

Lessons from the 2007 financial crisis*

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Abstract

The paper studies the causes of the current financial crisis and considers proposals for its mitigation as well as for the prevention or mitigation of future crises.

The crisis is the product of a 'perfect storm' bringing together a number of microeconomic and macroeconomic pathologies. Among the microeconomic systemic failures were: wanton securitisation, fundamental flaws in the rating agencies' business model, the procyclical behaviour of leverage in much of the financial system and of the Basel capital adequacy requirements, privately rational but socially inefficient disintermediation, and competitive international de-regulation. Reduced incentives for collecting and disseminating information about counterparty risk were a pervasive feature of the new financial world of securitisation and off-balance sheet vehicles. So was lack of transparency about who owned what and about who owed what and to who. Proximate local drivers of the specific way in which these problems manifested themselves were regulatory and supervisory failure in the US home loan market.

Among the macroeconomic pathologies that contributed to the crisis were, first, excessive global liquidity creation by key central banks and, second, an *ex-ante* global saving glut, brought about by the entry of a number of high-saving countries (notably China) into the global economy and by the global redistribution of wealth and income towards commodity exporters that also had, at least in the short run, high propensities to save.

In the UK, failures of the Tripartite financial stability arrangement between the Treasury, the Bank of England and the FSA, weaknesses in the Bank of England's liquidity management, regulatory failure of the FSA, an inadequate deposit insurance arrangement and deficient insolvency laws for the banking sector contributed to the financial disarray.

Despite this, it may well be possible to contain the spillovers over from the crisis beyond the financial sectors of the industrial countries and the housing sectors of the US and a few European countries.

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Introduction

According to a report in the Financial Times, "*European nations are to draw up radical proposals to improve transparency in financial markets and to change the way credit rating agencies operate in an attempt to prevent any recurrence of the financial turmoil arising from the credit squeeze.*"¹

Are transparency in financial markets and better designed rating agencies indeed key to preventing a recurrence of the kind of mess we have been experiencing in the world's most developed financial economies for these past four months? I intend to take a romp through the crisis to see what lessons it holds for policymakers and market participants.

The problems we have recently witnessed across the industrialised world (but not, as yet, in the emerging markets), were created by a 'perfect storm' bringing together a number of microeconomic and macroeconomic pathologies. Among the microeconomic systemic failures were: wanton securitisation, fundamental flaws in the rating agencies' business model, the procyclical behaviour of marked-to-market leverage (see Adrian and Shin (2007a,b) and also of the Basel capital adequacy requirements, privately rational but socially inefficient disintermediation, and competitive international de-regulation. Proximate local drivers of the specific way in which these problems manifested themselves were regulatory and supervisory failure in the US home loan market.

In the UK, the problems were aggravated by:

1. a flawed Tripartite arrangement between the Treasury, the Bank of England and the Financial Services Authority (FSA) for dealing with financial crises;
2. supervisory failure by the FSA;
3. flaws in the Bank of England's liquidity-oriented open market policies (too restrictive a definition of eligible collateral and an unwillingness to try to influence market rates at maturities longer than overnight, even during periods of serious lack of market liquidity);
4. flaws in the Bank of England's discount window operations (too restrictive a definition of eligible collateral; only overnight lending; too restrictive a definition of eligible discount window counterparties).

Both shortcomings in the Bank of England's operating arrangements and procedures were due to a flawed understanding in that institution of (1) the nature and determinants of market (ill)liquidity, of (2) the Bank of England's unique role in the provision of market liquidity because of its ability to create unquestioned liquidity instantaneously and costlessly, and of (3) the conditions under which there is a trade-off between moral hazard (bad incentives for future bank behaviour) and the *ex-post* provision of liquidity to (a) markets and (b) specific individual institutions with the aim of preventing unnecessary collateral damage to the financial system and the real economy.

Among the macroeconomic pathologies that contributed to the crisis were the following:

- (1) An *ex-ante* global saving glut, brought about by the entry of a number of high-saving countries (notably China) into the global economy and a global redistribution of wealth and

¹ Financial Times, October 8, 2007, [EU plans market reforms to avert crisis](#)

income towards commodity exporters that also had, at least in the short run, higher propensities to save than the losers from the global increase in commodity prices.

(2) Excessive liquidity creation by the world's two leading central banks, the Fed and (to a lesser extent the ECB) reinforced by the desire of many new industrialising and oil and gas exporting countries to limit the appreciation of their currencies vis-à-vis the US dollar. The behaviour of these central banks may be in part rationalised as a response to the Keynesian effective demand weaknesses that many feared would result from (1).

1. The Microeconomic Pathologies of Modern Finance

1A. Securitisation

Origins

Traditionally, banks borrowed short and liquid and lent long and illiquid. On the liability side of the banks' balance sheets, deposits withdrawable on demand and subject to a sequential service (first come, first served) constraint figured prominently. On the asset side, loans, secured or unsecured, to businesses and households were the major entry. These loans were typically held to maturity by the banks (the 'originate and hold' model). Banks therefore transformed and extended maturity and created liquidity. Such a combination of assets and liabilities is inherently vulnerable to bank runs by deposit holders.

Banks were deemed to be systemically important, because their deposits were a key part of the payment mechanism for households and non-financial corporations, because they played a central role in the clearing and settlement of large-scale transactions and of securities. To avoid systemically costly failures by banks that were solvent but had become illiquid, the authorities implemented a number of measures to protect and assist banks. Deposit insurance was commonly introduced, paid for either by the banking industry collectively or by the state. In addition, central banks provided lender of last resort (LoLR) facilities to individual deposit-taking institutions that had trouble financing themselves.

In return for this assistance and protection, banks accepted regulation and supervision. This took the form of minimum capital requirements, minimum liquidity requirements, other prudential restrictions on what the banks could hold on both sides of their balance sheets, as well as reporting and transparency obligations.

In the 1970s, Fannie Mae (Federal National Mortgage Association), Ginnie Mae (Government National Mortgage Association) and Freddie Mac (Federal Home Loan Mortgage Corporation) began the process of securitisation of residential mortgages. Asset securitisation involves the sale of income generating financial assets (such as mortgages, car loans, trade receivables (including credit card receivables) and leases) by a company (the originator of the financial assets) to a special purpose vehicle (SPV). The SPV, which might be a trust or a company, finances the purchase of these assets by the issue of bonds, which are secured by those assets. The SPV is supposed to be bankruptcy-remote from the originator, that is, it has to be an off-balance sheet entity vis-à-vis the originator. Cash-flow securitisation works in a similar way, as when the UK government agreed to create the

International Finance Facility which is supposed to securitise future development aid commitments.

Private institutions, especially banks, immediately took advantage of these securitisation techniques to liquefy their illiquid loans. The resulting 'originate and distribute' model had major attractions for the banks and also permitted a potential improvement in the efficiency of the economy-wide mechanisms for intermediation and risk sharing. It made marketable the non-marketable; it made liquid the illiquid. There was greater scope for trading risk, for diversification and for hedging risk.

Securitisation generally involves the 'tranching' of the securities issued against a given pool of underlying assets or cash flows. The higher tranche has priority (seniority) over the lower tranches. This permits the highest tranche secured against a pool of high-risk mortgages, say, to achieve a much better credit rating than the average of the assets backing all the tranches together (the lower tranches, of course, have a correspondingly lower credit rating). In addition, various 'enhancements' are frequently packaged with the securities. A common example is insurance against default risk, which was obtained from specialised financial institutions, called 'monolines' that had sprung into being to enhance the creditworthiness (and credit ratings) of securities issued by US municipalities.

Problems

There are three problems associated with securitisation (and the generally associated creation of off-balance sheet vehicles).

1. The greater opportunities for risk trading created by securitisation not only made it possible to hedge risk better (that is, to cover open positions); it also permitted investors to seek out and take on additional risk, to further 'unhedge' risk and to create open positions not achievable before. When risk-trading opportunities are enhanced through the creation of new instruments or new institutions, and when new populations of potential investors enter the risk-trading markets, we can only be sure that the risk will end up with those most willing to bear it. There can be no guarantee that risk will end up being borne by those most able to bear it.
2. The 'originate and distribute' model destroys information compared to the 'originate and hold' model. The information destruction occurs at the level of the originator of the assets that are to be securitized. Under the 'originate and hold' model the loan officer collecting the information on the creditworthiness of the would-be borrower is working for the Principal in the investing relationship (the originating bank or non-bank lending institution). Under the 'originate and distribute' model, the loan officer of the originating bank works for an institution (the originating bank) that is an Agent for the new Principal in the investing relationship (the SPV that purchases the loans from the bank and issues securities against them). With asymmetric information and costly monitoring, the agency relationship dilutes the incentive for information gathering at the origination stage. Reputation considerations will mitigate this problem, but will not eliminate it.
3. Securitisation also puts information in the wrong place. Whatever information is collected by the loan originator about the collateral value of the underlying assets and the credit worthiness of the ultimate borrower, remains with the originator and is not effectively transmitted to the SPV, let alone to the subsequent buyers of the securities issued by the SPV that are backed by these assets. By the time a hedge fund owned by a French commercial bank sells ABSs (asset backed securities) backed by US sub-prime residential

mortgages to a conduit owned by a small German Bank specialising in lending to small and medium-sized German firms, neither the buyer nor the seller of the ABS has any idea as to what is really backing the securities that are being traded.

Partial solutions

The problems created by securitisation can be mitigated in a number of ways.

1. Simpler structures. The financial engineering that went into some of the complex securitised structures that were issued in the last few years before the ABS markets blew up on August 9, 2007, at times became ludicrously complex. Simple securitisation involved the pooling of reasonably homogeneous assets, say, residential mortgages issued during a given period with a given risk profile (e.g. sub-prime, alt-A or prime). These were pooled and securities issued against them were tranching. However, second-tier and higher-tier securitisation then took place, with tranches of securitised mortgages being pooled with securitised credit-card receivables, car loan receivables etc. and tranching securities being issued against this new, heterogeneous pool of securitised assets. Myriad credit enhancements were added. In the end, it is doubtful that even the designers and sellers of these compounded, multi-tiered securitised assets knew what they were selling, knew its risk properties or knew how to price it. Certainly the sellers did not.

There is a simple solution: simpler structures. This will in part be market-driven, but regulators too may put bounds on the complexity of instruments that can be issued or held by various regulated entities. Central banks could accept as collateral in repos or at the discount window only reasonably transparent classes of ABS.

2. Unpicking' securitisation. This 'solution' is the ultimate admission of defeat in the securitisation process. A number of American banks with residential mortgage-backed securities (RMBS) on their balance sheets have been scouring the entrails of the asset pools backing these securities and have sent staff to specific addresses to assess and value the individual residential properties. This inversion of the securitisation matrix is, of course, very costly and means that the benefits from risk pooling will tend to be ignored. It is an ignominious end for the securitisations involved.

3. Retention of equity tranche by originator. When the originator of the loans is far removed from the ultimate investor in the securities backed by these loans, the incentive for careful origination is weakened. One way to mitigate this problem is for the originator to retain the 'equity tranche' of securitised and tranching issues. The equity tranche or 'first-loss tranche' is the highest-risk tranche – the first port of call when the servicing of the loans is impaired. It could be made a regulatory requirement for the originator of residential mortgages, car loans etc. to retain the equity tranche of the securitised loans. Alternatively, the ownership of the equity tranche could be required to be made public information, permitting the market to draw its own conclusions.

4. External ratings. The information gap could be closed or at least reduced by using external rating agencies to provide an assessment of the creditworthiness of the securitised assets. This has been used widely in the area of RMBS and of ABS. This 'solution' to the information problem, however, brought with it a whole slew of new problems.

1B. Rating agencies

A small number of internationally recognised rating agencies (really no more than three: Standard & Poor's, Moody's and Fitch) account for most of the rating of complex financial instruments, including ABS. They got into this business after for many years focusing mainly on the rating of sovereign debt instruments and of large private corporates. They have been given a formal regulatory role, (which will be greatly enhanced under the about-to-be-introduced Basel 2 Capital Adequacy regime) because their ratings determine the risk weighting of a whole range of assets bank hold on their balance sheets.

Their role raises a number of important issues because it creates a number of problems.

Problems

1. What do *they* know? This is a basic but important question. One can imagine that, after many years, perhaps decades, of experience, a rating agency would become expert at rating a limited number of sovereign debtors and large private corporates. How would the rating agency familiarise itself with information available only to the originators of the underlying loans or other assets and to the ultimate borrowers? How would the rating agency, even if it knew as much about the underlying assets as the originators/ultimate borrowers, rate the complex structures created by pooling heterogeneous underlying asset classes, slicing and dicing the pool, tranching and enhancing the payment streams and making the ultimate pay-offs complex, non-linear functions of the underlying income streams? These ratings were overwhelmingly model-based. The models used tended to be the models of the designers and sellers of the complex structures, who work for the issuers of the instruments. The potential for conflict of interest in the design and use of these models is obvious. In addition, even honest models tend to be useless during periods of disorderly markets, because we have too few observations on disorderly markets to construct reasonable empirical estimates of the risks involved.

2. They only rate default risk. Rating agencies provide estimates of default risk (the probability of default and the expected loss conditional on a default occurring). Even if default risk is absent, market risk or price risk can be abundant. Liquidity risk is one source of price risk. As long as the liquidity risk does not mutate into insolvency risk, the liquidity risk is not reflected in the ratings provided by the rating agencies. The fact that many 'consumers' of credit ratings misunderstood the narrow scope of these ratings is not the fault of the rating agencies, but it does point to a problem that needs to be addressed. First, there has to be an education campaign to make investors aware of what the ratings mean and don't mean. Second, the merits of offering (and requiring) a separate rating for, say, liquidity risk should be evaluated.

3. They are conflicted. Rating agencies are subject to multiple potential conflicts of interest.

- a. They are the only example of an industry where the appraiser is paid by the seller rather than the buyer, even though the buyers is likely to have the greatest information deficiency.
- b. They are multi-product firms that sell advisory and consulting services to the same clients to whom they sell ratings. This can include selling advice to a client on how to structure a security so as to obtain the best rating and subsequently rating the security designed according to these specifications.

- c. The complexity of some of the structured finance products they are asked to evaluate makes it inevitable that the rating agencies will have to work closely with the designers of the structured products. The models used to evaluate default risk will tend to be the models designed by the clients. This is not just the problem that ‘marking-to-model’ can become ‘marking-to-myth’ or ‘garbage in, garbage out’. There is the further problem that the myth will tend to be slanted towards the interest of the seller of the securities to be rated.

Partial solutions

There is no obvious solution other than ‘try harder and don’t pretend to know more than you know’ for the first problem. The second problem requires better education of the investing public. The third problem can be mitigated in a number of ways.

1. Reputational concerns. Reputation is a key asset of rating agencies. That, plus the fear of law suits will mitigate the conflict of interest problem. The fundamental agency problem cannot be eliminated this way, however. Even if the rating agencies expect to be around for a long time (a necessary condition for reputation to act as a constraint on opportunistic and inappropriate behaviour), individual employees of rating agencies can be here today, gone tomorrow. A person’s reputation follows him/her but imperfectly. Reputational considerations are therefore not a fully effective shield against conflict of interest materialising.

2. Remove the quasi-regulatory role of the rating agencies in Basel II and elsewhere. Just as the public provision of private goods tends to be bad news, so the private provision of public goods leaves much to be desired (‘the best judges money can buy etc.’). The official regulatory function of private credit risk ratings in Basel I and II should be de-emphasized and preferably ended altogether.

I may get my wish here, because Basel II appears fatally holed below the waterline. It was long recognised to have unfavourable macroeconomic stabilisation features, because the capital adequacy requirements are likely to be pro-cyclical (see Borio, Furfine and Lowe (2001), Gordy and Howells (2004) and Kashyap and Stein (2004)). On top of this, the recent financial turmoil showed that the two key inputs into Pillar 1, the ratings provided by the rating agencies and the internal risk models of the banks, are deeply flawed.

As regards internal risk models, there are two problems. The first is the unavoidable ‘garbage in – garbage out’ problem referred to earlier, that makes any quantitative model using parameters estimated or calibrated using past observations useless during times of crisis, when every crisis is different. We have really only had one instance of a global freeze-up of ABS markets, impairment of wholesale markets and seizure of leading interbank markets simultaneously in the US, the Eurozone and the UK. Estimates based on a size 1 sample are unlikely to be useful. Second, the use of internal models is inherently conflicted. The builders, maintainers and users of these models are perceived by the operational departments of the bank as a constraint on doing profitable business. They will be under relentless pressure to massage their models to produce the results desired by the bank’s profit centres. They cannot be shielded effectively from such pressures. Chinese walls inside financial corporations are about as effective in preventing the movement of purposeful messages across them, as the original Great Wall of China was in keeping the barbarians out and the Han Chinese in – that is, utterly ineffective.

3. Make rating agencies one-product firms. The potential for conflict of interest when a rating agency sells consultancy and advisory services is inescapable and unacceptable. Even the sale of other products and services that are not inherently conflicted with the rating process is undesirable, because there is an incentive to bias ratings in exchange for more business in functionally unrelated areas. The obvious solution is to require any firm offering rating services to provide just that. Having single-product rating agencies should also lower the barriers to entry.

4. End payment by the issuer. Payment by the buyer (the investors) is desirable but subject to a 'collective action' or 'free rider' problem. One solution would be to have the ratings paid for by a representative body for the (corporate) investor side of the market. This could be financed through a levy on the firms in the industry. Paying the levy could be made mandatory for all firms in a regulated industry. Conceivably, the security issuers could also be asked to contribute. Conflict of interest is avoided as long as no individual issuer pays for his own ratings. This would leave some free rider problems, but should permit a less perverse incentivised rating process to get off the ground. I don't think it would be necessary (or even make sense) to socialise the rating process, say by creating a state-financed (or even industry-financed) body with official and exclusive powers to provide the ratings.

5. Increase competition in the rating industry. Competition in the rating process is desirable. The current triopoly is unlikely to be optimal. Entry should be easier when rating agencies become single-product firms, although establishing a reputation will inevitably take time.

1C. The procyclical behaviour of leverage and of the Basel capital adequacy criteria

As documented extensively in a number of contributions by Adrian and Shin (2007a,b), leverage is strongly procyclical for financial intermediaries that operate mainly through the capital markets. This includes securities brokers and dealers, hedge funds and investment banks but not commercial banks. When assets are marked-to-market, as regulators increasingly require them to be, increases in asset prices therefore tend to be associated with rising leverage and falling asset prices with declining leverage. If financial intermediaries were passive and did not adjust their balance sheets in response to changes in net worth caused by changes in the prices of the assets they hold, leverage would be countercyclical. Higher leverage will put upward pressure on asset prices, creating a positive feedback loop. The response of the intermediaries to asset price-changes is therefore systemically destabilising.

Adrian and Shin also document the procyclical behaviour of the value at risk to equity ratio. A possible explanation of the procyclical nature of leverage, given by Adrian and Shin, is that financial intermediaries target some value at risk to equity ratio, which induces them to increase leverage when value at risk falls because of rising asset prices. This of course only changes the statement of the puzzle; it does not solve it.

This pattern of procyclical leverage is reinforced through the Basel capital adequacy requirements. Banks have to hold a certain minimal fraction of their risk-weighted assets as capital. Credit ratings are procyclical. Consequently, a given amount of capital can support a

larger stock of assets when the economy is booming than when it is slumping. This further reinforces the procyclical behaviour of leverage.

Partial solutions

There is no convincing explanation as to why financial intermediaries might target their value at risk to equity ratio (the 1996 Market Risk Amendment of the Basel capital accord only prescribes a lower floor for the regulatory capital of banks relative to value at risk²). Nor do we have much insight about the drivers of leverage for banks and non-bank financial intermediaries. It is, however, interesting that there is no procyclical (or countercyclical) behaviour of commercial bank leverage. If the procyclical behaviour of leverage is deemed a problem, bringing commercial bank regulatory practices to bear on other banks and non-bank financial institutions may deserve consideration.

The procyclical effect of the Basel capital requirements has been well-documented (see Kashyap and Stein (2003)). This undesirable feature (and the more recent doubts about the quality of the rating process itself) should lead to an immediate re-opening and rethinking of Basel II. It is rather disappointing having to go back to the drawing board of capital adequacy even before Basel II has been formally launched, but in view of its manifest flaws, there is no other choice.

1D. Excessive disintermediation

There are no doubt solid economic efficiency reasons for taking certain financial activities out of commercial banks and out of investment banks, and putting them in special purpose vehicles (SPVs), Structured Investment Vehicles (SIVs, that is, SPVs investing in long-term, often illiquid complex securitised financial instruments and funding themselves in the short-term wholesale markets, including the asset-backed commercial paper (ABCP) markets), Conduits (SIVs closely tied to a particular bank) and a host of other off-balance-sheet and off-budget vehicles. Incentives for efficient performance of certain tasks, including appropriate risk management, can, in principle, be aligned better in a suitably designed SPV than in a general-purpose commercial bank. The problem is that it is very difficult to come up with any real-world examples of off-balance sheet vehicles that actually appear to make sense on efficiency grounds.

Most of the off-balance sheet vehicles (OBSVs) I am familiar with are motivated primarily by regulatory arbitrage, that is, by the desire to avoid the regulatory requirements imposed on banks and other deposit-taking institutions. These include minimal capital requirements, liquidity requirements, other prudential constraints on permissible liabilities and assets, reporting requirements and governance requirements. Others are created for tax efficiency (i.e. tax avoidance) reasons or to address the needs of governments and other public authorities for off-budget and off-balance sheet finance, generally to get around public deficit or debt limits.

OBSVs tend to have little or no capital, little or no transparency and opaque governance. When opaque institutions then invest in opaque financial instruments like the ABS discussed earlier, systemic risk is increased. This is reinforced by the fact that much *de-jure* or *de-facto* exposure remains for the banks that have spun off the off-balance-sheet vehicles (the

² Regulatory capital should not be less than three times the 10-day, 99 percent value at risk.

‘sponsoring’ banks) to these vehicles . There exists *de jure* exposure when the bank is a shareholder or creditor of the OBSV, when the OBSV has an undrawn credit line with the bank or when the bank guarantees some of the OBSV’s liabilities. *De-facto* exposure exists when, for reputational reasons, it is problematic for the bank to let an OBSV that is closely identified with the bank go under.

Banks in many cases appear not to have been fully aware of the nature and extent of their continued exposure to the OBSVs and the ABS they carried on their balance sheets. Indeed the explosion of new instruments and new financial institutions so expanded the populations of issuers, investors and securities, that many market participants believed that risk could not only be traded and shared more widely and in new ways, but that risk had actually been eliminated from the system altogether. Unfortunately, the world of risk is not a doughnut: it does not have a hole in it. All risk sold by someone is bought by someone. If the system works well, the risk ends up being born by those both willing and most able to bear it. Regrettably, it often ends up with those most willing but not most able to bear it.

Partial solutions

Mitigation of the problems created by excessive disintermediation will be partly market-driven and partly regulatory.

1. Re-intermediation. Either Conduits, SIVS and other OBSVs are taken back on balance sheet by their sponsoring banks, or the ABS and other illiquid securities on their balance sheets are sold to the banks. The OBSVs then either wither away or vegetate at a low level of activity.

2. Regulation. We can anticipate a regulatory response to the problem of opaque instruments held by opaque OBSVs in the form of reporting requirements, and consolidation of accounts requirements that are driven by broad principles (‘duck tests’), with constant adaptation of specific rules addressing particular institutions and instruments. For instance, if the Single Master Liquidity Enhancement Conduit (M-LEC) or Superfund proposed by JPMorgan Chase, Bank of America and Citigroup, with the active verbal support of the US Treasury, ever gets off the ground, it is questionable whether the US regulators will permit the participating banks to keep it off-balance-sheet for reporting purposes, including earnings reports. This would not of course, solve the problem that M-LEC, were it to get off the ground, could be too successful in preventing sales of distressed illiquid assets held by various OBSVs at rock-bottom prices. There is a material risk that the participating banks would use M-LEC to buy each other’s bad assets at sweetheart prices. They would thus be able to postpone further the marking to market of these assets at realistic values. This would mean systemically costly further delays in the resolution of the paralyzing uncertainty about who has lost how much through what exposure.

1E. Competitive Global Deregulation

Regulators of financial markets and institutions are organised on a national basis and are, in part, cheerleaders and representatives of the interests of their national financial sectors. While regulation is national, finance is global. The location of financial enterprises and markets is endogenous; many are very footloose. A thriving financial sector creates jobs and wealth, and is generally environmentally friendly. So regulators try to retain and attract financial businesses to their jurisdictions in part by offering more liberal, less onerous regulations. This

competition through regulatory standards has led to less stringent regulation almost everywhere.

There have been occasional reversals in this process. The Sarbanes-Oxley Act of 2002 was a response to the corporate governance, accounting and reporting scandals associated with Enron, Tyco International, Peregrine Systems and WorldCom. It undoubtedly contributed to a loss of business for New York City as a global financial centre. Because Sarbanes-Oxley compliance is mainly a matter of box-ticking (like most real-world compliance, especially compliance originating in the USA), it has not materially improved the informational value of accounting or the protection offered to investors.

Is this global competitive deregulation process a welcome antidote to a tendency to excessive and heavy-handed regulation, or a race to the bottom in which everyone loses in the end? I believe the jury is still out on this one, although I am inclined, if pushed, to suggest that the following are likely to be true

- Principles-based regulation (allegedly what we have in the UK) vs. rules-based regulation is an unhelpful distinction. You need both. You need principles that spell out the fundamental ‘duck test’: (a) Does the institution lend long and borrow short? (b) Does it lend in illiquid form and borrow in markets that are liquid in normal times although they may turn illiquid during period of market turbulence? Do banks have substantial exposure to the institution? If so, it should be either consolidated for reporting purposes with the bank or treated as a bank in its own right. Then you also need rules that are constantly adapted to keep up with developments in instruments and institutions.
- Self-regulation is no regulation unless backed up credibly with the threat that, unless effective self-regulation is implemented, external regulation will be imposed.
- Voluntary codes of conduct are without significance unless they can be and are used by the regulator (through ‘comply or explain’ rules, for instance) to impose and enforce standards. That means that if the explanation is not to the regulator’s satisfaction, consequences follow and ultimately compulsion can be used.
- The UK’s ‘light-touch’ regulation has become ‘soft-touch’ regulation and needs to be tightened up in a large number of areas.

Partial solutions

- 1. Greater international cooperation between regulators.** This is a no-brainer, but very hard to achieve.
- 2. A single EU-wide regulatory regime for banks, other financial institutions and financial markets.** National financial regulators in the EU should go the way of the dodo. An EU-level FSA separate from the ESCB would be a good idea, although the central banks (the ECB and, from January 1, 2007, 16 national central banks) should collect more information about individual banks than the Bank of England has done since it lost banking supervision and regulation in 1997 when the Bank became operationally independent for monetary policy. Adequate information on the liquidity positions of systemically important banks and other financial institutions should be collected routinely by all central banks.
- 3. A crackdown on “regulators of convenience”.** This requires tough measures towards ‘regulation havens’, some found in the Caribbean, others closer to the UK. One effective

approach would be the non-recognition and non-enforceability of contracts, court judgements and other legal and administrative rulings made by non-compliant jurisdictions.

2. The Global Macroeconomic Setting

The macroeconomic background to the crisis is the ‘Great Moderation’ – the low and stable global inflation and the high and stable global real GDP growth of the past decade. Actually, this moderation is more apparent from the inflation figures than from the GDP figures. Figure 1 shows the spectacular decline and recent stability of global inflation.

Figure 1 here

(Source: IMF World Economic Outlook November 2007)

Figure 2 demonstrates two points.

Figure 2 here

(Source: IMF World Economic Outlook November 2007)

First, the stability of global GDP growth does not appear to have increased since the early 1980s. Second, the common belief that global growth over the past 4 years has averaged over 5 percent is based on the wrong statistics – that is, on data that weigh national GDPs at purchasing power parity (PPP) exchange rates rather than market exchange rates. PPP exchange rates are the best conversion factors if comparisons between national standards of living are to be made. To get the best estimate of developments in global economic activity, market exchange rates should be used. GDP growth at market exchange rates has averaged around 3.5 percent per annum over the past few years. The difference between the two measures is due to the fact that PPP exchange rates give a much greater weight to developing countries and emerging markets than do market exchange rates. Since emerging markets (China, India, Vietnam, South Africa) have been the fastest growers by far over the past decade, global growth measured at market exchange rates has been well below global growth measured at PPP exchange rates. The view that global growth has been good but not spectacular is confirmed by the observation that by 2006, the global share of investment in GDP was only slightly above its previous peak value achieved in 1994 (see Figure 1).

Another striking feature of the global macroeconomic environment has been the declining level of real interest rates since 2001, and specifically the marked decline since the bursting of the tech bubble at the end of 2000. This is shown clearly by Figure 3, which is taken from Desroches and Francis (2007).³

Figure 3 here

(Source: Desroches and Francis (2007))

The proximate determinant of the trend decline in global real interest rates is an ex-ante saving glut, caused by the rapid growth of new emerging markets like China, which have extraordinarily high propensities to save, and, in more recent years, the global redistribution

³ Nothing much can be concluded from eyeballing the ex-post saving and investment rates in Figure 4. They are supposed to be identically equal, and any difference represents just measurement error.

of wealth and income towards a limited number of producers of primary energy sources (especially oil and natural gas) and raw materials. For a number of years, the absorptive capacity of the beneficiaries could not keep up with their new-found wealth, and vast amounts of savings had to be recycled. The extreme financial conservatism of many of the big savers (in China, Japan, India, Russia, most South East Asian and Latin American countries and in the Gulf states, these often were the central banks) meant that much of the increased demand for financial assets was directed towards default-risk-free financial instruments, especially US Treasury bonds. With no response of supply, risk-free real rates fell very low indeed (see Caballero (2006)).

In addition, the response of the US monetary authorities to the bursting of the tech bubble, the continued liquidity trap in Japan and, for a while also the rather relaxed monetary policy in the Euro area resulted in massive and excessive global liquidity growth, especially from 2003 till the end of 2006. Many rapidly growing and high-saving emerging markets and a number of key oil producers (including the 6 members of the Gulf Cooperation Council) pursued policies of undervalued nominal exchange rates and sterilized intervention, which although only partially effective, resulted in an unprecedented accumulation of foreign exchange reserves and, until recently, growing demand for high-grade sovereign debt instruments.

As a result of this, not only were long-term risk-free nominal and real interest rates extraordinarily low since 2003, but unprecedentedly low credit risk spreads (that is, default risk spreads) prevailed across the board. There was also an explosion of leverage, although interestingly enough not in the non-financial corporate sector. Households leveraged up and so did the financial sector. Prima facie, commercial banks did not increase their leverage very much. The increased leverage in the financial sector took place outside the commercial banks - in investment banks, hedge funds, private equity funds and a whole range of new financial institutions (SIVs, conduits etc), often using the new securitisation-based financial instruments discussed earlier. It was insufficiently appreciated, by regulators, by the banks and by the new financial institutions themselves, that being off-balance-sheet for certain regulatory, auditing and reporting purposes, does not mean that there is no substantive (and potentially substantial) financial, commercial, economic and reputational exposure.

Partial Solutions

Low global risk-free real interest rates have been rising since the end of 2006, as the absorptive capacity of the oil and gas exporters has risen and as central banks at last lost control of the management of the external assets acquired in the high-saving emerging markets. The transfer of these resources to sovereign wealth funds with a much greater willingness to take risk and a thirst for returns, means that at first the incremental flows, but increasingly also the existing stocks of external assets are being shifted out of high-grade sovereign obligations and into such things as equity, infrastructure and other riskier but higher-yielding investments, including commodities.

As regards excessive liquidity creation, it looks as though both Japan and the US may be repeating (or be about to repeat) the policies of the beginning of the decade. Japan appears to be sliding back into recession, with renewed deflationary pressures and no prospects for an early normalisation of nominal interest rates. The Bernanke Fed has turned out to be more like the Greenspan Fed than I would have expected or hoped, and has, since the crisis started in August 2007, cut the Federal Funds target rate by 100 bps and the primary discount rate by 125bps, despite the presence of serious inflationary pressures. While the exchange rates of

many oil and gas producers have appreciated somewhat against the dollar, there has been considerable intervention to keep down the rate of appreciation. The same has been true in China and India. It looks as though the foundations for the next global liquidity glut are being laid while the world is still struggling with the (market) liquidity crunch that started this summer.

3. The Onset of the Financial Crisis

Facts can be ignored for a long time, but not forever. The realisation that risk may have been underpriced dawned first in the USA to holders of securities backed by sub-prime mortgages. During the second half of 2005, the delinquency rate on these mortgages began to creep up from a low of 10 percent at an annual rate (see Figure 4).

Figure 4 here

During 2006, the delinquency rate rose further and by early 2007 it had reached 15 percent. It became clear that, because many of the mortgages granted in 2005 and 2006 had up-front 'teaser rates', which during 2007 and 2008 would reset at much higher levels, there was only one direction delinquencies were going to go: up.

The prices of sub-prime mortgage credit default swaps began to fall late in 2006 (see Figure 5) and dropped like a stone by the middle of the year, indicating higher perceived default risk for the underlying assets.

Figure 5 here

The widening of credit risk spreads that followed was not confined to sub-prime related instruments and institutions. As is clear from Figure 6, which shows the behaviour of Sterling corporate bond spreads by rating, the global underpricing of risk had affected virtually every private financial instrument, and the sovereign instruments issued by all but a small number of highly creditworthy sovereigns.

Figure 6 here

The US sub-prime mortgage crisis was just the trigger of the global crisis. To illustrate, early in 2007, a large amount of unsecured household debt (consumer credit) had to be written down/off by UK banks.

In August 2007, we saw something we had never seen before. The simultaneous global freezing up of virtually all wholesale capital markets, including the interbank markets, CDO markets, markets for asset-backed-commercial paper (ABCP) (where the crisis hit Canada first) and markets for all but the very best asset-backed securities. Global new CDO issuance dropped precipitously (see Figure 7) and it became impossible to roll over outstanding stocks of commercial paper, especially asset-backed commercial paper, which as a result declined sharply (see Figure 8).

Figure 7 here

Figure 8 here

The financial turmoil did not just touch securities and institutions associated with sub-prime lending in the US. The underpricing of credit risk had been a global phenomenon, and the repricing of credit risk, which is by no means over at the time of writing (December 11, 2007), has affected other financial markets, as I discuss in the Conclusion.

The 'monolines' or credit risk insurers, from the largest ones like MBIA and Ambac to smaller ones like ACA, FGIC, Security Capital Assurance found themselves in the spotlight and under pressure. The value of the credit risk enhancement they can provide depends entirely on their own credit rating. A 'monoline' without a triple A rating no longer has a viable business model. It is therefore key that they are well-capitalised or are backed by well-capitalised parents or sponsors who can replenish their capital should the need arise. That this is a real issue became clear when at the end of November 2007, two French banks pledged \$1.5 bn to recapitalise a small French monoline, CIFG. This is unlikely to be the last rescue of a monoline in this credit cycle.

4. How Did the World's Leading Central Banks Respond to the Crisis?

None of the world's leading central banks exactly covered themselves with glory, although some did better than others, and the Bank of England probably did the worst job.

The Federal Reserve

After the crisis erupted on August 9, the Federal Reserve decided to reduce its (primary) discount rate by 50 basis points from 6.25 percent to 5.75 percent on August 16. This was at best a meaningless gesture. There were no US financial institutions for whom the difference between able to borrow at the discount rate at 5.75 percent rather than at 6.25 percent represented the difference between survival and insolvency; neither would it make a material difference to banks considering retrenchment in their lending activity to the real economy or to other financial institutions. It was a reduction in the discount window penalty margin (previously 100 basis points) of interest only to institutions already willing and able to borrow there (because they had the kind of collateral normally expected at the discount window). It was small subsidy to such banks – a small treat for their shareholders.

A possible rationalisation of this action – that it was a way for the Fed to say 'we feel your pain; we know and we care', without doing anything substantive, like a cut in the Federal Funds target rate – really makes little sense, as from a substantive viewpoint, the Fed's action on August 16 was cheap talk.

Subsequently, on September 18, the Fed cut the Federal Funds Rate by 50 basis points, with a further reduction of 25 basis points following on October 31. In both cases, the Discount rate was reduced by the same amount as the Federal Funds target rate.

The Fed also extended the maturity of loans at the discount window from overnight to up to one month. It also injected liquidity into the markets at maturities from overnight to 3-month. The amounts injected were somewhere between those of the Bank of England (allowing for differences in the size of the US and UK economies) and those of the ECB.

Throughout the four months of the crisis, it is difficult to avoid the impression that the Fed is too close to the financial markets and leading financial institutions, and too responsive to their special pleadings, to make the right decisions for the economy as a whole. Historically, the same behaviour had characterised the Greenspan Fed. It came as something of a surprise to me that the Bernanke Fed, if not quite a clone of the Greenspan Fed, displays some of the same excess sensitivity to Wall Street concerns. There is an always-present danger of a regulator getting too close to the industry it is supposed to be regulating in the public interest. Even if conscious regulatory capture is avoided, the regulator is at risk of internalising the objectives, fears and worldview of the regulated industry to such an extent, that it interferes with the regulator's ability to make an impartial judgement about what actions are most likely to serve its official mandate.

There can be no doubt in my view that the Fed under Greenspan treated the stability, well-being and profitability of the financial sector as an objective in its own right, regardless of whether this contributed to their legal triple mandate of maximum employment, stable prices and moderate long-term interest rates. While the Bernanke Fed has but a short track record, its rather panicky reaction and actions since August suggest that it too may have a distorted and exaggerated view of the importance of the financial sector for macroeconomic stability. Time will tell.

The ECB

The European Central Bank injected liquidity both overnight and at longer maturities on a very large scale indeed, but with limited success (see Figure 9 below). It did not cut the policy rate or its discount rate, but it refrained from raising rates as it had planned to do, and had effectively pre-announced following its last pre-crisis Governing Council rate-setting meeting on August 2. Since then there have been four more meetings where rates have been kept on hold, but where the rhetoric strongly hints at a bias towards further rate increases. The longer talk without action persists along these lines, the lower the credibility of the forward-looking statements of President Trichet.

The Bank of Japan

The Bank of Japan did nothing in particular, but did it very well. This is justified if the absence of evidence (of significant exposure of Japanese banks to sub-prime-backed securities or to other devalued financial instruments) is indeed evidence of absence (of such exposure). There is, unfortunately, a long history of Japanese banks not owning up to asset impairments, and refusing to write down underperforming assets. Japanese banks continue to be opaque, even by the modest standards of the rest of the banking sectors of the advanced industrial countries.

The Bank of England

The Bank of England cut neither its discount rate nor its policy rate until December 7, when it cut both by 25 basis points. It injected liquidity on a modest scale, at first only in the overnight interbank market. Rather late in the day, it reversed this policy and offered to repo at 3-month maturity, but subject to an interest rate floor 100 basis points above Bank Rate, that is, effectively at a penalty rate. No one came forward to take advantage of this facility.

The Bank now manages the Liquidity Support Facility for Northern Rock, although the Treasury is on the hook for any losses the Bank may suffer through its exposure to the mortgages that it is taking from Northern Rock as collateral for its use of the Facility.

Just before the Northern Rock crisis blew up, on 12 September 2007 (in a Paper submitted to the Treasury Committee by Mervyn King, Governor of the Bank of England) the Bank told the world the following:

“...the moral hazard inherent in the provision of ex post insurance to institutions that have engaged in risky or reckless lending is no abstract concept”.

On September 13, 2007, the announcement came that the Bank of England, as part of a joint action by HM Treasury, the Bank of England and the Financial Services Authority (according to the Memorandum of Understanding between these three parties), had bailed out Northern Rock, a specialist mortgage lender, by providing it with a credit line (the purpose-designed Liquidity Support Facility). Without this, Northern Rock, which funds itself mainly in the wholesale markets, would not have been able to meet its financial obligations.

Even today we don't know any of the details of how this reported credit line is secured, or how any draw-downs of this credit line are collateralised. If Northern Rock had sufficient collateral eligible for rediscounting at the Bank of England's Standing (collateralised) Lending Facility, it presumably would have done so, rather than invoking this emergency procedure involving the Bank, the FSA and the Treasury. Collateral eligible for rediscounting at the Standing Lending Facility consists of sterling and euro-denominated instruments issued by UK and other European Economic Area central governments, central banks and major international institutions rated at least Aa3 (and, exceptionally, US Treasury bonds). Such assets are said to be scarce on the balance sheet of Northern Rock. The severity of the penalty rate charged Northern Rock will also be important in determining the long-term moral hazard damage caused by this operation.

The Bank's September 12 Paper recognises conditions when this kind of bail out is justified:

“..., central banks, in their traditional lender of last resort (LOLR) role, can lend “Against good collateral at a penalty rate” to any individual bank facing temporary liquidity problems, but that is otherwise regarded as solvent. The rationale would be that the failure of such a bank would lead to serious economic damage, including to the customers of the bank. The moral hazard of an increase in risk-taking resulting from the provision of LOLR lending is reduced by making liquidity available only at a penalty rate. Such operations in this country are covered by the tripartite arrangements set out in the MOU between the Treasury, Financial Services Authority and the Bank of England. Because they are made to individual institutions, they are flexible with respect to type of collateral and term of the facility”.

The MOU states in paragraph 14:

14. In exceptional circumstances, there may be a need for an operation which goes beyond the Bank's published framework for operations in the money market. Such a support operation is expected to happen very rarely and would normally only be undertaken in the case of a genuine threat to the stability of the financial system to avoid a serious disturbance to the UK economy.”

It is clear that the conditions for a justifiable LoLR operation, as specified in the MOU and reiterated in the Bank's September 12 Paper, were not satisfied.

First, no evidence has been offered to support the frequently-heard assertion (from Northern Rock, the Treasury, the Bank of England and the FSA) that Northern Rock (total assets £113 bn as of 30 June 2007) suffered just from illiquidity rather than from the threat of insolvency. Delinquencies on its mortgages are said to be below the average of the UK mortgage lending industry, and that indeed is good news. However, the organisation had followed an extremely aggressive and high-risk strategy of expansion and increasing market share, funding itself in the expensive wholesale markets for 75% of its total funding needs, and making mortgage loans at low and ultra-competitive effective rates of interest. In the first half of 2007, Northern Rock accounted for over 40 percent of the gross mortgage lending in the UK, and for 20 percent of the net. It is hard to see how with such a breakneck rate of expansion, it is possible to maintain adequate quality control over the lending process. Creditworthiness vetting must have slipped – there are limits to the speed of organic growth. In addition, the bank reputedly offered mortgages up to six times annual income, and packages of mortgage and personal loans adding up to 125 percent of the value of the collateral for the mortgage. That seems reckless and an strategy designed to end up with non-performing loans. There is some information surely in the fact that Northern Rock's share price had been in steep decline since February of this year, well before the financial market turmoil hit.

In my view, the solvency of Northern Rock is a matter still to be determined. As usual, there is no hard information to go by.

Second, it is hard to argue that the survival of Northern Rock is necessary to avoid a genuine threat to the stability of the UK financial system, or to avoid a serious disturbance to the economy. The bank is not 'too large to fail'. As the fifth largest mortgage lender in the UK, it is not systemically significant. When all else fails, the 'threat of contagion' argument can be invoked to justify bailing out even intrinsically rather small fish, but irrational contagion, that is, contagion not justified by objective balance sheet and off-balance sheet interdependencies, is extremely rare in practice, and could have been addressed directly had it, against the odds, occurred, following the insolvency Northern Rock. With a reasonable deposit insurance arrangement (say one insuring personal retail deposits up to £50,000 and capable of making full payment on the insured deposits in no more than a couple of working days), Northern Rock could and should have been left to sink or swim on its own, or with any private sector assistance it might be able to drum up without the support of the UK taxpayer..

In a well-designed financial system, Northern Rock could have been taken into public ownership, with the deposits ring-fenced and distributed swiftly to the depositors, and with the bank remaining open to manage existing exposures and commitments. This would give everyone involved time to discover the best longer-term destination for Northern Rock, its assets and stakeholders. The US legal and regulatory framework for dealing with the insolvency of banks has this property.

Talking tough at first but then providing liquidity support to Northern Rock, and describing liquidity support to the markets at longer maturities as creating moral hazard (an erroneous view, in my opinion) but subsequently offering to provide such support after all, have undermined the credibility of the Bank. I believe the Bank recognises this and is taking steps to avoid a recurrence of such mishaps.

One of the ironies (and surprises) of this set of events is that despite the contrast between the low-key and small-scale interventions of the Bank of England, the massive liquidity injections at all maturities, including 3 months, of the ECB, and the rate cuts and continued moderate liquidity injections of the Fed, the effect of these policies on one key measure of money market distress, the spread between 3-month Libor (the interbank rate) and the 3-month OIS rate or Overnight Indexed Swaps, is now about the same for sterling, the euro and the US dollar. Figure 9 makes that clear. The spread of Libor over the Overnight Indexed Swap rate is a better indicator of the market's view of default risk plus liquidity risk than the spread of Libor over the policy rate, because over a 3-month horizon, the policy rate can be expected to change.⁴ This has obviously been the case for the Federal Funds target rate since the beginning of the crisis.

Figure 9 here
(Source: Haver.com, Goldman Sachs International)

5. Lessons to be Learnt by the UK Authorities

The way the crisis unfolded damaged the prestige and international standing of the City of London - the financial capital of the world – more than the other leading financial centres.⁵ The damage is manageable and remediable, but only if effective steps are taken to correct the many manifest weaknesses of the UK financial system that were brought to light by the crisis.

I believe there are thirteen lessons for the UK authorities.

(1) The Tripartite arrangement between the Treasury, the Financial Services Authority and the Bank of England, for dealing with financial instability is flawed. Responsibility for this design flaw must be laid at the door of the man who created the arrangement - the former Chancellor and current Prime Minister, Gordon Brown. The Treasury, as the dominant partner in the arrangement, also bears primary responsibility for the way in which the Tripartite arrangement has performed operationally and continues to perform during this crisis.

The main problem with the arrangement is that it puts the information about individual banks in a different agency (the FSA) from the agency with the liquid financial resources to provide short-term assistance to a troubled bank (the Bank of England). This happened when the Bank lost banking sector supervision and regulatory responsibility on being made operationally independent for monetary policy by Gordon Brown in 1997. It's clear this separation of information and resources does not work.

⁴ An Overnight Indexed Swap is a fixed/floating interest rate swap with the floating leg tied to a published index of a daily overnight rate reference. The overnight rate is close to the policy rate, so the fixed leg of an OIS swap can be interpreted as the market's expectation of the policy rate over a three-month horizon.

⁵ The damage done by weaknesses in the design of the framework for financial stability and the implementation of policy by the three key players, the Treasury, the FSA and the Bank of England should not be exaggerated. The position of London as the world's primary financial centre is threatened more by its grossly inadequate transportation infrastructure, its excessive cost of living (especially housing) and sub-standard and/or wildly expensive primary and secondary education facilities than by anything connected with the recent financial crisis.

There are two solutions. Either the relevant elements of banking supervision and regulation (those having to do with liquidity management) are returned to the Bank of England, or the FSA is given an uncapped and open-ended credit line with the Bank of England, guaranteed by the Treasury. With discretionary access to liquid resources, the FSA can perform the Lender of Last Resort function vis-à-vis individual troubled institutions. The Bank of England would of course retain the Market Maker of Last Resort Function of providing liquidity to markets and supporting systemically important financial instruments.

If the Bank were to regain all of banking supervision and regulation, two deeply political activities, its independence would be jeopardised, especially its operational independence for monetary policy. One solution to this problem could be to take the Monetary Policy Committee out of the Bank of England. The Governor of the Bank of England would no longer be the Chairman of the MPC, although I suppose he (or she) could still be an external member. The MPC would just set the target rate for the overnight interbank market. The Bank would act as agent for the MPC in keeping the overnight rate as closely to the official target as possible. Anything else (including liquidity-oriented interventions at maturities longer than overnight, and foreign exchange market intervention) would be the province of the Bank of England, not of the MPC.

(2) Three months after the creation of the Liquidity Support Facility and the granting of deposit insurance cover to Northern Rock (and to any other bank that might find itself in similar circumstances), Northern Rock is still on life support, having drawn over £25 bn from the LSF - just under 25 percent of its assets. This is a shambles. First, it never should have been necessary to provide both liquidity support and a deposit guarantee for Northern Rock. By effectively guaranteeing access to funds for Northern Rock and insuring virtually all unsecured creditors to Northern Rock (and all other UK banks who might find themselves in similar straights), the UK has socialised all risk to the liability side of the banking sector balance sheet.

Several courses of action would have been preferable. They include the following:

(a) Let Northern Rock sink or swim on its own strength (i.e. no Liquidity Support Facility), but guarantee all deposits, and ensure a speedy payment of all insured deposits. This would probably have resulted in the insolvency of Northern Rock.

(b) Let Northern Rock sink or swim, but guarantee all personal retail deposits up to £50,000, and ensure a speedy payment of all insured deposits. This would probably have resulted in the insolvency of Northern Rock and a much smaller run on the bank by depositors than actually took place.

(c) Take Northern Rock into public ownership. This would probably result in lawsuits by existing shareholders who feel they should have got a better deal from the tax payer.

(3) The UK deposit insurance arrangements (which have been in place since 1982) are flawed. The amount covered (£2000 outright and 90 percent of the next £33,000) was too low; the deductible for deposits over £2000 was an invitation to run, and the time (allegedly up to 6 months) it could take for depositors to get their money back was far too long. Responsibility lies with the Chancellor, although the Bank and FSA could have been better advisors and counsellors to the government in these matters. The necessary reforms are obvious.

(4) The FSA did not properly supervise Northern Rock. It failed to recognise the risk attached to Northern Rock's funding model. Stress testing was inadequate. The 'war-games' organised by the three parties to the Tripartite arrangement also seem to have suffered from a lack of imagination.

(5) The much-vaunted 'light touch' UK model of regulation (based on principles) turned out to be instead of model of 'soft touch' regulation. It is clear that the principles vs. rules debate is vacuous. You need both. The principles should state a clear 'duck test'. E.g. if a financial institution borrows short and lends long, if it borrows liquid (during normal times, but with the risk of occasional illiquidity in its usual funding channels) and lends illiquid, and if banks are substantially exposed to it, then it should be regulated like a bank, even if it says 'Hedge Fund' on the letterhead. The rules should aggressively chase the unceasing attempts, through institutional and instrument innovation, to avoid regulation.

(6) Bank insolvency law in the UK is flawed. A bank that goes into administration has its deposits frozen. The UK needs a US-style arrangement, where the regulator can take a threatened bank promptly into public ownership, ring-fence its deposits so they can be transferred within at most two days to the depositors, and reopen the bank immediately to manage its existing activities and commitments while a longer-term plan for is worked out. Disgruntled existing shareholders should have to meet a much tougher test for such bank nationalisations to be actionable through lawsuits and other legal remedies.

Provided a troubled and potentially failing bank can be taken into public ownership, I don't believe there is any need to give banks a dispensation from the laws governing its take-over by, sale to or merger with another institution. Despite the assertions to the contrary by the Governor of the Bank of England, the EU Market Abuse Directive was never an obstacle to an undercover rescue or support operation for Northern Rock.

(7) Following the announcement of the Liquidity Support Facility, there should have been a joint appearance by the Prime Minister, the Chancellor of the Exchequer, the Governor of the Bank of England, the Chairman of the FSA and the CEO of the FSA, looking solemn and reliable, and intoning jointly: 'your money is safe'. It might not have prevented the banana-republic-style bank run that started on the 14th, but it would have been worth a try.

(8) In case even the joint appearance of the Talking Heads would not do the job, the Treasury should have guaranteed the personal retail deposits of Northern Rock at the same time the LSF was announced.

(9) The Bank of England has a flawed liquidity policy, both in the money markets and at the discount window. It accepts as collateral, both at the Standing Lending Facility (discount window), and in liquidity-oriented open market operations (sale and repurchase agreements or repos) only instruments that are already liquid (UK and European Economic Area government bonds, bonds issued by a few highly-rated international organisations and, under exceptional circumstances, US Treasury securities). It should emulate the ECB and the Fed and accept as collateral also private instruments, including illiquid and non-traded instruments such as mortgages and asset-backed securities. Provided this collateral is priced severely or even punitively, and has a further 'haircut' or discount applied to it, there will be no moral hazard and the Bank can expect not to lose money.

The Bank does not need to have information superior to that available to the private sector, to ensure that the prices it pays for illiquid and nontraded securities are not excessive. Many auctions, including the reverse Dutch auction, are (reservation) price discovery mechanisms. With the Bank acting as a monopolistic buyer at these auctions, it could (provided there is no collusion among the sellers) cream off most of the surplus over and above the reservation prices of the sellers.

The Bank would not have to form a view on the true or fundamental value of these securities following the auction either. It could simply hold them on its books until maturity. That's the advantage of being the one institution that is never illiquid.

(10) The Bank should recognise that the spread between, say, three month Libor and the expected policy rate over the three month period (as measured, for instance, by the spread of 3-month Libor over the fixed leg of the 3-month Overnight Indexed Rate Swap) can reflect liquidity risk premia as well as default risk premia. In its memo to the Treasury Committee of September 12, it got close to arguing that this spread reflected just anticipated default risk. That makes no sense.

Liquidity can vanish today, because market participants with surplus liquidity fear that both they themselves and their potential counterparties will be illiquid in the future (say, three months from now), when the loans would have to be repaid. A credible commitment by the Central Bank to provide liquidity in the future (three months from now) would solve the problem, but it is apparent that the required credibility simply does not exist. Therefore, the only time-consistent solution, in the absence of a credible commitment mechanism, is to intervene today at a three-month maturity.

The Bank of England should aim, through repos at these longer maturities, to eliminate as much of the 'term structure of liquidity risk premia' as possible. This corrects a market failure. It does not create moral hazard if the collateral in the repos is priced properly.

Points (9) and (10) assign to the Bank the responsibility to be the Market Maker of Last Resort, to provide the public good of liquidity when disorderly markets disrupt financial intermediation and threaten fundamentally viable institutions.

(11) The Bank should lend at the discount window at longer maturities than overnight. Loans of up to one month should be available (properly priced, with a 'short back and sides' haircut, and at a punitive rate). Given points (9) and (10), the discount window would become, for all banks and on demand, what the Liquidity Support Facility purpose-built for Northern Rock is now.

(12) Northern Rock should have known about the Bank of England's repo and discount window policy. Given these policies, its funding policies were reckless.

No party involved in this debacle comes out of it smelling of roses. At least the Bank of England appears to be willing to learn, and even to admit that it made some errors. We are still waiting for the Treasury to admit to anything less than perfection.

(13) My last observation concerns the failure of effective Parliamentary scrutiny of and oversight over the laws, rules, regulations and institutions that brought us this debacle. Parliament has done little more than sniping *ex-post* at the other principals in this drama.

Finger-pointing and blame allocation are not, however, substitutes for effective *ex-ante* Parliamentary scrutiny of the laws, rules and regulations and institutions, at the point that they can still be moulded and shaped. Where was Parliament when it could have done some good?

6. Conclusion: is the Sky Falling in Both Wall Street and Main Street?

When all the relevant lessons have been learnt and all appropriate recommendations implemented, we still will not have a system in which banks cannot fail or in which systemic instability cannot take hold.

Capitalism, based on greed, private property rights and decentralised decision making, is both cyclical and subject to bouts of financial manic-depressive illness. There is no economy-wide auctioneer, no enforcer of systemic ‘transversality conditions’ to rule out periodic explosive bubble behaviour of asset prices in speculative markets. It’s unfortunate, but we have to live with it. The last time humanity tried to do away with these excesses of capitalism, we got central planning, and we all know now how well that worked. Hayek and Keynes were both right.

Regulation should try to curb some of the more egregious excesses of a decentralised capitalist market economy, but without killing the goose that lays the golden eggs. In the UK, the pendulum towards de-regulation and self-regulation has probably swung too far. It will, however, be difficult to tighten up unilaterally, as business would no doubt be lost to other jurisdictions with more relaxed standards. Regulation of financial markets and institutions at the EU level would be a major step forward. After that, intergovernmentalism, that is, cooperation between national (or supranational) regulators and tax authorities, will have to take over, to stop the regulatory race to the bottom from discrediting financial globalisation altogether.

The present financial crisis has not yet run its course. This is clear from Figure 9, which shows the spread of the 3-Month Interbank Rates over the OIS rate in the US, the Euro Area and the UK rising sharply again from the middle of November until the time of writing (11 December 2007). Both the sterling spread and the US dollar spread exceed 100 basis points and the euro spread is not much below 90 basis points. These massive 3-Month spreads cannot be attributed to technical year-end liquidity effects. They reflect a complete lack of trust and confidence among the leading banks, laced with irrational fear and panic. The failure of the three monetary authorities involved to regularise the operation of the interbank markets through continuous intervention in the repo markets at all maturities where irrational spreads manifest themselves, is no tribute to their understanding of the issues or to their decisiveness in addressing them. The central banks dither while the markets freeze.

The correction of the global underpricing of risk from 2003 till the beginning of 2007 will manifest itself beyond the US sub-prime residential mortgage markets, the instruments backed by these mortgages and the institutions exposed to them. Higher-rated residential mortgages in the US and in Europe will suffer similar corrections. So will commercial real estate-backed mortgages and securities backed by them, securities backed by car loans and credit card receivables, and unsecured consumer credit of all kinds. Unsustainable construction, housing market and residential lending booms occurred not only in the US, but

also in the UK, Spain, Ireland, the Baltic states and other CEE countries like Bulgaria. Until quite recently, industrial country equity markets have continued to perform well, unaffected by the re-appraisal and repricing of risk that has shaken many of the other markets for financial instruments. Further equity market corrections, in the advanced industrial countries and certainly in some of the more bubbly emerging markets, are due.

There remains pervasive uncertainty about the value of the credit ratings granted to complex structured products during the period 2003-2006, and about the value of the various enhancements to these products, including the credit risk insurance provided by the 'monolines'

Sovereign risk is being re-priced. Even within the Eurozone, the spread of 10-year Treasury bond yields over Bunds has increased from the 10 bps to 20 bps range to the 30 bps to 40 bps range for highly indebted, fiscally fragile countries like Greece and Italy. Belgium's spread over 10-year Bunds is now in the 20s. These spreads are likely to widen further when the budgetary positions of these countries worsen as the Eurozone goes into a cyclical downturn.

Emerging market risk continues to be underpriced, especially non-sovereign emerging market risk, a situation that will no doubt be corrected before long.

There are, however, also signs that the outline of a systemic stabilisation and recovery sometime in the second half of 2008 is beginning to take shape. Leading commercial banks are beginning to put their off-balance-sheet offspring back onto their balance sheets. HSBC's announcement on November 26, 2007, that it was taking onto its balance sheet \$45bn of debt, much of it mortgage-linked, owned by SIVs it manages is, I believe, a harbinger or things to come.

The apparent failure of the Single Master Liquidity Enhancement Conduit, aka 'Superfund' proposed by Citigroup, JPMorgan Chase and Bank of America, with the active verbal encouragement of the US Treasury, to get off the ground is another positive sign. It supports the view that it is no longer acceptable or possible for private financial institutions to avoid the recognition of capital losses on assets held in SIVs, conduits and other off-balance-sheet vehicles, by selling them to each other at sweetheart prices. The enforced revelation of where the losses are located will reduce the uncertainty and fear about counterparty risk that have been killing liquidity in so many markets.

Money from the 'New Global Moneybags' - sovereign wealth funds from the Gulf and from other emerging markets like China, Singapore and Russia - is beginning to find its way into some of the depressed financial markets. Citigroup announced on November 26, 2007, that it had raised \$7.5bn in new capital from the Abu Dhabi Investment Authority, albeit at 'junk' rates of 11 percent. On December 10, UBS raised \$11.5bn worth of capital in Swiss francs from Singaporean and Gulf Sovereign Wealth Funds, again at junk rates. More deals like this will follow. When the dust settles on this crisis, a significant share of the North-American and West-European financial sectors will be owned and controlled by residents of emerging markets, including the emerging sovereigns. This will be accompanied by a shift in diplomatic and political power to the new creditor nations.

The monetary authorities of the leading industrial countries may have learnt their lessons about the public good nature of market liquidity. While liquidity can be managed privately, by private financial institutions hoarding liquid assets, this is socially inefficient if it extends

beyond the private provision of liquidity for orderly market conditions. It is more likely today that, even in the UK, the monetary authorities are willing and ready to do what simple applied welfare economics tells them to do: to provide liquidity on a large scale should the need arise, say, because of disorderly conditions in systemically important financial markets. The announcements in late November 2007 by the Fed and the Bank of England about their plans for year-end liquidity are an example of this greater official preparedness.

Most importantly, the credit boom of 2003-2006 has not led to a massive bout of over-investment in physical capital, except in a few emerging markets like China. The only sectoral exceptions in the industrial countries are residential construction in the US, Spain, Ireland, the Baltics and a few other emerging markets in CEE, and overexpansion of the financial sector almost everywhere in the industrial world. In these countries the contractionary effects of lower residential investment is now being felt (the US) or will be soon (Spain, Ireland, the Baltics). But in the most systemically important of these countries, the US, residential construction accounts for barely 4.5 percent of GDP. The damage even a complete collapse of house prices can do through the residential construction channel is therefore quite limited.

There is therefore little threat of widespread excess capacity from the 'supply side' of the economy. The financial position (balance sheets and financial deficits) of the non-financial corporate sectors throughout the industrial world is strong. The bulk of the financial excess has stayed inside the financial sector or has involved the household sector.

The key question then becomes whether and to what degree the decline in housing wealth (in the US) and the general tightening of the cost and availability of credit will adversely affect household spending in the advanced industrial countries. While the *sign* of the effect is clear - consumption will weaken - its *magnitude* is not. The increasing cost and decreasing availability of household credit is likely to affect and constrain mainly those households wishing to engage in new or additional borrowing. The increased burden of servicing outstanding household debt, especially unsecured debt, is as likely to lead to higher defaults as to reduced consumer spending. Personal bankruptcy is, especially in the US, such an easy and relatively painless option, that it is the shareholders of the financial institutions that have made the unsecured loans, as much as the households that took out these loans, that will suffer the financial impact of the increased cost and decreased availability of credit. If these shareholders are typically not liquidity-constrained, unlike the defaulting borrowers, the net effect on consumption should be mild. There can be further effects on spending through the credit channel if, as a result of the write-offs and write-downs, the financial institutions whose debt has been defaulted on become capital-constrained and curtail further lending. As always, those most affected will be new would-be borrowers, households and corporates.

It is still likely, in my view, that the economic fall-out from the financial crisis will be contained mainly within the financial sector. It is clear that, following the overexpansion of the residential construction sector in the US and in a few European countries, and following the massive overexpansion of the financial sector just about everywhere in the industrial world during the past decade, there is now likely to be a retrenchment in both sectors, through lower employment, lower profits and lower valuations. From the point of view of the efficient allocation of resources in the medium and long term, the relative (probably even absolute in the short run) contractions of the residential construction sectors (in a few countries) and of the financial sectors almost everywhere in the industrial world, is a desirable development. For a number of years now, the private returns in the financial sector

have exceeded the social returns by an ever-growing margin. Too much scarce analytical and entrepreneurial talent has been attracted into activities that, while privately profitable and lucrative, were socially zero-sum at best. In the short run, this cutting down to size of 'Wall Street' and 'the City' will inevitably have some negative side effects for Main Street also. In the medium and long term, however, a more balanced sectoral allocation of the best and the brightest will be beneficial.

The short-run pain, concentrated in the financial sector, and especially in the banking and investment sector and its off-balance-sheet offspring, is not suffered in silence. There is an army of reporters and newscasters standing by to report each groan and moan from every CEO whose bank has just written down another chunk of careless CDO exposure. But as long as the monetary authorities take their mandates seriously – including their duty to act, at a price, as lenders of last resort and market makers of last resort – and as long as the growing financial market hysteria does not spread to the real economy, the financial market kerfuffle should result in no more than a mild cyclical downturn around a robust upward trend.

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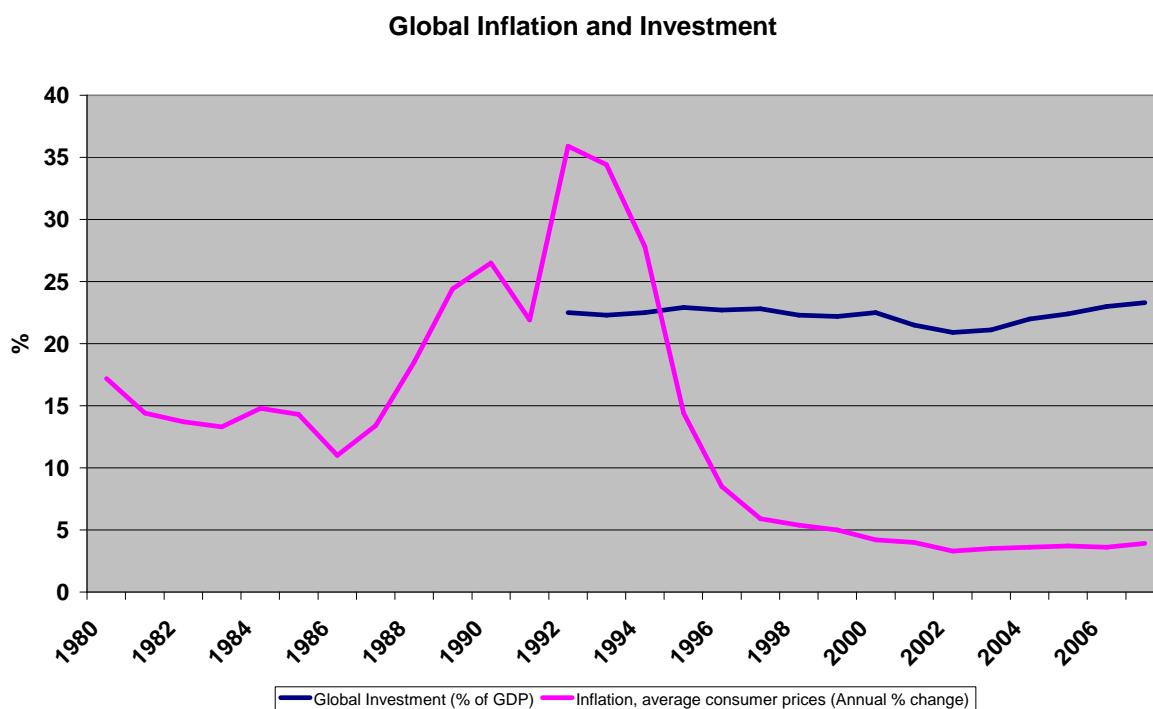
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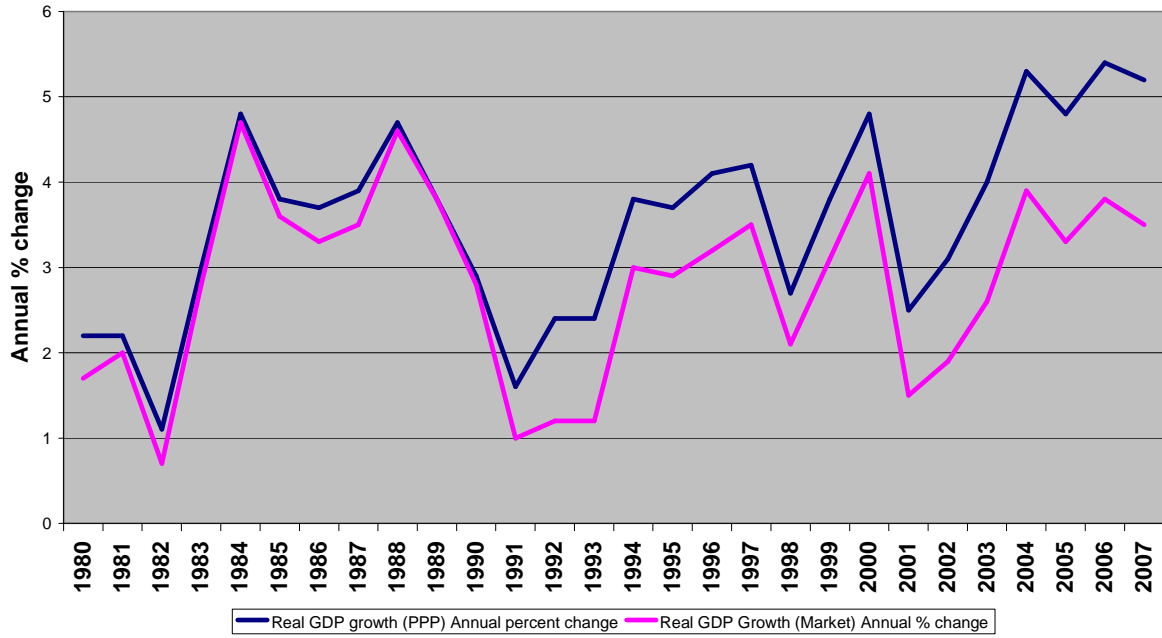
Figure 1



Source: IMF WEO 2007

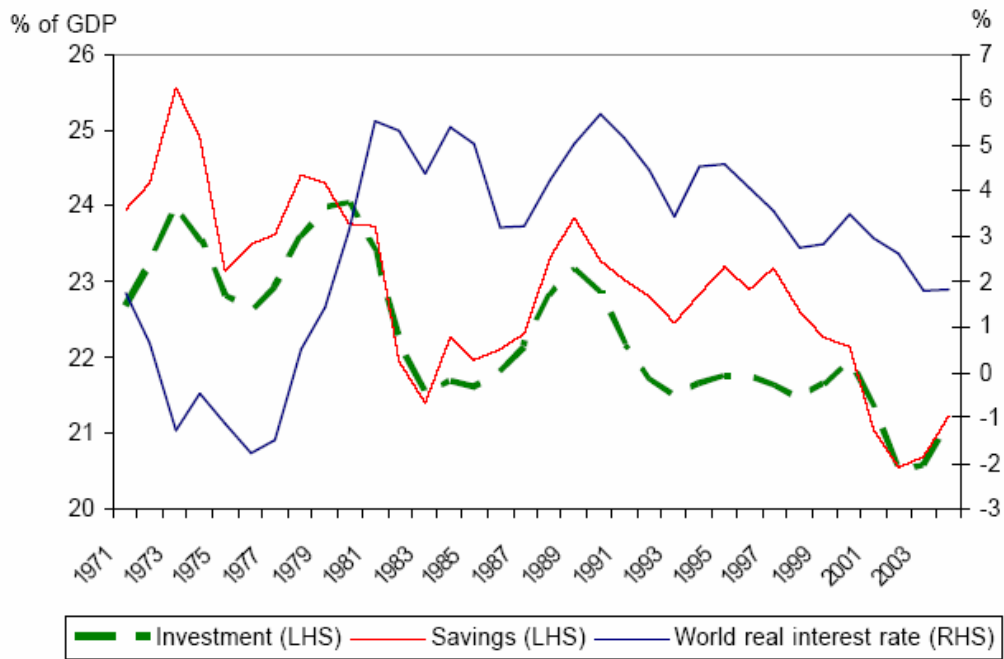
Figure 2

World GDP Growth at PPP and Market Exchange Rates 1980-2008



Source: IMF WEO 2007

Figure 3
Global Saving, Investment and Real Interest Rate

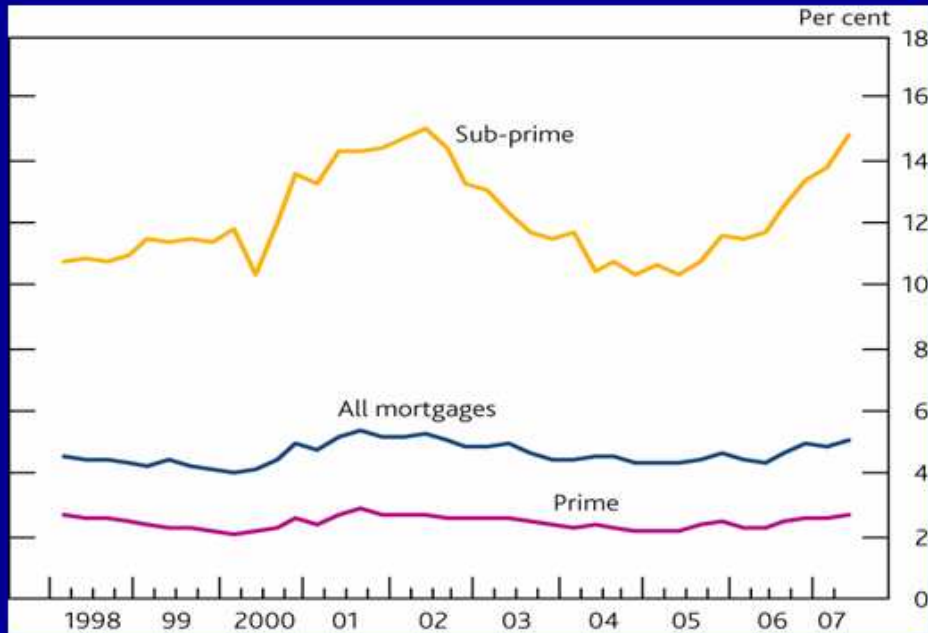


Sources: World Bank, BIS, IMF, Bank of Canada calculations.

Figure 4 is taken from Desroches and Francis (2007).

Figure 4
US Sub-prime mortgage delinquency rate

US residential mortgage delinquency rate^(a)

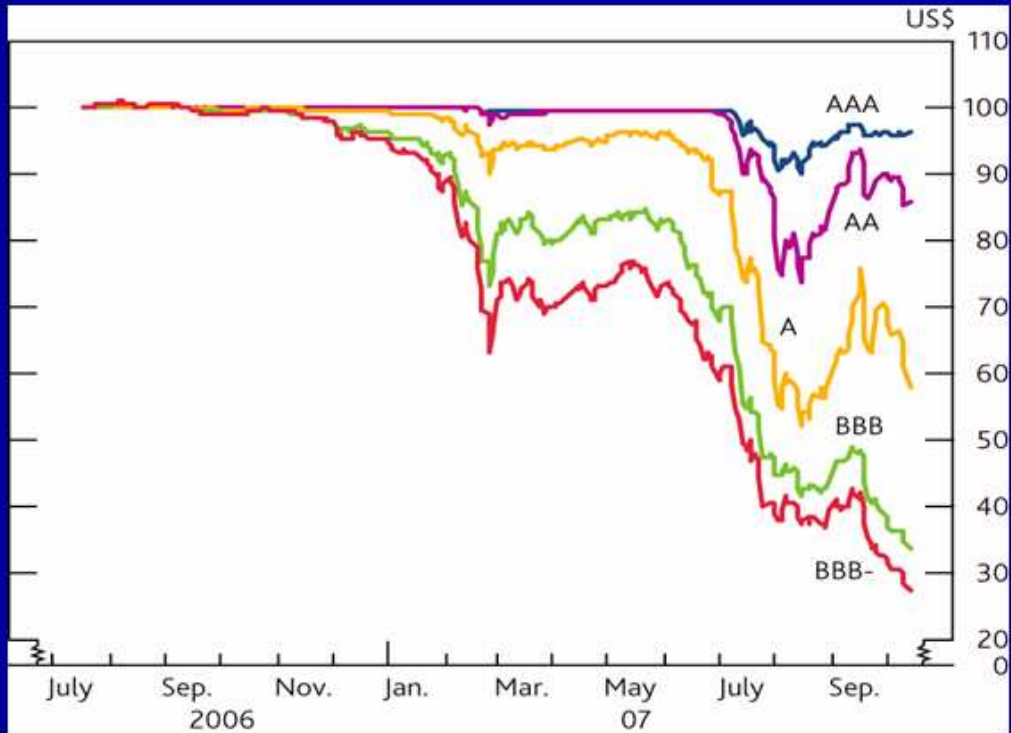


Sources: Mortgage Bankers Association and Thomson Datastream.

(a) 30+ days delinquent.

Figure 5
Prices of US Sub-prime Mortgage Credit Default Swaps

Prices of US sub-prime mortgage credit default swaps^(a)



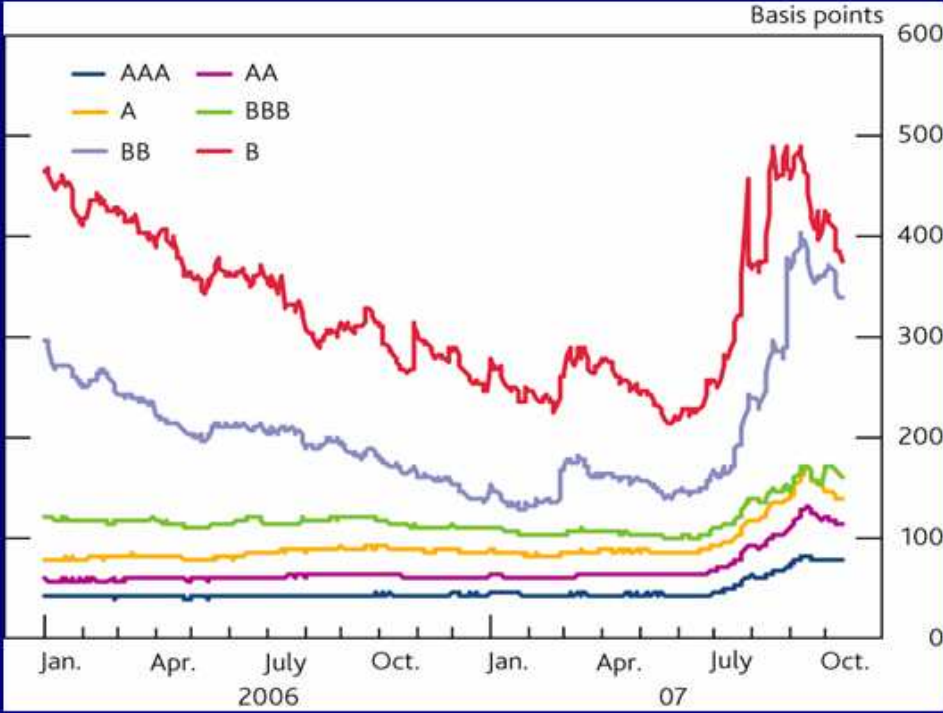
Source: JPMorgan Chase & Co.

(a) 2006 H2 vintage.

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Figure 6
Sterling Corporate Bond Spreads

Sterling corporate bond spreads by rating^(a)



Source: Merrill Lynch.

(a) Option-adjusted spreads over government bond yields.

Figure 7
Global CDO Issuance

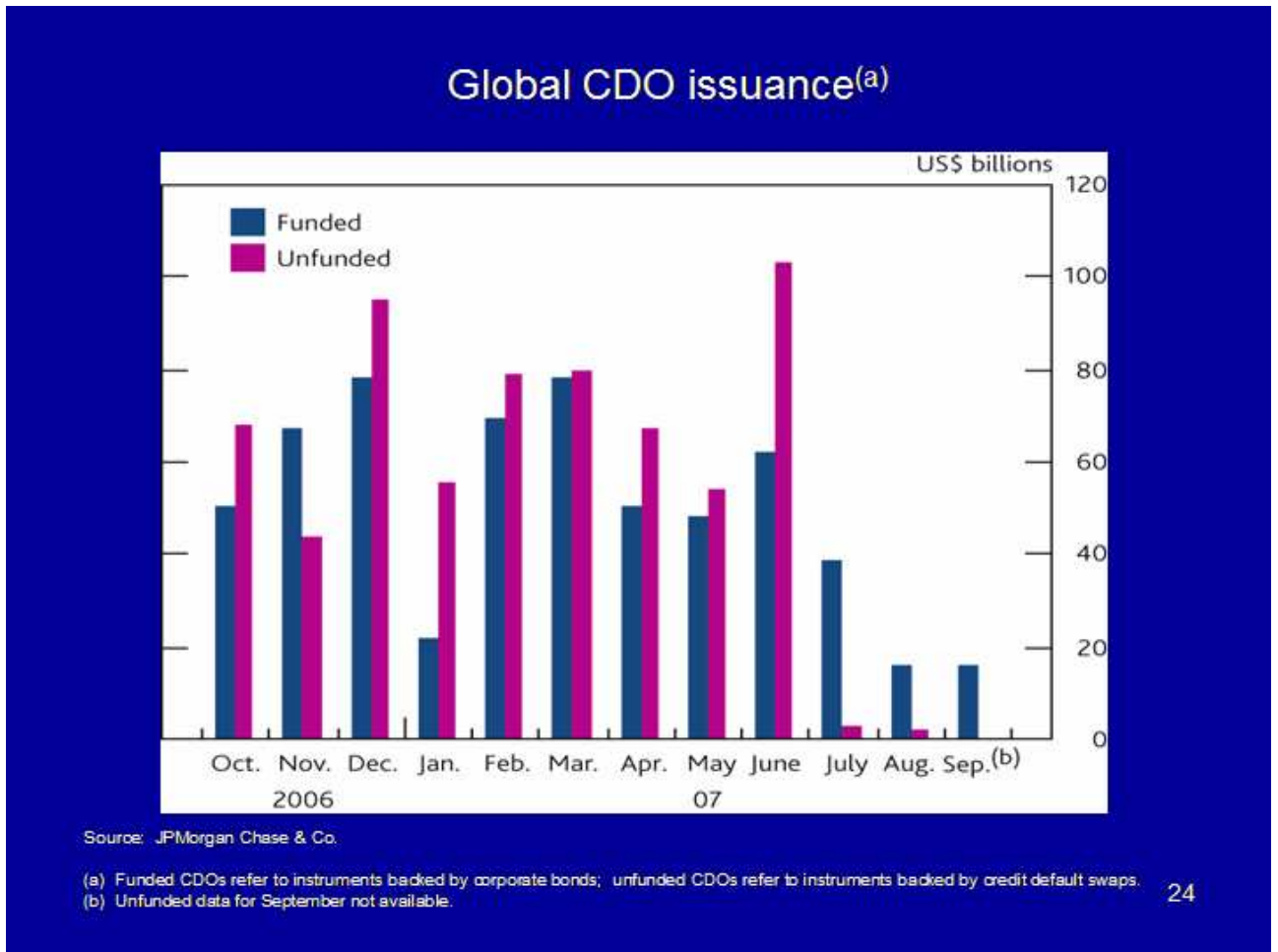
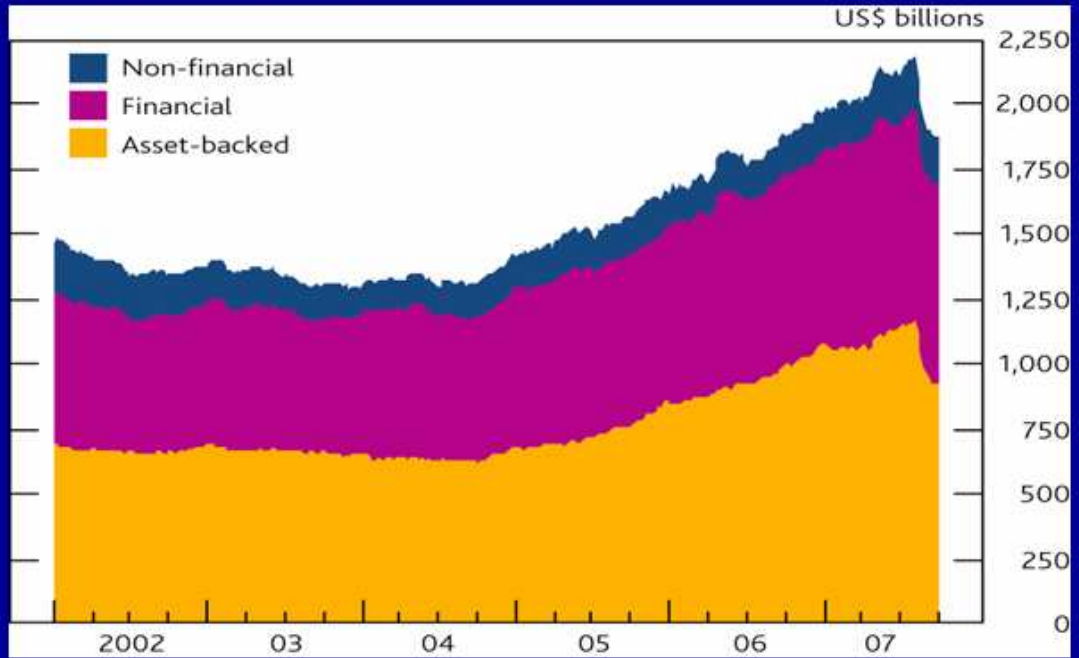


Figure 8
US\$-denominated Commercial Paper Outstanding

US\$-denominated commercial paper outstanding

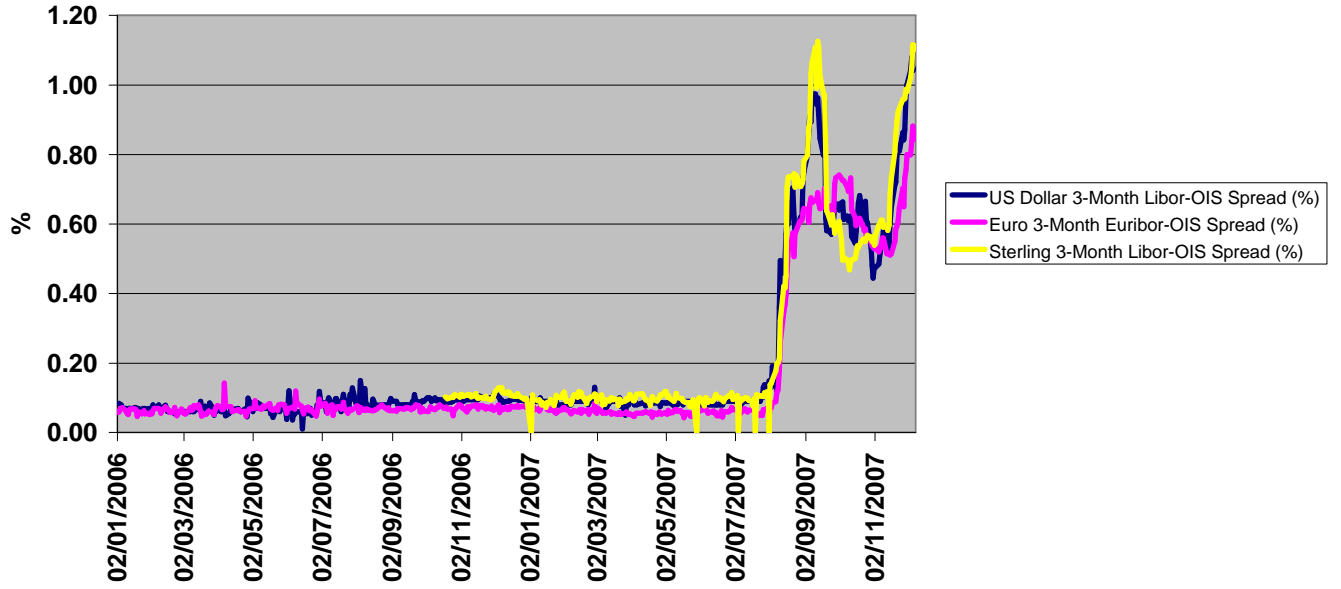


Source: Board of Governors of the Federal Reserve.

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Figure 9

3-Month Interbank Rate - OIS Spread (%)
03/01/2006 - 06/12/2007



Source: Haver.com & GSI