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Learning Lessons? The Global Financial Crisis five years on

Robert E. Marks

Economics, University of New South Wales and University of Melbourne

E-mail: robert.marks@gmail.com

Abstract

The main contribution of this paper is a Timeline of the Global Financial Crisis (GFC) from 1720 to 2013. It is accompanied by analysis in which I distinguish between the sufficient conditions for the Global Financial Crisis (GFC) (the conjunction of many things which occurred before the GFC, which were correlated with the GFC, and perhaps influenced it) and the necessary conditions for the GFC (those things without which the GFC would not have occurred). Is it possible to distinguish between elements of these two sets? Avoiding unnecessary regulation in the future, while insuring against a repetition, would suggest that one must strive to do so, for policy reasons, as well as for understanding the paths that led to the GFC. I conclude that three conditions were necessary for the financial crisis in the U.S., which, in turn, resulted in the GFC. All were failures of regulation.

Introduction

In its Leader of October 13, 2008, the *Financial Times* (*FT*) characterized the western world's banking system as suffering "the equivalent of a cardiac arrest". The collapse of confidence in the system means that "it is now virtually impossible for any institution to finance itself in the markets longer than overnight". This occurred less than a month after Lehman Brothers (LB) collapsed, without bailout. Six months earlier Bear Stearns (BS) had been bailed out after JP Morgan Chase (JPM Chase) had bought it for $10 a share, at the regulator's urging. After LB fell, who would be next? And if LB, who was not at risk? Despite the earlier U.S. government bailouts of the erstwhile government mortgage originators (and still seen as government-sponsored enterprises, or GSEs), the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac), and the later bailout of the world's largest insurer, American International Group (AIG), everything changed with the demise of LB.

The FT was describing the freezing of the interbank credit market. After LB's fall, so-called counterparty risk was seen as prohibitive to prospective lenders, at any price. This was revealed in the TED spread, the difference between the cost of interbank lending, the London Inter Bank Offered Rate, or Libor, on three-month loans in U.S. dollars, and the closest instrument to risk-free: three-month U.S. government bonds. In normal times the TED spread is between 10 and 20 basis points (bp), or 0.10 and 0.20 percent per annum, but on October 10, the TED spread reached 465 bp, when a lender could be found. In November, 2008, it had fallen back to below 200 bp.

I sit in a coffee shop that sports the sign "We are cash only, sorry for the inconvenience." I'm sure this is to avoid the hassle of credit cards, but such signs were massing off-stage in mid-October, 2008. How so? Imagine that banks refused to honour other banks' credit card debts. Then cash would soon become king for retail purchases. But what of letters of credit, used in international trade? What of other bank-backed credit instruments? And cash (fiat money) also relies on trust and confidence — of government. And when the government can't be trusted? This can result in catastrophic inflation, or devaluation, or both. And when there is a shared currency across countries, things can get very messy.

The U.S., U.K., European and Australian governments understood the abyss that faced the world economy, and the U.K. action at supporting its ailing banks and guaranteeing interbank lending was soon imitated elsewhere. The 2008 financial crisis, although severe, has not been catastrophic. Millions, however, saw the value of their assets on the stock market dwindle, and millions more lost their houses and their savings. Alan Greenspan (2010) called it the once-in-a-hundred-years event.

A related issue is the extent to which the action of governments in 2008 ameliorated the macro-economic consequences of the GFC, which might now have led people to underestimate the perils faced in October 2008, and so to underestimate what might be desirable to avoid future credit crises, perhaps not so distant.

The crisis was triggered by the bursting of the U.S. housing bubble,[1] and U.S. housing prices tumbled as the crisis led to further sales to improve liquidity. But, as we argue, other events were necessary for the bursting bubble to result in the crisis. Many also lost their jobs, at first in the finance industry, but later increasingly in the real economy.

But shed no tears for the shareholders or top managers of the U.S. finance companies. A very good description of the process that resulted in the subprime (SP) mortgage meltdown is a piece by Lewis (2008). Lewis gives a very insightful timeline of the unfolding of the crisis by focusing on a small group of people who were on Wall Street.[2] Johnson (2009, 2010) argues that since none of the bankers sought personal bankruptcy, and the banks avoided harsh measures in the 2010 U.S. financial reform act, it constitutes a "quiet coup."

There are three kinds of indicators of the progress of the GFC: prices and interest rates in financial markets, the performance of firms in the finance industry (at least at first), and then government responses to the growing crisis. As the events of 2008 flashed by, I began to put together my own Timeline of the crisis, from the far past to the present. I continue to add items, both current and past, as they are revealed. I have used many on-line resources and articles such as Brunnermeier (2009).

Necessary conditions for the GFC

In June, 2009, almost two years after the first market signs of the GFC and following my editorials in two issues of the *Australian Journal of Management* (Marks, 2008a, 2008b), and a timeline of the GFC (in the June 2009 issue

1 Even where there is recognition that a bubble exists, it is extremely difficult to forecast exactly when it will burst. That is not our task here: it is to identify the underlying causes of the bubble and the impacts of its bursting.

2 This piece was the inspiration for the Timeline below.

of the *Journal*, with an updated version below), it was time to begin attempting to answer the question of what caused the GFC. This is not simple. Many decisions and actions, by many individuals and organisations, came together to cause the GFC. Even asking whether it would still have happened absent any one of these decisions or actions is difficult to answer since it is counterfactual, and we can't run history again with this single difference in order to answer such questions.

Instead, in the Timeline, I have listed decisions and actions that together accompanied the GFC, as well as market indications of the crisis, and subsequent government actions in attempting to alleviate the crisis. (I will not here engage in the debate of what government policies are appropriate except to say that apparently Richard Nixon was wrong when he claimed in 1971 — almost 40 years ago — that: "We are all Keynesian now". Conservative politicians, both here and abroad, appear to be unaware of the merits of incurring short-term debt to pay for Keynesian stimuli and the virtues of the automatic macro equalisers of the modern economy.)

Looking at the Timeline (which is now much richer than the version I published in Marks 2008b and 2009) – see the online material – I count these significant events:

1. six changes to U.S. legislation from 1977 to 2008;
2. two changes in financial institutions' ownership;
3. a change in corporate governance;
4. several new technologies;
5. several market and extra-market events;
6. three regulatory changes that might have contributed to the financial crisis of 2008, and two changes that were in response to events in 2008; and
7. at least six changes in corporate behaviour.

I have also included several Cassandras — voices warning of danger who were ignored or, worse, shouted down since 1994, but more prevalent in the two years 2007–2009. Accompanying these have been a series of denials, and, more recently, a number of admissions of prior mistakes. Before I discuss these in more detail, I repeat that it must remain a question of individual judgment about which of the earlier actions caused the GFC.

The six legislative changes

The six legislative changes all occurred in the U.S.A. In 1977 U.S. banks were offered incentives to lend to poor people.[3] In 1980, usury controls for U.S. mortgages were lifted, allowing higher interest rates for risky borrowers.[4] In 1988, discrimination in the U.S. mortgage market was outlawed.[5] In 1999, many 66-year-old restrictions on U.S. banks were lifted, and bank regulation was eased.[6] In 2000, self-regulation of derivatives was affirmed, and some (such as the then recently invented Credit Default Swaps, CDSs) were explicitly exempted from state gaming regulations.[7] In 2008, the (new) regulator was given the power to place government-sponsored enterprises (GSEs), such as Fannie Mae and Freddie Mac, into receivership or conservatorship.[8] It is

3 1977 October 12: *The Community Reinvestment Act*.

4 1980 March 31: *The Depository Institutions Deregulation and Monetary Control Act*.

5 1988 September 13: *The Fair Housing Act*.

6 1999 November 12: The Gramm-Leach-Bliley *Financial Services Modernization Act* repeals the Glass-Steagall Act of 1933.

7 2000 December 21: *The Commodities Futures Modernization Act*.

8 2008 July 30: The *Federal Housing Finance Regulatory Reform Act*.

debated whether this last was a cause or an effect of the financial crisis (McLean, 2009).

Since the GFC was triggered by the bursting of the U.S. housing bubble (which, as Greenspan (2010) points out, unlike the 1987 stock-market collapse or the "tech wreck" of the early noughties, was not limited in the extent of its impacts), it is appropriate to focus on U.S. legislation. Both sides of politics saw political advantages in increasing home ownership, which, in itself, need not have led to the housing bubble — other countries, such as Australia, have also encouraged home ownership, without (yet) bursting housing bubbles, and without such consequences in the aftermath of a housing crisis.

Of these legislative changes, with hindsight, the repeal of the 1933 Glass-Steagall Act was the most significant: not the elimination of the geographic limits on bank operations, but rather elimination of the distinction between trading banking and investment banking. Given the disappearance of the investment-bank partnerships (starting with Salomon Brothers in 1981 (see below)), the banks' managers now faced strong incentives to grow. Which they did: the market share of the five largest U.S. banks rose from 8% in 1995 to 36.5% in June 2010.

Of course, after LB the powers that be decided that AIG and the rest were "too big to fail" (TBTF), a policy that has since been repudiated by King (2009) and even Greenspan (2010), and which raises issues of "moral hazard": not only do managers of TBTF institutions take more risks than managers of smaller institutions, the risks they pose to counterparties are lower and so their costs of capital are lower than the costs charged to small institutions. This is a recipe for even greater concentration in future. If there were economies of scale for larger banks, then at least there might be some upside to this growth, but Greenspan (2010) and others argue that there is no evidence of such economies, once banks have grown beyond a relatively small size.

Changes in financial institutions' ownership

The changes in financial firm ownership occurred over 18 years: in 1981 the first of the Wall Street investment banks, Salomon Brothers, previously a private partnership — as were all such investment banks then — sold itself, to become a publicly traded corporation.[9] The other banks followed suit, until the last, Goldman Sachs (GS), went public in 1999. They were now using what was predominantly other people's money. In 1997, the U.K. building society (or thrift), Northern Rock, demutualised to become a bank, the first of several.[10] Ten years later Northern Rock would experience the first bank run in the U.K. since 1866.

Changes from partnerships to private corporations are significant because of the changes in incentives that occur. Venturing their own money, private partners are less likely to take extravagant risks than are managers putting others' money at risk, especially if their annual bonuses are tied to the amount of fees the company receives from its clients and if there is a period of at least a year before any chickens come home to roost. Moreover, if there is no clawback provision to penalise employees whose judgment later turns out to have been misguided or wrong, then observers should

9 1981 August 1: Salomon Brothers, a private partnership since its founding in 1910, sells itself to Phibro Corp., a commodities firm.

10 1997 October 1: Northern Rock floats as a demutualised building society.

not be surprised if unduly risky decisions are made.

This, after all, is what happened in the U.S. subprime mortgage market, with mortgages securitised and diced and repackaged into tranches of debt. Moreover, the Credit Rating Agencies (CRAs), companies relied on to adequately signal the riskiness of these opaque financial instruments, also faced the perverse incentive that it was the sellers of these instruments, not the buyers — those who stood to lose if the ratings were inadequate — who were the customers of their services (White, 2010).

The credit ratings history of a single instrument — a residential mortgage pool put together by GS called GSAMP 2006-S5 — exemplifies the issues of opaqueness and perverse incentives: when issued in August 2006 the best tranche in the pool was rated at AAA by Moody's; a year later it was down-rated to Baa, the lowest investment grade; four months later it was down-rated again; four months later it was further down-rated to "junk"; by the end of 2008 it was no longer being traded. While GSAMP 2006-S5 might have been a once-off, sadly it is merely a representative of a myriad similar instruments.

The CRAs, by charging fees to the companies whose products they rated, also faced moral hazard. Indeed, there was potentially a clear conflict of interest, as Hannover Re's experience can attest.[11] Moreover, because the CRAs played a mandated role since the 2004 Basel II Accord and earlier, any shortcomings in their performance could (and did) have a serious effect during the crisis. The very existence of CRAs is a testament to the existence of asymmetric information; failures of theirs contributed to overall market failure, and even CRA-shopping on the part of the issuers (White, 2010).

The issue of incentives is pervasive in the GFC: even absent the spillover effects of the systemic risks associated with the SP mortgage bubble, if the incentives are perverse, then the actions of the actors will be perverted. In this case, it is foolish to expect efficient outcomes.

Change in corporate governance

The change in corporate governance occurred in 1993, when American International Group (AIG) took control of Financial Products (FP), whose activities later crippled AIG.[12]

The alliance between AIG and FP, although a once-off, highlights the issue of the subsidiary of an insurance company betting the house in activities not central to insurance. That AIG had bought a thrift specifically in order to fall under the regulation of the Office of Thrift Supervision, a prime example of regulator shopping, is another example of AIG straying from insurance.

Moreover, there is another issue of incentives here: the entire budget of the OTS is paid by assessments on the institutions it regulates. And the OTS, a later report finds, despite overseeing several companies that are primarily insurers, had only a single employee with expertise in insurance. AIG was the world's largest insurer.

Several new technologies

The new technologies are: the 1977 invention of the first of many credit derivatives,[13]

11 See the entry of March 2003.

12 1987 January 27: American International Group (AIG) and Financial Products (FP), a new risk-management firm, sign a joint venture agreement.

13 1977: With the Bank of America (BofA),

including credit-default swaps (CDSs) in 1997,[14] whose use later laid AIG low; and the 1983 invention of the collateralised mortgage obligation (CMO), which extended earlier invention of the (mortgage-backed security) MBS.[15]

The new technologies developed in the financial sector have been touted as improving the ability of the industry to handle risk, an increase of efficiency that has been reflected in the more than doubling in the value added in the finance and insurance sector as a share of U.S. GDP (from 3.5% to almost 8%) in the fifty years from 1960 (Greenspan, 2010, Exhibit 7). And yet others, such as Paul Volcker, doubt that the newly invented derivatives have been such a boon; indeed, the very opacity of their value contributed to the freezing of the short-term credit market that the editorial in the October 2008 *FT* was referring to above, and their lack of transparency has been a high price to pay for any gains in efficiency.

An ongoing research project might seek to demonstrate the social contribution of the financial sector.[16] This is important given several things: the growth of the relative size of the sector in advanced economies (and the U.K. it was proportionately five times larger than in the U.S., according to Mervyn King); the damage caused to entire economies by the events of 2008; and not least by the size of the remuneration packages received by top managers in the sector, even in the wake of the GFC and when institutions were in receipt of government bail-out payments.

The asymmetric information that the lack of transparency of these instruments exemplifies — where few if any truly understand the value of such derivatives as CDSs — should remind us that General Equilibrium Theory (GET) assumes full information, inter alia. Indeed, some have called GET "utopian economics" (Cassidy, 2009), and contrast the elegance but unreality of this theory with "realistic economics", with its "hidden information", spillovers, and other forms of market failure. Is it an ideology to believe in the Platonic ideal of GET in the face of forty years of research which has shown that it is an ideal, but not realistic? How long after the events of 2008 will it be before some believers forget the flaws in the GET and believe in it again, thus helping set the stage for a later "Minsky moment" (Cassidy, 2009, p. 209)?

Market and extra-market events

In 1998, Russia defaulted, which led to the rescue of Long-Term Capital Management (LTCM), but no increase in regulation;[17] indeed, the 2000 *Commodities Futures Modernization Act* expressly excludes derivatives from any state or federal regulation, despite analysis done after the near catastrophe. In 2001, the Al Qaeda attacks[18] and the earlier bursting of the tech bubble led to a permissive monetary policy (with low interest rates), that, Taylor (2007) and other argue, was sustained for too long, resulting in global financial imbalances. Greenspan (2010) argues that these low short-term rates had little effect on mortgage rates, and so

Salomon Brothers issues the first privately backed Mortgage-Backed Securities (MBSs).

14 1997 December: A team at JP Morgan (JPM) develop many of the credit derivatives that are intended to remove risk from companies' balance sheets.

15 1983 June: Larry Fink is the co-inventor, for Freddie Mac, of the collateralised mortgage obligation (CMO).

16 But see Shiller (2012).

17 1998 September 23: LTCM is saved.

18 2001 September 11: The destruction of the World Trade Center.

cannot be held responsible for the subprime blowout.

The issue of the lack of savings in the U.S. and the lack of consumption elsewhere, most particularly in China, with a resulting global imbalance, might be seen as another cause of the U.S. housing bubble. And yet it might also be seen as a consequence of U.S. consumption: the Chinese (and other creditor nations) stepped in to fund U.S. consumption by buying U.S. government debt, U.S. Treasuries. I leave it for others to continue this debate.

Recent regulatory changes

In 2004, the U.S. Securities and Exchange Commission (SEC) relaxed the minimum capital requirement for securities firms and investment banks, leading to much higher bank leverage.[19] In 2007 the SEC eliminated the "uptick" rule for short sales of securities.[20] But in 2008, as a reaction to the evident crisis, the SEC began tightening regulations: in July banning "naked" short selling of several financial corporations; [21] in September tightening its 2004 relaxed capital requirements for investment banks (closing the stable door?); [22] and in October the Congress was told that the SEC had only one officer left in the Office of Risk Management.[23]

The two changes of July and September 2008 were taken in response to the collapsing mortgage market and the behaviour of the Wall Street investment banks in increasing their gearing the previous years. The earlier actions (including the underinvestment in risk management at the SEC) exacerbated the crisis, when it came: the Consolidated Supervised Entities program of the SEC was introduced in order to convince the Europeans that the U.S. investment banks operating in Europe were adequately regulated in the U.S., after pressure from the top brass of the Wall Street investment banks, who were evidently responding to a belief that the Europeans would be tougher regulators than those at home; the evidence of later testimony that the SEC was under investing in its risk management office tends to support their beliefs. The subsequent rise in gearing only made things worse in 2008. It remains to be seen whether abolition of the uptick rule had any effect: some believe that it might have strengthened the short sellers' impacts, but not everyone believes that short selling should be proscribed, even in extremis. Moreover, in the decades during which the rule was in place, the minimum "tick" had been revised from an eighth of a dollar down to a cent.

Changes in corporate behaviour

Over the past forty-odd years there have been many changes in corporate behaviour: in the 1970s, Moody's started charging fees to finance companies, rather than their customers;[24] in 1986 American pension funds started buying CMOs, their first investments in home mortgages;[25] in 1987 international

19 2004 July 21: The SEC launches the "Consolidated Supervised Entities" program.

20 2007 July 6: After 73 years, the SEC eliminates the "uptick rule".

21 2008 July 21: The SEC bans "naked" short selling of the stocks of Fannie Mae and Freddie Mac and 17 large finance companies.

22 2008 September 25: The SEC abolishes the 2004 "Consolidated Supervised Entities" program.

23 2008 October 7: Before the congressional Committee on Oversight and Government Reform, the former chief accountant at the SEC reveals that the SEC's Office of Risk Management was cut back to a single employee.

24 1970s: The CRA Moody's begins to charge fees to the companies whose products it rates, instead of the potential customers of these products.

25 1986 June: American pension funds hold about $30 bn of CMOs; three years ago none.

banks started buying CMOs;[26] in 1998 trade in CDSs began, between AIG and JPM;[27] in 1999 Fannie Mae eased the credit requirements on mortgage loans it would buy from banks and other lenders;[28] in 2004, after the SEC's agreement to relax capital requirements for investment banks, Merrill Lynch's capital ratio rose to 40:1 (or 2.5%);[29] in 2005, after its credit rating fell to AA from AAA, and it had to post an additional $1.16 bn collateral, AIG stopped writing new CDSs, although pre-existing contracts exist as I write.[30] The issuance of SP mortgages, virtually non-existent at the beginning of 1995, peaked at $125 bn in Q4 2005, only to collapse to none three years later. Without these "toxic" instruments, the firms down the line left holding the contracts would not have suffered the losses they did after the housing bubble burst, and the credit crash would not have become a financial crisis, which in turn would not have become the Great Recession, affecting people around the globe, via the purchases by foreign banks of U.S. CMOs.

I do not ascribe to the view that the managers of the institutions, by and large, were miscreants.[31] I believe that they were responding to the incentives they faced. If their actions are now seen to have contributed to the GFC, or at least to the financial crisis in the U.S. in 2008, it was because of the incentives the system presented them with.

The changes in corporate behaviour highlighted here, as well as other changes listed in the Timeline, are a function of these incentives, and in many cases, the incentives banking executives faced were a function of the beliefs of the regulators that the markets are always efficient. For example, Alan Greenspan stated that, in many ways, "private counterparty supervision remains the first line of regulatory defence." He argued that firms' reputations would keep them honest. Later, he expressed surprise that this had not occurred. Nobel Laureate Stiglitz (2009) states that his professional career has been devoted to exploring the consequences of one form of market failure — asymmetric information — that should have given true believers pause, but did not.

We should not be surprised that some self-interested banking executives lobbied, and lobbied successfully, for the regulators and legislators to alter the incentives they faced. The 1999 Gramm-Leach-Bliley Act that repealed the Depression-era Glass-Steagall Act is the most prominent example. Another is the SEC's 2004 introduction of the Consolidated Supervised Entities program, whose advent occurred much to the satisfaction of the lobbyists.

We have attempted to identify proximate causes of the GFC. Any deeper explanation of how and why these changes occurred when they did must await a more profound analysis.

26 1987: The London office of Salomon Brothers sells $2 bn of the first tranche of CMOs to international banks.

27 1998: AIG FP begins to write CDSs, at first with JPM.

28 1999 September: Fannie Mae eases credit requirements on mortgage loans it will buy from banks and other lenders.

29 2004 July 21: Before the "Consolidated Supervised Entities" program, leverage of 12:1 is typical; after, more like 33:1 (and up to 40:1 in the case of ML).

30 2005 March 15: AIG's credit rating falls to AA from AAA; as a result, AIG has to post $1.16 bn in collateral for AIG FP's existing positions, and by the end of 2005 AIG FP stops writing CDSs.

31 Ferguson (2012) argues strongly that many banking executives were miscreants.

Which conditions were sufficient?

In Weisberg's words (2010): There are no strong candidates for what logicians call a sufficient condition — a single factor that would have caused the crisis in the absence of any others. There are, however, a number of plausible necessary conditions — factors without which the crisis would not have occurred.

We have considered a range of possible causes above: changes in legislation, changes in ownership, changes in corporate governance, new technologies, market events, changes in regulation, and changes in corporate behaviour. I would rule out some of these as causes, in the sense that they played little if any part in the unfolding of the crisis, which would likely have occurred in their absence.

I do not believe the change in corporate governance at AIG (its alliance with FP) was a cause, even if the FP division was riding on the insurers' AAA credit rating, and earning much revenue for AIG: in fact the fall in AIG's credit rating was not caused by the activities of FP,[32] although the re-rating had a clear impact on FP and AIG.

The only possible influence of the failure of LTCM (in the absence of regulation of derivatives this event might have resulted in, absent the strong opposition that prevented this) could have been that the moral hazard associated with "too big to fail" became clearer to the Wall Street investment banks: but there were so many other factors changing that it would be difficult to point to the LTCM failure and bailout as having any influence, in the absence of first-person testimony.

As I remarked above, there is no clear picture whether global imbalances were a cause or an effect of Americans' consumption and the saving habits of Chinese households: the imbalance in household saving/consumption patterns is reflected in the flows of capital and goods across the Pacific. I leave it to others to discuss this further.

There is no evidence that abolition of the uptick rules had any impact on the unfolding of events. At most, it might have made short selling of the stocks of compromised financial institutions easier, but there is no compelling evidence that such short selling, let alone the absence of the uptick rule, exacerbated the unravelling of the financial markets in 2007 and 2008.

Many of the changes in U.S. laws and regulations were in response to the development of new analyses (such as the Black-Scholes technique for pricing options) and new technologies that many believed (and still do) had improved the efficiency of the allocation of risk and intermediation of the financial markets.[33] In this case, lobbyists argued, why not relax the restrictions, some of which dated back seventy or eighty years?

Subsequently, restrictions were eased on mortgage lending, on the operations of banks and investment banks; new technologies, such as derivatives, were protected from what were evidently seen as heavy-handed regulators; investment banking partnerships became banking corporations, and owners became managers (of other people's money).

32 2005 March 15: AIG's credit rating falls to AA from AAA the day after Hank Greenberg resigns amid allegations about his involvement in a fraudulent deal with Gen Re.

33 The sector has clearly grown in relative size in the U.S. and the U.K.; whether there was a commensurate benefit to these economies before 2007 remains to be demonstrated.

These new technologies relied on the use of higher mathematics, but were often constructed using assumptions (such as normally distributed events) which later turned out to be misconstrued.

And the financial institutions responded to the changes in incentives and opportunities that resulted (often as a response to pressure on legislators and regulators from these same institutions' managers): gearing was increased; new lending with less restrictive criteria for approvals (SP mortgages, for instance) took place; there were incentives to push for easing in more regulations and to develop new forms of derivatives.

Moreover, as Charles Prince's famous quote of July 9, 2007, confirmed, firms could not afford to decline to dance, to engage in these activities on the back of the growing housing bubble — to do so would be to lose out to one's competitors, both corporate and peers, a situation not unlike an *n*-person Prisoner's Dilemma, or the famous Tragedy of the Commons.[34] But then that's what John Biddulph Martin was describing after the South Sea Bubble in 1720.

Personalities

In the first version of the Timeline, I deliberately avoided referring to individuals because I then believed the crisis was a systemic failure rather than the consequence of individuals' actions. This view is similar to that espoused in Posner (2009). In this version, I have included people's names and have also given their highest university qualification, since I think it is impossible to understand how the crisis evolved while ignoring the identities of the players, for good or ill. This approach is closer to that of Tett (2009) and others. But I do not believe that any are to blame for the crisis.

The crisis has not crept up on us completely unawares. A number of Cassandras have tried to warn us (or at least the U.S. Congress): James Bothwell in 1994; Brooksley Born in 1998 and 1999; Warren Buffett in 2007, 2008 and 2009; Ed Gramlich in 2004; Timothy Geithner in 2004; Ben Bernanke in 2005 and 2007; Richard Hillman in 2007; John Taylor in 2007; Meredith Whitney in 2007; C.K. Lee in 2008; George Soros in 2008; and, Paul Volcker in 2009 (somewhat after the event).

But these brave men and women had little, if any, impact. Arrayed against them were the optimists — most significantly Alan Greenspan, Robert Rubin, Arthur Levitt Jr., Hank Paulson, Larry Summers, Joe Cassano and Dick Fuld. Whether self-interest or ideological blindness, or a mixture of these, underpinned the optimists' arguments is not yet clear.

After the crash had occurred, it is true, Alan Greenspan did accept "partial" responsibility and later he allowed that temporary bank nationalization might be appropriate "once every century". Ben Bernanke has also spoken of the lack of regulation of AIG's financial activities, and the consequences. Others in positions of authority have been mute; perhaps they are writing their memoirs.

Europe

Beyond the U.S., the sub-prime mortgage debacle has triggered a sovereign debt crisis in the eurozone. The transmission link was that European banks had bought large numbers of mortgage-backed securities based upon U.S. home loans. As the crisis in the U.S.

34 Similarly, competition among the three main CRAs meant that adopting a more conservative ranking criterion might lose customers (the issuers of the rated instruments) to one's rivals (White, 2010).

developed, many of these loans turned bad, and in some cases imperilled the these banks. In Iceland, the banks failed. In Ireland and elsewhere the government announced guarantees: the private debt was replaced by sovereign debt. The next problem was the size of the bad debts, together with the flight of bank deposits as the plight of the banks became clearer. The size of the banking system in some European countries is much larger than the national economy (in Ireland's case, over twice the size). Hence the government guarantees are having a significant impact on the governments' sovereign debt, as reflected in rising government bond rates: the riskier the sovereign debt, the higher the rate. Moreover, higher sovereign debt, together with political pressure for government austerity, has led governments to cut their deficits. This in turn has weakened their economies.

In the case of Iceland, the local currency, the krona, collapsed, which caused pain for households that had borrowed in foreign-currency-denominated loans, but the massive devaluation provided a fillip for Icelandic exporters and so for the whole economy. Within the eurozone, however, devaluation is not an option. Its problem is that monetary union, with the common currency, is flawed: monetary policy is determined by the European Central Bank in Frankfurt, but there is no lender of last resort (such as the U.S. Fed) or European bank regulator or, most importantly, no common fiscal policy. This means that no single country in the eurozone can devalue its own currency, and it also means that there is no means for the better performing regions of Europe to support the worse performing regions, in contrast to the U.S., where Florida (and Floridians), hard hit by the bursting of the housing bubble, were supported by payments from U.S. taxpayers.

In the absence of fiscal union, the Maastricht Treaty, which sets out the necessary conditions for the monetary union that produced the euro, required annual national debt of no more than 3% of GDP and accumulated national debt of no more than 60% of GDP, inter alia. For a country to join the eurozone, it is necessary that its government budget satisfy the Maastricht conditions, an imperfect substitute for fiscal union. After the euro was launched, the Maastricht conditions were relaxed somewhat, and no country in the eurozone now satisfies the 60% limit. The case of Greece is unique, since its reported government budget before joining had been manipulated to appear to satisfy the Maastricht requirements, on advice from Goldman Sachs.

How the eurozone sovereign debt crisis will be resolved is unclear as of this writing. Both debtors and creditors (not least the northern creditor banks) would stand to lose if any country left the eurozone, an eventuality which was not envisaged in the Maastricht Treaty. At the same time, there is reluctance to advance fiscal union (which would require a loss of sovereignty by individual countries) or to develop a common banking regulator or to declare a lender of last resort for the eurozone. Are the capital controls recently introduced in Cyprus the first split in the eurozone?

Conclusions

In an earlier paper in this *Journal*, May (2011) pointed to the GFC as one of several pressing public policy issues that require rigorous analysis as a step towards appropriate policy. This paper is an attempt to begin such rigorous analysis, at least of the proximate causes of the GFC. To understand how the underlying political environment had changed in the 75 years since the Great Depression,

changes which allowed the triggers discussed above to occur, would require deeper analysis of the political economy of regulation and legislation in the U.S. and beyond, an analysis I do not attempt here.

In summary, I believe the crisis was brought on by three actions in the U.S.: first, the repeal on November 12, 1999, of the Glass-Steagall Act of 1933 (prohibiting the consolidation of financial institutions and insurance corporations), which led to a vast increase in the market dominance of the major banks; second, the Congressional decision enshrined in the *Commodities Futures Modernization Act* (signed into law by President Clinton on December 21, 2000), which explicitly exempted derivatives from government regulation; and, third, the SEC's decision on July 21, 2004, to relax the capital adequacy requirements of Wall Street banks, which allowed them to expand their leverage threefold or more. These were failures of regulation, not acts of venality. The failures of the CRAs were a symptom of the existence of asymmetric information, a form of market failure. Another way of looking at what happened is that, like the Prisoner's Dilemma or the Tragedy of the Commons, it was a phenomenon where individually rational actions were collectively irrational: no investment bank could afford not to trade in credit default swaps, since others would do so at the first bank's competitive expense, but the eventual aggregate outcome was the credit crisis. Such phenomena cannot be resolved by individuals alone, however well meaning they might be; instead, they require effective regulation, which failed here, over a period of years.

The Timeline

Available Online at the RSNSW website, http://royalsoc.org.au.

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Robert Marks

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Robert Marks: Originally trained as a structural engineer at the University of Melbourne, with a doctorate in economics from Stanford, Dr. Robert Marks is an Emeritus Professor of Economics at the University of New South Wales, and a Professorial Fellow at the University of Melbourne. He was a foundation faculty member at the Australian Graduate School of Management. He published the first application of the Genetic Algorithm in game theory, and was for 13 years the Editor-in-Chief of the *Australian Journal of Management.* He has published over 175 papers and reports, including pioneering papers on computer modelling and validation in the social sciences.