 7 percent loss in the value of US corporate bonds, an increase of around 40 percent from the 5 percent loss 5 years ago.

Since late 2015, credit spreads have begun to rise. For riskier non-investment grade, high yield bonds and borrowers in the energy sector, the levels on average are approaching those of 2006/ 2007.

Real estate prices have risen globally with investors purchasing rental income streams to diversify away from low income financial assets. Markets as disparate as the USA, Canada, UK, Germany, France, Scandinavia, Australia, New Zealand, China, India and many other emerging countries have become overheated.

Collectibles such as art, vintage cars, wine etc. also exhibit the effects of over enthusiasm. Prices reflect the scarcity of availability and the desire by smart money to escape the perceived manipulation of financial markets.

One asset class, commodities, has corrected. The combination of increased supply, slowing demand especially from China, a stronger US dollar and geo-political factors has seen most commodity prices fall. The most significant declines have been in energy and iron ore prices.

Charles McKay was correct in his observation that people lose their sanity collectively but regain it one by one.

De- or Re-leverage…

Contrary to expectations, global debt has increased.

Since 2007, global debt has grown by US$57 trillion, or 17 percent of GDP. As at mid-2014, global debt was US$199 trillion, or 286 percent of the world's GDP. In comparison, global debt was US$142 trillion (269 percent of GDP) in 2007 and US$87 trillion (246 percent of GDP) in 2000.

Since 2007, no major economies and only five developing economies have reduced the ratio of debt to GDP in the real economy (households, corporations and governments). In contrast, fourteen countries have increased their total debt-to-GDP ratios by more than 50 percentage points. Over twenty countries now have debt-to-GDP ratios above 200 percent, led by Japan (400 percent). The US, Canada, UK, Germany, France, Italy and Australia have debt-to-GDP ratios of 233, 221, 252, 188, 280, 259 and 213 percent respectively. China, India, Brazil, Russia, South Africa and South Korea have debt-to-GDP ratios of 217, 120, 128, 65, 133 and 231 percent respectively.

Since 2007, developing economies have accounted for roughly half of the increase in debt. China's debt levels have increased rapidly, quadrupling between 2007 and 2014 from US$7 trillion to $28 trillion.

Business, household and government debt have all increased. Only the financial sector in developed markets has reduced leverage. Businesses have borrowed not to invest, but to repurchase their own shares or buy other companies. Household borrowing, around 74 percent of which is mortgage debt, has increased in 80 percent of countries. Based on risk measures, such as debt-to-income ratios, debt service ratios, and house price changes, households in Canada, the Netherlands, Sweden, Australia, Malaysia and Thailand are potentially vulnerable.

Since 2007, government debt has grown by US$25 trillion, to US$58 trillion. It exceeds 100 percent of GDP in ten countries, including Japan and a number of European nations. Japanese government debt is over 240 percent of GDP. Given slow growth, low inflation rates, and the imbalance between tax revenues and expenditure, government debt-to-GDP ratios are forecast to rise for the foreseeable future in the US, Japan and many European countries. In a lot of these countries, government debt has reached unsustainable levels, and it is unclear how or when it will be reduced.

Despite definitional disagreements, the shadow banking system -a complex network of special purpose vehicles, securitisation structures and investment funds involved in providing finance- remains large, equivalent to a quarter of the world's total financial system. The Financial Stability Board estimates that the sector grew from assets of US$26.1 trillion in 2002 to US$71.2 trillion a decade later. Even after excluding spurious non-banking activities, the sector is estimated to be around US$35 trillion in size. It is especially large in the US, UK and China. Despite some retrenchment after 2008, shadow banks have continued to grow, ironically encouraged by tighter banking regulation and ample liquidity.

Debt continues to be a source of instability for the global economy.

Macro Matters….

Asset overvaluation and elevated debt levels are complicated by a poor macro-economic environment, characterised by weak growth, disinflation or deflation, low commodity prices and destructive policies such as competitive devaluations.

Despite having fared better, the US and UK have levels of growth well below trend. Europe hovers on the edge of recession. Since 2008, Japan has experienced four recessions in six years.

Emerging markets have not become the expected engine for global prosperity. While still high by developed country standards, growth in China and India has almost halved. Brazil and Russia are near or in recession. The slowdown in China affects other markets, all part of complex global supply chains. Higher demand for and prices of resources from China and India shielded Australia, Canada, South Africa and New Zealand from the impact of 2008, but the slowdown in emerging markets is now reducing growth in these commodity-dependent economies.

Inflation levels remain well below targets, with many economies threatened by falling prices. Policymakers fear the effects of deflation, when tax revenues stagnate or even fall, and consumption and investment may be deferred. Declines in asset prices and the appreciation in the real value of debt combined with lack of growth in incomes, or the shrinking of them would make the task of managing high debt levels more difficult, creating problems for banking systems. The shrinking economy increases the debt-to-GDP ratio. Deflation would also reduce the effectiveness of low or zero rates.

Slow growth and disinflation or even deflation would not normally be problematic, but they are incompatible with high levels of debt.

The feeble performance comes despite unprecedented efforts by governments and central banks to promote growth.

Between 2007 and 2014, the global debt increase of US$57 trillion created US$15-17 billion of additional GDP. In emerging markets, the result was worse. Between 2007 and 2014, China increased its total debt by US$21 trillion (from US$7 trillion to US$28 trillion) while the corresponding growth in the size of the economy was around US$5 trillion (from US$5 trillion to US$10 trillion). Central banks have pumped around US$12 trillion into the global money markets. While it has helped stabilise conditions, it has not boosted growth or created the expected levels of inflation. The lack of responsiveness suggests a fundamental deformation of the structure of economies.

Hobson's choice…

There are three possible scenarios.

The first is the Lazarus economy, where the strategies in place lead to a strong recovery.

The US leads the way. Europe improves as the required internal transfers and rebalancing takes place with Germany accepting debt mutualisation to preserve the Euro. Abe-nomics revives the Japanese economy. China makes a successful transition from debt financed investment to consumption. A financial crisis in China from the real-estate bubble, stock price falls and massive industrial overcapacity is avoided. Other emerging economies stabilise and recover as overdue structural reforms are made. Growth and rising inflation reduce the debt burden. Monetary policy is normalised gradually. Higher tax revenues improve government finances. There is strong international policy co-ordination, avoiding destructive economic wars between nations. Even a new, Bretton Woods-like international financial structure may be agreed.

Such an outcome is unlikely. The fact that current policies have not led to a recovery after 6 years suggests that they are ineffective. A general lack of demand combined with demographics, slower improvements in productivity, reduced rates of innovation, resource constraints, environmental factors and rising inequality is likely to constrain growth. Overcapacity, technological improvements, competitive devaluations and a lack of pricing power is likely to keep inflation low, despite loose monetary conditions.

Policy makers do not have instruments to deal with the identified economic weaknesses. Politically, the changes required are difficult, as it requires root-and-branch structural reform of labour markets, tax systems, welfare systems and the role of government in economies. Income and wealth distribution issues need to be addressed. The entire model of debt driven consumption and investment in a highly financialised economy requires radical overhaul. Given vested interests resistant to changes, it is unlikely that the required changes are feasible.

The second scenario is a managed depression, a Japan like prolonged stagnation.

Economic growth remains weak and volatile. Inflation remains low. Debt levels continue to remain high or rise. The problems become chronic requiring constant intervention in the form of fiscal stimulus and accommodative monetary policy, low rates and periodic QE programs to avoid deterioration.

Financial repression becomes a constant with nations transferring wealth from savers to borrowers, through negative real or increasingly nominal rates, to manage the economy. Competition for growth and markets drives beggar-thy-neighbour policies, resulting in slowdowns in trade and capital movements. While there are variations between nations, overall the global economy becomes zombie-lie, with entire nations, businesses and households trapped in a low growth, over-indebted state essentially on permanent life support. Resource allocation breaks down with more and more wealth trapped in low returning or unproductive activity.

Authorities may be able to use policy instruments to maintain an uneasy equilibrium for a period of time. But it will prove unsustainable over time. The ability to finance governments and stresses on central banks from excessive debt monetisation will ultimately constrain such strategies. In addition, asset price inflation and the growing debt burden encouraged by low rates will create dangerous financial instability.

The response of electorates to the reduction of living standards by stealth places political limits on this approach. Ultimately, a major correction may become unavoidable, as confidence in policy makers ability to control the situation diminishes.

The final scenario is the mother of all crashes. Financial system failures occur as a significant number of sovereigns, corporate and households are unable to service their debt. Defaults trigger problems in the banking system which leads to a major liquidity contraction, which in turn feeds back into real economic activity. Falls in employment, consumption and investment drive a severe contraction. Concerns about safety and security of savings create capital flight from vulnerable nations, banks and investment vehicles. The process continues in a series of iterations of increasing intensity.

Stray Matches Near Fires …

The trajectory of the impending crisis may look like this.

The first potential trigger may be equity prices.

The US market runs into trouble. The stronger dollar affects US exports and foreign earnings. Alternatively, emerging market weakness affects businesses in the technology, aerospace, automobile, consumer products and luxury product industries. Currency devaluations combined with excess capacity, driven by debt fuelled over-investment in China, maintain deflationary pressures reducing pricing power. Lower oil prices reduce earnings, cash flow and asset values of energy producers.

The adjustment process takes time. Initially, second tier firms in each sector are affected. Distressed equity raising and cost cutting buys time but pressures share prices. Stronger firms use the opportunity to purchases businesses or desirable assets, at discounted prices. But eventually everybody is affected. In the absence of a turnaround in operating conditions, survivors are impaired in terms of earnings, valuation or ratings. The sequence of events can be seen currently in the energy sector.

Earnings and liquidity pressures reduce merger activity and stock buybacks which have supported equity values. US equity weakness flows into global equity markets.

If the rise in the dollar stalls, then price pressures are transferred into European and Japanese stocks. These are adversely affected by a stronger Euro and Yen, reducing export competiveness.

The second potential trigger may be debt markets. Initially, heavily indebted energy companies and emerging market borrowers face increased risk of financial distress.

According to the Bank of International Settlements, total borrowing by the global oil and gas industry reached US$2.5 trillion in 2014, up 250 percent from US$1 trillion in 2008. About 40 percent of that debt was incurred by American oil companies, especially smaller shale producers. Energy companies now make up around 15 percent of the Barclays US Corporate High-Yield Bond Index, up from less than 5 percent in 2005. Since 2010, energy producers have raised US$550 billion of funds, through new bonds issues and loans. In 2014, over 40 per cent of new non-investment grade syndicated loans were to the oil and gas sector.

The initial stress will be focused in the US shale oil and gas industry which is highly levered with borrowings that are over three times gross operating profits. Many firms were cash flow negative even when prices were high, needing to constantly raise capital to sink new wells to maintain production. If the firms have difficulty meeting existing commitments, then decreased available funding and higher costs will create a toxic negative spiral.

In a pattern similar to previous crisis, lenders have already started to restrict credit to vulnerable firms by limiting access to revolving loan facilities as a result of the collapse in oil prices. Credit margins on the debt of energy firms have moved wider, to around 10 percent per annum, a premium over similar rated companies in other industries.

As in equities, the adjustment will occur gradually. Currently, distressed oil and gas firms have increased production to generate cash flow to service debt. They are hoping for a recovery in prices. If the expected recovery does not occur, in part because of similar behaviour by a large proportion of the industry, then eventually defaults and debt restructuring will occur, triggering losses for banks and investors.

A number of large emerging market borrowers, such as Brazil's Petrobras, Mexico's Pemex and Russia's Gazprom and Rosneft, are also vulnerable. These companies increased leverage in recent years, in part due to low interest rates. Between 2006 and 2014, Russian and Brazilian oil and gas companies increased their annual borrowing by 13 and 25 percent respectively. Chinese oil and gas companies increased annual borrowing by 31 percent. The borrowings financed significant operational expansion on the assumption of high oil prices.

These borrowers have, in recent years, used capital markets rather than bank loans to raise funds, cashing in on demand from yield hungry investors. Since 2009, Petrobras, Pemex and Gazprom (along with its eponymous bank) have issued US$140 billion in debt. Petrobras alone has US$170 billion in outstanding debt. Russian companies such as Gazprom, Rosneft and major banks have sold US$244 billion of bonds. The risk of contagion is high as institutional and retail bond investors worldwide are exposed.

With about US$42 billion on issue, Petrobras is one of the largest issuer of Yankee bonds excluding sovereigns and financial institutions. In addition to difficult trading conditions, Petrobras is embroiled in a corruption scandal involving Brazil's ruling People's Party. It was only able to issue audited financial statements after a lengthy delay, narrowly avoiding a breach of its loan agreements triggering a technical default on its debt. Like many emerging market borrowers it is also exposed to its sovereign. The downgrade of Brazil by S&P to non-investment grade immediately affected its outstanding bonds.

Like US shale producers, these companies have increased production or sold assets to continue meet their debt obligations. Some have the implicit support of governments. For example, some of the Russian firms have applied for assistance from government or sovereign funds to meet its foreign debt obligations.

Yields on this debt have increased significantly triggering large losses for holders.

The problems in the energy and emerging market sector is leading a general rerating in equity and debt, especially high yield, with prices falling and investors retreating.

A third potential trigger may be changes in liquidity conditions which exacerbate stress. Since 2009, asset prices have been affected by the central banks' attempted reflation. Today, as much as US250 billion in new liquidity each quarter may be needed to simply maintain asset prices.

However, the world is entering a period of asynchronous monetary policy, with divergences between individual central banks which has implications for markets and asset prices.

The US Federal Reserve is scaling back, terminating purchases of government bonds and mortgage backed securities ("MBS"), which at their peak provided over US$1 trillion a year in new funds to markets. While new purchases have ceased, the Fed does not plan to sell its portfolio of around US$4 trillion of securities. It will continue to reinvest principal payments from its holdings of MBS and roll over maturing Treasury bonds. The combination of maintaining its balance sheet at sizable levels and low official interest rates will keep financial conditions loose. But the Fed will not add significantly to liquidity. The withdrawal of Fed support may not be offset, as is widely assumed, by the European Central Bank ("ECB") and Bank of Japan ("BoJ").

The ECB plans to expand its balance sheet by more than US$1 trillion over the next 18 months, through a mixture of purchases of government bonds, asset backed securities and loans to banks. Based on its current plans, the BoJ plans to purchase Japanese government bonds at an annual rate of over US$700 billion. At 16 per cent of gross domestic product ("GDP"), the Japanese program is much larger than the corresponding US Fed's QE measures adjusted for relative size of the two economies.

The balance sheets of the BoJ and ECB should expand by a total of a minimum of US$2.5 trillion by the end of 2016 at current exchange rates. This is comparable to the US$3.6 trillion expansion in the Fed's balance sheet since 2008.

A wild card is the People's Bank of China ("PBOC") which is also loosening money supply. Initially, this appeared to be to mitigate the sharp tightening in liquidity resulting from the increasing controls on China's shadow banking system. More recently, it has been targeted at supporting falling stock market and slowing economic activity.

There are differences between the liquidity programs. The US Fed and BoJ primarily purchase government bonds. The ECB also lends to banks. The PBoC acts almost exclusively through the banking system. The crucial difference between the actions of individual central banks is that the ECB, BoJ or PBOC cannot directly supply the dollars crucial to global markets.

The importance of dollar liquidity is driven by several factors. First, the US dollar remains the most important global reserve currency. The US debt markets, at around US$60 trillion, are the largest in the world and larger than Europe and Japan combined. Second, the US dollar plays a crucial benchmark role with a number of currencies formally or de facto linked to the dollar. US rates influence the pricing of assets globally. Third, the largest amount of foreign currency debt, especially that issued by emerging market borrowers, is denominated in US dollars.

According to the Bank of International Settlements ("BIS"), US dollar credit to non-bank borrowers outside the US totalled over US$9 trillion, comprising 45-50 percent debt securities and over 50 percent bank loans. The total has increased over 50 percent since end-2009. Emerging market borrowers have borrowed around US$5-6 trillion in foreign currency, comprising US$2-3 trillion in securities and US$3 trillion in bank loans. Around 75 to 80 percent of this debt is estimated to be dollar denominated.

Cross border borrowings, mostly in US dollars, by Chinese banks and companies have reached US$1.1 trillion. It is around US$450 billion for Brazil, US$380 billion in Mexico and over US$700 billion for Russia. It is unclear what proportion of these liabilities is protected against currency risk by US dollar income or derivative hedges.

Tightening of available dollar liquidity, a rising US dollar and anticipated increases in American interest rates will result in losses on these borrowings. In turn, this will create repayment difficulties for over-indebted borrowers, in turn triggering a new financial crisis.

The risk is exacerbated by the economic weakness of many emerging markets. Low commodity prices also compound the problems. It reduces the US dollar denominated revenue available to meet debt obligations of exporters, increasing potential exposures to currency fluctuations.

It also reduces global dollar liquidity. Since the first oil shock, petro-dollar recycling, the surplus revenues from oil exporters, has been an essential component of global capital flows providing financing, boosting asset prices and keeping interest rates low. A prolonged period of low oil prices will reduce petrodollar liquidity and may necessitate sales of foreign investments.

Emerging market foreign currency reserves are also falling, led by substantial falls in Chinese reserves due to a combination of weaker trading conditions, capital flight and (suspected) liquidation to release capital to support the domestic economy and share markets.

Declines in global liquidity driven by falling petrodollar liquidity and emerging market currency reserves affect asset prices and interest rates globally. It will increase interest costs and affect the ability of borrowers to gain access to needed dollars.

A fourth potential trigger will be currency volatility and the currency wars that are not, at least according to policy makers, under way. A stronger dollar may weaken US growth. But a weaker dollar means a stronger Euro and a stronger Yen affecting the prospects of the Euro-zone and Japan.

A fifth potential trigger may be weakness in global economic activity.

One factor will be the weakness in the commodity sector, especially energy. The belief that lower oil prices will lead to an increase in growth may be misplaced, with the problems of producers offsetting the benefits for consumers. Approximately US$1 trillion of new investment may be uneconomic at lower oil prices, especially if they continue for an extended period of time. When combined with the reduction in planned investment in other resource sectors as a result of lower prices, the effect on economies will be significant.

An additional factor will be the increasing problems in emerging markets. Growth is slowing as a result of slower export demand from developed markets, unsustainable debt and unaddressed structural weaknesses. For commodity producing nations, lower revenues will weaken economic performance triggering a rerating. The problems will spread across emerging markets.

A sixth possible trigger may be problems in the banking system. Problems in equity and debt markets combined with changes in liquidity will drive defaults and non-performing loans. Unresolved asset quality issues after 2008 will aggravate the problem. European banks have around €1.2 trillion in troubled loans. Chinese and Indian bank problem loans are also high.

At a minimum, there will be reductions in the flow of credit. If problems prove more serious, then the need for state support will increase pressure on strained public finances.

A seventh trigger may be the renewed focus on the level and sustainability of sovereign debt, in the light of slowing growth, low inflation and financial system problems. The unresolved public debt issues of Japan and the US will attract renewed investor scrutiny. In Europe, the sovereign debt problems will affect not only peripheral members but move into core nations such as Italy and France.

Finally, markets will critically appraise government and central bank policies and find them wanting. The artificial financial stability engineered by low interest rates and QE is undermined by concern about the long term effects of the policies and the lack of self-sustaining recovery.

The cascade of financial woes would result rapidly in a financial crisis, driving global contagion and an economic slowdown. The position is eerily similar to 1997/98, when falling commodity prices, especially oil, a stronger US dollar, rising US interest rates and emerging market debt and weaknesses led to the Asian monetary crisis, the Russian default and the collapse of hedge Long Term Capital Management.

Transmission Lines…

A new crisis will have similarities to and difference to 2008. The problem of crowded trades, where a variety of market participants all have the same basic positions and strategies, and identical risk models will be familiar. The effect of new regulations, ironically designed to minimise the risk of a new crash, and a reduction in trading liquidity will be new.

In the aftermath of 2008, new bank regulation have emphasised capital, collateral and counterparty risk, especially the central counterparty ("CCP").

Extra capital, while welcome, does not alter the level of risk but merely who bears it. To recapitalise banks, regulators have approved risky hybrid securities, such as contingent capital and bail-in bonds. Investors have purchased these instruments, attracted by the return but probably not fully aware of the real risk, which is generally not fully compensated for. These capital instruments will transmit losses in the event of a systemic crisis to insurance companies, pension funds and private investors. Bailing them out may be politically necessary or expedient.

With simpler solutions proving politically difficult, attempts to reduce the risk in the chains of derivative contracts have focused on CCPs and collateral. CCPs have added complexity, creating new nodes of concentration and instability. CCP risk management is unproven under conditions of stress. New exposures arise from only some but not all products being cleared, the need to channel deals through a small group of clearing members and the clash between national CCPs and cross border trades. The reliance on collateral is likely to prove troublesome under conditions of real stress.

Collateral is used to secure borrowing, structured as repurchase agreements as well as mortgages over or pledges of real estate or other assets. In derivative transactions, collateral is lodged periodically to secure current mark-to-market exposure. Theory suggests that collateral reduces risk, making the financial system safer but its use merely creates different risks.

Firstly, the emphasis shifts from the borrower or counterparty's creditworthiness to the collateral. Focus on financial strength and ability to perform is reduced. Parties normally ineligible to borrow or transact in the first place are able to enter into transactions. The rapid growth in debt levels, volume of derivative contracts and hedge funds or structured investment vehicles relies on collateral.

Secondly the choice of collateral creates risks. Government securities now are not risk free. The range of securities accepted as collateral has increased, with the value attributed to each security being adjusted by a 'haircut'. This introduces the risk of volatile unexpected changes in the value of the collateral itself. The correlation between the risk covered and the value of the collateral becomes crucial. Wrong way correlation, where the underlying risk increases at the same time the value of the collateral decreases, reduces its utility as security.

Thirdly, it assumes liquid markets for the collateral, which must be realised in case of default.

Fourthly, it creates asset liability mismatches where the loan is for a shorter maturity than the security pledged or where collateral must be adjusted frequently over the life of the transaction. Unexpected changes in the amount of collateral needed create liquidity risks.

Fifthly, collateral use entails significant model risk. The underlying exposure (in the case of derivatives) as well as the value of the collateral must be determined. As evident during crises, there are difficulties in valuing less liquid securities, as well as risk of potential manipulation of and disputes about valuations. Models must establish the level of initial collateral posted, to cover the fall in value between the last margin call and the close out date. Initial margin amounts are based on historical volatility that may be inadequate in periods of stress. Where collateral is calculated on a portfolio basis, offset methodologies (based on correlation) may be flawed.

Sixthly, collateral introduces significant operational and legal risk. It places large demands on operational procedures to ensure mark-to-market calculations are accurate, collateral is paid and received, collateral is monitored and control over the cash or securities are held. The legally validity of these arrangements in all jurisdictions is not assured, involving a complex mix of domestic and international laws. Enforcement may be practically difficult because of the unwillingness of courts to enforce foreign judgements.

Seventhly, the use of collateral entails moral hazards. While lowering collateral levels increases leverage but decreases risk mitigation, pressure to increase business volumes may lead to inadequate collateralisation.

Finally, collateral has systemic risks which deeply alter the functioning of financial markets, especially the quantum of credit available, liquidity risk and behaviour.

Use of collateral is an important source of endogenous liquidity. The practice of re-hypothecation – where collateral received is re-pledged in support of other transactions – allows exponential expansion in leverage. But if re-hypothecation is restricted, then the cash and securities committed as collateral cannot be used, precipitating a rapid contraction in liquidity.

Reliance on collateral encourages the creation of high quality of securities that lenders are willing to lend against. This led to the creation of complex structured securities, reliant on complex ratings models. According to the Bank for International Settlements, between 1990 and 2006, AAA rated securities increased from around 20% to over 55% of all securities on issue, with asset-backed securities accounted for about two-thirds of the increase.

Collateral exacerbates financial distress risk where a solvent party cannot meet unexpected margin calls. Limited disclosure of collateral provisions and potential liquidity claims also makes it difficult to assess the financial position of counterparties.

Where collateral use is widespread, it exacerbates the problem of herding behaviour. In periods of stress, market participants all seek more collateral or need to sell pledged securities increasing market instability, potentially fatally.

Collateral use is now entrenched, exposing market to the danger identified by former US President Dwight D. Eisenhower: "*We will bankrupt ourselves in the vain search for absolute security*".

No One to Sell to…

Trading liquidity in markets has also diminished markedly since 2008. Traditionally, market makers act as shock absorbers in periods of stress allowing investors to readjust portfolios at a price. But consolidation, through bankruptcies, mergers or acquisition or withdrawal, has reduced the number of dealers. Higher capital charges and specific prohibitions on trading, such as the Volcker rule or narrow banking, have increased the cost of trading.

Measures such daily turnover, bid-offer spreads, dealer inventory levels and the amounts that can be transacted without moving prices materially indicate that liquidity has diminished. In the US Treasury bond market, it has fallen by over 50 percent. In corporate bonds, it has fallen by over 70 percent. The fall is particularly marked when measures against outstanding volumes of securities, which have increased.

The fall in liquidity has been less marked in equity market, primarily because of high frequency trading ("HFT"). However, the presence of these participants may not increase real market liquidity under conditions of stress. They may scale back their activity or actually require liquidity to exit position under such scenarios.

The decline in liquidity is exacerbated by the changing structure of many markets. There is increased participation by retail and private investors either directly or through funds. Paralleling the decline in the number of dealers, the number of major asset managers through whom these funds are deployed is small.

Many investment vehicles have a significant asset liability mismatch. Around half of the US$70 trillion of managed fund assets globally offers investors redemption at short notice. Increasingly, some investment vehicles are large, either individually or as a sector. For example, the total size of exchange traded funds ("ETFs") is now approaching US$3 trillion. The focus is also increasingly on less liquid assets, such as smaller cap shares or higher yielding securities.

The combination of size, the nature of the underlying assets and the redemption feature may prove especially toxic. It is simply not possible to transform highly illiquid instruments, using financial engineering into liquid equivalents. Oaktree Capital founder Howard Marks argued in a note to investors that: "*No investment vehicle should promise greater liquidity than is afforded by its underlying assets. If one were to do so, what would be the source of the increase in liquidity? Because there is no such source, the incremental liquidity is usually illusory, fleeting and unreliable, and it works (like a Ponzi scheme) until markets freeze up and the promise of liquidity is tested in tough times.*"

This lack of liquidity is not reflected in pricing, with the premium for liquidity risk in most segments having fallen to 2007 levels of below.

As the following scenario outlines, these changes in market structure are likely help to create instability in any new crisis.

The key drivers will be higher liquidity reserves for banks, more stringent calculations of risk in derivative transactions and use of government securities to lower capital requirements as collateral. Given pre-existing exposures to government bonds via repurchase transactions, investments or trading inventories, the regulations increase bank exposure to sovereign bonds. This coincides with the deterioration in the quality of government securities and unprecedented low rates driven by policy, creating a dangerous source of instability, which will feed market volatility and transmit losses across different markets.

Where rating downgrades or deteriorating credit quality result in falls in the value of sovereign securities, banks suffer losses on their holdings. Where the securities are used as surety for funding or derivatives, banks need to lodge additional collateral, draining liquidity from markets. The deterioration in a sovereign's credit quality will affect risk calculations, requiring additional capital as well as collateral.

Banks may hedge this risk, usually by purchasing default protection on the sovereign or shorting government bonds. This will exacerbate losses as the sovereign bonds' value falls further. Market constraints may necessitate use of proxies for the sovereign, including shorting or buying insurance on equity indices or major stocks. Banks may short sell the currency as a de facto hedge. Proxy hedges transmit the volatility into other asset markets. They create additional risk where volatility is high and correlation between major asset classes becomes unstable, such as in a risk-on risk-off trading environment.

Second round effects focus on the financial position of banks adversely affected by losses on government bond investments and reduced ability of the nation to support its financial institution. The increased default risk of affected banks sets of a chain reaction of additional capital charges increase and loss exposures across international active banks who deal with them , requiring further hedging, compounding the negative spiral.

The reduced demand for the affected sovereign's bonds result in higher funding costs and reduced market access, which is transmitted to banks and other firms in the country. Higher counterparty risk or downgrades may trigger more collateral calls.

Financial market shocks flow through into the real economy, affecting the supply of credit, growth, investment and employment. In turn, this feeds back into further sovereign and financial sector weakness.

The exact sequence of events is unpredictable because of the complexity of transmission pathways. But once these feedback loops start, they are very difficult to control.

Staying Positive…

Some historians view World War 2 as a continuation of World War 1 with an interval. Any new crisis is likely to be a further phase of the 2008 crisis, reflecting the fact that the causes remain largely unresolved.

The world is remarkably sanguine about the increasing risk of a new major crisis, which is not priced into markets. In April 2015, former vice chairman of the Federal Reserve Alan Blinder presented a novel argument against increased risk in his Wall Street Journal opinion piece. He argued that despite central bank activism, none of the hypothesized financial hazards had surfaced. In effect, as the absence of a crisis *to date* must mean that there was no risk and the policies were correct.

Governments and central bankers assume that they can control events. Investors believe that the authorities can implement measures that support the economy and asset prices. This faith may be misplaced.

Unwinding of the unsustainable excesses will be especially painful, much worse than 2008 for a variety of reasons.

First, the problems in 2016, such as debt levels, are much larger.

Second, the problems are now global with both developed and emerging markets affected. In 2008, the emerging markets acted as stabilisers to the weakness of developed markets, provided demand and also helping financing budget deficits in advanced economies.

Third, the downturn will exacerbated by the limited capacity of policy makers to respond. Fiscal measures are limited by poor public finances. Monetary policy may be used, with more money being pumped into money markets but with increasingly diminishing effects.

The stabilisation since 2008 has been the result of fiscal deficits in combination with lower interest rates and QE. In the US, rates were lowered from 5.25 percent to zero, injecting around 20% of income into the economy. This boosted economic activity and crucially avoided widespread defaults and collapse of the banking system, ensuring a short recession. The pattern globally was similar.

Today, strained government finances mean that running budget deficits on the scale that was done after 2008 will be more difficult. The fact that rates are much lower, in some cases negative, means that further monetary measures will be far less effective. In many economies, it is not clear why, with loan demand weak, banks will sell government bonds to central banks to receive negative returns on the cash proceeds. New initiatives (unconventional, unconventional measures), negative rates and 'helicopter money' may disappoint. Under current conditions, monetary policy will prove ineffective, the equivalent of Keynes' pushing on a string.

Fourth, the problems will be accentuated by political stresses. Poor economic growth and high unemployment, especially youth unemployment, in Europe have created a volatile political environment. With existing political elites seen as captured by businesses, banks and the wealthy, electorates are turning to populism and political extremes in search of representation and solutions. The resulting policy uncertainty and inconsistency further suppresses recovery.

Finally, the geopolitical situation has also deteriorated sharply. The Middle East is characterised by tribal and inter-faith conflict, with the chaos and extremism spilling out from the region. A revanchist Russia threatens a new cold war. Disagreements within the European Union mean that complicates the security situation. In Asia, territorial tensions centred upon Chinese claims are rising. Increasing defence readiness or militarism, depending on interpretation, is an additional factor impinging on global growth. Even if actual conflict is avoided, sanctions and other forms of economic or cyber warfare complicates matters.

The balance between the benefits and risks of intervention is now unfavourable.

With real activity unresponsive, the unintended financial consequences of monetary experiments on an unprecedented scale are unpredictable. The decision by the Swiss National Bank to remove the ceiling on the Swiss Franc highlights the uncertainty. In Japan, emerging differences between the government and central bank over policy show the increasing tension.

The risk of policy errors or poor execution, such as premature increases in rates, or withdrawal of liquidity support, is increasing. An intended or accidental breakdown within the Euro-zone potentially triggering a restructuring of the European single currency is no longer inconceivable. Global economic wars, entailing barriers to trade or capital movements as well as the ongoing currency devaluations, are likely as countries act independently consistent with their national.

The signs of breakdown are evident. The failure of existing policies are pushing central banks into more extreme and desperate action, such as negative interest rates (effectively paying people to borrow) and large currency devaluations. Actual market volatility has increased as valuations reflect anticipated central banks actions rather than fundamental values. For example, the fall in the yield of sovereign bonds reflects expectations of central bank purchases rather than true risk.

Deflationary pressures in commodities and industrial prices are increasingly globally. Behaviours now are economically irrational. The magnitude and speed of adjustment in commodity prices, currencies and credit markets suggests that the correction may occur more quickly than people anticipate.

Most investors remain oblivious assuming that the risk is in the price or that they are prepared and will be able to adjust their portfolio in time. They remain long risky assets, often on a leveraged basis.

Reconciling the performance of financial markets with the continuing problems of the real economy requires perverse reasoning with one analyst entitling a piece: '*I'm so Bearish, I'm Bullish . . . Memo to self: always buy stocks & credit on a negative [growth]*.' In his December 2014 letter to investors in the Eclectica hedge fund, founder Hugh Hendry confessed that he had no choice but to behave as if the things he truly believed in were now irrelevant. He was buying risky overpriced assets, knowing full well that those valuations could not be supported and that it would all end in tears. US fund manager Doug Kass summarised the dilemma with delicious accuracy when he tweeted: "*If you're Bullish and wrong, you are just wrong. If you're Bearish and wrong, you're unemployed*".

Coffin Corner…

Aviators fear "coffin corner". The term refers to the minimum speed need to avoid an aircraft stalling and losing altitude, potentially resulting in a fatal loss of control. The aerodynamics of modern aircraft means that the difference between minimum speed (below which the plane can stall) and maximum speed (beyond which it also loses control and potentially breaks up) is small especially at high altitudes. Today, financial markets and the global economy are flying at coffin corner. Unexpected turbulence or instability, whatever its source, will result in a major breakdown with the rapid spread of losses and problems.

Investors would do well to heed Cassius's warning in *Julius Caesar*: "*The storm is up, and all is on the hazard*."

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