

Risk transfer between banks, insurance companies and capital markets:

an overview

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Interlinkages between the banking and insurance industries are increasing. The most visible sign is the merger of banks and (in most cases, life) insurance companies to form bancassurance groups. But at least as important for the efficiency and robustness of the international financial system are linkages through the growing markets for risk transfer. Banks are shedding credit risk to insurance companies, amongst others; and life insurance companies are using capital markets and banks to hedge some of the significant market risks arising from their portfolios of retail savings products. This article describes these interactions, which are effected primarily through securitisations and derivatives. In principle, firms can use risk-transfer markets to disperse risks, making them less vulnerable to particular regional, sectoral or market shocks. Greater inter-dependence, however, raises challenges for market participants and the authorities: in tracking the distribution of risks in the economy, managing associated counterparty exposures, and ensuring that regulatory, accounting and tax differences do not distort behaviour in undesirable ways.

BANKS' AND INSURANCE COMPANIES are exposed to various credit, market and insurance risks in the course of their business. Broadly, they can manage these risks in three ways:

- Arrange for another entity to take on the risk at the outset. For example, a bank might arrange a bond issue for a corporate customer rather than lending itself; or an insurance company might arrange for a customer to 'self-insure' by establishing a captive insurance company rather than buy insurance cover.
- Retain risks on their balance sheets and seek to control them through careful monitoring, pricing and diversification.
- Hold the risk only temporarily before selling it into a secondary market, hedging it with another offsetting transaction or repackaging it in order to sell/hedge it.

This article concentrates on the third 'risk transfer' approach. After reviewing some longer-standing interactions between the banking and insurance industries, it maps recent developments in the ways they transfer credit, market and insurance risks – particularly to each other. The focus is international markets. The article is primarily descriptive but the final section identifies some issues and questions.

Background

Insurers and banks have always had mutual exposures in a number of areas. (The activities of different types of insurance companies are described in Box 1.)

- Insurance companies are significant investors in bank capital instruments, such as equities and subordinated debt. This gives them a leveraged exposure to the risks taken by banks.
- Insurance companies cover banks and their customers against the usual range of insurance

1: For convenience, this article refers to 'banks' in a loose way that includes other major financial intermediaries, such as the large US securities firms.

Box 1: Types of insurance company

Life insurers provide insurance cover against death, sickness and disability: often embedded in long or medium-term savings products, such as pensions. The insurer receives either a large single payment or a series of regular payments and invests the funds either to yield a regular income to the policyholder or a capital gain at some future date. The investment risk may be retained by the policyholder but often the insurance company will provide either a fixed return (eg guaranteed investment contracts (GICs) in the United States), a smoothed return (eg with-profits policies in the United Kingdom) or a minimum return. The balance sheets of life insurance companies are typically large, reflecting the intermediation of household savings into investments. For example, UK life insurance companies had investment funds of over £900 billions at end-2000 compared to less than £100 billions for general insurance companies.

General insurers (also known as Property and Casualty or P&C insurers) provide insurance cover against property and liability risks, sub-divided into categories such as property, motor, aviation, marine, fire, personal accident and legal liability. In most cases, policies are renewed annually with the insured bearing an initial share (the deductible or retention).

General insurers typically have smaller balance sheets than life insurers because they do not usually intermediate between savings and investments. Their

profitability depends on their underwriting performance (whether premiums received exceed claims paid) and their investment return on funds held during the period after premiums are received and before claims are paid (sometimes called the 'float').

Reinsurers take on a proportion of the risks covered by general and, to a lesser extent, life insurers. Under *treaty* reinsurance, an insurer commits to ceding and a reinsurer to accepting a share of risks on new business over an agreed period. Under *facultative* reinsurance, insurers and reinsurers agree cover for particular exposures. Reinsurance policies can be either be proportional ('quota share') – the reinsurer and insurer agree to share fixed percentages of premiums and claims – or non-proportional. Non-proportional or 'excess of loss' cover requires the reinsurer to pay any losses in excess of a pre-determined retention up to a certain limit. The retention may be set by individual risk (eg insurance of a particular building), as the sum of all losses resulting from a catastrophic event or as the sum of all losses in a particular period ('stop loss cover'). Some reinsurers retain the majority of their risk, others reinsure themselves through the so-called retrocession market.

Table A shows the largest life insurance, general insurance and reinsurance companies worldwide by revenue at the end of 2000.

Table A:
Largest life insurers, general insurers and reinsurers globally by revenue at end-2000

Life insurers	Revenue (US\$ billion)	General Insurers	Revenue (US\$ billion)	Reinsurers	Revenue (US\$ billion)
AXA	93	Allianz	71	Munich Re	14
ING Group	71	State Farm	48	Swiss Re	13
Nippon Life	68	AIG	46	Berkshire Hathaway	9
CGNU	62	Munich Re	40	Employers Re	7
Generali	53	Zurich	37	Gerling	4

Source: *Insurance*, City Business Series 2001, International Financial Services London (2001).

risks. Insurance also underpins bank lending by protecting customers against risks that might otherwise leave them unable to repay their debts. In some cases, the availability of insurance can determine whether companies can do business (eg airlines and construction), with direct consequences for bank credit risk.

- Some insurance companies have for many decades provided companies with trade credit insurance. Banks often finance these 'receivables', supported by the insurance.
- Banks provide insurance companies with liquidity facilities to enable them to pay claims, and with letters of credit, which may be required by regulators or customers to evidence ability to pay future claims.

More recently – perhaps since the 1980s – banking and insurance industries have borrowed from each other as part of a broader process of convergence. Traditionally, insurers wrote policies covering specific risks, renewable (and so repriced) annually. Banks, by contrast, have tended to take on a bundle of risks attached to term lending. These include interest rate, currency, credit, funding, prepayment and legal risks; and, within credit risk, the different risks that affect a borrower's willingness and ability to pay eg business, operational, political risk etc.

Over the past two decades, however, banks have increasingly been unbundling their lending risks. The use of interest rates and currency derivatives for that purpose is familiar. Some banks also buy, for example, political risk insurance cover against emerging market economy exposures². More generally, the techniques developed in recent years to split credit risk into tranches have been broadly akin to the layering of insurance and reinsurance; and in pricing terms, the spread over risk-free interest rates on a corporate bond and the premium paid on a credit derivative can be compared to the credit reinsurance 'rate-on-line' (the premium divided by the maximum loss).

On the insurance side, packages are now available to cover all or most of a corporate customer's potential liabilities and losses, sometimes for terms beyond a year³. And so-called financial or *finite risk reinsurance*, with its origins in the 1970s, Lloyd's 'time and distance' policies, has combined a degree of risk transfer with what amounts to a form of revolving loan and/or investment facility to insurers (see Box 2). In economic terms, the reinsurer provides liquidity insurance, a core commercial banking activity.

The formation of so-called *bancassurance* groups (eg Allianz/Dresdner, Citicorp/Travellers, Lloyds/Scottish Widows), via the merger of a bank and an insurance company (typically a life company), is another manifestation of the banking and insurance links. Many of these deals seem to have been motivated by the aim of securing efficiency gains in the distribution of short and long-term retail savings products. But they also produce combined portfolios carrying a mixture of insurance and banking exposures, which is likely to alter their diversification/concentration characteristics and so be relevant to financial system stability and efficiency⁴. Bank/insurance company mergers are not, however, essential to achieve this type of risk diversification.

New risk transfer techniques

The past decade has seen a growing range of new techniques and markets for transferring risk. They include:

- *Loan trading*: Markets for trading of individual loans are well established, particularly in the United States but also, to a lesser extent, in other countries including the United Kingdom. Institutional investors and specialist loan funds have, in recent years, taken up around half of many syndicated loans in the United States. Much of the secondary trading was initially in distressed debt (trading at less than par) but the 1990s saw growth in par debt trading⁵.

2: Political risk insurance typically covers banks against the risk of currency non-convertibility, nationalisation, expropriation etc. It does not cover the credit risk of borrower default. Some regulators require banks to hold provisions against country risk but allow offsets if they purchase political risk insurance.

3: See, for example, *Integrating Corporate Risk Management*, Swiss Re New Markets, 2000.

4: See *Risk Management Practices and Regulatory Capital: Cross Sectoral Comparisons*, Joint Forum 2001, available at www.bis.org.

5: For more on this see, for example, Section I of the *Financial Stability Conjunction and Outlook* in the June 2001 *Review*.

Box 2: Finite risk reinsurance

Finite risk reinsurance combines risk transfer with a form of 'banking' facility¹. In one variant, an insurance company will agree to pay premiums to a reinsurer over a period of years. If losses under the policy arise early in the period, the reinsurer will meet the claim up to a limit but recoup some proportion through higher premiums in the remaining years. The two companies may agree that, if losses are lower than expected, they will share any additional investment returns on the premiums, which accumulate in a so-called 'experience' fund. Indeed, premiums may be loaded in order to incorporate an element of investment in the transaction, with the reinsurer quoting an expected rate of return.

Finite policies may also be 'retrospective', relating to closed portfolios of outstanding policies expected to give rise to further losses. For example, a general insurance company may have large reserves held against expected future claims under policies from prior years that cover corporate asbestosis liabilities. Insurance companies are required to hold reserves against the face value of expected claims even if they

are expected to arise some way in the future. They can, however, transfer the liability to a reinsurer using a so-called 'loss portfolio transfer' or 'run-off' policy. Because the reinsurer can take account of the timing of claims and discount them back at the rate of return it anticipates on its investment portfolio, the insurance company may not need to transfer the entire amount of its reserves. The reinsurer takes on the risks that claims arise sooner, or its investment returns are lower, than expected.

Differences in accounting treatment are said to make finite reinsurance attractive to insurers. Under US Generally Accepted Accounting Principles (US GAAP), an insurer can offset a reinsurance recovery against an underwriting loss in its profit and loss account even if it is committed to 'repaying' a part of the money through higher premiums in future years. Many reinsurers, however, are located offshore, where accounting standards allow them to show the net present value of the loss taking account of the higher future income.

1: See, for example, *Modern ART Practice* Gerling Global Financial Products, Reactions Publishing Group, 2000 or *Integrating Corporate Risk Management* Swiss Re 2000 for more detailed descriptions.

- **Portfolio securitisation:** This typically involves the transfer of assets from the originator to a vehicle company, which then issues securities to investors backed by the cashflows on the transferred assets. The transaction is intended to remove risk from the balance sheet of the originator while ensuring that investors are exposed to the transferred assets only. Asset-backed securities (ABSs) typically shift credit risk⁶ on pools of relatively homogenous assets such as residential mortgage loans, credit cards or car loans. Transfers of credit risk on diversified corporate bond or loan portfolios are known as collateralised debt obligations (CDOs). Vehicles may finance themselves in the bond or short-term asset-backed commercial paper (ABCP) markets.
- **Derivatives:** These are transactions to exchange future payments contingent upon the future behaviour of a well-defined variable. The most actively-traded derivatives are based on interest rates, exchange rates, commodity prices, bond prices and equity indices. Mostly, they have short maturities. But life insurers have in the past few years been entering into some very long maturity contracts, largely to hedge interest rate risks embedded in their portfolios.

As noted above, derivatives have also developed linked to 'events', such as credit events affecting particular companies or sovereign states (credit default swaps)⁷, weather and natural disasters (eg catastrophe swaps). In addition, derivatives can also

6: Other risks may also be transferred, such as prepayment risk on mortgages. But ABSs are typically floating rate instruments with any interest rate risk hedged through a swap between the issuing vehicle and a bank.

7: On credit default swaps, collateralised debt obligations and portfolio credit default swaps, see my article in the June 2001 *Review* 'The Credit Derivative Market: its Development and Possible Implications for Financial Stability'.

Table 1:

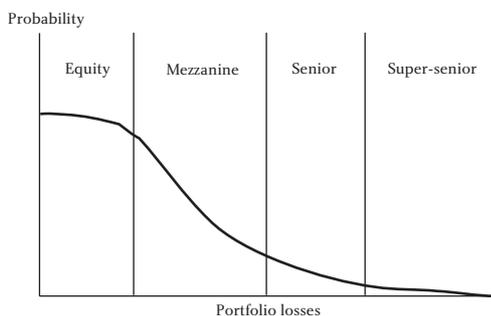
Risk transfers amongst banks, insurance companies and capital markets

Risk type	Credit risk	Market risk	Insurance risk
Direction of risk transfer			
Banks to insurance companies	Bank equities and bonds. Trade credit insurance. ABSs, CDOs, portfolio CDSs; financial guaranties; residual value insurance; other forms of credit insurance and surety bonds.	Bank equities and bonds. Insurance companies writing options and buying bonds with embedded options (eg callable bonds).	Insurance on bank property, legal liability etc. Insurance provided to borrowers to facilitate loans. Newly introduced insurance for eg operational, political risk.
Insurance companies to banks and other capital market investors	Letters of credit. Liquidity facilities.	Hedging of embedded options in portfolios of life insurance and pension products.	Catastrophe bonds.

be used to put together more complex structured instruments. For example, credit default swaps (CDSs) on different companies can be combined to form portfolio CDSs or they can be embedded in bonds to create credit-linked notes. Banks and insurance companies can use derivatives to hedge risks in their underlying businesses or to take trading positions. In effect, this transfers the risk to the derivative counterparty, although the bank/insurer may be left with counterparty credit risk and perhaps some form of ‘basis’ risk if the derivative is not a perfect hedge.

Banks use ABSs, portfolio corporate loan securitisations (CLOs) and portfolio CDS (also called *synthetic* securitisation) to pool single assets in portfolios on which the risk and return can then be split into different tranches. Bundling assets into portfolios is intended to reduce the variance of the returns and therefore the risk to investors. Tranching allows different investors to choose varying risk/return combinations depending on their preferences (Chart 1). The pricing of the tranches varies accordingly.

Chart 1:
Tranching of risk by cumulative default probability



Source: Bank of England

- *Alternative risk transfer (ART)*: ART is a catch-all term for a range of less conventional ways – some developed in the 1980s, others more recently – in which general insurance companies can take on and shed risk. It embraces insurance of new types of risk, such as credit portfolios or weather; different ways of organising insurance cover for large corporate customers, such as multi-year policies and the use of captive insurance companies; alternative ways of shedding risk, such as catastrophe bonds, with yields linked to the occurrence of earthquakes or windstorms; and, as noted above, finite risk reinsurance, effectively a form of banking facility provided by reinsurers to insurers (Box 2). ART also includes the unbundling of capital market transactions into the parts which can be sold into (liquid) securities markets and any remaining risks, for which the cost of insurance might be lower, such as an issuer’s potential environmental liabilities or the residual value of an asset. The idea is that insurance markets can complement traded securities markets in pricing less liquid or readily quantifiable risks.

These instruments and techniques are being used increasingly to shift credit, market and insurance risks amongst banks, insurance companies, reinsurers and other capital market investors, such as pension funds and mutual funds. Table 1 shows some of the instruments used, with the newer ones in orange.

Motivations

What drives the risk transfers described in this article? Part of the explanation – for both the direction and form of some transfers – lies in differences in the regulatory, accounting and tax treatments of different types of financial intermediary

Box 3: Differences between derivatives and insurance contracts

Derivatives

The main derivatives used to transfer credit risk are credit default swaps (CDS) and total return swaps. In principle, derivatives are ‘complete’ contracts: they set out each party’s rights and obligations in all relevant states of the world. Any delay in due payment beyond a short grace period is an event of default. Following default by either counterparty, derivatives are closed out at market value with one party having a claim on the other. Derivatives are usually based on standard definitions (eg those developed by the International Swaps and Derivatives Association¹) to facilitate hedging of positions. This encourages trading. Often counterparties will have collateral management agreements (CMAs) as part of their contract that allow for credit exposures based on market values to be collateralised with securities or cash if they exceed certain thresholds.

Insurance

Typical general insurance policies differ from derivatives in the following main respects:

- Derivatives specify payments that are either fixed or linked to independent prices or indices. By contrast, insurance policies indemnify the insured against its particular losses following an insurance event (usually up to a limit and with a retention/excess). The insured is required to have an economic exposure to the event (‘insurable interest’) for the transaction to be a valid contract of insurance under English law.
- Insurance policies are designed to protect the insurer against the possibility that the insured will have access to better information about the risk. So the insured will have a duty to disclose all relevant information to the insurer (‘utmost good faith’) or the insurance may be invalidated. The protection buyer has no similar duties under a derivatives contract.
- For similar reasons, insurance will typically give the insurer the right to delay settlement while it investigates the validity and size of a claim (loss adjustment).

- Insurance is not a traded instrument nor is it marked-to-market nor subject to events of default and close out at market value in the same way as derivatives. Consistent with the fact that policies are not marked-to-market, counterparty credit exposures are not usually collateralised.

These differences suggest that derivatives contracts are more suitable for risk transfer where information about the risk is public or the protection buyer’s exposure to loss is reasonably well correlated with an independent index or price. Insurance might be used where the insured has private information about the risk and its exposure to loss is not easily linked to an independent variable. Credit risk does not fall neatly into one of these categories. For example, protection sellers may be concerned about their exposures from credit derivatives if they believe that a lender has access to better information to assess the risk. Equally a protection buyer may want an unconditional risk transfer rather than insurance that is subject to loss adjustment.

Credit insurance policies can be written as unconditional guarantees. For example, if the insurer waives its right to avoid the cover following misrepresentation or failure to disclose relevant information by the insured. But they can also resemble standard insurance policies. The monolines (Box 5) provide financial guarantee insurance to bondholders, usually represented by a trustee, and have recourse to the issuer following a claim. In the reverse of the normal insurance relationship, the monolines seek to understand the risk on the underlying bonds better than the insured. This is one reason why monoline financial guarantee insurance can be an irrevocable and unconditional guarantee of interest and principal payment, even in cases of fraud. Monolines do not contest claims in the way of typical insurance but nor will they pay the market value of the insured’s losses immediately in the way of derivatives (acceleration). Rather they pay interest and principal on the original schedule.

1: See www.isda.org.

and of different types of contract. To take four examples:

- Under the 1988 Basel Capital Accord, banks that regard regulatory capital requirements as a potential constraint on their balance sheet have an incentive to transfer risk on high-quality loans, for which the economic capital allocation is less than the 8 per cent across-the-board minimum regulatory requirement. Banks have used CDOs and ABCP programmes to transfer risk on such loans, often to insurance companies, which assess technical reserves against expected losses, and capital requirements against unexpected losses, in different ways from banks.
- The 1988 Accord also produces an incentive for banks to take credit risk via undrawn but committed liquidity lines (zero per cent weight for under-364 day facilities) rather than drawn loans carried on-balance sheet (100 per cent). This is an important element in the ABCP market's rapid growth, as described below.
- Differences in accounting treatment between insurance and reinsurance companies have been a significant spur to 'finite risk reinsurance' (Box 2).
- Insurance regulations in some countries may prevent companies shedding interest rate risk or taking on credit risk using derivatives; they can, however, enter into insurance or reinsurance policies with similar economic effects (Boxes 3 and 6).

While such regulatory incentives are important, a big part of the explanation for increasing cross-sectoral risk transfers is economic. Firms with a comparative advantage in *arranging* financial services of particular kinds may not necessarily have a comparative advantage in *bearing and managing the resulting risks*. Risk transfer markets enable them to cap risk from their underlying businesses, to diversify across other types of exposure and, perhaps, to price risk more efficiently.

For example, those taking on risk may be able to bear it at a lower cost because of diversification effects, or a closer resulting match of their liabilities and assets, perhaps reflecting their having a different holding period from the risk transferors. Broadening the distribution of risks, such as the credit risk on bank-originated loan portfolios or the market risk on long-term savings products, may reduce their market

prices and therefore the costs of the underlying financial products to companies and households. In that event, more efficient use of resources should benefit the economy as a whole. So the big questions are: what is the nature and scale of these new types of transfer? Are they promoting greater economic efficiency? And what impact do they have on systemic stability?

Notwithstanding the rapid, and sometimes complex, developments of the past few years, the scale of the resulting inter-sectoral risk transfer probably remains small in relation to the balance sheets of the banking and insurance industries. Most insurers still have a much larger exposure to credit and market risk from their traditional bond and equity investments. Those risks are, though, familiar and this article therefore concentrates on more recent developments.

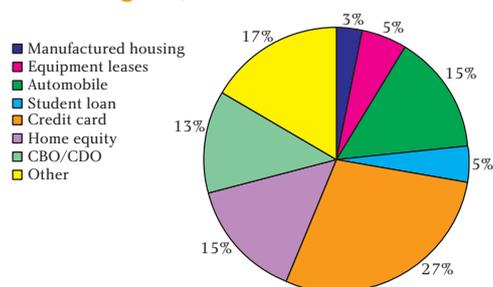
The following sections look in more detail at the transfer of, first, credit risk, and then of market and insurance risks respectively.

Credit risk: transfers from banks to insurance companies

Banks have shed credit risk to insurance companies primarily through the securitisation of credit portfolios and through portfolio CDSs. Broadly, credit portfolios are originated in four main ways:

- *Off the balance sheets of banks' corporate customers.* Large companies often provide short-term trade credit to a wide range of customers. Rather than providing working capital themselves, banks may arrange for companies to sell portfolios of these trade 'receivables' to an ABCP programme (Box 4).
- *Off commercial banks' balance sheets.* As noted in the introduction, since the mid-1980s commercial banks have been able to securitise residential mortgage loans through ABSs. These markets have since expanded to include a wide range of asset types, including credit card receivables, car loans, commercial property loans, non-performing loans etc (Chart 2). Banks may securitise such portfolios as term ABSs or through ABCP programmes. Often ABCP programmes are used to 'warehouse' assets until a bank has critical mass for an ABS issue. Over the past couple of years, especially in Europe, banks have also transferred credit risk on corporate loan portfolios using collateralised loan obligations (CLOs). These can be funded transactions, similar

Chart 2:
US dollar-denominated asset-backed securities
outstanding – Q2 2001



Source: Bond Market Association.

to securitisations. Increasingly, however, portfolio CDSs are used to transfer risk on, at least, the most senior (least risky) tranches.

- *Assembled by investment managers.* Collateralised bond obligations (CBOs) are backed by portfolios of bonds or loans purchased in the secondary markets by an investment manager. In effect, the manager uses the CDO structure to gain leverage for a fixed income fund.
- *Manufactured by investment banks.* Perhaps the most rapidly-growing portfolio structure is the 'trading desk' CDO in which an investment bank constructs a portfolio to meet the needs of a customer. It can be structured either as a portfolio CDS between the bank (the protection buyer) and its customer (the protection seller) or as a credit-linked note issued by the bank.

In 2001 investment banks have typically constructed CDOs and portfolio CDSs referenced

to portfolios of investment grade rather than sub-investment grade companies, capturing part of the widening spreads over swap rates on investment grade corporate bonds. These transactions are usually more leveraged to take advantage of the lower credit risk. Insurance companies (and others) are said to be more wary of sub-investment grade credit risk following losses on junior tranches of high-yield CDOs issued in 1997 and 1998. Particularly in Europe, there is also a wider sectoral spread of reference credits at investment grade; the sub-investment grade market has a preponderance of telecom issuers.

Table 2 provides some estimates of the scale of debt outstanding in these different portfolio credit risk transfer markets. Banks, pension funds, mutual funds, prime money market mutual funds, and private investment funds are all important investors. But insurance companies are one of the main takers – directly or indirectly – of credit risk, especially corporate credit risk, through different instruments as outlined below.

Asset-backed securities

Many general and, especially, life insurers are significant investors in (typically floating rate) ABSs, particularly in the large US dollar markets, alongside fixed-rate government and corporate bonds, equities and other asset classes. Although risk appetites vary, insurance companies will often purchase the lower-rated, investment grade tranches (single-A or triple-B) of ABSs in order to capture the higher spread relative to corporate bonds of equivalent rating. Pension funds, by contrast, are generally more likely to purchase the more senior tranches⁸.

Table 2:
Size of portfolio credit risk transfer markets

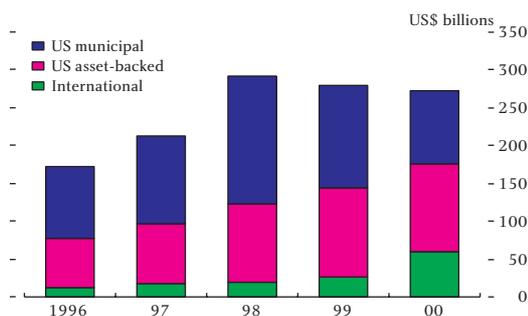
	1995	2001
Asset-backed securities^(a)	US\$ 315 billion (US only)	US\$ 1,048 billion (US only)
Asset-backed commercial paper^(b)	US\$ 100 billion €1 billion	US\$ 645 billion €30 billion
Collateralised debt obligations^(c)	US\$ 1 billion (global)	US\$ 300-400 billion (global)
<i>Memo:</i>		
<i>US bank lending^(d)</i>	US\$ 4,300 billion	US\$ 6,400 billion
<i>Euro area bank lending^(e)</i>	€9,900 billion (1997 data)	€13,300 billion

a: Source: Bond Market Association. (Excludes mortgage-backed securities issued or backed by US Agencies eg Fannie Mae and Freddie Mac).
b: Source: Federal Reserve Bank of New York and Bond Market Association.
c: Source: Bond Market Association, Dealogic and Bank of England estimates.
d: Source: Federal Deposit Insurance Corporation.
e: Source: European Central Bank.

8: See, for example, European Securitisation Forum 'European Securitisation: a resource guide' (2001) (www.europeansecuritisation.com).

One distinctive type of insurance industry involvement is the monolines' financial guarantee and surety bond cover of the lower investment-grade tranches of ABSs (Box 5 provides general background on monolines). With the growth of auto loan, credit card and home equity loan securitisation in the US dollar market, and the development of securitisation markets in Europe⁹, such ABS 'wraps' are becoming a larger part of monolines' portfolios (Chart 3).

Chart 3:
Monolines: new insurance written

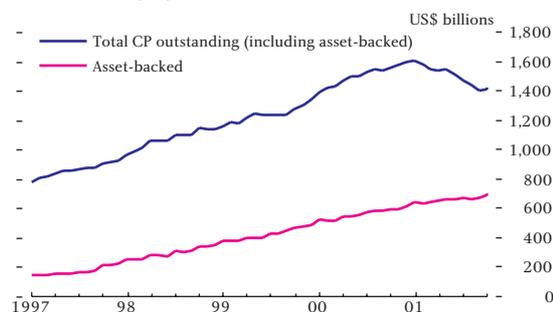


Source: Association of Financial Guaranty Insurers.

Asset-backed commercial paper

The ABCP market has grown rapidly over the last decade (Chart 4). Most ABCP programmes are designed primarily for funding or balance sheet purposes rather than to transfer credit risk to the commercial paper investors. In order to obtain a prime rating, rating agencies usually require a bank liquidity line to back 100 per cent of the outstanding paper, so that the vehicle can borrow from the banks to repay investors if it is unable to roll over its paper. Often the bank or banks providing the liquidity line bear the largest share of any credit risk and, as the sponsoring bank usually has the biggest part of the facility, the extent of any genuine credit risk transfer can sometimes be small¹⁰. The alternative is that a third party agrees to provide credit enhancement by taking on an exposure to some proportion of potential credit losses, whether these fall on the investors or the banks.

Chart 4:
Growth of US dollar-denominated asset-backed commercial paper market



Source: Board of Governors of the Federal Reserve System.

There are several ways of achieving this. Credit enhancement to cover an initial layer of losses is often provided by the ABCP vehicle purchasing assets at less than their fair value (over-collateralisation) or using a bank letter of credit or loss reserve. Increasingly, though, the monoline insurers and a few general insurers are themselves taking on the risk that losses will exceed this initial level of cover. For example, of the 172 ABCP programmes described by Fitch in its August 2001 *ABCP Scorecard*, 30 had so-called programme-wide credit enhancement (Box 4) from an insurance company – usually in the form of an unconditional surety bond. Of these, 26 involved monolines and four involved other insurance companies.

The monolines are also involved further up the chain (see Diagram 1). One way of 'manufacturing' highly-rated securities for ABCP vehicles is for a monoline to guarantee an ABS or CDO tranche in order to improve its rating from, say, triple-B or single-A to triple-A. A monoline financial guarantee can also be a convenient way for ABCP vehicles to reduce concentrated exposures to particular obligors¹¹.

Collateralised debt obligations and portfolio credit default swaps

Three features of CDOs and portfolio CDSs make them a particularly effective means of corporate credit risk transfer to the insurance industry:

9: For example, the recent 'whole business' securitisations by utilities (eg Welsh Water) and other business (eg public houses) in the United Kingdom, which transfer all the cashflows from an enterprise.

10: The covenants on liquidity facilities typically give the banks few 'outs'. Usually the bank is not required to lend if the issuing vehicle is insolvent but this is unlikely given the limited nature of its activities. Often the bank is also not required to lend if the value of the assets in the portfolio falls below that of the outstanding commercial paper. But this is usually unlikely given the short maturity of commercial paper and the typical requirement that the value of assets should exceed that of commercial paper by a margin at the time of issue. In effect, the banks would be likely to take on the credit risk on the asset portfolio before its value could fall sufficiently to expose investors to loss. Banks are, however, protected by any credit enhancement once they have financed the assets.

11: The US Securities and Exchange Commission puts investment restrictions on US money market mutual funds that limit their ability to invest in ABCP programmes with concentrations of more than ten per cent of total assets.

Box 4: Types of ABCP programmes

Multi-seller

The original ABCP programme, established by Citibank in 1983, was a multi-seller vehicle and over 60 per cent of ABCP is still issued through such programmes. Typically multi-seller programmes are established by commercial banks to meet the financing needs of their corporate customers by combining their assets into diverse portfolios. These assets are most often trade credit receivables but can be loans or securities. Each seller's assets may be credit enhanced before sale to the vehicle; for example, by buying the assets at less than their fair value (pool-specific credit enhancement). In addition, multi-seller vehicles usually also have so-called 'programme-wide' credit enhancement (eg a bank letter of credit or insurance company surety bond) to cover any further losses across the portfolio.

Single seller

Very large companies – or groups of companies – may justify their own 'single seller' programme. They issue just under 10 per cent of ABCP.

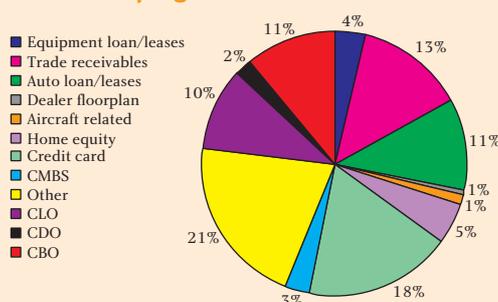
Securities and loan arbitrage

Securities arbitrage programmes were established to finance highly-rated tranches of ABSs as an alternative to banks holding them on balance sheet. Recently such programmes have also bought senior tranches of CDOs. The rating agencies set restrictions on the ratings and types of securities that any such vehicles can hold. Loan arbitrage programmes are similarly a means for banks to avoid regulatory capital requirements on loans to highly-rated companies. These types of programme issue around 15 per cent of outstanding ABCP.

Increasingly, the distinction between multi-seller and arbitrage programmes is blurring, with banks using vehicles for either purpose. The largest ABCP administrators are large commercial banks. ABCP vehicles are significant investors in senior ABS and CDO tranches. In this way, ABCP is used to finance a

very wide range of assets, either directly or indirectly via purchases of tranches in securitised portfolios (Chart A).

Chart A:
Diversification by asset type of the 15 largest Fitch-rated ABCP programmes

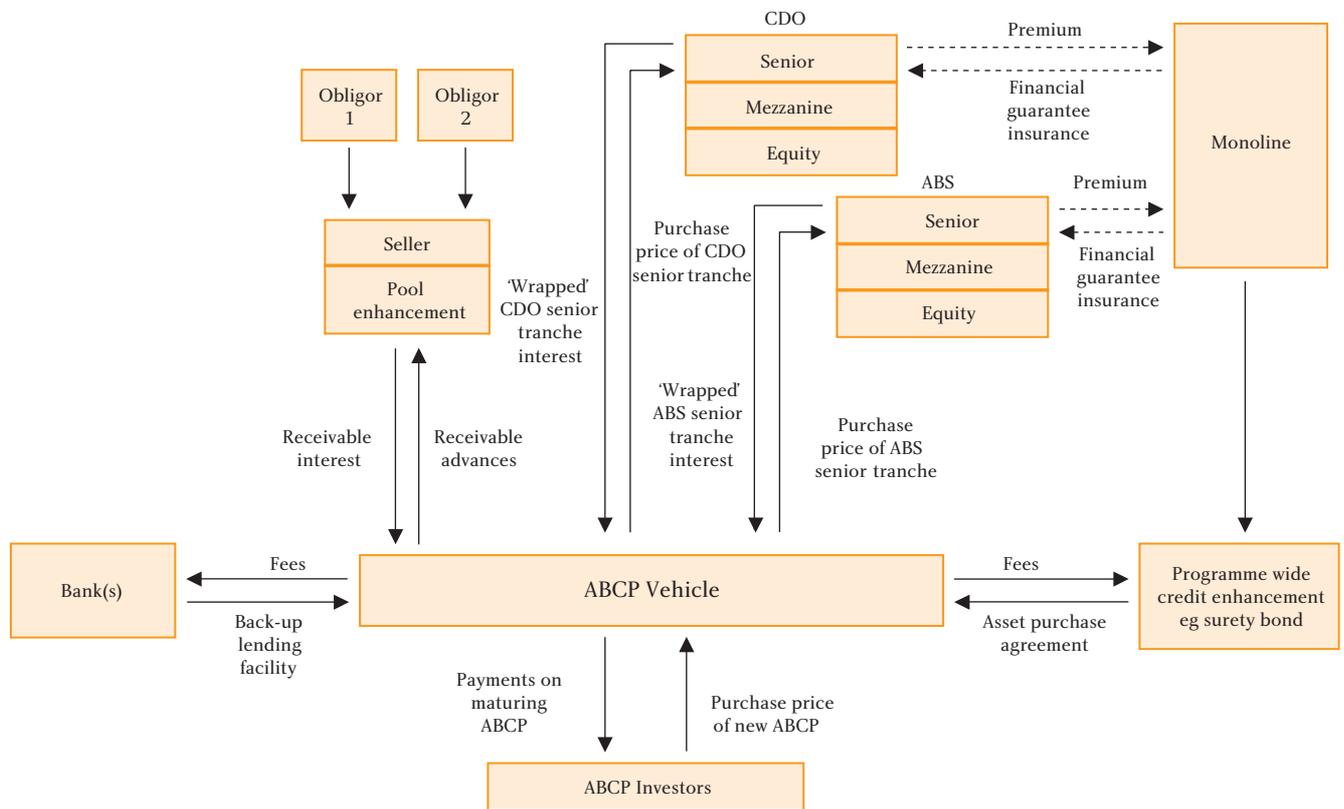


Source: Fitch Ratings.

Structured investment vehicles (SIVs)

SIVs are leveraged investment companies that finance bond portfolios by issuing prime ABCP, medium term notes and capital notes or equity. They set out to capture the spread between their longer-term, average AA-rated assets and shorter-term, AAA-rated liabilities. Derivatives are used to hedge interest and foreign exchange rate risks. Typically, they buy senior ABS and CDO tranches and hold them until maturity. Unlike securities arbitrage programmes, CP issued by SIVs is only partly backed by a bank liquidity line. Rather liquidity risk is managed by limiting mismatches between maturing assets and liabilities, and by holding marketable assets. Senior creditors and/or rating agencies require SIVs to meet a range of requirements related to portfolio credit ratings, liquidity, diversification, capital adequacy (in relation to the daily mark-to-market value of assets) and market risk. The SIV manager must remedy any breaches rapidly or will be obliged to de-leverage by selling assets in order to repay CP and medium term notes. SIVs currently issue about 5 per cent of outstanding ABCP.

Diagram 1: Monoline involvement in the ABCP market



Source: Bank of England.

- The portfolios are usually diversified across regions and industry sectors, limiting exposure to 'event' risk on particular corporate names, especially for holders of senior tranches. Insurers are more familiar with statistical analysis of portfolios than credit risk analysis of individual companies – although some have come to the view that these approaches are complementary, with both needed.
- Since they split the risk on the portfolio into tranches of increasing seniority (Chart 1), different types of insurance company can choose their risk and return trade-off.
- Credit risk can be transferred in either funded or unfunded form, via insurance or derivatives. This allows insurance companies to take risk in a form

Table 3:
Insurance companies and portfolio credit risk transfer instruments

	ABCP	ABS	'Trading desk' CDO	CLO ('balance sheet')	CBO ('arbitrage')
Monolines	Programme-wide credit enhancement. Financial guarantee of securities purchased by ABCP programmes.	Financial guarantee of senior tranches (usually triple-B – double-A rated).	Super-senior portfolio credit default swaps.	Super-senior portfolio credit default swaps.	Financial guarantee of senior tranches.
Reinsurers		Investment in portfolio tranches.	Sell protection (unfunded) on super senior, senior, mezzanine and equity tranches, depending on risk appetite.		
General/P&C insurers	Programme-wide credit enhancement (limited).	Investment in portfolio tranches.	Sell protection (unfunded) on super senior, senior, mezzanine and equity tranches, depending on risk appetite.		
Life insurers	Investment (estimated to hold 5 per cent of outstanding ABCP).	Investment in portfolio tranches (typically triple-B – single-A rated)	Investment (funded) in portfolio tranches: senior, mezzanine or equity.	Investment (funded) in portfolio tranches: senior or mezzanine.	Investment (funded) in portfolio tranches: senior, mezzanine or equity.

Box 5: Monoline bond insurers and reinsurers

The monoline bond insurance sector¹ developed in the 1970s with the establishment of a couple of AAA-rated companies to provide investors in US municipal bonds with a guarantee of timely payment of interest and principal on the original schedule in the event of issuer default (but not accelerated payment).

In 1989 New York State amended its insurance law (Article 69) to require all bond credit insurance to be done through monolines – separately capitalised insurance companies restricted to that line of business. Other US states adopted similar laws subsequently.

The motivation was partly to separate wholesale bond credit insurance from retail insurance products: for example, the monolines were excluded from the fund to protect policyholders against insurance company failure. Article 69 defines financial guarantee insurance and sets single and aggregate risk limits, risk-based capital requirements and mandatory contingency reserves.

The monolines diversified from the US municipal market into ABS in the 1980s and CDOs in the 1990s. In 2000 about 63 per cent (some US\$172 billions) of the gross par value insured by the monolines related to obligations other than US municipal bonds². Apart from some project and public sector financing outside the United States (including in the United Kingdom), these obligations were principally mortgage-backed securities, other ABSs, CDOs, portfolio CDS and ABCP.

In addition to regulatory requirements, monolines are scrutinised by the rating agencies. Preservation of the triple-A ratings is vital to their business. The rating agencies assess and apply a 'shadow' rating and

capital charge to virtually every transaction that they do. These capital charges rise at an increasing rate as the rating of the obligor falls.

Rating agency and regulatory requirements give the AAA-rated monolines strong disincentives to insure sub-investment grade risk or large exposures to single companies that expose them to 'event' risk. Structured finance is attractive to them because the risk is on asset portfolios and is typically tranching. ABSs, CDOs and ABCP insured by monolines typically have one or more levels of credit enhancement ahead of the insurance policy. One way of thinking about their business is that they write put options that are some way out-of-the-money to protect investors against extreme market events. Another is that they will only take positions that leave them exposed if losses on a portfolio are sufficiently high to reach near the 'tail' of an ex ante distribution of potential loss outcomes, beyond the 'expected' loss.

Monolines are relatively highly leveraged. Their statutory capital combined with unearned premium reserves amounted to about 1.4 per cent of the gross par value of debt guaranteed at the end of 2000². The companies disclose that they reinsure between 10 and 20 per cent of their business. This is partly through treaties to share premiums and losses on new business, partly through specific reinsurance of particular risks, and partly through 'stop loss' agreements that transfer a finite amount of losses to reinsurers if cumulative losses exceed a given threshold in any one year. They use the large, diversified global reinsurers but also a small number of specialist monoline reinsurers³. In addition, the monolines have so-called 'depression' lines of credit from banks that they can draw down if cumulative losses exceed a certain threshold.

1: The main AAA-rated monoline bond insurers are Ambac Assurance Corporation, Financial Guaranty Insurance Company (a subsidiary of GE Capital Corporation), Financial Security Assurance Inc (a subsidiary of the bank Dexia) and MBIA Insurance Corporation.

2: Fitch (2001) Who wants to be a bond insurer? – *Financial Guaranties Special Report* 3 May 2001.

3: The monoline reinsurers include ACE Guaranty Re, AXA Re Finance, Enhance Reinsurance and XL Financial Insurance.

that suits their balance sheet – either on the asset or liabilities side – and meets any regulatory restrictions on their activities.

Using this flexibility, different types of insurer have used CDOs and portfolio CDSs to take on credit risk at varying levels of seniority and in differing forms (Table 3).

Life insurance companies

A number of the larger life insurers in different countries have begun to allocate a proportion of their assets to CDOs as part of a diversified portfolio. In some cases, they may put them in the 'alternative investments' bracket, alongside, for example, stakes in 'funds of hedge funds'. Such insurers typically invest in equity or mezzanine tranches, either of managed CBO funds where they are or have chosen the asset manager; or in CDOs of static portfolios where they have had a veto over the corporate names included by an investment bank. In consequence, a number of large European and US life insurers and their asset managers have developed quite significant credit risk analysis operations in the past few years.

Life insurers might also invest in the equity tranches of CDOs in a search for high-yielding investments. In Japan and a number of European countries (including Denmark, Germany, Netherlands and United Kingdom), companies face variants of the problem that they have in the past guaranteed minimum nominal returns to savers (whether contractually or implicitly) which exceed the nominal yields currently available on risk-free assets. Some are said to have responded by seeking to take more credit risk in order to increase the yield on their assets. Market contacts suggest that, in particular, the German and Japanese life insurance sectors have been significant investors in CDO equity, often structured as 'principal-protected' notes: the income on the notes is at risk if there are credit losses on the portfolio but the principal repayment at maturity is not. The principal may be protected either by having the vehicle that issues the CDOs purchase highly-rated securities expected to accrue sufficient value over the life of the transaction, or by combining the equity tranche with a more senior tranche on which the cashflows are set aside¹². If protected, these notes can apparently be treated as bonds rather than equities

for the purpose of meeting regulatory restrictions on asset allocation in some countries.

Monolines

Monolines will typically take credit risk on the most senior tranches of CDOs and synthetic CDSs only. Sometimes a transaction will involve financing as well as risk transfer, with a monoline providing a financial guarantee 'wrap' (see Box 5). More typically, however, the bank or investment bank buying protection does not need funding. In this case, it buys credit protection directly from the monoline, usually in the form of a portfolio CDS.

In recent years, a number of CLOs have included so-called 'super-senior' tranches, with a AAA-rated senior tranche ranking lower in the capital structure. These transactions can be large, with the super-senior tranche sometimes exceeding US\$1 billion. Participating at the super-senior level does not expose the monolines to idiosyncratic credit risk on companies within the portfolio. To a greater extent than with their involvement in the ABS and ABCP markets, the monolines are, in economic effect if not legal form, writing options that are far out-of-the-money and should be exercisable only in extreme market circumstances. The premium is typically just a few basis points.

General insurance and reinsurance companies

General insurers may use more standard insurance contracts to take on particular variants of credit risk (Box 3). For example, insurance has been used to protect aerospace companies (eg British Aerospace and Saab) against falling revenue from aircraft leases. The British Aerospace transaction put a floor on the income from leases of the company's six hundred regional jet aircraft over 15 years¹³. Similar insurance has been provided on residual values of pools of leased automobiles and on property.

Many of the large, international general insurers and reinsurers have, however, also been active in the CDO and portfolio CDS markets. Their strategies vary. In general they prefer to take unfunded risk because, at least relative to life insurers, they do not have very large asset portfolios as they do not typically intermediate household savings. Less active general insurers may enter into credit transactions with banks

12: See Section IV of the *Financial Stability Conjecture and Outlook*, this Review.

13: See 'Modern ART Practice', Gerling Global Financial Products, Reactions Publishing Group (2000).

Box 6: Bermuda as an insurance centre

Bermuda has grown to be one of the main global insurance centres, focusing on reinsurance and insurance services for large companies. Since the 1970s it has been a location for captive insurance companies established by large companies or industry groups. In the mid-1980s a number of large US companies established two vehicles – ACE and XL – to self-insure their exposure to legal liability risk, which had become virtually uninsurable following asbestosis claims. A second wave of new companies was founded in the early 1990s, specialising in catastrophe excess-of-loss reinsurance, where global capacity had become tight following a series of natural disasters, including Hurricane Andrew. Since the mid-1990s, ACE, XL and some other Bermudan companies have become independent and grown through acquisition into large, diversified global insurance and reinsurance companies. Some are important participants in credit risk transfer markets. Following the terrorist attacks on the United States on 11 September, a series of new insurance ventures with quite substantial capital have been announced in Bermuda, anticipating opportunities following increases in insurance prices.

One of the attractions of Bermuda remains the absence of corporate income or profits taxation. But this is often not the crucial factor and, indeed, some insurance subsidiaries of US companies have opted to be taxed as US companies.

Bermuda has a flexible legal and regulatory regime: for example, some companies have obtained specific legal protection for their activities through private acts of the Bermudian Parliament. Regulatory requirements (eg solvency margins) differ between five classes of insurance company, depending on the nature and scale of their activities: single parent captives; multi-owner captives; commercial insurers/reinsurers; property catastrophe and excess liability insurers/reinsurers and life and health insurers.

Unlike insurance companies in some other jurisdictions (including the European Union), Bermudian companies are permitted to take on additional risk using derivatives.

Some investment banks own insurance companies in Bermuda – known as ‘transformers’ – to intermediate between insurance and derivatives/capital markets. For example, they may reinsure an insurer against catastrophe risk backed by issuance of catastrophe bonds; or sell protection using credit default swaps backed by reinsurance¹.

Recent legislation (Segregated Accounts Companies Act 2000) permits the creation of ‘protected cells’ within companies on which the assets are protected from the liabilities of other cells. These can be used, for example, to set up captives, special purpose vehicles and ‘transformers’ at low cost.

¹: See my article in the June 2001 *Review* for a more detailed explanation.

using insurance rather than derivative contracts, or via ‘transformer’ vehicles which convert derivative transactions into insurance (Box 6). Some of the larger general insurers have established ‘financial products’ subsidiaries, partly to give them greater flexibility to take on credit risk using derivatives. These subsidiaries are sometimes banks; or they may be based in jurisdictions where there are fewer restrictions on the types of contract which insurers can write (eg Bermuda, Box 6).

Some AAA-rated insurance companies do similar business to the monolines, selling protection on super-senior tranches of CDOs. A few other companies have established AAA-rated monoline

insurance (eg XL Capital Assurance) or reinsurance (eg ACE Guaranty Re, AXA Re Finance and XL Financial Assurance) subsidiaries for similar purposes. Some of the reinsurance subsidiaries also have other activities, such as selling protection on single name credit default swaps.

Further down the capital structure, a number of companies participate at different levels of seniority depending on their risk appetite and judgment about relative risk and return. Again, some have established specialist subsidiaries with ratings broadly equivalent to those of the risks that the company is taking, eg a double-A rated subsidiary company will underwrite double-A rated tranches.

More junior tranches, bearing significant credit risk, are more likely to be taken onto the balance sheets of a parent company. This allows the risk to be diversified across the company's other business lines whereas a specialist monoline subsidiary would need to hold substantial capital in order to retain an investment grade rating while taking sub-investment grade risks.

At the root of most general insurance companies' appetite for credit risk is a belief that it will be uncorrelated with much of their property and casualty business. Some, however, have sought to develop expertise in pricing risk to identify under-valued tranches, whether based on comparison with prices of comparable instruments or more fundamental analysis of expected cashflows. A number of specialist ('financial products' or 'financial solutions') units within large general insurers and reinsurers have moved beyond underwriting CDO tranches brought to them by investment banks to actively seeking out particular credit risk portfolios. This might mean taking the initiative to ask an investment bank to put together a particular portfolio in which the insurer wants to take an equity or mezzanine position; or looking to work with particular asset managers to establish a CBO. Some of these insurers have developed credit risk models to evaluate the performance of different tranches under a range of scenarios for the level and timing of defaults and default correlations across the portfolio; and to take positions based on any perceived pricing anomalies.

A form of 'reinsurance' market also exists for insurers to buy credit protection against particular names in a portfolio or against a part of the tranche of risk they have taken in a CDO or portfolio CDS. For example, an insurer that has taken on a mezzanine tranche exposing it to the first 3-8 per cent of credit losses on the portfolio might, in turn, be able to buy cover against its exposure to potential losses relating to a particular company in the portfolio or, alternatively, against, say, a 6-8 per cent tranche.

Finally, an alternative approach to credit risk transfer, offered by some reinsurers, is so-called *contingent capital*. This involves an insurer/reinsurer agreeing to subscribe for shares (they might be preference or ordinary) in a bank at a pre-determined price following a credit risk-related trigger – for example, if annual loan losses in the bank's portfolio exceed a threshold. Rather than agreeing to compensate the

bank following credit losses, the insurer or reinsurer commits to putting in capital that will be at risk to any further losses. So far, few contingent capital transactions appear to have been done.

Market risk: two way transfers

Whereas the net flow of credit risk transfer has been from banks to insurance companies in recent years, transfers of market risk have often been in the other direction.

Market risk transfers from banks to insurers

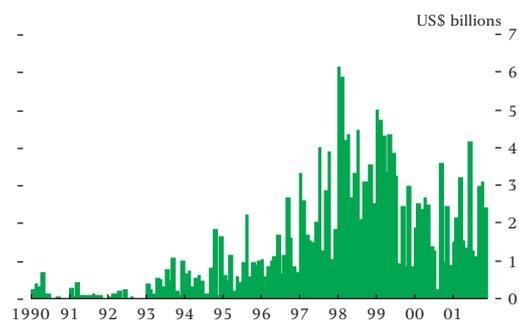
Some of the large *general insurers* and *reinsurers* have apparently nevertheless written out-of-the-money options on equity indices – in other words, taking short positions in equity market volatility – although it is unclear how much of this business has been done or remains outstanding. The more liquid markets in equity, interest rate and foreign exchange rate risk – in particular, option markets – may leave less room for profit than in credit protection markets.

Another area in which such general insurers/reinsurers are said to have provided protection against downside market risk is principal guarantees given to investors in managed equity funds and, more recently, funds of hedge funds. Some banks offer such principal protection to clients. They hedge themselves in different ways, one route being to enter into a put option or insurance policy with a large insurer or reinsurer.

Life insurers in some countries have also been willing to write options, typically on interest rates and foreign exchange rates. As with their involvement in credit markets described above, they are more likely to take the risk in a funded form in their large asset portfolios – for example, by purchasing a bond or medium-term note with an embedded call option. They are also more likely to write options that are close to the money in order to capture the premium in the form of a higher interest rate on the bond. Issuance of euro-denominated callable bonds by banks and securities dealers was particularly high in 1998-99 (Chart 5), perhaps partly reflecting demand by European life insurance companies.

In the same vein, German life insurers are said to have taken on similar risks in the form of promissory notes or *Schuldscheine*, issued by banks, which are only semi-tradable and have therefore been accounted for on an accruals basis rather than at market value.

Chart 5:
Euro-denominated^(a) callable bond issuance by banks



Source: Dealogic

(a) Euro area national currencies before 1999.

For banks, issuance of callable bonds – either themselves or by customers willing to sell them an over-the-counter (OTC) option matching the embedded option – is one way to obtain a long position in long-dated interest rate volatility. It can therefore enable them to cover any short positions incurred by writing long-dated interest rate options, eg for life insurance companies, discussed next.

Market risk transfers from insurers to banks/ capital markets

As described in the section on inter-sectoral credit risk transfers, a large part of the business of life insurance companies is to offer long-term savings products linked to insurance policies, such as pensions and life insurance. These products typically involve the following cashflows:

- The policyholder making an initial lump-sum payment and/or a series of regular payments to the company over the life of the product.
- The company making a payment to the policyholder at the maturity of the product (or earlier but deducting a penalty).
- In some cases, the policyholder having an option to convert this payment into an annuity on which the company will make regular payments until his or her death.

Guaranteed returns and/or annuity rates

In many countries, companies protect policyholders from some or all of the market risk on their products by guaranteeing returns. The guarantees may relate to the payment that the policyholder will receive at maturity and/or the rate of return on any annuity. In effect, options are embedded in the products.

Sometimes they are complex and often they have very long maturities so that, when aggregated, the portfolio risks can be challenging to measure and manage. The value of guaranteed annuities also depends crucially on how long policyholders live, exposing companies to longevity risk.

This practice of guaranteeing savings returns is common across the industrialised world, although the varieties of long-term saving product offered, and therefore the resulting portfolio characteristics, vary from country to country. In a number of European countries (eg Belgium, Denmark and Germany), life companies offered minimum guaranteed returns to policyholders of between 4 and 5 per cent in the early-1990s. Some such guarantees were fixed by regulation. As a general matter, the guaranteed rates have declined in line with lower long-term interest rates, but often for new business only. Japanese life insurers similarly committed to pay minimum guaranteed rates of return on long-term policies in the past, which now substantially exceed the very low nominal yen interest rates. In the United States, life insurers offer investment products with fixed or guaranteed minimum returns (guaranteed investment contracts or GICs) but they are usually for shorter maturities eg two to ten years.

Some life insurance products also offer policyholders guarantees, either explicit or implicit, related to equity returns. They might, for example, offer a share of returns in an equity index combined with a guaranteed return of principal at maturity. In some European countries (eg France), equity-linked retail products can be quite complex.

Risk management and hedging techniques

A pre-condition for effective management of the risks embedded in these portfolios is to recognise and monitor them. That can be complicated – for example, where policyholders have an option to surrender their policies early, or where the life company is holding long-term bonds on which the issuer has a call option (eg mortgage-backed securities). Both add risk: when interest rates fall, pre-payment risk on the bonds increases, whereas surrender rates on the underlying savings products should, in theory, decline as the value of the guaranteed return increases. While companies might be able to influence surrender rates by adjusting penalties (in effect, changing the price of the option),

surrenders are thought to be highly unpredictable in many markets.

Even where the risks can be measured with sufficient precision, hedging may be difficult if the embedded option is 'complex', in the sense of there not being a corresponding OTC market. In those circumstances, it might be necessary to unbundle the complex option into simpler components, for which OTC markets do provide hedging opportunities.

A variety of OTC derivative markets are used by life companies and pension plan providers, both to cover embedded optionality in their liability portfolios and to manage risk in their asset portfolios. For example, equity-linked products are typically hedged by purchases of equity index futures and options. These flows can be large in relation to the size of the equity derivatives market. Some life companies also use derivatives extensively as part of their investment strategy to manage the risk and return on their portfolios. Exposure to equity market volatility might be reduced, for example, by entering into equity index 'collars' in which they give up the benefit of a possible large increase in an equity index in return for protection if it falls significantly.

Various approaches seem to be employed in managing interest rate-related risks. For example, some life companies aim to eliminate exposure to interest rate risk by so far as possible matching liabilities with asset portfolios comprised largely (or completely) of bonds. This is, for example, a feature of the US market, where a large range of US dollar-denominated corporate and other bonds exist that can be held against a life fund's liabilities.

In Europe especially, some groups have sought to shed the risk from guaranteed returns via the derivatives markets. The closest hedge is to buy an option ('swaption'), exercisable at a future date, to enter into an interest rate swap in which the company would receive a fixed rate equal or near to the guaranteed minimum return on its portfolio of policies and pay a variable market rate for a defined period.

In the late 1990s, UK life insurance companies bought a large amount (perhaps over £10 billions) of sterling swaptions, typically with the right to enter into a long maturity (say, 15-year) swap a long time

into the future (say, 15 years)¹⁴. These might be an effective hedge for deferred annuities on which companies had guaranteed a minimum return; or for reinvestment risk where a company had purchased medium-maturity fixed rate bonds to back, say, a 30-year investment product carrying a guaranteed minimum return.

In Continental Europe, as discussed above, some life companies appear to have responded to the fall in long-term interest rates over the past few years by taking on more credit or interest rate risk in order to maintain yields on their assets. More recently, some guaranteed-return pension providers, including Danish funds, are said to have been significant buyers of euro swaptions.

Companies may enter into swaptions directly with investment banks. Where they act as principals, the banks may want to find an offsetting position in order to hedge their market risk. The markets in long-maturity volatility are, however, not liquid. Prices of long-dated interest rate options are heavily influenced by supply/demand balances, as evidenced by variations in derived long-dated implied volatilities across different currencies and over time. For example, as Chart 6 shows, long-dated sterling interest rate volatility spiked up sharply in 1999, when UK life companies are thought to have been heavy buyers of swaptions. And more recently, possibly reflecting Continental fund swaption purchases, long-dated euro volatility has risen.

Chart 6:
Implied volatility from 15 year/15 year swaptions in selected currencies



Source: Deutsche Bank.

Banks nevertheless have a variety of hedging strategies potentially available to them. One is to find

14: See, for example, Risk Magazine (1999) 'Sterling Swaptions under New Scrutiny', December and 'Sterling Swaptions: Volatility by the Pound', September.

an offsetting position through the flows they intermediate. For example, in 1996/98 some hedge funds (eg Long Term Capital Management) were large speculators in long-dated interest rate markets. But market contacts suggest that neither hedge funds nor proprietary trading desks are taking significant positions in these markets at present. Alternatively they might issue – or arrange for a customer to issue – bonds with embedded interest rate options, as described above.

A second route is for banks to delta-hedge their position dynamically, by entering into/closing out long-dated swaps or buying/selling long-dated government bonds as underlying interest rates change¹⁵. If the swaption is nearly at-the-money, the rate of change in the delta (gamma) is high, giving rise to potentially large flows in the underlying markets.

A third hedging strategy – perhaps used by some banks hedging sterling swaptions in the late-1990s – is to buy swaptions in another currency, taking the risk that interest rates might differ and on the exchange rate. The exchange rate risk can, in theory, be removed by purchasing so-called ‘quanto’ swaptions that give the right to exchange fixed for floating rate cashflows in one currency but with payments made in another at a fixed exchange rate.

As well as market risk, banks can also face substantial counterparty credit risks on such long-dated OTC derivatives. One way to address them is for the bank to arrange for a customer to issue a bond to the life insurer that includes an embedded swaption, perhaps with the bank selling the customer a matching (‘back-to-back’) swaption. If the customer is highly creditworthy, counterparty risk is reduced for bank and insurer. Some insurers might also face regulatory restrictions on entering into derivatives but not on purchasing bonds. For example, in 1998, the European Bank for Reconstruction and Development and the European Investment Bank both issued £530 million 40-year notes with complex interest payments and principal amortisation schedules linked to swap rates and mortality rates. Reportedly the bonds were purchased by a UK life insurance company as a hedge for its guaranteed annuity book.

Reinsurance companies also offer policies to life insurance companies as an alternative way of hedging

guaranteed returns and annuities. These might include surrender and mortality rates among triggers as well as interest rates. According to insurers, however, capacity for reinsuring longevity risk is limited because of its very long duration and the limited range of offsetting risks that reinsurers might add to their portfolio.

Insurance risks: transfers to capital markets

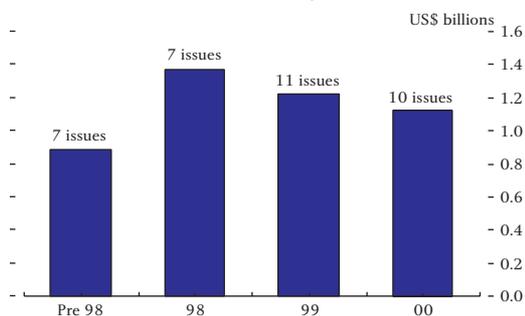
Insurance risks are defined broadly as those fortuitous, non-financial risks for which insurance companies typically offer cover, eg accident, natural disaster, death or illness, third party liability etc. Insurance companies have, over the past few years, begun to securitise insurance risks, principally related to natural catastrophes, and so transfer them to capital market investors.

The main instrument has been catastrophe bonds. Following a defined natural catastrophe, typically an earthquake or windstorm, the maturity of most of these bonds extends to allow for a ‘loss development period’, during which the amount of losses falling on the bondholders is determined. Interest and principal are then reduced accordingly, so that, in design, they are broadly analogous to credit-linked notes. Catastrophe bonds are issued for the benefit of general insurers or reinsurers as an alternative to purchasing excess-of-loss reinsurance. Typically they are issued via vehicle companies that invest the proceeds in high-quality securities for the benefit of the noteholders or (following a triggering event) the insurance company.

Unlike reinsurance, cashflows on most recent catastrophe bonds have been linked to external indices of either industry insurance losses following a disaster or direct measures of its severity (so-called ‘parametric’ triggers, like indices of the magnitude of an earthquake) rather than the consequent insurance losses to the particular issuer. This gives greater certainty to investors but exposes the insurer to the risk that its losses are imperfectly correlated with the index. A number of insurance and reinsurance companies have issued catastrophe bonds but the overall transfer of risk has been relatively small in relation to the size of the catastrophe reinsurance market (Chart 7).

15: See ‘Over-the-Counter Interest Rate Options’ Richhild Moessner, *Bank of England Quarterly Bulletin*, Summer 2001.

Chart 7:
Global issuance of catastrophe bonds



Source: Lane Financial.

Catastrophe bonds have been arranged and distributed by both investment banks and insurance brokers. With the exception of perhaps a score of investors in Europe and Asia, the main investors are said to have been US institutions, including a significant number of insurance and reinsurance companies – another indicator that the extent of risk redistribution has been limited so far.

According to market participants, the relative cost of bond issuance has been higher than reinsurance, although this balance may change as the technique becomes established (reducing legal costs), as investors obtain any necessary authorisations from trustees and regulators to purchase the bonds, and if reinsurance rates increase (as some expect following the terrorist attacks on the United States on 11 September).

Other types of insurance risk have also been securitised on a limited scale, including some risks associated with life insurance. For example, growing life insurance companies can have negative cashflow because the cost of obtaining new customers (marketing, sales commissions etc) exceeds policy contributions and investment income in the early years (so-called ‘new business strain’). Securitising future revenues from life insurance or pensions policies already in force is one way to finance growth. This is principally a financing transaction, although investors are exposed to the risks of higher-than-expected policyholder surrender and mortality rates.

Issues and questions

This broad-brush picture of the various risk transfers between the banking and insurance sectors suggests

growing interdependence. Banks are shedding credit and some market risk to insurance companies, while life insurance companies, in particular, are beginning to use capital markets to hedge the significant market risks embedded in their portfolios of retail savings products. By contrast, transfers of insurance risk (eg via catastrophe bonds) outside the insurance sector seem so far to have remained small.

From the perspective of financial stability, markets for risk transfer are, in principle, beneficial because they allow greater dispersion of risk. On the face of it, financial institutions need not be disproportionately exposed to particular credit, market or insurance risks as an unwanted by-product of providing to customers the services in which they have a comparative advantage. They can, in consequence, make themselves less vulnerable than otherwise to particular regional, sectoral or market shocks. The bundling and unbundling, slicing and dicing of risks made possible by financial engineering aids this process. It makes it easier for institutions to take a share of the risk in a portfolio with the degree of leverage that suits their appetite for risk and return.

Tracking credit risk in the system

But it is important to track whether or not concentrations of risk might decline in some places only to re-emerge in others. Unfunded risk transfer is, for example, more difficult to monitor from the available published statistics, potentially making any new concentrations less transparent. In contrast, data on banking flows and public bond issuance are available: for example, the BIS banking statistics on cross-border banking claims and a number of commercial databases of securities issuance. If flows of risk are not accompanied by flows of funds (eg insurance or derivatives), they become harder to track, in aggregate, from such public data sources¹⁶.

Micro-monitoring of risk transfers should, nevertheless, be possible for individual firms and regulators, albeit perhaps without the benefit of the context provided by a broader macroprudential picture. This article has tentatively suggested where certain types of risk might lie:

- Life insurance companies in some Continental European countries and perhaps Japan have taken on more credit risk in recent years, including

¹⁶: See, for example, Box 2 in ‘Financial flows via offshore financial centres as part of the international financial system’, Liz Dixon, June 2001 *Review*.

investments in the more leveraged, junior tranches of CDOs. In some cases, this seems to have reflected a search for higher risk/return investments, perhaps also manifested in demand for bonds with embedded (written) interest rate options, implying exposure to any rise in volatility.

- The monoline credit insurers are involved in a range of portfolio credit risk transfer markets (eg ABS, CDO, portfolio CDS and ABCP). In each case, they offer unfunded 'out-of-the-money' credit protection that would lead them to be exposed only in relatively extreme credit conditions, at or towards the tail of the *ex ante* distribution of possible loss outcomes.
- Large international general insurance and reinsurance companies have also taken on credit and, in some cases, market risk through risk transfer markets. It is impossible to make general statements about their strategies. Different companies make different risk/return trade offs. But most seem to prefer to take unfunded risk.

At the level of individual firms, it is, of course, for management, creditors and regulators to assess whether taking on additional credit risk (sometimes leveraged) through these markets is appropriate in the context of each company's balance sheet and capital adequacy.

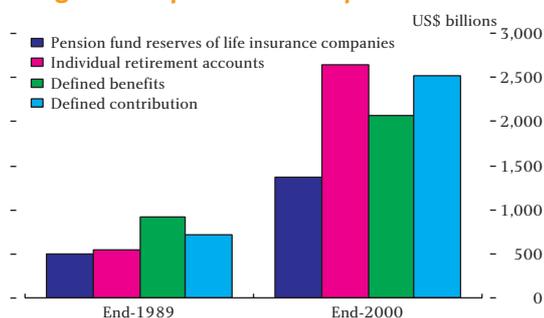
Tracking market risk in the system: who bears the risk on long-term household savings?

Broadly similar issues arise with exposures to market risk on household long-term savings products. *Life insurance companies* in several countries have assumed some of this risk by not matching the maturity and risk/return characteristics of their investments fully to those of their guaranteed liabilities. Some are beginning to use derivatives (eg swaptions) to reduce these mismatches. As intermediaries for such transactions, *banks* will typically seek to hedge their positions, but long-dated derivatives markets are illiquid. That potentially makes these transactions difficult to price and hedge unless, perhaps, the banks concerned have a large and varied customer base giving them access to, or the ability to arrange, offsetting transactions. *Reinsurers* offer policies with similar economic effects and may be more likely to retain the risk. *Companies* bear some risk through

defined benefit pension schemes or by issuing long-dated, fixed-rate bonds to households or intermediaries. *Governments* also issue long-dated bonds¹⁷ or they may take on the risk directly through different forms of state pension and savings arrangements.

In most countries, however, life insurers, companies and governments are seeking to reduce the extent of such risk-bearing, leaving *households* to shoulder more themselves. For example, in the United States, the value of assets held in defined contribution pensions schemes and individual retirement accounts has grown rapidly since 1989, outstripping growth in defined benefit pension schemes (Chart 8).

Chart 8:
Change in composition of US pensions



Source: Board of Governors of the Federal Reserve System.

For financial stability analysis, it is important to know who bears the risk on long-term household savings given the associated exposures to declines in financial asset prices and to secular shifts in the term structure of interest rates. To the extent that risk is held within the financial sector, market movements might affect stability directly, depending on the financial strength of firms, whether through trading losses at banks or, probably in a longer time-frame, through losses to insurance companies arising from mismatches between assets and liabilities.

As with credit risk, the first lines of defence are firm-level risk management, and regulatory oversight. There may, though, also be broader questions about where market risk on long-term household savings would most desirably lie.

Bank counterparty risk on insurance companies

From a wider financial stability perspective, an important question is the extent that banks and

17: See Bruce Devine and Stephen Senior (2001) 'Public Sector Debt: end-March 2001', *Bank of England Quarterly Bulletin*, Winter.

insurance companies are becoming inter-dependent. To the extent that risk transfer is fully funded through securitisation or embedding derivatives in bonds, it does not expose banks to counterparty risk. Banks may, however, have large and potentially long-dated counterparty exposures arising from unfunded transactions, increasing their need for timely information to assess insurance company creditworthiness¹⁸. Some are introducing collateral management agreements with the more active insurance companies, allowing for the mark-to-market value of exposures to be collateralised. Collateralisation cannot easily eliminate counterparty risk on credit-related transactions, however, because exposures can increase very sharply if the creditworthiness of a reference entity deteriorates quickly. Also, some insurance companies are subject to regulatory restrictions on giving collateral.

Extreme ‘excess-of-loss’ credit protection

In portfolio credit risk transfer markets, potential bank counterparty exposures are greater (typically high nominal value, low risk) at the more senior end of the capital structure, where risk transfer is often unfunded. Reflecting the direction of risk transfer, banks would be more likely to have counterparty exposures to insurance companies in times of increasing credit risk and vice versa. Concentration of risk may be unavoidable here. In some large CDO transactions it may become prohibitively expensive to fund portfolio credit risk transfer beyond a certain point on the loss distribution. Other options are retention of the residual risk or, alternatively, unfunded risk transfer using derivatives, insurance or guarantees. But only the most creditworthy institutions can provide a guarantee that has any value in such extreme credit conditions because of the potential impact on their own ability to pay. Such institutions must either be government-guaranteed (eg the German landesbanks are thought to have done such business), extremely large and well-diversified, and/or highly risk averse overall. Especially with the withdrawal of government guarantees on financial institutions in most developed countries, they are in the future likely to be fewer in number.

The monolines are able to sell credit protection against extreme events partly because of their risk-averse underwriting policies, which helps them to preserve a triple-A rating. But, equally, the capital requirements applied to them by the rating agencies in order to maintain the triple-A rating seem to limit to investment grade the exposures that they are able to take economically.

Buyers of unfunded protection against more extreme credit losses on portfolios make their own judgment about whether the protection seller will be able to perform in such circumstances, taking account of the other likely calls on their capital and liquidity from other business they have written. In the case of the monolines, the rating agencies address such questions through stress tests based on either the 1930s Depression or factor models and Monte Carlo-type simulations¹⁹; some of the monolines themselves also have portfolio credit risk models. Financial stability authorities have an interest in understanding those institutions that might be seriously exposed in circumstances of extremely high credit losses, and hence incipient if not actual financial instability, especially if a wide range of other market participants expected to rely on them.

Behavioural consequences of external ratings-based regimes

Some types of investor seek credit protection against extreme credit events not just because it is valuable to them but also because they face regulatory or other incentives to purchase assets having at least a specified minimum rating. One important example is US money-market mutual funds, which are subject to limits on their holdings of commercial paper rated below A1/P1. In the ABCP market, this in turn creates pressure for ABCP vehicles to hold double-A or triple-A rated²⁰ securities in order to meet rating agency requirements for an A1/P1 rating of their commercial paper (Box 4). Another example is the regulatory regime for the asset portfolios held by US insurance companies, which applies differential capital weightings according to the rating of the securities.

18: The recommendations of the Counterparty Risk Management Policy Group *Improving Counterparty Risk Management Practices*, June 1999 are relevant in this context.

19: See for example, the rating agency publications available from Association of Financial Guaranty Insurers (www.agfi.org).

20: Often on the basis of a monoline ‘wrap’ (Box 5).

One question about such external ratings-based regulatory regimes is whether they encourage investors to buy securities based on the rating rather than making their own credit assessment, including evaluating any credit enhancement. Ratings are simply credit *opinions*. Indeed, 'hard-wiring' regulatory regimes to external ratings may make it more difficult for the rating agencies to form objective opinions because their actions might have significant, unintended, behavioural consequences. In framing a revised capital regime for banks' investments in securitised assets, the Basel Committee on Banking Supervision is giving careful consideration to the behavioural consequences of any approach based on external ratings only²¹. It is seeking to achieve neutrality of treatment for the same assets, whether banks hold them directly or indirectly through tranches of a securitised portfolio.

Regulatory arbitrage

The proposed changes to the Basel Accord will address two key areas in which regulatory capital requirements for credit risk have been out of line with economic capital – the minimum 8 per cent capital requirement on lending to high-quality companies and the 0 per cent capital requirement for undrawn commitments of under one year. The first has encouraged banks to shed high-quality assets using, for example, CDOs; while the second has led banks to finance assets through ABCP programmes, providing liquidity lines that often function as credit enhancement.

It is clear, however, that risk transfer between banks and insurance companies is not simply a product of regulatory differences. Furthermore, it is not necessarily a sign of bad regulatory design that institutions have regulatory incentives for risk transfer: in other words, that they are not subject to identical capital and other regulatory requirements for every instrument and transaction type. Regulation of different types of financial institution may have different objectives and a redistribution of risk may be entirely consistent with these. But it is clearly important to monitor risk transfers carefully as an indicator of possible regulatory differences. The recent report *Risk Management Practices and Regulatory Capital: Cross Sectoral Comparisons* by the Joint Forum

of international banking, securities and insurance regulators is a welcome contribution to this type of analysis²². It will also be important to understand not just how the new Basel proposals will change capital requirements on banks' existing portfolios, but also the incentives they will give banks to alter those portfolios.

To what extent might credit risk return to the banking sector?

This question can be answered at different levels. A first is whether the techniques used to transfer credit risk leave banks with residual risks, whether contractual or implicit. The clearest example is the ABCP market, in which most banks recognise that a large number of the liquidity lines that they provide to ABCP vehicles expose them to some or all of the credit risk on the asset portfolios.

Where banks have genuinely transferred credit risk, a second question is whether the appetite of the risk takers will be sustained. Some have questioned to what extent the involvement of general insurers and reinsurers in credit risk markets is a secular trend or a temporary phenomenon, reflecting the low returns in many insurance markets in the late-1990s. Another possibility is that general insurers, reinsurers and life insurers might reduce their asset allocation to credit risk if losses were to increase materially during the current economic slowdown after a period of uninterrupted economic growth in which losses were low. It is too early to tell on both questions. For general insurers and reinsurers, a key issue will be whether credit risk adds to the diversification of risk across their overall portfolio in the way expected.

At a third, and perhaps deeper, level the extent that the banking system can change from being the 'originator and holder' to 'originator and distributor' of credit risk may be limited by the close link between credit and provision of liquidity. Credit risk is being transferred from banks to insurance companies and other capital market investors. But if credit losses crystallise in stressed market conditions, insurance companies may need to have recourse to the banking system in order to meet their obligations under credit risk transfer instruments, which typically require more prompt settlement than insurance claims. And

21: *Working Paper on the Treatment of Asset Securitizations*, 5 October 2001 (www.bis.org).

22: Available at www.bis.org.

in precisely those circumstances, corporate customers or ABCP conduits might need to draw down committed credit lines from banks. At this fundamental level, the banking system is likely to remain the final source of liquidity, and therefore contingent taker of the associated credit risk, for as long as bank liabilities (deposits) are regarded as uniquely liquid.