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Systemic risk in financial services

Abstract of the Edinburgh Discussion

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This abstract relates to the following paper:
Besar, D., Booth, P., Chan, K.K., Milne, A.K.L. & Pickles, J. Systemic risk in financial services. *British Actuarial Journal*, doi:10.1017/S1357321711000110.

The Chairman (Mr G. M. Bagot, F.F.A.): We are delighted to welcome Alistair Milne, one of the five co-authors of the paper. The authors were asked by the Actuarial Profession to examine the issue of systemic risk in financial services, by addressing the following questions relating to the financial crisis that we have just experienced: (1) What leads to such events having an effect on the entire financial system? (2) Can such disturbance arise in the insurance and pension sectors as well as in the banking sector? (3) What can be done to reduce the likelihood of such systemic events occurring, and to lower their impact when they do occur?

So, Alistair, please introduce your paper.

Professor A. K. L. Milne (introducing the paper): We are a London team based at the Cass Business School. We were invited by the Profession to discuss the problems of systemic risk in financial services. Although the motivation for this particular piece of work was to answer some of the specific questions raised by the Actuarial Profession, there are some linked issues.

First, I will focus on the historical record on financial crises. This is not our own work, but drawn from a huge body of academic and other research. Then I will look at what is more our own contribution. There is a lot of financial regulation but the question of what the financial regulations are trying to do, in the prudential area, in terms of containing systemic risk or maintaining financial stability (which is a related term), is rarely defined. We try to come up with a definition of systemic risk and its application in financial services. Using that definition, we then address the question: what is the extent to which systemic risk might apply in the insurance and pension areas?

We have also investigated a number of case studies. I will try to draw out some of the broad lessons from these and then finish with a policy discussion. We, as co-authors, are not entirely agreed on the best policy approach; but then neither are the policy makers. There is still a lot of ongoing debate, both here in the UK and in the United States. It is still far from clear how the policy responses will eventually evolve.

In reviewing the many financial crises over the years, we discern two opposing views on the operation of the financial system. One view is that of the US economist Hyman Minsky, which is

that for-profit financial intermediation is inherently unstable. In a number of books and papers he has addressed the instability of credit, particularly in the context of the United States. He has discussed the way in which government support for that credit, particularly government bailouts, whether through lower interest rates to support asset prices or through direct support for financial institutions in difficulties, lays the seeds for another round of unsustainable credit expansion: another boom and bust.

The other view, which is critical to thinking about future policy, is that a free market in financial intermediation can work well. But it is critical to have effective regulation and governance to control risk-taking, to ensure that the managers of financial institutions, primarily operating in the interests of their shareholders, also consider other stakeholders.

Table 1 in the paper is a tabulation of post-1945 systemic banking crises. There is an even longer tabulation in Appendix A showing a good many more going back further in time. In constructing this, we first need a clear idea of what we mean by "systemic". Some authors simply mean a case where many banks are in trouble. We wanted to distinguish cases of extremely weak rule of law and we wanted mainly to focus on larger countries. So our identification is based on two criteria: firstly, a size criterion for the countries concerned, in terms of gross domestic product, and secondly, that they should have, according to a World Bank index, reasonably effective rule of law. This ensured that the crises in our list are not crises produced just by corruption or a failure to enforce the law of the land.

When we finished the table we felt that there were certain prominent crises which come up often in discussion and which perhaps should have been in the table. So, deviating from the entirely mechanical exercise, we put back in crises in Argentina, India and China, as they are large countries and we also included the Asian crisis of 1997 which affected several countries: Indonesia, Thailand and others.

The first crisis, on these criteria, was a UK crisis in 1974, even though the table covers the period from 1945 onwards. There was a long period where a large-scale banking crisis in well-run countries simply did not occur. A natural explanation of that is the tight regulation of financial functions. Banks were quite limited in the types of contract they could offer and the exposures they could engage in, as were indeed insurance companies and other intermediaries. Also, there were tight controls on capital flows between countries so it was difficult to evade the domestic regulations by moving activity off-shore.

The financial deregulation that took place through the late 1960s and the early 1970s, both in terms of activities and of capital flows between countries, were partly technologically driven, especially by the telex machine. It allowed all sorts of contracts to be monitored across borders, which would have been much more difficult to do before the mid or late 1960s.

This preceded the well-known secondary banking crisis in the UK, where financial regulation allowed a number of non-bank financial intermediaries to engage in a considerable amount of lending and credit expansion in the property sector.

Putting the table together was purely secondary research, relying on other studies, including the extensive work by Reinhart & Rogoff which has recently been published in a book.

Obtaining data on the non-performing loans of these banking crises is difficult. Fiscal costs are even more difficult to establish. So there are gaps in the table.

We have added the final column in the table ourselves. One measure of loss of output is the largest decline of GDP in the years following the crisis. It is not always negative. In some years, in some countries, GDP continued to grow despite major financial crises.

What we discover from this tabulation, which agrees with the conclusions of Reinhart & Rogoff and others, is that there are a number of common features for these crises in many countries: rapid expansion of credit, most obviously associated with asset price booms, particularly in commercial property and often in residential property. In many cases, but not all, large-scale overseas borrowing was reflected in current account deficits. A feature that is also found in a large number of these cases was recent financial liberalisation. Examples are the UK case of the secondary banking crisis, the savings and loan crisis in the United States and the large Japanese banking crisis.

More information is set out in the paper.

We use this knowledge as background to the question, which we found not adequately addressed in the literature. These tabulated crises are regarded as systemic in the sense that there have been widespread problems in the financial system, and government has intervened on a large-scale to support or protect banks or other intermediaries. In many cases, there has been a substantial impact on economic activity: often a large fall of output or a rise in unemployment.

It seemed to us, though, that these were consequences, and therefore not satisfactory as a definition of systemic financial risk. This is paralleled in some current work in the Bank of England and elsewhere.

What is necessary to our minds is to stress the network aspects of the banking system, and the fact that the banks link savers and depositors on one hand with borrowers on the other. It is the feature of being a network that is the source of a systemic problem, in that a shock can affect the system as a whole. The amplification of an initial shock through the financial system is the key point to take into account.

Systemic risk is not necessarily purely a financial concern. We want to have a definition which we could apply to insurance, pensions, and other cases, and which does not rely on banking concepts. We settled eventually on the following definition of a systemic risk. "A systemic risk is a risk, not necessarily a financial one, materialising when an initial disturbance is transmitted through a network of interconnections linking firms, households and possibly financial institutions with each other, and leading to a breakdown of this network."

The two important features are the amplification of an initial shock and the consequent breakdown of the network of financial relationships.

There are a few caveats. The most important is that this is not necessarily a large common shock. One can certainly envisage a large environmental shock or possibly an epidemiological shock. There could be a major catastrophe which would have a substantial impact on the financial system simply because it is large. But that is different in nature from the systemic crises that we have observed in the banking industry in the past. Rather, systemic risk is something, at least in part, emanating from the instability of the system itself.

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The other feature is that it is not necessarily a complete collapse of the financial system. We have tabulated what we have identified as the major banking events of this kind since 1945. The periods of high interest rates in the UK when we were in the Exchange Rate Mechanism during the late 1980s and early 1990s had an impact on the housing market, particularly in the south east in 1991–1992. That did not lead to large-scale government bailouts; but in some respects, by our definition, that was also a systemic problem due to previous excessive credit expansion.

Quoting Wikipedia in the paper, we consider the 1964 New York electricity blackout, which is a non-financial example of a systemic crisis. This case study rather neatly illustrates the possibility of a small initial shock being sent through various parts of the network, leading to a much bigger consequence than anyone running the system would have thought possible.

The paper treats next the nature of the networks in banking, and then life insurance and pensions.

We identify four aspects of these networks in banking that can lead to such amplification. One is payment systems risk. The best-known example of this was the Herstatt crisis, where the failure of a small German bank led to the near collapse of the New York inter-bank money markets system, CHIPS.

The German regulators who closed down Herstatt did so at something like five o'clock or six o'clock in the evening German time, when German inter-bank exposures had settled, without thinking, "Hang on, there is a five hour time difference with New York and there could be plenty of exposures which have not yet cleared and settled. And it might be a good idea to wait until 11 o'clock in the evening before we go through the legal process of closure."

Regulators round the world have learnt that particular lesson. This became the principal motive for the major shift in payments systems towards what is known as 'delivery versus payment'. When there are large exposures between banks, all large value payments systems in the developed world and, nowadays, in most emerging markets, are settled delivery against payment relatively rapidly. The other thing that is avoided, as a consequence of delivery against payment, is a lot of netting of large payments. Everything goes through on a gross basis, which greatly simplifies the problems of unwinding if there is a failure.

The good news is that we know how to make systems more robust.

The other three examples relating to banking networks are sources of systemic risk and have all played a major part in the current crisis. One is the practice of maturity mismatch in banking and the use of short-term funding to hold illiquid assets.

This has not been emphasised enough in the media as a major role in the global crisis of the past two years. Poor lending decisions also played a major role but it is also clear that many major financial institutions failed to appreciate that liquidity could disappear for many of the assets they were holding. Therefore, to finance or fund those assets short-term was a substantial risk which, if materialised, could have a major impact. Maturity mismatch was evident in many banking crises of the 19th century. We thought we had escaped from it with liquid inter-bank markets, but it has come back. We realise that it cannot be taken for granted.

The other risks are more obvious. One is common asset exposure. It is common in banking to rely on collateral values as a source of protection when granting credit. That, to some degree, works

for individual risk. If an individual lends me money, and has collateral against my house, and I, for whatever reason, am unable to repay, that collateral is going to be fairly good protection. But it is not good protection against a macro-economic or systemic outcome, where the values of all collateral are falling dramatically. Banks made the mistake, made too often in the past, in assuming that protection against individual default through collateral is also a protection against an aggregate shock which leads to an aggregate increase in default. Regrettably, that collateral has been shown to be a rather weak source of protection in those circumstances.

The final area, which again is a common feature of banking networks but more associated with the inter-bank market and the derivatives market and which the failure of Lehman Brothers brought to the forefront, is counterparty risk. Several institutions, such as AIG and some monoline insurers, were providing insurance.

Taking out insurance is like the common asset exposure. It will work for individual risks when an individual defaults, but at an aggregate level you have to be sure that your counterparty, which is providing that insurance, has adequate reserves to cope with a large aggregate shock. Clearly AIG and other insurers did not. This is again a mistake that has been made in the past, for example, the UK property markets of the 1990s and late 1980s with mortgage guarantee indemnity insurance. Better arrangements to manage those counterparty risks are clearly required in the future.

Our research leads us to a relatively optimistic view as far as life insurance and pensions are concerned. Our conclusion, stressing these network relationships, is that systemic risk is primarily a banking, and not a pensions or insurance, problem. However, if banks get into deep trouble, it is a problem for the insurance and pensions industries as well. It could well lead to substantial deterioration of net worth. It could undermine measures of solvency, and so forth; but it is not something originating within pensions and life insurance.

The question we are addressing in this part of the paper is whether there is a possibility of systemic problems – networks of connections that amplify an initial shock – arising within pensions and insurance. We have come up with two main mechanisms but I will mention a third covered in the writings of a well-known US economist. I should like some feedback on whether we have missed something.

One of the main mechanisms is inflexible solvency regulation. We believe this is a problem both in banking and in insurance. Everyone wants to see more stringent capital requirements across financial services in the wake of a crisis. However, inflexible capital requirements are themselves a source of systemic problems.

Let us suppose that you are required to hold a certain level of capital and then mark-to-market valuations deteriorate. A decline in the market values can put stress on balance sheets, which can in turn can force sales and a further decline of market values, and further weakening of the balance sheet. That, it seems to us, has been a weakness of financial regulation in the past and potentially a weakness in the future. It has not been discussed enough in post-crisis debates.

There is again a difference of emphasis here. A big shift in market values is not something to be ignored. We are not arguing against mark-to-market valuations as a way of assessing the position: we agree that they should be used where possible for constructing balance sheets and assessing

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profits. But we also have to bear in mind that markets can be quite fickle and to then come in with an inflexible response can create a vicious circle. However, it is relevant in the context of Solvency II and is a matter which deserves more debate. We are taking on the bad features of Basel as well as the good, translating them into Solvency II. It is good to use capital as a tool of regulation, but are we doing so in too inflexible a way?

The other mechanism is related to the counterparty issue that has affected banks recently. It is inadequate recognition of, and capitalisation against, insurance counterparties. The Lloyd's insurance spiral seemed to be an earlier example of that inadequate recognition of risk in the insurance context.

The one issue not addressed in the paper but on which I would welcome comment is early encashment. Laurence Kotlikoff, who is a well-known pensions and fiscal policy economist from the University of Boston has been invited by Mervyn King, the Governor of the Bank of England, to visit the Bank. He has some radical ideas about banking reform, much more radical than we dared put in our paper.

He is more of an insurance and fiscal policy economist than he is a banking economist. He is particularly concerned with the possibility of early encashment of life insurance. We discussed this briefly in the paper but we felt it was not a major systemic problem. Kotlikoff argues in his book that the undermining of market values could lead, with the type of insurance arrangements prevalent in the US, to an acceleration of early encashment of life insurance policies, which could undermine the insurance system. I am not convinced, but if any of you have views on that I would much welcome them. It may be something that we have missed in our analysis.

We consider various case studies in the paper and now I touch briefly on these.

The crisis of the 1930s is the one of most concern and to which we should be paying particular attention in terms of the future. We spent quite a lot of time looking at the literature on the 1930s crisis. It was an opportunity to dispel some common preconceptions. Those who have looked at the facts, or at least read the extensive literature, will know that the popular view of the 1930s led to some unfortunate misunderstandings. One of the most unfortunate is the view that the crisis was triggered by the 1929 stock market crash. The stock market crash was followed by the crash of the US economy. It is not clear that they are entirely unrelated, but it is clear, when you look at the historical record, that, for various reasons, the stock market crash was a somewhat independent event. It did not cause the subsequent and unprecedented collapse of US economic activity, where industrial output fell by something like 50%. It was a cataclysmic event that began in 1930 and gathered pace in subsequent years. The US economy did not begin to turn around until 1933.

The stock market crash is one of the worrying parallels of the recent crisis – again there was a major decline in stock prices. But there was quite a substantial recovery as well. So stock prices fell dramatically over a few weeks but, over subsequent months, pulled back more than half their losses.

The other important point was that, although there were direct problems associated with the stock market in the US, many securities were associated with lending in Florida. Other drivers of the worldwide downturn seem to have been rather different, particularly in the US and Germany.

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In the US, there was an initial shock perhaps associated with the stock market. But it was the weakness of both fiscal and, particularly, monetary response, which played a much bigger role, in particular, the dramatic shift out of the banking system. The key feature of the United States during the crisis of the 1930s was the sharp decline in the ratio of bank deposits to currency. People were essentially saying, "I am not going to put my money in banks. I am going to put it under the mattress."

Banks are also a major source of credit as well as of money. There are different interpretations. There is a monetarist view which is that the consequent decline in the money supply is the critical factor. The funds withdrawn from the banking system meant banks were unable to grant credit and it put a credit squeeze on the US economy. The US authorities failed to respond to the situation.

Also the US economy was far from being a closed economy in the 1930s. It was a major exporter, as China is today. Its problems were greatly exaggerated by the worldwide banking problems. The weaknesses of the gold standard generated the international transmission of the 1930s crisis and were partly the reason for the weak response of the US authorities. They were still committed to gold and defending the gold parity as opposed to defending the monetary and real economy.

Keynes, in his book, *The Economic Consequences of the Peace*, identified the key flaws in the pre-war monetary system. These were the excessive reparation payments demanded of Germany and the instability of the fixed exchange rate standard. Although it is somewhat different because it is a monetary union, we are seeing how powerful those impacts can be today with the difficulties of Greece within the Euro area.

There is a lot still to be learnt from the 1930s. The lesson is, "You need to respond through a strong fiscal policy." Fiscal policy is only a temporary solution. You need to restore confidence in the financial system. So ultimately the solutions have to do with money and credit. That is still a big challenge for us today in terms of the global financial system.

Another example is Asia in 1987, which was caused by the maturity mismatch of short-term funding. This has been a feature of virtually all financial crises but it is particularly pronounced in the case of Asia. There, again, it was based on a misunderstanding: a belief that all these strong, rapidly growing economies were committed to a fixed exchange rate peg. Therefore, if we lend them foreign currency in the short-term, the exchange rate peg and the commitment of their central banks will ensure that we do not lose money. We are offered an attractive rate of return and, if there is a problem, it is only short-term lending so we can easily withdraw. But this is a fallacy of composition: not everybody can withdraw deposits from a fixed exchange rate system at the same time. Those who are slow to respond are going to get caught and that, in turn, generates instability when confidence is lost.

There were severe losses in some countries, both financial and in terms of output. The positive outcome for Asia was the rapid output growth in most of the countries affected – even Indonesia, which had the deepest structural and political problems. They had the advantage that they were not the whole global economy. The Asian economies could benefit from rapid depreciation and restore growth, and, within a couple of years, Korea, Thailand, Malaysia, the Philippines and, more slowly, Indonesia, were able to benefit from a more competitive exchange rate and favourable monetary policy from the US.

2000–2002 is of interest to insurance and pension funds, particularly because it is the previous occasion when the net worth of those funds was substantially affected by the decline of stock

market prices. The pensions and life assurance system we focused on are not systemic problems in our meaning of the word, because, despite the major deterioration in net worth, the systems continued to function. There is room for debate here, because this was one of the events which triggered the subsequent closure of a number of defined benefit pension schemes. The important point is that the promises that had been made were not broken.

The paper also focuses on our current crisis. It illustrates many more problems, other than payment system ones, although there were threats even of those. Barclays Bank got caught up with a major payment situation. They quite reasonably said it was not their fault: it was the connections between the Bank of England and the settlement system in London which left Barclays short.

The other problems include the global collapse, the exposure to collateral, the maturity mismatch, and the counterparty risks. The global spread is still proving difficult to contain. We have not resolved the problems. We have used a fiscal bandage to staunch the bleeding. Unfortunately, it is the nature of fiscal remedies that they do not last forever. The big concern is that we have not dealt with the underlying problems of confidence and structural problems in the financial system. That was not quite the subject of our paper, but it is something that I would not want to pass over without expressing a degree of pessimism. I would expect to see pretty slow growth of the advanced industrial economies for some years to come.

We mentioned briefly two examples of what we regard as systemic insurance episodes. I have already touched on the Lloyd's of London reinsurance spiral. My colleague, Philip Booth, was able to provide information about the 1998 episode in UK life insurance originating with the illiquidity of the long bond. There was only one bond issue that was of the appropriate term to maturity for the UK insurance industry. Solvency requirements and the pressure to buy the bond then pushed up the price and produced an amplification of the initial loss of net worth. It was resolved quite appropriately by a suspension of the solvency rules.

Turning to broad policy choices, I will mention some of the specific proposals. This is going back to the debate about Minsky, on the one hand, and the arch-regulation people on the other. We are sitting in the middle ground. We are neither with Minsky in saying that the system is inherently unstable, and if it moves, regulate it; nor are we sitting with those who think we should just tinker with our current system of regulation, with higher capital requirements and more regulators.

We have a third focus which has not achieved enough attention in the debate and not covered in the paper. Many of you will have come across the views of Paul Volker, which have now got the ear of President Obama in the US. This fits quite neatly with our own analysis.

We have two broad choices. Should we return to the 1950s when there were no systemic financial crises? Or should we be focusing on modelling, measuring and calibrating systemic risk – a broader, more system-wide approach? Our preferred policy focus, although we disagree on some of the details, is to focus on the resilience of the networks. What we want are arrangements that ensure individual institutions can absorb shocks without transmitting and amplifying them or – and this is a caveat – if an institution does fail, because we cannot have a 100% error-free system, that should not then lead to major consequences for others.

So how do we enforce this resilience? We have a number of specific recommendations to encourage resilience. First of all, we consider flexible capital requirements. I am certainly going to continue

to write about these in the banking context. There are strong arguments for them in insurance too in the context of Solvency II.

The second is related to flexible capital requirements: arrangements whereby more capital can be raised in a straightforward manner. This is a popular issue among regulators at the moment. There must be a pre-commitment on the part of suppliers of capital to provide additional equity capital in certain specified circumstances. The so-called coco bonds, which I think Lloyds TSB has recently issued, have been an example of this. We do not refer to this in the paper.

Something that is more obvious, and has not been highlighted enough in current regulatory responses, is that private firms need to report explicitly to regulators how they would respond to and deal with a systemic aggregate problem. Banks have been left to model risk purely from the point view of their shareholders, who are mainly concerned with the middle of the distribution, rather than the extreme tail. It makes sense for the regulators to say, "We, as regulators, do care about extreme outcomes and we want you to report to us on exactly how you would deal with systemic interactions." There should be discussion with the regulators on what those reports should contain.

There is a strong argument for the introduction of central counterparty type arrangements which would ensure that all those that are making commitments in the over-the-counter (OTC) markets, particularly the credit default swap market, have the balance sheet position to be able to meet their commitments in the event of a major shock.

Perhaps this has not been addressed as much as it could have been by the regulators, but we feel this is going to require more disclosure of information by financial institutions. That will need a lot of work. It is not just a question of providing the regulator with all the information in your data systems. You need agreement at industry level on how information is to be classified and coded so that it can be aggregated in a sensible fashion.

The final point, which in retrospect I would have liked to have included in the paper, is improving the arrangements for orderly closure of distressed institutions. It is not quite clear how that will work in practice, but it is something that would be helpful in containing systemic risk as we define it.

Those are our conclusions. I am looking forward to hearing the discussion.

The Chairman (Mr G. M. Bagot, F.F.A.): We have had a very interesting review of an impressive paper. There are challenges for us to respond to the ideas, comments and views on what has happened.

There is a couple of key points. The author has challenged us to speak on the role of regulation. There might be one or two comments on Solvency II, and an answer to the questions from the Boston professor regarding early surrender of insurance arrangements. We would welcome any comments on the five recommendations which are in the first part of the paper.

Mr P. O. J. Kelliher, F.I.A. (opening the discussion): Firstly, there is another interconnection between financial institutions in addition to the four listed in section 4.2. This will arise from investment banks making a market in securities. As has been seen in the current crisis, trading losses and higher trading capital requirements can lead to banks ceasing to make a market in some securities.

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The resulting uncertainty in the value of assets can lead to a damaging loss of confidence in the balance sheets and in the financial strength of financial institutions and represents a source of systemic instability.

My second observation concerns the role of hedge funds in the current crisis and whether they represent a source of systemic risk.

Section 1.12 states that only those hedge funds with similar investment strategies to banks suffered a loss of confidence and large-scale withdrawals during the crisis and that the suspension of redemptions prevented more widespread damage. However, I have seen some accounts where up to $250 billion was withdrawn from hedge funds in Q4 2008 alone. This was a more general loss of confidence in hedge funds and their strategies rather than a subset of funds.

The withdrawals, and the unwinding of leverage positions that followed the withdrawals, had a major part to play in the record bond spreads we saw at the end of Q4 2008 and the start of Q1 2009.

I view the threat of mass redemptions from one or more hedge funds as a serious source of systemic risk. I am not as sanguine as the authors appear to be in 7.2.25 over shifts in risky activity from banks to non-bank players.

A third point regards the role of UK life insurers in both the equity market crash of 2000–2002 and the current crisis. The equity market crash in the UK was probably exacerbated by life insurers selling equities to shore up solvency, particularly with the FSA's realistic balance sheet regime coming into force. In a way, this was the opposite of the paper's first recommendation that regulatory capital requirements should never force asset sales during periods of widespread financial distress. In any case, while life insurers were not the instigators of the Dotcom crash, they made a particularly bad situation worse in the UK.

Similarly, while the current crisis is principally a banking crisis, UK life insurers, or rather their policyholders, have contributed to banks' difficulties, with large-scale withdrawals from open-ended property funds in the latter part of 2007 and again over 2008. Life insurers were able to protect themselves by invoking deferral clauses but were still left with a large block of property to be sold at a time when finance was not available. I have no doubt that this exacerbated the falls in commercial property values and the losses banks like HBOS have incurred on commercial property lending.

I suspect this may dovetail in with your visiting Boston professor's comment regarding the impact of mass surrenders, though I suspect there might be a particular sensitivity in the US to such surrenders because I understand their insurance products are often pseudo deposit contracts, and obviously more vulnerable to a run.

In short, UK life insurers are not a primary source of systemic instability, but they have the potential to make a bad situation worse.

My final point is that systemic risk does not stand still. It was once thought that allowing insurers to fail should not create any systemic instabilities, but the US regulators got a nasty shock when they realised they had to come in and rescue AIG otherwise it would have caused carnage for its counterparties.

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While it might seem far-fetched for a UK insurer to create a similar crisis, I have seen quite a large growth in insurer usage of OTC derivatives in recent years, and this is likely to continue to grow as we get new derivatives like longevity swaps. Life insurers may not be a significant source of systemic risk at present, but the growth in their counterparty exposures could make them so in the future.

Similarly, pension funds could become a more significant source of systemic risk if accounting rules were changed. As bad as the current crisis has been for pension funds, it would have been a lot worse if funds could not reflect widening spreads in liability valuations. More breaches of borrowing covenants would then have arisen at a time when banks were unlikely to take a sympathetic view, and if we did not have that flexibility in the accounting regulations we would potentially have seen many more pension schemes dragging down firms, and making the current recession far worse.

I suspect this paper will need to be revisited in a few years' time but for now it is an important step forward in research in this field.

Mr B. G. Moretta, F.F.A.: By covering such a large topic, the authors are inevitably going to struggle to cover everything. I was a little disappointed that, having been given a brief to cover pensions and insurance, the authors did not do a case study on either of the potential systemic problems that they mentioned.

I want to mention the area of rating agencies. It is clear that they are crucial to much of what happened, not only in this crisis but in 2000–2002 and in 1997 as well.

We have contracted out part of regulation to agencies which have no statutory duties, no statutory obligations, and indeed hide behind a US amendment on freedom of speech as publishing companies. We should be doing something to bring these properly within the system if we are going to incorporate them into Solvency II modelling, Basel modelling and other risk systems employed by regulators.

Mr C. R. Barnard, F.I.A. (written contribution read by the Chairman): One of the issues that often arise from actuarial papers with broad scope is the lack of an over-arching narrative. It wasn't clear to me what the goal of the paper was, although I had understood the terms of reference.

I would have thought that the goal of the paper should have been to propose methodologies, policy measures and responses which would attempt to quantify and control systemic risk, and dampen and mitigate the adverse effects of developing systemic crises. Developing a definition of systemic risk, the review of previous crises, and literature provided in this paper, would be subsumed to this goal. This paper dealt with parts of this whole, but left some issues unclear.

For example, the authors' definition of systematic risk is good, and an improvement on the existing material. Perhaps the definition itself could also mention the importance of self-reinforcing feedback mechanisms, which make systemic crises so difficult to control, let alone reverse.

The paper didn't address how we can measure systemic risk. For example, it seems clear with hindsight that we have suffered a systemic crisis. However it is difficult to say when the crisis became systemic, or at what point regulators and controllers needed to step in during the past years and deal with the emerging crisis. The Property Casualty Insurers Association of America advocate

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two key tests for measuring systemic risk: the "too big to fail" and the "too interconnected to fail" tests. Perhaps we could consider such measures and determine how they could be used in practice to measure systemic risk.

I would like to have seen the authors distinguish more between endogenous systemic risk (generated by the system itself), that can lead to widespread market failure, such as excessive leverage, and exogenous shocks, since each requires a different approach and policy response. This was touched on in sections 1.14, and 7.1.3, 7.1.6 but could have been elaborated further.

The paper referred, especially in section 6.5.33, to the importance of models, and their use, in contributing to systemic crises. Have we, in the financial services arena, become slaves to using models in our work generally, and subscribing too much confidence to their use and in their outputs?

Take for example VAR. This measure assumes that exposures can be covered quickly, and at prices close to those used in the calculation of the VAR. Holding huge positions that, due to unwinding, dramatically change their market prices, negates the use and meaning of the VAR. How can we allow for and control such basic contributors to systemic risk, such as models (and I mean models in the broad sense of including models and methodology), in our profession, and in the financial services arena generally?

Mr J. S. R. Ritchie, F.F.A.: In 1.7 the authors give a definition of systemic risk, and then the next sentence says: "For brevity we do not include government bodies in this definition, although they could be added." I am mindful at the moment of what is going on in Greece and the sovereign debt issues that are arising, and commentators talking about the possibility that this issue could overflow into Portugal, Spain and some other countries within the Euro zone. Can the authors assess the potential impact of this in the context of systemic risk for financial institutions around the world but, in particular, in the UK?

The Chairman (Mr G. M. Bagot, F.F.A.): Paragraph 3.5.3 makes the comment that shareholders cannot rein in the senior executives, and non-executives are in a weak position. Then the authors state further that bank supervisors cannot rein in either after the event. In paragraph 3.5.7 the problem of mark-to-market is mentioned.

In paragraph 3.5.8 the authors also bring to our attention that there is insufficient attention paid to using risk systems and the limits of those systems. These are ignored or not understood at senior management and board level. How can that be overcome?

Paragraph 6.5.34 states that risk management was not taken seriously at senior management and at board level. I agree with all those comments.

I was employed as an analyst, an expert witness, in the case of Unilever Superannuation Fund against Merrill Lynch, and all the points that I have just mentioned were the points I discovered within the Merrill Lynch empire. Senior management did not understand the risks and those at board level did not know anything about them. Nothing was done about the basic numbers that were coming up from the systems that were in place then.

I have also been involved in a similar role in the split capital investment trust market and, again, it is clear that senior management and the board did not understand what was going on in the funds.

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It is sad to go back and say that the regulator seriously failed.

Of all the suggestions and recommendations made in the paper, I particularly support Recommendation 5, which is that the regulator should know 'the risks'. At the close of business each day the positions of each and every institution that it regulates should be passed to the regulator, so not only can it regulate an individual institution but, in aggregate, it can regulate the whole industry by asset type, by asset class, by asset holder.

Unless we get to that level of supervision, we could have another session like this in ten years' time: looking at another crisis, which will have unfolded by then.

Mr R. K. Sloan, F.F.A.: Firstly, about defined contribution schemes which we are seeing being brought in on a national level in NEST. Here we have the intergenerational effect of a stock market slump at a time when people are retiring, possibly combined with poor annuity rates.

It is certainly the role of actuaries to do something about trying to avoid these risks. My recommendation in the consultation process was to have the default fund to be on an index basis to avoid that kind of generational problem arising; but of course that has been largely ignored. Also, we have final salary pensions where career average pensions would have been a less risky option.

Despite over 30 years ago the government having introduced SERPS, which was a career average scheme, it always surprised me that the vast majority of occupational schemes eschewed the possibility of laying off risk and instead retained it themselves by contracting out. It took 25–30 years before the effects of that hit the pension funds with the result that many final salary schemes are now closing.

I have noted that there have recently been claims made in this chamber that actuaries, had they been more closely involved, might have saved the financial world from the ruin that currently surrounds us. It is unfortunate that the chief executive of one of the large banks, who also was a director of the Financial Services Authority, was an actuary.

Actions speak louder than words and I am therefore pleased that the Chartered Enterprise Risk Actuary (CERA) qualification is with us, because that will enable actuaries to be properly trained and examined in these disciplines and to play a meaningful role.

In conclusion, I have noted that it is now nearly ten years since I was first arguing for non-executive directors in life offices to include an at least one independent actuary. This could usefully be extended in the area of banks and other institutions to include somebody like a qualified CERA among the non-executive directors. This would enable all the risk management processes to be subject to an independent review by someone who is knowledgeable.

My issue with the governance of many of these institutions in the past has been that the non-executive directors were members of a club and did not necessarily bring any expertise to the game.

Lord Myners completed a comprehensive review of the governance of mutuals, which I participated in, but I do not think any specific conclusions of that nature were arrived at. That would be my addendum to Recommendation 5: to include some roles for CERAs among the non-executive directors.

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Mr R. D. Muckart, F.F.A.: As someone who lived through the Asian crisis as an investment manager, I am not convinced that the paper covers it as well as it might have done.

The authors suggest that stock markets are not part of the systemic risk. In the Asian case they certainly were because it was a domino effect that took out one after the other. It started in Thailand and ran, rather like swine flu, as an epidemic through the region. It was compounded by the fact that many of the stocks in the markets are held by the entrepreneurs who are involved in the very lending in which the banks were participating. So you have two sources that became rather clouded. I am not convinced that regulation, as it is at the moment, will be able to deal with that in an Asian context. The interesting country was Malaysia, which did what we investment managers hate: closed the door and would not let us out. By closing the door the Malaysians saved themselves. By leaving the party but then ring-fencing everything, they were able to save their economy far more than any of the others. Regulators should look at that and the implications of it.

Last week in the Financial Times there was an interesting article which talked about illiquidity risk and the accountancy systems having to adjust to the situation, albeit late in the day. One of the solutions suggested was that there should be flexibility in the way in which valuations are carried out. As someone who was involved in investment solutions and liability-driven investment in its early days, I wholeheartedly agree with that. Why should I have to produce a value at a particular point in time when the whole purpose of the investment is to produce a result over months and years where there is no forced sale in the short-term because it has been designed correctly? The need to value at a particular rate of interest today, or on a particular set of criteria, is a false premise and we, as a body, should be fighting against such regulation.

Mr J. S. Young, F.F.A.: I agree, as a Profession, we under-sell some of our skills. There is no way that we could say that there would not have been a crisis had actuaries been present, but banks do tend to run themselves on a relatively short-term basis.

As actuaries, the type of skill that we take for granted is the ability to look at a cohort view of the book of business that we are running. It is a core model office type of skill. It is also true that we would tend to look over historically much longer time horizons when working in a bank than people in banks typically do. Looking over 10 or 15 years in the future, we start to pick up some of the trends, such as a credit bubble being created, while the models in the banks started to struggle because in an inflating credit environment you do not get bad debts. But to look back and say how the different cohorts might roll out over the next five to ten years will give a fundamentally different view from that of typically run banks.

Actuaries have a role to play if we can bring our skills to bear in a wider context.

Mrs l. M. Paterson, F.F.A.: Do we focus too much on the absolute number, when we should be looking at how that number is changing? It is about the governance of what the number is telling us. The FSA and other regulators do have risk systems and they do ask boards to look at risks. But we do not understand enough about the change in the number. Part of the solution on this is to recognise change, and to recognise when it is accelerated change, because that is when the systemic risk really starts to get going.

There is still not enough emphasis on governance. Basel, Basel II and Solvency II are still focused on numbers, on reserving. By all means, let us make sure our model works and understand the

model and what the model is not doing. But the governance all around this seems to me to be still missing. Perhaps that is where, to echo the previous speakers' comments, actuaries can help.

Mr D. G. Robinson, F.F.A.: It is clear that, with the benefit of hindsight, the black swans that scuppered the banking sector were visible with the naked eye. Had boards and non-executive directors been asking the right questions, then much of the crisis that has transpired could have been avoided.

We have to ask ourselves what it is about the competences and behaviours of the boards of financial institutions that made them blind to the risks they were running. Why is it that, with the benefit of hindsight, we can now see these risks and yet, at the time, these risks were invisible?

The FSA's answer is to require higher fit-and-proper standards and greater time commitment from non-executive directors. This ties in with Mr Sloan's suggestion about better standards of governance and the involvement of actuaries in financial services businesses more widely. That will undoubtedly have some benefits. However, there would still be a residual systemic risk.

I have seen with some of the boards in which I have had some involvement that non-executive directors can quickly become part of the problem. They develop an intimate knowledge of the business, which is a good thing from a perspective of understanding the visible issues and risks the business faces. But, as a consequence, they often become blind to the type of issues that they saw when they joined the business with fresh eyes. Their ability to challenge tends to be compromised because they become insiders and, in effect, part of the problem.

On the one hand, businesses need better, more competent, non-executive directors who have an intimate understanding of the business and the market in which it is operating and who are thus able to ask the right questions of the executive team. On the other hand, you need board members who bring greater independence of thought and experience to bear and who can ask the seemingly innocent questions within which are potentially highly relevant insights.

It is important that businesses are able to explain the issues they face and their market responses to those issues in simple language. Had this been done in some of the financial institutions that have fallen on hard times, then much of the financial crisis that has ensued would have been avoided. Non-executive directors should have asked the right questions, rather than allowing themselves to be overwhelmed by complexity and cowed by so-called experts into not challenging what was going on.

I am concerned with the FSA's focus on requiring better fitness and propriety for non-executive directors and significantly increased time commitment – even full-time has been suggested. An unintended consequence of increasing the competence of non-executive directors is the potential loss of independence of thought, experience and challenge that only "naïve" outsiders can bring.

How do we get this challenge and diversity into boards? It is worth considering having some participants at board meetings who can be deliberately provocative and ask the seemingly ridiculous questions that spark insights that would not otherwise have been revealed. These people may not have board or non-executive director responsibility but must be capable of asking the right questions and that structures are put in place to ensure such a role.

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To conclude: the cultural and behavioural aspects of the way that boards operate, and specifically how to ensure the right sort of challenge goes into board decision-making and governance, deserve further investigation.

Professor J. N. Crook (Credit Research Centre): My first point is: how do you determine how much cost you are willing to bear to reduce the risk? There is a trade-off here, not addressed by the authors. We could have reduced the risk by banning all forms of asset-backed securities but then the amount of mortgage lending and the implications for society would have been quite considerable.

The second point is that some of the recent work on networking, by Franklin Allen, Ana Babus and others at Wharton, shows that networking is so complex that regulation of the form described cannot reduce the risk that much. You have to look in great detail at how agents within these networks interact in order to solve the problems one at a time.

Mr J. E. Gill, F.F.A.: I was very taken with the concept in 7.2.19 of double or triple liability for shareholders in terms of legal requirements to put in future capital. My question is: would that impose the disciplines that regulators want to see or would it leave the market completely devoid of capital whatsoever?

Secondly, I noted in the introduction of the paper the reference to the maturity mismatch problem. One of the things that we should not forget is that the maturity mismatch problem has only been deferred for about two years to 2011–2012, because the Special Liquidity Scheme and the Credit Guarantee Scheme that the Bank of England put in place runs out just in time for the implementation of Solvency II. So there is the potential for another banking crisis just at the point that Solvency II comes into place.

Dr D. C. Bowie, F.F.A. (closing the discussion): In common with others, I have read many snippets and commentaries about the current crisis, and have formed some views on what caused it, how we should fix it and who was to blame for it. In our professional lives we have all been helping our clients or our firms deal with the consequences of it.

The paper has had a much wider brief than just the current crisis. I found it an extremely readable paper with considerable evidence presented to support the arguments put forward. I should like to thank Professor Milne, and his co-authors, for writing the paper and for making the trip up to Edinburgh to present it to us.

Apart from learning a lot from the paper, I was also greatly encouraged to note that it was the Profession that commissioned the research. It demonstrates the responsiveness needed from the Profession. We should applaud the speed at which the global financial crisis group and the other organs within the Profession have been able to arrange discussions and research to take place on behalf of us as members.

The global financial crisis group is now in stasis. It is perhaps as well that it is in stasis rather than having been disbanded, given the rather gloomy comments by the author and a couple of speakers.

In common with quite a few of the earlier speakers, I spent a lot of time thinking about how the economic research in the paper applied in the insurance and pensions worlds. I was trying to see

the parallels and to see the more prosaic implications that the insights it provides might have for us in our day-to-day work.

The second theme, mentioned by quite a few contributors, is what we as individual professionals, as well as the Profession, need to take from the research and its findings as we move more into the world of risk management.

The two views of financial stability, or instability, put forward in the paper were the Minsky view that instability was inevitable and that progress was made in an 'x steps forward, y steps back' fashion and the notion that there can and should be a smoothly functioning funding market controlled by regulations. My take on that was the difference between reality and aspiration. I find it difficult to imagine it is sensible to do anything other than work with the instability. The best we can hope for is that x, the number of steps forward, is bigger than y, the number of steps back, on the way through life. What we are then trying to do is balance the pain and the progress among the economic agents in a way that is self-limiting and not catastrophic, and so that x and y are not both so small that progress is never made.

The authors have made their own recommendations as to what that balancing act might look like and how it might be achieved. They have been unrepentant that their recommendations are light on the difficulties of implementation. That is a challenge to us and our clients as economic agents and also to the Profession. We should not ignore the practical difficulties and we should persist as a Profession in exploring how we can contribute to making them come to fruition.

It was clear that many in the audience are a good deal less sanguine than the authors about the resilience of the pensions and insurance worlds to systemic risks. It might be that our perceptions are clouded by our proximity, but it certainly feels that pensions are not doing what they are supposed to be doing and that the problem is deep rooted and self-perpetuating.

Capital and labour will not work efficiently together unless there is some confidence that labour will get its just share of the return on capital. Pension benefits are part of that redistribution. The wobbliness in the defined benefit pensions world undermines that confidence hugely. It also impacts directly on the sponsoring corporations trying to make good on those promises.

The defined contribution plans that have arisen as replacements change the incidence of the risks but do not change the sources of risk or remove them from the system. The risks of investing in equity, which have been entrenched in defined benefit schemes, are also important risks in defined contribution schemes. It may be that the change in the pensions world is a reflection of other changes in society, but I suspect that the pensions dilemma is at least reinforcing that change, if not being a primary driver of change.

Pensions and insurance are a curious mix of long-term and short-term liabilities. While the obligations for the majority of policies and pension funds are undoubtedly long-term, the 'crystallisation' events or tests force a shorter-term perspective or some form of marking-to-market. While there seemed to be support for the notion that those long-term funds have a role in providing liquidity, they are not entirely protected from needing it themselves.

A couple of speakers also spoke about the way in which the insurance and pensions worlds are increasingly using banking products such as securitised credit and longevity-based products.

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Any risk is going to be transmitted more readily and fundamentally across the financial landscape as a consequence: this will be an interesting topic to explore further.

Although the recommendations were not widely discussed, several suggestions were made that more actuaries might be an appropriate recommendation. Indeed we are already trying to move more forcefully into the risk management world, and interpret our more traditional worlds of insurance and pensions as being part of that wider ambit.

In 3.2.2 and further in 3.5.8, the authors suggest that it is governance which plays a big part in establishing better stability rather than regulation. That notion strikes a chord with many of us; the comment that risk systems are not an end in themselves is something that we can take to heart. That gives us as a profession lots of opportunities to make effective use of our actuarial training and our ability (albeit slightly latent in some cases) to interpret and use numbers in decision-making. As Mr Young mentioned, if we are going to gain credibility and trust in that world, we need to be confident that we do not have to produce a number as our conclusion. We must avoid the temptation to contort numbers instead of working out how to use them as part of a wider process to come to the best recommendation. I would strongly encourage that we work on building that confidence and the communications skills that we need to bridge the gap between the measurement and the management of risks.

I thoroughly enjoyed both the paper and the discussion. It is a substantial piece of research and will be a useful resource to us as we continue to explore our place in risk management. There is much we can use as a springboard for new research, investigation or debate. For that I would like to thank the authors again for bringing it to the Faculty this evening.

Professor Milne (replying): First, it is my task to thank the audience for a very informative discussion. You have brought out several issues which we have touched on but not perhaps fully explored, even in a long paper, and indeed a number of issues which probably had not occurred to us.

I cannot answer every question individually, but I will try to draw two or three threads together.

One which particularly strikes me is the actuarial perspective of taking the long-term view, being able to assess not just the short-term and mark-to-market issues, but thinking through the longer-term consequences and the longer-term possibilities. There is the question of governance, and so on, and the professional skills involved.

There is a challenge for the Actuarial Profession. I am a risk management specialist teaching risk models to potential or practising bankers. I know there are other professional groups. The two I have the most contact with are GARP, the Global Association of Risk Professionals, and PRMIA, the Professional Risk Managers International Association, which has its own exam system.

It is probably unfortunate but unavoidable that there is going to be a number of professional qualifications that exist in parallel. There should be more communication between these different professional groups, recognising that they need to understand each other's points of view. There are going to be important career paths where any of a range of professional qualifications should be considered as an acknowledgement that you have had the basic training.

The point about models came up quite narrowly in the context of the rating agencies. I am not a defender of rating agencies but there are two different views of what they got wrong. One is

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that anybody could go to them, buy a rating and, if you paid them enough they would give you the rating you wanted. I think this is over simplified. The bigger problem with the rating agencies is that they became too obsessed with the models and the process of producing the numbers, and were no longer – at least in the structured credit universe – thinking enough about the underlying markets and the economics.

The mistake they have made was not in corporate bond ratings but one with some of the structured products. People thought, "How could they not have realised that, if, for example, the US housing market begins to go south, many of these tranches are going to go over like a row of dominoes?" It is probably not the AAAs that are the problem, because most of those ratings – not all – still stand up. It is the ones that were given a lower investment grade rating, such as A and BBB, which look like complete nonsense with retrospect.

Whether we are coming from an actuarial training or a risk management training, the point about not relying mindlessly on models but recognising them only as tools is something close to our hearts.

The third and final point I would draw from the discussion is that of Mr Kelliher's right at the beginning, which I admit we have not addressed properly. That was the quesion about the market-making function of investment banks, and whether that is systemic. I need to pause and chew on that one. It is a very good question.

I do not think markets are going to be perfect. Even the most liquid markets can, at times, be swung one way or another by a particularly large transaction or some rather short-term perspectives in the market. It will be too much to ask market-makers to deliver a world in which market prices always correspond to what we economists like to describe as the fundamentals.

That, in a way, also feeds back into this point about governance and how we respond. There are many threads to these issues. One is how we do the accountancy. Do we always rely on mark-to-market or should we rely on it whenever we can? Should we be looking at things at a point in time or taking the longer view, which the market often fails to do?

This is the area we have to keep debating. It would be a mistake to go back to a world of just book values, where markets are not an important source of information. We need to think more carefully about how market prices feed back into regulation and into governance.

The point we emphasise in the paper, and after these discussions emphasise even more, is the need to be flexible about responding to market values from a regulatory point of view. To hardwire falling market prices into balance sheets can entail that you are undercapitalised and therefore you must respond rapidly by changing the portfolios. This seems clearly to be creating more problems than it solves. But that does not necessarily mean that one should ignore market prices. We need to find the right balance.

The point came up about Asia and how equity prices were playing a big role. We have been rather dismissive of equity prices throughout the paper as a source of systemic risk. The market crashed in 1987 and there was a strong monetary policy response. There was a recession eventually in 1991 in the US but I do not think that was linked to the 1987 crash. It was problems of infrastructure and rather myopic trading strategies which created it.

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I am not sure whether I can speak right now for all my co-authors but we would say that the stock market oscillations – and they can oscillate a long way sometimes – are not a source of systemic risk, or at least should not be.

Commenting further on the situation in Asia, the Japanese banks had, for reasons to do with relationship banking, quite substantial exposures to equities, and the decline in equity prices in Japan in the first part of the 1990s clearly was a systemic risk. You are perhaps right that we have not looked closely enough at Asia. It is still my interpretation that it was the exchange rate interactions, as opposed to the stock market, that were the key drivers of the Asian crisis, but perhaps we should have said more on equity prices.

It depends on the institutional and regulatory arrangements, but we want to find ways in which stock market volatility does not feed back into the rest of the system. Instead, it is a signal that we interpret, which is perhaps the fundamental skill of the actuary or the risk professional.

The Chairman (Mr G. M. Bagot F.F.A.): I hope there are lots of ideas for Alistair and his colleagues when they read through the transcript. I now ask you to thank our speaker and all the participants in this session for making it such a memorable session.

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