



OECD Journal

Financial Market Trends

Focus on

- The Subprime Crisis: Lessons and Policy Options
- Sovereign Wealth and Pension Fund Issues

OECD Journal

Financial Market Trends

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Foreword

Financial Market Trends provides a six-monthly update of trends and prospects in the international and major domestic financial markets of the OECD area and beyond. Timely analysis of and background information on structural issues and developments in financial markets, focusing on areas where changes are most substantial, make this publication relevant for financial market participants and policy makers alike, and should stimulate discussion among experts.

The current issue focuses on financial market implications of the recent financial market turmoil, looking in particular on

- *the subprime crisis: size, deleveraging and policy issues;*
- *lessons regarding deposit insurance; and*
- *issues related to financial guarantee insurance.*

This issue also features

- *sovereign wealth and pension fund issues*

and includes articles on

- *pension funding regulations and risk-sharing and*
- *the use of derivatives in public debt management.*

In between the biannual publication schedules of the entire volume and print version of Financial Market Trends, individual articles are being released online as soon as they are available. Information on each article and each six monthly publication is available at www.oecd.org/finance and subscribers can order and download articles and full issues of the book at www.sourceOECD.org/periodical/fmt.

We hope this issue of Financial Market Trends will again serve our readers with timely information and analysis.

Comments and questions should be addressed to the Financial Affairs Division of the OECD Directorate for Financial and Enterprise Affairs (e-mail: fmt@oecd.org).

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The cut-off date was 16 May 2008.

Part I

Current Issues in Financial Markets: The Recent Financial Turmoil

Financial Market Highlights – May 2008: The Recent Financial Market Turmoil, Contagion Risks and Policy Responses^{*}

I. A retrospective on the origins of the crisis

The current crisis joins a list of crises triggered by a collapse in asset prices

No two episodes of severe financial distress are exactly alike, but they can be analysed in terms of the same three core elements: some type of triggering event, the propagation of the resulting shock, and its wider impact. Shocks may be triggered by sudden or marked changes in macroeconomic conditions or may instead be financial in origin. In that context, the current crisis joins a list of crises triggered by a collapse in asset prices. Many such episodes have been linked to the real estate sector and to declines in prices of land and commercial or residential property, typically after a period of rapid and sharp appreciation. Experience shows that these declines in real estate values, if unchecked, can induce a wave of defaults if borrowers end with negative equity, with flow-through effects on consumption and aggregate economic activity.

Steep declines in the value of collateral historically have meant a major impairment of banks' capital

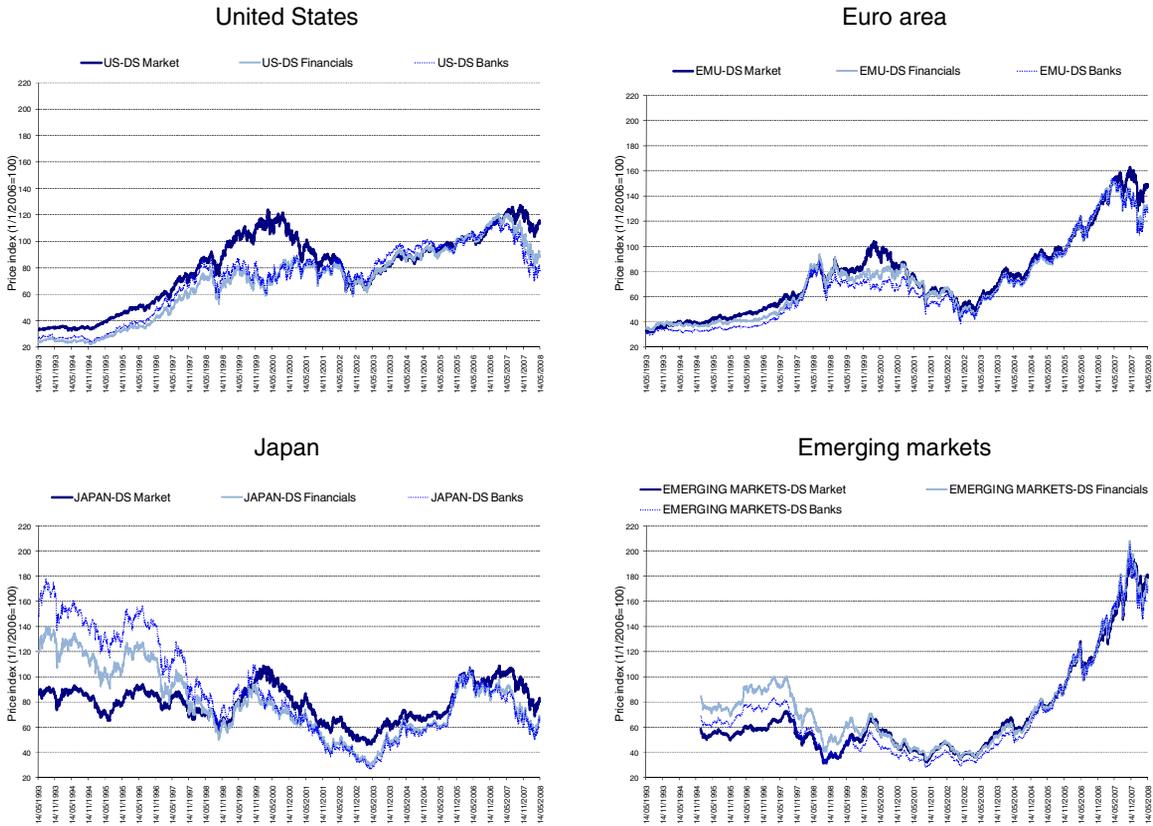
Given banks' predominance as lenders in real estate credit markets, steep declines in the value of collateral used to secure loans historically have meant a major impairment of their capital. It is difficult for institutions so-weakened to raise new capital and, thus, the typical response has been for them to extend fewer new credits, require additional collateral against outstanding loans, and perhaps even cut their balance sheets by calling in outstanding loans. In the case of serious difficulties affecting numerous banks, a widespread credit crunch might

^{*} This work is published on the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Organisation or of the governments of its member countries.

ensue whereby even creditworthy borrowers may be denied credit. These problems may propagate from one financial institution or market to another through various channels, including payments systems, security settlement systems, and inter-bank and other funding markets.

Figure 1. Equity markets plunged

Datastream total market and sector indices, 1/1/2006=100



Note: Daily data until 14 May 2008.

Source: Thomson Financial Datastream.

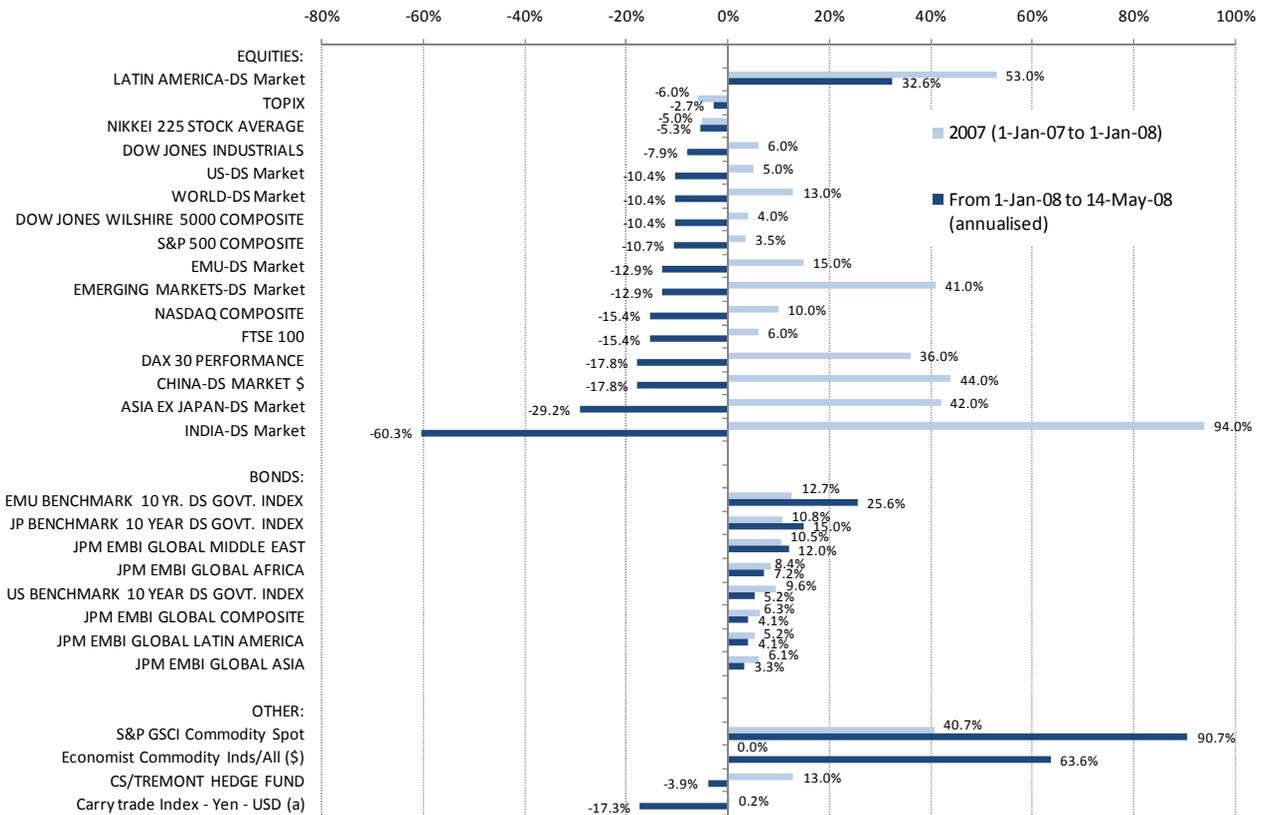
The current crisis has featured some of the same elements as in other recent episodes

The current crisis has featured some of the same elements as in other recent episodes:

- Stock prices plunged (Figure 1).
- There was a ‘flight to quality’ as investors reoriented portfolios toward low-risk assets and out of riskier classes (Figure 2).
- Volatility, as implied by futures and options prices rose markedly to levels last seen around the time of the events of 11 September 2001 (Figure 3).

Figure 2. Returns of selected investment alternatives

Per cent changes over period, annualised, in US dollar terms

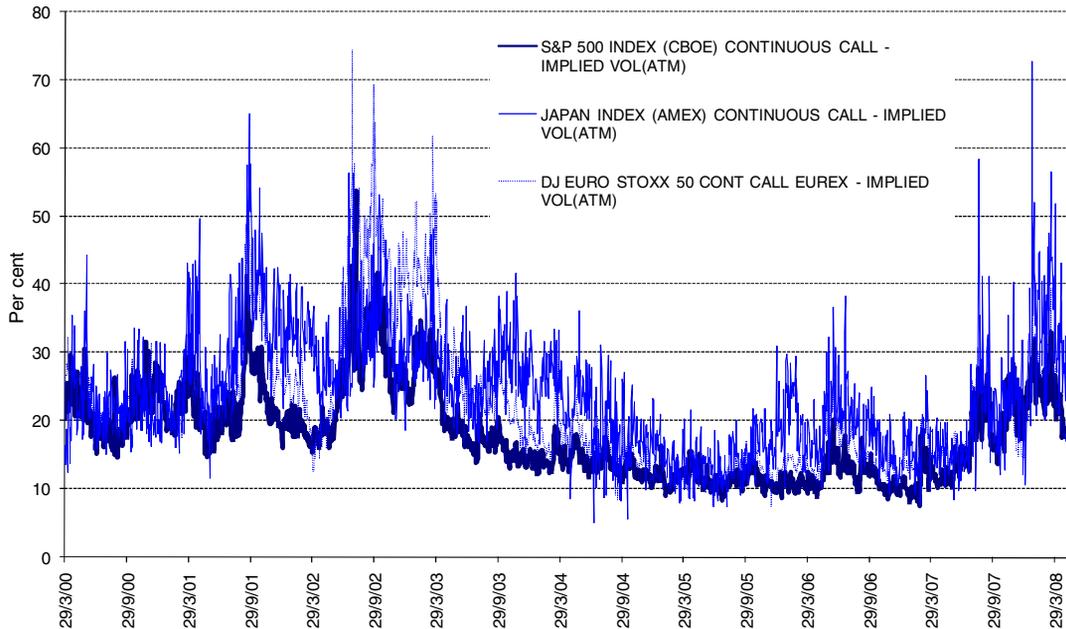


Notes: a) The carry trade return index is calculated based on the assumption of one-month investments in the respective currencies, borrowing in yen, applying 1-month eurodollar interest rates and central exchange rates, without taking into account bid/ask spreads and transaction costs.

Source: Thomson Financial Datastream, and OECD.

- Market liquidity has been severely impaired, with diminished trading in some cases even for the highest-grade bonds, while IPO activity slowed to a virtual halt (with the notable exception of the successful debut of Visa).
- While in overnight funding markets, demand for liquid assets shot up, spurred in part by fears of withdrawals and concerns about counterparty risk, and the price of cash surged well above targeted rates, despite efforts by monetary authorities to provide markets with ample liquidity.

Figure 3. Implied volatilities of major markets



Note: Daily data until 14 May 2008.

Source: Thomson Financial Datastream.

The turmoil in this case was triggered by the subprime mortgage crisis

But there are some ways in which the present crisis differs from previous ones. One notable feature of this bout of financial turmoil is that the particular triggering event did not occur in a core market segment. The turmoil in this case was triggered by significantly higher-than-expected defaults on subprime residential mortgage loans in the United States, and while the crisis is far from ended, it will likely be remembered – once the turmoil has ceased – as the subprime mortgage crisis. Even so, defaults on subprime mortgages are not the cause of the crisis, they are one of its symptoms, which partly explains why the financial costs appear to be more widely dispersed.

A major contributing factor was the marked compression in risk premiums...

For a crisis that continues to evolve and remains in a serious state, it is premature to attempt a *post mortem* to identify the causal factors. There are, however, some major contributing factors that have attracted the attention of industry observers and policymakers. One such factor was the marked compression in risk premiums observable on a variety of otherwise risky assets, in many cases to historical lows.

...raising concerns among financial authorities

Concerns about the apparent under-pricing of risk had for some time been on the radar screens of financial authorities, linked most often to discussions about the longstanding ‘search for yield’ by institutional and retail investors. Faced with a decline in interest rates on traditional low-risk investments over much of the early part of this decade to very low nominal levels, many investors moved out the credit risk spectrum. The broad-based quest for higher yielding assets was evident in a number of

notable developments, including the increase in ‘carry trades’, the growth in alternative investment vehicles such as hedge funds, and strong demand for relatively new and higher risk assets such as subprime residential mortgage-backed securities and various other types of structured financial products, such as collateralised debt obligations.

Strong demand for higher yielding assets supported the rapid growth of the “originate-and-distribute” model

The strong demand for higher yielding assets, in turn, supported the rapid growth of the “originate-and-distribute” model of credit intermediation, in which underlying credit risk is first unbundled and then repackaged, tiered, securitised, and distributed to end investors. Various entities participated in this process at various stages in the chain running from origination to final distribution. They include, in addition to primary lenders, mortgage brokers, bond insurers, and credit rating agencies. And while the subprime mortgage problem itself is limited largely to the United States, the originate-and-distribute strategies were international.

Securitisation facilitates risk transfer, but the underlying risks need to be properly assessed...

In principle, there is nothing wrong with securitisation *per se*. Securitisation enables the separation of a pool of assets from the credit and insolvency risk of the originator. There are many circumstances in which this arrangement works to the benefit of the end investors. However, most, if not all of them, are based on the assumption that the cash flows associated with the underlying assets are either known or predictable with a reasonable degree of certainty. A key requirement for this condition to hold is that the underwriting criteria used to originate the underlying loans are fairly standardised.

.. and market discipline needs to be ensured

That is how off-balance sheet securitisation worked in the past. Primary lenders whose loans failed to meet established underwriting criteria lost access to the secondary market. In the recent incarnation of the securitisation model, however, this component of market discipline seemed to have disappeared.

Opacity of many structured products makes them difficult to value

The apparent disconnect between the true credit quality of the underlying assets and the promised performance of the structured instruments backed by them proved eventually to be a major flaw. The current market dislocations partly reflect a lack of knowledge as to who is bearing the ultimate risk of loss. The opacity of many structured products makes them difficult for investors to fully understand and for third parties to value. In this environment, banks and securities firms have found themselves being forced to back-stop risks that supposedly had been transferred to other investors.

Uncertainty about the distribution of losses led to a complete drying up of liquidity

Widespread uncertainty about the distribution of losses and the financial situations of various associated participants led to a complete drying up of liquidity in markets for structured products and asset-backed commercial paper programmes, which are used to fund a number of securitised products. With growing concerns about counterparty risk, banks became reluctant to lend, even at very short horizons, and rather,

seemed inclined to hoard liquidity. History provides many examples whereby this curtailment in bank lending flows through to diminished aggregate economic activity at a minimum and many times to recession.

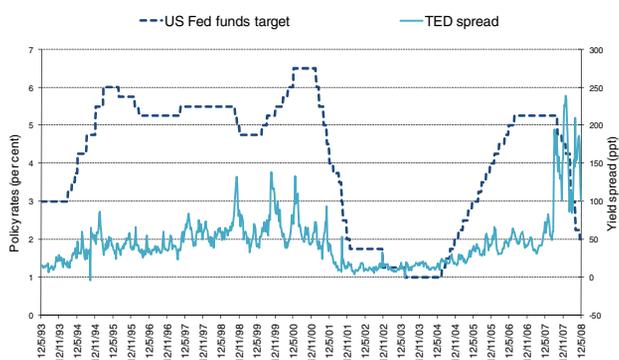
II. Financial market outlook and impact of the crisis

Central banks have taken action ...

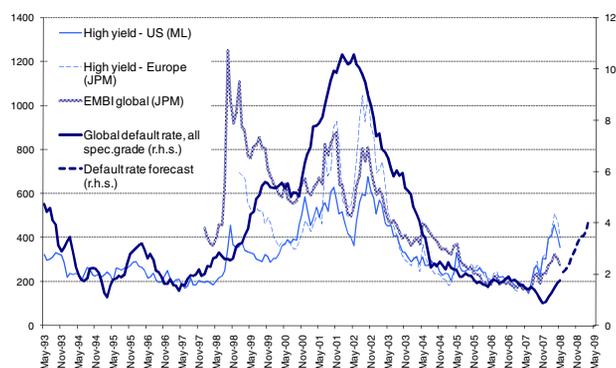
Central banks have worked to address the continuing liquidity pressures, not only through traditional facilities, but by increasing the frequency and amount of funds offered, by expanding the types of eligible collateral, by engaging in swap facilities with other central banks, and by expanding the types of accepted counterparties.

Figure 4. Risk spreads have risen

(A) Fed funds target and TED spread^{a)}



(B) High-yield and emerging market bond spreads vs. default rates^{b)}



Notes: a) Weekly data until 14 May 2008. The TED spread is the difference between the T-bill interest rate and LIBOR.
b) Monthly data until 14 May 2008.

Source: Thomson Financial Datastream.

...and money market tensions have eased, but concerns remain as the subprime crisis is affecting a broader set of markets and institutions

While these actions have helped to ease money market tensions somewhat, in many cases conditions have not returned to historical norms. Indeed, spreads, even though they recently have come down a bit, remain high as credit and liquidity risk concerns prevail (Figure 4) – more so as the subprime crisis has now come to affect a broader set of markets and institutions. A number of banks already revealed large subprime related losses in their preliminary earnings reports for the third and fourth quarters of 2007, and more for the first quarter of 2008. But the market appears not to be convinced that all losses have been acknowledged and fears remain of further bad news as final audited reports for 2007 are being released. Moreover, with mortgage defaults continuing to rise, housing prices continuing to fall sharply, and resets for variable rate mortgage loans still in the pipeline, more write-downs can be expected for 2008.

The financial crisis weighs on the global economy, and the likelihood of a US recession has by most accounts increased

Having to take such losses on their balance sheets, banks have tightened lending conditions. There is a growing expectation that both turmoil in financial markets and other factors will have an impact on the US economy. The US housing market is plunging, and recent data show that US household wealth has – for the first time in more than 5 years – declined in the fourth quarter of 2007.¹ This decline, rising foreclosures, increasing unemployment and precautionary saving may lead consumers to rein in spending and further tip the US economy over the brink into recession, the likelihood of which has increased according to many forecasts.

Other economies may not easily remain decoupled from the effects of the subprime crisis

It remains to be seen to what extent other economies will remain decoupled from the market turmoil and the slowing in the United States. Among particular pockets of risks outside the United States that are becoming apparent are deteriorating housing markets in some European countries, especially in Spain and the United Kingdom. While mortgage lending may have followed more prudent standards than in the US, banks in Europe are more directly exposed to mortgage risks than their US counterparts, and a retrenchment in the housing markets could have more direct effects on the sector.

Furthermore, some banks from Sweden, Austria and Italy have been expanding their market shares in eastern Europe. To the extent that these banks become affected by credit market pressures (as they tend to rely largely on wholesale funding) there could be ripple effects on these economies. Adding to these risks are the exposure to foreign currency loans in emerging Europe and equity derivative products which are more widespread in Europe than in the United States.

The Fed, the Bank of Canada and the BoE have lowered policy rates...

To cushion the economy from the negative effects of the financial market crisis the US Federal Reserve began a concerted easing cycle on 18 September 2007, lowering its policy rate in six subsequent steps (the last one so far taken end of April 2008) by a total of 250 basis points, to 2 per cent. A few other monetary authorities have also reduced their target rates. Among the major central banks, the Bank of England and the Bank of Canada followed suit over the past few months, easing however more hesitantly than their US counterpart.

... but most other central banks have not followed

But most other central banks have not followed the Fed in lowering policy rates, reflecting differences in economic conditions across OECD economies and less fall-out thus far from the financial market turmoil. The ECB, for example, has left policy rates unchanged, and so did the Swiss National Bank. At the other end of the spectrum, Sveriges Riksbank, the Swedish central bank, surprised financial markets in mid-February by raising its policy rate, thus continuing a tightening cycle that started back in mid-2005.²

One development that is complicating the task for monetary authorities is the continued rise in commodity prices. Central banks are

Commodity price increases continue to pose problems for monetary policy

under pressure in some cases to stimulate sluggish or faltering economies, but rising inflationary pressures tend to force a more restrictive monetary policy than might otherwise be suggested by the business cycle, in particular among those central banks with explicit inflation targets. Thus, short-term interest rate levels are still expected to remain substantially different across the Atlantic.

III. How is the financial sector coping with the crisis?

Issues related to monoline insurers

Specific concerns about monoline insurers have added to the financial crisis

One of the factors contributing to the market downturn in January were developments with respect to bond insurers.³ The exposure of bond insurers to subprime mortgage debt came into the central focus of the financial press after rating agencies were considering downgrading some of the major financial guarantors.

Bond insurers have played a crucial role in the mortgage risk transfer process...

Financial guarantors or bond insurers are now estimated to guarantee USD 2 400 billion of bonds, the bulk of which being municipal bonds. But they have also played a crucial role in the transfer of mortgage risk by enhancing structured products ratings. Many of these monoline insurers that essentially lend their credit rating (typically triple-A) for a fee, have grown rapidly over the past few years and moved from their traditional business of insuring municipal bonds to guaranteeing payment of interest and principal in structured financial products.

... and have been warily watched by investors...

These companies' share prices have fallen rapidly and their credit default swap premiums risen since the beginning of the financial turmoil. Perceptions of the risk implied by financial market indicators (in particular the level of credit default swap premiums) have been increasingly out of line with the triple-A rating awarded to these companies by credit rating agencies. This suggests that investors have been increasingly concerned that losses on structured financial products will be so large that they reach the highly rated tranches of these products.

... as their downgrading can have wider systemic effects

The credit rating downgrade of a big financial guarantor is important because such a demotion should lead to downgrades of a significant part of bonds that such companies guarantee. The rating of a guaranteed tranche of a structured financial product could not be higher than the rating of the guarantor.

Recapitalising banks

Recapitalisation of banks is now the major task

Throughout the past months of the financial crisis, the revaluation process of structured financial products has been slow and there has been much uncertainty related to the extent of subprime related losses at financial institutions. How to recapitalise the banking system remains one of the most important issues to be solved in order to rebuild investor confidence.

Loss estimates are between USD 300 to 400 billion and beyond

Estimates of subprime-related losses mostly range from USD 300 billion to 400 billion, but some estimates are as high as USD 1 trillion.⁴ The recent falls in banks' market values reflect, in a way, investors' estimates about such losses (Table 1). In the course of 2007, G10 banks have lost about USD 570 billion in market value, and another USD 184 billion year to date. However, losses in market value in this situation of crisis and uncertainty are an unreliable measure of underlying balance sheet losses (due to panic reactions etc.). In fact, changes in market value have fluctuated widely over the past few months since January, attaining the range of USD 500 trillion in March (measured from the beginning of the year).⁵

Table 1. **Banks' losses: the market view**
Change in market value of largest G10 banks (in USD billion)^{a)}

	2008 ^{b)}	2007	2006	2005
United States	-58.8	-358.1	187.8	-20.8
Japan	20.2	-112.2	-49.1	204.2
United Kingdom	-61.9	-108.4	130.5	-17.5
Switzerland	-35.9	-44.5	55.6	22.0
France	-14.6	-31.6	108.6	13.1
Sweden	-4.3	-4.3	26.7	0.7
Germany	-7.6	-3.6	34.3	14.8
Netherlands	-0.1	0.5	0.5	0.1
Belgium	-1.3	5.5	54.0	20.0
Canada	0.5	12.2	31.1	37.2
Italy	-19.7	73.1	61.9	46.8
G10 total	-183.5	-571.4	641.9	320.8
Global ^{c)}	-327.3	-134.0	1 225.2	522.9

Notes : Sorted by 2007 losses.

a) Based on banks contained in respective countries' Datastream bank indices.

b) From 1-Jan-08 to 14-May-08.

c) Based on banks in Datastream worldwide bank index.

Source: Thomson Financial, Secretariat calculations.

While substantial, losses would seem relatively manageable if related to the total size of the sector...

Such losses are quite substantial, but relating them to the size of the banking sector more generally they seem less burdensome. If we estimate G10 banks' assets at roughly USD 38 trillion (and global banks' assets at roughly USD 50 trillion),⁶ losses of USD 300 billion to USD 1 trillion would correspond to something like 0.8 to 2.6 per cent of these G10 banks' assets (and 0.6% to 2% of global banks' assets). Furthermore, previous growth in banks' total assets has been substantial, USD 2.5 trillion in 2005 for G10 banks, and USD 4 trillion for global banks.

Also, a USD 400 billion loss would correspond to less than 2% of the USD 22 trillion US equities outstanding, and to a not very abnormal daily decline in the US stock market.⁷

...but the special role of banks and the concentration of these losses make them systemically important

However, the special role of banks as providers of credit to the economy and their highly leveraged structure render these losses systemically important. Given the typical leverage of financial institutions, the impairment on bank lending could be tenfold the losses.⁸ Furthermore, given that this crisis is particularly linked to mortgage securitisation, the subprime losses are having further and crucial damaging effects on securitisation. The potentially economy-wide damaging effects have already been felt, and the confidence – if not liquidity – crisis on money markets is already an indicator of banks' distress.

Investors need certainty about the size and the way of recapitalising the losses

As mentioned above, some of these tensions have been eased by central banks providing liquidity and opening their discount windows, but this is more a cure for the pain and does not address its origin. Some easing of tensions should be expected over the next months when audited as well as new preliminary income statements will provide more transparency on subprime related losses, and perspectives to recapitalising banks hit by the crisis become more concrete.

The role of SWFs and other market players

So far, SWFs have stepped in to bail out the banking sector...

So far, some significant contributions for recapitalising institutions suffering from subprime-related losses have come from sovereign wealth funds (SWFs) (Table 2).⁹ Out of the fifteen largest M&A deals from 1986 to date involving SWFs, eleven have targeted financial sector and real estate companies, and all of these were announced or completed in 2007 and early 2008.

...at a time when such investments were particularly risky

This is even more remarkable as in the current crisis environment and with heightened uncertainty these investments were particularly risky, evidenced by the fact that SWFs have, so far, lost from their investments in large financial companies as their values have further dropped (Table 2, with GIC's UBS investment as one exception as of date). However, such investments may be seen as strategic and long-term, with the perspective of substantial gains should market and sector conditions improve. But then again, it remains to be seen how much longer and further these investors are willing to share with the (mainly US and European) financial sector the burden of adjustment to this current crisis. As other, more profitable options to invest (in other sectors or countries) are opening up their interest in the financial sector may tail off.

SWF investments are set for future growth

With currently estimated assets under management (AUM) of 2.3 trillion (2006/2007), SWFs are among the new global financial players which can provide liquidity when needed most.¹⁰ Given that much of SWF liquidity comes from oil exports, it is worth looking at the future potential of these players. At an oil price of USD 100 per barrel, and at the current pace of production and exports, petrodollar incomes could increase by USD 2.1 trillion per year.¹¹

Table 2. **Major financial sector acquisitions by SWFs**
Top 10 acquisitions by SWF in the financial and real estate sector^{a)}

Date announced	Date effective	Acquiror	Target	Target Sector/Industry	Value of deal (USD mill.)	Per cent acquired	Target's share price change ^{b)}
2008 (Jan-Apr)							
15-Jan-08	-	Government of Singapore Investment Corporation (GIC)	Citigroup Inc	Commercial Banks, Bank Holding Companies	6 880	-	-13.7%
15-Jan-08	-	Kuwait Investment Authority (KIA)	Merrill Lynch & Co Inc	Investment & Commodity Firms, Dealers, Exchanges	2 000	-	-7.8%
15-Jan-08	-	Korea Investment Corp. (KIC)	Merrill Lynch & Co Inc	Investment & Commodity Firms, Dealers, Exchanges	2 000	-	-7.8%
2007							
24-Dec-07	-	Temasek Holdings(Pte)Ltd	Merrill Lynch & Co Inc	Investment & Commodity Firms, Dealers, Exchanges	4 400	-	-9.3%
19-Dec-07	-	China Investment Corp. (CIC)	Morgan Stanley	Investment & Commodity Firms, Dealers, Exchanges	5 000	-	-6.2%
10-Dec-07	05-Mar-08	Government of Singapore Investment Corporation (GIC)	UBS AG	Commercial Banks, Bank Holding Companies	9 760	9	6.0%
26-Nov-07	-	Abu Dhabi Investment Authority	Citigroup Inc	Commercial Banks, Bank Holding Companies	7 500	-	-22.0%
17-Jul-07	17-Jul-07	GIC Real Estate Pte Ltd	WestQuay Shopping Center	Real Estate; Mortgage Bankers and Brokers	612	50	-
20-Jun-07	20-Jun-07	GIC Real Estate Pte Ltd	Chapterhouse Holdings Ltd	Investment & Commodity Firms, Dealers, Exchanges	954	100	-
20-May-07	27-Jun-07	China State Investment Corp.	Blackstone Group LP	Investment & Commodity Firms, Dealers, Exchanges	3 000	10	-34.8%

Notes: a) Counted from the beginning of January 1986 until the end of April 2008.
b) As of 14 May 2008, since date effective; since date announced (in italics) if not yet effective.

Source: Thomson OneBanker.

Hedge funds have also suffered and fared worse than in previous downturns...

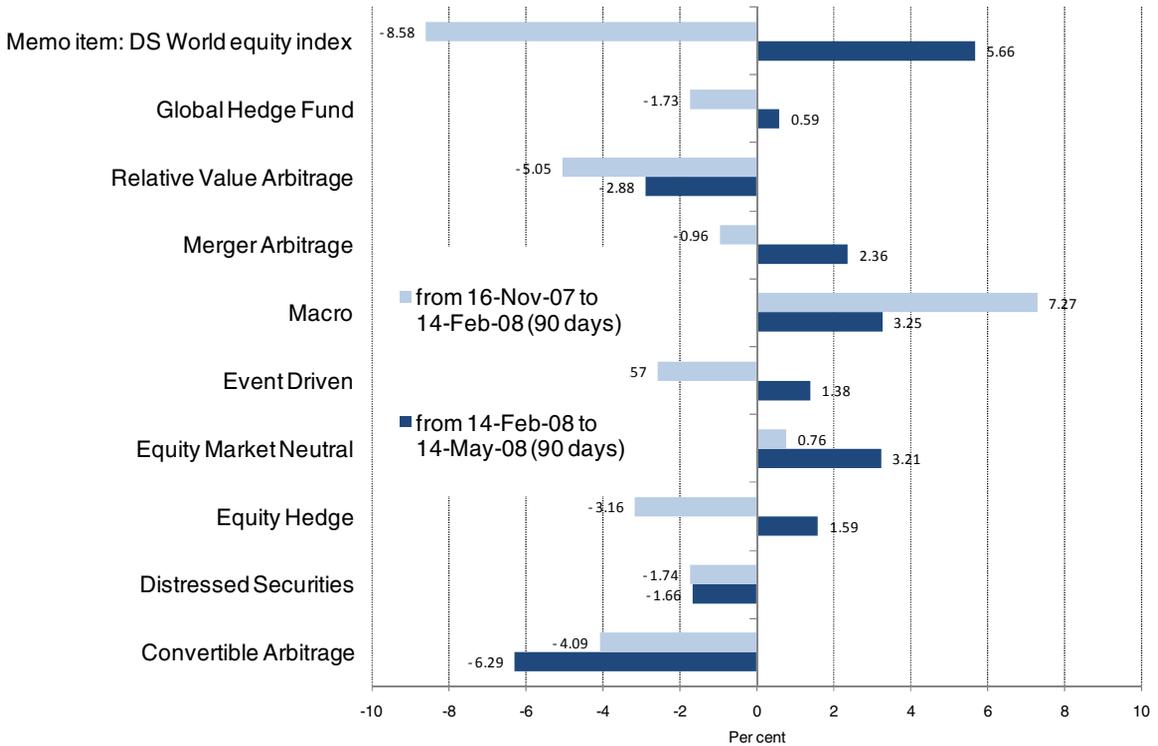
Hedge funds have been playing an ambiguous role during the recent turmoil. While some observers had attributed some of the rapid market correction which happened in July and August of 2007 to hedge funds' so-called "quant-strategies", some had later come to the rescue of institutions in distress by taking contrarian bets. However, such bets did often not play out well, and hedge funds' returns remained comparatively modest over the last year and have often been negative (Figure 5). Several funds, especially those specialising in credit, had to shut down their operations. Macro strategies seem to have fared relatively well during the downturn, but more recently, some traditional (e.g. equity) investments' returns have picked up more strongly.

...perhaps leading investors to more realistic expectations

Investors' expectations with respect to hedge funds' positive, absolute returns – providing a financial shield during a downturn – may have somewhat cooled. However, over the past few years, hedge funds have become entrenched also in more traditional investors' (e.g. pension funds') portfolios. In fact, institutional investors have contributed much to hedge fund growth over the past few years. But it remains to be seen how large a share these investors will allocate to these alternative investments in their portfolios in the future.

Figure 5. Returns on various hedge fund strategies

HF-research price indices, per cent changes over period



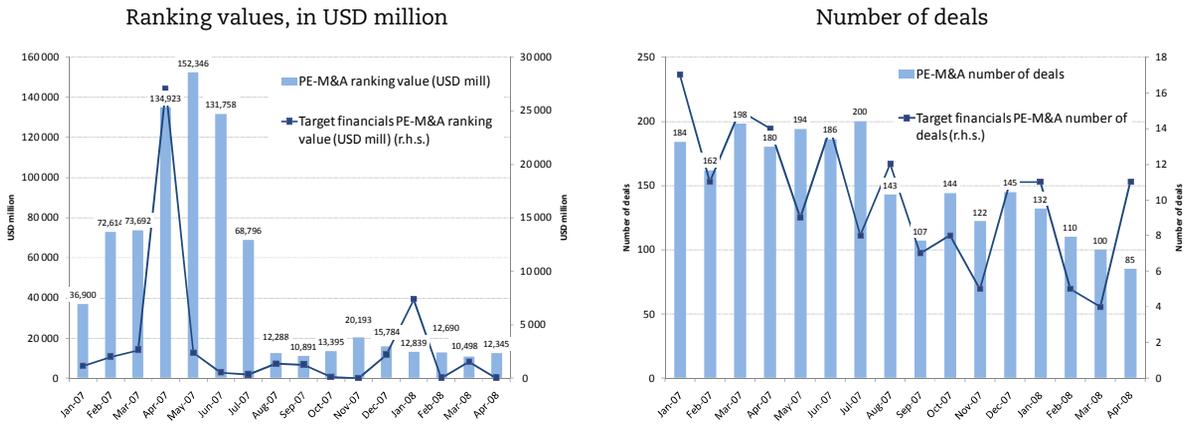
Source: Thomson Financial Datastream.

The recent private equity boom has stalled, but less leveraged deals have begun targeting the financial sector

Leveraged private equity deals, which were at a high until early 2007, have cooled since, in particular those targeting the financial sector (Figure 6A), and many planned deals had been cancelled. While private equity deals helped to fund some financial institutions' balance sheets, and provided fee income for major investment banks, private equity companies are now suffering from higher financing costs and from the deteriorating financial environment more generally, as reflected in tumbling share prices of listed private equity firms (Figure 6B). Adding to this picture is the recent insolvency of Carlyle Capital Corporation, after the fund had received substantial margin calls and default notices from its lenders. However, some funds backed by the still ample global liquidity are making a comeback, and less leveraged deals have begun targeting the financial sector for opportunities arising from the bottoming out of the adjustment.

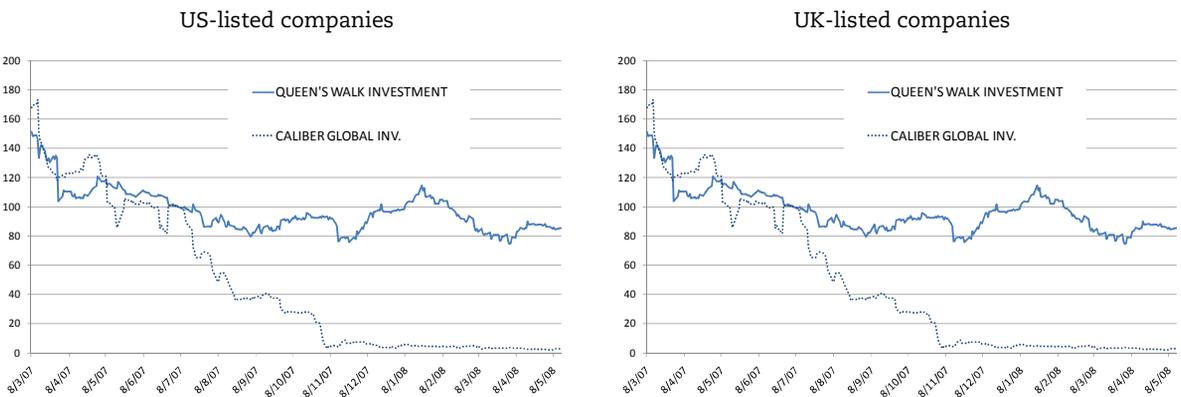
Figure 6. Private equity (PE) is cooling off

(A) Total PE deals vs. PE deals targeting the financial sector



(B) Selected listed private equity firms

Share prices relative to respective country's total market, index, 4/1/2007=100, daily until 14/5/08



Source: Thomson OneBanker and Thomson Financial Datastream.

Some opportunities could lie in financial sector consolidation

In recapitalising balance sheets of banks that have suffered from the subprime losses, other, relatively healthier financial institutions may come to the rescue. The crisis in the financial sector may thus provide opportunities for further financial sector consolidation, as M&As between financial institutions may be a means to strengthen banks' balance sheets for the long run. However, in the current market environment, financial sector M&As have declined (Figure 7A). Not only funding problems, but also protectionist tendencies and the fear of potential targets to have to offer their assets at fire sale prices have led to several withdrawals of announced M&A deals, in particular of very large ones (Figure 7B). The deal value ratio of withdrawn to completed deals attained 65% in 2007, the highest value since 1992 (when that ratio reached 120%).

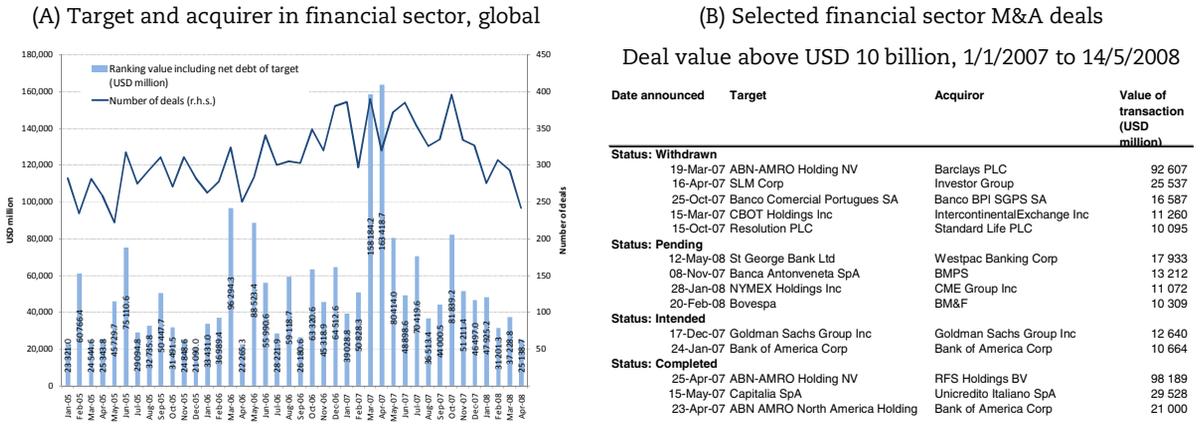
As fears of big bank failures begin to recede, the cost of protection against default (via Credit default Swaps – CDS), which had risen to

As fears start receding, banks have successfully started to tap capital markets

record levels, has come down recently (Figure 8). Market observers date the turning point for the CDS market as March 17, the date of the US Fed-lead bail-out of Bear Stearns which signalled the willingness of policy makers to step in to avert a systemic impact of the crisis, underlined also by (preceding and subsequent) liquidity operations by major central banks.

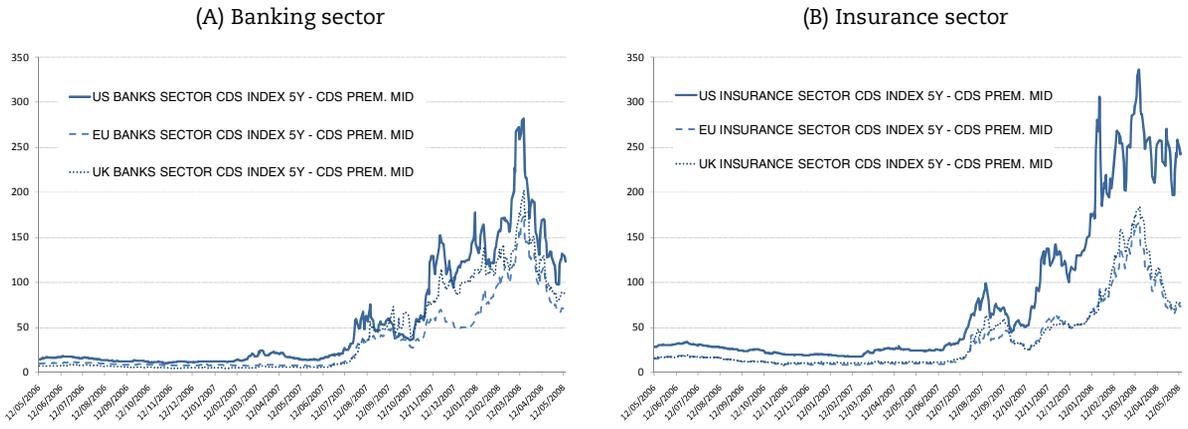
This climate of waning uncertainty has also allowed banks to successfully raise new capital from their investors, which in the middle of the turmoil may have signalled weakness and may have weighed on share valuations. In April, about USD 30 billion were raised in capital markets by big US financial groups. A concern however, highlighted by some rating agencies, is that new funds came from a record amount of preferred shares and other hybrid securities which could weaken banks' balance sheets further down the road.¹²

Figure 7. M&A in the financial sector



Source: Thomson Financial Datastream, and Thomson OneBanker.

Figure 8. CDS spreads



Note: Daily data until 14 May 2008.

Source: Thomson Financial Datastream.

Risk management and the future of asset-backed structured products

Risk transfer through mortgage securitisation increased lending

At the core of the US subprime mortgage crisis, and its global repercussions, lies financial innovation, transferring mortgage risk through securitisation from mortgage lenders' balance sheets to other parts of the financial system and to other investors globally. Years of low interest rates with easy financing, innovative, non-traditional mortgage products and risk transfer through mortgage securitisation generated a rising volume of loans that had been extended increasingly to sub-prime borrowers.

The “originate-to-distribute” model led to riskier behaviour ...

This “originate-to-distribute” model not only has led to lower underwriting standards but has also tended to increase loan volume as substantial (and upfront) fees at all stages, from origination to securitisation, have been involved. Long-run performance of the loans and related securities was not a concern at the originating level, so risk-management standards would be relaxed. Many borrowers with poorer records have stretched their financial capacities too far, leading to record-high default rates with negative effects on mortgage securities and structured products, CDOs and SIVs based on such securities.

... with wider repercussions as risks materialise

Spread of mortgage bonds are still at record highs, and issuance has declined rapidly. Liquidating the overhang of bad, outstanding securities (and entities that have taken on such securities), is the major task at hand. Liquidating structured credit instruments has increased demand for credit default swaps which provide protection for the buyers of bad debt, and has driven up the cost of protection (Figure 8). This and narrowing markets, where small trades can lead to large movements, can potentially trigger a major chain reaction hitting other market segments and the wider economy. Thus, further deleveraging, margin calls and fire sales of assets may lead to a self-sustained downward spiral towards a full-blown credit crunch, stalling economic growth or resulting in outright contraction of the economy.

Alternatives to mortgage securities are becoming more important, and simpler and higher quality structures will dominate a shrinking market for synthetic products

As investors have become more aware of the risk involved in mortgage-backed and structured products, they also seem to be better at discerning such risks. As risk spreads are rising, gaps are opening up between spreads of various asset classes. While risk transfer and securitisation are very likely here to stay, the future of structured products and related financial innovations is as yet uncertain. Simpler products with less leveraged structures and backed by assets of superior quality will certainly dominate, while it seems inevitable that the market will have to shrink more permanently. Some money market funds in Europe had been big buyers of ABS recently, but some 60-70% of investors have left the market, perhaps for a long time, if not permanently. Investors may certainly apply more careful scrutiny and choose alternatives with a more appropriate incentive structure as regards the security originator. Alternatives to MBS and ABS are also likely to become more important, for example the (European type) covered

mortgage bonds where the mortgage risk stays on the balance sheet of the originator.

IV. Some policy lessons from the downturn

Mortgage market reforms would involve the private sector

Excessive mortgage lending, which led to the crisis, has added calls for more scrutiny on the US mortgage market. While such calls may entail tighter regulation, it has been argued that current legislation, if properly enforced, should be sufficient to deal with cases where lending has been fraudulent. Proposals for reforms include expanding federal backing of mortgages, and enhancing financial literacy of borrowers. Many of these initiatives would involve the private sector, particularly at the mortgage lender level.

Basel II under scrutiny...

The growth of SIVs and conduits may be partly attributed to the first (1988) Basel Accord, which established minimum capital requirements to bank balance sheets and required more capital protection for riskier assets. The creation of these off-balance sheet vehicles allowed banks to reduce the capital associated with the underlying loans, thus encouraging banks to shift risky activities to such entities, which were less transparent and under weak regulatory scrutiny.

... and reforms are being proposed

Basel II, in operation since the beginning of this year, was designed to amend some of these problems. The new agreement bases capital requirements on a more comprehensive risk assessment, taking into account a bank's overall portfolio, including contingencies, which should reduce a bank's incentives to off-load risk. However, risk assumptions in portfolio models and prevailing accounting standards still provide loopholes for underestimating capital requirements.¹³

In order to address such problems, the Basel Committee on Banking Supervision issued in mid-April proposed regulations that seek to impose higher capital charges for banks that manage asset-backed securities. By closing close loopholes that let banks off-load risks in entities such as SIVs, more banking activity would be pulled back in into the regulated sphere.

Procyclicality of capital adequacy requirements and mark-to-market valuations may need to be attenuated...

Another concern is the procyclicality inherent in capital adequacy requirements, and the procyclicality inherent in the mark-to-market valuations introduced by reforms in accounting systems. During a downturn, requirements to set capital aside and book losses as asset prices decline, may unduly restrain lending and weaken balance sheets of institutions that might otherwise more easily weather a storm, and thereby amplify and spread crisis effects. Various proposals have been made to attenuate such procyclicality,¹⁴ but none of these proposals are without problems of their own.

... especially in cases where markets become illiquid or for institutions with high systemic significance

While a moratorium on marking to market could be counterproductive if it results in a loss of confidence in basic accounting rules, the issue must be addressed over the longer term. As the crisis has shown, there are many instances where the market has not been coping well with this accounting rule which does not factor in what has become a significant liquidity premium or the role of a fear factor. Specifically, there can be dramatic effects for monoline insurers which do not hold traded portfolios and cannot be forced to sell. Monolines occupy a pivotal position in some markets, and further downgrades would have flow-through effects on these segments. Mark-to-market techniques regarding the timing of when losses occur can thus have widespread effects.

Incentive structure of intermediaries should be reconsidered

A problem with loan securitisation is the incentive structure for intermediaries, in particular traders of such securities, who sometimes take undue risks with their employers' capital because of the way they are rewarded. Bonuses based on revenues generated during a year are a single-sided bet, as banks will have to bear credit and trading losses that may appear later. Such risk can be contained by paying the bonuses in restricted shares and options and with a delay. But trading also means that risks may be transferred outside the institutional base of the trader, posing a valuation problem if information is asymmetric.

Liquidity crises needs coordination between market participants, besides policy action

The liquidity crisis, last year's bank run on Northern Rock, and the recent Fed liquidity support for Bear Stearns (to help a buyout by JPMorgan), have shown that central banks' role in crisis solution is crucial, but ambiguous. Injection of money into the market is a two-edged sword, and helping out banks may increase moral hazard. While it helps to ease a temporary credit crunch, it may also be to the disadvantage of banks that are flagged as needing access to the central bank's resources.

In the UK, the tripartite regulatory structure was blamed for the difficulties in arranging an interbank solution to the liquidity crises, under the heading of the central bank. While this is a valid argument, it should also be mentioned that private sector associations exist that could help bringing the relevant stakeholders to the table without government or central bank co-ordination. If the industry favours self-regulation, it could take a lead in such co-ordination efforts.

With regard to the monoline insurance industry, options discussed so far have included spinning-off the structured-products business from the municipal bond business, and there were also policy efforts to organise concerted action by major financial institutions to recapitalise bond insurers.

Valuation of new products by rating agencies need to be enhanced

Structurally, MBS risks have been undervalued,¹⁵ and the sudden rerating and defaults of mortgage backed securities over the past months brought to the fore such inherent problems. While financial supervisors may also be blamed for not having adequately recognised the problem, rating agencies have been the focus of the discussion.

While a private sector approach is favoured by some, initiatives enhancing the transparency of rating methodologies and facilitating more competition in the market for credit assessments are seen as necessary. It has also been highlighted that the closeness of the relationship between credit rating agencies and banks they rate and from which they earn their fees, may pose a problem of dependence, introducing a bias into the ratings.

Some rating agencies have responded by enhancing their risk assessment by creating tools to address liquidity and market-value issues, making rating models more conservative and broaden the definition of subprime mortgages.¹⁶ The idea of introducing liquidity ratings has also been welcomed by regulators with whom major rating agencies have engaged in a dialogue to discuss how to restore confidence in the structured credit sector.

More transparency of complex financial instruments is needed to restore market confidence in the long run

In order to address the valuation problem of structured products, a standardisation (perhaps including an “official seal of approval”) of such products has been proposed. Such a step would not only increase transparency, but also facilitate the participation of a wide range of investors in these instruments, enhance their liquidity and improve (risk) pricing in the respective markets.

In their efforts to step up transparency in the structured finance universe, various policymakers called for more transparency. In the United States, the president's working group on financial markets met with the various stakeholders of the private sector, investors and asset managers, to formulate a private sector-led response to concerns about the activities of hedge funds, and balance the diverse requests for transparency and regulation. In the United Kingdom, the Hedge Fund Working Group has reviewed industry standards and best practices in relation to valuation, risk management and disclosure in a report also welcomed by the Financial Stability Forum (FSF).¹⁷

Market sources to repair damaged balance sheets are hardly sufficient, thus further policy action may be needed

Substantial capital injections to restore financial institutions' balance sheets have come from market sources, but so far they have not proven sufficient – in particular in cases where emergency funding has been needed to restore market confidence and liquidity to avoid major disruptions with more widespread repercussions. As the crisis is still playing out, many banks are yet many months away from going back to “business as usual”. In order to restore bank lending and banks' and other financial institutions' earnings capacity (also to cover previous losses), additional policy action may be needed, including regulatory forbearance, tax relief measures, direct funding and explicit guarantees. Most helpful in this respect could be a “Resolution Trust Corporation” (RTC) mechanism¹⁸ or a “good bank/bad bank” approach as applied in previous crises. In any case, while authorities should allow the banks to solve the problem, it is important to deal with weaknesses at the system level, not just in individual institutions.

Notes

1. Falling share prices and dropping house prices added to a decline of total household wealth by USD 533 billion in 2007q4, to USD 57,718 billion.
2. The ECB left the repo rate unchanged at its June 2007 levels of 4%, and the Swiss National Bank has left its target range for the three-month Libor unchanged at 2.25–3.25%. Sveriges Riksbank raised its policy rate by 25 basis points to 4.25% on 20 February 2008.
3. For more detail, see the related article in this issue by Sebastian Schich, “Challenges Related to Financial Guarantee Insurance”, *Financial Market Trends* vol. 2008/1, No. 94.
4. See the article in this issue, Adrian Blundell-Wignall, “The Subprime Crisis: Size, Deleveraging and some Policy Options”, *Financial Market Trends* vol. 2008/1, No. 94. For a spectrum of different approaches and estimates, see also David Greenlaw, Jan Hatzius, Anil K. Kashyap, and Hyun Song Shin, *Leveraged Losses: Lessons from the Mortgage Meltdown*, paper presented at the U.S. Monetary Policy Forum, New York, NY, February 29, 2008. For an estimate at the high end of the spectrum, see IMF, *Global Financial Stability Report*, April 2008.
5. It should be noted, however, that the changes in market values as shown in Table 1 apply to banks only, thus do not include losses of other, non-bank financial institutions that have been directly affected by the subprime crisis.
6. Summing up total assets of banks in the Datastream G10 and global bank index (as of beginning 2006, a date for which most total asset data were available), yields USD 37.67 trillion and USD 50,24 trillion, respectively; these estimates for G10 and global banks’ assets certainly represent a lower limit as they exclude smaller and non-listed banks.
7. See Frederic S. Mishkin, *Comment on “Leveraged Losses: Lessons from the Mortgage Meltdown”*, presented at the U.S. Monetary Policy Forum, New York, NY, February 29, 2008.
8. If the leverage ratio for financial institutions is estimated at 10:1; see David Greenlaw, Jan Hatzius, Anil K. Kashyap, and Hyun Song Shin, *Leveraged Losses: Lessons from the Mortgage Meltdown*, paper presented at the U.S. Monetary Policy Forum, New York, NY, February 29, 2008. The authors, assuming that have of the losses could be neutralised by raising new capital, they estimate a contraction of domestic lending in the range of USD 1 trillion.
9. For more detail on SWFs, see the related article in this issue by Adrian Blundell-Wignall, Yu-Wei Hu and Juan Yermo, “Sovereign Wealth and Pension Fund Issues”, *Financial Market Trends* vol. 200/1, No. 94.
10. See also McKinsey Global Institute, *The New Power Brokers: How Oil, Asia, Hedge Funds, and Private Equity Are Shaping Global Capital Markets*, October 2007.
11. Crude oil production can be assumed at about 85 mill barrels/day, and exports at roughly 70 per cent of production; see International Energy Agency, *Medium-Term Oil Market Report*, July 2007; see also Stephen Jen, “Petrodollar tsunami will be at expense of euro and dollar”, *Financial Times*, March 4, 2008.
12. Hybrid securities give holders ownership while paying a fixed interest rate. Ratings agencies would normally require companies to have less than 25-30 per cent of their total capital in hybrid securities, a limit now surpassed by some institutions. Such securities also enable banks to increase their regulatory capital requirements without diluting their existing shareholder base by issuing common equity. Another concern would be that the high interest rates offered by preferred shares may have attracted less sophisticated retail investors who are less aware of the equity risks entailed when companies decide to eventually exchange these securities for shares, with no further (fixed) interest payments. This lack of information may also let issuers achieve better prices at the retail than at the institutional level.

13. See also Barry Eichengreen, “Ten questions about the subprime crisis”, *Banque de France Financial Stability Review – Special issue on liquidity*, No. 11, February 2008.
14. See also C. A. E. Goodhart, *The Regulatory Response to the Financial Crisis*, CESifo Working Paper No. 2257, March 2008.
15. See Frank Partnoy and David A. Skeel Jr., “The Promise and Perils of Credit Derivatives”, *University of Pennsylvania Law School Paper* 125 (September 11, 2006).
16. See, for example, Moody’s *International Policy Perspectives*, “Stress-testing the modern financial system”, September 2007.
17. Hedge Fund Working Group (HFWG), *Hedge Fund Standards: Consultation Paper*, October 2007.
18. See the article in this issue, Adrian Blundell-Wignall, “The Subprime Crisis: Size, Deleveraging and some Policy Options”, *Financial Market Trends* vol. 2008/1, No. 94.

The Subprime Crisis: Size, Deleveraging and Some Policy Options

Adrian Blundell-Wignall*

The paper revises our previous USD 300 bn estimate for mortgage related losses to a range of USD 350-420 bn. In doing this the paper explicitly rejects the previous approach based on implied defaults from ABX pricing, because these prices are affected by illiquidity and extreme volatility; they will likely lead to misleading estimates of losses. Instead it builds a proper default model approach and allows for recovery of collateral via house sales over time. The paper separates out the losses due to commercial banks in the US, and goes on to look at the implied deleveraging required to meet capital standards. It could take 6-12 months for banks to offset losses via earnings alone, depending on Fed rate cuts and the dividend policy of banks. Since even more capital than this is required if banks were to expand their balance sheets, the paper looks at possibilities for capital injections from groups like sovereign wealth funds; and it also looks at a novel plan for the use of public money with an RTC-style approach and the issue of zero coupon bonds. Finally the paper looks at the issues of moral hazard, the likely size of the impact in Europe and Asia and non-bank corporate leverage.

* The views expressed herein are those of the author and do not necessarily reflect those of the OECD or the governments of its Member countries. The author is solely responsible for any errors.

Executive summary

The main focus of this study is to review where we now stand in relation to our September 2007 calculation that the losses from subprime could amount to USD 300 bn; what the losses mean for deleveraging in the economy; and what policy options there are to deal with the negative economic consequences of deleveraging.

Section I of the paper looks at losses calculated with market price methods (the basis of the 2007 work). Liquidity problems and panic are causing major problems for price discovery, rendering this type of approach invalid. Section II therefore looks at default model-based estimates of losses. The estimates from this model, assuming a 40%-50% range for recovery on defaulting loans and an economic and house price scenario benchmarked against previous episodes, is USD 352-USD 422 bn. To get anything like recent mark-to-market losses (of virtually double our estimate) would require a 0% recovery rate – which seems extreme even for the most bearish. Section III focuses on the commercial banking share of the losses and potential transmission through deleveraging by this key sector to the economy, as well as policy options to counter this. About USD 60 bn of direct losses may be put down to US commercial banks and USD 27 bn to investment banking. Four things can happen: (i) commercial bank deleveraging, causing a credit crunch; (ii) banks can earn back the capital (with help from interest rate and dividend policy) and get back to intermediating; (iii) capital can be injected by investors (*e.g.* sovereign wealth funds and hedge funds); and (iv) public sector intervention can be used to separate problem bonds and mortgages from the intermediation process. It could take at least 6 months (with maximal interest rate and dividend cutting) and possibly up to 1 year (with more pessimistic assumptions on rates and dividends) to replace losses. This is too long for the economy, and risks early 1990s credit crunch scenarios. Capital raisings/injections from risk-taking private institutions or SWFs are a big help. But the arithmetic of getting quickly back to ‘business-as-usual’, which requires much more capital than simply offsetting the losses, argues for more action if possible. One such action mentioned in this context is the socialisation of losses. The paper provides a low cost example of a ‘Resolution Trust Corporation-like’ (‘RTC-like’) mechanism.

Section IV looks at US-listed prime brokers/investment banks. Direct holding losses could be around USD 27 bn (warehousing, etc). They are less capitalised and problems for the economy arise through their linkages to other sectors, particularly hedge funds.¹

Moral hazard issues arising from actions taken to date underline that the private sector should be encouraged to do the maximum of which it is capable. These are considered in Section V. Even so, the perceptions that the trade-off between returns-to-risk is now asymmetric must be addressed in the future, and may require more fundamental financial system reforms.

Section VI of the paper draws attention to issues for Europe, but does not analyse them in as much detail as for the US. Europe is not immune from the issues raised, and has its own special set of potential problems. It also risks real economy consequences from the subprime crisis. Section VII draws attention to Asia, where direct subprime holdings are relatively less. In Asia, orderly unwinding of bubbles and avoidance of future problems turn on attitudes to exchange rate policy.

Section VIII looks at spill-over risks to corporate bonds and equities. While corporate balance sheets are in good shape on average, there is a fat tail of overleveraged companies that will default in the advent of a recession, creating pockets of turmoil in corporate bonds (non-investment grade) and equities. Avoiding such spill over from the mortgage sector is essential, and underlines why a broad approach to policy to minimise the size of the economic impact is required.

The macro policies options are summarised in section IX: liquidity support and rate cutting to enhance earnings power of banks; focus on dividend policies; capital injections and M&A from stronger financial institutions; and RTC-like socialisation of losses.

I. How big is the subprime crisis: previous FMT and now?

Was our USD 300 bn estimate in 2007 too small?

In the previous issue of Financial Market Trends (FMT), written in September 2007, USD 300 bn was considered the likely size of the subprime and Alt-A mortgage losses.² At the time the official views were in the USD 100-USD 150 bn range. That previous estimate was based on a 14% overall default-loss probability applied to the stock of mortgages (subprime and Alt-A, etc.) of about USD 2.3 trillion³ (of which USD 1.3 trillion was subprime). The 14% was based on weighting up the ABX indexes (prices of credit default swaps used to insure risk of default in the underlying subprime mortgages) across vintages and tranches at that time, September 2007.

A focus on private label RMBS

Strictly speaking the ABX applies to subprime, the worst part of the market, whereas private label Residential Mortgage-Backed

Securities (RMBS) include mortgages other than subprime – for example Alt-A, jumbo loans, etc. Collateralised Debt Obligations (CDOs) and Structured Investment Vehicles (SIVs) use RMBS and other asset-backed securities (ABS). CDO issuance (cash and hybrid) was USD 1.47 trillion at the end of 2007, and much larger if unfunded synthetic CDOs are included. The sharp acceleration from mid 2004 in underwriting of what were to become the key problem mortgages, were to a large extent securitised, and found their way mostly into private-label RMBS (including home equity); which totalled USD 2.3 trillion at the end of 2007. The leveraged demand for these was facilitated by CDOs and asset-backed commercial paper (ABCP) conduits. This study focuses primarily on the losses associated with this private label RMBS variable. Some subprime and Alt-A mortgages remain un-securitised, but the losses here are expected to be much smaller, and follow loss patterns based on past experience.⁴

*The equity approach
also gave a USD 300 bn
number*

The loss estimate in the previous FMT was cross-checked by looking at the market cap losses of all banks and major broker-dealers (most heavily affected by subprime) as compared to their average prices in June 2007. The result was a similar number of USD 308 bn.

Market liquidity & price discovery problems become extreme now

The next section sets out the results of applying the two estimation approaches used in our previous article to the current market situation. But before doing this, it needs to be stated that both of these methods are now likely to lead to a serious over-estimation of the size of losses, because they rely on market prices that have become unreliable and possibly misleading.

*Liquidity and panic are
affecting ABX and
equity prices...*

In recent months, price discovery for structured products has been problematic with bouts of panic and extreme liquidity problems. At times the only market makers in RMBS have been the central banks. The Federal Reserve at the time of writing (mid-March 2008) has increased its liquidity operations, making an unprecedented USD 200 bn available, and accepting asset-backed securities (ABS) as collateral, *i.e.* doing what private banks and capital market participants will not. In such circumstances, price discovery is hugely problematic, and mark-to-market price calculations of implied losses are unlikely to be valid. An approach to model and estimate the losses that is not dependent on these market prices is therefore required.

Potentially misleading mark-to-market approaches to loss calculations

*... which means the
loss calculations based*

The ABX estimates are shown in Table 1. The prices for each tranche/vintage are shown in the top section of the table. Thus in the

*on them grow larger
without any change in
underlying solvency!*

first row, for ABX 06(1), the 14 March price 86 implies that 14% losses are discounted for AAA.⁵ The weights by vintage and tranche (not shown) are applied and, the weighted expected loss is shown in the bottom row of the table. This number is applied to the stock of US RMBS. Using the September 7 numbers, USD 292 bn is the implied loss (the main basis of the work last year). But as can be seen, over time the implied size of the losses seems to get ever larger. On the 14th of March, a staggering USD 887 bn loss is implied.⁶

Table 1. **ABX-based subprime loss estimates**

	PRICES -- 2007			PRICES -- 2008		
	07-Sep	19-Oct	30-Nov	11-Jan	22-Feb	14-Mar
ABX 06(1)						
AAA	98	98	95	94	93	86
AA	95	93	86	85	78	64
A	84	75	61	59	50	33
BBB	65	47	34	31	25	16
BBB-	57	38	30	25	19	15
EQ	0	0	0	0	0	0
ABX 06(2)						
AAA	97	94	87	84	78	71
AA	88	77	62	60	50	37
A	63	46	40	34	22	17
BBB	47	26	21	19	15	10
BBB-	40	24	19	18	13	10
EQ	0	0	0	0	0	0
ABX 07(1)						
AAA	95	91	77	73	65	56
AA	77	65	47	40	31	22
A	50	34	28	24	14	11
BBB	36	23	20	18	12	9
BBB-	33	21	19	17	12	9
EQ	0	0	0	0	0	0
ABX 07(2)						
AAA	95	92	72	70	63	52
AA	86	70	39	40	30	22
A	61	43	32	28	22	17
BBB	42	26	21	24	17	13
BBB-	39	24	21	22	16	13
EQ	0	0	0	0	0	0
OVERALL DEFAULT-LOSS PROBABILITY IMPLIED BY THE WEIGHTED BASKET						
%	87.7	84.0	75.3	73.0	67.9	60.2
RMBS \$bn	2378	2303	2303	2228	2228	2228
LOSS \$bn	292	368	568	602	715	887

Source: OECD, ABX. RMBS based on OECD forecasts for 2008Q1.

A similar picture emerges from our naïve equity market-cap-loss approach in Table 2. Far from the USD 308 bn published in the last FMT, the market cap losses for levered financial institutions most affected by mortgages is now a staggering USD 702 bn, very much showing the same pattern as the ABX approach.

Both approaches are undermined by recent market panic and problems with price discovery. If it is agreed that these are features of recent experience, then it follows that these estimates of losses are way too high.

Table 2. Major levered financial institutions with mortgage exposure

	Mkt Cap 14th Mar \$bn	Price 14 Mar \$	Av Price June 2007 \$	% Chg	Mkt Cap Jun-07 \$bn	Decline in Mkt Cap \$bn
INVESTMENT BANKS						
Citi	102.98	19.77	51.29	-61.5	255.14	152.16
JP Morgan	124.11	36.54	48.45	-24.6	162.73	38.62
Merril Lynch	42.27	43.51	83.58	-47.9	71.50	29.23
Goldmans	62.1	156.86	216.75	-27.6	86.58	24.48
UBS	53.18	27.76	60.01	-53.7	115.79	62.61
Credit Suisse	49.8	48.79	70.96	-31.2	74.26	24.46
Deutsche Bank	51.94	108.88	144.74	-24.8	72.38	20.44
Lehmans	20.83	39.26	74.52	-47.3	39.50	18.67
Morgan Stanley	43.69	39.55	83.88	-52.8	89.02	45.33
Bear Stearns	4.08	30	140	-78.6	20.24	16.16
Total	554.98				987.15	432.17
MORTGAGE LENDERS						
Bank of America	158.54	35.69	48.89	-27.0	216.92	58.38
Wells Fargo	92.85	28.45	35.17	-19.1	116.95	24.10
US Bancorp	51.3	31.57	32.95	-4.2	56.84	5.54
Suntrust	20.65	55.83	85.74	-34.9	29.90	9.25
Washington Mut	11.59	10.59	42.64	-75.2	36.78	25.19
BB&T	17.11	31.33	40.68	-23.0	22.35	5.24
NATL City	9.63	13.15	33.32	-60.5	21.10	11.47
Countrywide	2.61	4.5	36.35	-87.6	20.95	18.34
First Horizon	2.12	16.75	39	-57.1	4.93	2.81
Indy Mac	0.42874	5.3	29.17	-81.8	2.15	1.72
Total	366.83				528.87	162.04
OTHER SIGNIFICANT						
Barclays	57.63	34.93	55.79	-37.4	91.28	33.65
Wachovia	52.61	26.54	51.25	-48.2	97.43	44.82
PNC Fin Serv	20.58	60.38	71.58	-15.6	24.13	3.55
Regions Financial	14.05	20.25	33.1	-38.8	22.99	8.94
Fifth Third	11.64	21.84	39.77	-45.1	21.18	9.54
Keycorp	8.47	21.24	34.33	-38.1	13.34	4.87
M&T Bank Cp	8.8	79.96	106.9	-25.2	11.42	2.62
Total	173.78				281.76	107.98
GRAND TOTAL	1346.98				1797.78	702.19

Source: OECD, NYSE.

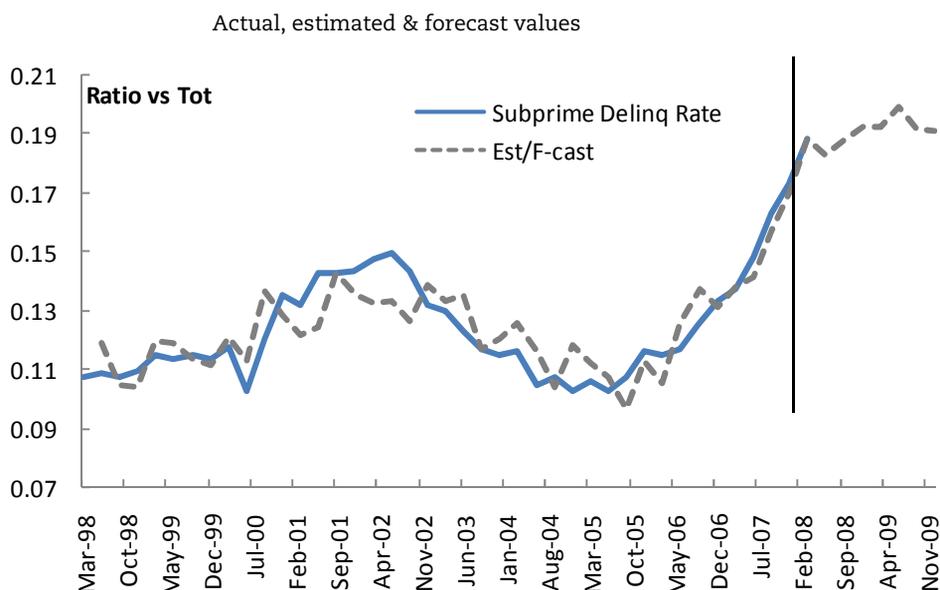
II. A default-model calculation of the size of losses in RMBS

The delinquency model

To work independently of the prices of assets (the mark-to-market approach) and focus on final default values requires modelling and assumptions.⁷

A default model calculation of losses is therefore required

The approach adopted here is to model the subprime delinquency rate, and then to make assumptions about the time path of the independent economic variables in the model, that can be benchmarked against previous crises. The delinquency rate is modelled as a simple co-integrating vector with GDP (a proxy for income to service debt), house prices (which determine the equity in mortgages), and unemployment (which drives inability to service) as components. Interest rates were also tested but did not play a significant role. This may be due to a variety of factors, such as the importance of resets, and other mechanisms to de-sensitise delinquency to rates (e.g. option ARMS, loan renegotiation of terms, etc.). No lagged-dependent variable is used in the model.

Figure 1. **Model of subprime delinquency rate**

Source: Datastream, OECD.

The modeled subprime delinquency rate is shown in Figure 1. The model explains the rise in delinquency in late 2006 and 2007 as house prices stagnated at first, and then began to fall, and GDP growth slowed from 2006 as housing slumped.

Delinquency/loss scenario benchmarked against 1990s and 2001 recessions

A 'first round' scenario for losses

The approach to constructing a scenario for losses here is to benchmark the delinquency model drivers against past episodes, to arrive at ex-ante first round effects on delinquency (and hence ultimately on losses). To the extent that these drive deleveraging on the part of financial intermediaries, credit crunch mechanisms come into play that could drive bigger second round effects on the economy (and hence losses). These deleveraging issues are discussed later.

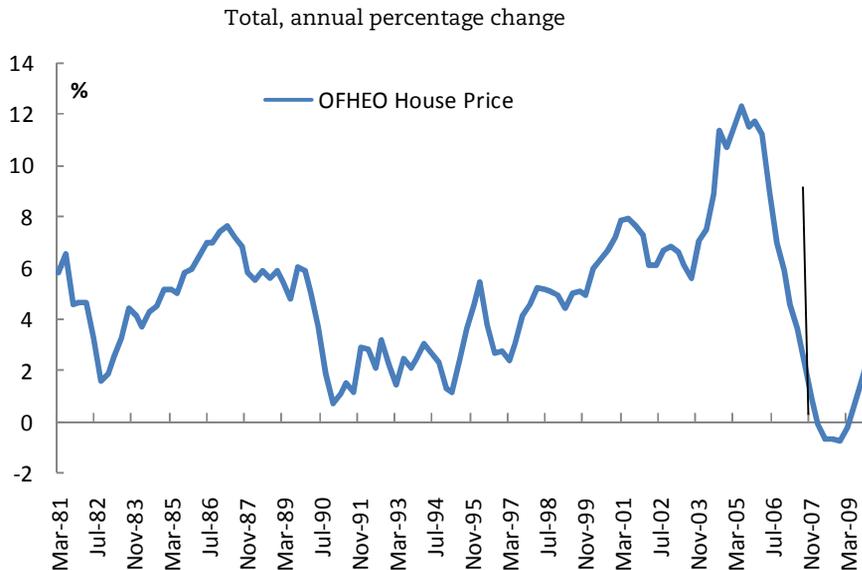
With GDP and unemployment like the modest 2001 recession

US economy is more flexible than the early 1990s and will benefit from continued growth in China and other emerging markets in 2008 and 2009 (the assumed adjustment period). The first round GDP impact of past tightening and the collapse in housing investment is therefore treated as more akin to the early 2000s recession, which was driven by the collapse of business investment after the tech bust. This was a modest recession without a credit crunch deleveraging process in play. Hence the early 2000s path of the real economy is imposed to obtain first round effects without assuming a deleveraging credit crunch – unemployment rises from 4.8% to 6.1% by end 2009; and nominal GDP annual growth slows by 2 percentage points.

*But house prices worse
than the early 1990s*

The OFHEO house price index since March 1981 is shown in Figure 2. While various regions can do worse (California, Florida), the national 12-month % change has never gone negative, even in the early 1990s housing crisis. A future scenario worse than the 1990s episode is shown after the vertical line. The rationale for this is that subprime problems were not a feature of the previous episode, but are very much the focus of concern at present. The housing investment setback and excess inventory situation is also worse than the early 1990s.

Figure 2. **OFHEO house price index**



Source: OECD, Datastream.

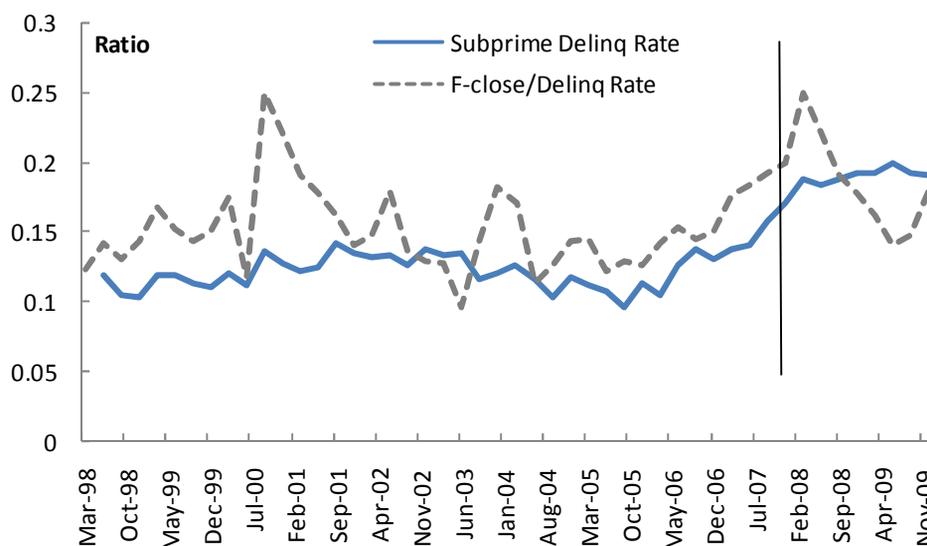
The foreclosure rate (shown as a ratio to delinquency) is shown in Figure 3. It rises quickly in a recession, as weak vintages default first, and then tends to return to the norm. This pattern is assumed to be repeated, and a rise to the worst ratio in its history (but not more than this) is imposed. The key moving part in this study remains the economic scenario driving the delinquency rate.

*With a choice of
collateral recovery
rates*

The final thing required to determine loss-given-default, is the recovery rate. That is, if a defaulted mortgagee house is foreclosed and sold, what percent of the loan is recovered? This is difficult to assess, so a range is given from 40% (pessimistic) to 60% (optimistic).

The adjustment is assumed to take place over 2008 and 2009, after which losses revert to normal and the crisis has passed. No net new RMBS is assumed to be issued in this adjustment phase.

Figure 3. Delinquency rate vs. foreclosure/delinquency ratio



Source: Datastream, OECD.

The default model loss estimates

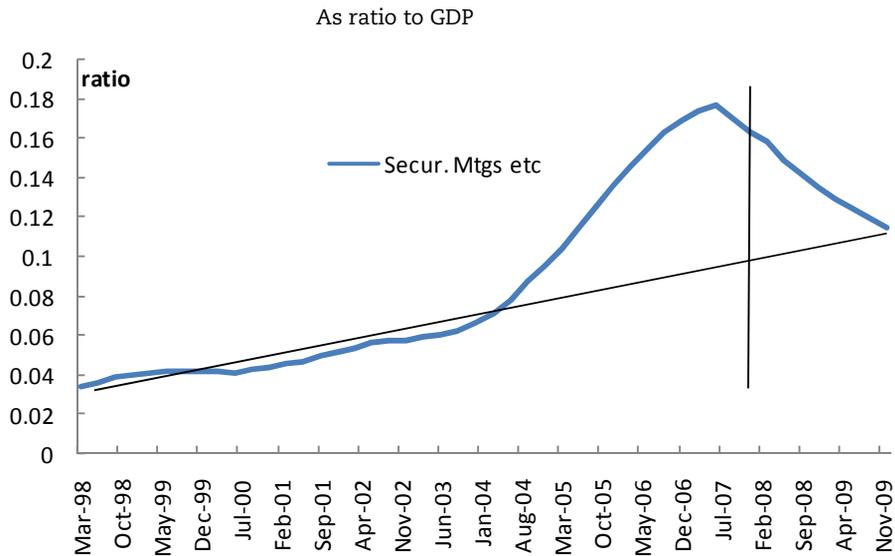
A two-year adjustment to get RMBS back to trend

The cumulative losses quarter by quarter derived from the model and the first round economic scenario are shown in Table 3. The time path of the stock of RMBS is shown in Figure 4, as a percentage of GDP.⁸ The losses implied by the model return the level of RMBS back in line with the longer-run trend that was in place before the parabolic acceleration of subprime, Alt-A and securitisation from mid 2004.

Table 3. Securitised mortgages cumulative loss model

Quarter	CUMUL. \$bn LOSS @ RECOVERY RATE			
	0%	40%	50%	60%
Sep-07	74	45	37	30
Dec-07	153	92	77	61
Mar-08	258	155	129	103
Jun-08	344	206	172	138
Sep-08	416	250	208	167
Dec-08	483	290	242	193
Mar-09	542	325	271	217
Jun-09	593	356	297	237
Sep-09	644	386	322	258
Dec-09	703	422	352	281

Source: Datastream, OECD.

Figure 4. **Mortgage-backed securities**

Source: Datastream, OECD.

At a 40% recovery rate, the losses cumulate to USD 422 bn with this modelling approach independent of market prices. At 50%, losses drop to USD 352 bn and at 60% to USD 281 bn.⁹

The loss estimate range for a 40%-50% recovery range is USD 352 bn - USD 422 bn

A 60% recovery rate is too generous in the current environment. The (extremely pessimistic) zero recovery case is shown only as a reference point, and because it affects the stock of RMBS shown in Figure 4. If the recovery rate is in the 40-50% range, then the new estimated loss range is USD 352-USD 422 bn, (compared to the USD 200-300 bn mentioned in the previous FMT).

Spillovers to other asset classes and debts are ignored at this stage, and the issue is taken up in the latter part of the study.

The market-price based estimates quoted above are closer to the numbers shown for the default-model-based approach that assumes 0% recovery from collateral (left-hand column of the table) *i.e.* USD 700 bn. This illustrates why skepticism should be employed when interpreting any estimates based on ABX and other market prices.

Market pricing models are supposed to take into account the loss given default, (even though there is some lag between foreclosure and recovery amounts). They do not appear to be doing so – implied loss levels are virtually double the default-based calculation. Clearly, market pricing models cannot give a fair estimate in the presence of liquidity problems and panic. A default-model approach is to be preferred. The study now turns to look at the implications of the default-model measures for deleveraging and the economy – focusing first on commercial banking.

III. Commercial bank deleveraging (default-model estimates)

(i) Losses and deleveraging

Commercial banking is the key for intermediation pressures

Table 4 focuses on the US Commercial Banking sector as a whole, and uses assets minus liabilities as a proxy for equity.¹⁰ The commercial banks are a key group in the intermediation process, and hence are critical for the impact the crisis will have on the economy – if one can solve the problems of commercial banks, there will be a return to normal intermediation and growth which will give the rest of the financial system a basis to take care of itself (after a 2-year adjustment period).

Table 4. Deleveraging vs. loss recovery & equity injections

	At start (Jun-07)	At full adjust. (Dec-09?)	%	Equity Req. (\$bn) for Asset growth p.a. of: & socialise losses with 7% p.a.		
				0% p.a.	7% p.a.	7% p.a.
0% Recovery of Losses						
Assets \$bn	10082.1	9169.5	-9.1			
Equity \$bn	1102.9	1003.1		99.8	177.0	77.2
Lev Ratio	9.14	9.14				
Cum. Loss (14% \$703bn total)		99.8				
40% Recovery of losses						
Assets	10082.1	9534.3	-5.4			
Equity	1102.9	1043.0		59.9	137.1	77.2
Lev Ratio	9.14	9.14				
Cum. Loss (14% \$422bn total)		59.9				
50% Recovery of losses						
Assets	10082.1	9626.5	-4.5			
Equity	1102.9	1053.1		49.8	127.0	77.2
Lev Ratio	9.14	9.14				
Cum. Loss (14% \$351bn total)		49.8				

Source: OECD, Datastream.

The leverage ratio before the start of the crisis was 9.14. If it is assumed that this is some 'desired' level, it is easy to work through illustrative loss calculations for deleveraging in US Commercial Banks. Total reported RMBS held by US Commercial Banks was USD 930 bn in June 2007. But this includes Fannie, Freddie and other GSE securities, whereas the focus is on private label RMBS in this study. This is approximated by multiplying the USD 930 bn by the proportion of Private Label in (Private Label + Federal Mortgage Pools), *i.e.* at around 38%. So the exposure to private label RMBS is about USD 345 bn, or about 14-15% of the total RMBS of USD 2.3 trillion.

Consider a USD 60 bn ultimate loss for US commercial banks

Using this figure for exposure, and applying the cumulative loss model from above, the Commercial Bank share of cumulative losses for the whole system to the end of 2009, are:

- (i) USD 100 bn if zero recovery from collateral sales is assumed;
- (ii) USD 60 bn if 40% recovery is assumed; and
- (iii) USD 50 bn for 50% recovery.

The central case in this study is a 40% recovery rate; *i.e.* USD 60 bn.

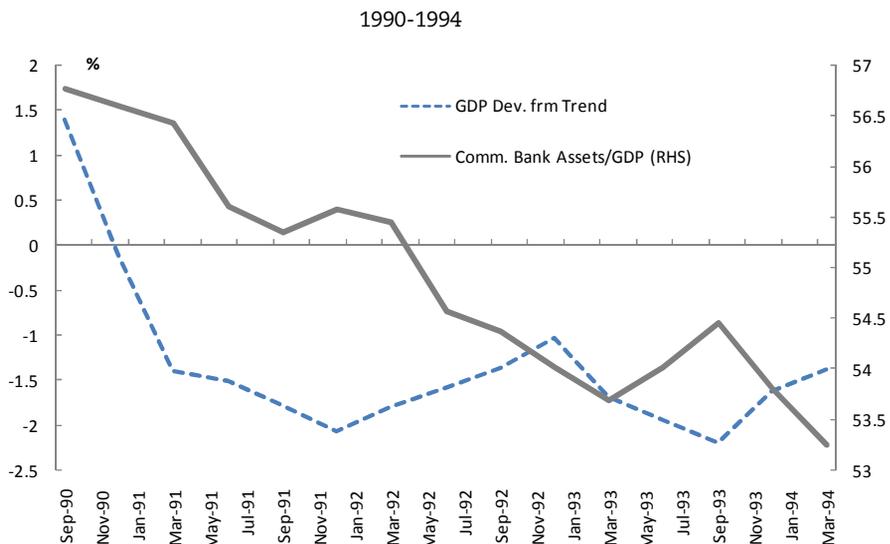
This would cause significant deleveraging in the absence of capital injections and other policies

The deleveraging associated with such losses at the given leverage ratio implies falls in assets, shown in the 3rd column of Table 4. Nominal assets would fall by 5.4% over the two years in our USD 60 bn central case – assuming no new capital is injected and that there is no socialisation of the losses.

It would risk 1990s style scenarios and bigger losses

This cannot be allowed to happen! While there were large compositional shifts (*e.g.* C&I loans and government security holdings) during the serious 1990s recession, total commercial bank assets in nominal terms did not fall: assets were flat for a time, and then began to rise. Commercial bank assets did fall as a share of GDP, however, from about 56.7% of GDP in September 1990 to around 52.9% in April 1994, as shown in Figure 5. Over this same period, the cumulative fall in GDP versus its trend was around 2% – a massive loss. The kind of fall in nominal banks assets that would follow on from the deleveraging associated with the central case hypothesis for losses would imply an exceedingly heavy impact on GDP and hence cannot be allowed to happen.

Figure 5. Commercial bank assets/GDP vs. GDP gap



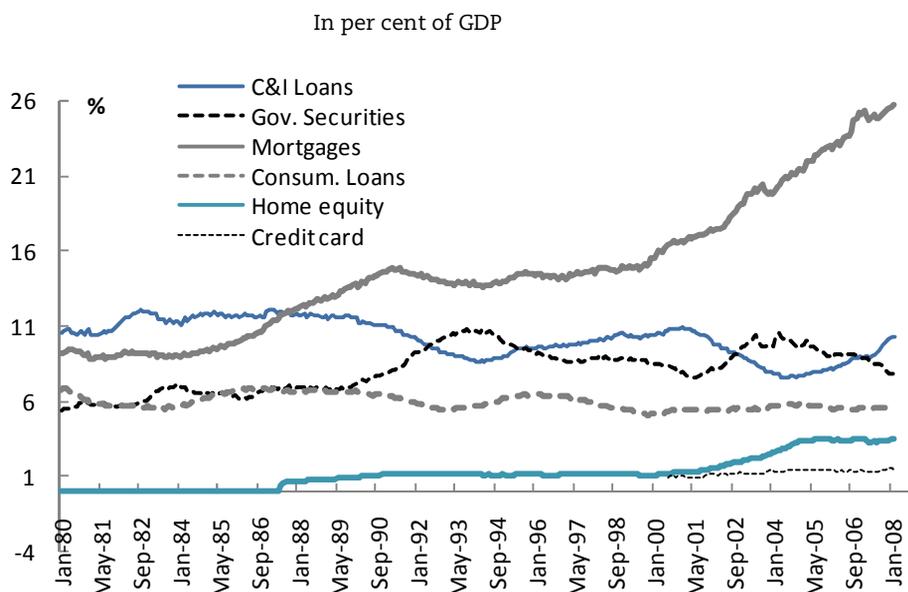
Source: OECD, Datastream.

What happened in the 1990s?

During the 1990s the transmission mechanism from the financial sector to the real economy was largely through C&I loans to business, as the S&L and junk bond crisis reached its climax. C&I loans fell from 11% of GDP to 8.6% from September 1990 to April 1994, while the mortgage share fell only slightly (see Figure 6).

Encouraged by the incentives following the introduction of Basel I, banks increased their share of Government securities substantially. The same sorts of mechanisms are coming into play now, as risk aversion rises. This time, however, the cutback on mortgages could be much larger than in the 1990s. If both C&I loans and mortgages are subject to deleveraging efforts by commercial banks, the impact on the economy risks being stronger than in the 1990s.

Figure 6. **Commercial bank assets**



Source. OECD, Datastream.

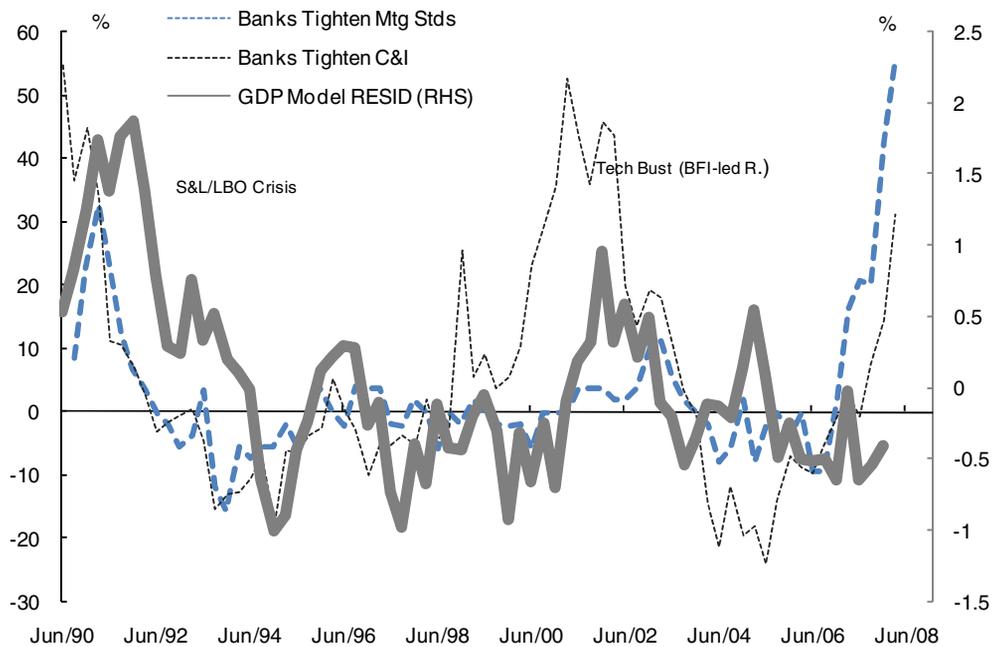
The indications are that the pressures could be larger this time than in the 1990s

In the 1990s the credit crunch was worth 1.5%-2% of GDP

The Fed's loan officer surveys of tightening lending standards are shown in Figure 7. The large and small C&I loan surveys are averaged, and the mortgage standards survey weights its components.¹¹ The C&I loan standards are tightening sharply, but are less significant compared to the tightening of mortgage standards. This is to be expected, given the size of the mortgage crisis. Also shown in the chart is the residual from a long-run VAR model of the US economy (based on monetary conditions price variables – Fed Funds, bonds, the exchange rate, equity prices and oil prices). If the residual moves positive, it suggests that modelled GDP is stronger or better than actual GDP; *i.e.* something abnormal related to credit crunch mechanisms from money and credit (bank balance sheets) might be at play. The correlation with the Fed lending standard surveys is instructive in this regard – in the early 1990s and the early 2000s lending standards tightened and the model residual moved up. In the early 1990s the model residual moves to 1.5%-2% of GDP, (also consistent with the above trend deviation chart in Figure 5).

The risk this time is that both mortgages and C&I loans will be subject to a credit crunch, driving a significant recession tendency. Losses in RMBS could rise above the estimates set out earlier, if unemployment and house prices deteriorate by more than was assumed there.

Figure 7. Fed survey of lending standards vs. GDP model residual



Source: Datastream, OECD.

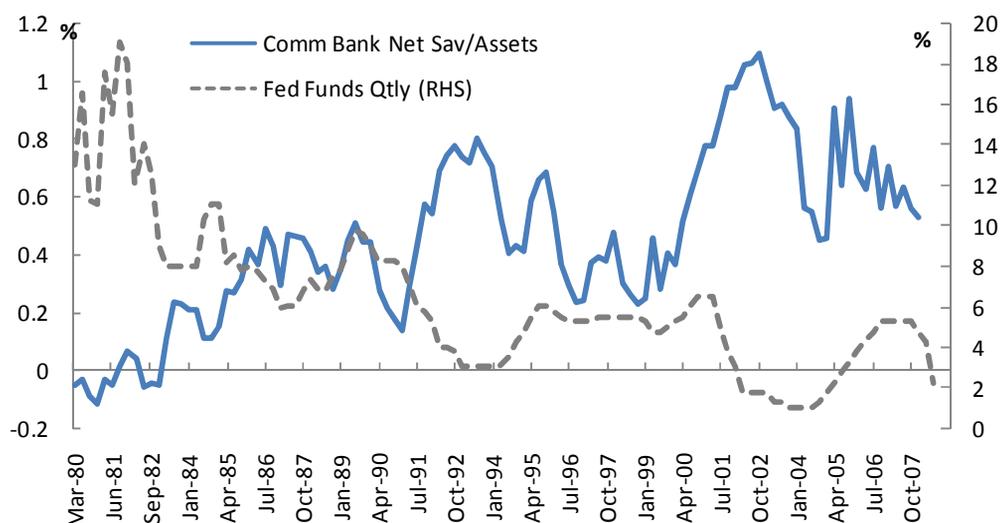
(ii) Policy options via earnings: with Fed rate cuts and the dividend payout ratio arithmetic

The simplest approach to recapitalisation is to allow banks to earn back their losses and help them along the way via rate cuts and encouraging cuts in dividends (via jawboning). The above central case of USD 60 bn commercial bank ex ante losses is considered.

Fed rate cuts help margins

The relationship between commercial bank net saving as a percent of assets (after investment and after dividends are paid) is shown alongside the Fed funds rate in Figure 8. This is one of the classic mechanisms of monetary policy in a supply-side loan crisis where capital is destroyed: see particularly what happened in 1991-92. By cutting the Fed funds rate in a crisis, the Fed improves bank margins and hence their profits net of dividends.¹² Commercial banks must decide on how much to cut dividends in order to speed recapitalisation. The basic arithmetic is shown in Table 5.

Figure 8. Fed Funds vs. Commercial bank net saving % assets



Source: Datastream, OECD.

Table 5. Recapitalising through earnings: Fed & dividend arithmetic

Earn. Rate p.a. Assets \$11.4trn. %	Payout Ratio 0.5			Payout ratio 0.25			Payout ratio 0		
	Net Earn Rate % p.a.	Cap Build \$bn p/qtr	No. qtrs recap. \$60bn	Net Earn Rate % p.a.	Cap Build \$bn p/qtr	No. qtrs recap. \$60bn	Net Earn Rate % p.a.	Cap Build \$bn p/qtr	No. qtrs recap. \$60bn
1.1	0.55	\$15.68	3.8	0.8	\$23.51	2.6	1.1	\$31.4	1.9
1.5	0.75	\$21.38	2.8	1.1	\$32.06	1.9	1.5	\$42.8	1.4
2	1.00	\$28.50	2.1	1.5	\$42.75	1.4	2.0	\$57.0	1.1

Source: OECD.

Without interest rate and dividend cuts it could take two years to get back on track

If the before dividend earning rate is say 1.1% and after dividend at 0.55% of assets (the current number shown in Table 5, with commercial banks implicitly paying out dividends at a ratio of 0.5, or 50%), only USD 15.7 bn per quarter is available for recapitalisation and it takes a full year before the business returns to normal (the 3.8 quarters shown in the 4th column of Table 5). Recapitalisation can happen quickly if (a) the Fed cuts rates and pushes the before-dividend earning rate back to its highs of 2% and the net 1% (shown in Table 5 around the early 2000s), and (b) commercial banks cut the payout ratio to zero. In this case about USD 57 bn per quarter is available and it takes only just over one quarter to raise the USD 60 bn. But even here, this only covers losses and does not raise new capital for actual expansion of balance sheets.

With maximal interest rate and dividend cutting this can be cut to about three

Taking a middle scenario (1.5% gross and 0.75% net earning rates, and a 25% payout), it would take two quarters to earn back the loss (at the USD 32 bn net earnings per quarter in column 6). If the payout ratio were not cut, then despite Fed easing it would take three quarters to

quarters – but it is still too long

earn back the losses (at USD 21 bn net per quarter in column 3). In both cases much more is required to actually expand balance sheets (presumably needed to avoid recession pressure). To earn back the USD 60 bn loss in the middle scenario would take two quarters, and then USD 20 bn per quarter is needed to grow balance sheets at a 7% p.a. pace (USD 80 bn p.a.), adding another quarter before the economy could get going.¹³ This is too long if one wishes to avoid a full blown credit crunch and the effects on the real economy that would follow. It seems clear that rate cuts and dividend policy can only do so much – so that avoiding the 1990s-type scenario could require capital raisings independently of earnings and/or socialisation of losses.

(iii) Injections of capital

A 40% collateral recovery rate is our central case

On the right hand side (RHS) of Figure 8 the simple illustrative arithmetic for policy of capital injections versus socialisation of losses is shown. Taking the 40% recovery central case (the middle row), the USD 422 bn of total RMBS losses translates to USD 60 bn in losses for commercial banks. If the full amount of this loss, which has to be written off by the banks, were to be made up by capital raisings and no additional capital were raised during the adjustment period, then asset growth would have to remain at zero – shown in the 4th column – until earnings kicked in. Simply replacing capital losses would not avoid the sort of credit crunch mechanisms we saw working in the early 1990s – unless it all happened on day 1 and the market ‘tone’ changed as a consequence.

Offsetting losses and allowing for 7% balance sheet expansion would require USD 137 bn in the first year

If capital had to be raised to offset the USD 60 bn loss and also allow assets to grow at the trend rate of 7% p.a., then more than USD 60 bn would have to be raised. As before, the banks would also require about USD 20 bn per quarter (USD 77 bn p.a.) to capitalise their businesses for more normal average 7% p.a. growth (at a 9.14 leverage ratio). A total of USD 137 billion in capital raisings would be required. This is a tall order at present, after very bad initial experiences on the part of SWF investors. Nevertheless, rights issues and subordinated debt seeking new capital are essential.

A tall order now

A credit crunch would raise our loss estimates

If a credit crunch began to bite, so the economic scenario is worse than assumed earlier, then the losses and capital raisings required would grow too. This worse second round scenario of losses could require public money.

(iv) Socialising losses – RTC-like mechanisms

If the losses were socialised with government money – in the spirit of the Resolution Trust Corporation (RTC) or the emerging market debt bail out via the Brady Bond mechanism, then the commercial bank balance sheets could be directly cleansed of all the

RMBS, and normal intermediation could begin without waiting for SWFs and earnings to kick in. This option turns the problem into an ‘RTC’, capital markets and mortgagee issue. If this were done quickly, the tone in the markets would change and the banks would have some chance to go about raising capital from private sources – get back to business as usual.

An example is provided in the following box for illustrative purposes only.

An RTC-style mechanism

In a very simplistic example, this would work something like the following. The RTC would take on the USD 345 bn private label RMBS that was estimated above for the commercial banks, and take the collateral with it (claims on mortgagee’s homes) with an appropriate USD 60 bn ‘haircut’ estimated from the default model approach. This frees the banks of these assets and liabilities – the whole purpose of the exercise. The USD 60 bn loss is subtracted from the USD 345 bn, *i.e.* USD 285 bn post the ‘haircut’. The RTC issues USD 285 bn in its own notes, and these are exchanged for the RMBS held by the investors in these bonds, *e.g.* CDOs, conduits, hedge funds, pension funds etc. They also get the 17% ‘haircut’ to their assets and hence to their investors/note holders etc. But this is better than the sorts of haircuts in current market prices and underlines the value of the default model approach to calculating losses. To make this work without the turmoil in prices at present, a guarantee is required at the lowest possible cost; so the US Treasury, for example, could issue the RTC with USD 108 bn of zero coupon bonds with a yield of (for arguments sake) 5% and a 20 year maturity: *i.e.* the USD 108 bn will be worth the USD 285 bn at maturity. The RTC passes the interest from the mortgages through its notes to the investors and prices are stable because of the principal (but not interest) guarantee. The RTC body has assets of USD 108 bn zeros + USD 285 bn housing assets, or USD 393 bn; and liabilities of USD 285 bn to the CDOs, hedge funds etc., and equity of USD 108 bn. The government would borrow the USD 108 bn to issue the zero coupon bonds. The question of whether politics would allow this is outside the scope of this paper.

IV. The investment bank (prime broker) and hedge fund arithmetic

Counterparty credit exposures are very large

The other key focus of the crisis in leveraged institutions is the prime brokers, because of their exposure to counterparty risk. These are shown in Table 6. While prime brokers do not lend to households and businesses in the same way as commercial banks, they play a key role in the allocation of capital and the workings of the financial system. If one risks failure, as with the recent case of Bear Stearns (one entry in Table 6), financial crises may amplify due to the

interconnectedness of brokers with other players like hedge funds, and the commercial banks themselves. The total counterparty exposures calculated here from loaned securities, reverse repos, derivatives and margin loans sum to just over USD 3.3 trillion for prime brokers listed in the US, grossing up to USD 4 trillion globally.

Table 6. Prime broker published credit exposure to counterparty risk

As of FY end 2007 *	Loaned Securities \$bn	Ratio to Tier 1 Capital	Reverse Repos \$bn	Ratio to Tier 1 Capital	Derivatives PRV \$bn	Ratio to Tier 1 Capital	Margin Loans NYSE Total \$bn	Total Credit Exposures \$bn	Tier 1 Capital \$bn
UBS	54.3	1.4	352.5	9.3	273.7	7.2	#N/A	#N/A	38.1
Credit Suisse	45.8	1.5	148.8	4.7	65.3	2.1	#N/A	#N/A	31.5
Deutsche Bank	15.1	0.4	203.2	5.8	89.8	2.6	#N/A	#N/A	35.1
Goldman Sachs	28.6	0.7	85.7	2.0	105.6	2.5	#N/A	#N/A	42.7
Morgan Stanley	110.4	3.4	126.9	4.0	77.0	2.4	#N/A	#N/A	32.1
JPMorgan Chase & Co	10.9	0.1	169.3	1.9	77.1	0.9	#N/A	#N/A	88.7
Lehman Brothers	53.3	2.3	162.6	7.0	44.6	1.9	#N/A	#N/A	23.1
Merrill Lynch	55.9	1.8	221.6	7.0	72.7	2.3	#N/A	#N/A	31.6
Citigroup	67.1	0.8	98.3	1.1	76.9	0.9	#N/A	#N/A	89.2
Bear Stearns	3.9	0.4	27.9	2.5	19.7	1.8	#N/A	#N/A	11.1
Total	445.5	1.1	1596.8	3.8	902.4	2.1	322.8	3267.4	423.3
Grossed Mkt Tot. (Top 10 = 80%)	556.9	1.1	1996.0	3.8	1128.0	2.1	403.5	4084.3	529.2

Source: Company accounts, OECD.

Hedge funds are big players

Given the role hedge funds play in this interconnectedness, estimates of prime broker exposure to hedge funds are shown in Figure 15. An estimated USD 1.4 trillion of these exposures is likely to be hedge-fund related.

Prime broker warehoused losses

If global prime brokers have a 6 2/3% direct exposure to our estimated losses for RMBS of USD 422 bn, this is equivalent to USD 27 bn of write-offs.¹⁴ Adding this to the USD 60 bn for commercial banks leads to a number for US listed commercial and investment banks of something like USD 87 bn.

Table 7. Prime broker exposure to hedge funds

	Total Credit Exp \$bn	Ratio to Tier 1 Capital	Hedge Fund \$bn	HF% Total Exposure	HF Exp Ratio to Tier 1 Capital
Loaned Securities	557	1.05	223	40%	0.42
Reverse repos	1,996	3.77	499	25%	0.94
Derivatives PRV	1,128	2.13	372	33%	0.70
Margin Loans	403	0.76	266	66%	0.50
Total	4,084	7.72	1,360		2.57

Source: Company accounts, OECD.

A problem arises if hedge funds start to fail

A problem arises however, if hedge funds start to fold. If hedge funds are exposed to about 20% of RMBS¹⁵, or USD 84 bn of our overall loss number, this rebounds to the banks. Hedge funds are more leveraged than banks. The total counterparty exposure to hedge funds

calculated in Table 7 of USD 1.3 trillion is very large indeed. It is hard to estimate how much of this would be at risk in the event of RMBS hedge fund losses causing failures of funds – given the interconnectedness – and it is probably best not to find out.

This is one reason why central bank policies to flood the market with liquidity etc are very important at this stage.

V. Moral hazard and related issues

Banks too big to fail!

The unconventional methods the Fed has adopted in smoothing the crisis raises a multitude of issues concerning moral hazard: these most recently include the guarantee to JP Morgan on Bear Stearns securities in order to encourage the former to take over the latter. Should taxpayers' money be used in this way? How was JP Morgan selected versus other financial institutions? Can the effectiveness of markets as an efficient allocator of capital amongst competing ends be relied upon in the future, when the trade off between risk and return is now asymmetric and banks know they are too big to be allowed to fail?

Taxpayers helping out the banks?

Should taxpayers pay the price of rapid moves up the risk curve to gain short-run bonuses and returns, often involving financial innovation that is too difficult for regulators to monitor, understand and control. This is particularly pointed now, as signs emerge of banks beginning to take strategic advantage of the situation. Examples of such strategic behaviour include:

- (i) A hedge fund may have a portfolio of strong assets (*e.g.* securitised complying mortgage loans such as Fannie and Freddie) but be dependent on prime brokers for various forms of leverage. If the leverage is withdrawn, for example increased margin calls are made, the entity with little capital may fail. The bank would take the attractive assets at their current high spreads and be in a strong position later on when asset prices firm.
- (ii) A prime broker subject to defaults of hedge funds may be at risk in a liquidity sense, but still have an attractive business. A stronger institution may acquire it for a bargain price with huge upside to its stock price and earnings after the crisis, particularly if guarantees on unknown risks in the portfolio are given by authorities.

Obviously RTC-like proposals would further imbed the risk of moral hazard. Undertaking these sorts of actions could well require a complete reconsideration of the regulation and structure of the financial system, in order to ensure that even bigger problems associated with asymmetric risk and moral hazard do not arise in the future. Secretary Paulson of the US Treasury has opened this debate. How far it should be taken is a critical issue, going beyond the scope of this paper.¹⁶

VI. The spill-over issues: Europe

Europe is not immune

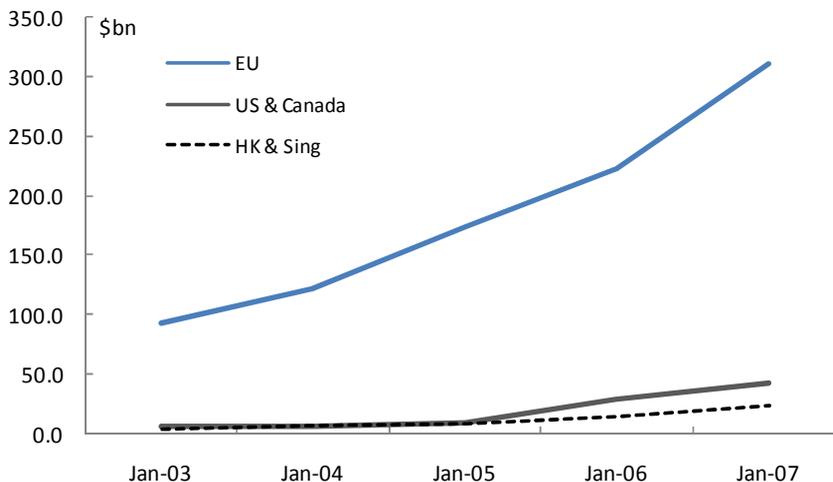
Europe is not immune from these issues. One third of RMBS related CDOs etc. is thought to have moved offshore, and to Europe in particular. One third of the USD 422 bn default loss amount is USD 138 bn. Insurance companies are likely to have a large part of the RMBS held in Europe. Fortunately, from a financial intermediation perspective, they do not mark to market. Nevertheless, levered financial institutions are also exposed to RBMS-backed products, so all of the issues concerning losses and deleveraging above apply in Europe too.

Equity derivative problems could follow

A related concern is structured products that do not include any RMBS. Once again this involves prime brokers at the core. For example, a small bank or building society offers to its clients capital guaranteed products with exposure to risk assets such as equities. Constant Proportion Portfolio Insurance (CPPI) products are a popular form of this that use complex options replication programs and are passive; *i.e.* in the sense that they are not managed in a discretionary way by a fund manager. Of course the small bank or building society is only distributing the products. The real guarantee is coming from the prime broker that issues and manages it.

The parallels are clear. If a major market break occurs and counterparties fail, the guarantee is going to fall on prime broker capital. The current crisis, if not handled well, could spill into these products. Interestingly, Europe is in the forefront of issuing these products. By the start of this year no less than USD 1 trillion of these products had been issued since 2003, and all to retail investors. Europe's pre-eminence in this respect is shown in Figure 9.¹⁷

Figure 9. Retail equity structured product issuance: EU vs. others



Source: Structured Retail Products.

Eastern European exposures

Finally, a European banking system concern is the exposure to banks in Eastern Europe. These countries fix their exchange rates and borrow in foreign currency. Inflation is accelerating in some of these countries as capital inflows and managed exchange rates prove incompatible. This situation is reminiscent of the Asia crisis of the late 1990s.

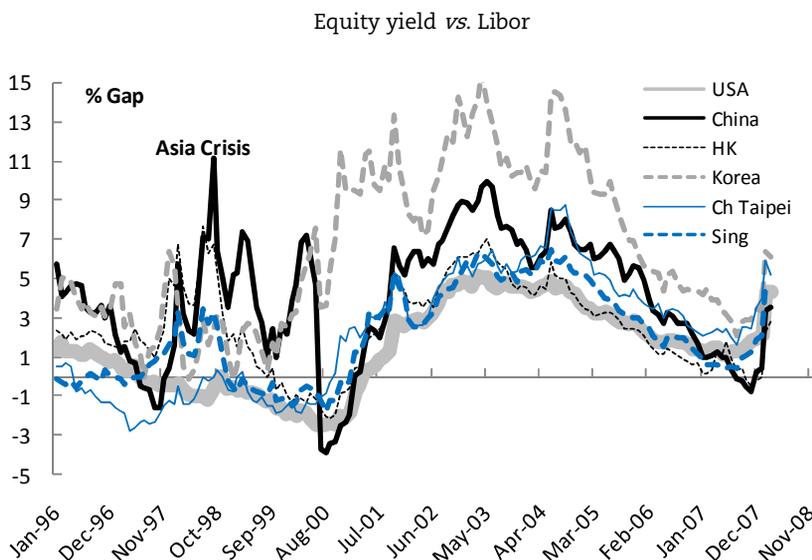
VII. The spill-over issues: Asia

Asia is less directly exposed to subprime. But as the US dollar falls, they face a different type of risk – asset inflation through excess liquidity. This is because many countries in the region peg to the US dollar, and may try to resist exchange rate appreciation. Avoiding the rolling bubbles associated with excess liquidity, which are at the very origin of the crisis in the US, argues for more flexibility in their exchange policies. If credit crises are to be avoided in Asia, it is essential that asset bubbles should be avoided and unwound where they have been in place.

Flexible exchange rates help avoid inflation and bubbles

The greater the flexibility of Asian country exchange rates versus the US dollar, the more independent monetary policy can be. This is shown in Figure 10, which shows equity yields of China, Hong Kong, Singapore, Korea and Chinese Taipei alongside the USA, all versus Libor. At the peak of the recent bubble, the risk premium went negative in the case of China and Hong Kong – clear signs of bubble trouble. Countries which showed more flexibility in exchange rates during the 2000s experienced less equity price inflation.

Figure 10. US vs. Asian equities



Source: Datastream, OECD.

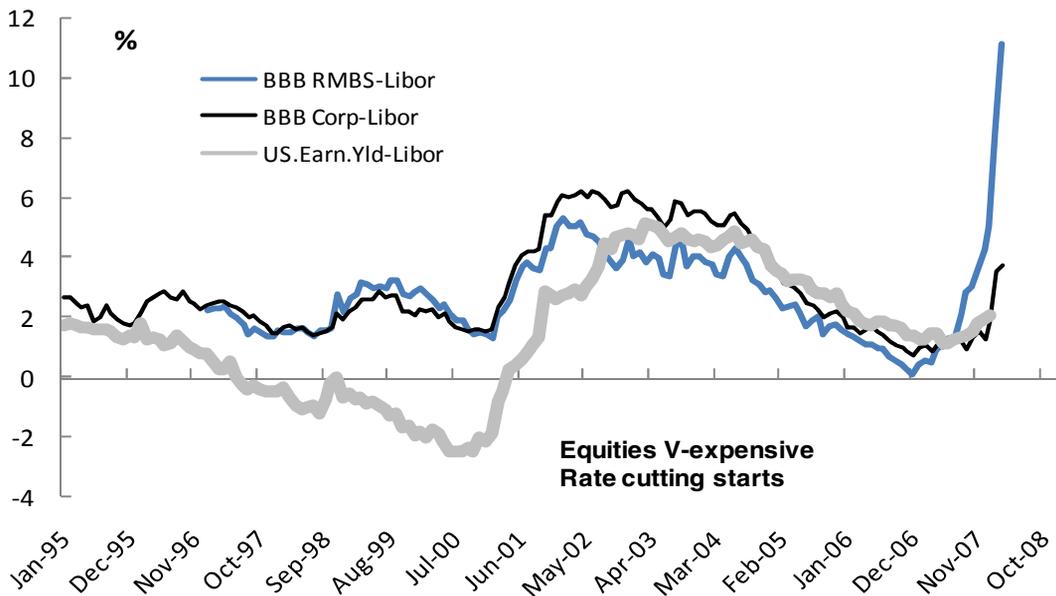
VIII. Spill-over issues: corporate bonds and equities

Bubbles in other assets, were not present to the same extent as in the mortgages market, as is shown in Figure 11, which shows spreads for BBB assets and the equity yield versus Libor. For RMBS, the rally to early 2007 (incredibly) pushed the RMBS BBB yield into line with what essentially is cash. The BBB corporate bond spread is also shown. It rallied, but not nearly as much as RMBS. Here it needs to be recalled that corporate balance sheets on 'Main Street' are in good shape on average. So a rally from the tech-bust sell off was justified by fundamentals (much more so than the low end of the housing market).

A 'fat tail' of overleveraged companies

There is however a fat tail of companies that are overleveraged following the LBO boom of the past few years. A large number of companies have issued a lot of less-than-investment grade debt. S&P believe that 90 or so companies are at risk of defaulting on over USD 50 bn in debt, 75 possibly in the next year. A recession in the next year will bring this factor into play, with the size of losses depending on the extent and duration of the recession.

Figure 11. The RMBS bubble & reversal vs. corporate bonds & US equities



Source: Datatream, OECD.

Similar points can be made about equities. While balance sheets are in good shape on average, and the earnings yield remained positive (certainly did not move into very expensive territory as occurred with the negative risk premium implied in the chart for the late 1990s and early 2000s), the fat tail of indebted non-financial companies will remain a concern. This could lead to equity volatility and a spill-over to equity derivatives products mentioned above.

This underlines why authorities need to move quickly using the full arsenal of macro tools at their disposal.

IX. Some policy issues raised

The bears are getting carried away in the markets, as mark-to-market losses move well above default-model based estimates. The estimate of losses on a default-model basis here is USD 352-USD 422 bn, assuming 40% to 50% recovery on defaulting loans and a harsh house price index scenario. To obtain a result anything like recent mark-to-market losses would require a 0% recovery rate – which may be a little extreme even for the most bearish. About USD 60 bn of the losses may be put down to commercial banks listed in the US and a further USD 28 bn to prime brokers. These are key intermediaries and are therefore a major focus of the study.

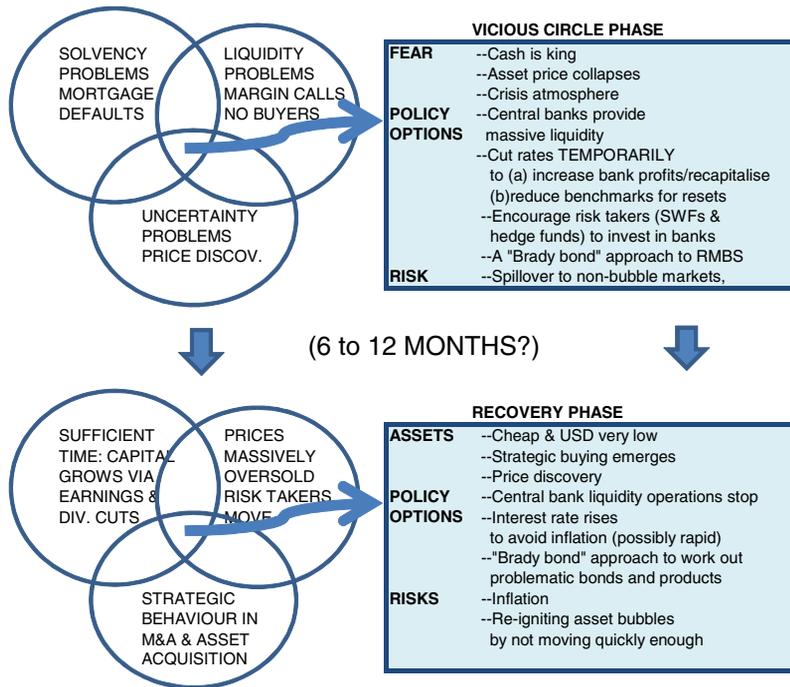
Under certain assumptions concerning the Fed Funds rate and dividend pay-out rates, it could take US commercial banks six months to earn back the capital write-offs that will be required. But further recapitalisation is necessary if banks are actually to re-start lending and expand their balance sheets. A six-month-plus period to rebuild would risk credit crunch scenarios such as happened in the 1990s.

Capital raisings/injections from risk-taking private institutions or SWFs are a big help. But the arithmetic of getting quickly back to 'business-as-usual', which requires much more capital than simply offsetting the losses alone, argues for more action if possible. One such action mentioned in this context was the socialisation of losses through government action like the RTC.

A combination of approaches has a better chance of success.

The issues discussed here are summarised in Figure 12.

Figure 12. The requirements of recovery



Source: OECD.

While avoiding credit crunch mechanisms resulting from past policy failure is a prime short-term concern, the longer-run issue of moral hazard and asymmetries in the trade off between returns to risk is a critical issue. Fundamental reform of the financial system and its regulation has to be a key focus of policy debate going forward. It will no longer be possible to assert the Panglossian view that we have the best of all possible financial systems.

Notes

1. Citi is a prime broker and investment bank. But this is buried in the bank holding company structure of Citi. It has a consumer bank. These should be separated for analytical discussion. The question of whether they should be separated for regulatory purposes is not considered in this study.
2. A. Blundell-Wignall, "Structured Products: Implications for Financial Markets", *Financial Market Trends*, Volume 2007/2, No. 93.
3. Or about 20% of subprime, if Alt-A and jumbos were ignored. But ignoring them seemed unreasonable. If 14% of subprime defaulted and 11% of Alt-A and the rest, a number of USD 300 bn results. See A. Blundell-Wignall, "Structured Products: Implications for Financial Markets", *Financial Market Trends*, Volume 2007/2, No. 93.

4. Citigroup commentary.
5. These prices in principle are supposed to take all major factors into account in theoretical models: default probability, loss-given default, and default correlations. The issue of recovery via collateral to determine loss given default is important and taken up below.
6. If this is applied to subprime mortgages alone, as opposed to RMBS private label, the number is USD 557 bn. But this is too small as it ignores Alt-A, jumbo loans etc. as previously discussed. If the estimate is updated to the 14th of March, following a minor rally in prices, USD 100 bn drops off the number, illustrating extreme volatility.
7. Efforts in this regard simply make assumptions about defaults and losses by mechanical extrapolations, as in David Greenlaw, Jan Hatzius, Anil K. Kashyap, and Hyun Song Shin, *Leveraged Losses: Lessons from the Mortgage Meltdown*, paper presented at the U.S. Monetary Policy Forum, New York, NY, February 29, 2008.
8. It is calculated without the recovery rate. This is paid to bond holders later as compensation for defaulted securities.
9. These estimates would be too high if Alt-A performs better than subprime in delinquency. This is very much a house price profile issue. Compensating this, the results would be too low on account of ignoring subprime and Alt-A that was not securitised. The results are therefore a fair estimate.
10. While this is not strictly speaking regulatory capital, it is close enough for the approximate nature of the calculations here.
11. This weights the prime and subprime surveys for the last couple of quarters, due to new procedures now separating these in the survey. This is necessary to keep the continuity of the series.
12. The funds rate is shown quarterly, but it can move a number of times in a quarter; the latest daily value in the chart for the Fed funds rate would already be at 2.25%.
13. If assets are around USD 11 trillion, a leverage ratio of 9.14 requires USD 1.2 trillion in capital. If this has to grow at 7% p.a. then about USD 80 bn a year is needed.
14. Goldmans estimate that US investment banks have 5% exposure. If US investment banks are 75% of the total, this is around 6 3/4%.
15. Goldman estimates that hedge funds have exposure to about 21% of subprime.
16. The basic issue is that regulators, the private sector and monetary policy have combined to lead to an outcome with unintended consequences: the potential for a serious recession and spill-over to countries and markets where excesses were less marked. While short-run policies are needed to avoid this, the long-run cost may be severe if the system is not fundamentally reformed.
17. Norway has already taken action against these products.

Financial Turbulence: Some Lessons Regarding Deposit Insurance

Sebastian Schich*

One specific aspect of financial safety nets that has been in the spotlight of late is deposit insurance. As events in markets are still unfolding, it is too soon to draw definitive conclusions regarding the effects of the crisis and the adequacy of financial safety nets, including deposit insurance arrangements. Nonetheless, preliminary suggestions for policy are emerging and the article singles out four areas for special attention. First, as regards coverage, deposit insurance systems with low levels of coverage and/or partial insurance may not be effective in preventing bank runs. Second, for an explicit deposit insurance system to be effective, depositors need to understand the extent of and limits to existing deposit protection schemes. Third, when different institutions are entrusted with responsibilities that are relevant in a crisis situation, ex ante arrangements delimiting the scope of the different responsibilities as well as the respective powers may not be sufficient to ensure co-ordination that is as close and smooth as needed. Fourth, the question as to whether a specific bankruptcy regime for banks is needed remains an important issue.

* Sebastian Schich is Principal Administrator in the Financial Affairs Division of the Directorate of Financial and Enterprise Affairs. The present article is a revised version of a document prepared and presented by the author and discussed by the OECD's Committee on Financial Markets (CMF) at its meeting in April 2008. The current version takes into account the comments made at the meeting and received in writing. The article has also benefitted from comments received by the author at a presentation of the document at the Financial Stability Seminar organised by the OECD's Economics Department in December 2007.

Executive summary

The recent financial turbulence provides supervisory, regulatory and other financial policy authorities with a timely opportunity to review existing regulatory structures underlying the operation of financial markets, including those related to the financial safety net. One specific aspect of financial system policy that has been in the spotlight of late is deposit insurance. Episodes of bank runs have been rare since the advent of deposit insurance, the specific aim of which is to protect retail depositors and prevent bank runs. Thus, the run by depositors in the United Kingdom on the country's fifth-largest mortgage bank in 2007 provides a timely opportunity for policy makers in OECD countries to revisit the design of deposit insurance systems. The issues to be discussed in this context are germane to the design of deposit insurance systems, and, thus, are relevant for the systems in place or under study in other countries.

The present article revisits the issue of deposit insurance and provides a brief overview of some of the key challenges related to the design of explicit deposit insurance systems. These challenges include issues related to coverage, funding and premium setting, membership, safety net interrelations, and bank failure resolution mechanisms. In addition, the note identifies some preliminary findings that could be drawn from the recent financial turmoil.

As events in markets are still unfolding, it is too soon to draw definitive conclusions regarding the effects of the crisis and the adequacy of regulatory and policy frameworks. Nonetheless, preliminary suggestions for policy are emerging and the article singles out four areas for special attention.

First, as regards coverage, deposit insurance systems with low levels of coverage and/or partial insurance may not be effective in preventing bank runs.

Second, for an explicit deposit insurance system to be effective, depositors need to understand the extent of and limits to existing deposit protection schemes. Consumer surveys show, however, that such knowledge can be limited.

Third, when different institutions are entrusted with responsibilities that are relevant in a crisis situation, *ex ante*

arrangements delimiting the scope of the different responsibilities as well as the respective powers may not be sufficient to ensure coordination that is as close and smooth as needed. Delimiting responsibilities without establishing a hierarchy in the event of a crisis may not always be effective in dealing with events that were not envisaged in the *ex ante* arrangements. In this context, it should be noted that deposit insurers have extensive failure resolution powers in some countries.

Fourth, the question as to whether a specific bankruptcy regime for banks is needed remains an important issue.

I. Introduction

Recent developments provide authorities with a timely opportunity to review existing regulatory structures

The recent financial turmoil provides supervisory, regulatory and other financial policy authorities with a timely opportunity to review existing regulatory structures underlying the operation of financial markets, including those related to the financial safety net. For one, recent developments help identify areas in which the effectiveness and efficiency of structures could be improved. As events in markets are still unfolding, it may be too soon to draw definitive conclusions regarding the effects of the crisis, its causes, and its amplifiers. Nonetheless, first lessons are emerging, even if national and international deliberations on the appropriate policy measures, including those affecting the financial safety net, are not yet completed.

Implementing changes to existing regulatory and policy frameworks in some areas, where significant shortcomings are identified, may be facilitated during and in the close aftermath of a crisis, given that a sense of urgency for action tends to be widely shared. In other areas, however, changing the existing frameworks may be more difficult, especially if the changes foreseen have direct implications for the losses incurred by different market participants. Changes in frameworks could also affect risk perceptions, perhaps exaggerating existing concerns. In any case, it is important on efficiency grounds for policy makers to carefully assess the potential benefits against the likely costs of policy intervention and to refrain from unnecessary activism.

One specific aspect of the financial safety net that has been in the spotlight of late is deposit insurance

The recent financial turmoil and the incidence of significant losses on the part of many commercial and investment banks, as well as other financial institutions, have led to heightened interest on the part of both the general public and policy makers in key aspects of the financial safety net. One specific aspect that has been in the spotlight of late is deposit insurance,¹ which aims to protect retail depositors against bank insolvencies and, thereby, prevent bank runs.

Episodes of bank runs have been rare since the advent of deposit insurance. Thus, the run by depositors in the United Kingdom on the country's fifth-largest mortgage bank in 2007 provides a timely opportunity for policy makers in OECD countries to revisit the design of deposit insurance schemes. In the United Kingdom, policy makers have started a broad review of the existing crisis resolution system, including areas such as the legal framework for dealing with banks in financial distress as well as compensation arrangements for bank depositors. A consultation document setting out the views of UK policy authorities was published at the beginning of 2008. Many of the issues discussed in this context are germane to the design of deposit insurance systems, however, and thus they are relevant for the systems in place or under study in other countries.

For instance, in countries where no explicit deposit guarantee exists or where guarantees are relatively limited, the question arises as to how effective the safety net is. And where explicit guarantees do exist, the question is whether coverage is deemed to be adequate and how credible relatively limited levels of coverage may be. Clearly, the more complete is the insurance coverage, the more likely is market discipline involving both deposit-taking institutions and their depositors to break down.

The purpose of the present note is to draw attention to the issue of deposit insurance and to provide a brief overview of some of the key challenges related to explicit deposit insurance systems. In addition, the note identifies some preliminary lessons that could be drawn from the recent financial turmoil in an attempt to stimulate a policy discussion. This discussion will also inform the CMF's ongoing work on accession, as issues related to this subject area will certainly be explored in that context.

The remainder of the note is organised as follows. The second section elaborates on some of the basic issues related to the establishment of explicit deposit insurance systems, while the third section focuses on specific issues and findings related to various elements of the design of explicit deposit insurance systems. The fourth section repeats some of these findings before it singles out for special attention some preliminary lessons that emerge from the recent financial market turmoil with regard to the design of such systems.

II. Explicit deposit insurance systems

Desirability of deposit insurance remains controversial among economists

The desirability of deposit insurance remains a matter of controversy, as it could involve moral hazard problems

The desirability of deposit insurance remains a matter of controversy. In particular, several economists question the usefulness of deposit insurance on the grounds that it could involve moral hazard problems. These could result in excessive risk taking on the part of depositors as well as the banks accepting the deposits.

Some cross-country empirical studies provide support to this hypothesis. For example, a study of banking crises from the beginning of the 1980s to the mid-1990s found that the presence of an explicit deposit insurance scheme tends to increase the probability of such events. In addition, a more recent related study finds that poorly designed deposit insurance, in institutionally weak environments, tend to increase the probability of systemic banking problems.² Other researchers have criticised the validity of some of the assumptions underlying these results, however.

An interesting observation is that the Basel Committee does not include deposit insurance as a key principle in its 1997 Core Principles of Effective Banking Supervision.³ The Principles refer to deposit insurance in a short separate appendix, however, which briefly discusses arguments in favour of and against such insurance.⁴

Deposit insurance can increase public confidence in banks and thereby make the financial system more stable. A safety net may also limit the effect that problems at one bank might have on other, healthier, banks in the same market, thereby reducing the possibility of contagion or a chain reaction within the banking system as a whole. Furthermore, a key benefit of deposit insurance is that, in conjunction with logical exit procedures, it gives the banking supervisors greater freedom to let troubled banks fail.

Deposit insurance can however increase the risk of imprudent behaviour by individual banks. Small depositors will have less incentive to withdraw funds even if the bank pursues high-risk strategies, thus weakening an important check on imprudent management. Government officials and supervisors need to recognise this effect of a safety net and take steps to prevent excessive risk-taking by banks. One method of limiting risk-taking is to utilise a deposit insurance system consisting of "co-insurance", in which deposit insurance covers less than 100 per cent of individual deposits and/or provides cover only up to a certain absolute amount so that depositors still have some funds at risk. Other methods include charging risk-based premiums or withholding deposit insurance from large, institutional depositors.

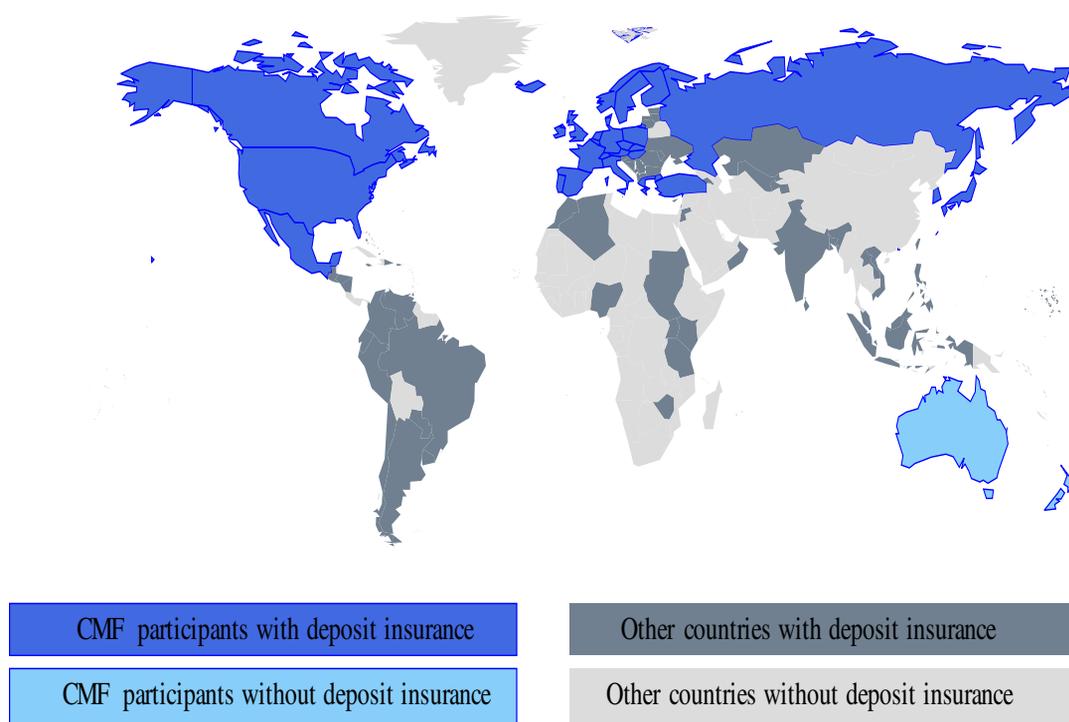
Growing adoption of explicit deposit insurance systems

An increasing number of CMF members have explicit deposit insurance systems in place, however

This controversy notwithstanding, most CMF members have explicit deposit insurance systems in place (Figure 1), and several of them have been either established (or revised) within the past decade. Recently, for example, Singapore and Hong Kong, China established such systems. In Australia and New Zealand, explicit deposit insurance systems do not exist.

Explicit deposit insurance involves the creation of a deposit guarantee scheme by law, with specific rules concerning the extent of the protection, the operation and funding of the scheme, and the type of deposits or depositors protected.

Figure 1. **Explicit deposit insurance systems around the world**



Note: CMF denotes the OECD Committee on Financial Markets, with membership comprising all OECD countries and, as observers, Russia, Singapore and Hong Kong, China.

Source: Secretariat assessment based on information provided by the International Association of Deposit Insurance (IADI, "Country System List", 24 January 2008), available at www.iadi.org.

Such schemes have been adopted to (i) support the stability of the banking system and (ii) protect bank retail depositors from incurring large losses due to bank failures.

The first objective is motivated by the view that the banking system is inherently fragile. Liabilities are of a first-come-first-serve nature, while assets are illiquid and worth less at liquidation than on a going concern basis. Thus, it can be rational for depositors 'to run' at the sign of problems at the bank. Moreover, bank failures can be highly contagious and spread from one to several banks.

The second objective relates to the presumed inability of ordinary retail depositors to assess and monitor on an ongoing basis the riskiness of the institutions that are holding their deposits.⁵ The costs to such ordinary depositors of losing the money they keep in deposit accounts could be potentially very severe.

Demarcation line of financial safety net

An explicit deposit insurance scheme is helpful in defining the outer limit of the financial safety net

An explicit deposit insurance scheme is helpful in defining the outer limit of the financial safety net. In particular, it limits the guarantee to a specific type of creditor, in this case "insured depositors". Thus, uninsured depositors, other creditors, shareholders and managers are not protected. By limiting the protection to "insured depositors", explicit deposit insurance exposes uninsured depositors, creditors, shareholders, and managers to increased risk exposure, thereby encouraging them to monitor and limit the riskiness of the bank. These positive aspects were cited as part of the motivation for the recent establishment of explicit deposit insurance in Singapore.

By contrast, in a situation where deposit insurance is not explicit, the demarcation line of the safety net is less clear. As a result, a perception could arise that there will be intervention by the government to bail out any depositors, as well as perhaps, general creditors and shareholders, thus distorting the incentives to monitor and limit risk on the part of these groups.

The perception that retail depositors would be bailed out may have been reinforced by recent trend shifts in risk allocations, especially in relation to personal retirement financing risks, which essentially consist of individual households bearing an increasingly larger share of risks themselves. Under those circumstances, it may be politically more difficult for governments to resist pressures supplying guarantees or "insurance *ex post*".

In Australia and New Zealand, explicit deposit insurance arrangements do not exist but have been under study. As part of the debate, in September 2007, the Australia-New Zealand Shadow Financial Regulatory Committee issued a statement, encouraging

Australian and New Zealand authorities to finalise and implement existing proposals regarding failure management arrangements, stressing in particular that such arrangements would help to clearly delineate the safety net boundary.⁶ An earlier report commissioned by the Australian government (Davis Report) concluded that the costs and benefits of adopting such a scheme in Australia are finely balanced. Consistent with the reports terms of reference, it did not make recommendations for or against the establishment of such a scheme; it did catalogue however the broad range of issues that would need to be considered in designing any such scheme to suit Australia's circumstances. More recently, in 2006, the country's Council of Financial Regulators reviewed crisis management arrangements and concluded that there is a strong case for the introduction of a scheme to provide depositors in a failed deposit-taking institution with timely access to at least some of their funds. In this context, the Council cited evidence from a Reserve Bank survey which suggests that despite the absence of an explicit deposit insurance system most Australians believe that the Government would step in to ensure either full or partial repayment of their deposits.

Currently, the Australian Government is considering the establishment of an 'Early Access Facility' recommended by the Council of Financial Regulators, which will complement the existing depositor preference arrangements that exist in that country.⁷ Such an early access scheme is not identical to an explicit insurance deposit scheme however. Importantly, there would be no *ex ante* funding and current depositor preference rules, which are important in the eventual distribution of assets, would not change. Indeed the early access scheme under consideration would be complementary to existing arrangements.

Deposit insurance increases need for proper oversight

Deposit insurance increases the need to ensure proper oversight of deposit-taking institutions

Deposit insurance is only part of the financial safety net and there are other official measures which are designed to protect bank depositors from the risk of loss or to contain that risk. Deposit insurance is not a substitute for, but a complement to those measures.

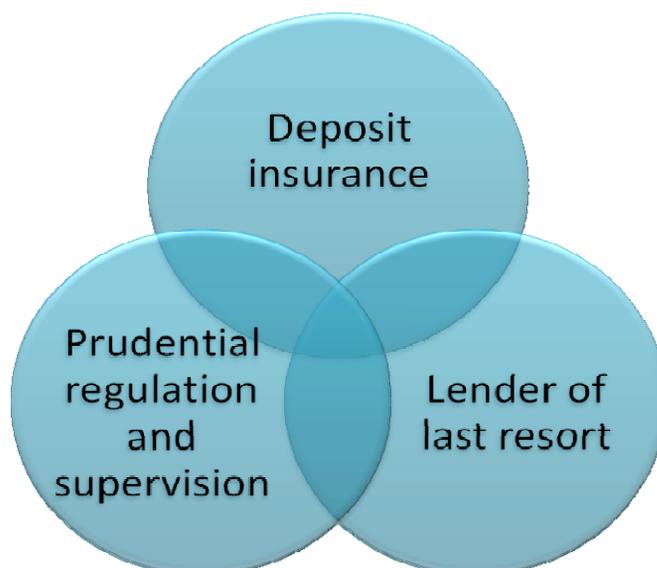
There are a number of complex interrelationships between the three elements of financial safety nets

In fact, by providing deposit insurance and other safety net features, there is an even greater need to ensure proper oversight of deposit-taking institutions to defend those safety nets and to contain moral hazard. Moral hazard is a feature commonly associated with financial safety nets and deposit insurance in particular. One important method to minimize moral hazard while preserving the benefits of deposit insurance involves promoting good governance practices for banks and ensuring that there is a sound regulatory and supervisory (and legal) framework in place to deal with excessive risk-taking by banks.

In this context, the FSF Working Group on Deposit Insurance (FSF, September 2001), stressed that a financial safety net consists of three elements: prudential regulation and supervision, a lender of last resort, and deposit insurance. The report concluded that if a country has established a well-developed mechanism in only one or two of these three areas, it is still likely to face difficulties in finding effective solutions for preventing or resolving serious problems in its banking system.

Indeed, there are numerous interrelations between these three elements. For example, as already mentioned, the issue of moral hazard creates a link between prudential regulation and oversight and deposit insurance. Also, there are interactions between the liquidity provision by the lender of last resort and the likelihood of a bank run (see *e.g.* Box 1). Thus, while each of the three elements can be discussed separately one from another, as the remainder of this note does, the close interrelationships should be kept in mind. Figure 2 illustrates the situation in the case where all three elements of the safety net are present.

Figure 2. **Interrelations between elements of financial safety nets**



Source: OECD.

Box 1 : Deposit insurance and lender of last resort functions

By providing temporary lending to the market in general at a time of financial distress, the central bank can relieve tensions in core funding markets and limit the potential fears that might prompt bank runs. Actually, the existence alone of a lender of last resort (LOLR) could already have this effect, as it may stabilise expectations without necessitating any particular course of action.

Monetary policy interventions during the second half of 2007 and the first quarter of 2008 could be interpreted as **conceptually** close to the concept of LOLR, as defined by the 19th century British economist Walter Bagehot. The classic interpretation of that function, following Bagehot, holds that the LOLR has a role in lending to solvent but illiquid financial institutions. It should prevent temporarily illiquid but solvent banks from failing, lending as much as necessary, but at a penalty rate (so that financial institutions cannot use the loans to fund their current lending operations) and against acceptable collateral. These loans are provided against acceptable collateral (valued at pre-panic prices). The LOLR must make clear in advance its readiness to lend any amount to any institution that fulfils the conditions on solvency and collateral. The support should be *vis-à-vis* the entire market and not to specific institutions and it must be credible. There is widespread agreement that LOLR loans should be short-term loans and be extended only to solvent but illiquid institutions. Any extended lending is an indication of insolvency rather than of mere illiquidity of the institution(s) receiving the loans, and any delay in closing an insolvent institution is likely to increase the costs associated with bank resolution. A bail-out of insolvent banks raises severe moral hazard issues.¹ Having said that, in practise it is notoriously difficult to distinguish between illiquidity and insolvency.²

In situations where it is difficult to distinguish between illiquidity and insolvency, there exists another link between deposit insurance and the function of lender of last resort to the extent that the latter focuses on an individual institution rather than on the market at large (thus differing from the classic interpretation of that function that is outlined above). In particular, if the lender of last resort intervened to lend to an insolvent institution against good collateral, the central bank may effectively reduce the collateral available for depositors and other creditors. Thus, such lending, if publicly known, could actually raise the likelihood of a run by depositors on that bank.

In any case, lending of last reserve against good collateral tends to reduce the funds available to depositors and other creditors, which include (in some countries) the deposit insurer. Thus, extensive lending of last resort can expose the deposit insurer to greater losses compared to a situation without such lending.

¹ In addition, it could even violate competition law, as there exists an inherent subsidy in central bank lending to an insolvent institution. For example, under the EC rules on state aid, the granting of emergency aid to banking institutions can be considered illegal in some cases, given that the Luxembourg Court of Justice recognised that EC competition rules are also applicable to the banking sector. See Lastra, R.A., *Legal Foundations of International Monetary Stability*, p.121, 2006, Oxford. In this context, note that the European Commission is expected to open a formal investigation into the restructuring aid package devised by the United Kingdom government for Northern Rock.

² Goodhart, C. (1999), "Myths about the Lender of Last Resort", *International Finance*, Volume 2 Issue 3, pp. 339-360.

III. Selected issues related to the design of deposit insurance schemes

The specific design of deposit insurance regimes differs across OECD countries ...

The specific design of deposit insurance regimes differs across OECD countries. There is no generally agreed standard for such systems, and the Core Principles of Effective Banking Supervision note that the actual form of such programmes should be tailored to the circumstances in, as well as historical and cultural features of, each country. In particular, the special banking environment of the country that proposes to establish such a system will have to be taken into account at the design stage. While there exist no generally agreed templates for the design, the International Association of Deposit Insurers offers guidance to policy makers wishing to establish a deposit insurance system or reform their deposit protection arrangements however. The organisation has developed a set of “Core Principles for Effective Deposit Insurance Systems” (published on 4 April 2008), which are intended as a voluntary framework for effective deposit insurance practices.

To establish a credible and effective deposit insurance system, there must be internal consistency between the goals of the system (in particular the mix between consumer protection and financial stability objectives) and the system’s design. The latter has many features, including:

- coverage,
- funding and premium setting,
- membership,
- financial safety net interrelationships, and
- bank failure resolution.

Coverage

One of the important aspects in the design of a deposit insurance system is the specification of a maximum insurance coverage, which is the maximum amount a depositor can claim from the deposit insurer in the event of bank failure. Noticeable differences exist in that respect (Figure 3 shows limits in USD equivalents, based on the data shown in Table 1). In the United States, for example, the amount covered is high in absolute terms; the Federal Deposit Insurance Corporation in the United States covers up to USD 100 000 per account. In Canada and Mexico, the amount covered is broadly similar, while it is even higher in Italy and Norway. Elsewhere, maximum coverage is more limited in absolute terms, but could be higher in relative terms (*e.g.* as measured by coverage to deposits per capita ratio or in relation to household balance sheets).

Table 1. Coverage limits in constituencies of CMF participants

Country Name	Explicit deposit insurance coverage limits	Limits to full coverage (in USD at exchange rates as of early 2008, rounded)
Australia	No explicit deposit insurance system	Not relevant
Austria	EUR 20 000, 10 % co-insurance for non-individuals (companies etc.)	29 000
Belgium	EUR 20 000	29 000
Canada ¹⁾	CAD 100 000	99 000
Czech Republic	EUR 25 000, 10 % co-insurance	37 000
Denmark	DKK 300 000	60 000
Finland	EUR 25 000	37 000
France	EUR 70 000	104 000
Germany ²⁾	Private: not to exceed 30% of bank's equity capital. Public: no coverage limit; Obligatory minimum of EUR 20 000 is generally exceeded	> 29 000
Greece	EUR 20 000	29 000
Hong Kong, China ³⁾	HKD 100 000	13 000
Hungary ⁴⁾	100% for up to HUF 1 million, 90% for the amount in excess of it, up to maximum of HUF 6 million	34 000
Iceland ⁵⁾	EUR 20,887 (equivalent to ISK 1.7 million as of 01/05/99)	> 31 000
Ireland	90%, not to exceed EUR 20 000	29 000
Italy	EUR 103,291.38	153 000
Japan	JPY 10 million	93 000
Korea	KRW 50 million	53 000
Luxembourg	EUR 20 000	29 000
Mexico ⁶⁾	MXN 1,602,844.40	148 000
Netherlands ⁷⁾	100% up to EUR 20 000; 90% of next EUR 20 000, <i>i.e.</i> from EUR 20 000 to 40 000	29 000
New Zealand	No explicit deposit insurance system	Not relevant
Norway	NOK 2 million	375 000
Poland	100% of up to EUR 1 000; 90% of EUR 1 000 to EUR 22,500	33 000
Portugal	EUR 25 000	37 000
Russia ⁸⁾	RUB 190 000	16 000
Singapore ⁹⁾	SGD 20 000	14 000
Slovak Republic	EUR 20 000; Co-insurance 10%	29 000
Spain	EUR 20 000	29 000
Sweden	SEK 250 000	40 000
Switzerland	CHF 30 000	28 000
Turkey ¹⁰⁾	NTL 50 000	41 000
United Kingdom ¹¹⁾	GBP 35 000	68 000
United States ¹²⁾	USD 100 000	100 000

Notes: see next page.

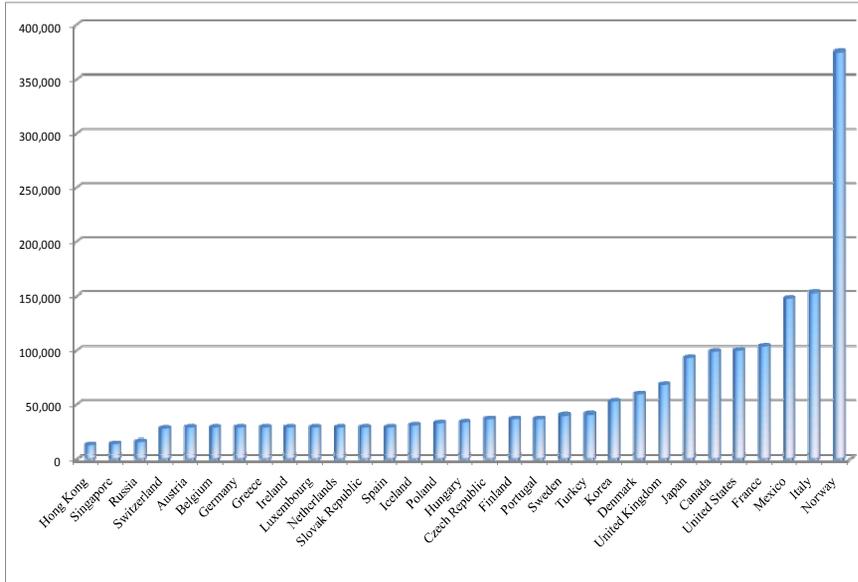
Source: OECD Secretariat estimates based on information available from deposit insurance websites, updating information available from Demirgüç-Kunt, A., B. Karacaovali, and L. Laeven (2005), *Deposit Insurance around the World: A Comprehensive Database*, World Bank, April 2005.

Notes for Table 1:

CMF denotes the OECD Committee on Financial Markets, with membership comprising all OECD countries and, as observers, Russia, Singapore and Hong Kong, China.

- 1) In Canada, the coverage limit was CAD 60 000 in 2003, but it has been raised since then.
- 2) In Germany, widespread voluntary arrangements provide additional coverage as compared to official, obligatory coverage limits. Full protection of clients' deposits at German public banks is provided through member banks' viability guarantee on behalf of public bank associations. The obligatory arrangement is coinsurance up to 90% of EUR 20 000 (or USD 28,367 as shown in the right-hand column). In practise, the coverage limit depends on institute in question, and coverage limits are typically much higher than that reference value. See also Deutsche Bundesbank. Monthly Report, July 2000.
- 3) The Hong Kong Deposit Protection Board (HKDPB) launched the Deposit Protection Scheme on 25th September, 2006. All licensed banks, unless otherwise exempted by the HKDPB, are required to participate. The compensation limit of the deposit insurance scheme, launched on 25th September, 2006, was set at HK\$ 100 000 per depositor per scheme member, and both Hong Kong dollar and foreign currency deposits are protected.
- 4) Hungary raised the coverage limit from HUF 3 million to HUF 6 million in May 2004.
- 5) The number for Iceland is actually not a ceiling, but rather a floor. In the event that the assets of the Icelandic Fund are insufficient to pay the total amount of guaranteed deposits in member companies concerned, payments shall be divided among the claimants as follows: each claim up to ISK 1.7 million shall be paid in full, and any amount in excess of that shall be paid in equal proportions depending on the extent of assets. This amount shall be linked to the EUR exchange rate of 5 January 1999."
- 6) Mexico transitioned to a limit which is set at 400 000 UDI ("Unidades de Inversión", an index which basically reflects inflation and which is constantly updated). As of April 25, 2008, one UDI was equivalent to 4.0071 pesos, corresponding to USD 153,824.
- 7) This new coverage level (previously only up to EUR 20 000) and the introduction of co insurance were implemented in January 2007.
- 8) The maximum insurance coverage was raised to RUR 400 000 from its previous level of RUR 190 000.
- 9) Following the enactment of the Deposit Insurance Act in 2005, the deposit insurance scheme commenced on April 1, 2006. The deposit insurance scheme provides (limited) compensation for deposits held by individuals and charities, in the event of the failure of a bank or finance company.
- 10) The deposit insurance guarantee was unlimited in 2003, but as of July 2004, it became limited. NTL stands for New Turkish Lira.
- 11) The Financial Services Authority (FSA) announced changes to the rules governing the Financial Service Compensation Scheme. The new rules specify a 100 per cent guarantee of a depositor's first GBP 35 000 in a bank account if the bank goes into default. Before 1 October 2007, compensation was limited to the first GBP 2 000 plus 90 per cent of the deposit between GBP 2 000 and 35 000. The limits are being reviewed.
- 12) Recent changes made to the FDIC deposit insurance system include the expansion of coverage of individual retirement accounts to USD 250 000 and (future) indexation of coverage limits.

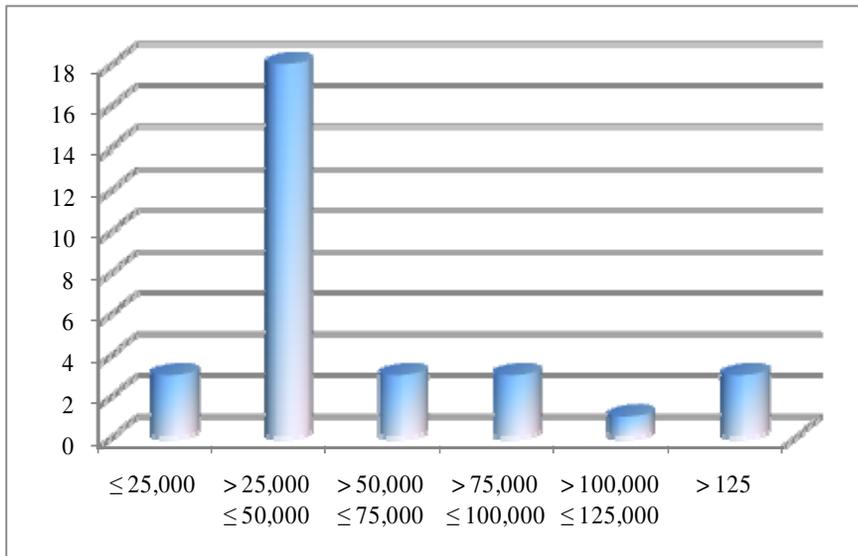
Figure 3. **Explicit deposit insurance coverage limits**
USD equivalents, as of early 2008



Source: OECD Secretariat estimates. For qualifying notes and sources see Table 1.

Figure 4. **Incidence of specific explicit deposit insurance coverage limits**

Numbers of constituencies, ranges in USD equivalents, as of early 2008



Source: OECD Secretariat estimates. For qualifying notes and sources see Table 1.

... including with respect to the maximum insurance coverage provided

In the European Union, the EC Directive on Deposit Guarantee Schemes of 1994 specifies a minimum coverage of EUR 20 000, although exemptions existed in the past. Grouping the observations of explicit *deposit* insurance coverage limits into ranges, with widths of USD 25 000 each, shows that most constituencies specify coverage limits that lie between the equivalent of USD 25 000 and USD 50 000 (Figure 4). Thus, an important aspect of the design of deposit insurance systems differs across countries in the European Union, where banking systems have become increasingly integrated. This situation may create some challenges in situations when the stress experienced by one bank has a significant cross-border dimension (*e.g.* when the troubled institution has branches in other countries).⁸

The higher the extent of guarantee the greater tends to be the risk of moral hazard

There are at least two, partly opposing, considerations affecting the choice of the level of coverage.

Low coverage tends to be less effective in instilling confidence on the part of depositors, however

- Conceptually, the higher the extent of guarantee the greater is the risk of moral hazard on the part of depositors and deposit-taking institutions. Indeed, the risk of any insurance system – besides that of being ineffective or insufficient – is that it encourages moral hazard. One feature of such systems that can and should mitigate the occurrence of moral hazard is that the amount of deposit insurance coverage for retail depositors should not be set so high as to encourage irresponsible behaviour by banks or depositors, or both, by stimulating the growth of deposits at low-quality and high-risk banks.⁹
- By contrast, specifying a too low coverage rate partly contradicts one of the purposes of deposit insurance, which is to protect small depositors who lack the resources to assess the soundness of banks. Also, low coverage tends to be less effective in instilling confidence on the part of such depositors, and it runs the risk of undermining the credibility of the deposit insurance arrangement, thus increasing the likelihood of bank runs.

The response has been to establish limits that attempt to cover most small depositors while leaving large deposits exposed

In most deposit insurance systems the response to this trade-off has been to establish coverage limits which gravitate towards covering the vast majority of small depositor's balances while ensuring that large, especially corporate and interbank, deposits are exposed to market discipline. For example, in Canada, the CDIC's coverage limit of CAD 100 000 per institution per depositor is estimated to fully protect around 90 per cent of individuals while leaving the majority of deposits by value exposed to market discipline. The current (new) compensation level of GBP 35 000 in the United Kingdom covers an estimated 96 per cent of depositors and 50 per cent of the value of deposits. In Singapore, the coverage limit of 20 000 Singapore dollars protects an estimated 86 per

cent of depositors. Coverage limits may need to be adjusted periodically to reflect the effect of inflation and other factors.

Co-insurance arrangements also exist. Co-insurance, by specifying a proportional deductible for claims beyond a specific threshold, requires depositors to bear part of the cost in case of a banking failure (e.g. 10 per cent of the losses beyond the specific threshold, and up to a specific ceiling). The method of co-insurance aims to reduce moral hazard risk on the part of depositors and banks. However, the very purpose of the insurance system to instill confidence could be undermined if there is a perception among depositors that adequate coverage is not available. Such a perception may partly reflect the fact that co-insurance arrangements are somewhat more complex and perhaps not properly understood.

Effective consumer protection requires that the public properly understand existing arrangements and is aware of the extent of and limits to existing compensation arrangements. Consumer surveys have shown however that depositors' knowledge of such arrangements can be limited.¹⁰ Thus, simplicity is valuable in making the public understand the arrangements.

The speed of reimbursement of depositors in the event of bank failure is another element of the extent of coverage. In this respect, there are important differences between some OECD countries. In the United States, for example, arrangements are in place that give depositors near-immediate access to the par value of their insured deposits. By contrast, in many European countries, it would take several months for depositors to receive a pay-out. Liquidity concerns could however be an important consideration for depositors in withdrawing deposits. Recent proposal in the United Kingdom specify that compensation should be paid within one week of a bank being closed. In Australia, where the establishment of a scheme to repay depositors up to AUD 20 000 in a failed deposit-taking institution is currently under consideration, considerable emphasis is placed on the issue of the timeliness of the payments to be made.

A consensus seems to be emerging that systems with low coverage and partial insurance may not be effective in preventing bank runs

A consensus seems to be emerging that one of the lessons from the run on mortgage lender Northern Rock in the United Kingdom is that deposit insurance systems with low levels of coverage and partial insurance, together with likely delays in repayment, may not be effective in preventing bank runs. One example supporting this assessment is that the President of the ECB, in the context of a discussion of ways to foster European financial integration, made the explicit recommendation that “partial insurance, or the so-called co-insurance, for smaller deposits could be removed where it still exists, as recent experience seems to suggest that it may reintroduce incentives for retail investors to run (on) a bank”.¹¹

In response to the run on Northern Rock,¹² the UK Chancellor announced that arrangements would be put in place to guarantee all existing (retail and wholesale) deposits in Northern Rock during the period of market instability, with no co-insurance.¹³ These arrangements were to apply, “during the current instability in the financial markets”, to any other bank that arranged an emergency lending facility with the Bank of England while being assessed solvent by the Financial Services Authority (FSA). They essentially replaced the deposit insurance system that was in place. In the United Kingdom, deposit insurance previously fully covered only the first 2 000 GBP and 90 per cent of the next 33 000 GBP. By contrast, the new arrangements specify a 100 per cent guarantee of a depositor’s first GBP 35 000 in a bank account if the bank goes into default. The UK government launched a consultation process regarding these arrangements (see also section III).

Funding and premium setting

Funding and premium setting arrangements also differ across schemes

The differences in deposit insurance systems also include those related to the funding and premium setting arrangements. Explicit deposit insurance systems can be either funded or unfunded. Many deposit insurance systems are based on *ex ante* funding, using periodic contributions by member institutions of the scheme to build up resources for payouts to depositors during bank failures. In a few countries there are unfunded systems, while arrangements with both *ex ante* and *ex post* funding features also exist.

Ex post funding could reinforce downward cyclical developments...

In systems with *ex post* funding, the issue arises as to how funds should be collected after bank failures. This issue can be complicated by a difficult market situation after the time of the bank failure(s), especially if the failure(s) was not an idiosyncratic event but instead involved more than one bank. In such situations, *ex post* funding would be confronted with the risk of reinforcing (downward) cyclical developments.

...while ex ante funding gives rise to an opportunity cost

Ex ante funding involving a stand-alone deposit insurance fund ensures that funds will be available for depositor compensation when needed, provided premiums charged reflect appropriate assumptions regarding potential losses and other deposit insurance costs. In this context, it is important to maintain an appropriate ratio between the size of the fund and the amount of total insured deposits; the “adequacy” of such a ratio depends on the goals of the deposit insurance system, that is, on the specific mix of consumer protection and financial stability objectives. Opportunity costs are likely to arise as the funds would need to be invested in liquid securities with potentially lower returns.

One issue related specifically to *ex ante* funding is that of insurance premium determination. While many countries charge flat rate premiums uniform for all insured institutions of the same type,

some countries charges risk-adjusted premiums, meaning that premiums vary according to proxies of the riskiness of the member institution. For example, in the United States, since 1993, premiums are related to the estimated risk category of the member institution. In Singapore, the Monetary Authority of Singapore is currently reviewing the introduction of a risk-based framework, which would also take into consideration the results of supervisory risk assessments. Newly established schemes often specify flat premiums. In cases where the insurance fund is being built up, substantial premium payments are typically required by all institutions, including the safest.

In the case of ex ante funding, risk-based premiums should discourage excessive risk-taking

In theory, risk-based premiums should tend to discourage insured banks from taking excessive risks because undertaking risky activity would imply that a bank faces higher premiums. By contrast, flat insurance premiums for different financial risks stimulate the (deposit) activities of the weaker banks. The specification of risk-based premiums is another important feature (besides the specification of limits to the deposit insurance coverage for individual depositors) of deposit insurance systems that can and should mitigate the occurrence of moral hazard.¹⁴ In practice, the identification of a proxy for risk represents an important challenge however.

Sound funding is critical to the effectiveness of the system

Whatever funding and premium setting method is chosen, funds must be available when needed, and arrangements must be credible. Sound funding arrangements are critical to the effectiveness of the deposit insurance system and the maintenance of depositor confidence. By contrast, inadequate funding can lead to a loss of credibility of the deposit insurance system.

Members should be subject to strong prudential supervision and regulation

Membership

As a general rule, membership criteria should ensure that the deposit insurance scheme remains viable on an ongoing basis. Also, to ensure that the potential exposure of the system remains under control, it is important to include as members in the system only those institutions that are subject to strong prudential supervision and regulation.¹⁵

Most existing deposit insurance guarantee schemes are public, while private deposit schemes or those jointly publicly and privately administered are also available in some countries.¹⁶ A strength of the government's involvement arguably is that it is more successful than a purely private alternative in generating strong public confidence in the safety of deposits. In most public schemes, participation is compulsory, thus ensuring that *all* depositors have a designed amount of protection and avoiding adverse selection among deposit-taking institutions.

Financial safety net interrelationships

Delimiting the scope of different responsibilities in a crisis situation is important

Recent developments have drawn attention to the issue of effectiveness of the institutional set-up of crisis management. To the extent that different institutions are entrusted with responsibilities that are relevant in a crisis situation, delimiting the scope of different responsibilities as well as powers in a crisis situation is important. Numerous links exist in this context, involving the deposit insurance, supervisory and lender of last resort functions.

Compared to a situation in which supervisory and deposit insurance functions are assigned to a single organisation, in a situation when these functions are assigned to different organisations, issues related to information sharing and co-ordination of actions can be quite complex. But even when these functions are combined in the same organisation, the smooth functioning of the financial safety net depends on the existence of clearly defined roles and responsibilities of the respective players in that organisation.

One question is whether and to what extent the deposit insurer should play a role in crisis management

Whether and to what extent the deposit insurer should play a role at all in crisis management is a relevant question. For the entity in charge of deposit insurance to play such a role, it must be given some specific intervention powers (or the authority to request certain actions from the supervisor), which would allow it to play an active role in attempting to minimise the costs to the deposit insurance scheme. Such powers could be related to the restructuring of the deposit-taking institution, such as the authority to transfer deposits, provide guarantees, take control of the institution, or to provide liquidity. Another one is the power to close an institution and begin payout. Some deposit insurers have extensive failure resolution powers, such as in the United States, Japan, Canada, and Korea, while others have little or no authority in this area.

In any case, there is a need for close co-ordination among different authorities...

To the extent that the deposit insurer possesses some of those capacities, close co-operation and co-ordination among different safety net participants needs to be ensured, so as to avoid an outcome where any potential conflict in the mandates undermines the effectiveness of the financial safety net. While overlap and duplication should be avoided, giving deposit insurers some of those capacities just mentioned could provide a check against forbearance on the part of the regulator.

...regardless of the specific institutional setting

Indeed, there is widespread agreement that the need for such close co-ordination exists in *any* institutional setting and that information sharing among the different institutions that are entrusted with responsibilities that are relevant in a crisis situation is essential.¹⁷

There is also a need for co-ordination on an international level. In this context, it has been stressed that it is vital to ensure, firstly, the appropriate composition of any (national) safety net and then, secondly, appropriate international co-operation and co-ordination among countries and among the national mechanisms (FSF, 2001). The recent financial turmoil has revealed significant weaknesses, however. Co-operation, including the exchange of information, was not as good as needed. Against this background, the FSF has called on policy authorities to improve co-operation at the international level,¹⁸

The potential cross-border dimension of stress in the banking sector has received particular attention in the European Union (EU). The EU Commission and Parliament have been fostering the information sharing and other close co-operation of European schemes in recent official announcements following the completion of a 2-year long review process of the relevant EU Directive.

Arguably, the larger the number of parties involved, the more relevant is the issue of co-ordination. In some circumstances, co-ordination requirements or efforts may limit the speed of policy response, compared to a situation in which a single institution performs all of the safety net functions. In some situations, *ex ante* specifications of such co-ordination arrangements may be of limited usefulness if crises develop considerably differently from expectations and contingency plans.

Bank failure resolution

The key aspect of bank failure resolution is speed

The key aspect of bank failure resolution is speed: The timely and quick resolution of failed insured institutions reinforces systemic stability and promotes public confidence in the banking system.

Operationally, there are a number of different resolution techniques. The choice of the specific technique used depends in part on the underlying cause of financial distress (*e.g.* microeconomic, macroeconomic, or institutional and/or system-wide or idiosyncratic), although it is often difficult to define the exact mix between the different causal factors. Moreover, there is no one-to-one mapping between causal factors and resolution techniques. However, the observation that there is no single best resolution technique should not be interpreted to mean that all instruments are equally effective in all circumstances, or that they result in the same (fiscal) costs. Indeed, historical experiences across countries suggest that certain resolution tools – those that permit impaired institutions to continue to operate for extended periods of time – can significantly increase the (fiscal) costs of resolving crises compared to those tools that allow a very timely and quick resolution.¹⁹

Law and regulation should facilitate an orderly and timely exit of failing banks. In this context, bankruptcy procedures need to be conducive to quick resolution efforts. In particular, they need to prevent failing institutions from continuing to operate for lengthy periods and possibly deteriorate further, perhaps depleting the remainder of their capital.

Explicit crisis resolution procedures can be helpful in ensuring an early intervention

In this context, explicit crisis resolution procedures such as prompt corrective action (PCA) requirements, which automatically would trigger supervisory action in the event an institution began to encounter financial difficulties – even before the institution becomes technically insolvent – can be helpful in ensuring an early intervention before all asset values of the failing institution are lost. PCA frameworks entrust supervisors with tools to turn troubled banks around and, if such measures fail, require the legal closure of a bank before its capital deteriorates to some specific (and, ideally, well publicised) minimum capital level.

PCA frameworks can be an important part of the supervisory-deposit insurer nexus, as they help establish a hierarchy among the different institutions in situations of extreme stress. Where such frameworks do not exist, early intervention may occur however on an ad hoc basis by special award of powers.

As for bank insolvencies, in many countries there are no separate statutory regimes but bank resolutions are covered under general bankruptcy proceedings. These can drag on for long periods of time, however. Some countries, such as the United States, have developed specific regimes for banks.²⁰ These typically give bank supervisors and/or deposit insurers greater powers and remove banks from the scope of normal corporate insolvency proceedings.

There is considerable diversity of approaches regarding bank resolution regimes

There exists a considerable diversity of approaches among CMF members regarding bank resolution regimes. The recent financial market turmoil has highlighted that these regimes can play an important role. Thus, these events provide a good opportunity for each country to see whether they need to refine or change the approaches that they are currently using.

III. Preliminary lessons emerging from the recent turmoil

Key design challenges relate to...

The present note revisits the issue of deposit insurance to provide a brief overview of some of the key challenges related to explicit deposit insurance systems, the understanding of which is considered helpful for the discussion of the current situation. In this context, the note recalls some of the widely agreed findings related those challenges for the purpose of facilitating the discussion of preliminary lessons from the current situation. These challenges include issues

related to coverage, funding and premium setting, membership, safety net interrelations, and bank failure resolution mechanisms.

... (i) coverage,
(ii) funding and
premium setting,
(iii) membership,
(iv) safety net
interrelations, and
(v) bank failure
resolution
mechanisms

As regards coverage, the higher the extent of guarantee the greater tends to be the risk of moral hazard on the part of depositors and deposit-taking institutions. Low coverage tends to be less effective in instilling confidence on the part of depositors, however. In most deposit insurance systems the response to this trade-off has been to establish coverage limits which gravitate towards covering the vast majority of small depositor's balances while ensuring that large, especially corporate and interbank, deposits are exposed to market discipline. Funding, both *ex ante* and *ex post*, raise challenges. For example, *ex post* funding could be confronted with the risk of reinforcing downward cyclical developments, while *ex ante* funding gives rise to an opportunity cost. In the case of *ex ante* funding, the specification of risk-based premiums can and should discourage excessive risk-taking. As regards membership, membership criteria should ensure that the deposit insurance scheme remains viable on an ongoing basis, and it is important to include as members in the system only those institutions that are subject to strong prudential supervision and regulation. To the extent that different institutions are entrusted with responsibilities that are relevant in a crisis situation, delimiting the scope of different responsibilities as well as powers in a crisis situation is important. Close co-ordination and information sharing among the different institutions is essential in any institutional setting, both on a national and international level. Another finding is that bank failure resolution arrangements matter. The key aspect here is speed: The timely and quick resolution of failed insured institutions reinforces systemic stability and promotes public confidence in the banking system.

*Some preliminary
lessons regarding
features of deposit
insurance systems are
emerging*

As events in markets are still unfolding, it may be too soon to draw definitive conclusions regarding the effects of the crisis and the adequacy of regulatory and policy frameworks. Nonetheless, some preliminary lessons are emerging, including regarding features of deposit insurance systems.

Where explicit deposit insurance systems exist, reviews of such systems are being conducted. Once the reviews are completed, specific features of the design of these systems may need to be changed. In the United Kingdom, for example, the review process has advanced significantly.²¹ In particular, in the consultation document published in January 2008, the Government proposes to bring forward legislation after consultation, alongside actions by the FSA and the Bank of England, to address five key issues, one of which is to ensure the existence of effective compensation arrangements in which consumers have confidence. As part of such efforts, the document proposes to (i) consult on a potential increase to the compensation limit for deposits, and the coverage of certain balances above the limit;

(ii) make changes to enable the Financial Services Compensation Scheme to make payments within one week of a bank failing; and (iii) increase consumer awareness of the scope and operation of the compensation scheme. The review in the United Kingdom should provide useful lessons for the reviews of such schemes elsewhere and for the discussion regarding the establishment and design of such schemes.

Four areas in which some preliminary lessons are emerging from the recent financial turmoil are singled out here for special attention: First, coverage; second, public awareness; third, financial safety net interrelations and, fourth, bank failure resolution.

Systems with low levels of coverage may not be effective

First, as regards coverage, deposit insurance systems with low levels of coverage and/or partial insurance may indeed not be effective in preventing bank runs.

Consumers need to understand the extent of deposit protection

Second, for the explicit deposit insurance system to be effective, consumers need to understand the extent of and limits to existing deposit protection schemes. Such knowledge can be poor, however. In this context, co-insurance arrangements are somewhat more complex than arrangements with full coverage (up to a pre-specified ceiling) and perhaps not properly understood. But even when they are understood, they could be ineffective in preventing bank runs given that they may imply that the depositors would share a substantial part of the losses.

Crisis management arrangements matter

Third, when different institutions including the deposit insurer are entrusted with responsibilities that are relevant in a crisis situation, *ex ante* arrangements delimiting the scope of the various responsibilities as well as the powers in a crisis situation may not be sufficient to ensure co-ordination that is as close and smooth as needed. Delimiting responsibilities without establishing a hierarchy in the event of a crisis may not be effective in dealing with events that were not envisaged in the *ex ante* arrangements. In this context, it should be noted that deposit insurers have extensive failure resolution powers in some countries.

A specific bankruptcy regime for banks may be helpful

Fourth, the question of whether a specific bankruptcy regime for banks is needed remains an important issue. In this context, note that bank resolution frameworks differ considerably across constituencies of CMF members, implying differences in the speed of bank failure resolution and/or payouts for insured depositors.

Notes

1. For instance, European finance ministers agreed in October 2007 on a roadmap to protect financial markets against future turmoil by establishing new guidelines on transparency, valuation standards and risk management. One of the four proposed steps in this context is to reinforce the prudential framework, risk management and supervision of the financial sector, partly by “reviewing possible enhancements of deposit guarantee schemes in the EU.”
2. Demirgüç-Kunt, A. and E. Detragiache (1998), “The Determinants of Bank Crisis in Developing and Developed Countries”, *IMF Staff Papers* 104. Demirgüç-Kunt, A. and E. Kane (2001), “Deposit Insurance Around the World: Where Does it Work?”, *World Bank Paper No. 2679*.
3. This observation has been made by Lastra (2006), on which parts of the discussion in the present note draws. See Lastra, R.A., *Legal Foundations of International Monetary Stability*, p.121, 2006, Oxford. The observation may reflect that there is no strong consensus as to whether or not establishment of deposit insurance is desirable. It may also just reflect that it is understood that deposit insurance arrangements are not part of banking supervision *per se*, but is part of the broader financial safety net.
4. See *Core Principles for Effective Banking Supervision (Basel Core Principles)*, September 2007, available at <http://www.bis.org/publ/bcbs30a.pdf>.
5. There exist many initiatives that aim at enhancing household financial literacy. One key benefit of enhanced financial literacy is that households can evaluate more sensibly the risk-return tradeoffs of their deposits. Such capacity is particularly relevant when the adverse effect on households of the materialisation of risk is not or only in a very limited way cushioned by existing guarantees. Implementing effective strategies to enhance financial literacy is difficult, however. Moreover, results take time to materialise. The OECD has undertaken a review of existing schemes across OECD countries and developed guidelines for the design of such schemes. Some of the lessons from the review and the guidelines are probably relevant for financial literacy programmes in relation to household deposits, although the latter are not mentioned explicitly in the study or the guidelines. See *OECD Good Practices for Enhanced Risk Awareness and Education on Insurance Issues* (available on www.oecd.org/daf/financialeducation).
6. Australia-New Zealand Shadow Financial Regulatory Committee, “Responding to Failures in Retail Markets”, Statement No. 3, Melbourne, September 25, 2007.
7. Reserve Bank of Australia, *Financial Stability Review*, September 2006 (pp.44-45) and March 2008 (pp. 65ff).
8. For example, under current EU rules, depositors of a banks’ foreign branch (rather than subsidiary) are protected under the laws of the home country of that bank. Note that the European Shadow Financial Regulatory Committee, a group of academics and other experts in the fields of banking and finance, has recently reiterated its call for a similar level of deposit insurance in all European countries in its statement regarding the recent financial crisis. See European Shadow Financial Regulatory Committee, Statement No. 27, “Resolving the current crisis and preventing its return”, 10 March 2008.
9. Full coverage is rather rare. Some countries provided unlimited coverage in response to banking crises. Often, they revoked full coverage after the crises seemed to abate.
10. The International Association of Deposit Insurers (IADI) has issued a discussion paper to examine public awareness issues for deposit insurance systems in October 2007 and proposed research to develop comprehensive guidance for related public awareness programs.
11. Keynote speech at the Second Symposium of the ECB-CFS research network on “Capital Markets and Financial Integration in Europe”, 13 February 2008.
12. While the medium-sized mortgage bank Northern Rock PLC had relatively limited direct and indirect (through CDOs) exposure to US sub-prime mortgage debt, the firms’ business model involved a heavy reliance on raising money in short-term funding markets to finance its mortgage lending. This model seemed to have been successful while these markets were liquid, but the disruptions in those markets

resulted in the bank requiring liquidity facilities with the Bank of England. The latter initially did not provide additional liquidity to the banking system in reaction to tight money market conditions. It did, however, provide liquidity assistance to Northern Rock, widening the collateral base it was prepared to accept from the bank in exchange for providing it with short-term funds. The public interpreted these developments as signalling that the bank may become insolvent, which resulted in a run on deposits.

13. The UK government called for private bids for Northern Rock. In January 2008, however, the government came to the conclusion that the only two private bids made were inadequate, and the government took the unusual step of fully taking over the bank itself.
14. In this context, it is interesting to note that the OECD Guidelines on Funding and Benefit Security in Occupational Pension Plans request that “Insolvency guaranty schemes should rely on appropriate pricing of the insurance provided in order to avoid unwarranted incentives for risk-taking (moral hazard).”
15. See Blair, C. E., F. Carns, and R.M. Kushmeider, “Instituting a deposit insurance system: Why? How?”, *Journal of Banking Regulation* (2006) 8, pp. 4-19.
16. For example, in Germany, voluntary private deposit insurance schemes have existed for decades. The existing private deposit insurance system was supplemented however by a statutory depositor compensation system with the implementation of the 1994 EU Deposit Guarantee Directive in the form of the German Federal Deposit Guarantee and Investor Compensation Act of 1998. Given the positive experience of the system of private insurance in Germany, the German legislator, in implementing the EU Directive, also wished to retain the voluntary deposit insurance system to ensure extra cover over and above the minimum cover provided by the statutory compensation system. The supplementary deposit protection provided by the banking associations’ own insurance schemes depends, however, on the institutions voluntary membership of the association in question. In practice, nearly all banks have signed up to the voluntary deposit protection schemes for competitive reasons.
17. For example, this assessment was reflected in the guidance on the issue of the inter-relationships among safety net participants provided in September 2001 by the Financial Stability Forum (“Guidance for developing effective deposit insurance systems”). Also, in January 2006, the International Association of Deposit Insurers published some practical advice to safety net participants on how to promote effective inter-relationships, stressing again the importance of information sharing.
18. Financial Stability Forum, *Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience*, 7 April 2008 (especially section V).
19. See for more detail and an overview of different resolution techniques Lumpkin, S., “Experiences with resolution of weak financial institutions in the OECD area”, *Financial Market Trends* No. 82, June 2002.
20. See e.g. the discussion in Box 8 of Bank of England, *Financial Stability Report*, April 2007.
21. In October 2007 the Chancellor of the Exchequer announced that he would review the existing supervisory regime, including areas such as depositor protection and the framework for dealing with banks facing difficulties. A consultation document, published in January 2008, sets out the views of the Government, the FSA, and the Bank of England on these issues, building on responses to a discussion paper, “Banking reform – protecting depositors” published in October 2007.

Challenges Related to Financial Guarantee Insurance

Sebastian Schich*

Traditionally, bond insurers have provided guarantees of payments on municipal bonds, where defaults have been very limited. But since the late 1990s they have become increasingly involved as guarantors of elements of various structured financial products: in particular, the credit enhancements provided by these entities have played an important role in making securities based on sub-prime loans attractive to a wide range of investors. It is this trend change in their activity that has become the focal point in concerns about the health of these entities that have grown during the financial turbulence. The note identifies three policy issues that arise in the context of the current challenges facing these entities and it draws some preliminary findings. First, while concerns regarding the potential financial stability implications of further downgrades and/or failures of some of these companies have ebbed somewhat from their peaks in early 2008, the situation still bears monitoring. Second, current developments raise questions regarding the role of financial guarantors in specific financial market segments. In this context, there appears to be a public interest in the continued availability of guarantees on payments on municipal bonds. Private solutions seem to be forthcoming. Third, transparency of the financial guarantee insurance sector is limited. In this context, the performance of credit rating agencies in providing guidance for investors regarding the quality of the guarantees provided by financial guarantors appears to have been uneven.

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Executive summary

Structured products have been at the heart of this financial crisis and there is considerable questioning regarding the future of this segment and the roles of the various players involved. In this context, the present note draws attention to financial guarantee insurance companies (or bond insurers) and to their interaction with other financial institutions and markets.

Financial guarantee insurance provides investors in debt securities with guaranteed payment of interest and principal in the event that the issuer of the guaranteed (“wrapped”) debt is unable to meet its financial obligations. The sector is largely based in the United States, but its clout is international, not least because securities wrapped by financial guarantors are issued by various internationally active institutions and are held in portfolios around the world.

Traditionally, bond insurers have provided guarantees of payments on municipal bonds, where defaults have been very limited. But since the late 1990s they have become increasingly involved as guarantors of elements of various structured financial products: in particular, the credit enhancements provided by these entities have played an important role in making securities based on sub-prime loans attractive to a wide range of investors.

Despite the growing role of financial guarantee insurance in the securitisation process that has come to characterise modern financial markets, the entities providing this specific financial service received relatively limited attention until early 2008, when several rating agencies openly discussed the possibility of taking adverse rating actions related to the biggest entities in the sector. Those discussions brought intense scrutiny on the role of bond insurers in structured finance.

The note does not attempt to arrive at definitive conclusions regarding the past and possible future role of these entities in the securitisation process, as current developments are in flux and uncertainty about outcomes is very high. Instead, the note identifies some policy issues that arise in the context of the current challenges facing these entities and it draws some preliminary findings, which could be confirmed in future work to permit firmer policy conclusions to be drawn.

- First, over the short term, current pressures on financial guarantors raise the question as to how relevant are these developments and the possibility of further credit rating downgrades and/or failures of some of these entities for financial markets, institutions, and stability. Such downgrades would feed through to downgrades of the guaranteed securities, the “wrapped” amounts of which are well in excess of USD two trillion, and there would be additional adverse effects on counterparties of financial guarantors. While concerns regarding these effects have ebbed somewhat from their peaks in early 2008, the situation still bears monitoring.
- Second, on a structural issue, current developments raise questions regarding the role of financial guarantors in specific financial market segments. In this context, there appears to be a public interest in the continued availability of guarantees on payments on municipal bonds. Whether and/or to what extent such concerns justify policy intervention is uncertain, however, especially as the business outlook for this activity is reasonably good anyway. Private solutions are forthcoming and new private capital is entering that segment. As to the role of financial guarantors in structured finance, some of the weaker and smaller companies may exit the market (enter into “run-off”). Whether remaining financial guarantors will be successful in procuring the necessary capital base to insure such business going forward is uncertain.
- Third, transparency of the financial guarantee insurance sector is limited. In this context, a specific issue relates to the performance of credit rating agencies in providing guidance for investors regarding the quality of the guarantees provided by financial guarantors. There is a possibility that concerns about the broader adverse effects of downgrades may have inclined rating agencies to forestall quick actions, perhaps giving investors inadequate or inaccurate assessments of underlying credit quality. But there is also the possibility that rating agencies actually have toughened their stance vis-à-vis financial guarantors more recently in an attempt to preserve their own reputations in the wake of the broader criticism of the role they have played in the rating of structured financial products. These issues have to be seen against the background of a wider discussion regarding the role and performance of rating agencies in the originate-and-distribute model that has come to characterise modern financial markets, as well as the heightened role assigned to credit rating agencies as part of the new approach to banks’ capital adequacy. The performance of credit rating agencies in providing guidance for investors regarding the quality of the guarantees provided by financial guarantors has been uneven.

I. Introduction

Structured products have been at the heart of the financial crisis and there is considerable questioning regarding the future of some segments of the market and the roles of the various players involved. In this context, the present note draws attention to financial guarantee insurance companies (or bond insurers), and to their interaction with other financial institutions and markets.¹

Financial guarantee insurance provides investors in debt securities with guaranteed payment of interest and principal in the event that the issuer of the guaranteed (“wrapped”) debt is unable to meet its financial obligations.

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Despite the growing role of financial guarantee insurance in the securitisation process that has come to characterise modern financial markets, the entities providing this specific financial service received relatively limited attention by the financial press and the wider public until early 2008, when several rating agencies openly discussed the possibility of taking adverse rating actions related to the biggest entities in the sector, although financial market indicators had indicated rising concerns since July 2007.

The rating assigned to bond insurers is a key parameter, as the business model of the latter essentially consists of lending their own credit rating to debt issuers for a fee. Their (typically high) credit ratings underpin the value of the insurance, or credit protection, provided to investors. Any lowering of such ratings would not only adversely affect the business outlook of the financial guarantor itself, but would most likely feed through to the rating of securities enhanced by guarantees provided by the insurers.

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Financial guarantors have played a very active role in many securities markets, including the very large US municipal bond market and those for structured financial instruments including collateralised debt obligations (CDOs) backed by residential mortgage-backed bonds and other asset backed securities. The total amount of securities “wrapped” by bond insurers’ payment guarantees is well in excess of USD two trillion.

Traditionally, bond insurers have provided guarantees of payments on municipal bonds, where defaults have been very limited. But since the late 1990s they have become increasingly involved as guarantors of elements of various structured financial products: The credit enhancements provided by these entities have played an important role in making securities, including those based on sub-prime loans, attractive to a wide range of investors. It is this trend change in their activity that has become the focal point in recent concerns about the health of these entities.

The note identifies some policy issues that arise in the context of the current challenges facing these entities

The note does not attempt to arrive at definitive conclusions regarding the past and possible future role of these entities in the securitisation process, as current developments are in flux and uncertainty about outcomes is very high. In particular, from a financial stability point of view, considerable uncertainty remains about the extent to which eventual loan delinquencies and foreclosures in subprime mortgage securitisations will translate into realised capital losses at financial institutions, including financial guarantee insurers. Instead, the note identifies some policy issues that arise in the context of the current challenges facing these entities and it draws some preliminary findings, which could be confirmed in future work to permit firmer policy conclusions to be drawn.²

The note is structured as follows. In the second section, the note provides some background information, focusing on selected developments preceding the recent financial pressures facing financial guarantors. The third section describes in some detail the activities and current challenges facing financial guarantors. Then, each of the subsequent three sections identifies and discusses a specific policy issue. They are as follows:

First, current pressures on guarantors raise the question as to how relevant are these developments for financial stability

- First, over the short term, current pressures on financial guarantors raise the question as to how relevant are these developments and the possibility of further credit rating downgrades and/or failures of some of these entities for financial markets, institutions, and stability. Such downgrades would feed through to downgrades of the guaranteed securities, the “wrapped” amounts of which are well in excess of USD two trillion, and there would be additional adverse effects on counterparties of financial guarantors. The most severe problems are primarily concerning weaker and smaller financial guarantors, while the two largest companies have preserved their (high) rating from two credit rating agencies for now. Thus, concerns regarding these effects have ebbed somewhat from their peaks in early 2008, although the situation still bears monitoring. Perhaps the most significant uncertainty in this context relates to the timing of potential losses at financial guarantee companies. Regardless of the specific point estimate of such losses, the key question is over what period of time these losses may be spread out (see also section IV).

Second, current developments raise questions regarding the role of financial guarantors in specific financial market segments

- Second, on a structural issue, current developments raise questions regarding the role of financial guarantors in specific financial market segments. In this context, there appears to be a public interest in the continued availability of guarantees on payments on municipal bonds. Whether and/or to what extent such concerns justify policy intervention is uncertain, however, especially as the business outlook for this activity is reasonably good anyway. Private solutions are forthcoming

and new private capital is entering that segment. As to the role of financial guarantors in structured finance, some of the weaker and smaller companies may exit the market (enter into “run-off”). Whether remaining financial guarantors will be successful in procuring the necessary capital base to insure such business going forward is uncertain (see also section V).

Third, a specific issue is the transparency of the sector

- Third, transparency of the financial guarantee insurance sector is limited. In this context, a specific issue relates to the performance of credit rating agencies in providing guidance for investors regarding the quality of the guarantees provided by financial guarantors. There is a possibility that concerns about the broader adverse effects of downgrades may have inclined rating agencies to forestall quick actions, perhaps giving investors inadequate or inaccurate assessments of underlying credit quality. But there is also the possibility that rating agencies actually have toughened their stance vis-à-vis financial guarantors more recently in an attempt to preserve their own reputations in the wake of the broader criticism of the role they have played in the rating of structured financial products. These issues have to be seen against the background of a wider discussion regarding the role and performance of rating agencies in the originate-and-distribute model that has come to characterise modern financial markets, as well as the heightened role assigned to credit rating agencies as part of the new approach to banks’ capital adequacy. The performance of credit rating agencies in providing guidance for investors regarding the quality of the guarantees provided by financial guarantors has been uneven (see also section VI).

II. Backdrop for the current challenges facing financial guarantors

Search for yield

Events in financial markets are still unfolding, so it is too soon for a proper *post mortem* on the crisis. This section seeks instead to discuss some of the important developments that gave rise to the market environment in which the crisis was triggered. Some factors are relatively recent phenomena, while others, such as the “search for yield” by investors, are more longstanding.

The backdrop to recent events is the longstanding “search for yield”

Over much of the early part of this decade, interest rates on low-risk investments such as high-credit-quality government bonds declined to low levels in many countries. Having become accustomed to higher nominal returns, many investors responded to the drop in yields on safe-haven investments by moving out the credit spectrum into higher-risk assets. This shift was evident in a number of

developments, including the strong demand for relatively new and higher-risk assets such as sub-prime residential mortgage-backed securities (RMBS), the increase in ‘carry trades’, the growth in alternative investment vehicles and the compression of risk spreads across a variety of different asset classes.

The “search for yield” had for some time been one of the main themes of discussions related to financial stability in various international *forae* such as the OECD’s Committee on Financial Markets (CMF), the Committee for Global Financial Systems at the BIS, the IMF, and the Financial Stability Forum (FSF). But as more time passed without any major financial market turbulence or casualties, concerns about the possible adverse implications of such behavior seemed to have ebbed (at least prior the actual outbreak of the crisis). There are a number of reasons why concerns had subsided. For one, at least some of the narrowing in yield spreads could be justified by underlying fundamentals, such as the strength of the global economy, strong corporate profit growth, sound corporate balance sheets, low corporate bond defaults, and strong economic performance by many emerging markets (EM). And while spread compression was evident in a variety of asset classes, some comfort could be taken from signs that investors were managing to differentiate between some types of high-yield instruments, *e.g.* with spreads on claims on a few of the riskier emerging market borrowers remaining at relatively more elevated levels.

Originate and distribute model

The search for yield also stimulated financial innovation

The search for yield, together with technological and financial theory advances, also stimulated financial innovation and supported rapid increases in the issuance of structured financial instruments, such as CDOs, asset-backed securities in which the underlying collateral consists of various forms of credit obligations, including loans, bonds, or other asset-backed securities. One asset class referenced by CDOs that has been in the spotlight of late is that backed by residential mortgage-backed securities.

The growth of the market for these instruments reflected a change in the business models of banks from so-called “buy-and-hold” to “originate-and-distribute” strategies. As a result of these changes, the role of banks as the ultimate holders (and monitors) of credit assets has become less important in many markets, replaced in turn by institutional investors such as insurance companies, pension funds, and hedge funds.

These shifts notwithstanding, banks and some securities firms continued to occupy a pivotal position in the credit intermediation process. They originated and underwrote a large share of credit assets,

which they then distributed to various investors, using securitisation and a variety of other techniques to unbundle and repackage the risks.

Heavy reliance on ample market liquidity

Many of these structured credit products relied on the prevalence of a substantial risk appetite among investors

The transformation of banks' business models from the so-called "buy-and-hold" to the "originate-and-distribute" model yielded substantial benefits, including a wider dispersion of risk throughout the financial system. At the same time, however, new risks arose.

One of them was that the structure of many of the new financial instruments relied on the continued supply of ample market liquidity. In this context, many of these structured credit products relied on the prevalence of a substantial risk appetite among various types of investors, in particular, those taking on the riskier tranches.

To sustain demand for structured products, a variety of enhancements were provided, including financial guarantees

To sustain investor demand for structured financial products, a variety of enhancements were provided, including financial guarantees. In fact, many investors did not invest in debt securities that did not carry such enhancements. Once highly rated financial guarantors had enhanced specific tranches of structured financial products, so that these tranches were considered high credit quality by rating agencies, many investors felt encouraged to invest in them. Oftentimes, issuers of structured financial products sought financial guarantees in situations when a CDO was invested in newer asset types or was managed by a new CDO manager.³

While market liquidity is crucial for the functioning of the modern securities-based financial system, recent events have again highlighted that it can evaporate very rapidly. It has now become clear that in a situation of stressed liquidity, risks that supposedly have been transferred to other investors through the sale of financial products can flood back to banks' and securities firms' balance sheets. That appears to be the case in the current scenario, whereby the complex structures created by these institutions have turned out to ultimately require the originators' support. It is difficult to grasp the full magnitude of this effect, not only for third parties, but also for the institutions themselves that had originated these structures.

In any case, the securitisation process became more complex as it involved a large number of players at different stages, with fees and premiums being earned at each stage. This situation implied that the process was subject to a number of frictions, stemming in particular from the existence of asymmetric information, meaning that one party has more information about an asset or portfolio of assets than another. Market participants have developed a variety of solutions to reduce these frictions or their effects. Nonetheless, with hindsight, it has become clear that at least some of them were insufficient.⁴

Sub-prime mortgage debt developments

Enhancements related to securitizations of sub-prime debt are the main reason for current pressures on financial guarantors

Even if the crisis has now moved beyond the area of sub-prime mortgage loans, the latter have been at the center of the recent financial market turbulence, and they have been the ultimate collateral that backed many complex financial instruments that were “wrapped” by guarantees from financial guarantee insurance companies. Indeed, the enhancements that financial guarantors have provided in the context of the securitisation process related to residential mortgage-backed securities are the main reason for the financial pressures that these entities are currently facing.

Sub-prime mortgage loans were often originated at a low initial “teaser” rate that expires after a set period of time, at which point the rate resets to its fully indexed level. It appears that mortgage lenders have been excessively lenient in their screening of mortgage applications, perhaps because they anticipated refinancing on the part of households as the result of an increase in house prices or because lenders anticipated that they would transfer the credit risks through securitisation, while borrowers may have opted for temporarily low financing costs, among other things, in anticipation of further increases in house prices.

In any case, the observation that defaults on some vintages of sub-prime mortgage loans have risen sharply *even before* interest rate resets have taken place is a clear sign of poor underwriting. This point is regularly made on the basis of a plot of the percentage of 60-day delinquencies as a share of total payments due by mortgage vintage year. What is remarkable in these charts is that for some vintage years delinquencies do occur within very short delays of only a few months after origination of the mortgage. These charts show considerably steepening curves as more recent vintage years are included, with the year 2006 standing out as a particularly bad one in terms of underwriting quality, according to that criterion.

There were similar patterns recorded in 2001 and also in the late-1990s. In the latter episode, after a period of depressed underwriting standards and high loan volumes, defaults on new vintage US sub-prime home equity loans ran well above the rates associated with earlier vintages. At that time, however, despite considerable fallout in the sub-prime sector, there was no broader contagion.

More recently, developments in the sub-prime (and Alt-A) mortgage market spilled over to broader financial markets. Default rates in the subprime segment reached record levels, and so did foreclosures, even though many recent vintage loans in the United States had not yet experienced rate resets. At the same time, falling house prices reduced the value of the collateral backing mortgage loans and effectively eliminated the possibility for borrowers to refinance their loans into more standard mortgage products after a period of satisfactory repayment experience. In

the past, with house prices rising, many sub-prime loans were refinanced after a short period and often turned into higher-grade loans. Such benefits were not available in the recent episode.

This time around, developments in the subprime market seem to have had outsized effects on the broader financial markets. Indeed, the US sub-prime market is small compared to the US mortgage market let alone as a share of the global financial market. For example, the notional value of asset-backed securities backed by US subprime mortgages (excluding those issued by US housing agencies) was around USD 700 billion at end-2006, according to estimates shown in the Bank of England's Financial Stability Report of October 2007. Thus, these securities accounted for not much more than ten per cent of the total notional value of the sum of (agency and non-agency) residential mortgage-backed securities and less than ten per cent of the total notional value of more than USD 10 trillion of US mortgage and non-mortgage asset-backed securities outstanding at end-2006 (based on data from the Flow of Funds Accounts, Federal Reserve Board).

Thus, it is remarkable that developments in the former were at the centre of the broader financial market turmoil. One explanation for this apparent puzzle is that problems in mortgage markets are no longer confined to the subprime sector. This explanation seems to be vindicated by recent developments, with problems now extending beyond the subprime area.

Another explanation, not contradicting the former, is that the initial shock of soaring delinquencies on U.S. subprime mortgage loans was amplified as it uncovered serious flaws in the mechanism of the securitisation process more general. The subprime sector affords, however, perhaps the most egregious example of the effects of shortcomings in the securitisation process, and the effects of past mistakes in this specific market have already been clearly revealed by reported losses.

III. Developments regarding financial guarantee insurance

Financial guarantee insurance

A financial guarantor promises to make payments associated with the insured security over the lifetime of that security

For a fee, a (monoline) financial guarantee insurance company promises to make payments associated with the insured security over the lifetime of that security. The institution that issues the debt or the arranger of a structured financial product may decide to acquire such insurance; it is not the investor that buys it directly. From the point of view of the debt issuer or arranger, this insurance is advantageous to the extent that it makes the security issued safer and thus lowers the interest payments required by investors in such a security.

The international dimension of financial guarantee insurance is significant

The financial guarantee sector consists of nine main firms. They are MBIA, Ambac, FSA, FGIC, SCA (quoted as XL Capital Assurance), Assured Guarantee, Radian Asset Assurance, ACA Financial Guarantee Corporation and CIFG. Most companies are based and supervised in the US states of New York or Wisconsin, while there are also subsidiaries and similar companies in Europe, including in the United Kingdom and France, with passporting rights in the case of other European countries.

Thus, while the sector is largely based in the United States, its clout is international. In this context, note that about one fifth of the business reported on the balance sheets of the nine main firms is qualified as international, and securities guaranteed by financial guarantors are held in portfolios around the world.

The credit ratings of financial guarantors are crucial to their business model

The business model of financial guarantee insurers is to guarantee the servicing of the bonds or asset-backed securities they insure (or “wrap”, in the common industry jargon), thus effectively lending their high credit rating to less creditworthy debt issuers against a fee. Hence, the credit ratings of financial guarantors are crucial to their business model and traditionally most financial guarantors held the highest triple-A rating in the case of the three major rating organisations, Moody’s, Standard and Poor’s, and Fitch Ratings.

In addition, to reduce the likelihood of the occurrence of the risk that the debtor defaults, the financial guarantor assists in the structuring of the debt issues, typically insisting on various covenants that provide a variety of rights and remedies available to the financial guarantor to address issuer or servicer financial problems or deteriorating asset performance. Moreover, the guarantor monitors the performance and alerts the issuers in situations when servicing difficulties may arise. In some cases, the financial guarantor intervenes - in advance of actual claims - to transfer servicing, redirect cash flows or enhance the coverage of insured securities to improve performance or mitigate losses.

While financial guarantors typically retain most of the risk that they underwrite, they use reinsurance selectively, although much of that reinsurance occurs within the financial guarantee sector (thus limiting the protection to be had for the sector as a whole). A limited amount is placed with traditional property and casualty insurance companies, however.

Box 1. Private mortgage insurance

There are two types of monoline insurance companies that were closely involved in the construction of many of the new complex financial products based on securities exposed to (mortgage) credit risk. Further to the financial guarantee insurance companies that provide guarantees related to flows of payments on outstanding debt, there are private mortgage loan insurers that provide guarantees of (part of) the stocks of outstanding mortgage debt. The latter repay a certain percentage of the loan, typically between 25 and 35 per cent, if the borrower defaults. Both types of insurance companies are referred to as monoline insurance companies, as they focus on just one specific type of risk, that is credit risk. Private mortgage insurers have the most direct exposure of any insurance sector to mortgage credit risk. Their core business is founded on insuring mortgages that are relatively high-risk (*e.g.* where loan-to-value ratios exceed a specific percentage, say, for example, 80 per cent) or otherwise non-standard (*e.g.* the absolute amount of the loan exceeding specific limits). In many jurisdictions, banking regulations require banks to demand mortgage insurance in those instances. To the extent that non-banks originate mortgage loans, such regulations do not apply, however. There have been substantial capital losses on the part of several of these entities, depleting substantial parts of the capital buffers that many of them had been able to build up beforehand. Share prices for many of the companies that are members of the Mortgage Insurance Companies of America (MICA) have fallen significantly.

A changing business focus of financial guarantors

Traditionally, the business of financial guarantors was confined mostly to guaranteeing bonds issued by municipalities ...

... requiring only very thin capital bases

Traditionally, the business of financial guarantors was confined mostly to guaranteeing bonds issued by municipalities. This specific business focus perhaps explains the widespread use of the label “bond insurers” when referring to these institutions. Indeed, financial guarantee insurance is generally acknowledged to have begun in 1971 with the insurance of a USD 650 000 obligation bond for the Greater Juneau (Alaska) Borough Medical Art Building. By 2003, almost half of all municipal bonds issued in the United States were insured.

The insurance provided by financial guarantors consisted of a guarantee of the *flows* of payments rather than *stocks* of outstanding debt. Moreover, defaults were very limited in this asset class, allowing the financial guarantee insurance companies to operate with very thin capital bases (Figure 1).

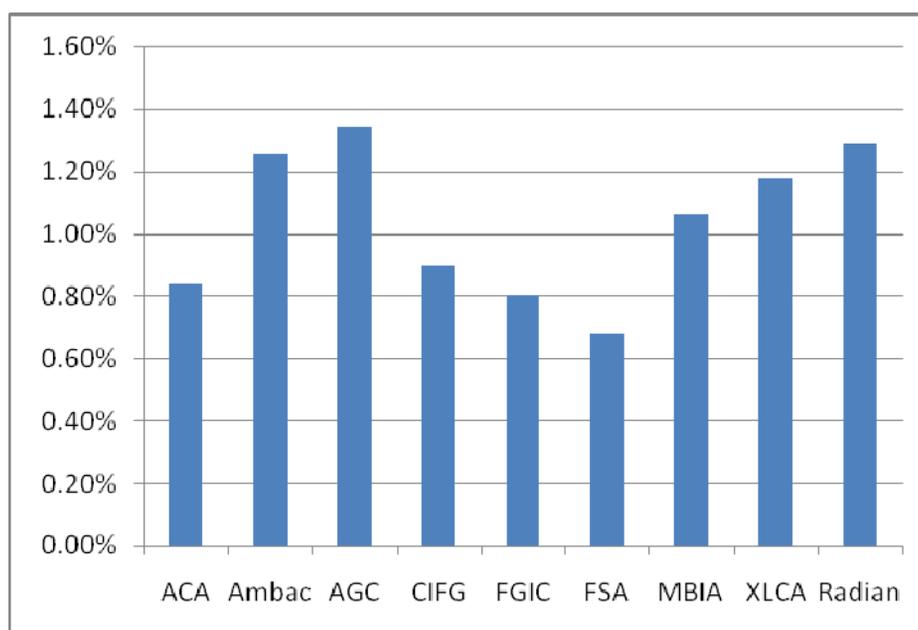
Subsequently, financial guarantors began to increase their exposure to structured financial instruments

Subsequently, however, in response to the increasingly competitive conditions in the municipal bond insurance sector, financial guarantors began to increase their exposure to risk in structured financial instruments. As well, there was a rule change in the United States in the late 1990s that facilitated the financial guarantors' expansion beyond their speciality business of insuring municipal bonds to the area of more complex structured financial products.⁵

Over the past few years, financial guarantors have played an increasingly important role as both protection sellers in asset-backed structured products and leveraged synthetic structures (mostly CDOs) and as providers of secondary guarantees for certain structures. While the regulatory capital base of financial guarantors has grown over the past few years, this growth rate was eclipsed, especially most recently, by that of their structured finance business (Figure 2). The relative involvement in this type of business differs across individual companies, however (Figure 3).

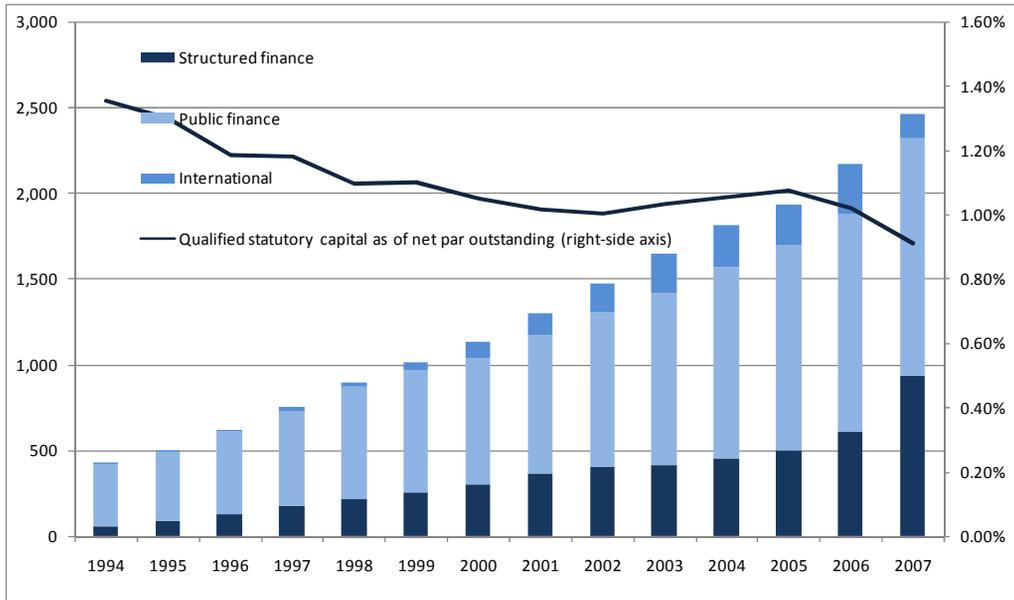
Figure 1. **Capital as a percentage of business underwritten**

Capital as of net par outstanding, as of end-2006



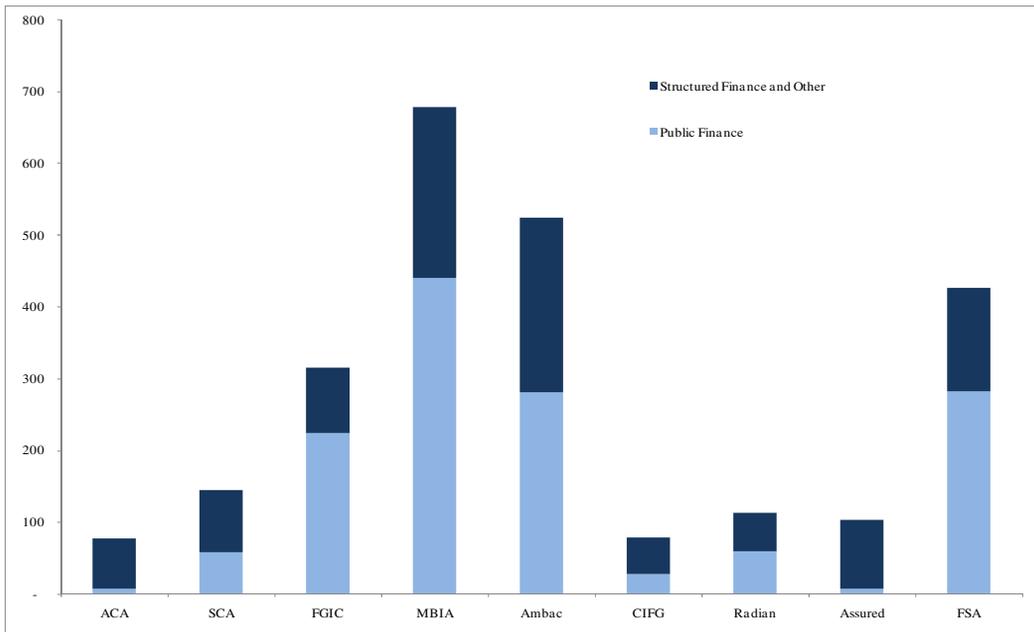
Source: Standard&Poor's and Secretariat's own estimates.

Figure 2. Total net exposure by line of business



Note: In USD billions unless otherwise stated.
 Source: Standard & Poor's and Secretariat's own estimates.

Figure 3. Total net exposure by line of business



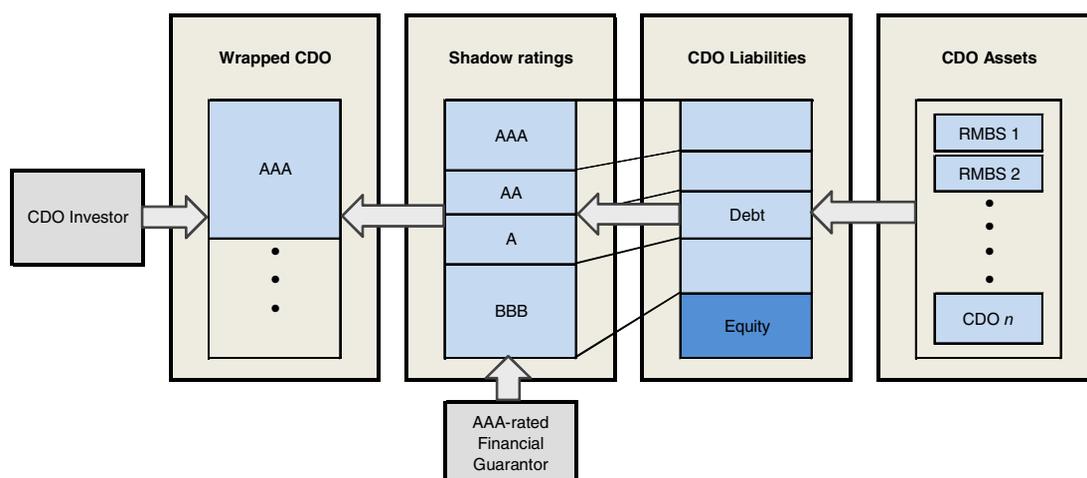
Note: In USD billions. The item "other" may include international public finance in the case of some of the companies. Adding "international public finance" to the "public finance" shown here for those companies where such breakdown is available does not materially change the overall picture, however.
 Source: Standard & Poor's and Secretariat's own estimates.

The insured part of the CDO attains the credit rating of the financial guarantor

The insured or “wrapped” part of the CDO attains the credit rating of the financial guarantor, which is typically higher than the shadow ratings of the securities for which the guarantor provides the payment guarantee (Figure 4). The shadow rating is determined by the credit rating agency. It is not published by the agency unless the debt issuer specifically requests or consents to its publication. It is based on the credit quality of the underlying CDO assets: in the example shown in Figure 5 these assets consist of residential mortgage-backed bonds and CDOs (far-right column).

The financial guarantee (of the payment of interest and principal) in the example above raises the rating of the wrapped CDO. In this sense, financial guaranty insurance is similar to other credit enhancements embedded in the structure of CDOs, such as diversification, over-collateralisation, cash-trapping triggers and, perhaps most notably, subordination. A very important aspect of the structure of a CDO is the absolute seniority and subordination of the CDO’s debt tranches to one another. Cash flows from the CDO’s assets are distributed according to the scheme dictated by seniority.

Figure 4. Example of CDO enhancement by financial guarantor



Source: OECD.

In this context, most financial guarantors typically guarantee payments only on the most senior CDO tranches. For example, according to the trade association of insurers of municipal bonds and asset-backed securities (*Association of Financial Guaranty Insurers – AFGI*), its members provide insurance only in the case of securities that are rated investment grade by at least one rating agency (the “shadow rating” rating of the security).

This policy aims at ensuring that financial guaranty insurance remains a “loss-remote” business. Such a strategy is actually seen as the defining criterion of many financial guarantors. For example, the

Encyclopedia of Actuarial Science (2004) explains that "...all triple-A insurers subscribe to what may be termed a zero-loss or remote-loss underwriting standard".

Recent loss experience inconsistent with "zero-loss underwriting standards"

Financial guarantors have not maintained their traditionally positive loss experience track record

This practise has not enabled financial guarantors to maintain their traditionally positive loss experience track record, however. Indeed, most financial guarantors reported their first ever quarterly losses during 2007.⁶

In part, reported losses reflect the fact that financial guarantors were obliged to mark unrealised losses to the extent that they guaranteed payments on CDOs using credit default swaps (CDSs). These are derivatives, and they have to be marked-to-market: Under US accounting standards, derivative positions must reflect price changes, and unrealised gains or losses reflected in income statements. By contrast, changes in the value of bonds guaranteed using traditional insurance policies (rather than using derivatives) do not require such treatment, and this practise has contributed to the stability of many insurers' earnings in the past. The unrealised losses arising from derivatives business are typically ignored, however, by rating agencies and regulators in assessing claims payment capacity of financial guarantors. In fact, in April 2008, one of the largest financial guarantors reported losses related to the financial turbulence in excess of USD 3 billion, noting that these losses would have fallen by a third if CDS policies had been written in insurance form.

Losses are projected by many analysts to rise even further. For example, in mid-January 2008 Standard & Poor's Rating Services updated and published the results of its financial guarantor stress tests, considering a steepened path for losses and severities in its mortgage vintage model. It showed projected losses well exceeding those that the agency had projected only a month before, even though loss estimates continued to focus only on the exposures of those companies to RMBS and to CDOs with RMBS collateral, however (see for a summary of results Figure 5). These exposures may be most problematic, although they may not be the only source of potential losses.

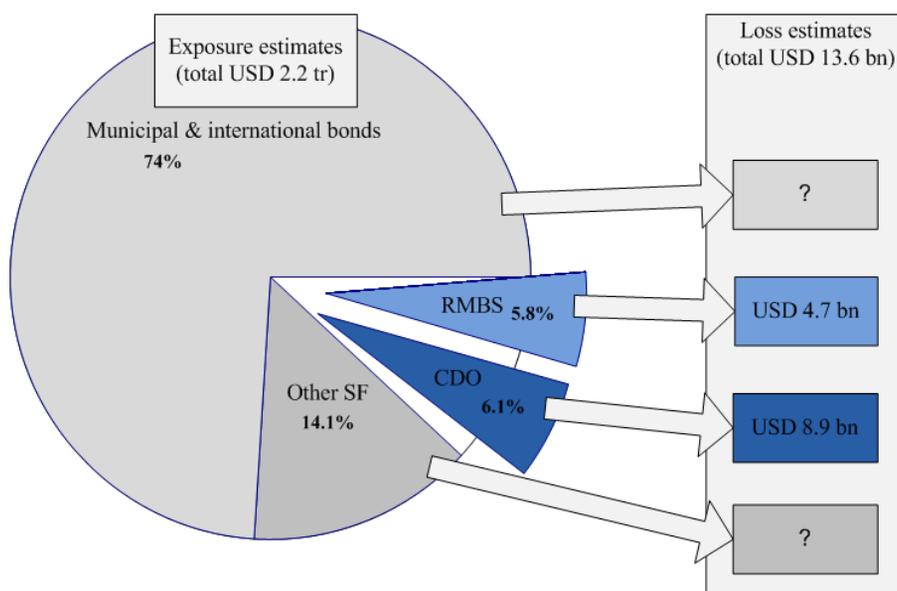
Additional losses could arise from non-core business activities in the structured finance area, where financial guarantors have offered products including guaranteed investment contracts (GIC), medium-term notes (MTN), and structured investment vehicles (SIV). The companies offered GIC, which carry a guaranteed return, to the municipalities whose bonds they "wrapped" so as to enable the latter to temporarily invest the cash raised from a bond issue before it is

being spent. In the case of unexpectedly high redemptions, losses could arise in liquidating the assets backing those GIC contracts. Financial guarantors also offered programmes that involve a subsidiary issuing MTN and investing the proceeds to earn a spread, with the financial guarantor guaranteeing both MTN assets and liabilities. Losses could arise from the materialisation of maturity transformation and credit risks.

Loss estimates are highly uncertain however because of the large number of assumptions involved regarding the materialisation of risk. Also, a deal-by-deal analysis would be required to determine the exact size of the exposure to the risk. In particular, detailed information is required with respect to a number of different parameters including distinction by loan vintage, underwriter, geography, loan-to-value ratio and the terms of subordination embedded in guarantees. While credit rating agencies have access to detailed information on individual deals, such information is generally not publicly available.⁷ Estimates based on observed financial market prices, which could be an alternative to those based on deal-by-deal data are problematic in a situation when prices are depressed by a widespread lack of liquidity and thus not as informative as under normal circumstances; they would tend to lead to exaggerated loss estimates.

Figure 5. **Exposure and loss estimates by a credit rating agency**

Aggregate for nine as of early 2008



Note: The data shown is the aggregate for nine financial guarantee companies (ACA, AGC, Ambac, CIFG, FGIC, FSA, MBIA, Radian, and XLCA).

Source: Standard & Poor's, "Standard & Poor's updates results of its bond insurance stress test for revised assumptions", January 17, 2008.

Note that a hedge fund manager made publicly available a list of individual transactions that are supposed to provide a fairly complete assessment of the individual deals in which the two largest financial guarantors (MBIA and Ambac) are involved. On the basis of that data published in early 2008, the hedge fund manager arrived at loss estimates that far exceed those publicised by the major rating agencies. In particular, he projected losses to the tune of USD 11.61 billion in the case of Ambac and USD 11.63 billion in the case of MBIA. Thus, these estimates for the two companies combined exceeded those produced by Standard & Poor's by a factor of about 4. They must be regarded with caution, however, as the hedge fund manager's investments may benefit from publishing such data.

In any case, even if these and other loss estimates may not appear to be large in absolute terms they are certainly large compared to the capital base and/or claim-paying resources of those financial guarantors, estimated to amount to somewhat less than USD 25 and 50 billion, respectively.⁸ As always, the key question related to such loss estimates is over what period they will be incurred.

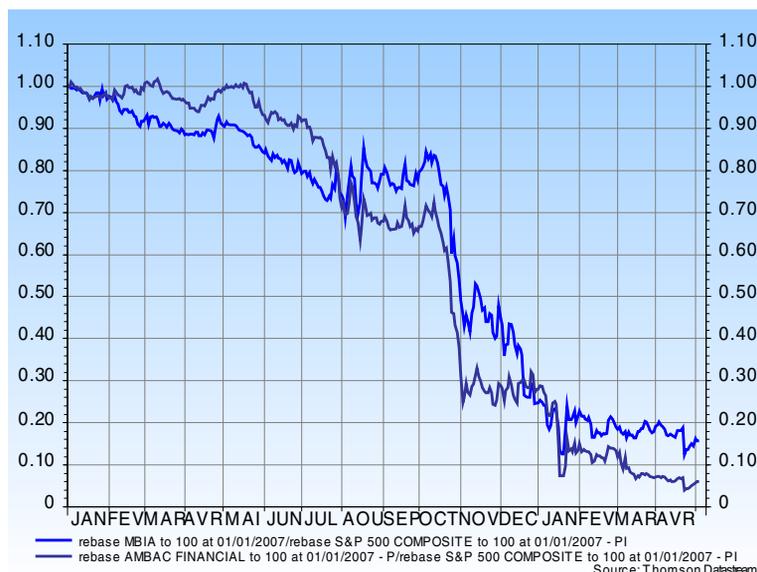
Financial market assessments of financial guarantors

Market indicators suggest that there is concern about the financial health of many of these entities

Even before the publication of some of these loss estimates, several financial market indicators suggested that market participants had already become increasingly concerned about the financial health of bond insurers. For example, the relative share prices of several of them underperformed compared to a broad market index throughout the year 2007, but most notably a few months into the financial turmoil, in October 2007.

Given the potential system-wide importance of the financial health of large financial guarantors, most attention focused on the stock price decline of the two largest financial guarantors, Ambac Assurance Corporation and MBIA Insurance Corporation. Figure 6 shows the share price developments of the parent holding companies of these two financial guarantors. The developments at the parent holding companies of some of the smaller financial guarantors were broadly similar.

Figure 6. Relative share prices of the two largest financial guarantors



Source: Thomson Financial Datastream.

Protection against credit default on the part of these entities is now expensive

Also, protection against credit default on the part of these entities has become expensive compared to its own recent past.⁹ For example, premiums on credit default swaps (CDS) for the two major bond insurers rose from less than 30 basis points in early 2007 to several hundred basis points more recently (Figure 7). The development was broadly similar in the case of some of the smaller peers (Figure 8).

A CDS premium of 500 basis points means that the cost of insuring against default on USD one million of five-year senior debt issued by the referenced entities costs USD 50 000 per annum, although this premium is paid quarterly (*i.e.* 12 500 per quarter). Converting this premium to the implied default probability, assuming a contract for one year only and an expected recovery under default equal to half of the original debt, the premium is consistent with a perceived 10 per cent probability of default within one year.

Thus, the current cost of buying protection on credit exposure to financial guarantors via credit default swaps would suggest that market participants attach a significant probability to a default by these entities over the short term. Thus, some earlier analysis interpreted the increase in CDS premiums in autumn 2007 as a sign that there was at least some concern on the part of market participants that losses on CDOs would turn out to be so substantial that they affected not just the unrated and lowly rated but also the most highly rated tranches of CDOs, that is those tranches that are typically “wrapped” by financial guarantors.¹⁰

Figure 7. **Credit default spreads of the two largest financial guarantors**
 Five year maturity, in basis points



Source: Thomson Financial Datastream.

Figure 8. **Credit default spreads of some other financial guarantors**
 Five year maturity, in basis points



Source: Thomson Financial Datastream.

The business of financial guarantee insurance may be poorly understood

Bond insurers have argued that these price developments reflect an exaggeration of their problems and an underestimation of their actual financial health. Indeed, it is possible that a lack of understanding on the part of many investors of the situation of monoline insurers, including of issues related to their balance sheet accounting, has contributed to recent price developments. This suggestion is not implausible given that the business of financial guarantee insurance in general and specific issues such as calculating adequacy of capital, capacity and reserves, in particular, are perhaps not widely understood, reflecting the limited transparency of the sector.

Another factor explaining the significant run-up in CDS prices are attempts by the counterparties of financial guarantors to hedge any exposure they might have against the latter. More generally, according to some market observers, CDS price developments in early 2008 for any company may have reflected to a significant extent the presence of technical imbalances between the supply of and the demand for credit protection, which may have tended to make these indicators less informative about the fundamental prospects of any individual company.

Recent credit rating actions

The stance of major credit rating agencies seemed at times to be fully at odds with financial market prices

Initially, the major credit rating agencies seemed reluctant to change their existing ratings stance with respect to the bond insurers, while independent specialist analysts at GimmeCredit had already downgraded at least two bond insurers.¹¹ Moreover, at times, the stance of the major credit rating agencies with respect to these companies seemed to be at odds with the assessment reflected in financial market prices (Figure 9). For example, there were episodes where credit protection costs for bond insurers enjoying triple-A credit ratings were higher than those related to some BBB-rated companies.

More recently, however, credit rating agencies seemed prepared to take more decisive rating actions. By early 2008, several monoline companies had seen their triple-A rating put on credit watch negative or even downgraded to double-A or lower by at least one of the three major rating agencies. One rating agency even downgraded one of the two major bond insurers from triple-A to double-A. The other two major rating agencies stopped short of stripping these two companies of their triple-A rating, however. They reconfirmed these ratings, although the ratings carry the qualification “on negative credit watch”.

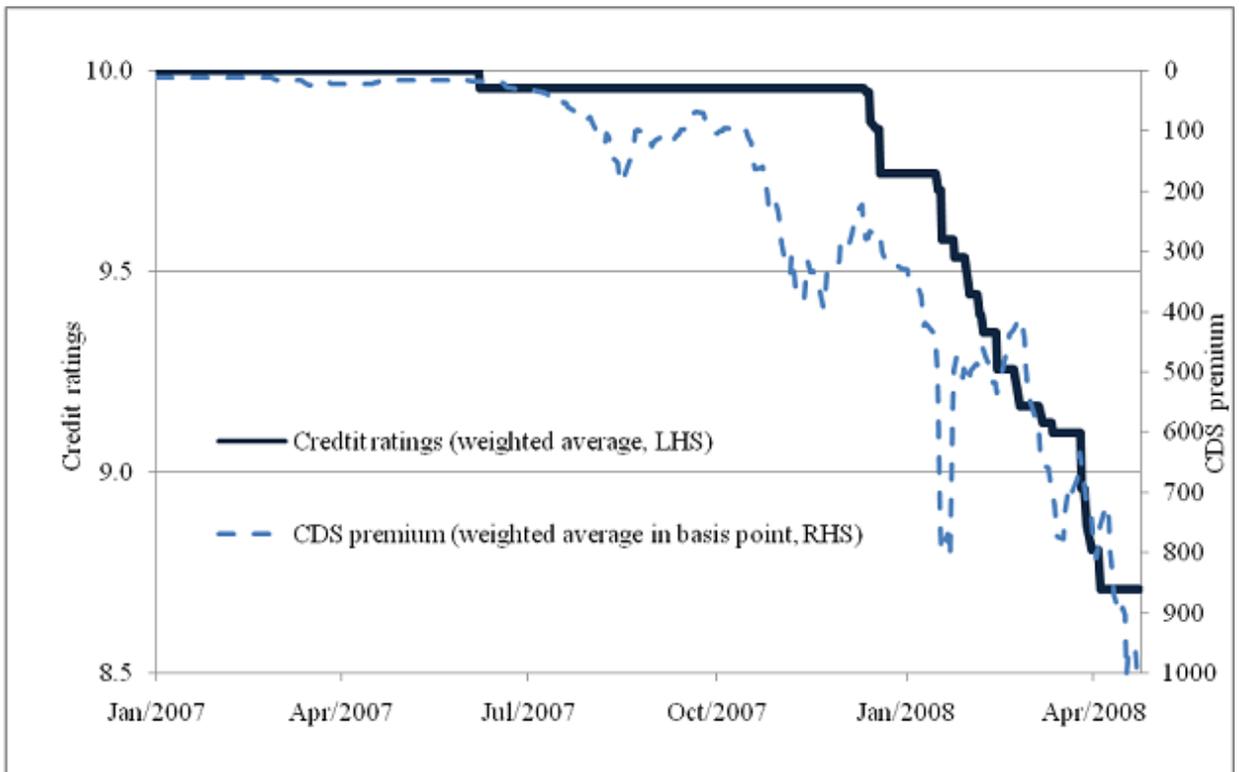
All rating agencies continue to stress the need for bond insurers to raise significant amounts of additional capital, although each agency uses a different capital model, which produces markedly different

outcomes regarding the amount of capital needed to sustain a specific rating. In this context, one financial guarantor has requested one rating agency to discontinue rating its insurance business, as it felt that the capital model used by that agency would overestimate the level of additional capital needed to back the company's structured finance business. The agency has continued to rate that company however. Withdrawing its rating would imply that some investors would be forced to sell the securities that are insured by that financial guarantor and rated only by that rating agency.

The disparities among rating agencies may have contributed to the uncertainty surrounding the situation of financial guarantors and the increased volatility of their equity and credit default swap prices. While some observers may not have welcomed this effect, such disparities would be expected if the rating market was competitive.

Figure 9. **Indexes of guarantors' credit ratings and credit default spreads**

Averages for seven guarantors, weighted by net par outstanding



Source: Secretariat calculations based on data from Thomson Financial Datastream and the three major credit rating agencies.

IV. Financial stability concerns

Potential implications of bond insurer credit rating downgrades

Ratings of bond insurers have implications for their own outlook and for “wrapped” securities

A financial guarantors' credit rating lies at the heart of its business. The ratings of bond insurers have implications both for their own business outlook and for the universe of financial products that are backed by guarantees from these entities. In particular, the quality of the guarantee provided by a bond insurer as part of a financial product cannot exceed the quality of its own rating.

Thus, if the rating of a monoline is lowered, *e.g.* from triple-A to double-A, this may give rise to a series of subsequent adverse developments. As the credit ratings are crucial for a financial guarantor's business model, any downgrade would adversely affect the entity's capacity to write *new* business. There is a widespread perception among bond insurance analysts that a rating reduced to double-A may still permit the concerned company to write some new business, but that any lower credit rating would imply a “run-off”, that is, abandoning writing any new business, be it an explicit strategy or merely a *de facto* state of affairs. Any new business would likely be taken up by the better rated companies, including new start-ups (like Warren Buffet's Berkshire Hathaway Assurance).

A run-off of a company does not imply that it may quickly become insolvent...

A run-off of a company does not imply that it may quickly become insolvent, given the specific nature of its payment guarantees. The bond insurer does not pay the full value of a defaulted security up front. Instead, it needs to honor the payment of interest and principal only when these contractual payments actually fall due. Thus, in principle, a company's existing claims-payment capacity may be sufficiently large so that the company could make the required payments on guarantees in cases of defaults, even if the company does not attract any new business. To overcome liquidity problems, the company may even be able to accelerate receipt of outstanding premiums.

... although the financial situation of a bond insurer may deteriorate rapidly

In practise, however, the financial situation of a bond insurer may deteriorate rapidly for a number of reasons. For example, a rating downgrade may allow the insurer's counterparties to ask the bond insurer for extra cash to back their contracts (or alternatively to terminate these contracts). To what extent such contingencies indeed exist depend on the exact specifications of the financial guarantee contract, which differ from one contract to another. It appears that the more highly rated bond insurers tend not to accept such clauses, so that they are less likely to face calls for extra collateral in the case of a rating change. There is, however, little information in the public domain of the exact terms of such contracts, so that it is difficult to assess the risks that a company will face liquidity problems after a rating cut.

The example of ACA is sometimes cited as an example how quickly the situation of a bond insurer can deteriorate, although the company was special in some respects. The bond insurer ACA Financial Guaranty Corp. was downgraded in December from single-A to a junk rating of triple-C. Subsequently, counterparties of the parent company of ACA Financial Guaranty Corp (that is ACA Capital Holdings Inc.) had to enter into “forbearance agreements” to help the company avoid failure. ACA is relatively small, however, and the company was only A-rated even before the pressures on bond insurers started and it has a relatively large share of structured finance business as opposed to municipal bond business (see also Figure 3). Thus, its experience may not be the most relevant benchmark when assessing the potential downward dynamics for the larger financial guarantors that were entering this phase with the highest credit rating.

A downgrade of the credit rating of a financial guarantor has serious consequences beyond those for the company itself

A decline in the rating of the guarantor feeds through to downgrading of the ratings on all securities it guarantees

In any case, a downgrade of the credit rating of a financial guarantor has serious consequences beyond those for the company itself. In particular, a decline in the rating of the guarantor would feed through to downgradings of the ratings on all securities it guarantees, which would affect not only the issuers but possibly the investors as well. Under these circumstances, it seems clear that the implications of deteriorations in the credit ratings of bond insurers for securities markets would likely be widespread.

Monoline insurers have played a very active role in many securities markets, including, in particular, those for mortgage-backed bonds and the very large US municipal bond market, with the total amount of bonds carrying a bond insurer payment guarantee estimated to total some USD 2 400 billion. Issuers in these markets have relied to a considerable extent on guarantees of interest and principal payment from these entities to boost the ratings on their debt security offerings and thereby lower their overall borrowing costs.

Some investors do not invest in debt securities that do not carry such a payment guarantee. For example, as a result of any rating downgrades, many institutional investors that can only hold the highest rated or very highly rated paper may be forced to sell securities that involve bond insurer guarantees, putting additional downward pressures on the prices of these financial instruments.

Concerns about possible knock-on effects

The failure of one big financial guarantor may lead to a chain reaction in financial markets

There is a perception that a significant downgrade or the failure of one big financial guarantor might lead to a chain reaction in financial markets and among financial institutions, including systemically important ones. This effect could operate through various channels. For one, problems at one financial guarantee insurance company

could also spill over to other companies through reputational effects as well as through the existing reinsurance arrangements within the sector. Moreover, deteriorations in the financial health of bond insurers and/or downgrades of the credit ratings of these entities may imply market-to-market losses on guaranteed positions in trading and investment portfolios of financial institutions. Also, there would be a decline in the value of hedges purchased by these institutions from guarantors. In addition, in the case of investment banks and securities houses, there may be funding implications (*e.g.* in the case of so-called liquidity backstop arrangements) and potential mark-to-market losses from guaranteed positions in ABCP conduits and other off-balance-sheet funding vehicles.

Monoline insurer downgrades could lead to large additional losses for major investment banks and securities firm ...

By some estimates, monoline insurer downgrades could lead to between USD 10 billion and close to USD 100 billion of *additional* losses for major commercial and investment banks. Estimates at the lower end of the range apply to potential downgrades from triple-A to double-A, while the estimates at the higher end refer to downgrades to single-A. These numbers are significant especially as large banks and securities firms have already suffered about USD 200 billion in write-downs and credit losses related to subprime mortgage debt in the second half of 2007, and are expected to be forced to make further write-downs of about USD 60 billion in the first half of 2008, even assuming that the situation of financial guarantors worsens only moderately.¹²

As regards the broader insurance sector, there seems to be a perception on the part of the management and the regulators of large life and non-life insurance companies that they are well placed to weather the potential fall-out from any further deterioration in the situation of financial guarantors. For example, when discussing this issue at the meeting of the OECD's Insurance and Private Pensions Committee (IPPC) in December 2007, delegates took a sector-wide view and, on the basis of the accumulated experience to that point, concluded that the insurance industry overall was not substantially exposed to developments in the monoline insurance industry and that the former was well capitalised. Delegates from regulatory bodies did not raise any specific concerns.

Market indicators of the quality of large financial institutions deteriorated considerably both in the United States as well as in Europe (until the Bear Sterns takeover), although it is not clear however to what extent these declines reflect specific concerns of investors regarding the potential impact on these firms of downgrades or failures of bond insurers. Looking at the joint behaviour of such market indicators, the evidence for close links is not very strong in the case of at least some types of institutions. For example, the changes in credit default swap (CDS) premiums for large investment banks are not very tightly linked to the changes in

such risk premiums for the major financial guarantors in situations when there are very large moves in either of these premiums. These extreme co-movements appear to be less strong than co-movements of CDS premiums for entities within the *same* industry, which suggests that problems at financial guarantors may not have been the main drivers of the deterioration in the credit quality indicators of large investment banks.

Box 2. A recent public initiative for private capital injection

There was a meeting on 23 January 2008 between insurance regulators (New York Insurance Department, which regulates MBIA, and the Commissioner of Insurance in Wisconsin, which regulates Ambac that is based in New York but chartered in Wisconsin) and representatives of more than ten large banks to discuss ways to help improve the situation of these companies. Among the different solutions discussed, regulators suggested that banks inject additional capital. According to some reports, the talks focused on a proposal for the banks to inject a sum of USD 15 billion of additional capital into the monoline insurance sector. This sum appeared significant, given that efforts by individual bond insurers to raise additional capital have met with great difficulties. Ambac had to abandon its plans for raising an additional USD 1 billion, while MBIA did raise (just) USD 1 billion shortly before that date, although at an interest rate that was more than twice as high as the rate paid by debt issuers with similar credit ratings.

The initiative by the New York Commissioner for Insurance initially failed to achieve agreement, however. A number of reasons were advanced. First, there was a large degree of uncertainty about potential losses. Unlike in the case of LTCM (which could be seen as a template for the effort related to bond insurers), where exposures were known, there was (and still is) great uncertainty as to total potential losses and how they are distributed over time. There was certainly a longer time frame for liquidation compared to the LTCM case, assuming the insurers are put in “run-off” mode, given the nature of their contracts. Second, related to this observation, there was probably a lack of a sense of urgency. In the case of LTCM there was a risk of an immediate collapse, while in the case of the bond insurers, the immediate risk was only one of further downgrades. Third, not just one but several bond insurers were involved and each company had a very different business mix and extent of relations with banks and securities houses. This situation complicated the development of a common template. In this context, it should be noted that several banks initiated separate talks about potential bailouts with individual monoline insurance companies (*e.g.* with Ambac and FGIC). Fourth, unlike in the case of the LTCM rescue, the understanding by banks and securities firms of this specific insurance business may have been limited, thus further complicating agreement on details. Finally, the demand for additional funds came at a time when the banking and securities industry itself was trying to attract additional capital.

In March 2008, an agreement was reached in the case of one of the two large guarantors, whereby banks would provide a backstop for part of the additional equity that the company needed to raise to prevent a cut of its triple-A rating by two of the major rating agencies.

... although the latter may have been able to establish a certain measure of protection

Indeed, banks may have achieved a certain degree of protection against problems at financial guarantors. For example, investment banks have been reported to have been significant buyers of CDS on financial guarantors, thus providing them with a certain degree of hedge against their exposure to these entities. Incidentally, these

purchases may have contributed to the at times rapid increases in the prices for protection against monoline insurer defaults that could be observed.

Banks appear to be reluctant to bail-out the financial guarantee industry as a whole

Indirect evidence for the hypothesis that the implications of a worsening of financial guarantor problems for banks may be contained could perhaps be seen in the fact that banks were (initially) reluctant to join a publicly supported financial bail-out arrangement for the financial guarantee insurance industry, although a host of other factors may explain the failure to reach an agreement (see *e.g.* Box 2).

But even if banks and other systemically important financial institutions may have achieved a degree of protection against a further deterioration of the situation at financial guarantors, recent developments have highlighted that historical data (such as past correlations between CDS premiums) may be of limited use for projecting future developments in a stress situation.

Perhaps the most significant uncertainty in this context relates to the timing of potential losses at financial guarantee companies. Regardless of the specific point estimate of such losses, the key question is over what period of time these losses may be spread out.

V. Concerns regarding the role of guarantors for specific market segments

The past few years have seen a number of new and complex financial products emerge that allow market participants to isolate and repackage different aspects of their risk exposures. The credit markets have been the focus of much of this activity. Financial guarantors have come to play an increasingly important role as providers of protection for many of the new products, and they have thus been an important -- although little known -- driving force behind the securitisation process. For example, the “wraps” by financial guarantors were particularly sought after (and provided by these entities) when new and perhaps more complex securities were brought to the market. The “wraps” provided by financial guarantors allowed these products to obtain the credit rating of the guarantors, which were typically higher than the “shadow ratings” of the “wrapped” securities. Some investors, especially those that can only hold highly rated papers would not have bought these securities without such enhancements. These enhancements may also have served a signalling function, whereby the financial guarantor essentially puts its approval stamp on the “wrapped” security.

With hindsight, it is clear that this new line of business (as compared to the traditional business of insuring municipal bonds)

The capital base was not adequate to withstand the materialisation of the risks associated with the new line of business

was characterised not just by higher premiums but also by greater default intensities and extents of losses. Judged by equity market valuations, market participants seem to be sceptical that the combined capital bases of many financial guarantors are sufficient to withstand increasing demands on their payment capacities arising especially from their involvement in the area of structured finance. The fundamental question raised by these developments is how adequate is it to use the same capital as a base for two types of business characterised by very different risks.

Clearly, as a result of recent developments, the economic value of the type of enhancement that financial guarantors provide has recently become more uncertain. This situation in turn has implications for (all) the market segments in which the financial guarantors have been active.

For example, recently, there have been unusual signs of stress in the municipal bond markets, presumably reflecting the uncertainties regarding the value of the guarantees provided by financial guarantors to many of these instruments. For example, while municipal bonds have traditionally yielded much less than comparable US Treasury instruments because of their tax-favoured status, the yields on the former have converged to those on US Treasuries and even exceeded them at times. Moreover, municipal bond issuance has recently fallen and issuance of insured municipal bonds has fallen even further. Stress also appeared in the market for tender option bonds, which are programmes that issue short-term securities backed by (long-term) municipal bonds. Some programmes had to sell assets from their portfolios, as money market funds withdrew some of their investments.

The (traditional) role of guarantors in municipal bond markets is considered valuable

This situation was considered critical enough by some regulatory authorities to justify immediate policy intervention, apparently aimed at ensuring the continued availability of (credible) financial guarantee insurance for municipal bonds. A recent proposal by a US regulator foresees the breakup of the monoline insurance companies into two different business areas, one consisting of the more traditional business of insuring municipal bonds and the other one consisting of business related to more complex structured financial instruments, including those involving residential mortgage bonds. The idea of this proposal is to allow the former to again start writing insurance policies on municipal bonds after such activity suffered in early 2008.

Thus, there appears to be the view that monoline insurers have played a useful economic role in providing insurance for municipal bonds and that any further deterioration in the financial health or credit rating of these entities would reduce or eliminate such benefits.

Indeed, financial guarantors can play a useful screening function, as their “wraps” effectively represent a kind of approval stamp. Unlike rating agencies, financial guarantors are also assuming a liability when they perform this function. This aspect would be expected to help ensure a high quality of the financial guarantors’s assessment. With hindsight, however, it is clear that their performance in this respect can be uneven.

Whether the availability of bond insurance is indeed essential for municipal bond issuance is not so clear

Whether the availability of bond insurance is indeed essential for municipal bond issuance is also not so clear. Due to the relatively high level of inherent credit quality of municipal bonds -- as reflected in their track record of very low historical default rates -- the value added by such insurance may be relatively limited. Indeed, the default performance of municipal bonds is actually better than that of triple-A rated corporate borrowers, which is why some commentators have questioned the need for municipalities to purchase insurance for their bonds at all. The only real economic value of these guarantees, these observers argue, is that they reconcile the difference between the perception and reality of the creditworthiness of these issuers. Moreover, they argue that municipal bond insurance has effectively subsidised the structured finance business at financial guarantors.

Private solutions in this area are forthcoming

Looking ahead, the financial guarantors’ municipal bond insurance portfolios may indeed offer a reasonably good business outlook, unlike the structured finance portfolios. In this context, for example, the investor Warren Buffet announced in mid-February 2008 that he had offered to take over the municipal bonds guaranteed by three financial guarantors (Ambac, MBIA, and FGIC), although financial guarantors were reportedly reluctant to accept that offer. It is interesting to note that these three companies are characterised by a relatively larger ratio of municipal bond business to total business, as compared to some of the smaller financial guarantors, especially ACA (see Figure 3). In the meantime, substantial new private capital has already entered the segment with the establishment of a new financial guarantor in the United States.

Also, in the recent backstop agreement between banks and one financial guarantor, one of the conditions imposed by the former was that the latter would cease writing structured finance business and instead fully concentrate on municipal business for an indeterminate amount of time. To a similar effect, rating agencies have recognised that their previously used capital models overstated the risks of many municipal exposures insured by financial guarantors and understated the risk of many of these entities’ structured finance exposures, and they have revised their capital models accordingly.¹³ Thus, private solutions are forthcoming.

VI. Transparency and the performance of rating agencies

Transparency is limited

The transparency of the financial guarantee insurance sector is not as high as one might wish. For example, the financial health of financial guarantors is difficult to assess using publicly available data. The deal-by-deal data required to assess the (financial) health of financial guarantee insurance companies with some degree of confidence is typically not publicly available but only available to the financial guarantors themselves and the credit rating agencies that assign credit ratings to these entities. Enhancing transparency would be helpful, although financial guarantors have a legitimate business interest in keeping some information proprietary.

Rating the financial guarantors is difficult

In this context, attention has recently focused on the role of rating agencies. Rating agencies assess both the financial guarantors that provide enhancements for structured financial instruments as well as the underlying instruments themselves. Rating agencies not only assign credit ratings to the various tranches of debt issued by these structures but they also approve the legal and credit structure of many structured financial products and perform other related services.

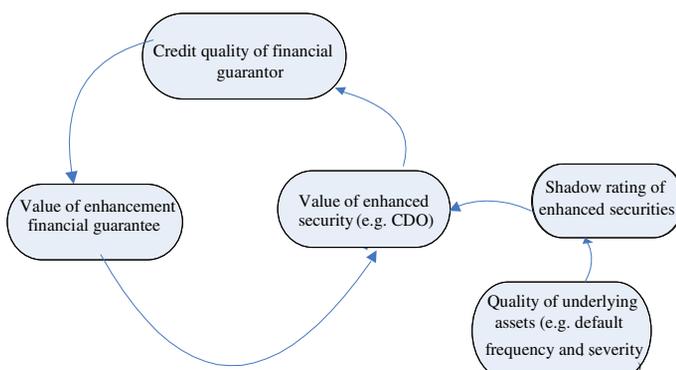
The health of guarantors depends on the value of complex financial products, the value of which in turn depends on the enhancements provided by the former

Important informational asymmetries characterise any rating process, but the task is especially difficult in the case of structured products, owing in part to the lack of a generally agreed modelling approach for many of these securities.

In the case of financial guarantor ratings, the assessment is further complicated by the presence of an important element of circularity: The values of financial guarantors depend on the values of the securities that they have “enhanced” and, in turn, the values of these enhancements depend on the financial health of the financial guarantor (see Figure 10 for a stylised representation).

Because of the complexity of the instruments and the lack of verifiable public information on the specificities of the structure and composition of many of the products guaranteed by financial guaranty insurers, investors have relied much more heavily on the ratings assigned by credit rating agencies to the tranches of structured financial instruments than they would in the case of other more traditional, and less complex, securities. Indeed, absent such ratings, some of the structured products could not even be placed with investors.

Figure 10. Simplified illustration of credit quality/value interrelations



Source: OECD.

But given the above cited important challenges involved in calculating such ratings, there is a non-trivial risk that the agencies' published ratings may not be accurate and, in that case, may have given some investors a false sense of security.

In addition, there may be conflicts of interest in the case of rating agencies' assessments of financial guarantors

In addition, there may be conflicts of interest in the case of rating agencies' assessments of the credit quality of financial guarantors. It is not clear, for example, to what extent, if any, concerns about the broader adverse effects of downgrades of large guarantors may incline rating agencies to forestall quick actions regarding changes to ratings of bond insurers. Any change in the status quo, in particular, any downgrades of financial guarantors would cast doubt on the validity of the originate-and-distribute model that has come to characterise modern financial markets and has benefitted many players, including the rating agencies themselves and others that receive fees based on the issuance of structured products.

The considerations may, however, be balanced by the fact that rating agencies increasingly rely on models to determine their ratings. To the extent that the results of the models are closely followed, there would have to be a compelling external reason to disregard a model's predictions, for example, by resisting a suggested change in a rating. But to the extent that the agencies do not rely exclusively on those models, there is scope for greater reliance on judgement, which could favour the status quo in situations such as those characterising financial markets in the second half of 2007.

In this context, there is a long-standing discussion among policy makers about whether and the extent to which the activity of rating agencies needs to be subjected to closer public scrutiny, especially given the heightened role assigned to credit rating agencies as part of

the Basel II approach to banks' capital adequacy. In particular, under the standardised approach (as opposed to the internal ratings-based approach), ratings assigned by approved credit rating agencies are to be used in the calculation of credit risk and, hence, in the determination of required capital.

This discussion is likely to intensify in the wake of recent experience, as recent developments have highlighted the significant challenges facing valuation practises by credit rating agencies in the case of new instruments such as structured financial products. In particular, rating agencies have been criticised for their supposedly slow reaction to recent developments, which allegedly reflect conflicts of interest arising from the fact that the ratings are paid for by the originators of the financial structures.

A valid question is whether ratings are influenced by incentive problems

Indeed, one important question is whether and to what extent incentive problems might exist. This question is a valid one, given current payment arrangements for ratings. As the number of instruments issued increases, so, too, does the fee income received by the rating agencies.

Yet another question is whether rating actions are, in fact, reinforcing downward pressures, thus aggravating the crisis. In this context, there is the possibility that rating agencies actually have toughened their stance vis-à-vis financial guarantors more recently in an attempt to preserve their own reputations in the wake of the broader criticism of the role they have played in the rating of structured financial products.

Notes

1. Throughout the remainder of this note the terms financial guarantor, bond insurer or monoline insurer are all used interchangeably to reference a monoline financial guaranty insurance company. They are referred to as "monoline" insurers since they only underwrite one type of business – financial guaranty insurance.
2. In this context, the OECD is well placed among international institutions in addressing issues related to the role of financial guarantors in financial markets, given the significant cross-border dimension of the problem and the fact that the activities of these entities span the institutional perspectives of the Committee on Financial Markets (CMF) and the Insurance and Private Pensions Committee (IPPC), the membership of which consists of insurance supervisors and regulators.
3. Lucas, D.J., L.S. Goodman, and F.J. Fabozzi, "Collateralised Debt Obligations and Credit Risk Transfer", *Yale ICF Working Paper* No. 07-06, 2007.
4. A discussion of these frictions is beyond the scope of the present note. For a detailed description and analysis of them, using the example of subprime mortgage securitisation, see Ashcraft, A.B.

and T. Schuermann (2007), *Understanding the securitisation of subprime mortgage credit*, Federal Reserve Bank of New York, 4 December 2007.

5. For example, the regulator allowed bond insurers to issue credit-default swaps on complex asset-backed and mortgage securities through shell companies called “transformers”. The latter transformed a traditional bond insurance contract into a credit default swap, while the bond insurers in turn guaranteed the “transformers” obligations, which required them to pay the interest and principal on these obligations of the asset-backed securities defaulted. The liabilities of the “transformers” were consolidated with the financial statements of the bond insurers.
6. The companies MBIA and Ambac (both of which reported losses for the first time in the third quarter of 2007), SCA, AGR, Radian, and ACA (which reported losses already in the second quarter of 2007) had not reported quarterly loss ever before 2007. The company XL Capital Assurance already reported losses from 2003 to 2005; it was subsequently taken over by SCA in 2006 and had not reported loss since then.
7. In releasing the information in early 2008, the hedge fund manager said it was doing so to provide market participants with access to primary source data so that they could construct their own views of potential losses by financial guarantors, without having to rely on the analytical judgement of rating agencies or the financial guarantee industry. It also made public however the information that the hedge fund company holds short positions on these financial guarantors. Thus, even if these estimates were inaccurate, by publishing them, the hedge fund manager may succeed in depressing asset prices and moving his short positions into profit.
8. Data from company reports of the nine financial guarantors. Further to the qualified statutory capital (which consists of stockholder’s equity and contingency reserves), the claim paying resources include *unearned premiums*, *contingent capital* and the *present value of future premiums*. *Unearned premiums* are the part of premiums that were paid upfront but that have not yet been recognised or “earned”. They are recognised as capital (i.e. cash or cash equivalent) for rating agency capital adequacy modelling since there are no conditions to their recognition except the passage of time. Such upfront premium payments are typically made in the area of municipal bond insurance. If premiums are not paid upfront in full, then they pay in instalments over the life of the insured security. This is the typical method of payment for structured finance deals. The *present value of future premiums* is obtained by simply discounting the premiums that have not been paid in full at the beginning of the transaction. *Contingent capital* is capital that is not yet paid in, but the payment of which is triggered by specific events. Typically, there is an option that gives the holder the right to raise capital from the option provider at predefined terms upon the occurrence of a pre-agreed event. The resulting capital injection can be in form of subordinated debt or preferred shares etc.
9. A distinction needs to be made between the holding company and its insurance subsidiary. Financial guarantors are generally structured as a publicly traded holding company (for which data on stock prices are available, as well as on credit default swap premiums in many cases) with an insurance company subsidiary (for which data on premiums on credit default swaps are available).
10. See Blundell-Wignall, A., “Structured Products: Implications for Financial Markets”, OECD *Financial Market Trends* No. 93, November 2008.
11. For example, one of the major rating agencies confirmed in August 2007 that “the deterioration in the subprime mortgage markets does not appear to be a threat to the rating stability of U.S. bond insurers.” Even after the write-downs recorded by some of the bond insurers in the third quarter, another rating agency explained end-October that these developments were unlikely to lead to any changes in credit ratings. One rating agency adopted a somewhat more critical stance ahead of the other major agencies however and reported around that time that it had put the ratings of one or more bond insurers “on review” – to see if downgrades were needed (although the agency insisted that such a review is not identical to putting the ratings of insurers on watch, which has a more negative connotation). It eventually downgraded one of the two largest financial guarantee insurance companies, while the other two major rating agencies confirmed these companies’ triple-A ratings.
12. Deutsche Bank, *Banks and brokers – Estimate revision*, 11 March 2008.
13. See e.g. *Fitch Discusses Financial Guaranty Capital Model and Ratings Methodology*, FitchRatings, 19 March 2008.

Part II

Sovereign Wealth and Pension Funds

Sovereign Wealth and Pension Fund Issues

Adrian Blundell-Wignall, Yu-Wei Hu and Juan Yermo*

Sovereign Wealth Funds (SWFs) are pools of assets owned and managed directly or indirectly by governments to achieve national objectives. These funds have raised concerns about: i) financial stability; ii) corporate governance and iii) political interference and protectionism. At the same time governments have formed other large pools of capital to finance public pension systems, i.e. Public Pension Reserve Funds (PPRFs). SWFs are set up to diversify and improve the return on foreign exchange reserves or commodity revenue, and to shield the domestic economy from fluctuations in commodity prices. PPRFs are set up to contribute to financing pay-as-you-go pension plans. The total of SWF pools is estimated at around USD 2.6 trillion in 2006/7, and is getting bigger rapidly, owing to current exchange rate policies and oil prices. The total amount for PPRFs is even larger, around USD 4.4 trillion in 2006/7, if the US Trust Fund is included (USD 2.2 trillion if excluded). SWFs and PPRFs share some characteristics, hence give rise to similar concerns. However, their objectives, investment strategies, sources of funding and transparency requirements differ. There is concern about strategic and political objectives of SWFs, and their impact on exchange rates and asset prices. But SWFs also provide mechanisms for breaking up concentrations of portfolios that increase risk. Enhancing governance and transparency of SWFs is important, but such considerations have to be weighed against commercial objectives.

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I. Introduction

Sovereign Wealth Funds (SWFs) are pools of assets owned and managed directly or indirectly by governments to achieve national objectives

Sovereign Wealth Funds (SWFs) are pools of assets owned and managed directly or indirectly by governments to achieve national objectives. They may be funded by: *i)* foreign exchange reserves; *ii)* the sale of scarce resources such as oil; or *iii)* from general tax and other revenue. There are a number of potential objectives of SWFs, which are not always easy to attribute to a particular fund; and some funds may have more than one of the distinguishable objectives. Some of these are: *i)* to diversify assets; *ii)* to get a better return on reserves; *iii)* to provide for pensions in the future; *iv)* to provide for future generations when natural resources run out; *v)* price stabilisation schemes; *vi)* to promote industrialisation; and *vii)* to promote strategic and political objectives.

These funds have raised concerns

These funds have raised concerns about: *i)* financial stability, *ii)* corporate governance and *iii)* political interference and protectionism.

Public Pension Reserve Funds (PPRFs) have a more specific objective

At the same time governments have formed other large pools of capital, in particular to finance public pensions, which are generally referred to as Public Pension Reserve Funds (PPRFs). There are two such types of funds: those set up and owned directly by government (Sovereign Pension Reserve Funds, or SPRFs) and those belonging to the social security system (Social Security Reserve Funds, or SSRFs). SPRFs may be considered a type of SWF with an exclusive mandate to finance future public pension expenditures. On the other hand, not all SSRFs may be considered SWFs. Some are legally independent of government and their balances are not integrated for national accounting purposes into the government accounts.

The paper focuses on macro stability issues

This paper focuses primarily on the issues at the broad macro level. It also compares the possible effects of different kinds of pools of capital, depending on how they are formed and on their governance, rules and strategies.¹

II. Definition and examples of Sovereign Wealth and Pension Reserve Funds

SWFs are set up to diversify and improve the return on foreign exchange reserves or

There is no single, widely accepted definition of SWFs and PPRFs. In this paper PPRFs are identified by their specific mandate to finance public pension systems.

commodity revenue, and to shield the domestic economy from fluctuations in commodity prices

1. A SWF is a fund set up to diversify and improve the return on foreign exchange reserves or commodity (typically oil) revenue, and sometimes to shield the domestic economy from (cycle inducing) fluctuations in commodity prices. As such most invest in foreign assets. This group (in order of size) includes the Abu Dhabi Investment Authority (ADIA), the Norway Government Pension Fund - Global, the Government of Singapore Investment Corporation (GIC), the Kuwait Investment Authority (KIA), the Saudi Arabian Monetary Authority (SAMA), China Investment Corporation (CIC), the Stabilisation Fund of the Russian Federation, Temasek Holdings (Singapore), the Reserve Fund of Libya, the Revenue Regulation Fund of Algeria, the Qatar Investment Authority (QIA), and many more. Where national resource funds are earmarked for particular regions, such as Canada's Alberta Heritage Savings Trust Fund, and the USA Alaska Permanent Fund, they are included as a SWF. Some of the above funds are set up to meet industrial objectives, such as regional development, as in Temasek.

PPRFs are set up to contribute to financing pay-as-you-go pension plans...

2. Public Pension Reserve Funds (PPRFs) could be defined as funds set up by governments or social security institutions with the objective of contributing to financing the relevant pay-as-you-go pension plans. Based on this yardstick, two sub-categories of pension reserve funds can be identified:

... either as part of the overall social security system...

(i) The first type, Social Security Reserve Funds (SSRFs), is set up as part of the overall social security system, where the inflows are mainly surpluses of employee and/or employer contributions over current payouts, as well as, in some cases, top-up contributions from the government via fiscal transfers and other sources. Among others, Denmark's Social Security Fund, Japan's Government Pension Investment Fund, and USA's Social Security Trust Fund fall within this category. These funds may be managed by the social security institution itself or an independent – often public sector – fund management entity. While most of these funds, like the social security system itself, fall under the government sector, there are some exceptions. For example, the Canada Pension Plan (CPP) reserve fund is legally independent of government. The CPP has no financial guarantee from government and relies solely on mandatory pension contributions and investment income from the reserve fund to finance pension benefits for Canadian citizens. In this sense, the CPP reserve fund may not be considered a SWF.

... or directly by the government

(ii) The second type, Sovereign Pension Reserve Funds (SPRFs), refers to those funds which are established directly by the government (completely separated from the social security system), and its financial inflows are mainly from direct fiscal transfers from the government. Unlike the first type of reserve fund, those within this category have been set up by

governments to finance public pension expenditures at a specific future date. Some are not allowed to make any payouts for decades. Examples include the Australian Future Fund, the New Zealand Superannuation Fund, the Irish National Pension Reserve Fund, the Norwegian Government Pension Fund, and the French *Fonds de réserve pour les retraites*. Some of these funds are sometimes treated as SWFs and indeed a few fit both definitions. For example, Government Pension Fund-Norway and Government Pension Fund-Global, both established in 2006, are the result of the restructuring of the Norwegian pension reserve funds (formerly, the National Insurance Scheme Fund) and a SWF (formerly, the Government Petroleum Fund). The Government Pension Fund – Global draws its funding from oil revenues and has a mandate beyond financing pension expenditures, so it is classified as a SWF in this paper.

III. How large are global SWF & PPRF markets SWFs?

Some funds are a mix of SWF and pension assets which belong to individuals, as in the GIC, which manages these and foreign exchange reserves for the Monetary Authority of Singapore (MAS). Korea's investment authority has a similar mix of assets to manage. For this reason we include both as SWFs rather than PPRFs.

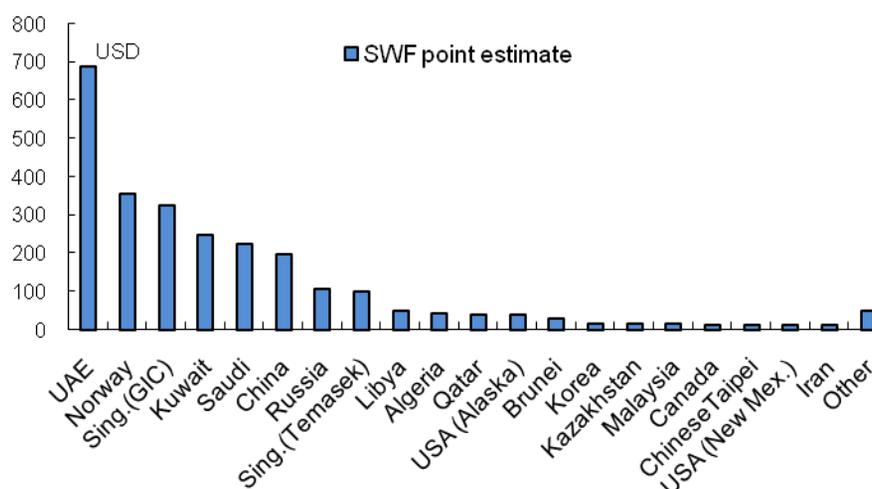
The size of the main SWFs are shown in Figure 1 and Table 1. At present, ADIA (UAE) is the largest, at 26.3% of the total, followed by Singapore's 2 funds at 16.2%, the Norway Government Pension Fund – Global at 13.6%, the Kuwait Investment Authority at 9.5%, the Saudi Arabian Monetary Authority (not foreign exchange reserves) at 8.6%, and China Investment Corporation at 7.6%.

The total of SWF pools is getting bigger rapidly, owing to current exchange rate policies and oil prices

Our estimate of total SWF pools is around USD 2.6 trillion, but they are getting bigger at a rate that is beginning to alarm some commentators. SWFs are likely to grow rapidly with the current configuration of foreign exchange policies, the relative weakness of the US dollar and the current oil price. For example, Chinese intervention policies are generating accelerating increases in reserves at present (a staggering USD 446 billion in the year to September 2007, versus USD 247 billion in the year to December 2006). China is beginning the process of transferring this money to its SWF (China Investment Corporation). So there is scope for rapid acceleration in these entities.

Transfers to oil producers are also accelerating. At a (say) USD 100 oil price and say 85 million barrels per day consumption, the world is handing over revenue of over USD 3 trillion per annum. There are costs of producing oil, and some of the surplus is consumed – but the sums are very large indeed.

Figure 1. Sovereign wealth funds by size



Source: Private sector market sources, central banks' balance sheets. Note: In February 2008 the Stabilisation Fund of the Russian Federation was split into two separate funds (i.e. the Reserve Fund and the National Wealth Fund) while at the same time a portion of this Fund was transferred to the Federal budget.

Table 1. Sovereign wealth funds estimates

Assets under management in USD billion, various dates

Country	Fund, year established	Estimates of assets under management (AuM) by Sovereign Wealth Funds (SWF), according to different sources				Range of estimated AuM	Foreign Exch. Reserves
		Deutsche Bank	Peterson Institute	Morgan Stanley	Official		
UAE	Abu Dhabi Investment Authority, 1976	875	500 to 875	875		500 to 875	48.5
Singapore	Gov. of Sing. Invest. Corp. (GIC), 1981	330	100 to 330	330		100 to 330	164.9
Norway	Government Pension Fund - Global	322	308		357	308-357	38.4
Saudi Arabia	Saudi Arabian Monet. Auth. ¹	300	-	300	225	225 to 300	33.8
Kuwait	Kuwait Invest. Auth. (KIA, 1953),	250	213	70		70 to 250	16.6
China	China Investment Corporation (CIC), 2007 ²	200	-	200		200	1,528.2
Russia	Stab. Fund of the Russian Fed. (SFRF), 2003	127	122	-		32 to 127	483.2
Singapore	Temasek Holdings, 1974	108	108	100		100 to 108	164.8
Libya	Reserve Fund	50				50	na
Qatar	Qatar Investment Authority, 2000	40	50	40		40 to 50	9.9
Algeria	Revenue Regulation Fund	25	43	-		25 to 43	na
USA	Alaska Permanent Reserve Fund, 1976	40	40	39		39 to 40	70.6
Brunei	Brunei Investment Authority (BIA), 1983	35	30	30		30 to 35	na
Korea	Korean Invest. Corp. (KIC)	20	20			20	261.4
Kazakhstan	National Oil Fund	18	18			18	19.1
Malaysia	Khazanah Nasional	18	18	17.7		18	101.5
Canada	Alberta Heritage TF (1976)	17		13		13 to 17	42.2
Chin. Taipei	National Stab. Fund	15		15		15	2.7
USA	New Mex. SIO Trust Fund	15				15	above
Iran	FX Reserve Fund	15		8		8 to 15	na
Other		50				50	
TOTAL	(of above)	2,870	2,274	2,038		2,038-2,870	2,985.8
Memo items:			World hedge funds AuM incl. F-of-F	OECD pension funds		World mutual funds AuM	
			2,000	17,915		21,765	5,200

Notes: This table reflects the OECD definition of a SWF – it excludes Public Pension Reserve Funds, and excludes obvious overlaps (e.g. HK Monetary Authority using the GIC to invest).

1. The Saudi Arabian government is establishing a SWF using reserves held by the monetary authority and other government assets.

2. Assets previously held by China Huijin Investment Corporation (approximately USD 65 bn) are now integrated to those of CIC.

3. The official estimate of the Norwegian data (i.e. USD 357 bn) refers to December 2007.

Source: Peterson Institute, Deutsche Bank, OECD, national sources. Data for worldwide mutual funds is from Investment Company Institute. Total pension fund data is from OECD Global Pensions Statistics Project.

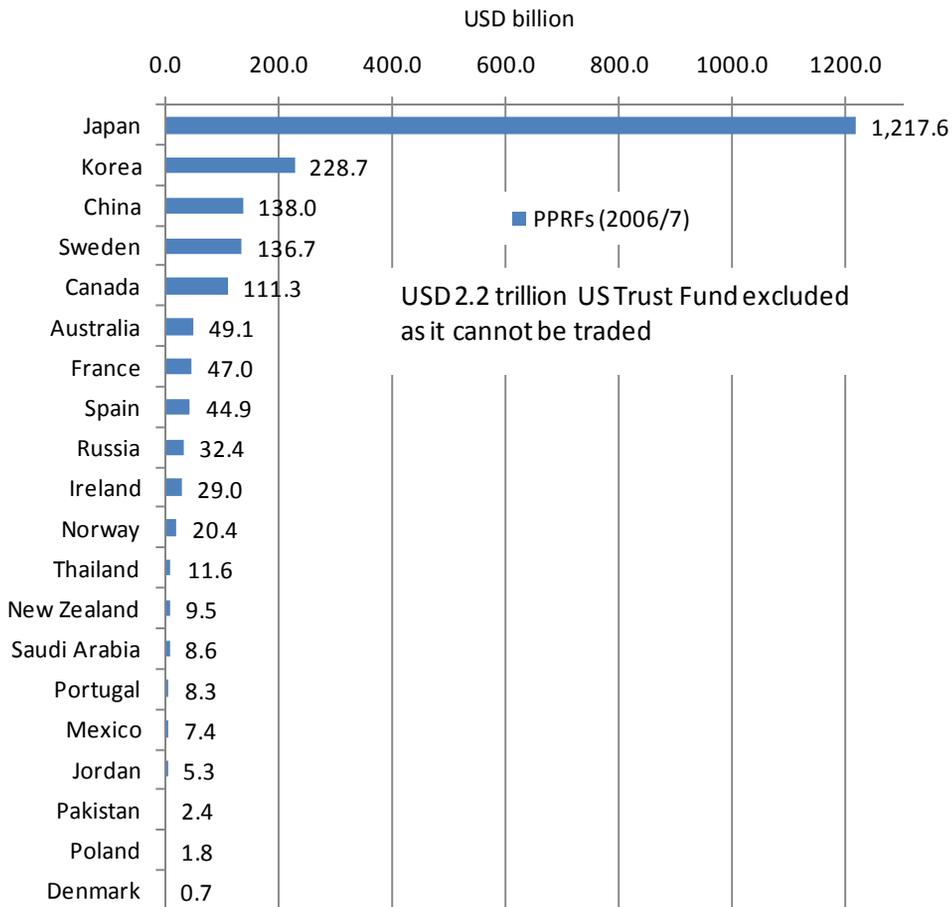
The total amount for PPRFs is even larger, if the US Trust Fund is included

The total amount for PPRFs is an even larger USD 4.4 trillion as of 2006/7, if the US Trust Fund is included, some 53.9% of the total. This reduces to USD 2.2 trillion if we exclude the US Trust Fund, on the grounds that the amount cannot ever be traded because it is a notional accounting figure (IOU number) based on accumulated surpluses lent to the government. The USD 2.2 trillion is shown in Figure 2. USD 1.2 trillion was accumulated by Japan’s National Reserve Funds – accounting for 29.3% of the total; USD 228.7 billion by Korea, at about 5.5% of the total.

Some PPRFs are relatively new

Some of the PPRFs, especially those of the sovereign (longer-run accumulation) kind, are relatively new. For example, Australia’s Future Fund was established in 2006, New Zealand’s Superannuation Fund was established in 2001, Russia’s National Wealth Fund in 2008 and China’s National Social Security Fund in 2001. Given their short history, their assets are smaller than those in the more mature funds. However, some of these funds are growing rapidly. For example, as of 2006, the Future Fund in Australia had assets equivalent to USD 13.6 billion, while this figure increased to USD 49.1 billion as of February 2008.

Figure 2. **Public Pension Reserve Fund (PPRF) assets by country**



Source: OECD and national sources.

Sweden has the biggest system in terms of GDP

In terms of total assets relative to the respective national economies (*i.e.* GDP), Table 2 shows that Sweden had the biggest system, *i.e.* 31.6% in 2007. The other countries where pension reserve funds were significant relative to the economy include Japan (27.9%) and Korea (23.9%). On average, the ratio of OECD PPRFs assets to GDP was 15.0% in 2006/7.

A large amount of PPRF assets have been also accumulated in non-OECD countries. For example, in 2007 China and Russia witnessed such assets at USD 138 bn (94.6 bn plus 43.4 bn) and USD 32.4, respectively. In terms of the PPRFs assets to GDP ratio, Jordan had the largest value at 36.7%.

Table 2. **Statistical summary of selected Public Pension Reserve Funds by region and type, 2006/7**

	Country	Name of the fund/institution	USD bn	% of total	% of GDP	
OECD: SSRF	Canada	Canada Pension Plan	111.3	2.7	8.1	
	Denmark	Social Security Fund	0.7	0.0	0.2	
	Japan	National Reserve Funds	1,217.6	29.3	27.9	
	Korea	National Pension Fund	228.7	5.5	23.9	
	Mexico	IMSS Reserve	7.4	0.2	0.9	
	Spain	Fondo de reserva de la seguridad social	44.9	1.1	3.7	
	USA	Social Security Trust Fund	2,238.5	53.9	16.6	
OECD: SPRF	Australia	Future Fund	49.1	1.2	5.5	
	France	fond de reserve des retraites' (FRR)	47.0	1.1	1.9	
	Ireland	National Pensions Reserve Fund	29.0	0.7	11.5	
	New Zealand	New Zealand Superannuation Fund	9.5	0.2	7.8	
	Norway	Government Pension Fund - Norway	20.4	0.5	5.3	
	Poland	Demographic Reserve Fund (DRF)	1.8	0.0	0.6	
	Portugal	Social Security Financial Stabilisation Fund	8.3	0.2	4.3	
	Sweden	National Pension Funds (AP1-AP4 and AP6)	136.7	3.3	31.6	
	OECD:Total			4,150.8	100.0	15.0
	Non-OECD: SSRF	China	National reserve funds	94.6	57.7	3.1
Jordan		Social Security Corporation	5.3	2.7	36.7	
Pakistan		Employees' Old-Age Benefits	2.4	1.2	1.8	
Saudi Arabia		General Organisation for Social Insurance	8.6	4.3	2.4	
Thailand		Social Security Office	11.6	5.9	5.6	
Non-OECD: SPRF	China	National Social Security Fund	43.4	26.4	1.4	
	Russia	National Wealth Fund	32.4	16.3	3.3	
Non-OECD:Total			198.2	100.0	4.2	

Notes: SPRF stands for Sovereign Pension Reserve Fund, and SSRF stands for Social Security Reserve Fund. For definitions see main text. Japan's National Reserve Funds reflect mainly assets managed by the Government Pension Investment Fund (GPIF). China's national reserve funds reflect mainly assets of the provincial and local social security funds.

IV. SWFs and PPRFs: similarities and differences

SWFs and PPRFs share some characteristics, hence give rise to similar concerns

SWFs and PPRFs share some similarities. Both are very large in terms of assets under management, and are autonomous and accountable only to governments or public sector institutions. Like SWFs, PPRFs are also increasingly investing abroad and moving into alternative assets (*e.g.* property, private equity and hedge funds). Hence the financial stability concerns raised over SWFs are also applicable to PPRFs.

However, objectives, investment strategies, sources of funding and transparency requirements differ between SWFs and PPRFs

However, there are still a number of discernable differences between SWFs and PPRFs.

1. The objectives of these funds are different. PPRFs serve as a long-term financing vehicle of public pensions and other related benefits, while SWFs are normally established to shield the domestic economy from fluctuations in commodity prices (*e.g.* oil) and to diversify foreign reserve holdings into higher return assets, among others. Hence, PPRFs manage assets to meet clearly defined liabilities, while SWFs tend to have broad objectives and are rarely assigned to meet specific government expenditures. For this same reason, the investment horizon of PPRFs tends to be better defined and longer than that of SWFs. Some PPRFs even have specific timeframes for drawing down funds and at least one (the Canadian one) aims to meet a funding target (the ratio of public pension asset to liabilities). Clear objectives and investment timeframes shed much clarity to the mission of PPRFs and are conducive to better governance and more efficient investment management.
2. In many countries PPRFs face strong pressures to invest their resources domestically and conservatively. This is more the case of PPRFs managed within the social security system. Three of the four largest PPRFs, the US Social Security Trust Fund, the Japanese GPIF, and the Korean National Pension Fund are largely (solely in the US case) invested in domestic government securities. In emerging markets, where institutional investors and capital markets are underdeveloped, it is sometimes felt that PPRFs should help promote domestic investment and financial sector development. These concerns contrast with those of SWFs which are by construction mainly or solely invested in foreign assets.
3. As noted earlier, SWFs and PPRFs have different sources of funding. SWFs are mainly financed by foreign exchange revenues on commodity exports and/or transfers of foreign reserves from the Central Bank. PPRFs, on the other hand, are more often financed via social security contributions or direct fiscal transfers from the government.
4. PPRFs may also raise issues concerning fiduciaries' responsibilities and of social ownership by pensioners of PPRF assets. Trustees may constrain what these funds can do and require greater transparency than is the case for SWFs. For example, most PPRFs have policies for socially responsible investments.

V. SWFs and PPRFs' asset allocation across countries

There is concern about strategic and political objectives of SWFs

Consistent with this latter observation (point 4 above), we found it much easier to extract information about PPRF governance and asset allocations than we did for SWFs. It is extremely difficult to find information on actual SWF sizes and investment allocations. One

concern about SWFs is that their governance, investment objectives and asset allocations may reflect strategic and political objectives.

Information on objectives and asset allocations is more readily available for PPRFs

Information on objectives and asset allocations is more readily available for OECD PPRFs, though there are differences between funds in this respect. For most of the countries for which data are available, bonds and equities are the largest components in PPRFs portfolios (see Table 3). For example, as of 2007 France's FRR allocated 64.5% of its total assets to equities and 33.5% to bonds, while the remaining was invested in cash (1.2%) and other assets (0.8%). At the extreme, PPRFs in Spain and the USA invested all assets in short-term assets and bonds. For the US Trust Fund, such conservative investment strategy is mandated in the relevant legislation.

Table 3. **Asset allocation information of PPRFs in 2006/7**

In per cent of total asset allocations

		Equities	Bonds	Cash	Property	Alternative Inv.	Other
OECD	Australia	25.6		72.8			1.6
	Canada	57.9	28.3	0.1	6.8	6.9	0
	Denmark	0.7	26.4	67.0			5.9
	France	64.5	33.5	1.2			0.8
	Ireland	72.3	16.7	4.4	1.4	4.5	
	Japan	37.3	62.7	0.0			
	Korea	13.7	83.2	0.3		2.5	0.3
	New Zealand	59.9	17.3		6.9	10.8	5.1
	Norway	48.3	51.3	0.4			
	Portugal	20.8	70.1	2.2	3.6		3.3
	Spain	0.0	100.0				
	Sweden	53.1	38.7	1.1		3.8	3.3
	USA		100.0				
Non-OECD	China	24.2	53.7	9.5			12.6
	Jordan	63.5	17.0	8.1	4.4	2.6	4.3
	Pakistan	17.7	76.9		3.1		2.3
	Russia		100.0				
	Thailand	7.2	80.7	8.4			3.6

Note: 1. "Alternative investments" refer to "private equity" for Canada and Ireland, while that for Korea and New Zealand refers to various alternative asset classes. 2. Data for Japan refers to the GPIF, while that for China refers to the National Social Security Fund. 3. The Thailand data refers to the year of 2005.

Source: National sources and OECD.

Trend of increased allocation to equities in some countries

Over time, there is a trend of increased allocation to equities and declining bond allocations in some countries. For example, equities accounted for 15.6% of the Canada Pension Plan assets, while bonds accounted for 63.0% in 2001. In 2007, these two figures were 57.9% and 28.3%, respectively. A similar trend was observed in France and Portugal.

Generally speaking, because of its low returns, cash and its equivalent do not account for a significant share of the PPRF portfolios, except for Denmark.

Recently there has been an increased exposure to high-yield, alternative assets

In contrast, recently there has been an increased exposure to high-yield, alternative assets, *e.g.* private equity. This trend is driven by the perceived low correlation between alternative and traditional asset classes and pressure on PPRFs to beat market benchmarks (so-called “beta”) and seek higher “alpha” via active management. In most cases, active management is delegated to professional fund managers, though a few PPRFs (*e.g.* Canada’s) carry out such investments in-house. Alternative investments accounted for 2.5% of the Korean National Pension Service funds as of 2007. Meanwhile, a major increase in the alternative asset allocation was implemented by the New Zealand Superannuation Fund (10.8% in 2007, from 0.5% in 2005).

Some PPRFs are also increasing their allocation to foreign assets

Some PPRFs are also increasing their allocation to foreign assets, though this information is not readily available for some funds. For the countries where statistics are available, the trend has been towards rapid increases in overseas investment. Examples include the 34.6% overseas investment of Irish PPRFs,² and 75.3% overseas investment of New Zealand’s Superannuation Fund in 2007. France’s FRR started to invest in foreign assets (defined as assets denominated in non-Euro currencies) in 2004, with 5.1% of total assets, and this increased to 34.8% by 2007. Foreign assets accounted for only 0.3% of Korea’s NPF in 2002, but this increased to 10.8% in 2007. In Japan, foreign assets accounted for a large share and were on a steady rise, from 19.4% of the total portfolio in 2001 to 25.5% in 2006.

VI. Global financial stability issues

Financial stability issues often come from two broad sources:

1. Excessive liquidity creation reflected in asset price inflation, and the encouragement of low interest rates and leverage.
2. Excessive concentrations of investments in particular securities.

1) Liquidity

Excess liquidity can cause asset bubbles and results from the (unintended) global implications of national economic policies

The creation of excessive global liquidity can cause asset bubbles. Fixed exchange rates in the face of capital inflows lead to foreign exchange accumulation and, if impossible to fully sterilise, easier domestic monetary conditions. This can contribute to local asset bubbles. The global investment of the reserves may affect prices in other financial markets.

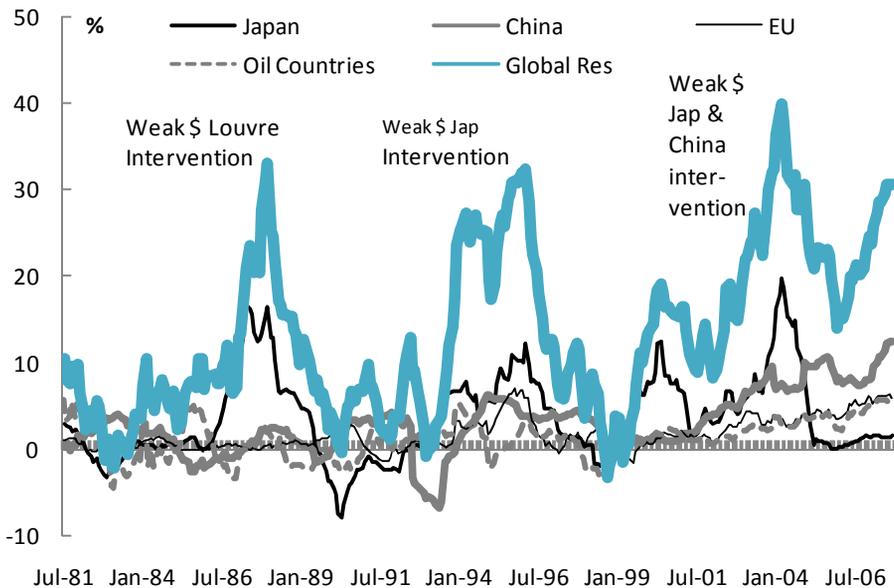
The staggering growth of global reserves since the late 1990’s is shown in Figure 3. Similar episodes have occurred during weak dollar

Rapid reserve accumulation has contributed to asset price pressures.

periods in the past when Japan was the main driver. China has been a more consistent accumulator since the mid 1990s devaluation, and currently has USD 1.5 trillion of the (above) USD 5 trillion total. In periods of USD weakness Japan has carried out massive interventions, as can be seen from the chart. While Japan has huge holdings of foreign reserves, it has now been eclipsed by China as the major holder.

Foreign exchange intervention by central banks is typically carried out in US dollars and invested in US Treasury securities. This has served to keep US bond yields abnormally low relative to short rates, hence influencing other rates (e.g. mortgages at the fixed rate end) and the cost of capital more generally. This, in turn, influences leverage and asset prices through that channel.

Figure 3. **Global USD reserves and contributions**
Chinese intervention now dominates



Source: Thomson Financial Datastream and OECD.

The China Stock Market boom

The growth of global reserves and China's stock market are shown in Figure 4. The mechanism here is that when risk taking rises, investors buy into emerging markets creating capital inflow into countries like China that fix or quasi fix their exchange rate. This eases monetary policy and contributes to stock market booms.

Private equity has been in a bubble until recently

The growth rates of global reserves and of private equity deals are shown in Figure 5. Private equity has been in a bubble until recently.

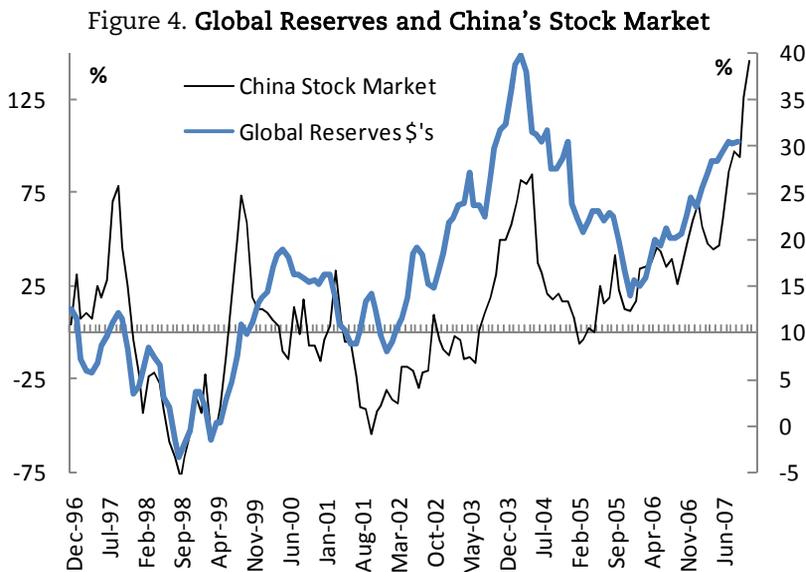
There is a clear leading relationship from global liquidity dominated by foreign exchange reserves to commodity prices

The global reserves and a commodity price index constructed by the Reserve Bank of Australia (with a heavy weighting to materials used by China – energy, base metals, bulks) is shown in Figure 6. This is one of the bubbles that commodity funds have invested in. The hedge fund Amaranth had difficulties with respect to this bubble.

Sovereign wealth funds do not create liquidity, but may impact on exchange rates and asset prices

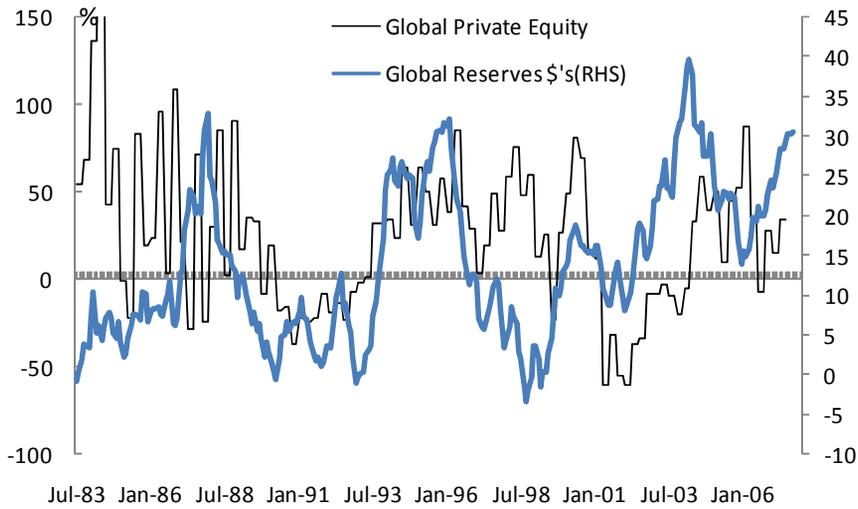
While foreign exchange reserve accumulation can create liquidity, this is not the case for SWF's. If a part of the USD foreign exchange reserves is transferred to a SWF, the central bank gets a credit and the SWF invests the reserves. There are indirect and second round effects, but no primary liquidity is created. If the SWF switches out of dollars into another currency, there will be an exchange rate impact (one reason why China can't really do this). If it switches out of one asset like a Treasury security to another one like an equity stock, there will be an asset price impact. Given the large size of some SWFs, changes in the strategic asset allocation, such as a shift from bonds to equities, could have a significant impact on the relative prices of these two asset classes. The price impact will also vary depending on whether the changes in portfolio allocation are carried out via new fund inflows (as is the case during periods of rapid asset accumulation, like the one we are going through) rather than the sale of existing assets. Stronger price effects can be expected once the growth rate of the funds slows down and changes in the investment policy can no longer be implemented solely by shifting inflows.

If a SWF provides capital to a private equity company, like Blackstone, the latter may lever this amount at the low global cost of capital (where the carry trade and other forces are at play). If they invest in smaller emerging markets which are less liquid they might increase volatility. But there are much bigger pools of capital in the West which will have exactly the same effects.



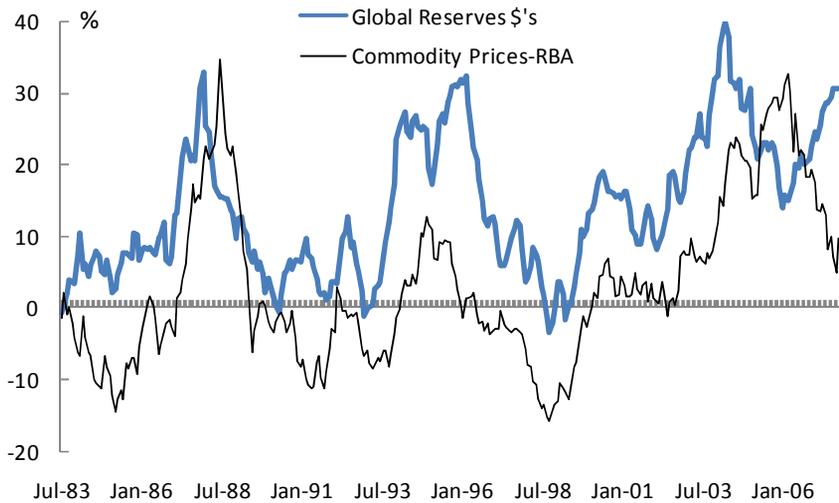
Source: IBES, Thomson Financial Datastream.

Figure 5. Global liquidity and private equity deals



Source: Thomson Financial Datastream.

Figure 6. Global liquidity and commodity prices



Source: Thomson Financial Datastream.

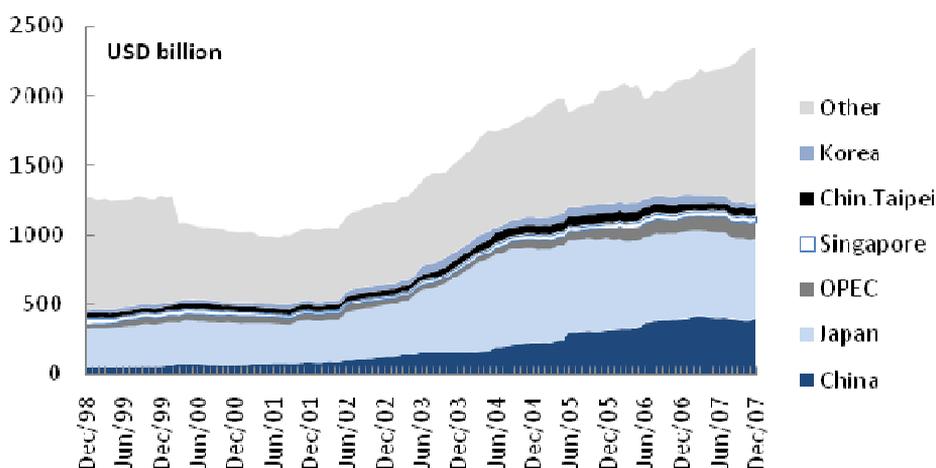
2) Excess concentration

SWFs provide mechanisms for breaking up concentrations of portfolios that increase risk

SWFs provide mechanisms for breaking up concentrations of portfolios that increase risk.

USD 1.5 trillion of Chinese reserves invested mainly in the US Treasury market distorts the yield curve in the US, and sudden changes could lead to USD and yield effects that could hurt (certainly) China and possibly the USA. By shifting assets to SWFs, the foreign exchange reserve concentration is reduced.

Figure 7. Foreign holdings of US Treasury securities



Source: Thomson Financial Datastream.

The official holdings of US Treasury Securities by some foreign governments are shown in Figure 7. The rising trend has been driven by Japanese and Chinese foreign exchange intervention policies. In this context it is also very clear that Singapore and OPEC, both of which are associated with the largest SWFs, and by some considerable margin, have very little holdings of US Treasury Securities. In other words, SWFs invest in a much more diversified way and do not concentrate their holdings in US Treasury Securities.

Many SWFs also hire external managers as a part of normal style diversification. Investing in equities in Western countries requires 'buying' experienced in-house teams, or outsourcing to western funds management firms, private equity companies and hedge funds. Once again, these structures and strategies are diversifying.

3) Governance

Governance and transparency are important, but have to be weighed against commercial considerations

To the extent that commercial considerations allow, clear corporate governance and full accountability are important for all public funds. Similar issues apply to both SWFs and PPRFs. PPRFs appear to have better transparency in these areas, and this probably follows from the clearer mandate and the fiduciary and pensioner ownership considerations that have become a part of the generally accepted wisdom in the pension area. Where these lines should be drawn for SWFs is less clear.

The clearer mandate of PPRFs stems from their founding purpose, which is to meet pension benefits. As a result, some PPRFs have specific investment return targets and concomitant investment strategies that have been designed on purely financial grounds. In particular, PPRFs try to achieve a rate of return that will help maintain the actuarial balance of the public pension system. In contrast, most SWFs have diffuse investment objectives, which can expose them to manipulation for political purposes.

Most PPRFs have strict selection criteria for their boards

Another difference with most SWFs is that many PPRFs, at least those of the sovereign type, are governed by boards that have been selected according to strict criteria of knowledge and professional experience in financial matters. The governing body of an PPRF of the sovereign type is typically either an independent committee (like the National Pensions Reserve Fund Commission in Ireland) or the highest organ of an independent legal entity that is exclusively responsible for the management of the reserve fund (like the Board of the Guardians of New Zealand Superannuation). One of the strictest eligibility requirements for board members is in place in New Zealand, where all board members must have experience and expertise in investment management, and at least four must be qualified as investment professionals.

Some public pension reserve funds, like the Canada Pension Plan reserve fund, are even operated by private sector management entities (the CPP Investment Board) and led by a board of professionals independent of government. The board approves investment policies and makes critical operational decisions, such as the hiring of the president and chief executive officer and the setting of executive compensation. Such governance structures ensure a high degree of protection against political interference in the management of the reserve fund.

PPRFs are generally subject to rigorous accountability and disclosure requirements

While operating at arm's length from government, many PPRFs are subject to rigorous accountability requirements. Accountability is primarily exercised via strict disclosure requirement and oversight by relevant authority. PPRFs are required to publish an annual report, to have their accounts audited by an independent external audit firm (or in some cases the public audit office) and to provide regular and timely information on their website.

Disclosure is a particularly sensitive topic for both SWFs and PPRFs. Commercial considerations argue against detailed disclosure of investments in both SWFs and PPRFs. At the same time, there is a need to promote the transparency of the funds' investment policy. Public disclosure of asset allocation and investment performance at sufficiently long intervals (*e.g.* one year) and with prudent delays (a few months) can help meeting the goal of transparency without jeopardising the fund's confidentiality regarding some aspects of its investment management.

In conclusion, lessons can be learnt from existing PPRFs in OECD countries for the debate on the design, operation and role of SWFs in the global financial system.

Notes

1. Earlier versions of this paper served as background documentation at the October 2007 and April 2008 meeting of the OECD Committee on Financial Markets, and the December 2007 meeting of the OECD Working Party on Private Pensions. A previous version was also presented at the 2008 Global Pension Summit in Suzhou, China on 28-29 February 2008. The current version takes into account the various comments received from participants of these meetings. Other aspects related to SWFs have been addressed in other OECD Committees, in particular the Steering Group on Corporate Governance, the Working Group on Privatisation and Corporate Governance of State-Owned Assets, and the Investment Committee.
2. Note that for PPRFs in France and Ireland foreign investments refer to those investments in assets outside the euro area or denominated in non-euro currencies.

Governance and Investment of Public Pension Reserve Funds In Selected OECD Countries

Juan Yermo*

Many countries around the world are partly prefunding their otherwise pay-as-you-go (PAYG) financed social security systems by establishing or further developing existing public pension reserve funds (PPRFs). Most OECD countries have put in place internal and external governance mechanisms and investment controls to ensure the sound management of these funds and better isolate them from undue political influence. These structures and mechanisms are in line with OECD standards of good pension fund governance and investment management. In particular, the requirements of accountability, suitability and transparency are broadly met by these reserve funds. However, some specific details of the funds' governance and investment management could be improved in a few countries, such as enhancing the expertise in the funds' governing boards and constraining discretionary interventions by government. Such reforms will ultimately raise the long-term investment performance of the funds and the solvency of social security systems.

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I. Introduction

The growth in Public Pension Reserve Funds (PPRFs) is explained by the shift towards pre-funding social security systems

Many countries around the world are partly prefunding their otherwise pay-as-you-go (PAYG) financed social security systems by establishing or further developing existing public pension reserve funds. This trend is parallel to the growing shift towards fully-funded, privately managed pension systems, which has in turn heightened the role of pension funds in retirement income arrangements.

PPRFs are similar to pension funds but their assets are owned by the public sector, not households

The main defining feature of public pension reserve funds, which differentiates them from pension funds, is that their ultimate beneficiaries (the general population) do not have legal or beneficial ownership over the reserve funds' assets. Rather, the legal or beneficial owner is the institution that administers the public pension system (social security reserve funds - SSRFs) or the government (sovereign pension reserve funds - SPRFs). This feature of reserve funds exposes them to potentially greater state influence than pension funds and has been in the past one of the main reasons for favouring pension funds as a way to prefund pension benefits.

The OECD and ISSA governance and investment guidelines offer a benchmark for the management of these funds

However, as shown in this paper, internal and external governance mechanisms and investment controls can be put in place in order to isolate reserve funds effectively from undue political influence. At a minimum, public pension reserve funds should be subject to similar governance and investment management standards as pension funds, following the "OECD Guidelines on Pension Fund Governance" first developed by the Working Party on Private Pensions in 2001 and revised in 2004 (OECD (2005a)) and the "OECD Guidelines on Pension Fund Asset Management" (OECD (2006a)).¹

The OECD governance and investment standards are also fully consistent with the "ISSA Guidelines for the Investment of Social Security Funds" developed by the International Social Security Association (ISSA, 2005), which cover both governance and investment management issues and used the OECD guidelines as a blueprint.

Additional governance safeguards are needed to protect PPRFs from political risks

The OECD and ISSA guidelines effectively address basic governance and investment management issues. However, in the case of reserve funds additional safeguards are needed to promote better protection from political manipulation of the funds. In particular, special care needs to be taken with the selection and appointment of the board of reserve funds, given their central responsibility in designing investment strategies.²

The report focuses on reserve funds in the following countries: Canada, France, Ireland, Japan, Korea, New Zealand, Norway and Sweden. In general, these reserve funds show good levels of governance, but some weaknesses have been identified that call for reforms. In particular, two of these countries, Korea and Japan, are implementing reforms to their funds' governance that should bring them further in line with international good practices. The report also addresses some aspects of investment management, comparing the practices in these countries against the OECD and ISSA guidelines. The main concern is the presence of some potentially restrictive investment rules in Sweden and political influence on the investment policy in countries such as Korea, Japan and Norway, as decisions over the funds' investment strategy are ultimately taken by a government ministry or parliament.

The policy recommendations are particularly relevant for PPRFs in non-OECD countries

The policy implications of this report are particularly relevant to many non-OECD countries that have already or are in the process of establishing public pension reserve funds. Anecdotal evidence suggests that the internal governance features of some of these funds are weak and potentially exposed to undue political influence (see Impavido, 2002).

The report is structured as follows. The next section discusses the rationale for prefunding public pension systems via the establishment of reserve funds. Section III presents the recent evolution of reserve funds and the outlook for the future. Section IV and V discuss respectively the main aspects of the governance and investment of these funds, using the OECD and ISSA Guidelines as reference of good practices. The last section concludes.

II. Why and how are countries prefunding social security?

PPRFs primarily help to address the fiscal imbalances of ageing populations, and can also raise national savings and improve diversification

Prefunding social security benefits can help governments respond more effectively to the fiscal pressures that will result from ageing populations. While prefunding may not in itself offset the decline in domestic growth rates that will result from worsening dependency ratios³ it can help to solvent some aspects of the demographic shock. The main reasons for prefunding via the establishment of reserve funds are:

- Tax-smoothing, that is, maintaining relatively constant contribution rates to the social security system. While such objective could also be met by appropriate management of the public debt, assets in the reserve fund are assigned to financing the social security system. Savings in the form of public debt reductions, on the other hand, may end up being used for other future outlays of the government;
- Raising public savings and as a result, national savings. By clearly assigning the reserve funds for future expenditure, the government may have to reduce current expenditure or raise

taxes to maintain its fiscal objectives. Hence, the overall debt position of the government may improve.

- Accessing output produced in foreign countries which may not be suffering the same demographic shock. Again, such objective could be met through other means, such as redirecting private savings towards foreign assets. A reserve fund, however, may be able to take a longer horizon on these investments, hence reaping greater benefits from international diversification of its investments.

In developing countries, where financial systems are underdeveloped, prefunding via reserve funds may also contribute to economic growth by improving access to finance for productive activities.

Around the world, countries have chosen different routes to prefund social security systems. Many OECD countries have recently established reserve funds, which complement a long tradition of pension fund provision. The situation varies widely across non-OECD countries. In Latin America and most countries in Eastern Europe, pension funds have been recently established, partly replacing the PAYG financing system. This is leading to a rapid accumulation of funds in these countries. In addition, a few non-OECD countries, primarily in Asia, have relatively large reserve funds that support their social security systems, but a rather small pension fund sector. Examples include China, Egypt, Jordan, Philippines and Saudi Arabia (see Blundell-Wignall et al (2008)).

Prefunding via pension funds is generally preferable to reserve funds

In general, prefunding via pension funds is preferable to reserve funds, as the former guarantee ownership or beneficial rights to pension plan members and are normally subject to a comprehensive regulatory and supervisory framework. Moreover, the financial advantages of prefunding generally apply whether this takes place via pension funds or reserve funds. A preference for reserve funds may arise if there are cost or/and investment performance advantages over privately managed pension funds, something which is unlikely to happen in countries with poor public sector governance.

There are two main types of PPRFs, those set up and owned directly by government and those owned by social security institutions

Historically, reserve funds were managed as part of the social security scheme (social security reserve funds or SSRF), where the legal or beneficial owner is the scheme itself. More recently, some governments have established autonomous reserve funds that are under its direct ownership but are legally assigned to support the social security system or more generally to address fiscal imbalances caused by demographic ageing (sovereign pension reserve funds or SPRFs).

The largest PPRF is the United States' Social Security Trust Fund

Table 1 shows the main SSRFs and SPRFs in OECD countries. The total assets managed by these funds equalled USD 4.1 trillion in December 2006. By far the largest reserve fund in the world is the United States' Social Security Trust Fund, with assets of over USD 2 trillion. However, all of its investments are non-tradable securities issued by the

US Treasury. The second largest reserve fund is Japan's, with assets over USD 1.2 trillion in December 2006, the largest part of which is held at the Government Pension Investment Fund.⁴ The third largest is Norway's Government Pension Fund-Global⁵, with assets approaching US\$280bn in December 2006, followed by Korea's National Pension Fund, with assets equal to US\$190bn. The Japanese reserve fund is larger than any pension fund in the world, while the Norwegian and Korean reserve funds also rank among the ten largest pension-related institutional investors in the world.

Table 1. Public Pension Reserve Funds in selected OECD countries

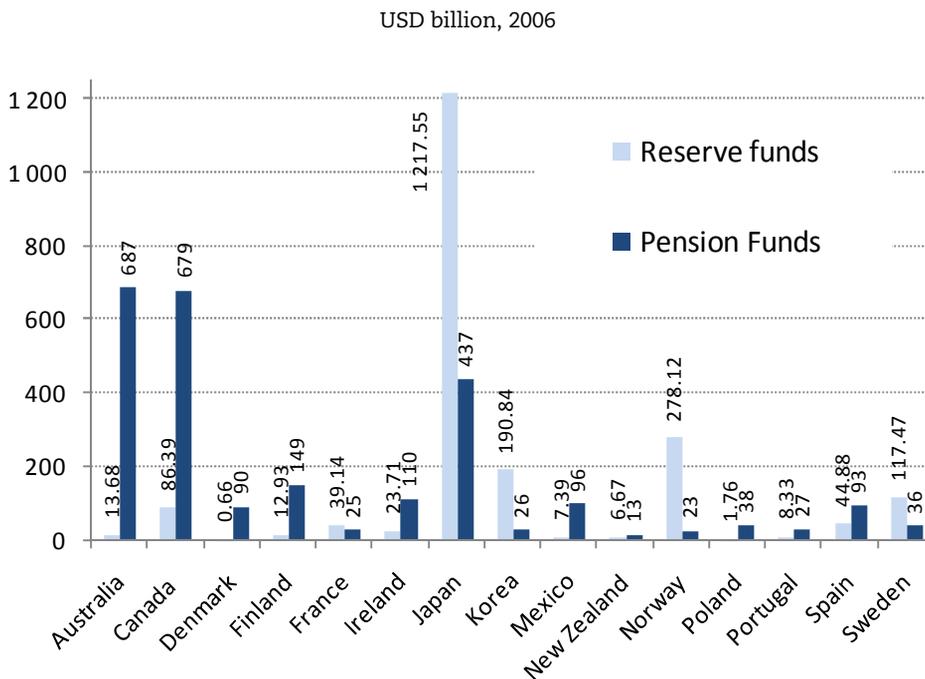
Country	Name	Type	Since	AUM (mn \$, 2006)
United States	Social Security Trust Fund	SSRF	1940	2 048 112
Japan	National reserve funds (incl. GPIF)	SSRF	1959	1 217 551
Norway	Government Pension Fund - Global	SPRF	1990	278 124
Korea	National Pension Fund	SSRF	1988	190 842
Sweden	National Pension Funds (AP 1-4 and 6)	SPRF	2000	117 468
Canada	Canada Pension Plan reserve fund	SSRF	1962	86 392
Spain	Social Security Reserve Fund	SSRF	1997	44 875
France	Pension Reserve Fund (FRR)	SPRF	1999	39 140
Ireland	National Pensions Reserve Fund	SPRF	2001	23 710
Australia	Future Fund	SPRF	2006	13 678
Portugal	Financial Stabilisation Fund	SPRF	1989	8 330
Mexico	IMSS Reserve Fund	SSRF		7 392
New Zealand	Superannuation Fund	SPRF	2001	6 666
Poland	Demographic Reserve Fund	SPRF	2002	1 760
Denmark	Social Security Fund	SSRF	1964	659

Source: OECD (2007).

In some OECD countries, reserve funds manage a bigger asset pool than pension funds

While at a global level, the wealth accumulated in occupational and personal pension funds (USD 16 trillion) is still much greater than that in public pension reserve funds (USD 4 trillion), the situation is the opposite in some OECD countries. In Figure 1, the assets accumulated in reserve funds are compared against those of pension funds. In a few countries (France, Japan, Korea, Norway and Sweden), reserve funds have actually accumulated more assets than pension funds.

Figure 1. Reserve funds and pension funds in selected OECD countries



Source: OECD (2007).

III. Recent evolution of reserve funds and outlook for the future

PPRFs are only expected to cover a small part of public pension liabilities.

Unlike pension funds, reserve funds support what are otherwise PAYG-financed pension systems and are generally not expected to cover but a small part of the social security system's liabilities. For example, the Portuguese reserve fund (the so-called Social Security Financial Stabilisation Fund) is expected by law to receive every year between 2 and 4 percent of the obligatory contributions paid by employees to the social security system until it accumulates assets equivalent to two years of social security benefits. The fund was established in 1989 and by December 2006 had USD 8.3 bn in assets, equivalent to 5% of GDP. Sweden's reserve fund is actually a group of competing and independent funds (the AP-Fonden 1 to 4 and AP6) which were established in May 2000 from the existing ATP fund, which had been established in 1960.

Some recently established reserve funds are amassing a large amount of capital

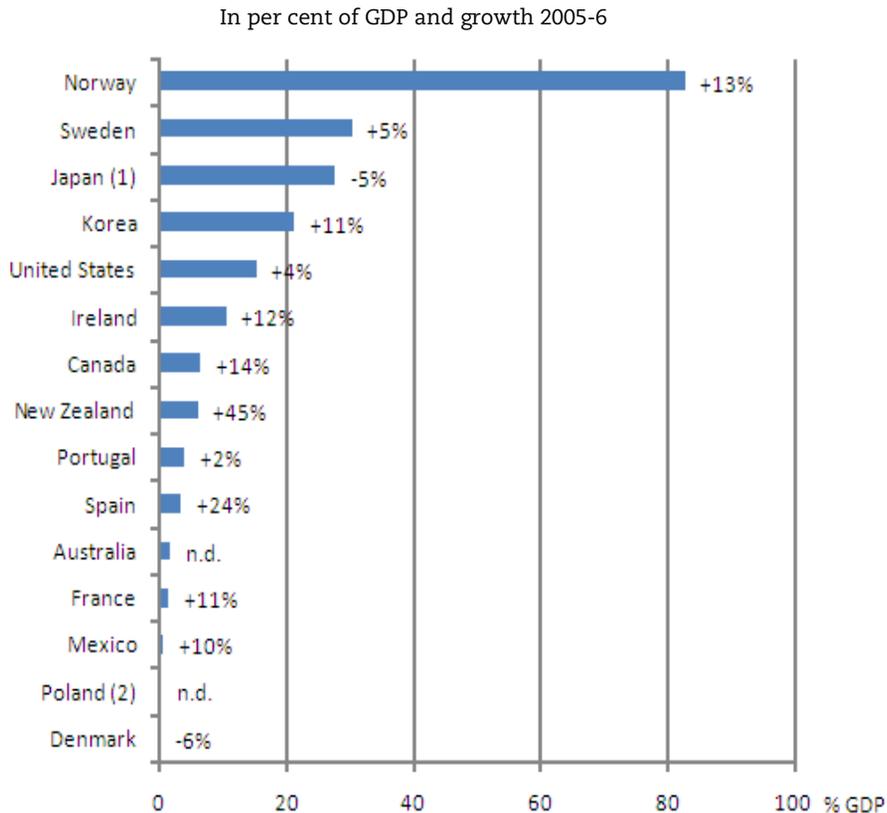
Some of the more recently established reserve funds, which are also of the sovereign type, have grander ambitions. Examples of SPRFs that are destined to accumulate large assets include the following:

- *France's Pension Reserve Fund (FRR):* The fund was set up in 1999 and by December 2006 had assets of USD39 billion (31 billion euros). The part of the projected PAYG shortfalls that the Fund will finance from 2020 onwards will depend on the funding it will receive until this date. Up until now, the fund has

been receiving a varying annual contribution from the government, ranging from 5.5 billion euros in 2002 to 1.5 billion euros in 2006. Financing comes from surpluses from the National Old Age Insurance Fund for Wage Earners, the Old Age Solidarity Fund, additional taxes on private assets, and contributions from savings banks and the Deposit and Securities Fund plus infrequent cash injections. Some funding also comes from asset sales: starting in 2000, the bulk of the revenue generated by the sale of licenses for third generation cellular telephones will also be transferred to the FRR.

- Ireland's National Pensions Reserve Fund: The National Pensions Reserve Fund Act that established the reserve fund in 2001 stipulates explicitly that utilisation of the fund to cover deficits in the social security system will only become possible from 2025 onwards. As the fund receives 1% of GNP every year from the government (until at least 2055, as stated in the National Pension Reserves Fund Act), it is expected to accumulate assets representing up to 45% of the country's GDP. At its founding in 2001, the fund also received part of proceeds from the privatisation of Telecom Éireann.
- New Zealand's Superannuation Fund: This fund was established in 2001 to partially provide for the future cost of superannuation payments. The government's annual contribution is determined by an actuarial formula (which is in the legislation) and is expected to average NZD 2.2 billion a year (around 0.75% of GDP) until 2025. The actuarial formula also determines the rate at which the government can draw down the funds, but no withdrawals are possible before 2020. In the drawdown period, expected to begin in 2028, the government expects to draw the equivalent of between 15 to 20 per cent of the annual cost of superannuation payments. In December 2006, the fund had NZD 11.9 billion in invested assets (over 6% of GDP) and is expected to peak at around 33% of GDP in 2037.
- Norway's government pension fund – global: This fund, previously known as the Norwegian petroleum fund, was established in 1990. The name change occurred in January 2006. By law, transfers from the fund are limited to four percent of the capital a year, which is equal to the estimated long-term real rate of return from the fund. The fund already had assets representing 83% of the country's GDP in December 2006 and is projected to reach USD 800-900 billion in assets by 2017.

The rapid growth of SPRFs relative to SSRFs can be observed in Figure 2, which compares the largest reserve funds relative to GDP in each country. The two largest reserve funds in relative terms are of the SPRF variety. The highest rate of growth in 2005-6 was observed in New Zealand, followed by Spain, Norway, and Ireland, all of which, except Spain, are of the sovereign type.

Figure 2. **Assets accumulated in reserve funds**

Notes: (1) Japanese data is from fiscal year 2005-6. (2) Polish data refers to 2005.
Source: OECD (2007).

IV. The governance of reserve funds

Good governance of PPRFs is essential to meet their goals

Ensuring good governance of reserve funds is essential to meet their goal of financing public pension systems. Given the size of reserve funds in many countries, their governance has also major implications for the behaviour of the financial system. A particular concern in the governance of reserve funds is how to ensure sufficient independence from undue political interference.

The OECD guidelines on pension fund governance and investment can also be applied to reserve funds

Reserve funds, like pension funds, require a governance structure that ensures an appropriate division of operational and oversight responsibilities, and the suitability and accountability of those with such responsibilities. This basic principle of governance is enshrined in both the OECD's "Guidelines on Pension Fund Governance" and ISSA's "Guidelines for the Investment of Social Security Funds".

Clear fiduciary duties for the governing body are essential

Both sets of guidelines contain similar criteria to implement this objective. At the centre of the governance structure is a governing body that has ultimate responsibility for the fund and is accountable to its beneficiaries. The members of this body must have clear fiduciary duties

and a specific, measurable mandate, and must possess relevant expertise to be able to carry out their functions.

The governing body may be a government ministry, the board of the social security institution or the board of an entity established expressly for the purpose of investing the scheme's funds. The latter, segregated set-up may be preferable as a protection against political interference, especially if a government ministry is responsible for administering the social security scheme.

The governing body is usually assisted by an investment committee

The governing body is usually assisted by an investment committee which advises on the investment strategy, and an executive that is in charge of operational management, including asset management. Asset management may also be delegated externally, but the governing body should retain the fiduciary responsibility for the fund. Where the governing body does not possess sufficient knowledge to discharge its duties, it should also seek external advice.

The governance structure of reserve funds (like that of pension funds) should normally include three other bodies. An independent auditor should be appointed to carry out an annual audit of the fund. In the case of funds that are integrated in the social security institution, an actuary would also need to be appointed to carry out the actuarial valuations of the system and analyse the implications of different investment strategies for the system's financing. In most instances, it is also a good practice to appoint a custodian who is in charge of the safekeeping of the assets.

Good governance also calls for effective mechanisms of internal and external control. According to the OECD guidelines for pension fund governance (again, in common with the ISSA guidelines), reserve funds should have appropriate control, communication and incentive mechanisms that encourage good decision-making, proper and timely execution, transparency and regular review and assessment. Control systems should include a code of conduct and mechanisms to address conflict of interest situations. Reserve funds should also be required to disclose publicly relevant information and should have procedures in place to address complaints from the general public.

Additional checks and balances are needed to protect reserve funds from political risk

While all these basic features of governance are common to both reserve funds and pension funds, reserve funds also face some unique challenges that call for greater care in the governance design and possibly additional constraints and requirements on the governing body and other parties that partake in the governance of the fund. The challenges specific to reserve funds include the following:

- Reserve funds are established by the government, the social security institution, or some other public sector entity. The government selects at least some of the members of the

governing body, and may influence its decisions, either directly (through regulations), or indirectly, through political influence. This political risk, which also affects pension funds for government workers, can endanger the effective governance of the fund.

- Unlike pension funds, reserve funds are not usually subject to the supervision of an independent supervisory authority. The accountability of the governing body therefore relies on public disclosure of its operations (such as an annual report containing the accounts verified by an independent auditor) and any reporting requirements to the government, parliament or the public controller.
- Reserve funds do not normally have national competitors or even peers, as is the case with pension funds. Hence, their performance (including not just investment performance but also their operational efficiency) can only be benchmarked against any initial objectives set or, as far as relevant, against foreign reserve funds.

Reserve funds support pension systems that do not have a full-funding goal in mind. Hence, investment objectives may not be readily established with regards to liabilities, time horizon or risk aversion.

Given these difficulties, reserve funds are in need of specific governance structures and mechanisms to protect them from political risk while ensuring their accountability to the general public. These additional features of reserve fund governance can be observed in a selection of reserve funds (both SSRFs and SPRFs) around the world, which rank among the largest in terms of assets as a percentage of GDP.

Legal separation and ring-fencing

The legal separation of assets, or at least its ring-fencing, enhances transparency and helps prevent misuse of the funds

From a governance perspective, the key difference between SSRFs and SPRFs is that the latter involves a strict legal separation of the reserve fund's assets from other assets of the social security system. As social security systems offer services other than pensions, such as health or family benefits, the mingling of reserve fund assets with other resources of the social security system can lead to misuse, such as a diversion of pension assets to cover deficits in non-pension branches of social security.

While this justification has some merit, legal separation is not as critical as it is in the case of pension funds, where it is used to protect pension assets from company insolvency. Regardless of whether the reserve fund is legally separated from the scheme, the legal title to the assets is by necessity in the hands of the public sector. In the case of a SSRF, the social security institution holds the legal title to the assets, and

hence the government is an indirect owner. In the case of a SPRF the government holds directly the legal title to the reserve fund's assets. Yet, the government can also be tempted to use the funds for other purposes than pension financing.

Hence, rather than requiring the legal separation of the reserve fund from the social security institution, what is essential is to ensure that the fund is used only for pension financing. This can be achieved via so-called "ring-fencing", which in the case of a reserve fund consists in laws stating that the assets of the reserve fund are to be used exclusively for the payment of pensions. Such laws are applied to some SSRFs, such as the Canada Pension Plan reserve fund, while most SPRFs are subject to them. The main exception is Norway's Government Pension Fund. Its founding act states that it "shall support central government saving to finance the National Insurance Scheme's expenditure on pensions and long-term considerations in the application of petroleum revenues." The broader mandate, while granting flexibility to the government's fiscal objectives, obscures the financing of the social security system.

The governing body and the management entity

The governing body is the ultimate decision-maker

The governing body is the central strategic decision-making organ of a reserve fund. Its main function is approving the investment policy for the fund, and specifically, the strategic asset allocation. The governing body also monitors the executive and operational staff of the fund and is responsible for fulfilling the fund's mission and complying with regulations. As shown in Table 2, the governing body of some reserve funds is a stand-alone board or committee. In most cases, though, the governing body is integrated in the management entity which is responsible for the administration of the fund.

Reserve funds of the social security type tend to be run by tripartite boards

Given the critical importance of the governing body, it is understandable that efforts at insulating reserve funds from political risk have focused on it. Under the SSRF structure, the governing body is typically the tripartite board of the social security institution, whose members are selected by the government, and representatives of employers (*e.g.* employer associations) and workers (typically labour unions). There are, however, some exceptions. In Canada, for example, the reserve fund is under the direct responsibility of the board of a Crown corporation, the Canada Pension Plan (CPP) Investment Board. In Korea, the reserve fund is under the direct responsibility of the National Assembly and the management entity is the National Pension Service, Korea's social security institution.

Table 2. **Management entities and governing body of reserve funds**

Country	Management Entity	Governing body
Canada	Canada Pension Plan (CPP) Investment Board (a public sector corporation)	Board of Directors of the CPP Investment Board
France	Pension Reserve Fund (FRR)	Supervisory Board of the FRR
Ireland	National Treasury Management Agency	National Pensions Reserve Fund Commission
Japan	Government Pension Investment Fund (GPIF)	Chairman of the GPIF and Ministry of Health, Labour and Welfare
Korea	Fund Management Centre of the National Pension Service (the country's social security institution)	National Assembly
New Zealand	Guardians of New Zealand Superannuation (a public sector corporation)	Board of the Guardians of New Zealand Superannuation
Norway	Norges Bank Investment Management (an arm of the Central Bank) for the "Global" fund and "Folketrygdfondet" (National Insurance Fund) for the "Norway" fund	Norwegian parliament and Ministry of Finance
Sweden	AP Fonden	Board of Directors of the AP Fonden

Source: OECD.

Reserve funds of the sovereign type tend to be run by independent management agencies

Under the SPRF structure, the governing body is either an independent committee (like the National Pensions Reserve Fund Commission in Ireland) or the highest organ of an independent legal entity that is exclusively responsible for the management of the reserve fund (like the Board of the Guardians of New Zealand Superannuation). Japan and Norway are the main exceptions to such an arrangement. In Japan, the investment strategy, one of the key responsibilities of the governing body, is decided by the Ministry of Health, Labour and Welfare, after consulting with the chairman and investment committee of the Government Pension Investment Fund. In Norway, the fund is directed by parliament, which sets out the investment guidelines, and the Ministry of Finance. The fund's assets are invested by the asset management subsidiary of the Central Bank (Norges Bank Investment Management).

Independent management is preferable

The segregated governance model of reserve funds in countries such as Canada, France, Ireland, New Zealand and Sweden presents some important advantages over the integrated model where the fund is under the direct control of government or the social security institution:

- Less scope for political interference in the management of the reserve fund. Under the segregated mode, key decisions, such as the strategic asset allocation are decided by an autonomous entity at arm's length from government and the social security institution.
- Greater clarity in mandate and objectives, without any other policy goals than the investment of the reserve fund's assets. For example, under the segregated model, the governing body is not responsible for contributions and benefit payouts.
- Greater transparency and accountability of a segregated fund's governing body. The focus on investment management raises the visibility of the board's action and allows an effective measurement of its performance.
- Easier to attract qualified investment professionals than to a social security institution. An autonomous management entity may be able to apply a different salary scale than the one in place in the social security institution and may also be able to avoid many of the latter's bureaucratic procedures.

One potential drawback of the segregated governance model is that investment management is separated from the actuarial and payments functions of the social security system. On the other hand, as the main goal of reserve funds is to help facilitate tax-smoothing over a relatively long time period, an independent governing body can focus on long-term investment objectives.

The board's expertise in investment matters is a key determinant of the fund's performance

As the ultimate authority with responsibility for the management of the reserve fund, the composition and functioning of the governing body are the first and main determinant of the fund's performance. An experienced, well-functioning board will ensure that proper monitoring, incentive and control mechanisms are put into place to achieve the fund's objectives.

As the governing body of most SSRFs is the tripartite board of the social security institution, the lack of experience and knowledge of these representatives in financial matters can be a cause of concern. While it may not be necessary for all board members to be experts in finance, the board must collectively possess the necessary skills to carry out its oversight function effectively.

Reserve funds of the sovereign type tend to have strict selection criteria

Professional eligibility requirements for members of the governing body are in place in all countries with SPRFs. As shown in Table 3, the strictest requirements are in place in New Zealand, where all board members must have experience, training and expertise in investment management.

The nomination of the members of independent governing bodies varies between countries, but a key feature in some countries (*e.g.* Canada and New Zealand) is the appointment of a nomination committee that is in charge of selecting candidates for the governing body. The selection is made by the government from this list, ensuring greater independence in the selection process from political influence. This is especially the case in New Zealand as at least four of the members of the nominating committee must have work experience qualifying them as investment professionals. In Canada, on the other hand, the nominating committee is made up of representatives of the federal and provincial governments (one from each jurisdiction).

Termination clauses are also important to avoid the capricious dismissal of members of the governing body by government. In Canada, for example, CPP Investment Board directors may only be removed “for cause”. Commissioners of Ireland’s NPRF may be removed for misbehaviour, or because his or her removal appears to the Minister to be necessary for the effective performance by the Commission of its functions. In the other countries, there are few if any restrictions on the government’s ability to dismiss board members.

Small boards can make better, quicker decisions

The effectiveness of the governing body in accomplishing its duties also depends on its size, working methods and voting procedures. Most of the governing bodies covered in this study have fewer than 15 members, ranging from 7 in Ireland and New Zealand to 20 in France. In between are the Canadian reserve fund (12 members), the Japanese (11 members) and the Swedish (9 members). Voting is by simple majority with the chair having a casting vote in case of a tie.

A clear delineation between oversight and operational duties is needed

Good governance also requires a clear assignment of responsibilities between the governing body and the fund’s executive. In particular, the separation of the role of chief executive and board chairman is essential in reserve funds because of the lack of a market mechanism or external supervisor that can ensure effective, ongoing monitoring of the reserve fund’s executive. The top executives, having been elected for their expertise in investment matters, need to have their incentives aligned by a strong, independent board that looks after the fund’s mission. The reserve funds surveyed have achieved a clear separation between executive and oversight responsibilities. This is most evident in countries where the reserve fund’s governing body is not part of the management entity (*e.g.* Ireland, Korea, and Norway), but is also the case in the other countries surveyed as there is no overlap in the membership of the governing body and the executive team.

Table 3. Selection of the governing body of reserve funds

Country	Fit and proper criteria	Nomination	Length of appointment	Removal
Canada	Directors are chosen based on financial experience and other criteria.	Directors are appointed by the Finance Minister from a list drawn by a nomination committee.	Directors have three-year terms for a maximum of three terms (9 years maximum).	Directors may only be removed for cause.
France	Two of the twenty members of the supervisory board must be individuals with recognized credentials in fields considered to be relevant to the FRR's stated missions.	Members are appointed by parliament (two), the senate (two), various Ministries (four), trade unions (five) and employer and self-employed associations (five).	Members that are not appointed by governmental authorities have 6 year terms.	
Ireland	Commissioners must have expertise and experience at senior level in any of the following areas: investment, economics, law, actuarial practice, civil service, trade union representation, etc. Civil servants cannot be Commissioners. A commissioner shall be disqualified from being a member of the Commission where he or she is bankrupt, is convicted of an offence involving fraud or dishonesty, or is disqualified or restricted from being a director of any company.	Commissioners are appointed by the Minister of Finance, except the CEO of the management entity, who is an ex-officio member of the Commission.	All Commissioners other than the CEO of the management entity have five year terms, renewable for a second consecutive term.	A commissioner may be removed by the Minister of Finance if the member has become incapable through ill-health of performing his or her functions, or has committed stated misbehaviour, or his or her removal appears to the Minister to be necessary for the effective performance by the Commission of its functions.
Japan	The Chairman and investment committee members must have experience in economic or financial matters.	The Chairman is appointed by the Ministry of Health, Labour, and Welfare.		
Korea	The national assembly is the main governing body.	Not applicable.	Not applicable.	Not applicable.
New Zealand	All board members must have experience, training and expertise in investment management.	Board members are appointed by the Ministry of Finance via a nominating committee.	Board members are appointed for up to 5 years.	Board members can be dismissed for reasons that in the Minister's opinion justifies the removal.
Norway	The governing body is parliament and the ministry of finance.	Not applicable.	Not applicable.	Not applicable.
Sweden	All board members are appointed on the basis of their expertise in asset management.	Directors are appointed by the government. Two are nominated by employee organisations and two by employer organisations. The Chairman and Deputy Chairman are appointed by the government from amongst the members who have not been nominated by the organisations.	Directors have three-year terms.	There are no rules concerning the removal of board members. The government may remove a Director prior to the expiry of his term in office.

Source: OECD.

But even when reserve funds have achieved a clear oversight-executive separation on paper, in practice, some boards are still excessively involved in investment micromanagement. This is often the case where they lack the necessary executive and operational support.

Only some reserve funds have a CIO function

The composition and organisational structure of the executive also matters greatly for the successful deployment of a fund's resources. In investment institutions, two key roles are those of the chief executive officer (CEO) and the chief investment officer (CIO). Many large pension funds have both of these functions, but only some reserve funds have them. Reserve funds that have appointed CIOs in addition to CEOs include the French and New Zealand reserve funds. It is also good practice for the reserve fund's top executives to meet regularly. The French FRR, for example, has established an executive board made up of the top three executives in the organisation.

The investment committee

The board relies on the investment committee for advice on strategic investment decisions

The investment committee plays a central role in most reserve funds. It advises the governing body on the investment policy and the fund's performance. The governing body appoints the investment committee from among its own membership, investment officers and external, independent experts.

Members of the investment committee need to be knowledgeable about investment matters. It is also important to have representatives of the governing body sitting in the investment committee in order to create an institutional link between the two bodies and ensure smooth communication. For example, it is common for the chairman of the governing body to be a member of the investment committee.

Most of the reserve funds covered in this study have investment committees. Most also have fewer than 10 members, but there are some exceptions, like the Japanese with 11 members and the Korean one which has 21 members, consisting of:

- Chairman (Minister of Health and Welfare).
- Five vice-ministers of government.
- President of the Korea National Pension Service.
- Twelve representatives of employers, labour and consumer groups.
- Two experts with knowledge about pensions.

This complex and highly political composition contrasts with the situation in a country like France where the investment committee consists of only 5 members, including a member of the Executive Board.

The other four members are individuals with the requisite professional credentials, and are appointed by the Executive Board. Its mandate is to assist the Executive Board in the task of screening investment firms being considered for asset management mandates.

Remuneration, code of conduct and conflicts of interest

Board remuneration improves accountability and incentives

Remuneration policies vary across reserve funds. For example, the members of the supervisory board of the French FRR serve on a voluntary basis. On the other hand, board members of the Swedish AP Fonden are remunerated according to government policies.

A written code of conduct is essential

A written code of conduct is also part of the best practice requirements for reserve funds or their managing entities. Canada's CPP Investment Board is required to implement and disclose a code of conduct, including tight controls on the personal investing of directors and employees and a requirement to report any attempted political influence of investment decisions. The code of conduct is based on a duty of care and a duty of loyalty. Such duties as expressly mentioned in the Japanese reserve fund's statement of investment principles.

In New Zealand and Ireland guardians/commissioners must follow a code of conduct and must disclose any conflicts of interest they may have. In Ireland, *"commissioners and members of the staff of the manager or committee must disclose to the Commission (or manager or committee) any pecuniary or beneficial interest in and material to any matter considered by the Commission"* (Section 12(1), NPRF Act, 2000). The Act further requires that any conflicted person:

- Can neither influence nor seek to influence a decision to be made in relation to the matter.
- Can take no part in any consideration of the matter.
- Where relevant, must absent himself/herself from the meeting or part thereof during which the matter is discussed.
- Where relevant, cannot vote on a decision relating to the matter.

Not all reserve funds are required to establish a code of conduct. However, conflicts of interest are still regulated. For example, the Act establishing the Swedish AP funds requires members of the board of directors to refrain from participating in meetings regarding agreements between the fund and third parties in which the member has a material interest or legal entities which the member is authorised to represent.

Internal control, independent audit and custody

Internal control or audit functions can be performed by a special committee

It is good practice for reserve funds to have an audit committee that meets regularly to assess the adequacy of systems of internal control, review the fund's accounts and the external auditor's report. Management entities of reserve funds that must have an audit committee include Canada's CPP Investment Board, while both the Irish NPRF's Commission and New Zealand Superannuation Fund's Board of Guardians decided to establish an audit committee soon after their start of operations.

An annual, independent audit is required of all reserve funds

An independent annual audit of the reserve fund is also a standard practice among reserve funds and consistent with OECD and ISSA Guidelines. All reserve funds or/and management entities surveyed are subject to such a requirement. For example, the CPP Investment Board is subject to an annual financial audit by an external auditor and every six years there is a special examination of investment practices. In Ireland, an independent audit of the NPRF is carried out annually by the Comptroller and Auditor General. In Sweden, the government appoints two auditors to each AP Fund, one of whom is common to all the funds. The auditors must be authorised public accountants and must be changed every three years. The French FRR is audited annually by the Audit Office (*Cour des Comptes*). The Norwegian Government Pension Fund is audited by the Office of the Auditor General.

The appointment of an independent custodian can also ensure a better protection of the fund's assets and serve as a check on asset manager transactions. Reserve funds that require the appointment of a custodian include the French FRR (by the *Caisse des dépôts et consignations*, a public sector financial institution) and the Irish NPRF.

Public disclosure and external supervision

The basic contents of annual reports are common across reserve funds

The accountability of the governing body calls for regular reporting of its activities to the relevant government authority and the public at large. One of the central pieces of disclosure is the annual report, which describes the fund's investment operations during the year and contains the financial statements and the independent auditor's certification. All reserve funds are required to publish an annual report and to disclose the following information:

- Portfolio allocation, by broad asset classes;
- Investment performance ;
- Operational expenses.

Standardised valuation methods, following international best practices (such as the CFA Global Investment Performance Standards) are

also necessary to allow these reserve funds to compare their performance against relevant market benchmarks and against their own target return. In addition to valuing assets at market prices, it is important that management fees are accurately measured. In some cases, like Ireland, all expenses (including those of the Commission, investment manager, custodian, consultant or any other service provider engaged by the Commission) shall be charged on and paid out of the Fund. Where only some expenses are charged to the fund, the additional costs should be disclosed by the relevant body.

Other documents that are published by some reserve funds are the statement of investment principles and the code of conduct. For example, The Canadian CPP Investment Board and Irish Pension Reserve Fund are required to publish their statement of investment policy, governance structure, quarterly financial statements (CPP Investment Board only) and annual reports (including performance assessment).

***Additional oversight
may be exerted by
relevant public entities
and parliament***

Other than the independent audit and the disclosure of the annual report and other relevant documents to the public, additional oversight may be exerted by relevant public entities and parliament. For example, the French FRR is subject to the control of the General Inspectorate of Social Affairs and the General Finance Inspectorate; in addition to the Audit Office (*Cour des Comptes*). The Japanese GPIF must present its independently audited financial statements to the MOHLW for approval. After approval, the GPIF discloses the accounts to the general public. The GPIF also discloses publicly on a quarterly basis the result and status of its investments. The Swedish government must make an evaluation of the management of the AP Fund assets and submit it to the parliament together with the funds' annual reports. Similarly, the Norwegian Government Pension Fund's reports are submitted to parliament for discussion.

Policymakers may also consider bringing reserve funds under the purview of the pension fund supervisory authority as is the case in some non-OECD countries (e.g. Costa Rica, Kenya, and it has also been recently proposed in Chile). Supervision by the pension fund authority can ensure independent, efficient oversight by an authority with expertise in fund management issues.

V. Investment management of reserve funds

Mission and objectives

***Reserve funds require a
clear mission statement
and measurable
objectives***

Reserve funds, like pension funds, require a clear mission statement and measurable objectives to enhance their efficient management and raise the accountability of the governing body. With the single exception of the Norwegian Government Pension Fund, all the reserve funds surveyed in this report have clear mandates, focused exclusively on the

financing of public pension expenditures. However, not all reserve funds have sufficiently specific investment objectives allowing them to determine an appropriate investment strategy.

*Investment goals should
be defined in
performance terms*

Reserve funds require a specific investment goal, which is usually defined as a rate of return objective (and associated risk) over a certain time horizon. As the purpose of reserve funds is to help meet future pension liabilities, there is a need for a clear return objective derived from the actuarial calculation of the future cashflows of the social security system. Among the reserve funds covered, most have a mission statement, but only three (Canada, Japan, and New Zealand) have stated a specific rate of return objective.

In Canada, the government has set a funding ratio (ratio of public pension assets to liabilities) and a rate of return target (and time horizon) for the CPP reserve fund. The fund targets a 4.2% real rate of return (in order to increase the funding ratio from 8% to 25% by the year 2025), which is based on the yield on long term government bonds in real terms plus a 2.3% premium for equities.

The French FRR was established for the purpose of “contributing to the long-term sustainability of the PAYG pension plans”.⁶ The fund receives various contributions from the government, including part of the social solidarity contribution, and part of the surplus of the old age solidarity fund. Disbursements cannot be made until 2020.

In Ireland, the NPRF’s explicit aim is tax-smoothing, covering future deficits in the pension system. No money can be withdrawn before 2020. Its mission, set out in the National Pensions Reserve Fund Act’s Art. 18(1) is “...meeting as much as possible of the cost to the Exchequer of social welfare pensions and public service pensions to be paid from the year 2025 until the year 2055, or such other subsequent years”.

The Japanese GPIF is required to develop an investment strategy that will attain a long-term rate of return sufficient to maintain a stable ratio of reserves to annual public pension expenditure. The performance goal is set by the Ministry of Health and Welfare and written into the fund’s medium-term plan. The GPIF has a long-term real rate of return target of 2.2% p.a. (3.2% nominal), or 1.1% p.a. above the assumed rate of growth of wages.

The New Zealand Superannuation Fund is required to facilitate tax smoothing over a forty-year period. By law, the government’s contribution rate is linked to the fund’s performance and there can be no withdrawals from the fund before 2020. Its investment goal (set by the “Guardians”, the governing body of the fund) is to exceed, before New Zealand tax, the interest rate on New Zealand Treasury bills by at least 2.5% p.a. over rolling 20 year periods.

In contrast the requirements on the Korean National Pension Fund and the Swedish AP Funds are relatively sparse. The Korean fund is managed and run “for the purpose of maintaining and increasing the value of the fund in order to achieve the long-term stability of the fund”.⁷ The fund’s investment policy statement defines a long-term goal to align its return with the pace of GDP growth. The Swedish AP Funds are required to manage assets so as to achieve the greatest possible return on investments, but “total risk levels must be low”.⁸ A similarly vague investment objective is applied to the Norwegian Government Pension Fund, which is expected to achieve a “high financial return subject to moderate risk”. However, the government’s planned withdrawal of 4% of the fund is based on its expectation of the fund’s long-term real rate of return, so this level of investment return has effectively become the Fund’s target.

Statement of investment policy and portfolio limits

Reserve funds should have written statements of investment policy

Most countries require the reserve fund to have a written statement of investment policy and to review it regularly. As a minimum such statement covers:

- The strategic asset allocation (main asset classes);
- The extent to which external managers may be used and how they are to be selected and monitored;
- To what extent and how active investment management will be pursued; and
- The criteria for assessing the performance of the reserve fund and the different portfolio components.

Political influence has been observed in the past in the investment of some reserve funds

The investment strategy is set out by the fund’s governing body. In countries where this body is housed in a government ministry or parliament, like Japan, Korea and Norway, there is greater scope for political influence on investment decisions and in particular for investing the fund for macro-stability or developmental goals. For example, in Korea and Japan, the government has in the recent past pressed their respective reserve funds into buying shares to support the stock market at times of financial weakness, such as during the 1997-8 Asian financial crisis. Before its 2001 reform, the Japanese reserve fund was also largely used to invest and lend money to government agencies for public works in the country. Until 2000, the Korean fund was also required to deposit part of its annual receipts with a government agency to invest in rural areas, infrastructure and for providing loans to the poor and small companies.⁹ The fund also has a small “welfare sector” investment allocation (less than 0.5% of assets), which includes direct loans to individuals for housing and schooling and lending for building recreational and care facilities for senior citizens, children, and the disabled.

Few investment limitations on reserve funds are imposed

One of the most remarkable aspects of the regulatory environment of the reserve funds surveyed is that with the exception of Ireland, Japan, Korea, and Sweden there are no major investment limitations. The only quantitative investment limit applied to the Irish NPRF is the prohibition to invest in Irish government securities. The Japanese GPIF's investments are mainly restricted to domestic listed equities and bonds, though this is the outcome of the medium term investment plan developed by the GPIF and approved by the Ministry of Health, Labour and Welfare. Until 2007 the investment policy excluded any allocation to alternative investments and allowed the use of derivatives for hedging purposes only.¹⁰ The fund's investment committee has also established additional investment limitations (the portfolio invested in foreign bonds must be less than the portfolio invested in foreign equities which in turn must be less than the portfolio invested in domestic equities). A similar situation exists in Korea, where the National Pension Fund's investment committee develops an investment policy that ultimately needs to be approved by the National Assembly. The asset allocation has become increasingly diversified over time and since 2003 includes foreign securities and alternative investments. By 2009, the overseas asset allocation and the alternative investments allocation are to be raised to 12% and 3% of the fund, respectively.

The following restrictions by asset class are applied to the Swedish AP Fonden since 2001:

- Only investments in capital market instruments which are quoted and marketable are permitted. Direct loans are prohibited.
- No more than 5% of the funds' assets may be invested in unlisted securities. These investments must be made indirectly via portfolio management funds or similar.
- At least 30% of the funds' assets must be invested in low-risk interest-bearing securities.
- No more than 40% of assets may be exposed to currency exchange risk.

The reserve funds in these countries also face additional restrictions intended to ensure diversification or to avoid direct control of corporations by reserve funds. The Irish NPRF is prohibited from controlling any company or hold such percentage of the voting rights in any company that would require it to seek control of that company. The Japanese GPIF's investment policy sets a ceiling of 5% of its assets in securities issued by a single company and it limits its ownership of a given company to 5% of the firm's equity. The GPIF is also not expected to exercise directly shareholder rights but may do so only via the private financial institutions to whom investment is entrusted. Similar restrictions are applied via legislation to the Swedish reserve funds:

- No more than 10% of a fund's assets may be exposed to one issuer or group of issuers.
- Shares held in listed Swedish corporations may not exceed 2% of total market value.
- Each fund may not own more than 10% of the votes of in any single listed company.

Some of the reserve funds in other countries face prudential restrictions of this same nature (diversification and ownership limits), but in most cases these are imposed by the funds themselves. The main case of a legislative or governmental limit is the ceiling of 5% on the Norwegian Government Pension Fund's ownership of a stake of any company. This ceiling is established by the Ministry of Finance and was raised from 3% in 2006.

Socially responsible investment

Most reserve funds are active SRI investors

Socially responsible investment (SRI) is also an area of increasing interest among reserve funds. SRI involves assessing extra-financial risks in investment decisions, in particular those related to environmental, social and corporate governance (ESG) factors. In its origins, SRI focused primarily on ethical factors, but such considerations are now treated separately from the more objective concerns over environmental impact or corporate governance practices. Nonetheless, some reserve funds, like Norway's Government Pension Fund, puts a strong focus on ethical investment, and in particular, weapons manufacturing.

The implementation of SRI policies has traditionally relied on a screening mechanism, where either "non-compliant" companies were excluded from a portfolio (negative screening) or where companies seen to be socially responsible were selected for inclusion in the fund ("positive screening"). These approaches have been superseded in recent years by a shareholder engagement approach which seeks to change company behaviour via the exercise of voting rights and other mechanisms of corporate governance. This approach is also favoured by the UNEP FI's Principles of Responsible Investment, to which six of the eight reserve funds surveyed are signatories (Canada, France, Ireland, New Zealand, Norway and Sweden).

A few funds still use a "negative screening" approach to SRI

Some reserve funds still use a negative screening approach to SRI. Norway's reserve fund, for example, has been applying a selective negative screen which has led to the exclusion of many large companies, including well-known firms such as Wal-Mart, EADS, Lockheed Martin, hales, BAE Systems, Boeing, Finameccanica and Honeywell International because of their involvement in weapon manufacturing. Wal-Mart was later excluded because of violations of basic labour rights. In September 2006, Sweden's AP2 fund followed the Norwegian reserve fund's example and decided to liquidate its Wal-Mart holdings.

Other reserve funds have specifically incorporated SRI criteria into their investment policy or engaged part of their portfolio in this manner. These include the Canadian, French, Irish, Swedish and New Zealand reserve funds.

Asset allocation and performance

While some of the older reserve funds surveyed started operations with conservative portfolios, invested mainly or solely in fixed income securities or loans to public entities (Canada, Korea, Japan and Norway), investment policies have rapidly veered in recent years towards equities and other asset classes in the higher risk-return spectrum, including in some cases private equity, hedge funds, commodities, and other alternative investments (see Table 3). The more recent funds (France, Ireland, New Zealand and Sweden) have all started with diversified portfolios that included at least a sizeable allocation to equities.

Some PPRFs are also increasing their allocation to foreign assets, though this information is not readily available for some funds. Countries with high foreign investment allocations in their reserve funds in 2006 include Norway (the Government Pension Fund – Global is fully invested overseas), New Zealand (75.9% overseas investment), Ireland and France (35.4% and 29% of total assets, respectively, invested in non-euro assets). On the other hand, foreign assets account for only 9.6% in Korea and 25.5% in Japan.

Table 4. **Asset allocation information of PPRFs in 2006**

	Equities	Bonds	Cash	Property	Alternative investments
Canada	58.5	31.8	0.6	4.6	4.5
France	62.1	26.4	11.5		
Ireland	77.1	13.3	4.7	3.0	0.6
Japan	37.3	62.7	0.0		
Korea	8.9	89.3	0.4		1.2
New Zealand	60.0	20.1		7.2	12.7
Norway	40.7	59.3			
Sweden	59.5	36.7	0.8		

Note: Australia is August 2007. Ind. Of govt.: independent of government. SSRF stands for Social Security Reserve Fund. SPRF stands for Sovereign Pension Reserve Fund. For definitions see main text. Japan's National Reserve Funds reflect assets managed by the Government Pension Investment Fund (GPIF).

Source: Blundell-Wignall *et al.* (2008).

Information on gross and net of fees performance in recent years is also readily available from the reserve funds' respective annual reports, but it is not always clear whether all investment management fees are deducted. All countries use a market valuation approach, but there are some differences in the methodology for calculating for rates of return. An assessment of investment performance is however difficult since half of the funds surveyed were established after 1999 while those that were established earlier (*e.g.* Canada, Japan, Korea and United States) do not have readily accessible statistics on historical performance. The feasibility of such an exercise is also questionable given that these funds were historically invested only in loans to public agencies or non-marketable government bonds.

The information on performance reported by the funds in recent years shows that on average they have been able to meet their long-term return targets and have also done better than their market benchmarks, even after taking management fees into account. Overall, therefore, both in terms of transparency and management efficiency the assessment is generally positive (see Vittas et al. (2008)).

Asset management

The smaller reserve funds tend to delegate more to external asset managers

Policies in the implementation of asset management vary across reserve funds. Some, like the French and Irish reserve funds are required to fully externalise their asset management. In the case of the Swedish AP Fonden, at least 10% of assets must be managed by external fund administrators. This decision can be explained by the government's wish to isolate the funds from political pressures.

On the other hand, a few reserve funds are large enough to allow them to carry out a significant part of their investment in-house. Three noteworthy cases are the Norwegian Government Fund which carries out 80% of its asset management in-house (by Norges Bank Investment Management), the Korean National Pension Fund, with 90% in-house management, and the Canadian reserve fund. The CPP Investment Board also has a series of units in charge of investments in specific areas such as private equity, real estate and infrastructure.

The Japanese GPIF, despite its size, relies to a large extent on external asset managers for its non-debt and foreign investments. It reviews the composition of external asset managers (manager structure) once every three years and invests largely in a passive manner, tracking market indices. The weight of passive to total investment ranged from 72% for the foreign bond portfolio to 80% for the foreign equity portfolio in March 2007.

VI. Conclusions

The public pension reserve funds reviewed in this report can be considered to be largely compliant with OECD standards of good pension fund governance and investment management. In particular, the requirements of accountability, suitability and transparency are broadly met by these reserve funds. However, some specific details of the fund's governance structure and investment management could be improved to better isolate them from undue political influence, ensure a level-playing field in the institutional investment market, and to enhance the expertise in the management of the funds.

The following can be considered international examples of good governance and investment management of reserve funds, complementing those required by the OECD and ISSA guidelines:

- Reserve funds should be under the ultimate oversight responsibility of a board (the governing body) composed of members with the necessary collective investment knowledge and experience to carry out their functions effectively. Board members should be appointed following a transparent selection and nomination process. The reserve fund's board may be an independent committee or the board of the management entity in charge of the operation of the reserve fund.
- Reserve funds should be served operationally by an autonomous management entity, dedicated exclusively to the administration and investment of the reserve fund assets. Where such separation cannot be guaranteed, there should be a department in the management entity exclusively dedicated to the reserve fund.
- Where justified on economic grounds (*e.g.* for small funds and special asset classes such as alternative investments), reserve funds should aim to carry out as much as possible of their investment via external asset managers, selected where relevant via a competitive bidding process.
- Reserve funds should have clear mandates and specific measurable objectives, such as funding ratio and investment return targets. The performance of the board should be measured against these objectives.
- Legal investment restrictions should be limited to those concerning basic diversification, such as exposure to single issues or issuers. The setting of restrictions on broad asset classes should be left to the board of the reserve fund as part of the design of the investment policy.
- Reserve funds should be subject to a strict disclosure policy, requiring them to make their annual report publicly available,

containing its audited financial statements as well as information on asset allocation and performance. Other documents that should be publicly disclosed are the statement of investment policy and the code of conduct. Additional oversight may be exerted by relevant public entities (for example, the pension fund supervisory authority) and parliament.

The study has revealed that the reserve funds surveyed follow most of the practices above. In particular, there is a high degree of public disclosure and oversight by parliament or public sector entities and relevant experience requirements on board members, though these vary across countries. There are only a few exceptions to this generally positive assessment. For example, the Korean and the Norwegian reserve funds are under a governing body housed in a ministry, rather than under an independent committee or the board of an autonomous management entity. The asset allocation of the Japanese reserve fund (the GPIF) is also decided by a Ministry, rather than the GPIF's board. In the other countries surveyed, the governing body is either an independent committee or the board of an autonomous management entity, and its members are required to have some expertise and knowledge in investments and fund management.

The absence of an arms-length relationship between the government and the reserve fund's governing body can also facilitate political interference in the management of the fund. Both the Japanese and Korean reserve funds have been used in the past for financial stability and developmental goals that may come into conflict with their stated objective to achieve a good investment performance in order to improve the financing of the pension system.

Norway is the only country surveyed whose fund does not have an exclusive mandate to finance public pension benefits. The flexibility retained by the government, while possibly necessary as far as government fiscal objectives are concerned is not conducive to better predictability of the fund's outflows and hence limits the board's ability to set clear investment objectives.

Investment objectives are most clearly defined in a few reserve funds that have set specific investment return targets, allowing a better monitoring of the fund's performance and enhancing the accountability of the governing bodies of these funds. Such practice should be more widespread than is currently the case.

Quantitative investment restrictions are also applied in some countries. Some of these can be justified on prudential grounds (*e.g.* limits on investment in singles issues and issuers) or as a way to limit the direct control of companies by these public sector entities (*e.g.* limits on control of company votes or ownership of a company's shares).

However, legislation in Sweden sets an investment floor on fixed-income securities, a practice that is discouraged by the OECD Guidelines on Pension Fund Asset Management. In countries such as Korea, Japan and Norway where the ultimate decision-making body is a government ministry or parliament, changes in the fund's investment policy can also become mired in political debate.

Reserve funds make a great use of external asset manager, reducing the possible concerns over political influence and public control of private companies. However, for some of the larger funds, the direct investment of part of the portfolio is an inevitable consequence of the attractions of economies of scale.

Overall, therefore, the OECD reserve funds surveyed show relatively high levels of governance and investment management, but there are some important differences across countries and areas where a strengthening in governance and investment management practices is called for. Further research could be conducted to assess the impact of any identified weaknesses on the fund's operation and in particular on its investment performance. It would also be valuable to extend the analysis to non-OECD countries.

Notes

1. The report does not address the question of the role of these reserve funds in the corporate governance of the companies that they invest in. The relevant OECD standard on this issue is the "OECD Principles on Corporate Governance" (OECD (2004)).
2. The policy proposals considered in this report draw partly on the OECD Guidelines on Corporate Governance of State-Owned Enterprises (OECD (2005b)).
3. In order to offset demographic shocks, policies need to be guided primarily to increase the size and productivity of the working population.
4. In March 2007, about one quarter of the Japanese reserve fund assets were held in deposits to the Fiscal Loan Fund. These funds are expected to be transferred to the GPIF by 2009.
5. Norway's Government Pension Fund consists of two funds, the Government Pension Fund - Global invested exclusively abroad and financed from oil revenues (formerly, the Norwegian Petroleum Fund) and the Government Pension Fund - Norway that invests mainly domestically (formerly, the National Insurance Scheme Fund). Both are discussed in this report, though the Government Pension Fund - Global is often classified as a Sovereign Wealth Fund (see Blundell et al. (2008)).
6. Act No. 2001-624 of July 17, 2001, amended by Act No. 2003-775 of August 21, 2003, on the reform of pensions, codified in the Social Security Code, in Chapter V bis entitled Fonds de réserve pour les retraites in Articles L135-6 to L135-15.
7. Quoted from the 2004 Annual Report on National Pension Fund Management.
8. Quoted from the Law Establishing the AP Funds.

9. The allocation to this public agency was reduced sharply from 71.5% of total assets in 1998 to 4.8% in 2004.
10. A review of the investment policy in 2008 includes a new allocation of 5% to hedge funds.

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Funding Regulations and Risk Sharing

Colin Pugh and Juan Yermo*

This paper provides a description of the risk sharing features of pension plan design in selected OECD and non-OECD countries and how they correspond with the funding rules applied to pension funds. In addition to leading to a better understanding of differences in funding rules across countries with developed pension fund systems, the study considers the trend towards risk-based regulation. While the document does not enter the debate over the application of risk-based quantitative funding requirements to pension funds (as under Basel II or Solvency II), it identifies the risk factors that should be evaluated and considered in a comprehensive risk-based regulatory approach, whether prescriptive or principles-based. The three main risk factors identified are the nature of risks and the guarantees offered under different plans designs, the extent to which benefits are conditional and can be adjusted, and the extent to which contributions may be raised to cover any funding gap. In addition, the strength of the guarantee or covenant from the sponsoring employer(s) and of insolvency guarantee arrangements should be carefully assessed when designing funding requirements.

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Executive summary

This document develops one aspect of the project of the OECD Working Party on Private Pensions on the efficiency and effectiveness of private pension regulation, namely the funding of defined benefit (DB) and other pension plans with benefit (or return) promises and its interaction with the risk sharing features of these plans.

The study starts from the basic premise that funding regulations should promote high levels of benefit security at a reasonable cost to members, sponsoring employers and other stakeholders. As a result, funding regulations should take into account the nature of benefit promises, and in particular the specific risks being guaranteed, and the way those are shared between the different stakeholders. Policymakers should also consider the impact that changes in accounting and tax rules may have on employers' willingness to sponsor occupational pension plans with promises.

At the same time, there are other regulations, grouped under the generic goal of protection of the rights of members and beneficiaries, that affect directly the nature of the benefit promise itself, such as regulations over vesting, portability, indexation as well as statutory minimum benefits and investment return requirements.

The trade-off between benefit security and cost is one that requires careful analysis and is obviously being resolved in different ways across countries. It is not possible to define an ideal model of funding regulations or member protection requirements. However, policymakers should at least consider the impact of regulations on sponsor's willingness to sponsor different kinds of pension arrangements. Certain regulations may hamper the development of plan designs which offer a level of benefit security between traditional defined benefit ones and "pure" defined contribution arrangements. Such plans, which are grouped under the generic name of hybrid DB arrangements, share risks between sponsors and employees or between different cohorts of workers. Examples of such hybrid DB plans include cash balance and conditional indexation plans. From the perspective of plan members, hybrid DB plans are a priori superior to "pure" DC arrangements as they reduce the uncertainty over benefit levels inherent to the latter.

The study provides a description of the risk sharing features of pension plan design in selected OECD and non-OECD countries and how they correspond with the funding rules applied to pension funds. In addition to leading to a better understanding of differences in funding rules across

countries with developed pension fund systems, the study considers the trend towards risk-based regulation. While the document does not enter the debate over the application of risk-based quantitative funding requirements to pension funds (as under Basel II or Solvency II) and does not address cross-border issues, it identifies the risk factors that should be evaluated and considered in a comprehensive risk-based regulatory approach, whether prescriptive or principles-based.

The three main risk factors identified are the nature of risks and the guarantees offered under different plans designs (with risks falling under three main groups - market, biometric, and operational risks), the extent to which benefits are conditional or can be reduced, and the extent to which contributions may be raised to cover any funding gap. In addition, the strength of the guarantee or covenant from the sponsoring employer(s) and of insolvency guarantee arrangements should be carefully assessed when designing funding requirements. One important implication from this approach is that plans with strong risk sharing features (for example, conditional indexation, nominal benefit cuts as last recourse, and flexible contribution policies) may have lower funding needs than traditional DB arrangements with mandatory indexation.

This document could be followed with more specific recommendations regarding the design of funding rules, in line with the project on regulatory efficiency and effectiveness. Another area for possible future research is intergenerational risk sharing and the implications for pension regulations. While in many countries plan sponsors act as providers of financing and guarantors of benefits, pension costs to employers are in the long-term transferred to employees via lower wage settlements. Hence, ultimately pension-related risks are also being redistributed across different generations of workers. Making such intergenerational risk sharing more explicit and transparent can help policymakers design better regulations.

I. Introduction

OECD Guidelines on funding set out basic regulatory requirements

In April this year the OECD Council approved the Recommendation on Guidelines on Funding and Benefit Security in Occupational Pension Plans which were developed by the Working Party on Private Pensions. These guidelines set out basic requirements for the funding of pension promises in occupational pension plans.

There is a wide variation in funding regulations across countries

In practice, funding regulations show a high variation across countries, with some allowing for relatively long periods of underfunding, up to 7 years in many cases (*e.g.* Austria, Canada, Finland, Ireland, Japan, Portugal, South Africa, Switzerland, United Kingdom and the United States), while others require the build-up of buffers or solvency margins on an on-going basis and a much quicker recovery to full-funding levels (*e.g.* Denmark, Finland, Germany, Iceland, Netherlands, Norway and Sweden).

Stricter funding rules are applied in countries where pension funds are not financially backed by sponsoring companies

These two basic country groupings roughly coincide with the two main types of plan, the former group being that of traditional DB arrangements (mainly final pay), where benefits are underwritten by sponsoring employers, while in the second group pension funds tend to be more detached from sponsoring employer. In some of the countries of this second group pension funds directly underwrite benefits and do not benefit from an employer guarantee.¹ Another important and related distinction between these two groups is that in the former, pension funds are not established or regulated as life insurance undertakings while in the latter group pension funds are either a form of life insurance undertaking (industry-wide funds in Denmark, *Pensionskassen* in Germany, and pension insurance companies in Finland, Norway and Sweden) or are regulated in a somewhat similar way to insurance companies (pension funds in Finland, Iceland, Netherlands and Norway).

Funding regulations in some countries also take into consideration the extent of risk sharing

Occupational pension plans also differ in the extent to which the benefit promises made are irrevocable and whether employees also contribute to the plan. In some countries, benefits can be adjusted in line with some measure of the financial strength of the pension fund or the sponsor. For example, in the Netherlands, the indexation of accrued benefits and pensions in payment is linked to the funding level of the pension fund. This introduces a form of risk sharing between the plan sponsors and beneficiaries. An even more flexible arrangement exists in Japan and Portugal for DB plans. Even nominal, accrued benefits can be adjusted if the pension fund is in financial difficulties (Portugal) or if both the pension fund and the sponsoring company are in financial difficulties (Japan). With the consent of the plan members, the plan sponsor and the regulator, it is also possible to reduce accrued benefits in the Netherlands. In the United States, pension plans must reduce or eliminate lump sums (and freeze benefits) if not well funded, and Multi-Employer plans can reduce various benefits if not well-funded.

Risk sharing can also be implemented via the contribution policy. In contributory DB plans, employers and employees may share the risk of underfunding of any pension promises. Risks may also be distributed among specific categories of workers. For example, most DB pension plans have waiting and vesting periods, before which departing workers may not earn any pension rights. These plan features shift pension risks from long to short-tenure employees. There is also the more complex subject of intergenerational risk sharing, *i.e.* the transfer of risks between different generations of plan members and beneficiaries and plan sponsor shareholders. Any pension plan that offers some type of benefit promise in effect involves an intergenerational contract, whereby future workers and shareholders share some of the cost of meeting that promise. Although this document does not attempt to address the issue, it deserves further research.

Regulations can affect risk sharing arrangements

Pension plan regulations can alter these risk sharing arrangements and shift risks in one or other direction. For example, mandatory indexation requirements for DB plans in the United Kingdom (5% for benefits accrued prior to 2005, 2.5% thereafter), have turned a “soft” promise into a statutory right of beneficiaries and shifted part of the indexation risk (up to the cap) to sponsoring employers. The opposite shift has taken place in some countries such as Italy, Hungary or Poland, where occupational DB plans are not allowed. In countries such as Italy where voluntary pension plans can only be pure DC, risks are borne solely by the beneficiaries.

Although insurance contracts are an allowed alternative to pension funds in many countries, it should be noted that the regulation of *insured* pension contracts is not within the scope of this paper or the project. Fully insured contracts are now to be found in only a handful of countries. In these countries and elsewhere, insurance companies are becoming increasingly reticent to take on mortality, investment and other pension risks and are moving rapidly to offering unbundled investment management, actuarial, administrative and other services. They generally offer completely individualized, segregated funds to their larger clients and unit-linked funds to their small and medium-sized clients. In many countries, there is a direct contractual relationship between the plan sponsor and the insurance company, as such arrangements are permitted in lieu of establishing a trust, pension foundation or equivalent funding entity. Unless otherwise indicated, this paper will focus on conventional pension funds established through pension entities other than insurance companies.²

The document is divided as follows. Section II presents the main types of pension plans, focusing on their risk sharing features. Section III discusses the impact of regulations on plan design, covering both regulations that have a direct impact as well as those that indirectly affect the choice of pension plan. Section IV takes the opposite approach, analysing how funding regulations may take account of plan design and risk sharing features in order to ensure adequate funding, and hence high levels of benefit security, without impeding the operation of flexible plan designs. Section V concludes. Specific country information is provided in the Annex which contains comparative information on funding rules.

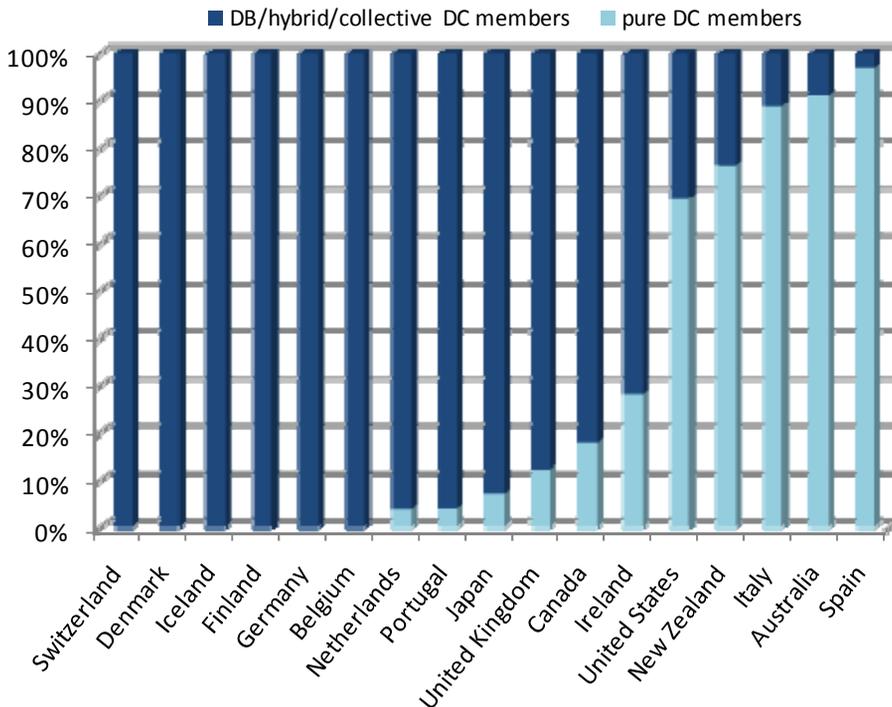
II. Plan design and the nature of risk sharing

There are many kinds of pension plans with risk sharing features

The OECD classification (OECD 2005) identifies two main types of occupational pension plan, defined benefit (DB) and defined contribution (DC). Under defined contribution plans the plan sponsor pays fixed contributions (usually a percentage of salaries) and has no legal or constructive obligation to pay further contributions to an ongoing plan in the event of unfavourable plan experience. Defined benefit plans are classified by default, as plans other than defined contribution ones. This classification follows that of International Financial Reporting Standards (IFRS), under IAS19. The OECD classification provides a further breakdown of these two basic categories which allows a more precise understanding of the nature of the benefit promise and of risk sharing within DB³ and DC plans:

- Traditional DB.
- Hybrid DB.
- Protected DC (including collective DC plans).
- Unprotected or “pure” DC.

Figure 1. Main type of occupational pension plans in OECD countries (2006)



Source: OECD Global Pension Statistics.

“Pure” defined contribution plans still account for a small part of membership, but they are growing fast

Figure 1 groups occupational pension plan members in selected OECD countries into two main categories: plans with promises, including traditional DB, hybrid DB and collective DC, and “pure” (or unprotected) DC on the other, where all plan risks are transferred to the member during the accumulation stage. A large number of OECD countries rely mainly on the former type of plans. However, some countries are experiencing rapid changes in plan provision. For example, in the United Kingdom, a large part of private sector workers that are members of DB pension plans belong to plans that are closed to new entrants.

Traditional DB plans

Final pay plans’ popularity is rapidly declining in many countries

Traditional DB plans are those where benefits are linked through a formula to the members’ wages or salaries, length of employment, or other factors. Originally, DB plans used to be based on a final-pay formula, the benefit being calculated as the product of a percentage (the so-called accrual rate) of the worker’s salary in the last year (or few years) before retirement and the number of years of service. In some countries, career-average plans had also been popular in the distant past, and they are now seeing a resurgence in some countries such as the Netherlands, though in a hybrid form (see below). Under “traditional” career-average plans, accrued benefits are calculated using the average of past wages revalued with a measure of the cost of living or average wages. Different benefit accrual formulas lead to different forms of risk sharing.

Traditional DB plans usually pay benefits in the form of annuities, may adjust benefits in payment to the cost of living (indexation), and have traditionally offered generous early retirement provisions. Discretionary benefit improvements and contribution holidays were also common in the past whenever the plans accumulated large surpluses.

Under traditional DB plans, risks are laid largely on the sponsoring employer. Even in the countries where employees contribute to such plans, their contribution rates tend to be fixed while those of the plan sponsor vary with the plan’s funding needs. An exception is the Netherlands, where employees’ contribution rates in some plans may also be changed if needed. This risk sharing feature, among others, may explain the durability of DB plans in the Netherlands. Employee contribution rates can also be changed in other countries, like the United Kingdom, subject to all the necessary agreements.

Hybrid DB plans

The extent of risk sharing varies across the different types of hybrid plans. Some hybrid plans introduced recently in OECD countries may have actually led to a higher level of risk for the plan sponsor. There are four main types of hybrid plans:

Hybrid plans involve some

*kind of risk
sharing with
employees*

- Conditional benefit plans: benefits are calculated as in a traditional defined benefit plan but there is an element of conditionality tied to the performance of the fund, the member's longevity expectations or other factors. For example, conditional indexation plans are those where the revaluation of past wages (used to calculate benefit accruals) and the indexation of benefits in payment is tied to some measure of the plan's financial strength. Other variations of these conditional DB plans are those where the benefits or the retirement age are automatically linked to improvements in life expectancy.
- Cash balance plans: benefits are calculated on the basis of a notional individual account that earns a specified rate of return, which can be a fixed percentage, the return on an index tracker fund, or the return on several funds selected by participants (plan assets do not necessarily have to be invested in those funds). Benefits may be paid as a lump-sum or converted into an annuity.
- Nursery plans: benefits are calculated on a DC basis up to a certain age and on a DB basis thereafter.
- Floor or underpin plans: benefits are the higher of a DC and a DB formula.

Of all four kinds of hybrids, conditional benefit plans may present the lowest risks for plan sponsors as benefits can be adjusted with the plan's financial situation. Such plans have become popular in the Netherlands in recent years. Cash balance plans also lower risks to sponsors relative to traditional defined benefit plans, since the interest credit is generally modest and the initial pension amount is normally adjusted for longevity and interest rates at retirement. The risks borne by sponsors are even lower wherever participants choose lump sum distributions as opposed as annuity-like payments. Cash balance plans are common in Japan and the United States, where they have replaced traditional DB arrangements. The Swiss occupational pension system may also be considered a type of cash balance arrangement, though some plan sponsors have been able to account for their plans under the DC classification of IAS19.⁴

Under cash balance plans longevity risk is borne by the participant until retirement (*i.e.*, if, while working, expected life spans increase, employees will be charged higher annuity prices when they retire), while pre-retirement investment risk is borne by the plan sponsor. At retirement, the participant normally bears the risk of the available annuity conversion rates being expensive due to low interest rates at time of purchase. If the annuity option is taken, post-retirement investment and longevity risk may be borne by the sponsor (if the plan guarantees a fixed annuity conversion rate or if it is self-annuitising) or may be shifted to an insurance company via the purchase of annuities. The investment risk (and reward) can also be taken by employees if they can choose a variable annuity.

Under nursery plans, plan sponsors bear investment and longevity risks only from the age at which benefits start being calculated on a traditional DB basis. Unless this age is high, sponsors will bear added risk in these plans relative to cash balance arrangements.

Finally, in floor or underpin plans, plan sponsors bear both investment and longevity risks, just as in DB arrangements, while participants bear only upside risk potential in the form of higher benefits if the DC formula turns out more favourable than the DB one. For a given level of DB benefits, such arrangements are clearly more costly for employers than a traditional DB plan, as benefits may never be lower than those guaranteed under the DB formula and may be higher if the DC accumulation formula yields a higher benefit.

Protected DC plans

There is also growing interest on collective DC arrangements

Protected occupational DC plans are those where the pension entity or provider guarantees or targets a specific rate of return or benefit, but there is no automatic claim to the sponsoring employer in case of underfunding.⁵ Protected DC plans include collective DC and insured DC plans. The two are equivalent, the key difference being that a collective DC plan is financed by a pension fund while an insured DC plan is financed by a life insurance company. The main OECD examples of collective DC plans are Denmark and Iceland. The nature of the guarantee is different in these two countries. Pension funds and pension insurance companies in Denmark offer a guaranteed interest rate and annuity conversion rate, plus a variable bonus on the return that depends on investment performance. The guaranteed interest rate can be lowered, but this only affects new entrants to the plan. In Iceland, on the other hand, pension funds guarantee a minimum replacement rate of 56% of the worker's reference wage. Benefits above this minimum level can be lowered. Pension funds react to underfunding caused by negative investment performance by adjusting downwards accrued benefits and pensions in payment, but leaving future benefit accruals unchanged. If the difficulties stem from benefits thought to be too generous given mortality and morbidity rates, the benefit rules for future accruals are changed.

The Netherlands has also started to introduce a small number of so-called collective DC plans, but they are not directly comparable with the arrangements in Denmark and Iceland. Under the Dutch arrangements, as they are currently evolving, they are essentially career-average earnings plans with conditional indexing and a conservative employer contribution rate fixed over a certain time period (usually five years). If the fixed contributions are coupled with favourable investment performance, full or partial indexation will be given. At the other extreme, if the plan experience is particularly unfavourable, future benefits or even accrued benefits could be reduced. These plans are still in the early stages of development, and various questions remain unanswered. In particular, it remains to be seen whether employers will be called to bail out severely underfunded pension funds.

Unprotected or “pure” DC plans

Pure DC plans expose members fully to investment and longevity risk during the accumulation phase

Unprotected occupational DC plans are those where the pension entity or provider does not offer plan members any investment return or benefit guarantee or promise during the accumulation phase. During the retirement phase, however, the member may purchase an annuity which may transfer investment and longevity risks to the provider. The plan sponsor’s sole obligation is to pay its fixed contribution rate, and it is not subsequently exposed to any pre-retirement or post-retirement investment, longevity or related risks. They are frequently referred to as “pure” DC plans.

III. The impact of regulations on plan design

Regulations can affect plan design directly and indirectly

Regulations drive plan design in two main ways. Firstly, there are rules that require plans to meet certain design criteria. These have a direct effect on plan design and are discussed next. Other regulations, and in particular funding regulations, while they do not directly restrict the design of plans can nonetheless affect it indirectly. This indirect effect may be important in some countries as these types of regulations can increase the cost of certain forms of benefit provision.

Regulations directly mandating aspects of plan design

Certain plan designs are prohibited in some countries

Although in many countries occupational pension plans are established on a voluntary basis, many countries regulate various aspects of the plan’s design. Table 1 describes the types of plans permitted by the law as well as any regulations on minimum returns and benefits. In some countries like Italy, occupational DB plans are not allowed anymore. On the other extreme of the regulatory spectrum, unprotected DC plans are prohibited in Belgium⁶, Germany, and Switzerland. In all these countries, regulators impose a minimum rate of return on investments on occupational pension plans (3.75% and 3.25% in Belgium for employee and employer contributions, respectively, and 0% in Germany as at least the contributions promised minus, if applicable, the risk element of contributions must be guaranteed at retirement. From a classification perspective, these rules effectively make all seemingly DC plans in Belgium and Germany DB in nature as employers must guarantee any return or benefit promise. Mandatory occupational pension plans in Switzerland (BVG/LPP) are also subject to a statutory interest rate and annuity conversion rate, but there is less clarity in the legislation over the sponsor’s responsibility over these guarantees.

Regulations in some countries also restrict the type of hybrid plans that may be established. For example, in Japan the only type of hybrid DB plans permitted are cash balance plans. Furthermore, the revaluing rate (or interest

credit) applied to the accrued balance must be based on one of the following:

- a constant interest rate;
- the average rate of return on sovereign bonds, the rate of growth of wages or the rate of growth of the Consumer Price Index;
- a combination of the two above-mentioned options;
- one of the above-mentioned two rates with a maximum or minimum rate.

Table 1: **Plan type regulations in selected OECD countries**

Country	Plan type regulations
Australia	All plan types permitted.
Austria	All plan types permitted.
Belgium	Annual minimum return of 3.75% on employees' contributions and 3.25% on employer contributions, guaranteed by sponsoring employers, making all plans underpin DB.
Finland	Accrual rates in the statutory system are fixed giving a 77.5% replacement rate to a full career worker.
Germany	Only DB plans are permitted as employers have to guarantee at least contributions promised minus, if applicable, risk elements of contributions.
Iceland	Minimum 56% replacement rate (based on career average earnings) at 67 with 40 years of service.
Ireland	All plan types permitted, but there are specific revaluation requirements for all DB plans (see Table 2).
Italy	No DB plans can be established under the new regulatory framework
Japan	Only hybrid plans permitted are of the cash balance type.
Netherlands	All plan types permitted.
Norway	All plan types permitted.
Spain	All plan types permitted.
Switzerland	Minimum investment return of 2.25% and mandatory annuity conversion rate of 7.1 for men and 7.15 for women (to be gradually reduced to 6.4% between 2008 and 2011).
United Kingdom	All plan types permitted, but there are specific revaluation and indexation requirements for DB plans (see Table 2).
United States	All plan types permitted.

Source: OECD.

Regulations in several countries, usually tax regulations, also impose a maximum on either the salary that can be recognized for pension purposes under a qualified pension plan or the maximum annual or lifetime benefit accrual. Examples are Canada, the United Kingdom and the United States, countries where the gap between average and executive salaries continues to widen. The maximum pension accrual under a Canadian pension plan is the lesser of 2 percent of earnings and C\$2 333 (for 2008) per year of service. The dollar limit will be increased to C\$2 444 for 2009 and will be indexed to average wage growth starting in 2010. The Dutch government is also proposing to introduce a ceiling of 185 000 on annual pensionable salaries. Although the

rationale behind many of these limits is easy to defend, it means that executives are looking less and less to the company's pension plan for their retirement income.

Risk sharing is also restricted in some countries by regulations or tax requirements affecting the extent to which employees can contribute to an occupational pension plan. For example, in the United States, employee contributions to DB plans and conventional DC plans are not tax-deductible, while those to special forms of DC plans (such as 401(k)'s) are. Other countries where almost all DB plans are non-contributory include Portugal and Sweden. In almost all other countries, where DB plans are contributory, employee contribution rates tend to be fixed. This contrasts with the situation in countries such as Denmark and Iceland with collective DC plans, where employee contribution rates may also be adjusted. Another exception is the Netherlands, where employee contributions are often variable and where many conventional DB pension plans raised employee contribution rates after 2000, while a few have been converted into a Dutch variation of collective DC plans.

*Other aspects
of plan design
that are
regulated
include
vesting and
indexation*

Pension regulations also determine other specific aspects of the design of DB plans. Table 2 below presents in a highly simplified form the main regulations that affect benefit design of DB plans in selected OECD countries. The regulations are the following:

- *Vesting*: time period after which terminating employees are entitled to the benefit of the employer financed portion of their accrued benefits.
- *Benefit*: the form of the benefit paid at retirement; usually a life annuity, lump-sum, instalment payout or capital drawdown, or a combination thereof.
- *Revaluation*: how deferred benefits of departing employees (early leavers) are revalued during the period until commencement to compensate for inflation.
- *Indexation*: how benefits in payment are indexed over time to compensate for inflation.

Table 2: Main DB benefit design regulations in selected OECD countries

	Vesting ¹	Benefit ²	Revaluation ³	Indexation ⁴
Austria	Max. 5 yrs	Annuities	Not required	Not required
Belgium	Max 1 yr	Flexible	Not required	Not required
Canada	Max 2 yrs	Annuities	Not required	Not required
Denmark	Max. 5 yrs	Flexible	Not required	Not required
Finland	Immediate	Annuities	n.a.	CPI-wages (80%-20%)
Germany	Max. 5 yrs	Flexible	Not required	Inflation
Ireland	Max. 2 yrs	Annuities	CPI 4% cap	Not required
Japan	20 years for annuities; 3 years for lump sums	Flexible	Not required	Not required
Netherlands	Max. 1 yr	Annuities	Not required	Not required
Norway	Max. 1 yr	Annuities	If allowed by fund's solvency	If allowed by fund's solvency
Portugal	None	Annuity (2/3)	Not required	Not required
Spain	Immediate	Flexible	Not required	Not required
Sweden	Immediate	Flexible	Not required	Not required
Switzerland	Immediate	Annuities	n.a.	Not required
United Kingdom	Max. 2 yrs	Annuity (2/3)	RPI 5% cap	RPI 2.5% cap
United States	Max. 5 yrs	Flexible	Not required	Not required

Notes: (1) All countries require immediate vesting of employee contributions. The table addresses vesting of employer contributions. In the United Kingdom, employees must be allowed a transfer value that includes employer contributions as an option after 3 months membership. (2) In Germany, for *Pensionsfonds*, only a maximum of 30% of the capital paid at retirement can be paid out as a lump-sum. (3) In Finland (statutory system) and Switzerland, there is full portability of occupational pension benefits. Deferred pension benefits do not exist. In Switzerland, employees have a right to transfer their accrued benefits to their next employer. Otherwise, funds need to be directed to an insurer or banking foundation that provides pension annuities. There is also an auxiliary fund for all remaining cases. In the Netherlands and Sweden there is full portability within industry plans, which cover the majority of workers. While indexation is not mandatory in the Netherlands, once awarded to pensions-in-payment it must be applied equally to deferred vested benefits of early leavers. (4) In Japan, under contracted-out DB plans, indexation is paid directly by the government. There are no indexation requirements for all other plans.

Source: OECD.

***Vesting rules
are widespread***

There are three striking differences in regulations between these countries. First, only one country, Portugal, does not have explicit vesting rules. The lack of vesting rules means that accrued benefits can be cut. Indeed, in Portugal employers can curtail or altogether withdraw benefits from employees who leave before retirement.

***Some countries
allow the
reduction of
accrued
benefits in
exceptional
circumstances***

In all other countries, accrued benefits are protected by law. However, legislation in some countries makes exceptions. In Japan, the practice of benefit reduction was legalised in 1997, provided that certain conditions were met, including the explicit agreement between labour and management and the existence of business difficulties. For Employee Pension Funds (EPFs), the regulation also requires that benefits other than the substituting portion (which substitutes part of the state-run old-age social security earnings-related pension benefit) to be no less than 10% of the substituting portion. Since then the number of pension funds that have taken up this option has increased rapidly (see Box 1).

In Ireland, the supervisor (Pensions Board) may direct trustees to reduce accrued benefits if no adequate actuarial certificate can be presented. In the Netherlands, in case of underfunding, a pension fund could in principle decide to cut accrued (and vested) benefits, but this decision requires the approval of employers, employees and the supervisor, and is only used as a measure of last resort. In the United States while “anti-cutback” rules generally prohibit the reduction of vested benefits, trustees of Multi-Employer plans can cut benefits of workers (active and terminated) if the plan is weak. The trustees can eliminate lump sums, other payment options (except the life annuity to single employees and the joint & survivor annuity to married ones), other benefits/rights/features not a part of the accrued benefit (*e.g.*, death benefits after retirement and disability benefits), early retirement subsidies and supplements, and benefit improvements in the past 5 years (which can mean some of the accrued benefit can be cut). Once the plan is healthy again, the trustees do not have to bring those benefits back.

***Statutory
reevaluation and
indexation
requirements
are rare***

The second striking fact about Table 2 is that only four countries (Finland, Germany, Ireland, and the United Kingdom) require some form of revaluation or indexation while only in one country (the United Kingdom) are both revaluation and indexation mandatory. In the case of Finland, this regulation only applies to the statutory pension entities that operate under the social security system. This system has mixed financing, partly funded and partly PAYG. The state is therefore effectively guaranteeing the indexation requirements. In Germany, pension plans financed through one of the two insurance vehicles, direct insurance and *Pensionskassen*, do not need to index pensions if surpluses are used to increase benefits. For other financing vehicles, there are different methods of indexation, such as adjustments in line with the lower of price and wage inflation every three years (except when the sponsor is in financial difficulties) or a minimum annual 1% increase.

Box 1. Benefit cuts in Japan

Japanese employers have been able to reduce accrued benefits since April 1997. While there are no official statistics, a private firm, Rating and Investment Inc., conducts an annual survey on benefit cuts. The table below reproduces some figures from this survey, showing an increase in the number of Employee Pension Funds (EPFs) that cut benefits in different years. The last column of the table below shows the number of EPFs that cut benefits in payment. This was clearly a much rarer event than cutting accrued benefits. It should be noted that the benefits cut affected those provided on a voluntary basis by EPFs on top of the substituting portion. There were also some cases where the same EPFs cut their benefits more than once. In these instances, each benefit cut was counted.

FY (April – March)	Number of EPFs that cut benefits (a)	Number of EPFs that cut benefits of beneficiaries (out of (a))
1997	7	0
1998	16	1
1999	52	1
2000	177	3
2001	131	2
2002	99	3
2003	219	15
2004	158	19
2005	111	17

To understand how widespread the practice is, the table below shows the percentage of EPFs that cut benefits each year, together with the total number of EPFs. Given the double counting in EPFs, these figures should be interpreted as a maximum estimate of the proportion of EPFs cutting benefits. It is also noteworthy that after 2000 the number of EPFs decreased dramatically. The main reason for this is the 2001 reform (effective in 2003) which allowed EPFs to return their substituting portion to the government.

at the end of FY	number of EPFs	percentage of benefit cut cases (%)
1997	1 874	0.4
1998	1 858	0.9
1999	1 835	2.8
2000	1 801	9.8
2001	1 737	7.5
2002	1 656	6.0
2003	1 357	16.1
2004	838	18.9
2005	651	17.1

Note: This box was prepared by Junichi Sakamoto, Nomura Research Institute.

In other countries, like Portugal and Spain, indexation is common practice when part of collectively bargained agreements, but it is not required by legislation. Pension funds in some countries like Denmark, Norway, Netherlands, Sweden and Switzerland have explicitly tied up indexation to the pension fund's solvency position (conditional indexation).

Probably one important reason why most countries do not require revaluation or indexation of occupational pensions is the fact that social security systems already provide inflation-indexed benefits. By the same token, mandatory indexation in countries like Germany, Ireland and the United Kingdom may be explained by the relatively low levels of public pension benefits in these countries. In the United Kingdom, occupational pension plans can even be a substitute for social security benefits, which may explain the statutory nature of both revaluation and indexation. However, obliging revaluation and indexation increases the cost of pension provision for sponsors. It may not be conducive either to higher levels of benefit security if it leads sponsors to abandon DB plans and establish pure DC plans instead.

In some countries benefits may only be paid in the form of annuities

Regulations also affect the type of benefit that plans can offer. In half of the countries in Table 1, benefits can only be paid in the form of annuities, except for very small benefits, which may be paid as lump-sums.⁷ Of the rest, two impose limits on the portion of the benefit that may be paid in lump-sum form (Portugal and United Kingdom). The rest do not impose any regulations. Hence, for example, in Japan, DB benefits are usually paid as lump-sums. In Belgium in 2006, 72% of total benefits were paid as lump-sums. The same year in Spain, 78% of total benefits were paid as lump-sums.

The indirect impact of regulations on plan design

There are other regulations that may affect plan design indirectly by changing the cost of provision of defined benefit relative to defined contribution plans. Funding regulations come to mind, though the administrative burden of regulatory compliance in general can also vary between DB and DC arrangements.⁸ In addition, sponsoring employers are nowadays required to report DB pensions on their accounts at market values which may lead to undesirable volatility in their balance sheets. A less advantageous tax treatment of pensions can also render DB plans less attractive for employers. While employers may scale back benefits in line with the reduced tax advantages, this may not be feasible, leading to a preference to DC arrangements with contributions set at a lower level than in DB plans.

In theory, all the many risks associated with a traditional defined benefit pension plan (investment, longevity, wage and price inflation,

etc) are borne by the plan sponsor, with the counterbalancing opportunity that favourable experience under the plan will allow a reduction in its ongoing contributions and, in extremely favourable times, to withdraw a part of the funding excess.

Regulations over funding excess have reduced the attractiveness of DB plans for plan sponsors

In most countries, this balanced equation has collapsed. Employers cannot recover the surplus accumulated in pension plans or are subject to a substantial excise tax. While they may take contribution holidays, sometimes they are also required to grant additional benefits. This creates an asymmetrical situation whereby employers bear downside risk but have no or little upside potential. As shown in Table 3, only two countries, Ireland and the Netherlands leave the treatment of surplus to the plan rules, while Portugal allows withdrawals as long as the surplus has lasted five years at a specific level above the accrued liabilities. As it happens, the Netherlands and Portugal are among the few in the OECD where most traditional DB plans (final salary or career average) are still open to new entrants to the labour force.

The reversion of surplus to employers is one of the key issues being debated in the United Kingdom as part of a “deregulation” review. Currently, the law requires that trustees are satisfied that any surplus return is in the members’ interests before giving their agreement. In their July 2007 report to the UK’s Department of Work and Pensions “Deregulatory review of private pensions”, Chris Lewin and Ed Sweeny suggest a reform to this rule, allowing the return of surplus to employers once the scheme has reached the scheme specific funding target and the trustees agree at that time that such a payment should be made. Such a reform would allow plan sponsors to get economic value from pension surplus without appreciably threatening benefit security. However, the UK government has stated its disagreement with the removal of the trustees’ approval on the grounds that it would jeopardize the current level of protection for plan members (Department of Work and Pensions (2007)). Within EU jurisdictions, granting employers unconditional access to funding excesses may also potentially run into conflict with employment- and wage-related legislations, if such unconditional access puts at risk DB pensions which under EU legislation are treated as deferred wages.

In the United States, the high tax on excess assets in case of plan termination (50%) is regarded as the main reason why employers prefer to convert them into cash balance plans (Coronado and Copeland (2004)). A conversion into defined contribution arrangements would be treated as a termination of the DB plan and hence trigger the 50% tax on excess assets.

Table 3: Surplus regulation of DB plans in selected OECD countries

	Maximum funding limit	Contribution holidays	Surplus withdrawal
Belgium	Yes	Optional	Not allowed in case of plan termination, some possibilities in other cases
Canada	Yes	Mandatory	Plan rules with consent of the regulator
Ireland	Notification	Optional	Plan rules
Japan	Yes	Mandatory	Not allowed
Netherlands	No	Optional	Plan rules
Portugal	Yes	Optional	If “structural”
Switzerland	Yes	Optional	Not allowed
United Kingdom	No	Optional	Only possible if funding up to buy-out level, trustees to approve if in best interest of beneficiaries
United States	Yes	Optional	Excess assets taxed at 50%

Source: OECD

Regulations and accounting standards may have also raised the cost and risk of DB provision

More generally, regulations and accounting standards can raise the actual and perceived cost and risk of DB plans to employers. Brown and Liu (2001) argue for example that a lighter administrative burden on DB plans, greater freedom on coverage, the equivalent tax treatment between DB and DC plans (including tax-deductible employee contributions), and stronger unions may be factors upholding DB plans in Canada relative to the United States. Ponds and van Riel (2007) argue that the supervisor’s response to the fall in the funding ratio after 2000 – calling for additional contributions to ensure full funding and the build-up of buffers - was one of the key drivers of the move from final salary to career average DB plans (with conditional indexation) in the Netherlands. The Dutch government had already been pushing for this type of plan conversion in the 1990s, and falling markets and new funding regulations simply caused this to happen sooner than anticipated. In the United Kingdom, the introduction of the new accounting standard (FRS17) appears to be an important factor behind the mass closures of DB plans (Klumpes and Whittington (2003)).

The growth of hybrid (DB) pension plans in recent years in some OECD countries (but primarily Japan, the United Kingdom and especially the United States) is partly a response to external pressures on these plans that call for a rebalancing of the burden of risk-bearing between employers and employees. Regulations and accounting standards may have contributed to the shift towards hybrid pension arrangements in which there is a more balanced sharing of risks between employers and employees. However, in some cases, and in particular the United Kingdom, employers have overwhelmingly preferred to replace DB plans for new entrants with “pure” DC ones.

The main risk of excessive regulatory zeal is a move to pure DC arrangements

The problems of going to this extreme and implementing pure DC plans are now becoming clear. The cracks are beginning to show. As an ever increasing number of employees are retiring under such plans, the consequences of inadequate contributions, poor investment choices by employees, high management costs, and the dramatic and continuing increase in annuity purchase rates on generating inadequate retirement pensions are becoming painfully obvious. This is another reason for a redistribution of risk between plan sponsors and employees in the form of hybrid DB arrangements. Such plans generally offer higher levels of benefit security than pure DC plans while lowering costs to plan sponsors relative to traditional DB arrangements.

Regulations should avoid discouraging the development of hybrid arrangements

However, as regulators shift their attention away from traditional DB plans, some of the developing regulations for DC and hybrid DB plans are clouding the debate. One simple, but potentially negative example has already been mentioned – namely the imposition of a minimum return guarantee (as opposed to a fixed rate as in a cash balance plan). Under such so-called underpin DB plans, plan sponsors have no opportunities for upside gains, as high investment returns are credited in full to the employees, and the plan sponsors still retain all the downside risks. This is not only an aggravation of the asymmetrical risk problem, it also has potentially adverse consequences on pension plan investments and hence ultimately on the level of pension benefits. Either there will be a single “DC” fund invested conservatively to ensure achievement of the minimum interest guarantee or the employees will have freedom of choice of funds, as under a normal DC plan, but with the obvious problems of moral hazard. The employees will invest in very risky investments, in the full knowledge that they will be protected by the underlying, cash balance type guarantee. In practice, as is already being shown, only the single fund approach is practical. The consequences of low, conservative investment returns on eventual pensions is predictable.

Staying within the realm of traditional DB plans, which plan sponsors and regulators are still trying to retain in such countries as Canada and Ireland, situations of asymmetrical risk mean that plan sponsors will try to avoid any form of overfunding. This will be

achieved by making lower contributions, quickly correcting even the slightest overfunding (even temporary overfunding that can disappear as quickly as it arose) and by avoiding the establishment of any contingency reserves. This is, first and foremost, a funding problem, but it also has impacts on plan design. Future plan improvements can only be financed through the ‘hard’ route of explicit additional plan sponsor contributions (whether in lump sums or under short amortizations), rather than through the ‘soft’ route of surplus utilization. Thus, it is easy to imagine that plan improvements in the future will be rare, and there is already some, perhaps circumstantial evidence to this effect.

IV. Implications of plan design and risk sharing for funding regulations

Benefit security is the prime concern of funding regulations

The primary role of funding regulations is to promote a high level of benefit security, and in particular to protect beneficiaries from one risk that they cannot hedge themselves against, namely the risk of default on the pension promises by the sponsoring employer (in DB plans) or the pension fund (in collective DC plans). In Austria, Germany, Luxembourg and Sweden, book reserving is also allowed. As this form of financing by itself exposes workers to the risk of sponsor insolvency, additional forms of protection are required, as recognised in the OECD Guidelines on Funding and Benefit Security in Occupational Pension Plans. In Germany and Sweden, book reserved pension promises must be insured against the risk of sponsor insolvency with a third party. In Austria, at least 50% of the liabilities must be matched with earmarked sponsor assets held in separate accounts.

Key drivers of funding regulations in selected countries

There are two broad approaches to funding regulations

The Annex shows the wide variations that exist in funding regulations across OECD countries. However, two distinct, broad approaches to such regulations can be identified. One group of countries (which includes Belgium, Canada, Finland, Ireland, Japan, Portugal, Spain, Switzerland, United Kingdom and the United States) does not require “full funding” of the liabilities of pension funds at all times nor the build-up of risk buffers of solvency margins above full funding.⁹ The minimum funding level is in fact below 100% in some countries like Japan or Switzerland (90%).¹⁰ Moreover, recovery periods vary significantly across countries, with some (like Ireland and the United Kingdom) allowing up to 10 years.¹¹

Another group of countries (*e.g.* Denmark, Germany - *Pensionskassen*, Iceland, Netherlands, Norway and Sweden) requires the establishment of a solvency margin above the full-funding level and, with the exception of the Netherlands, requires the full-funding of the pension fund's liabilities (or technical provisions, the insurance term for liabilities that is often used in these countries¹²) at all times, with short recovery periods. For example, pension funds in Germany are subject to a ca.4.5% solvency margin. In the Netherlands, there is a 5% solvency margin, but pension funds have up to three years to reach it if they fall below it.

There is one main explanation for this differentiated approach to funding regulations across countries. For the first group of countries, pension funds are entities that are legally different from life insurance companies and are linked to a sponsoring entity that provides capital back-up in the event of underfunding. The plans supported by these pension funds are therefore of the DB kind.

The stricter approach is applied in countries where pension funds resemble insurance companies

For the second group of countries, on the other hand, pension funds are often special kinds of life insurance undertakings (or are treated as such) that function on a stand-alone basis without ongoing recourse to the plan sponsor for additional funding to cover underfunding emerging from accrued benefits. This is the case even in countries like Germany, where, by law, there is ultimately a sponsor guarantee on all occupational plans (hence making them DB), but where pension insurance companies (*Pensionskassen*) and pension funds (*Pensionsfonds*) underwrite risks of accrued benefits directly. In some of the other countries in this group (Denmark and Iceland), occupational plans are of the collective DC kind. In the Netherlands, pension funds are separate legal entities financially supported by sponsoring employers, which would normally put them in the first group. However, the new Dutch-type collective DC plans do not – at least in theory – have any recourse to the plan sponsor for additional funding.

Comparing minimum funding levels under common valuation methods

Differences in valuation standards make comparisons of funding regulations hazardous

Because of differences in valuation methodologies, these so-called minimum funding levels and “full-funding” goals are not comparable across countries. The Annex presents the main aspects of the valuation of occupational pension liabilities in selected OECD countries. One major difference in the valuation approach across countries is the discount rate. Some countries use maximum fixed discount rates set by the government or the supervisor, often in relation to government bond yields (*e.g.* Finland, Germany, Norway, Portugal, Spain and Switzerland). In other countries discount rates are based on current market interest rates (*e.g.* Canada, Denmark, Japan, Netherlands, Sweden and the United Kingdom). There are also

important differences across countries in mortality assumptions, in the treatment of economic factors such as inflation, in the actuarial cost method used and the assumptions to be made over the service and retirement patterns of plan members. Such differences call for caution when comparing funding regulations across countries. A regulatory system that requires high funding levels on the basis of lax valuation methods and assumptions may offer lower levels of benefit security than one with more flexible funding rules but more prudent assumptions.

One way to assess the required minimum funding level in a common way is to state it as a percentage of the IAS19 measure, the international accounting standard for occupational pension liabilities. Depending on market conditions and the assumptions used, the regulatory measure of liabilities for DB plans may be above or below the IAS19 value. Despite the generally more prudent actuarial assumptions used by regulators, the inclusion of salary projections under accounting standards (using the so-called projected unit credit method) can lead to a higher measure of liabilities for final pay DB plans than the one calculated by regulators. The gap between the regulatory and the accounting measure varies over time and across countries. For example, in Finland, regulatory liabilities are currently between 96-99% of the accounting liabilities. On the other hand, in the United Kingdom, the $\pounds 179$ ¹³ liability measure monitored by The Pensions Regulator was about 83% of the accounting measure (FRS17 or IAS19) as of March 2007 (The Pensions Regulator – Pension Protection Fund, 2007), while the value of technical provisions calculated by the average pension fund was about 96% of the accounting measure (The Pensions Regulator, 2007).

A recent report by the Committee of European Insurance and Private Pensions Supervisors (CEIOPS (2008)) also provides an estimate of the level of technical provisions of defined benefit pension plans under different regulatory frameworks. In countries like Spain and the United Kingdom, the technical provisions corresponding to the same pension benefit would be valued at a level 50 percent higher than that in countries like Belgium, Denmark or the Netherlands. A large part of the difference is caused by the presence of mandatory revaluation and indexation requirements.

Risk-based funding regulations

Market-based valuation and risk-based regulation are gaining adept

Despite the important differences in funding regulations that still exist across OECD countries, there is a trend towards market-based valuation methods and greater recognition of the risks that pension beneficiaries are exposed to.¹⁴ Policymakers are also giving consideration to the implementation of a risk-based approach to funding regulations in the pensions industry. These new regulations

are part of a trend towards risk-based supervision which follows its development in the banking and insurance sectors (Brunner et al. (2008)). Under a risk-based approach, funding requirements should reflect as best as possible the risks borne by pension funds or/and different stakeholders including risk factors related to the nature of the benefit promise and the extent of risk sharing imbedded in DB, hybrid and collective DC plans. Such factors include the following:

- *Types of risks:* pension funds manage two main types of risks, market risks and biometric risks. Under a risk-based approach, the types of risks guaranteed in a particular plan affect the funding requirement. For example, cash balance plans, which do not offer any pre-retirement longevity risk protection or guaranteed annuity conversion rate at retirement, call for funding rules that focus specifically on the investment risk borne by the plan sponsor. On the other hand, DB plans and collective DC plans that guarantee a minimum annuity benefit on entry require funding regulations that also address the uncertainty over longevity projections. In addition to market risks and biometric risks, policymakers using a risk-based approach would also normally require pension funds to make sufficient provisions for operational risks.
- *Flexibility and conditionality of the benefit promise:* funding regulations may also need to consider the extent to which accrued benefits can be adjusted discretionarily or in line with the pension fund's financial performance. For example, in many countries benefit indexation is discretionary while in some even nominal benefits can be cut as a last recourse measure.
- *Contribution policy:* funding requirements may also take into account the extent to which contributions by sponsoring employers and – as is the case in some countries – those by members can be increased to cover any underfunding of accrued benefits. These additional contributions are effectively a contingent capital reserve for pension funds that they can tap into whenever they enter financial difficulties.

Benefit and contribution flexibility are specific pension fund features in many OECD countries

The flexibility of benefit promises and contributions are the main policy levers of pension funds in many OECD countries, differentiating them from financial institutions such as banks or insurance companies. This flexibility or risk sharing inherent to occupational pension funds in these countries is also related to their overall governance which often involves employee representation. Such representation ensures an additional level of oversight relative to standard financial products.

As yet, no OECD country has attempted to introduce a comprehensive risk-based approach to funding regulations of the kind that, for example, has been proposed for the insurance industry in the European Union (Solvency II). However, it is expected that some European countries will apply Solvency II to pension funds based in their countries as they are regulated as life insurance undertakings. Moreover, some countries have already begun to consider market risk factors in their calculations of funding requirements or as part of their monitoring of solvency levels of pension funds (e.g. stress tests). Under such approach, a riskier investment strategy, with a higher equity allocation, would call for a higher average funding level in order to protect against the potentially larger funding gaps that can emerge. Risk mitigation factors would also need to be considered. Risk-based funding requirements would need to take into account the extent to which such hedging strategies are in place via the use of derivative products, for instance. Policymakers, however, may be reticent to consider investment policies when setting funding rules because it may interfere with the paramount importance of prudence in pension plan investments, leading potentially to short-termist and procyclical investment strategies.

Risk-based features have been introduced in funding regulations of some OECD countries

In the OECD, only a few countries (Denmark, the Netherlands, and Sweden) have introduced funding regulations that directly take into account the riskiness of the pension entity's investment portfolio. In Denmark, the quantitative solvency rule is a fixed percentage of the technical provisions (4% plus 0.3% of risk-bearing investments), but a stress test is also carried out. Under the so-called traffic light stress test the supervisor models the different market and biometric risks to which a pension fund is exposed in order to form an opinion about the likely evolution of solvency of the pension fund in the year ahead. The test defines three scenarios, green, yellow, and red, which are characterised by increasingly adverse market and biometric (longevity) shocks. Pension funds under a red light scenario face a severe insolvency risk that requires immediate remedial action. If the pension fund's capital is less than one third of the minimum solvency requirement, the recovery period is usually stated in months and will not normally exceed one year.

The Dutch solvency test is the closest example of a fully risk-based funding requirement

The approach taken in the Netherlands is an application of Value-at-Risk, where market downside scenarios of a given probability are used to calculate a buffer or capital requirement for the pension entity. The Dutch FTK risk-based solvency test requires pension funds to build up buffers - above 100% funding of the nominal pension liability - so that there is a probability of at least 97.5% that within a year the funding level will not be below 100%. This solvency test leads to a funding target for the typical fund of 130% of its liabilities. Pension funds have 15 years to make up any difference between their actual funding ratio and the one required by the solvency test. In addition, pension funds must ensure that their minimum funding is above 105%

of their liabilities at all times (a 5% solvency margin), and eliminate any gaps within three years.

The general risk-based approach taken by the Dutch FTK has the same one year horizon that is used by the Solvency II approach to measure the capital (or solvency buffer) required to withstand shocks up with a certain confidence (probability) level. There are, however, three major differences between the FTK and the Solvency II framework.

There are important differences between the Dutch solvency test for pension funds and Solvency II

Firstly, while the FTK uses a level of security of 97.5% for pension funds, Solvency II provides a higher level of security, at the 99.5% level, which naturally leads to higher solvency requirements.¹⁵ Secondly, the Dutch minimum funding rules (specifically the 105% solvency requirement) only apply to the nominal liabilities when indexation is conditional. Since most pension funds apply conditional indexation to both accrued benefits and pensions in payment, the solvency requirement is based on about one half of the total liabilities of a typical pension fund. Under the Solvency II framework for insurers, in contrast, a complete and market consistent valuation of technical liabilities takes place, including any option-like commitments. Such conditional liabilities would be included in the measures of technical provisions, which would correspondingly raise the funding requirements on pension funds. Thirdly, Solvency II requires the full-funding of technical provisions at all times, while the Dutch funding rules provide a recovery period of three years to meet the solvency requirement and a longer period of fifteen years to meet the buffer requirement.

The differences between the Dutch approach to solvency and Solvency II may be explained by the other two risk factors mentioned earlier, namely the conditionality of benefit promises and the possibility of raising contributions from sponsoring employers and - in some countries - employees in situations of underfunding. Other specific aspects of pension funds that may affect regulations are the fact that they often have a quasi-mandatory membership, stemming from the labour contract and their not-for-profit nature. In the Netherlands, for example, most occupational pension plans are based on the concept of intergenerational risk sharing, which is also a characteristic of pay-as-you-go pension systems. Decisions about the division of costs and benefits are made by social partners reflecting the solidarity and collectivity of these arrangements.

The strength of the sponsor's guarantee may also be considered in a risk-based funding rule ...

In countries where benefits can be adjusted and where employers' or/and employees' contribution rates can be raised to cover funding gaps, underfunding poses a lower risk for benefit security than in countries where pension funds are stand-alone entities with no link to plan sponsors, and specifically without any recourse to higher contributions from sponsoring employers or plan members in case of

underfunding. Under risk-based funding regulations, therefore, such differences would be reflected in funding requirements. A priori, funding needs for DB pension funds of the first kind are lower than for stand-alone pension funds, such as those that operate on a collective DC basis. However, the strength of the employer's covenant varies depending on its creditworthiness, which can be subject to unexpected swings. Given the difficulties involved in assessing and closely monitoring an employer's covenant, it may be complicated to adjust funding requirements on the basis of the financial strength of the sponsoring employer. One country that has partly done so is the United Kingdom, where pension fund trustees are expected to assess the sponsor's covenant when establishing their funding objective. The Pension Regulators funding triggers also take the sponsor covenant into account when determining possible interventions.

... as well as guarantee arrangements

From the perspective of benefit security, the presence of arrangements such as the Pension Benefit Guarantee Corporation in the United States or the Pension Protection Fund in the United Kingdom, by protecting DB pension funds against the risk of sponsor bankruptcy, should also be considered under a risk-based approach to funding regulations. Such arrangements may reduce the need for a differentiated approach to funding across companies on the basis of the strength of the sponsor covenant, as insurance premia (or levies) can be set as to reflect the risk of employer insolvency. On the other hand, policymakers are aware of the difficulty of managing these insurance arrangements in a way that accurately reflects the risks insured and may therefore look to protect them from large claims. This is the approach taken by The Pensions Regulator in the United Kingdom, which in addition to regulating and supervising pension funds has as one of its stated objectives the mitigation of risks shifted to the PPF. The PPF itself charges levies that are to a large extent risk-based.

Given the wide range of occupational plan designs and security mechanisms across OECD countries, the same risk-based funding regulations could lead to rather different funding outcomes.¹⁶ While the implementation of a prescriptive risk-based funding requirement is open to debate¹⁷, it is clear that any country considering such exercise should carefully consider the specificities of pension funds and in particular the nature of risks being guaranteed and their distribution among different stakeholders.

V. Concluding remarks

Occupational defined benefit pension plans are facing an increasingly stricter regulatory environment in many OECD countries. At the same time, new accounting standards have been introduced that have enhanced the perceived cost and risk of these plans to

employers. In some countries employers and employee representatives have successfully redesigned benefit promises, introducing risk sharing elements that will make them more sustainable in the future. In other countries, on the other hand, the new pension plans being created are of the pure defined contribution kind, with correspondingly higher uncertainty over benefit levels.

Regulations should have as their main aim the provision of high levels of benefit security at an acceptable cost to members, sponsoring employers and other stakeholders. Hence, to the extent that regulations drive plan sponsors away from traditional DB and even hybrid DB plans and towards pure DC plans, the soundness of these regulations may be put into question. Regulations which are intended to protect beneficiaries may have had the unintended consequence of raising the cost of DB provision beyond a level at which they have a value to plan sponsors. Two kinds of regulations may be considered: those that set constraints on plan rules and those that aim at ensuring that benefit promises are honoured.

Plan design regulations, such as minimum return or benefit requirements, indexation and revaluation rules have raised controversy when they are applied to what are otherwise voluntary pension arrangements. Such rules, although they may be justified from social policy objectives, reduce the attractiveness of DB plans for sponsoring employers. For example, mandatory indexation requirements can restrict the development of hybrid arrangements such as cash balance and conditional indexation plans which have been heralded in some countries as a viable solution to the increasing cost imposed by traditional defined benefit arrangements. From the perspective of plan members, such hybrid plans are a priori superior to “pure” DC arrangements as they reduce the uncertainty over benefit levels inherent to the latter. On the other hand, statutory indexation requirements may be justified in countries where private pension plans play a central role in retirement provision.

Strict funding requirements and the withdrawal of the right to excess assets (or surplus) have also raised the financing costs to employers and greatly reduced the upside potential. While this regulatory tightening may be justified in the interest of benefit security it may contribute to the abandonment of DB provision, even in hybrid forms, leading to what are ultimately highly uncertain pure DC pensions. A better alternative to pure DC could be the detachment of DB pension funds from sponsoring employers into stand-alone pension entities offering guaranteed benefits, as has taken place in some Scandinavian countries such as Denmark and Iceland. In the Netherlands, collective DC plans, where employers commit to a fixed contribution rate are also gaining ground.

The trade-off between benefit security and cost is one that requires careful analysis and is obviously being resolved in different ways across countries. It is not possible to define an ideal model of funding regulations or member protection requirements. However, policymakers should at least consider the impact of regulations on sponsors' willingness and ability to support different kinds of pension arrangements.

The trend towards risk-based regulation observed in some OECD countries may help better address the balance between benefit security and cost. Under a risk-based approach, funding regulations should take into account the nature of benefit promises, and in particular the specific risks being guaranteed, and the way those are shared between the different stakeholders. While the document does not enter the debate over the application of risk-based quantitative funding requirements to pension funds (as under Basel II or Solvency II) – specially as cross-border issues are not addressed here –, it identifies the risk factors that should be evaluated and considered in a comprehensive risk-based regulatory approach, whether prescriptive or principles-based. The three main risk factors identified are the nature of risks and the guarantees offered under different plans designs (with risks falling under three main groups - market, biometric, and operational risks), the extent to which benefits are conditional or can be reduced under certain circumstances, and the extent to which contributions may be raised to cover any funding gap. In addition, the strength of the guarantee or covenant from the sponsoring employer(s) and of insolvency guarantee arrangements should be carefully assessed when designing funding requirements.

The flexibility of benefit promises and contributions are the main policy levers of pension funds in some countries and differentiates them from financial institutions such as banks or insurance companies. This flexibility or risk sharing is also related to the overall governance of pension funds in these countries which often involves employee representation, ensuring an additional level of oversight that does not exist in standard financial products. In some countries, like the Netherlands, which are clinging to DB provision (though in a hybrid form) decisions about the division of costs and benefits of pension plans are made by social partners reflecting the solidarity and collectivity of these arrangements.

All these considerations call for risk-based funding regulations to be set in a way that reflects the risks to the members' benefits taking into account the flexibility of the benefit promise and contribution policy, including the ability to raise contributions when a funding deficit emerges. Future work could focus on the specific design of funding rules, as part of a broader project on regulatory efficiency and effectiveness.

Notes

1. In Germany and Norway pension insurance companies can underwrite benefit promises but benefits are also ultimately guaranteed by sponsoring employers.
2. For Germany, the paper focuses on *Pensionskassen* and *Pensionsfonds*. The former are actually a type of insurance company.
3. The OECD Taxonomy includes a third category of DB plans, so-called mixed DB plans, which have two separate DB and DC components within the same plan.
4. If there is no employer obligation other than paying the fixed contribution rate, such plans would be considered protected (“collective”) DC under the OECD classification. Cash balance plans that pay benefits in the form of annuities using fixed annuity rates (as in Switzerland) are also equivalent to indexed career-average earnings plans.
5. Plans where the pension entity or provider guarantee or target a specific rate of return or benefit but where there can be a claim on the sponsoring employer(s) in case of underfunding are treated as hybrid DB plans.
6. In general the information given for Belgium in the document (unless mentioned otherwise) comes from Belgian social and labour legislation which applies on all Belgian plans (whether administered by insurance companies or pension funds, and whether they are administered in Belgium or abroad). Belgian prudential legislation is purely prudential as foreseen in the European IORP directive (no fixed maximum interest rate, no limits regarding return to the employer, own experience mortality tables, etc.).
7. For example, in Austria, a lump-sum benefit may be paid if the accumulated balance is less than 9 300 euros.
8. For example, Keating and Slater (2008) argue that the administrative cost of DB pension funds in the United Kingdom has nearly doubled over the last fifteen years.
9. Full funding is measured differently across countries, so it is not possible to compare levels of security of pension promises across countries on the basis of funding levels alone.
10. No remedial action is required if the funding level is above this level.
11. In contrast to other OECD countries, the United Kingdom does not have a prescriptive minimum funding requirement, applied equally to all funds. Instead, there is a requirement to establish a fund-specific funding target and an associated recovery plan in case of underfunding. The regulations do not specify the length of the recovery plan either beyond stating that it should be as short as reasonably affordable for the sponsor. In practice, few recovery plans are longer than ten years and The Pensions Regulator has stated that it will give particular attention to plans longer than this. Both Belgium and Portugal require full funding, but like the United Kingdom, allow pension funds to decide on a recovery period which must ultimately be approved by the supervisor.
12. In the insurance field, technical provisions are the estimated value of claims which have not been settled at the date on which the financial statements are finalised.
13. The s179 measure estimates the level of benefits guaranteed by the Pension Protection Fund. The Pensions Regulator has established a funding “trigger” somewhere between the FRS17 and the s179 level that varies across pension funds depending on the maturity of the scheme, the strength of the employer covenant and other factors. Pension funds whose funding levels drop below this trigger value are closely monitored by The Pensions Regulator which may intervene only when funding is below a critical level.
14. On the move to market-based valuation methods see Yermo (2007).
15. The proposed FTK regime for insurance companies also specified a 99.5% confidence level but it has been postponed.

16. For a recent empirical analysis of risk-based funding regulations for pension funds using Solvency II rules see Peek et al. (2008).
17. For a recent discussion of this approach see e.g. Bjerre-Nielsen (2007).

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Annex - OECD pension fund regulations on calculation of liabilities

	Accrued liabilities / Technical Provisions	Employee turnover	Early retirement	Discount rate and other economic assumptions	Mortality Tables	Expenses for winding up	Minimum funding	Maximum amortisation period
Belgium	<p>The calculation of technical provisions must be prudent and take into account the risk profile of the pension fund (IORP). Furthermore, the technical provisions must at least equal the vested reserves, which are determined by the pension plan rules and the Social and Labour law. When Belgian social legislation is applicable the technical provisions must at least be the maximum of vested rights as defined in the plan rules and own contributions accumulated with an interest rate of 3.75% Minimum vested rights are calculated on the basis of current salaries with an interest rate of 6% and specific mortality tables (MR 88-90 table for males and the FR 88-90 table for females).</p>	None	Most advantageous	<p>Belgian prudential legislation: the discount rate for the calculation of the technical provisions has to be chosen in a prudent manner and taking into account: (i) the return on covering assets as well as future returns and/or (ii) the return on bonds of a Member State or on other high-quality bonds.</p>			100% of technical provisions	<p>Not specified. In case of underfunding, a recovery plan which takes into account the risk profile of the pension fund must be submitted to and approved by the regulator (CBFA). It is up to the pension fund to decide itself on the most appropriate recovery plan, but it has to be approved by the CBFA.</p>

	Accrued liabilities / Technical Provisions	Employee turnover	Early retirement	Discount rate and other economic assumptions	Mortality Tables	Expenses for winding up	Minimum funding	Maximum amortisation period
Canada	Plan termination liability (current unit credit)		Most advantageous	interest rate of x% per annum for 10 years and y% per annum thereafter. The rate "x" is equal to the market yield on 7-year Government of Canada benchmark bonds plus 0.5%. The rate "y" is a more complicated blend of market yields on such 7-year bonds and on long term Government of Canada benchmark bonds, again plus 0.5%. Lower interest rates apply when the plan provides indexation of pensions; the formulas are specified in the CIA Standard of Practice.	UP-94		Two tests must be met. (i) 100% of technical provisions. (ii) 100% funding of going concern liabilities under the selected actuarial costing method (e.g. PBO under projected unit credit method).	5 years.
Finland	Accrued benefits calculated under current unit credit method			3.5%-3.8% depending on the plan			100% of technical provisions, no solvency margin	Immediate action, but period not specified.
Germany	The technical provisions are the present value of the future liabilities minus the present value of the future premiums. The valuation of liabilities includes salary increases or inflation revaluation between the retirement date and retirement age if these are included in the pension promise.	None		The maximum discount rate for <i>Pensionskassen</i> and <i>Pensionsfonds</i> (if the latter offer insurance-like guarantees) is currently 2.25% for new schemes. <i>Pensionsfonds</i> can use market interest rates on a best estimate basis if they offer no insurance-like guarantees.			100% of technical provisions, solvency requirement of about 5% of technical provisions.	<i>Pensionskassen</i> : underfunding has to be eliminated immediately. <i>Pensionsfonds</i> : maximum underfunding of 5% of technical provisions for a maximum of 3 years (certain conditions have to be met). In case of contribution payment during the period of holding a pension a maximum of 10% of technical provisions. The recovery period can be

	Accrued liabilities / Technical Provisions	Employee turnover	Early retirement	Discount rate and other economic assumptions	Mortality Tables	Expenses for winding up	Minimum funding	Maximum amortisation period
Ireland	Plan termination liability (current unit credit), including mandatory revaluation of benefits with 4% cap, until retirement	None	Most advantageous	(a) a pre-retirement discount rate of 7.25%; (b) a long term post-retirement discount rate of 4.50%; (c) a pre-retirement price inflation rate of 2.25%; and (d) a post-retirement long term rate of price inflation of 2.00%.	90% of PMA92 for males and 90% of PFA92 for females.	Yes, deducted from scheme's assets for the purpose of funding regulations	100% of technical provisions, no solvency margin	3 years, but can be extended up to 10 by the regulator if certain conditions are met.
Japan	Plan termination liability (current unit credit)			80-120% of 10-year government bonds issued during the previous 5 years.			100% funding of contracted-out portion, 5% solvency margin; 90% funding for total plan benefits.	7 years, but was temporarily extended to ten years.
Netherlands	Accrued benefits calculated under current unit credit method	None		swap rate	GBMV 1995-2000 table plus allowance for future mortality improvement.	Yes	100% of technical provisions, solvency margin of 5%, risk-based reserve, fund-dependent, averaging about 30% of accrued liabilities inclusive of 5%.	3 years for solvency margin, 15 years for buffer.
Norway	Accrued benefits calculated under current unit credit method			4% discount rate until 1993. For contributions due after 1 January 2004 and pension funds			100% of technical provisions, solvency	Immediate action, but period not specified.

	Accrued liabilities / Technical Provisions	Employee turnover	Early retirement	Discount rate and other economic assumptions	Mortality Tables	Expenses for winding up	Minimum funding	Maximum amortisation period
				established after 1993 the maximum rate is 3%, 2.75% for new contracts after 2006.			margin of 8% of the total risk-weighted asset items and off-balance sheet items.	
Portugal	Accrued benefits calculated under current unit credit method. If indexing of pensions is contractually guaranteed, then an allowance for the effect of future indexing must be included in the calculation of the accrued liabilities.	None		4.50%	TC 73/77 mortality table must be used.		100% of technical provisions, no solvency margin	Not specified. A plan to eliminate any underfunding must be submitted to the regulator. The effect of changes in regulation can be amortised over 20 years.
Spain	Projected Benefit Obligation (including salaries at retirement - projected unit credit method)		Most advantageous	4% discount rate. Inflation assumption of 1.5-2.0%.	PERM/F-2000. For new plans, GRM/F-95 tables can be used.		100% of technical provisions, 4% solvency margin	Up to 5 years (extendable to 10 by the supervisor).
Switzerland	Accrued benefits calculated under current unit credit method						90% funding of technical provisions. Fluctuation reserves are actively encouraged.	Less than 10 years. Normally, 5-7 years
United States	Accrued benefits calculated under current unit credit method			Simplified yield curve based on a two-year average of high-grade corporate bonds of appropriate duration.	RP-2000 Mortality Tables plus an allowance for future mortality improvements.		100% of technical provisions, no solvency margin	7 years.

Evaluating the Impact of Risk-Based Funding Requirements on Pension Funds

Jordy Peek, Andreas Reuss and Gerhard Scheuenstuhl¹

The objective of this study is to analyse what the quantitative funding requirements for pension funds with defined benefit plans would be, if Solvency II (based on the QIS 3 methodology) would be applied. Also possible extensions of the Solvency II methodology that seem necessary in order to reflect the specifics of pension funds will be discussed.

*

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I. Introduction

The target of this study is to evaluate the impact of risk-based funding requirements on pension funds. This is achieved by performing quantitative analyses of risk-based funding requirements using as an example the risk-based valuation framework being introduced for insurance companies.

There is an ongoing discussion on risk-based funding requirements for pension funds

Within the European Union (EU), risk-based funding requirements for insurance companies are currently being revised as part of the Solvency II project. Solvency II includes a fundamental and wide-ranging review of the current insurance directives with the target to ensure adequate policyholder protection in all EU member states. One of the main goals is that the quantitative funding requirements better reflect the true risk of an insurance undertaking.

In order to evaluate the impact of quantitative funding requirements under Solvency II, a number of Quantitative Impact Studies (QIS) have been performed. The most recent study is QIS 3, which summarizes the current status of the standard model for determining solvency requirements for insurance companies under Solvency II.

Use QIS 3 model as a starting point for the solvency discussion

Although Institutions for Occupational Retirement Provision (IORPS) are not included in the scope of the Solvency II project, discussions are currently underway internationally as to whether the Solvency II requirements that will be introduced for insurance companies should be extended to pension funds as well.¹ While it is not expected that Solvency II models developed for insurance companies will be directly applied to pension funds, the underlying principles may be similar. In particular, it seems possible that the QIS 3 model could be used as a starting point for such a modification.

The objective of this study is to analyse what the quantitative funding requirements for pension funds with defined benefit plans would be, if Solvency II (based on the QIS 3 methodology) was applied. We will also discuss possible extensions of the Solvency II methodology that seem necessary in order to reflect the specifics of pension funds.

It is beyond the scope of this study to discuss whether the introduction of Solvency II for pension funds is appropriate. This would require a much deeper analysis.

Generic DB pension plans are used to identify the principle impacts of such types of funding regulation

It is also important to understand that this study does not focus on pension funds in specific countries. Instead, a generic analysis is performed (based on certain assumptions regarding type of pension plan, mix of plan members, asset allocation and initial funding level). The various plan types represent a broad range of pension plan designs found throughout OECD countries.

The quantitative impact of Solvency II capital requirements will be shown for these generic pension plans and strategic asset allocations.

The study is organised as follows. In section II, we describe the generic funds and the assumptions underlying the calculations. Section III summarizes the QIS 3 methodology and possible extensions to reflect the specifics of pension funds. The results of the calculations are presented in section IV.

II. Scope and assumptions

In this section, we describe the characteristics of the generic pension funds analysed in this study and the major assumptions underlying the calculations.

Pension funds

Study a broad range of generic DB pension funds to capture the consequences for typical plans

The quantitative analyses in this study are based on a limited number of generic pension funds, where a pension fund is defined as a combination of a pension plan and a plan member portfolio. The pension funds considered in this study are generic and do not intend to reflect pension funds in specific OECD countries.

It is obviously not possible to analyse all types of pension plans. We therefore focus on characteristics of pension funds that are both relevant for risk-based funding requirements and different from life insurance companies. Figure 1 gives an overview of the generic pension funds considered in this study.

Mix of plan members

Characteristics of the plan members are chosen to be typical

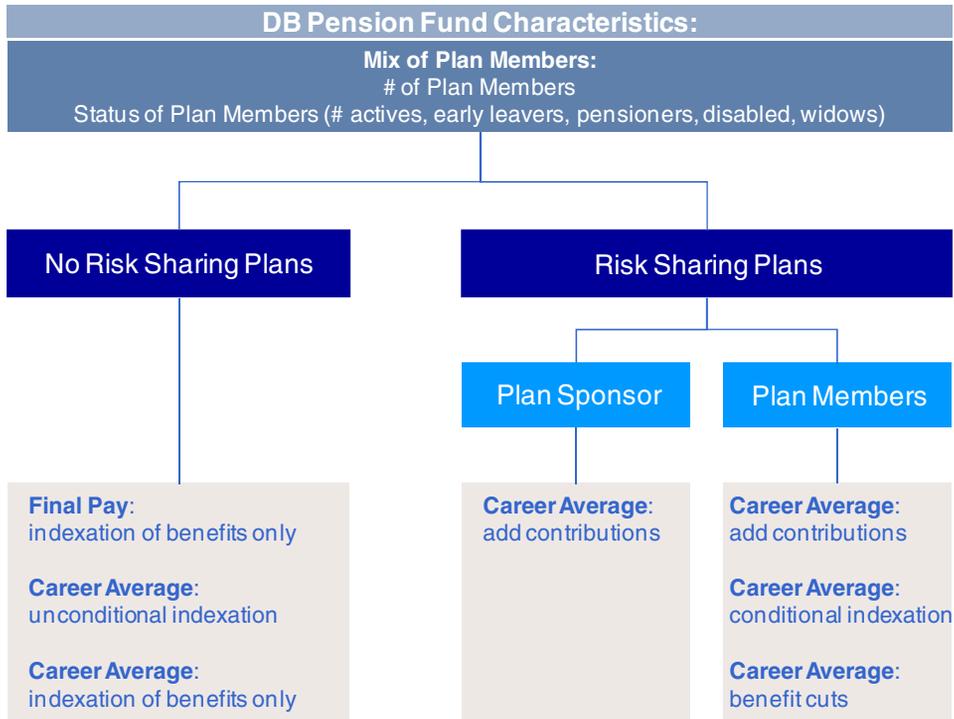
The same synthetic mix of plan members is assumed for each of the pension plans described below. The number of plan members amounts to 10 000 and consists of 50% active members, 10% early leavers, 25% old-age pensioners, 5% disabled persons and 10% widows/widowers. Age, gender and salary distribution coincide with the assumptions made in a previous study.² Assumptions about new members are not required as the valuation focuses on accrued benefits of existing members.

Different mixes of plan members have been analysed

For sensitivity analyses, two alternative mixes have been assumed (see Appendix):

- “Less Actives”: 25% active members, 5% early leavers, 44% old-age pensioners, 9% disabled persons and 17% widows/widowers;
- “Retirees”: 100% old-age pensioners.

Figure 1 . Overview of generic pension funds



Source: risklab, IFA.

Pension plans

The focus of this study is on traditional Defined Benefit (DB) plans. Book value reserves, protected Defined Contribution (DC) and pure DC plans are outside the scope of the study.

Pension plans can be split into risk sharing plans and no risk sharing plans. Risk sharing plans contain features that allow the pension fund to mitigate the risk by sharing part of it with the sponsor and/or with the plan members. In pension plans without risk sharing, the risks stay within the pension fund.³

Consider both types of plans : with and without risk sharing features

In a first step, generic pension plans that do not allow for risk sharing with the plan sponsor and/or the plan members are defined. These are the standard final pay and the standard career average plan. The main features of both plans are:

Characterisitcs of Final Pay Plan

Final Pay (FP) Plan:

- The plan member receives 1% of the final salary for each year of service as pension benefit;
- Benefits are paid as life-long annuities and are indexed based on inflation (CPI);
- Accrued benefits for early leavers are indexed based on inflation (CPI).

Characterisitcs of Career Average Plan

(Indexed) Career Average Plan:

- For each year of service, the plan member earns a deferred benefit equal to 1% of the current salary;
- Accrued benefits and pensions in payment are (unconditionally) indexed based on inflation (CPI).

In addition, another Career Average Plan with indexation only for pensions in payment has been considered.

Pension funds with risk sharing features

The generic pension plans that do allow for risk sharing are career average (CA) plans with a risk sharing feature. The risk sharing features that we have considered are additional contributions, conditional indexation and benefit cuts.

Risk sharing by flexibility in contribution levels

An important risk sharing aspect of pension plans is the fact that the plan sponsor may be required to make additional contributions in case of underfunding. In a similar way, future contributions of plan members may be increased in an underfunding situation. These risk-sharing mechanisms do not occur in the life insurance sector and therefore deserve special attention.

Overall, there seems to be no general agreement on how to best reflect this type of risk sharing in a risk-based funding framework such as Solvency II. Instead, discussions have shown that a contribution commitment by the sponsor could be reflected in the pension fund's solvency balance sheet in a number of different ways. For example, the sponsor's credit rating could be directly reflected in the calculation of the SCR (*e.g.* by taking into account future probabilistic solvency of the sponsoring company). Alternatively, the sponsor could be allowed to set up SCR in a separate fund (instead of increasing the funding of the pension fund itself). Both alternatives would reduce the pension fund's SCR (in some cases even to zero). Other protection mechanisms such as guaranteed protection funds (fire funds) as well as allowance for recovery periods might also be taken into account.

Another idea is to reduce the security level underlying the Solvency Capital Requirement (SCR) calculation. We will illustrate how the capital requirements change for the CA plan if the security level is reduced from 99.5% to 97.5%.⁴ We acknowledge that this is only illustrative and that further methodological work is necessary.

Risk sharing by flexibility in indexation of benefits

Another type of risk sharing between the pension fund and the plan members is conditional indexation of both accrued benefits and benefits in payment.⁵ The amount of indexation depends on the IAS 19 funding level of the pension fund.

Risk sharing by cutting benefit payments

A third type of risk sharing is where the pension fund is allowed to cut accrued benefits. We therefore consider a CA plan with the option to cut benefits in the case of underfunding.

Assumptions

Assumptions have been made regarding the valuation of liabilities, the asset portfolio and the initial funding level.

Liabilities

Best estimate mortality assumptions

For valuation purposes, the demographic evolution of plan members is projected using mortality and morbidity assumptions normally used for occupational DB plans in Germany (so called Heubeck Richttafeln 2005 G).⁶ These reflect best estimate mortality and disability probabilities (no security margins) that include an allowance for future increase of life expectancy (trend function). Expected age at death for various ages and generations is shown in Table 1.

Table 1. Expected age at death for various ages and generations

age in year	45		65		85	
	male	female	male	female	male	female
2007	82,5	87,7	82,9	87,0	90,2	91,2
2017	84,0	89,1	84,3	88,3	90,7	91,9
2027	85,5	90,4	85,6	89,6	91,2	92,6
2037	86,8	91,6	86,9	90,8	91,7	93,2
2047	88,1	92,8	88,2	92,0	92,3	93,9

Source: risklab, IFA.

Allowance for future salary increases

Similar to IAS 19, allowance for future salary increases is made in the valuation of liabilities. Salaries are assumed to increase annually by productivity growth (1.7%), by advancement in one's job or position (0.25%) and by last year's inflation (CPI, which has been modelled stochastically).

Allowance for administrative expenses

Allowance for administrative expenses has been made. Unit costs of 500 monetary units have been assumed, which increase annually by inflation. The administrative expenses are equal to the square root of the number of plan members (actives and retirees) multiplied with the unit costs.

Assets

The strategic asset allocation (SAA) has an important impact on the risk-based funding requirements of the pension fund under Solvency II.

The asset allocation of pension funds differs within countries but also between countries. Pension funds in Anglo-Saxon countries generally invest a larger share of their assets in equity and alternative investments than pension funds in continental Europe, which tend to have a greater focus on fixed income investments ⁷.

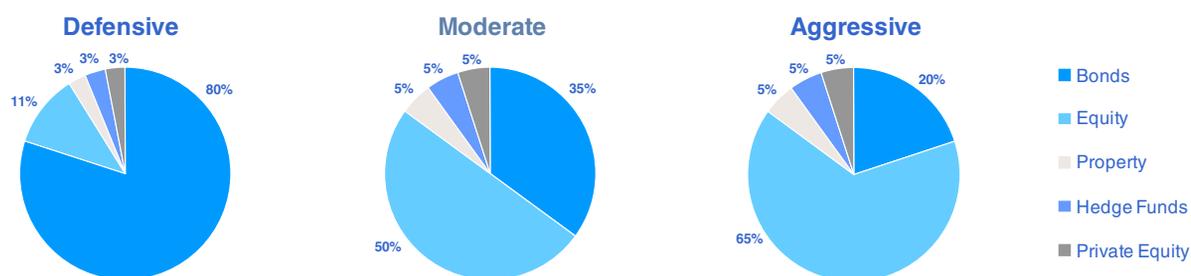
3 different asset portfolios have been assumed

We have assumed three (from an asset only perspective) mean-variance efficient asset allocations in accordance with typical asset allocations of pension funds we observed in OECD countries. These asset allocations are shown in Figure 2.

Different characteristics of the asset portfolios are considered

For each SAA, the fixed income portfolio is split into 60% government bonds and 40% corporate bonds (where latter entail credit spread risk) and has a duration of 10 years. The corporate bonds are primarily invested in investment grade bonds. In addition, we assumed that 5% of the total asset portfolio would be invested in foreign currency (leading to currency risk). Furthermore, no concentration of more than 3% of the total asset portfolio invested in one counterparty was supposed (no concentration risk).

Figure 2. Specification of different Asset Allocations



Source: risklab, IFA.

The moderate asset portfolio will be used in the main part of this study. We refer to the Appendix for the results of the other two SAA.

Funding level

Initial IAS funding level of 100%

In order to have a well-understood starting point for the quantitative analyses, we assume an initial funding level of 100% based on an IAS 19 valuation of liabilities (and assets shown at market value). This means that the amount of assets is equal to the IAS 19 DBO (calculated using the Projected Unit Credit method).

We understand that funding levels of pension funds vary significantly between countries and between different types of pension funds. In addition, funding levels are often measured on specific local accounting rules and when measured on IAS 19 basis differ significantly between countries. In subsequent sections, we will show the minimum required funding level under IAS 19 that is needed to be in compliance with the Solvency II funding requirements.

III. Solvency II methodology

This section summarises the main features of the Solvency II methodology for determining quantitative funding requirements. First, we describe the QIS 3 framework, which summarises the current status of the standard model for insurance companies. Then, we discuss possible extensions of this model in order to better reflect the specifics of pension funds. This discussion focuses on specific characteristics of pension funds and therefore does not cover the basic principles underlying the methodology (such as choice of time horizon and risk measure).

QIS 3 Framework

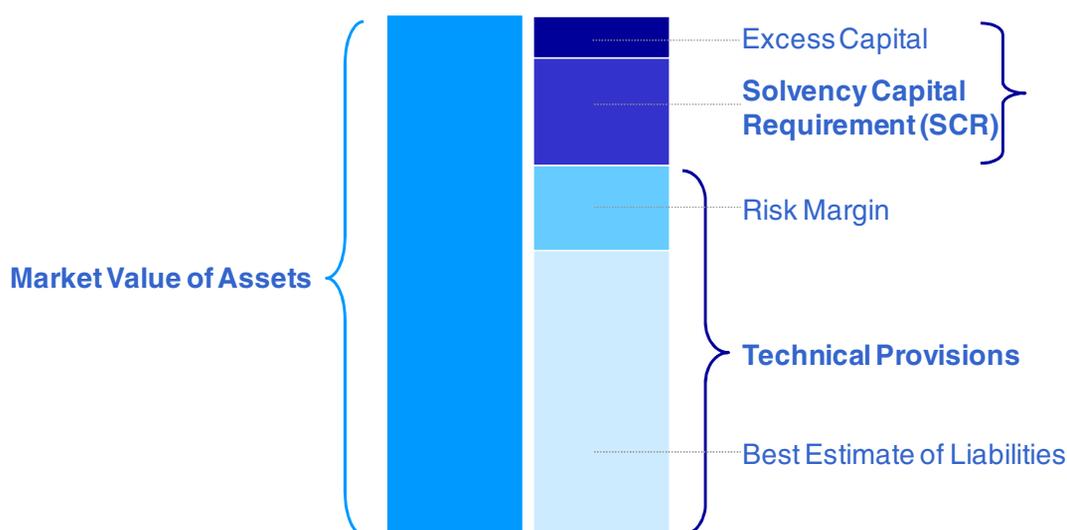
The QIS 3 model consists of two building blocks:

The two building blocks of the QIS 3 model

- Market consistent valuation of pension liabilities (“Technical Provisions”);
- Calculation of the Solvency Capital Requirement (“SCR”).

These will be discussed in turn. The QIS 3 model is summarised in Figure 3.

Figure 3. Overview of QIS 3 model



Source: risklab, IFA.

Technical provisions

Market consistent valuation of assets and liabilities

As a basic principle, the QIS 3 model requires a market consistent valuation of assets and liabilities using a total balance sheet approach. This is quite straightforward for the assets, where market values are normally available (mark-to-market) or can be derived (mark-to-model). Since pension liabilities of the pension plans are typically not hedgeable (e.g. due to the embedded longevity risk), a market value for pension liabilities is usually not available. The valuation of pension liabilities is therefore split into two parts, the Best Estimate of Liabilities (BEL) and the Risk Margin.

Pension liabilities consist of the Best Estimate of Liabilities and the Risk Margin

The BEL is equal to the expected present value of all potential cash flows arising from the pension promises calculated according to the following principles⁸:

- Valuation based on already accrued benefits (no allowance for future accruals)⁹;
- Realistic assumptions including future expenses (best estimate);
- Risk free discounting (based on swap curve);
- Allowance for market value of options and guarantees (BEL has to include both guaranteed benefits and extra benefits e.g. due to future conditional indexation).

The Technical Provisions must also include a Risk Margin that meets the objectives either to transfer the portfolio to a third party or to recapitalize the pension fund to ensure a proper run-off by the original undertaking. Underlying assumptions can be summarized as follows¹⁰:

- Assume that the pension fund becomes insolvent at the end of the first year due to economic loss and that the portfolio of assets and liabilities is taken over by another pension fund (reference pension fund).
- The reference pension fund has to be compensated for additional SCR it has to put up during the whole run-off of the portfolio.
- Assume that the reference pension fund would eliminate investment risk (resulting in zero SCR for market risks from year 2 onwards; only life underwriting and operational risk remain).

The Risk Margin is equal to the present value of the cost of future SCR that the reference pension fund will have to put up during the run-off of the portfolio of assets and liabilities for the in-force book of business at the end of next year ($t=1$).

The Technical Provisions (TP) equals the sum of BEL and Risk Margin. The difference between the market value of the assets and the TP gives the Available Capital that can be used to absorb risks.

SCR

The SCR calculation is based on the following principles¹¹:

The pension funds needs to have capital to cover the solvency requirement (SCR)

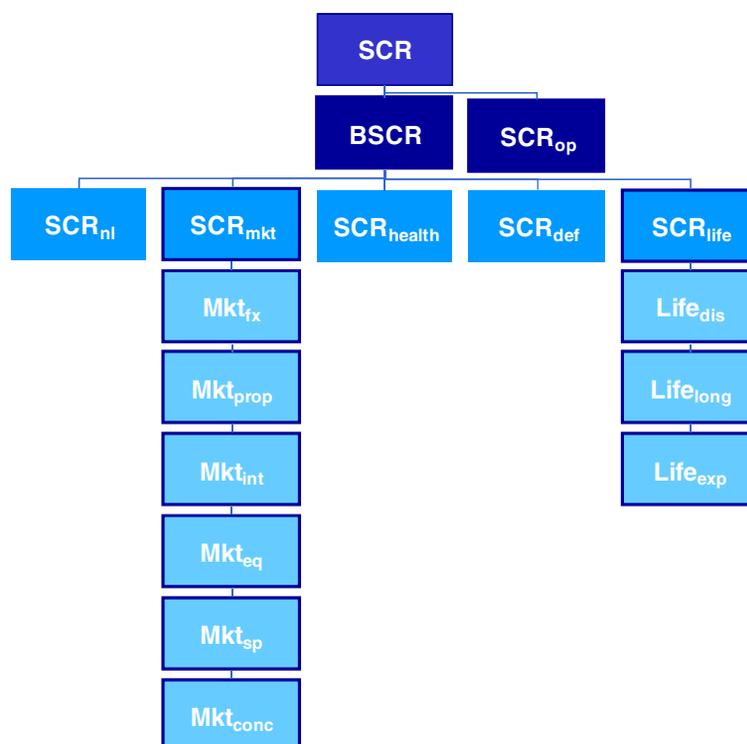
- The SCR should deliver a level of capital that enables an insurance undertaking to absorb significant unforeseen losses and gives reasonable assurance to policyholders (plan members) that payments will be made as they fall due.
- It should reflect the amount of capital required to meet all obligations over a specified time horizon (1 year) to a defined confidence level (99.5%).
- In doing so, the SCR should limit the risk that the level of available capital deteriorates to an unacceptable level at any time during the specified time horizon.
- The SCR should take into account all significant, quantifiable risks (including market risks, life underwriting risks and operational risk).

This means that the SCR corresponds to a 1-year Value-at-Risk with a 99.5% confidence level – with 99.5% probability, the Available Capital (defined as market value of assets minus Technical Provisions) will not decrease by more than the SCR over the next year.

The diversification of risk factors reduces the overall solvency requirement

In the QIS 3 framework, capital requirements are first calculated separately for each individual type of risk assuming a worst-case change in the underlying risk factor (e.g. a drop of 32% in the index for global equity investments). The capital requirements for the different risk factors are then aggregated using pre-defined correlation matrices (so called variance-covariance approach). The risk factors considered in QIS 3 are illustrated in Figure 4, where the risks that are relevant for the generic pension funds are highlighted. The other risks are not relevant for pension funds and are therefore not considered further.

Figure 4. Risks for pension funds in the QIS 3 model



Source: risklab, IFA.

Pension funds: adjustments to QIS 3 Framework

The QIS 3 framework needs to be adjusted for pension funds

As mentioned above, the QIS 3 framework was initially designed for (life) insurance companies. It clearly needs refinements in order to reflect all risks relevant to pension funds. Two possible modifications are analysed in this study resulting in an adjusted QIS 3 model.

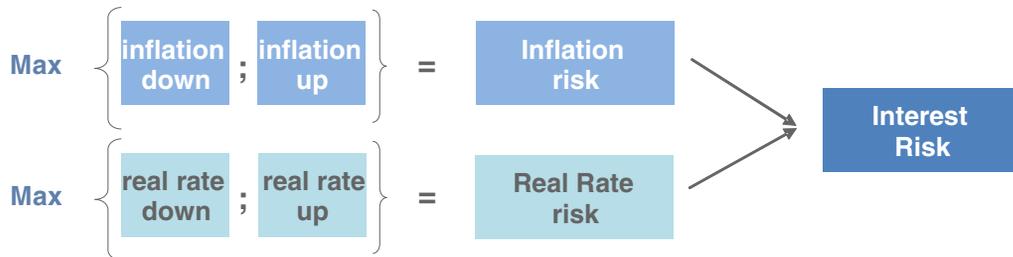
Inflation risk has to be taken into account for pension funds

First, the impact of inflation changes on the pension fund's liabilities is assessed in more detail. As explained above, the market consistent valuation of pension liabilities depends on the level of nominal interest rates (for discounting) and on the implied inflation (for future indexations and/or salary increases). Under QIS 3, allowance for the risk

related to a change of nominal interest rates is made, but it is not stated to what extent this change is caused by inflation and/or real rate changes.

We propose to split the nominal interest rate risk into two components – inflation risk and real rate risk – and to replace the (nominal) interest rate risk in the QIS 3 model by the aggregated values for inflation and real rate risk. This is illustrated in Figure 5.

Figure 5. Interest risk in the adjusted QIS 3 model



Source: risklab, IFA.

Salary increase risk has to be taken into account for final pay plans

Second, an additional module reflecting salary increase risk seems necessary (in particular for final pay plans). The salary increase risk is defined as the risk that future salary increases differ from best estimate assumptions (underlying the BEL calculation), but only to the extent that this is not related to general price inflation (CPI).¹²

We assume that a salary increase of 1.0% p.a. above best estimate assumptions corresponds to a 99.5% security level for salary increase risk. Zero correlation is assumed with other underwriting risks (longevity, disability and expense risk).

IV. Results

In this section the results for the different generic pension plans will be presented. We start with the pension plans without risk sharing features. The main focus will be on the final pay plan. In the second part, the results for the pension plans with risk sharing will be shown.

Final pay plan

The technical provisions are 25% higher under QIS 3 compared to IAS.....

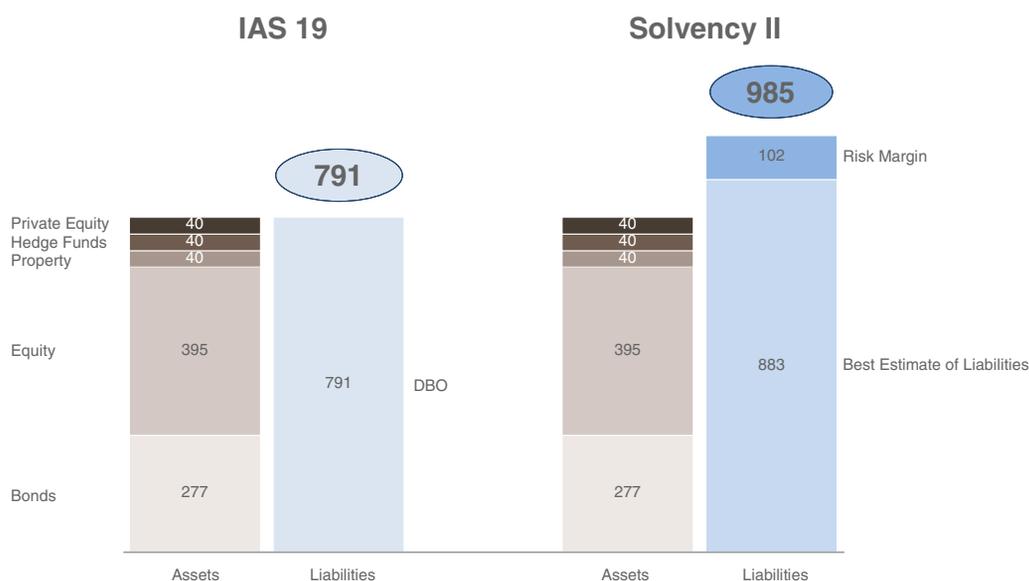
The result of the market consistent valuation of assets and liabilities of the final pay plan is shown in Figure 6. Compared to the IAS 19 DBO (791m), the Technical Provisions under QIS 3 (985m) are approximately 25% higher although the same valuation method is applied (project unit credit method based on accrued benefits including allowance for future salary increases¹³). This difference can be explained as follows:

- Discount rate: For the BEL, the expected benefit payments are discounted using the risk free term structure¹⁴ whereas the IAS 19 DBO uses a single discount rate which is the sum of the risk free yield and the AA corporate spread (which is assumed to be equal to 50 basis points). This results in lower discount rates under Solvency II and thus increases the BEL.
- The IAS 19 DBO does not include a Risk Margin.

.....leading to a drop in funding level

This leads to a drop in the funding level from 100% (based on IAS 19) to 80% (based on QIS 3).

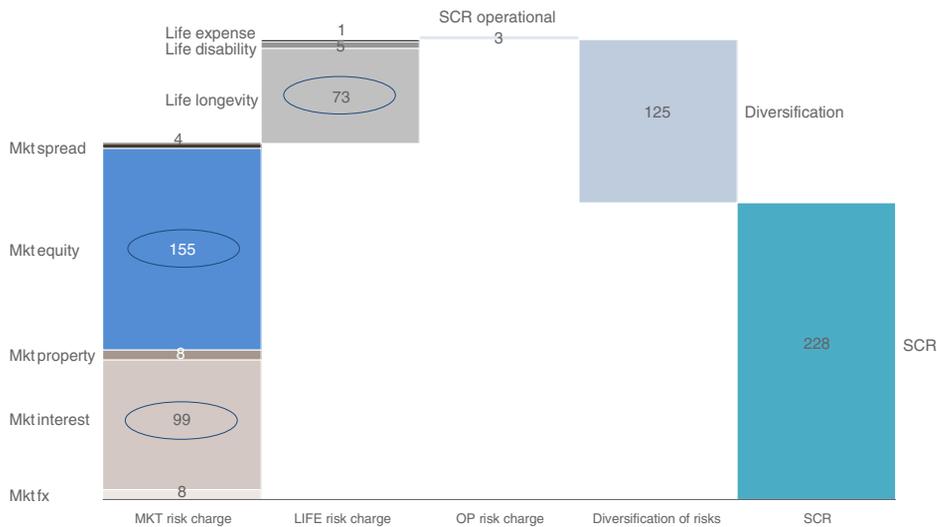
Figure 6. Market consistent valuation for final pay plan



Source: risklab, IFA.

On top of the Technical Provisions, the QIS 3 model requires additional capital to back the SCR. Overall SCR for the final pay plan amounts to 228m (26% of BEL), based on the standard QIS 3 model. Figure 7 shows that the main drivers of the SCR are equity, interest rate and longevity risk.

Figure 7. SCR for the final pay plan



Source: risklab, IFA.

The solvency requirement cannot be fulfilled

After allowing for the SCR, the funding level based on QIS 3 reduces to 65%. This shows that the solvency requirements would not be fulfilled for the generic final pay plan (minimum of 100% funding level is required under Solvency II).

Conversely, in order to fulfil the funding requirements, the amount of assets would need to be increased by 65% (i.e. amount of assets would need to be equal to 165% of the IAS 19 DBO in order to arrive at a Solvency II funding ratio of 100%).

Another possibility would be to decrease the SCR by adjusting the asset allocation. For example, a reduction of equity risk would be achieved by reducing the equity exposure (which is 50% of total assets for the moderate SAA). The asset allocation is an important driver of the SCR. The results for other SAA can be found in the Appendix. Furthermore, a better match of assets and liabilities would reduce the interest risk. Results for the modified QIS 3 model (i.e. including allowance for salary increase risk and refined modelling of interest rate risk) are similar. Both SCR and Risk Margin increase slightly (see Figure 8).

Other pension plans without risk sharing

Results for the other pension plans without risk sharing are similar

For the other SCR pension plans without risk sharing, similar calculations were made using the same assumptions.¹⁵ Results for the adjusted QIS 3 model are shown in Table 2.

Absolute numbers differ due to different underlying liabilities. However, there are only minor differences with respect to the funding level based on QIS 3. For all plans, the Solvency II requirements would

not be fulfilled if the initial IAS 19 funding level is 100% and funding would need to increase significantly in order to do so.

Figure 8. Results modified QIS 3 model for final pay plan



Source: risklab, IFA.

Table 2. Results for plans without risk sharing (modified QIS 3 model)

Pension Plan	Assets*	Technical Provisions	SCR	Liabilities	Funding level: Solvency II	Funding level: minimum IAS
Final Pay: indexation of benefits	791	990	238	1228	64%	169%
Career Average: unconditional indexation	607	741	172	913	66%	164%
Career Average: unconditional indexation: benefits only	518	624	143	767	68%	160%

* Assets are equal to 100% of corresponding DBO^{IAS}

Source: risklab, IFA.

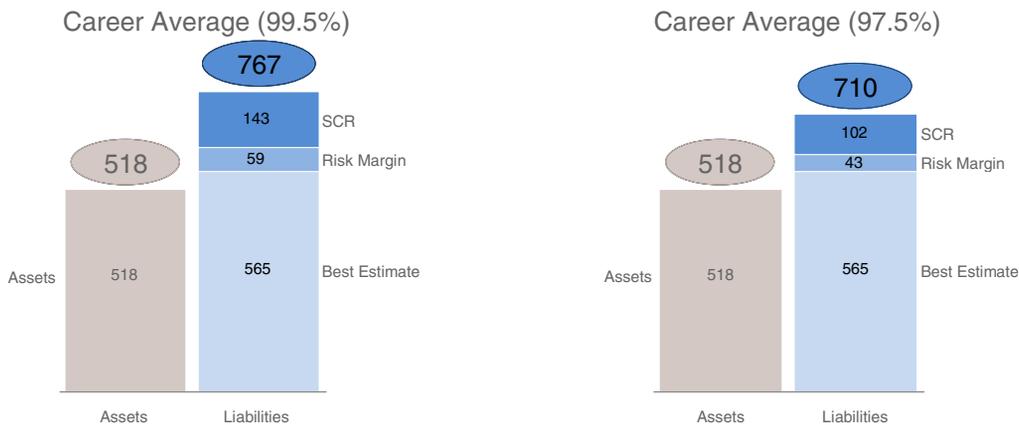
Pension plans with risk sharing

Pension plans with risk sharing features show better results under QIS 3

As discussed above under “Pension Plans”, risk sharing with the sponsoring company and (different generations of) plan members via the contribution policy is an important feature of pension funds that distinguishes them from life insurance companies. A lower security level could be defined in order to reflect this. We therefore illustrate the results for the career average plan (with unconditional indexation of benefits only) using a 97.5% security level. For this purpose, publicly available information about the calibration of the QIS 3 stresses¹⁶ has been used to recalibrate the stresses to this new security level.¹⁷

Figure 9 shows that the SCR reduces by 29%. A similar decrease can be observed for the Risk Margin since it is closely linked to the SCR. Obviously, the BEL does not change. Although the funding level increases from 68% to 73%, the Solvency II requirements are still not satisfied.

Figure 9. Results for different security level (modified QIS 3 model)



Source: risklab, IFA.

In order to illustrate the impact of risk sharing between the pension fund and the plan members via conditional indexation, we compare the QIS 3 results for the following pension funds:

- Pension fund 1: Career average pension plan with unconditional indexation and initial funding level of 100% based on IAS 19.
- Pension fund 2: Career average pension plan with conditional indexation and the same amount of assets as pension fund 1. This corresponds to an initial funding level of 143% based on IAS 19.

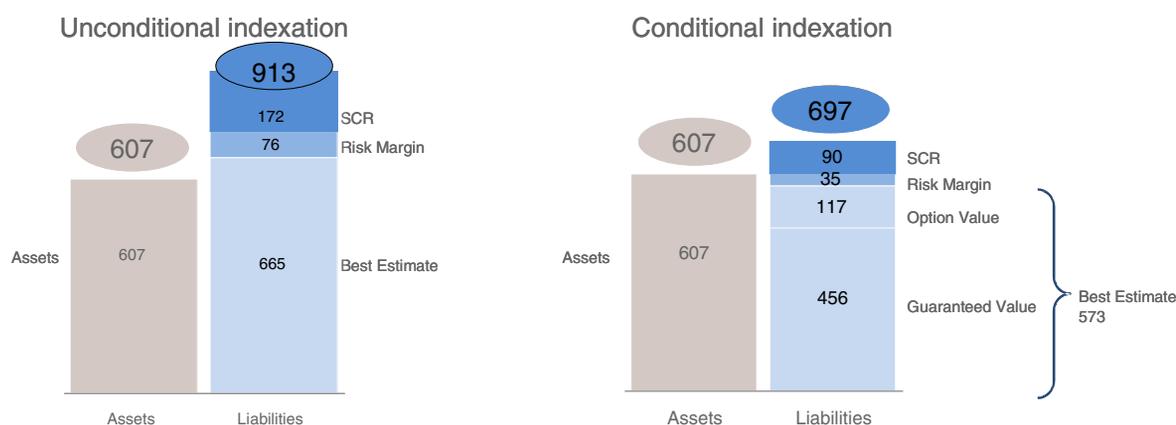
The results of the Solvency II calculations are shown in Figure 10 for both pension funds.

Opposed to the IAS 19 DBO, the BEL under QIS 3 has to include the time value of options and guarantees. The market consistent value of future indexations is therefore part of the BEL under QIS 3 for the pension plan with conditional indexation. This is to some extent comparable to discretionary future profit sharing appearing in traditional participating life insurance contracts.

The value of this option is determined using market consistent valuation techniques based on Monte Carlo simulations. The amount of

indexation at each point in time in each scenario depends on the IAS 19 funding level (where the IAS 19 DBO at each point in time reflects past indexations but does not include future indexations). A management rule is defined that describes the amount of indexation as a function of this funding level.

Figure 10. Results conditional indexation (modified QIS 3)



Source: risklab, IFA.

For the generic pension fund with conditional indexation, the BEL amounts to 573m, which is 14% lower than the BEL of the pension fund with unconditional indexation. Since the BEL of a pension plan without indexation would be 456m, the value of future indexations equals 117m (26% of the BEL for guaranteed benefits).

Compared to the pension fund with unconditional indexation, the SCR reduces by 48% (from 172m to 90m). This is due to the fact that allowance is made for risk sharing with the plan members. In bad scenarios (where the funding level decreases), the amount of future indexations also decreases (i.e. the option value decreases). Therefore the change in the market value of assets (e.g. in an equity stress) can be partially mitigated by a corresponding change in BEL.

Overall, the funding level based on QIS 3 is still below 100% for the pension fund with conditional indexation. However, it should be noted that the results are somewhat distorted by the fact that the amount of indexation is derived from the IAS 19 funding level (as currently practised), but the valuation of liabilities is made on a market consistent basis. If a market consistent valuation framework would be introduced, it would seem natural to also adjust the indexation rules in order to have a consistent overall setting.

Another observation is that this option value and as a result the BEL would increase further if the amount of assets would be increased (since plan members would receive higher indexations). If the amount of assets

reaches a certain level, the BEL would be equal to the BEL for the pension fund with unconditional indexation. An increase in the amount of assets would also have an impact on the solvency capital requirements for market risks (due to the larger amount of assets subject to the stresses) and on the amount of risk mitigation recognized under QIS 3 (due to higher option values before stress). As a consequence, the SCR would change as well.¹⁸ It is conceivable that in some situations an increase of the amount of assets would be offset to a large extent by increases of the BEL and SCR.¹⁹

The option of benefit cuts is a very effective way to reduce funding requirements ...

Benefit cuts are another way for pension funds to share risks with plan members. When the funding level of the pension fund is below a certain level (in our case 100%), the benefit payments are cut. This means that the plan members cover some part of the losses of the pension fund if the funding level of the pension fund deteriorates.

The results of the career average plan with the option to cut benefits have been compared to the results of the standard career average plan in Table 3.

Table 3. **Results benefit cuts (modified QIS 3)**

Pension Plan	Assets*	Technical Provisions	SCR	Liabilities	Funding level: Solvency II
Career Average: benefit cuts	518	460	45	505	103%
Career Average: unconditional indexation: benefits only	518	624	143	767	68%

* Assets are equal to 100% of DBO^{IAS}

Source: risklab, IFA.

The technical provisions and the SCR decrease significantly due to the option to cut benefits resulting in a funding level of 103% under Solvency II. The funding level of the standard career average plan without the option to cut benefits amounts to only 68%.

...but it means also a significant risk shift to beneficiaries.

Benefit cuts can be seen as a put option that the plan members have sold to the pension fund. It is important to recognize that the value of this option depends on the management rules for benefit cuts. When the funding level at which benefits are cut is set at a lower level (e.g. 90%), the value of this risk sharing feature is smaller. In this case, only modest reductions in Technical Provisions and SCR would be observed compared to the career average plan without the option to cut benefits.

Overall, the Solvency II funding level of the pension plans with risk sharing features is higher compared to the plans without risk sharing. The amount of improvement varies depending on the type of risk sharing and the associated management rules.

V. Conclusions

The target of this study was to analyse what the quantitative funding requirements would be, if Solvency II (based on the QIS 3 methodology) would be applied to pension funds with defined benefit plans. In addition, possible extensions of the Solvency II methodology were discussed in order to reflect the specifics of pension funds.

The results can be summarised as follows:

- Compared to an initial funding level of 100% based on IAS 19, Solvency II may potentially require a dramatic increase in funding level for pension funds depending on the security level and the allowance for risk sharing with the plan sponsor.
- Significant changes in asset allocation may arise if schemes seek to reduce the SCR (*e.g.* by reducing their equity exposure) as an alternative to holding additional capital.
- The Solvency II methodology makes allowance for risk sharing with plan members. This leads to a reduction of SCR.
- The QIS 3 model has to be modified in order to account for the specific risks of pension funds, in particular regarding inflation risk and salary increase risk.
- Further conceptual work seems necessary in order to properly reflect risk sharing with sponsoring company or plan members (*e.g.* via reduced security level or based on credit rating of sponsoring company).

It is important to understand that the results may vary significantly between countries and between different types of pension funds. We therefore recommend additional analyses that reflect the situation in specific countries (*e.g.* initial funding level, asset allocation, type of pension plan). Similarly, possible consequences of the introduction of Solvency II for pension funds (*e.g.* impact on contribution rates, plan design and asset allocation) need further investigations.

Notes

1. See McCreevy, C. "Closing address to the CEIOPS Conference 2007 - View from the Top", *Proceedings of CEIOPS Conference 2007*, Frankfurt (http://www.ceiops.eu/media/docman/public_files/Conference2006/CEIOPS%20Conference-McCREEVY-EC.pdf) and Terták, E. (2007), "The Supervisory Framework for Occupational Pensions – Where Now and What Next?", *Proceedings of CEIOPS Conference 2007*, Frankfurt (http://www.ceiops.eu/media/docman/public_files/Conference2006/CEIOPSConference-ElmerTertak-EC.pdf).
2. See Blome, S., Fachinger, K., Franzen, D., Scheuenstuhl, G., and Yermo, J. (2007), "Pension Fund Regulation and Risk Management: Results from an ALM Optimisation Exercise", in *OECD Private Pension Series* No. 8, *Protecting Pensions: Policy Analysis and Examples from OECD Countries*, Paris, OECD.
3. In reality, almost all pension plans involve a plan sponsor. For presentational purposes, we first show results for plans without any risk sharing (i.e. with no plan sponsor involved).
4. This could be refined by defining the security level depending on the credit rating of the sponsoring company.
5. This could be considered as some type of hybrid DB plan.
6. See Heubeck, K., Herrmann, R. and D'Souza, G. (2006), "Die Richttafeln 2005 G – Modell, Herleitung, Formeln", in *Blätter der DGVFM*, p. 473-517.
7. See Mercer Investment Consulting (2007), *Asset allocation survey: European institutional market place overview*, p. 2.
8. See CEIOPS (2007), *QIS 3 Technical Specifications, Part I: Instructions*, <http://www.ceiops.eu/media/files/consultations/QIS/QIS3/QIS3TechnicalSpecificationsPart1.PDF>, p. 7–11.
9. We acknowledge that the allowance for benefits and contributions related to future service needs further considerations
10. See CEIOPS (2007), *QIS 3 Technical Specifications, Part I: Instructions*, <http://www.ceiops.eu/media/files/consultations/QIS/QIS3/QIS3TechnicalSpecificationsPart1.PDF>, p. 11–16.
11. See CEIOPS (2007), *QIS 3 Technical Specifications, Part I: Instructions*, <http://www.ceiops.eu/media/files/consultations/QIS/QIS3/QIS3TechnicalSpecificationsPart1.PDF>, p. 31–33.
12. Inflation risk is covered separately (see above).
13. We acknowledge that allowance for future salary increases in the context of solvency assessments needs further considerations.
14. In QIS 3, the risk free term structure was based on swap rates. CEIOPS is currently considering to use government rates for future QIS (resulting in a further increase of the BEL).
15. See section "Assumptions".
16. See CEIOPS (2007), *QIS 3 Calibration of the underwriting risk, market risk and MCR*, (<http://www.ceiops.eu/media/files/consultations/QIS/QIS3/QIS3CalibrationPapers.pdf>).
17. This is done for all relevant stresses except for operational risk where a factor-based approach has been used. In most cases, the recalibration is based on the assumption of a normal or lognormal distribution of the underlying risk factors.

18. At this point, it is important to recall that the SCR is based on the change of all assets held by the pension fund and not only on the assets needed to cover the liabilities. Thus, giving more assets to a pension fund that is already overfunded would increase the SCR under the QIS 3 model (which seems counterintuitive).
19. Conversely, a reduction of the amount of assets would lower the BEL (since the value of future indexations would decrease). Hence the decrease in funding level would be less severe than for a pension plan with unconditional indexation.

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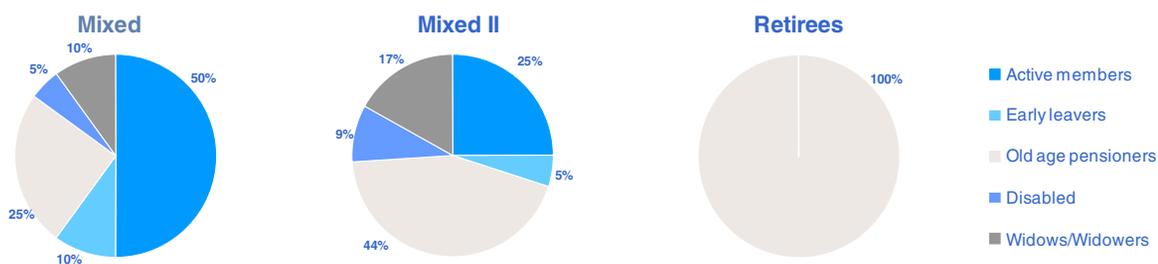
APPENDIX

In this Appendix, we present the results for the final pay plan for different plan member portfolios and for different asset allocations.

A1: Sensitivity analysis: mix of plan members

Two different mixes of plan members have been assumed: “Less Actives” and “Retirees” (see Figure A1). In the “Less Actives” portfolio the amount of active members and early leavers has been reduced. The “Retirees” portfolio consists of 100% retirees.

Figure A1. Mixes of plan members



Source: risklab, IFA.

The results for the final pay plan show that an IAS 19 funding level of 100% is not sufficient to fulfil the Solvency II requirements for all considered mixes of plan members (see Table A1). The Solvency II funding level improves however for the “Less Actives” (71%) and the “Retirees” portfolio (74%) compared to the “Mixed” portfolio (64%). The main reason is that the difference between the IAS 19 DBO and the BEL is smaller for the other two mixes due to a lower IAS 19 DBO discount rate (which in turn depends on the duration of the benefit payments).

Table A1. Final pay plan results for different mixes of plan members

Final Pay Plan with	Assets	Technical Provisions	SCR	Liabilities	Funding level: Solvency II
Mixed portfolio	791	990	238	1228	64%
Less Actives portfolio	766	874	207	1081	71%
Retirees portfolio	1040	1133	281	1414	74%

Source: risklab, IFA.

A2: Sensitivity analysis: asset allocation

The asset allocation has a significant impact on the solvency requirements for the pension fund under Solvency II. Two different asset allocations have been assumed: “Defensive” and “Aggressive”. Table A2 shows the weights of the different asset classes in these two asset portfolios. The “Defensive” asset allocation has a larger share of bond investments (80% instead of 35%), whereas the “Aggressive” portfolio is mainly invested in equities (65%) and alternatives (15%).

The SCR for the final pay plan with the “aggressive” asset allocation increases due to the higher equity risk charge. Although the SCR for the final pay plan with the defensive asset allocation is reduced, the funding level under Solvency II is still below 100% (see Figure 16).

Table A2. **Final pay plan results for different mixes of plan members**

Final Pay Plan with	Assets	Technical Provisions	SCR	Liabilities	Funding level: Solvency II
Defensive SAA	791	986	170	1156	68%
Moderate SAA	791	990	238	1228	64%
Aggressive SAA	791	992	272	1264	63%

Source: risklab, IFA.

Part III

Debt Management

Use of Derivatives for Debt Management and Domestic Debt Market Development: Key Conclusions

Hans Blommestein (OECD), Udaibir Das (IMF), Alison Harwood (IFC), Ceyla Pazarbasioglu (IMF)
and Anderson Silva (WB)

The Ninth OECD/World Bank/IMF Annual Global Bond Market Forum held on 22-23 May 2007 in Paris, France, highlighted that there has been very sharp growth in the use of derivative instruments in both mature and emerging market countries. The use of derivative instruments is helping public debt managers in their portfolio management operations and in supporting market development. Several institutional and structural impediments, however, remain toward the more active use of derivative products. Most developed market debt managers use derivative instruments for debt management purposes, while this is the case for only a handful of emerging markets. Several emerging markets, though, are taking steps towards developing the legal environment necessary to support derivative markets, and are addressing the challenges posed by illiquidity of the underlying cash market, deficiencies in prudential regulation, and restrictions on market participation.

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I. Background

The Ninth OECD/World Bank/IMF Annual Global Bond Market Forum was held on 22–23 May 2007 at the OECD headquarters in Paris. The forum, which was jointly hosted by the OECD, World Bank, and IMF, was attended by nearly 120 delegates from OECD and non-OECD countries, including debt managers, central bankers, securities regulators, and representatives from the private sector. A key objective of this annual forum is to create awareness of the major issues in developing sound policies for managing public debt and developing government bond markets. It allows participants to get better acquainted with emerging international practices on specialised topics that benefit debt managers and debt market practitioners in both mature and emerging markets.

Objective of the forum was to discuss policy, operational, and regulatory issues relating to the use of derivatives by public debt managers and market participants...

The theme of the forum was the use of derivatives by debt managers and their role in domestic debt market development. The importance of the topic emanates from the rapid growth in derivatives in global markets, including interest rate and foreign exchange derivatives and credit default swaps. The objective of the forum, therefore, was to discuss policy, operational, and regulatory issues relating to the use of derivatives by public debt managers and market participants, and their relevance for domestic debt market development.

...and their relevance for domestic debt market development

Within that, three principal topics were addressed. First, there was an overview of recent trends in fixed income derivative markets, how the markets have been evolving, and developments relating to instruments, infrastructure, transparency, and the investor base. Second, technical aspects of the use of derivatives by public debt managers, ranging from objectives to operational modalities to risk management, valuation, and other operational challenges, were discussed. Third, the role of derivatives in developing government securities markets, from the perspective of market participants, was considered.

This report documents the key conclusions from the forum. Section II presents the recent trends in fixed income derivatives. The use of derivatives in public debt management is discussed in Section III. Section IV presents the importance of derivatives for government bond market participants. In Section V, the challenges facing emerging markets in developing derivative markets are discussed.

II. Recent trends in fixed income derivatives

Sharp growth in derivatives in both mature and emerging markets...

There has been a sharp growth in derivatives in both mature and emerging markets. This includes transaction volumes, types, and users. Public debt managers in most mature markets already use derivatives to some extent, and many emerging market debt managers have begun to use them as well. They use primarily interest rate and currency swaps, futures, and forward transactions to achieve strategic objectives.

...in particular credit derivatives

The use of credit derivatives, in particular, is increasing rapidly. This is leading to a transformation of debt markets in the same way that the use of derivatives transformed interest rate markets in the 1980s. The availability of credit derivatives is facilitating the broadening of the investor base for public debt managers, especially in emerging market countries.

Growth has been robust in both exchange-traded and over-the-counter (OTC) derivatives. The two markets have their respective benefits. Exchange-traded derivatives reduce counterparty and operational risk through centralised clearing mechanisms, and are considered more transparent, liquid, and accessible to a broader range of market participants. OTC derivatives, which are easier to develop, grow organically, do not require underlying cash markets, and are more customised.

There may be a stronger symbiotic relationship today between exchange-traded and OTC derivatives. Exchange-traded markets face pressure from their OTC counterparts, where important investments in new electronic platforms are developing rapidly and can now provide a legal confirmation of the deals within minutes of their execution. Similarly, there are now several models of exchanges offering clearing services to OTC participants. It is the operational aspects of clearing, trade matching, and confirmation that make clearing by exchanges attractive. Risk mitigation resulting from centralised and multilateral clearing is secondary. These two markets, however, are not pure substitutes from the perspective of institutional funds, where investment guidelines may dictate that products be exchange-listed. Similarly, OTC derivatives can offer public debt managers greater flexibility to customise risk-reduction transactions to the specific risks in their portfolios. Thus, debt managers that use derivatives are likely to benefit from having both OTC and exchange-traded products available for their portfolio management operations.

Emerging market countries may benefit from the strengthening of OTC markets. Providing the enabling environment, including an adequate legal and regulatory framework, helps protect against counterparty risk in OTC trades and improves transparency and disclosure. Such efforts could enable emerging market countries to introduce derivatives at an earlier stage in their development, as they would not have to wait until cash markets are liquid enough to support an exchange-traded derivatives market.

III. Use of derivatives by public debt managers

For public debt managers, the use of derivatives is largely strategic

For public debt managers, the use of derivatives is largely strategic, with clear objectives. Debt managers should first consider whether the use of derivatives is in line with achieving their risk and cost objectives within a well-specified debt strategy, and with other goals, such as developing and maintaining an efficient market for government securities. Within this framework, the implementation of the debt strategy may include the use of derivatives to separate funding decisions from the optimal portfolio composition decision, reduce the cost of borrowing, and manage risks in the portfolio (in particular, interest rate refinancing risk and refinancing risk). Debt managers should determine the purpose of transactions in order to select the appropriate instrument(s) and structure(s). For many debt managers in emerging market countries, the priority should remain on developing a credible and well-functioning issuance program, deepening the debt market, and building a diverse investor base.

Well-developed derivative markets may benefit public debt managers...

Well-developed derivative markets may benefit public debt managers, even when they are not direct users of such instruments. Derivative instruments contribute to overall market efficiency and liquidity. These benefits include the ability for market participants to hedge positions effectively, the ability to trade in and out of markets at any time, continuous price updates and market intelligence through trading in the derivative asset class and, last but not least, the maintenance of market liquidity. In turn, these factors can contribute directly to lower funding costs for the government, with more competitive participation in auctions (by investors and intermediaries) and better market-making in the secondary market.

...but certain preconditions need to be in place...

Use of derivatives by public debt managers should be considered only after certain preconditions are satisfied. Initially, priority must be given to establishing a credible debt issuance program, a diversified funding base, and adequate market infrastructure for the primary and secondary markets. Debt managers need to possess adequate internal capacity (including personnel and systems) for front-office execution, middle-office strategic analysis, and back-office settlement for managing derivative transactions and their associated risks. Capability is built over time, and in the meantime, if the case for using derivatives is strong, steps can be taken to facilitate their use, such as outsourcing or appointing agents for particular aspects of transaction execution, settlement, collateral management, and ongoing risk management.

...in particular regarding risk management and reporting

In terms of risk management and reporting, several pre-requisites are needed by public debt managers. Real-time market information is needed for evaluating potential new transactions, periodic rate resets, determining required collateral movements, and remunerating posted collateral. Independent calculation and bilateral confirmation of cash flows is essential. For debt managers, there are sometimes

inconsistencies in the accounting treatment of derivatives (often mark-to-market) and underlying bonds (often book value). This complicates communication and evaluation of the risk reduction that derivatives were intended to help achieve.

Derivatives entail credit risk to the counterparty and operational challenges with valuation and day-to-day management. Common controls include transacting only with counterparties with a minimum credit rating and applying exposure limits to individual counterparties. Collateralisation is increasingly common. This helps reduce credit risk, but raises further challenges with valuation, posting, and remuneration. Lower-rated sovereigns face additional complexity in that they themselves may have to pledge collateral, which also affects the cost-effectiveness of using derivatives in debt management.

There is no clear consensus on the optimal degree of transparency

There is no clear consensus on the optimal degree of transparency for derivative transactions. Fear of front-running or squeezes may limit *ex ante* transparency, while the reasons for limited *ex post* transparency around derivatives are less well articulated. For public debt managers, their policy regarding derivatives, however, should not undermine the benefits trying to be achieved through high transparency in respect of securities issuance and the cash market for government securities.

IV. Importance of derivatives for market participants

Derivatives help complete the market by increasing investment, trading, and asset management opportunities

Derivatives help complete the market by increasing investment, trading, and asset management opportunities. An economically complete market supports the willingness of investors to hold assets or take positions in particular securities. Investors need to have certainty that they can finance, adjust, and liquidate their positions efficiently; reduce or smooth the risks of volatility through hedging or risk management strategies; or extract exceptional gains through speculative strategies to the extent possible, at the lowest transaction cost, continuously into the future.

Derivatives are beneficial for dealers and investors

Derivatives are clearly needed by market participants, dealers, and investors in the government securities markets. A liquid, reliable futures market supports the ability to hold assets. It provides a means for forward price discovery, enhancing the likelihood that risks can be transferred when and as desired, and permits market makers to hedge their net exposures. OTC and futures markets support hedging needs. Stock loans and repurchase transactions support financing of cash market activity.

Market participants attribute significant value to futures market liquidity. Liquidity is the primary driver of futures market success. It translates into low transaction costs and tight spreads, which are key to whether market participants are willing to use a futures market to lay off

risk. Market participants will prefer to use a standardised product (that is, an organised market), provided the basis risk (the risk that the price of a future will vary from the price of the underlying cash instrument as expiry approaches) is not high. There must also be sufficient two-way trading interest to assure that positions can be assumed and disposed of at the market's projected price with the least cost or price slippage. A more tailored product will be preferred if the basis risk is too high.

A number of pre-requisites are essential for government securities market participants to benefit from derivative markets

A number of pre-requisites are essential for government securities market participants to benefit from derivative markets. These include, notably, operational aspects such as a well-functioning clearing, trade matching, and confirmation infrastructure and an adequate legal and regulatory framework. Market participants, through government and self-regulation, should ensure transparency, product suitability, prevention of market abuse, and best execution. Risks associated with the use of derivatives, in particular operational risk, should be identified and managed adequately, notably through the use of appropriate stress-testing type methods.

Investors need to be educated about the use of derivatives for hedging and more broadly for risk management. The current positive and stable global environment can discourage market participants from buying the insurance that derivatives provide. Buying insurance typically entails some degree of opportunity cost, but ensures adequate risk management by limiting downside risks especially in times of sharp volatility or distress.

At the same time, market participants would also benefit from understanding the risks of using certain types of derivatives. The practice of separating origination from distribution risk by using credit derivatives raises some concerns. Regulators, and market participants, may not always understand where risks are hidden, or may lack the information to accurately assess credit risk. Operational risk is another key concern with using derivatives. Regulation, both self-regulation and by government, can help reduce the risks associated with using derivatives. New regulatory developments, such as Basel II Pillar 2, will help address these issues from a regulatory and supervisory perspective, but stress testing techniques are not uniform among banks, which puts pressure on supervisors to compare results across different banks.

V. Developing derivative markets in emerging market countries

Emerging market countries can benefit from derivative products...

Emerging market countries can benefit from derivative products. Investors need to be able to translate their views on financial conditions into transactions in order to protect themselves from anticipated changes that might harm their positions. Derivatives can provide this protection and help prevent minor changes, such as in monetary policy,

from turning into systemic shocks. In addition, derivatives can reduce the cost of issuing bonds and help lengthen the yield curve. They can also be a way to address the lack of investible assets and provide more investment opportunities. In many emerging market countries, the growth of institutional investors, including pension funds and insurance companies, has outstripped issuance of investible domestic assets creating a supply/demand imbalance. Derivatives can help fill this gap.

...but they are facing important challenges in developing derivative markets

Emerging market countries face several challenges in developing derivative markets. These include relatively underdeveloped markets for the underlying assets; lack of adequate legal, regulatory, and market infrastructure; and restrictions on the use of derivatives by local and foreign entities. Low liquidity in bond and equity markets is a particular problem. Limited trading may reflect information asymmetries on account of insufficient disclosure standards, lack of transparency, poor corporate governance, and limited participation due to entry restrictions. Countries need to focus on addressing these challenges and creating the conditions to help build both cash and derivative markets.

Statutory barriers and uncertainty surrounding legal and accounting requirements specific to the structure, trading, and enforcement of derivatives have inhibited development in many emerging markets. Derivative contracts in mature markets are usually structured under broadly accepted norms of market practice and are governed by a developed legal regime. In many emerging market countries, legal codes and accounting rules are silent on all or certain types of derivatives, fail to identify the regulatory jurisdiction over derivatives, or make derivative contracts unenforceable.

Regulators in emerging market countries should develop appropriate policies on the operational and credit risks of trading derivatives. Regulators often fear that derivatives will increase, rather than reduce, risk and, as a result, they adopt a conservative stance. Several risks can be reduced and controlled; for example, counterparty risk can be reduced with exchange-traded derivatives through central counterparties with strong risk management systems, including margining and membership rules. In addition, price transparency can be increased through trading platforms, while disclosure provides additional information of importance to users. Many of these mechanisms are now being used in OTC derivative markets, most notably requiring collateral and allowing only highly rated entities to engage in OTC transactions, using OTC trading platforms to display price information, and copying disclosure practices used for futures markets. Regulations on the suitability of use can help ensure that derivatives are used appropriately.

Liquidity in cash and derivative markets can be mutually reinforcing, but the lack of liquidity in underlying cash markets is a particular concern in emerging market countries. The availability of reliable pricing benchmarks across the term structure helps avoid concentration of

Lack of liquidity in underlying cash markets is a major obstacle in several emerging markets

trading at certain maturities (usually short-term). In some emerging markets, only futures contracts on a limited range of maturities are liquid, while contracts on other (usually longer) tenors have been restricted by limited short-term benchmarks and sluggish secondary market trading. Derivative markets have also developed out of foreign exchange-driven interest in the absence of a developed bond market. In other emerging market countries, liquid and long-maturity swaps trading pre-dated a liquid bond market. There are also emerging markets where low levels of treasury bill liquidity have impeded development of interest rate derivative markets, making foreign exchange swaps the choice for investors to take liquid interest rate positions. Countries should take action to increase market liquidity (such as through making issues fungible and creating market benchmarks), by allowing their bonds to be traded OTC, as that typically results in higher liquidity than exchange-trading of bonds.

It is unclear whether exchange-traded or OTC derivatives are preferable for emerging market countries. Exchange-traded derivatives reduce counterparty risk and make price and information transparency more accessible to a wider range of market participants, but they require cash market liquidity to develop. On the other hand, OTC derivatives are not so dependent on cash market liquidity, but entail more counterparty risk and are less accessible. As noted, counterparty risk can be reduced through the use of collateral, which is increasingly being done. Transparency can be helped by using electronic trading platforms that support OTC trades and by strengthening documentation.

A broad investor base is essential for the sound development of derivative markets

While a diverse investor base is essential for the sound development of derivative markets and for efficient price discovery in underlying cash markets in many emerging market countries there are serious constraints. Pension funds and insurance companies are subject to stringent investment guidelines, often requiring substantial holdings of government debt. At the same time, derivative market regulations and reporting requirements limit the participation of institutional investors and their ability to hedge cash market exposures to interest rate and exchange rate volatility.

Policymakers need to allow two-sided markets to develop. Two-sided derivative markets can be constrained because investors seek to buy and hold cash market assets when the supply of assets is limited relative to the demand for them. As a consequence, all investors hold long assets and want to hedge their holdings. Policymakers need to allow participants in the market to sell derivatives, educate them so as not to see that activity as undesirable speculation, and encourage foreign participation (since foreign participants often perform this function). Regulators should allow short sales and fails, and allow market participants to take positions without having the underlying security. Otherwise, a two-sided market cannot develop.

In some emerging markets, capital account restrictions have shifted derivatives trading to offshore markets

In some emerging markets, capital account restrictions have shifted derivatives trading by foreign investors to offshore markets. This has several implications. It reduces the ability to monitor the transactions, and limits many smaller investors, such as small- and medium-sized companies, from hedging their risks, due to higher transaction costs and limited market access. In some countries, offshore non-deliverable forwards have provided an effective way to hedge foreign exchange exposures. As emerging market countries liberalise capital controls, activity can move onshore and to deliverable forward markets. It should be noted that the lack of a clear legal framework and restrictions on the use of derivatives by corporate and institutional investors have slowed the development of onshore derivative markets.

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