





EUROPEAN CENTRAL BANK



# THE EURO BOND MARKET STUDY

DECEMBER 2004



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## I INTRODUCTION

In July 2001 the Market Operations Committee (MOC) of the European System of Central Banks (ESCB) issued a report on the euro bond market. The study focused on major trends in this market segment after the introduction of the euro. Three years later, the MOC prepared a new report on the euro bond market that is intended to be an analytical enhancement of the first study. In addition to taking a more analytical approach, the report also covers all significant developments in the euro bond market in the period from 2001 to 2003. The euro bond market study 2004 draws on data from both public and private sources as well as qualitative information from selected intermediaries and final investors. The report has also benefited from data support of the ESCB Statistics Committee. Furthermore, a questionnaire that was circulated among banks in the European System of Central Banks during the preliminary stages of drafting the report provided valuable information about special characteristics of the euro area bond market.<sup>1</sup>

<sup>1</sup> The study was prepared by staff members from Deutsche Bundesbank (lead), ECB, Banque de France, and Banca d'Italia, and subsequently discussed by the ESCB Market Operations Committee.

## 2 EXECUTIVE SUMMARY

The euro bond market developed quite well since 2001. The growing importance of the euro as an international investment currency has made the market for euro-denominated issues more attractive for both investors and issuers. A key element behind these developments of the European bond market in this period was the impetus for a better integrated and more liquid market and the increasing diversity of innovative products, such as index-linked bonds, real-time bond indices, fixed income exchange traded funds, credit derivatives and structured products. The euro bond market study includes most of these developments, including, as appropriate, in some empirical testing of special market features. The executive summary is hence only a shortcut to finding the chapter that is of special individual interest.

The attractiveness of investments denominated in euro is associated with greater competition between market segments and different issuer types in the euro area. In continental Europe, where financing structures are still strongly bank-based, government bonds and bank debt securities have dominated the market for decades and still do. However, of particular importance is the rapidly growing market segment of private issuers. At the beginning of European monetary union, corporate bonds had a share of only 9% in the stock of outstanding bonds. This share went up to 14% towards the end of 2003 as access was gained to a larger potential pool of investors than existed before the introduction of the euro.

Improved access to financial markets within the EU allows investors to diversify their portfolios and to invest more easily in markets of countries other than their own. Since many investors prefer assets denominated in local currency, the introduction of the euro has reduced the home bias of euro area investors and further promoted the diversification of investments within the euro area. Furthermore, the development of a relatively broad and homogenous financial market in the euro area attracts international investors. Efforts to reduce information asymmetry and to improve

transparency (as enforced by the Financial Services Action Plan) together with increased liquidity and declining transaction costs further foster the attractiveness of European bond markets for European and international investors.

In recent years the more intense competition, also due to the introduction of the euro, has accelerated the process of reshaping market infrastructure and has involved trading, clearing and settlement stages. The different components of the financial marketplaces have developed new services and slimmer ownership structures. Strong synergies, the need to lower costs and the drive to strengthen the position of the main management companies have spurred integration between the trading circuits and the settlement systems.

The euro covered bond market, an example for on-balance sheet securitisation, has witnessed interesting developments over recent years. While the issuance of covered bonds declined until 2001, mainly due to the sharp reduction in issuance of German Pfandbriefe, a recovery started in 2001. However, apart from the rising volumes since 2001 and continuous product innovation, the interesting feature in this market segment is the growing share of issuance from European countries other than Germany, whose covered bonds nonetheless still dominate the market to a large extent. While issuance has increased in the existing covered bond markets, new markets have also developed or are about to be born. This is an outcome of the modernisation of existing covered bonds legislation in several countries, while other countries have already adopted covered bonds legislation or will soon do so. These developments show the current dynamism in the covered bond market in a pan-European context.

Off-balance-sheet securitisation has seen impressive growth since the late 1990s and has become an established asset class in the European fixed income market. Total issuance volumes rose to €268 billion in 2003 and expectations are that securitisation issuance

will continue to grow and even outstrip corporate bond issuance in 2004. Different kinds of securitisation in terms of asset classes have been introduced, among them residential mortgage-backed securities (RMBS) and collateralised debt obligations (CDOs). With respect to the degree of development of the securitisation market there are still large differences between European countries which can be explained mainly by differing legal, regulatory, tax and accounting rules applicable to securitisation transactions. In some countries the legal and tax conditions for securitisation have been improved recently. Whether the high growth rates seen over recent years can be maintained, however, remains to be seen.

Considering the performance of the European bond markets, spreads of corporate bond yields over government bond yields were at exceptionally low levels by the end of 2003 after having peaked in the autumn 2001 and in 2002. Quantitative assessment of this phenomenon suggests that much of corporate spread depression is due to historically low interest rate levels, encouraging investors to search for yield. In addition, spreads, taken as premia for default risk, have been depressed by declining corporate leverage, a possible indicator of companies' solvency. Finally, the increasing market liquidity associated with the maturing corporate bond market has squeezed liquidity premia. The current broadening and deepening of the European corporate bond market is expected to continue in the future. This gives reason to believe that the dampening impact of lower liquidity premia on spread movements will continue.

Another segment of European credit markets which has expanded rapidly in recent years is the credit derivatives market. Credit derivatives, which allow the transfer of credit risk to other sectors that lack direct origination capabilities, are on the way to becoming one of the most successful financial innovations in recent history. The remarkable development of credit derivatives markets especially in Europe and the ongoing integration of European credit

markets is contributing to the evolution of liquid markets, thus facilitating the efficient pricing and trading of credit risks. Meanwhile, credit default swaps (CDS), which also provide the basis for more complex structured instruments, fulfil an important function in secondary credit markets with respect to price discovery. On 21 June 2004, the Iboxx/TRAC-X merger led to the launch of DJ iTraxx indices. This set of new rules-based and transparent indices is comprised of the most liquid names in the European financial and corporate credit default swap (CDS) market. Discussions are ongoing among market participants for listing futures on DJ iTraxx indices and for having them traded on electronic trading platforms and cleared in a central clearing house. Should these avenues or similar developments become concrete and successful, it is likely that they will enhance transparency and liquidity in the overall credit markets, ultimately expanding the corporate market, both in terms of instruments and market participants.

Inflation-linked bonds is a small but growing segment of the euro bond market. Most of the EU national treasuries which have already issued some inflation-linked bonds (UK, Sweden, France, Italy and Greece) are tending to increase their issuance, whereas the German Treasury is expected to start to issue in 2005. In parallel, the market for inflation linked derivatives has picked up over the last three years, expanding the hedging and trading opportunities of inflation risk.

One of the most recent innovations in the European bond market was the development of exchange-traded funds (ETFs), which allow a diversified portfolio to be bought or sold more cost-efficiently through one single transaction than is currently possible with traditional funds. Another means by which innovation could help would be through the development of futures contracts based on portfolios of corporate bonds, with delivery taking place through either cash or through ETFs. A prerequisite for the development of the former (cash-settled futures contracts based on

corporate bond portfolios) is, however, the development of indices whose integrity is beyond doubt and whose computation and publication is effected in real time. It is interesting to monitor the development of real-time indices and ETFs in the bond market and the corporate bond segment in particular because it may allow two impediments to the development of this market to be overcome: the shortage of convenient hedging instruments and the relatively high transaction costs associated with portfolios composed of many small issues.

Rating agencies have been playing a pivotal role in the development of the euro bond market as providers of independent credit assessments on bond issuers' creditworthiness. One of the factors underpinning this growth has been the increasing coverage and use of credit ratings provided by rating agencies. However, owing to still greater reliance on bank intermediation, the coverage of credit ratings in Europe is still under-developed compared with the United States. Both general structural factors and specific European drivers explain the role of rating agencies in the European bond market. The advent of the euro and the integration of European financial markets conferred an even more determinant role to credit ratings. By eliminating currency risk, the use of the euro allowed bond investors to focus on credit risk while the enlargement of their investment universe increased their need for simple indicators of this risk.

The Financial Services Action Plan (FSAP), adopted by the European Commission in 1999 and endorsed by the Lisbon European Council in March 2000, presents the most ambitious initiative to date to foster the integration of capital markets and to achieve a single market for financial services in the EU. The four strategic objectives underlying the FSAP relate to the single EU market for wholesale financial services, open and secure retail markets, state-of-the-art prudential rules and supervision, and wider conditions for an optimal single financial market (namely tax and corporate governance issues). With regard to the euro-denominated

bond market, a relatively high degree of integration can be observed. Nonetheless, in the case of the euro area government bond market, additional integration may be possible.

### 3 MARKET OVERVIEW

This chapter reviews the trends in the primary and secondary market in respect of the bond issuance by the public and the private sectors in the EU. The general trends observed in the previous bond market studies are still valid.<sup>2</sup> Openness and competition between the euro area issuers has increased. However, competition is likely to be given fresh impetus by new EU Member States.

The re-denomination of bonds from former national currencies into euro at the beginning of EMU paved the way for a European bond market. The trends already observed in the previous studies still hold true. Bond market conventions were harmonised among the participating Member States, which resulted in a relatively homogenous euro-denominated bond market. That market has since become much larger and more liquid than the national markets of the participating Member States were in the pre-EMU era. The European bond market has also made distinct progress in terms of competition with markets of other developed countries.

Although the size of the euro area securities market in terms of the outstanding volume is still smaller than the market for domestic debt

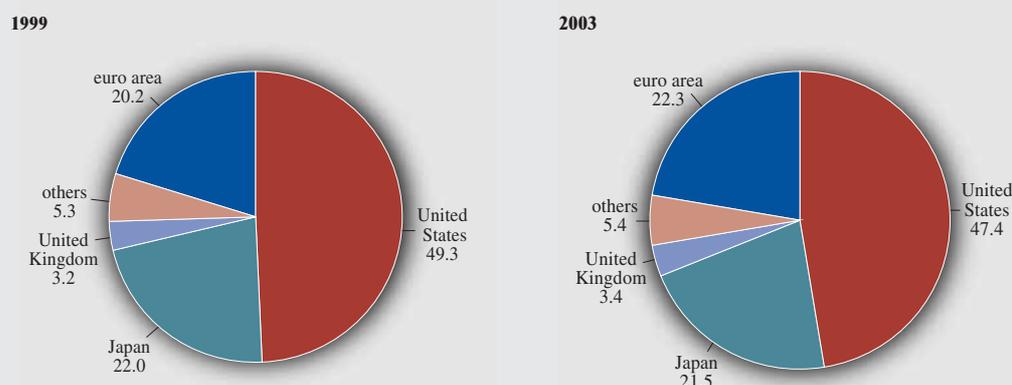
securities in the United States, this market has a sustained rate of growth and is characterised by more individual investment products. Domestic debt securities in the developed countries have an overall outstanding volume of USD 24,495 billion<sup>3</sup> (at the end of 2003) and the share of the euro area countries is now nearly on a par with Japan. Furthermore, the euro gained increasing importance on the international bond market (outstanding volume USD 11,103 billion at the end of 2003). The growing relevance of the euro as an international investment currency has made the market in euro-denominated issues more and more attractive for both investors and issuers.

The relative attractiveness of the investments denominated in euro is associated with more competition between market segments and different issuer types in the euro area. Of particular importance is the rapidly growing market segment of private issuers. At the beginning of EMU, corporate issuance had a market share of only 9% of the outstanding of

2 See European Central Bank, "The euro bond market", July 2001 and Javier Santillán, Marc Bayle and Christian Thygesen, "The impact of the euro on money and bond markets", Occasional Paper No 1, European Central Bank, July 2000.  
3 Bank for International Settlements, Quarterly Review, June 2004.

**Chart 1 Domestic debt securities**

(as a percentage of the outstanding volume in developed countries)

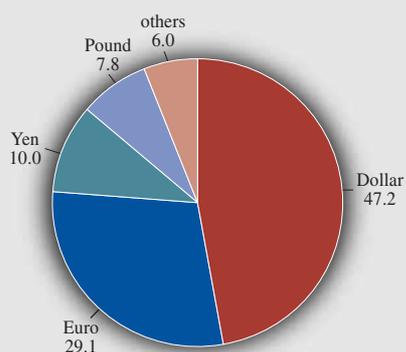


Source: BIS, Quarterly Review, June 2004.

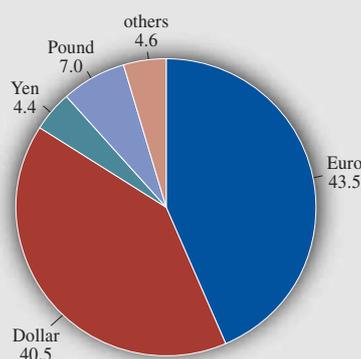
Chart 2 Currency of international bonds and notes

(as a percentage of outstanding volume)

1999



2003



Source: BIS, Quarterly Review, June 2004.

euro-denominated bonds. This share went up to 14% in 2003 as a result of the access to a larger potential pool of investors than existed before the introduction of the euro. The funding requirements associated with large mergers and acquisitions and the burst of the equity bubble have also played a significant role. Nevertheless, the outstanding amount of euro-denominated bonds issued by euro area residents is dominated by government issuance with a share of 51%, albeit with a slightly decreasing proportion. In relative terms, the outstanding volume of monetary financial institutions (MFIs) has remained more or less constant, achieving a share of 35% at the end of 2003 (see Table 1). Another trend, which is not surprising, is that the share of euro area residents' debt denominated in foreign currencies has fallen to negligible levels. This is also due to the fact that debt in legacy currencies (i.e. formerly denominated in national currencies) was re-denominated in euro and there is no longer issuance in those currencies.

The characteristics of European bonds are relatively homogenous. Concerning the coupon type, the fixed rate segment still plays the most important role. Regarding maturities, the whole spectrum is represented. Government bonds

provide nearly the complete range of maturities (from 1 to 30 years), while MFIs and especially corporates dominate in the short- and medium-term segments. The size of single issues varies considerably. Due to the refinancing needs arising from the high degree of indebtedness, governments issue rather large bonds, while corporates generally sell smaller bonds. Even though the European bond market is relatively homogenous, many niches have emerged. Some issuers have specialised in floating rate notes, index-linked bonds or the covered market segment. Furthermore, structured finance and derivative instruments have gained in importance, as is shown by the growing segments for asset backed securities, credit derivatives or exchange traded funds. This trend is tailored to the needs both of issuers pursuing cost-efficient debt management and of investors optimising their risk management.

Easier access to foreign financial markets within the EU helps investors to diversify their portfolios and to invest in European markets abroad. Since many investors prefer assets denominated in the local currency, the introduction of the euro has reduced the home bias of euro area investors and further promoted the diversification of investments within the

**Table 1 Euro-denominated bonds by issuer type: historical development**

	Total in EUR bn	Outstanding		Non-MFI Corporations <sup>2)</sup>
		Government	MFI <sup>1)</sup>	
2001 Q1	6,104	54%	37%	9%
Q2	6,245	54%	37%	10%
Q3	6,318	53%	37%	10%
Q4	6,419	53%	36%	11%
2002 Q1	6,547	52%	36%	11%
Q2	6,674	52%	36%	12%
Q3	6,715	52%	36%	12%
Q4	6,742	52%	36%	13%
2003 Q1	6,868	52%	35%	13%
Q2	7,024	52%	35%	13%
Q3	7,129	52%	35%	14%
Q4	7,205	51%	35%	14%
average	6,666	52%	36%	12%

	Total in EUR bn	Gross issuance		Non-MFI Corporations <sup>2)</sup>
		Government	MFI <sup>1)</sup>	
2001 Q1	388	45%	41%	13%
Q2	336	43%	37%	20%
Q3	311	45%	38%	16%
Q4	353	31%	41%	27%
2002 Q1	423	53%	37%	10%
Q2	370	45%	36%	18%
Q3	295	46%	39%	15%
Q4	363	40%	37%	23%
2003 Q1	450	48%	37%	14%
Q2	463	48%	35%	17%
Q3	391	47%	38%	15%
Q4	376	32%	46%	22%
average	377	44%	39%	18%

	Total in EUR bn	Redemption		Non-MFI Corporations <sup>2)</sup>
		Government	MFI <sup>1)</sup>	
2001 Q1	288	58%	34%	7%
Q2	193	42%	48%	10%
Q3	238	53%	39%	8%
Q4	252	40%	50%	10%
2002 Q1	295	55%	37%	8%
Q2	242	47%	41%	12%
Q3	244	45%	45%	9%
Q4	336	47%	45%	8%
2003 Q1	325	45%	47%	7%
Q2	307	51%	42%	7%
Q3	289	51%	40%	9%
Q4	298	43%	46%	10%
average	276	48%	43%	9%

Source: ECB securities database; bonds with a maturity > 1 year; the percentages represent the ratio of the amount of the indicated category to the total amount for the related quarter. Due to rounding, totals may not add up to 100%.

1) MFIs include the Eurosystem and central banks.

2) Non-MFI Corporations include non-financial corporations and non-monetary financial corporations.

euro area. Furthermore, the development of a relatively broad and homogenous financial market in the euro area is attracting international investors. Efforts to reduce information asymmetry and to improve transparency (as enforced by the FSAP) together with increased liquidity and declining transactions costs foster the attractiveness of European bond markets for European and international investors. A quantitative assessment of the questionnaire linked to this study showed that European and international investors are increasingly seeking exposure to European bond markets. The share of non-resident investments (investments from outside the single country) in euro-denominated bonds issued by local entities grew from 30.7% in 2000 to 38.6% in 2003.

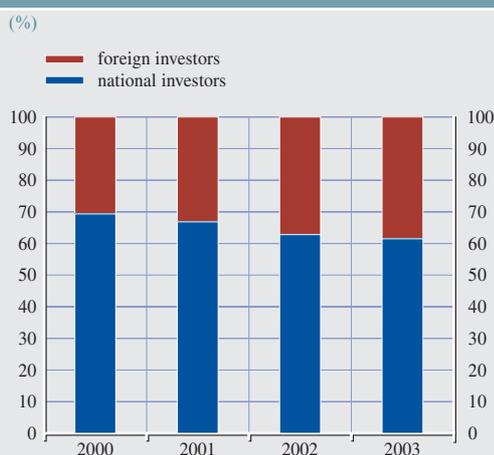
International diversification of EU investors' portfolios has significantly increased in recent years, too, whereas for most EU countries the share of foreign euro bond holdings ranged from 19% to 48% (median 37%) in 2000, this increased to 27% to 79% (median 61%) in 2003.<sup>4</sup>

### 3.1 DEVELOPMENTS IN THE EURO-DENOMINATED GOVERNMENT BOND MARKET

The sovereign issuance segment is still the most important market segment of the bond market in the EU. The relative importance of this market segment arises from a number of factors that distinguish sovereigns from other securities. These include the size of the market, the creditworthiness of the borrowers, the availability of a wide range of maturities, the fungibility of issues facilitating trading, the high liquidity (particularly of recently issued securities), the fact of being accepted in open market operations and lending facilities, the existence of a well-developed repo- and derivatives market and, as a result of these features, the coexistence of benchmark yield curves. The introduction of the euro created one

4 These figures are derived from the results of the questionnaire linked to this study after adjustment for outliers and referring to the upper and lower quantile of the distribution.

**Chart 3 Residency of investors in euro-denominated bonds**



Source: Questionnaire to the Euro Bond Market Study 2004.  
 Note: The term "foreign investors" refers to all investments from outside the single national economy. The share of foreign investors is calculated as the average of foreign investments in each individual Member State (also including intra-euro area investments).

of the world's biggest markets for sovereign issuance. According to BIS data, the European government bond market ranks third after the United States (USD 6,150 billion) and Japan (USD 5,022 billion), and the three together account for 84% of all government bonds outstanding. Although the market is comparable in size to the US or Japanese markets the multiplicity of issuers and differences in creditworthiness distinguish the euro area government bond market from its counterparts.

In the past public issuers in the euro area benefited from a quasi-monopoly situation, but they now compete for the same pool of funds. In this more competitive environment the sovereign issuers have had no alternative but to improve the attractiveness of their securities. However, competition exists not only between euro area countries but also with the top-rated non-sovereign market segment. In their function as basic investment products for institutional investors or central bank reserves European government bonds also compete with US Treasuries. A fresh impetus will also emerge from the 10 new EU Member States.

### INCREASED SIZE OF THE GOVERNMENT BOND MARKET

As already mentioned, the government bond market is the dominant segment in terms of market size. The amounts outstanding have decreased relative to other segments, but it still continues to represent nearly half the Euro area bond market. A share of 70% of this market is provided by only three countries: Italy, France and Germany. A further share of 20% comprises the government issues of Spain, Belgium and Netherlands, while Austria, Finland, Portugal, Greece, Luxemburg and Ireland account for 10% of the sovereign issues outstanding.

Although, in relative terms the amounts outstanding have decreased over the past three years, the issuance activity of euro area Member States increased. This trend has occurred not only in response to a high level of redemption but was also the result of an increase in central government funding needs as budget deficits of the largest euro area countries escalated. Fiscal performance has had a significant impact on the issuance activity of the euro area governments. In the early years of EMU lower budget deficits combined with revenues from the sales of UMTS licences led to a reduction in the net borrowing requirements. In the following years, due to lower economic growth, there was a shift from a budget surplus for the euro area of 0.1% of GDP in 2000 to a deficit of 2.7% of GDP in 2004. As a consequence, the gross borrowing requirements of euro area countries increased. For example, the net borrowing of the biggest debt issuers, Italy, Germany and France, was as high as the volume outstanding of the seven "small" euro area countries together.

However, several factors facilitated the placement of sovereign issues. The market environment, with historically low yields, provided convenient conditions for issuing long-term debt. In addition, the high quality of euro area sovereign bonds furthers their

**Table 2 Euro-denominated central government debt securities in 2003**

(EUR billions)

Country	Outstanding amounts December 2003		Gross issuance January-December 2003		Redemptions January-December 2003	
	short-term	long-term	short-term	long-term	short-term	long-term
Italy	120	972	217	215	211	211
Germany	35	743	64	157	58	127
France	109	713	238	130	217	70
Spain	39	257	36	37	33	39
Belgium	27	220	68	25	69	24
The Netherlands	20	181	76	34	72	24
Greece	4	130	4	31	2	18
Austria	1	112	6	16	6	12
Portugal	6	59	22	8	18	6
Finland	6	46	11	13	13	11
Ireland	1	28	63	7	64	1
Luxembourg	-	-	-	-	-	-

Source: ECB securities database.

acceptance in repo transactions or in open market operations and lending facilities.

Sovereign issuance in euro denominated bonds was predominantly from euro area sovereigns, but there have been occasional – albeit quantitatively unimportant – issues by other sovereigns from the new Member States<sup>5</sup> (see Table 3).

#### BENCHMARK GOVERNMENT BOND YIELD SPREADS OF EURO AREA COUNTRIES TIGHTENED

The trend of tightening government yield spreads continued. Prior to EMU, yield differentials within euro area government bonds

had been determined by four main factors: expectations of exchange-rate fluctuations, different tax treatment of bonds issued by different countries, credit risk and liquidity. After the introduction of the euro, currency-related premia were eliminated by the irrevocable fixing of legacy currency pairs. With respect to taxation differences, good progress was made in harmonising national tax treatments. Thus yield differentials are mainly generated by the credit premium and the liquidity of the market. It was widely believed that spreads would tighten.

<sup>5</sup> See also European Central Bank, “Bond markets and long-term interest rates in European Union accession countries”, October 2003.

**Table 3 New EU Member States**

Country	Debt securities outstanding Dec. 2003 (EUR millions)	Market share of debt securities issued by general government (%)	Market share of debt securities denominated in euro (%)
Cyprus	7,020	79	34
Czech Republic	45,146	40	1
Estonia	268	43	47
Hungary	45,490	79	13
Latvia	1,098	90	40
Lithuania	2,661	95	62
Malta	3,055	87	0
Poland	69,462	85	12
Slovakia	10,992	88	17
Slovenia	11,480	55	53

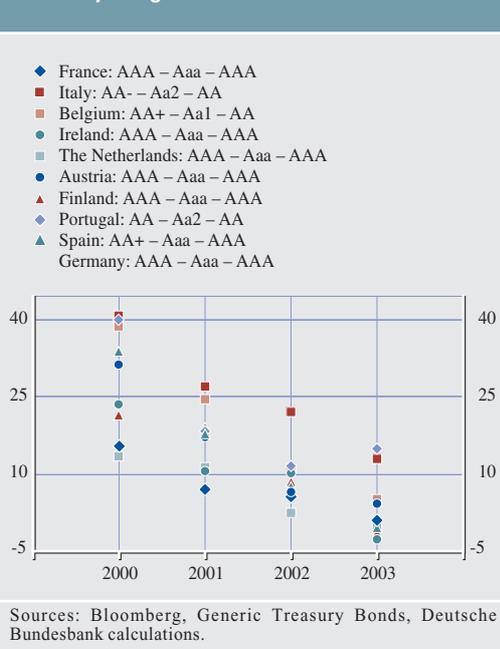
Source: ECB, statistical survey August 2004, (all maturities).

Yields have indeed converged substantially compared to the pre-euro period. The lowest yielding sovereign securities in the ten-year segment are still German government bonds (Bunds), not least because of the liquid Eurex Bund-Future contract that accepts only German Bunds as deliverable bonds. The observable yield spreads of euro area sovereigns in 2000 were 14 to 41 basis points (bp) over German Bunds. That premium narrowed steadily and ranged from -3 to 15 bp at the end of 2003. In addition to the risk and liquidity premium, another (more speculative) reason for the reduction of yield spreads could be the fact that the relative credit standing of the German Bunds shifted a little last year as the budget deficit for Germany was above the 3% limit and Germany's rating was being monitored closely by rating agencies. A further reason is that the euro capital market acquired more relevance in international bond indices, and smaller countries, in particular, could take advantage of this as any international investors seeking to replicate these indices are also bound to invest in the smaller issues.

Over the past few years the yield spreads of AAA-rated government bonds (S&P rating) have narrowed to such an extent that the ten-year yields of Austria, Belgium, France, Germany, Netherlands, Portugal and Spain have nearly the same level. Finland had a premium of 8 bp, followed by Ireland with a premium of 13 bp, Italy with AA- rating (having recently been downgraded) and a premium of 15 bp and Greece with an A rating and the highest premium of 16 bp (yield spreads as of 22 November 2004).

Good progress was made on taxation differences within the euro area. As part of the "tax package" aimed at combating harmful tax competition, the EU decided to draw up a legislative instrument to overcome existing distortions in the effective taxation of savings income in the form of interest payments. The tax regulations are aimed at an exchange of

Chart 4 Yield differentials in the segment for ten-year government bonds



information on non-resident EU nationals. The instrument in question is the Council Directive 2003/48/EC of 3 June 2003 on taxation of savings income in the form of interest payments. The Directive will come into force 1 July 2005, provided that agreements are in place with certain third countries (Switzerland, Andorra, Liechtenstein, Monaco and San Marino) to ensure that equivalent measures are applied in those countries. Furthermore, a long transitional exemption has been granted to Austria, Belgium and Luxembourg, allowing them to replace the exchange of information by a withholding tax.

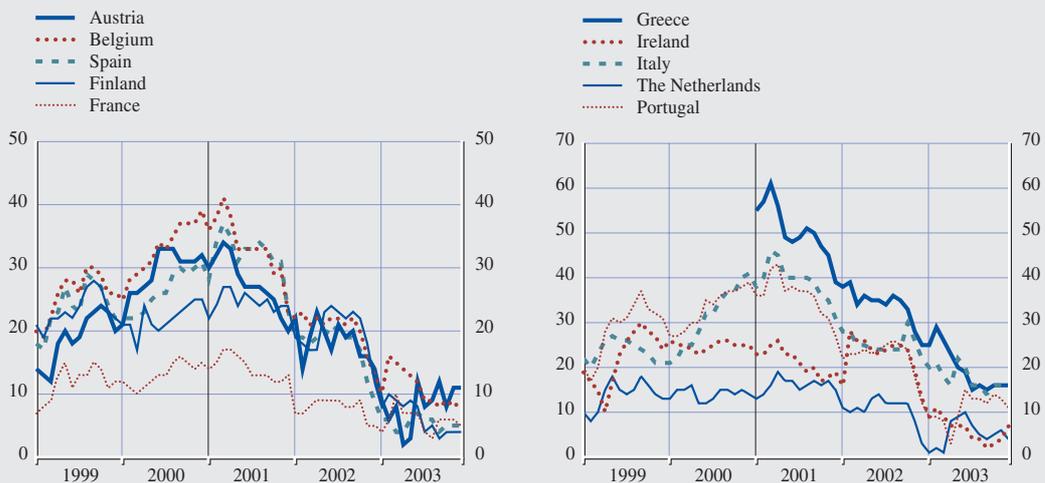
In the future, yield spreads will therefore predominantly result, all other things being equal, from the different creditworthiness of the EU Member States and the different liquidity of the bonds as exchange rate fluctuations have disappeared for legacy currencies and differences in tax treatment are gradually being tackled.

Box I

**DEVELOPMENTS IN EURO AREA LONG-TERM GOVERNMENT BOND YIELD SPREADS AND FISCAL POSITIONS**

The development of different euro area countries' government bond yields since the start of EMU is of particular interest, not least for assessing convergence tendencies within the euro area sovereign bond market. Instead of using the government bond yields themselves, it seems more intuitive to define yield spreads of the countries with respect to a "benchmark" country in

**Chart A Long-term government bond yield spreads against Germany**

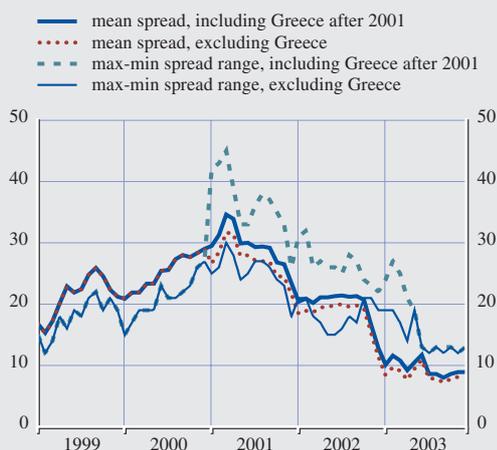


Sources: Eurostat and Deutsche Bundesbank calculations.

the sample. For the long-term government bond segment investigated here, the best "benchmark" candidate seems to be Germany because of Germany's large share in the long-term euro area government bond segment<sup>1</sup> and the fact that harmonised long-term German government bond yields were the lowest at the start of EMU.<sup>2</sup> Chart A illustrates the fact that the cross-sectional pattern of the various countries' harmonised long-term government bond yield<sup>3</sup> spreads against Germany has gone through different phases since then. The general trend in the government yield spreads showed an increase over 1999-2000, which is mirrored in the development of the cross-sectional mean spread and the dispersion as captured by the max-min spread range<sup>4</sup> over this period (see Chart B). This trend did not turn around until early 2001. Afterwards, both the mean spread and the max-min range showed a strong decline until the end

1 For example, for the Bloomberg's EFFAS Government Bond Index, Germany's share in the composition of the index for the maturity bucket of 7-10 years amounted to 25.1% in December 2003. The next largest share, namely 19.2%, was for France.  
 2 This argument for calculating the yield spreads relative to German long-term government bond yields was presented previously in the ECB Monthly Bulletin, November 2003, pp 22-23.  
 3 Since the comparability of yields between countries is critical, harmonised long-term interest rates were taken from a Eurostat database which provides these data for convergence assessments among EU Member States. Luxembourg was excluded from the sample, since no harmonised long-term interest rate based on secondary market yields of government bonds with maturities of close to ten years are included for Luxembourg in the Eurostat database.  
 4 The cross-sectional max-min range is defined as the difference between the cross-sectional maximum and minimum yield spread in a given month.

**Chart B Euro area government bond yields: cross-sectional mean spreads and maximum-minimum spread ranges**



Sources: Eurostat and Deutsche Bundesbank calculations.

of 2003. The mean spread declined even below the levels of early 1999. In January 2001, the net change in spreads between January 1999 and December 2003 was negative for all countries in the sample.

Empirical results for sovereign risk premia in the European government bond market stress that fiscal developments (e.g. the debt-to-GDP ratio) play an important role for the yield spreads of individual government bonds.<sup>5</sup> It therefore seems plausible that (relative) fiscal developments might also have been one of the driving factors<sup>6</sup> for the development of the “harmonised” central government bond yields and their spreads against Germany over time.<sup>7</sup> This is also emphasised

of 2003. The mean spread declined even below the levels of early 1999.

These general convergence patterns after early 2001 are also valid for the sample including Greece from 2001 onwards. While Greek yield spreads at 55 bp in January 2001 were far above those of the other countries in the sample, by early 2003 this strong “outlier” effect on the cross-sectional mean spread and max-min spread was no longer visible. A closer inspection of harmonised long-term government bond yield spreads against Germany shows that at the end of 2003, apart from Greece, spreads above 10 bp were observed only for Italy, Portugal and Austria. However, despite the increase in spreads over the period from January 1999 to January

### Spreads of euro area countries' long-term government bond yields against Germany

Country	Spreads (in bp)			Changes in spreads		
	Jan. 1999	Jan. 2001	Dec. 2003	Jan. 1999- Dec. 2003	Jan. 1999- Jan. 2001	Jan. 2001- Dec. 2003
Austria	14	30	11	-3	16	-19
Belgium	20	36	9	-11	16	-27
Spain	18	28	5	-13	10	-23
Finland	21	22	4	-17	1	-18
France	7	14	5	-2	7	-9
Ireland	19	23	7	-12	4	-16
Italy	22	38	17	-5	16	-21
The Netherlands	10	13	4	-6	3	-9
Portugal	20	36	11	-9	16	-25
Average	16,78	26,67	8,11	-8,67	9,89	-18,56
Greece (since 2001)		55	16			-39
Average (including Greece)		29,5	8,9			-20,6

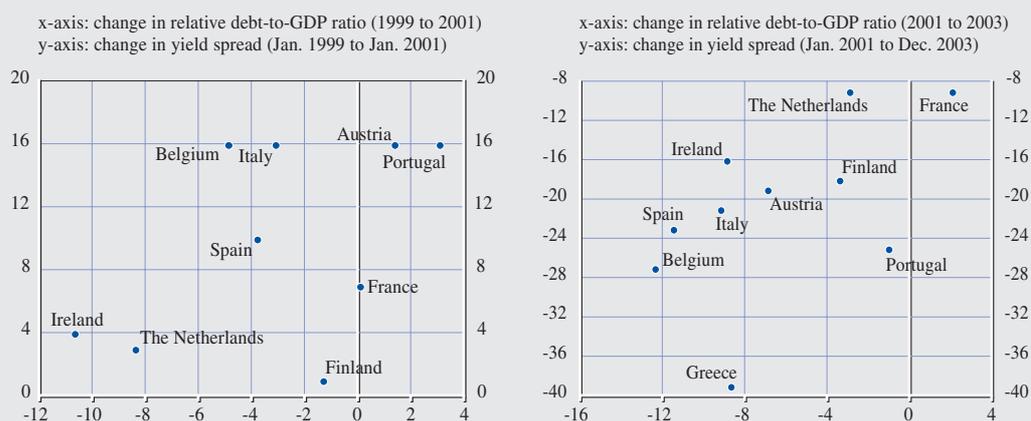
Sources: Eurostat and Deutsche Bundesbank calculations.

<sup>5</sup> See, for example, Bernoth, von Hagen and Schuhknecht, “Sovereign risk premia in the European government bond market”, Working Paper Series No 369, European Central Bank, June 2004.

<sup>6</sup> Other factors might include, for example, different degrees of liquidity of the underlying government bond issues. Furthermore, the fiscal position factor might not be linear in its influence; in times of high overall liquidity, investors might be searching for yield and more willing to accept smaller yield spreads in compensation for risks.

<sup>7</sup> See European Central Bank, Monthly Bulletin, November 2003, p 23.

**Chart C Changes in relative debt-to-GDP ratios and changes in yield spreads**



Sources: Eurostat and Deutsche Bundesbank calculations.  
 Notes: The change in the yield spread (relative debt-to-GDP ratio) is calculated as the difference between the value at the end point versus the starting point of the reference period. The relative debt-to-GDP ratio is defined as the difference between the debt-to-GDP ratio (in percentage points) of the individual country and the German ratio.

by the observation that the turning point in 2001 and the strong decline of the mean spread coincided with a period during which Germany experienced a significant worsening of its fiscal position.<sup>8</sup>

Simple scatter plots of the changes in yield spreads against the changes in relative debt-to-GDP ratio, while no substitute for a thorough econometric analysis, allow – at least visually – potential “correlation patterns” between a pair of variables to be examined, even for small sample sizes. While no clear picture emerges for the early 1999-2001 period, for the latter period from 2001 to 2003 the plot suggests that a positive correlation between an improvement in the countries’ debt-to-GDP ratios relative to Germany and a decline in the country’s long-term government bond yield spread might in fact exist. At first glance, this could be interpreted as suggesting that investors, apart from other factors, may also have rewarded countries for relatively sound fiscal policies with a decline in spreads.<sup>9</sup> While this story would fit economic intuition and empirical results for bond pricing at the disaggregate level, given the scarcity of data one has to be careful not to over-interpret such scatter plot “aggregate level” evidence. Furthermore, even if taken at “face value”, the difference in tendencies across the two plots would suggest that such a relationship need not be stable. Finally, the French example underlines the fact that – even for the trend in yield spreads over 2001-2003 – this factor can at best give a partial explanation since the change in the French yield spread is negative despite a worsening of France’s relative fiscal position. Other factors that might have been relevant – especially at the end of the observation period – include, for example, the relatively high liquidity in capital markets and the ensuing search for a better yield, which are said to have been contributing factors for yield spread compression observed elsewhere in bond markets, particularly, for example, in the emerging economies’ bond markets up to the end of 2003.<sup>10</sup>

8 This is best illustrated by the fact that in 2002 and 2003 Germany found itself unable to keep the budget deficit as a percentage of GDP below the critical threshold of 3%. However, it was already close to this threshold in 2001, with an absolute value of 2.8% of GDP. Source: Eurostat.  
 9 See also European Central Bank, Monthly Bulletin, November 2003, pp 22-23.  
 10 See, for example, IMF, Global Financial Stability Report, April 2004.

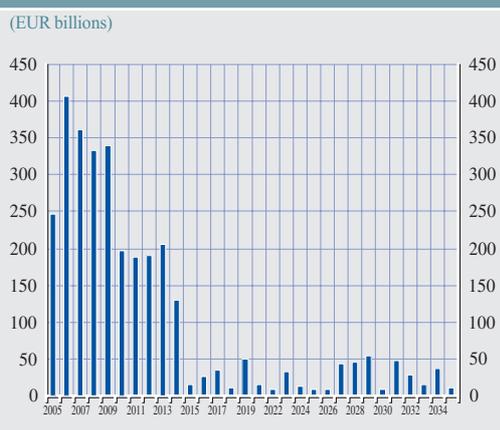
### GREATER DIVERSITY IN THE CHARACTERISTICS OF GOVERNMENT BONDS

The existence of national legislative and regulatory frameworks together with a large variety of investment and debt management strategies made it difficult to establish a single market. Every country has its own issuance policy with individual strategies for creating their debt products. However, from certain elements it is apparent that, because of their domestic focus in the EU, the trend is for governments not to cooperate but to coordinate. One example of coordination between governments is the adoption of a similar coupon calculation convention. Bilateral and multilateral contacts have also been developed and one forum for such contacts is the Working Group on EU Government Bonds and Bills (“Brouhns Group”) established by the Economic and Financial Committee.

One clear trend in the government bond market is towards larger issue sizes as national debt managers have focused on improving liquidity in their instruments by launching benchmark bonds of €5 billion or more in order to be eligible for trading on the EuroMTS electronic trading platform. Bonds up to a volume outstanding of €20 billion have an 80% share of total bonds outstanding, while small bonds of up to €500 million have all but disappeared and bonds up to €5 billion have a market share of only 4% of bonds outstanding. Smaller countries in particular are tending to increase the volume of existing bonds rather than issue new debt to obtain market liquidity (fungible issues). Certain countries have also arranged programmes to buy back or exchange bonds primarily in order to increase the liquidity of on-the-run issues and to exchange old illiquid bonds.

The maturity spectrum up to ten years is relatively homogenous in terms of the share of sovereign issuers. More interesting in terms of fragmentation is the long-term spectrum, where no single maturity is offered by all of the six biggest euro area sovereign issuers. These

Chart 5 Euro area government bond maturity profile



Sources: Bloomberg, Deutsche Bundesbank calculations.

incomplete maturity structures for each issuer result from the different sizes of the debt requirements of the countries concerned. Only big countries are able to serve the whole maturity spectrum.

The coupon structure itself did not change significantly. It has been possible to observe a slight reduction in the share of fixed coupons, but 65% of government bonds still have fixed rate coupons.

One clear trend in EMU is the search for new types of instruments or the replication of existing securities by issuing euro-denominated bonds linked to an inflation index. Other governments in the EU, such as the United Kingdom and Sweden, have many years of experience of issuing index-linked bonds. The French Treasury started issuing bonds linked to the French inflation index in 1998. Other EU Members States also placed securities in this market segment and Greece and Italy issued euro area inflation-linked bonds in 2003. Germany has also announced that it will issue index-linked bonds. For detailed information see Chapter 5.5.

Another niche is the “TEC10” issued by France, with a quarterly coupon that is linked to the created TEC-10 index, an average yield of

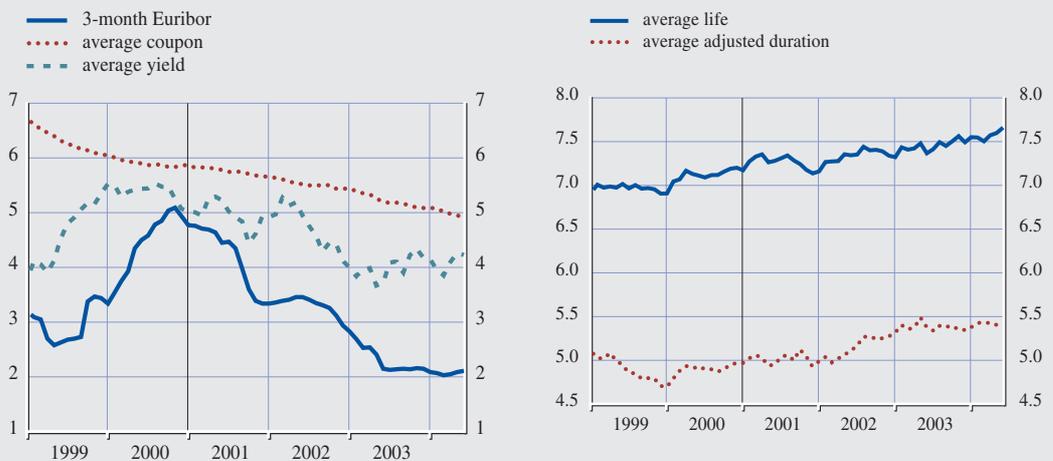
**Box 2**

**RECENT DEVELOPMENTS IN EURO AREA GOVERNMENTS' DEBT DURATION**

The average debt duration – i.e. the duration of a composite of bonds, such as a bond portfolio or the government bond market – is derived as a weighted average of the duration of the individual bonds, taking into account their weights in the respective composite. All factors that influence the duration of bonds therefore also affect the average debt duration. The duration of a bond is calculated as the weighted average term to maturity<sup>1</sup> of its discounted cash flows. Only for a zero coupon bond with no cash flows prior to maturity is the debt duration equal to the remaining maturity; for a fixed coupon bond, the cash flows from remaining coupon payments imply that the duration will be smaller than the maturity. Furthermore, the larger the coupon and hence the discounted cash flows from coupon payments relative to the discounted cash flow

**Chart A Index characteristics over time**

**EFFAS Euro Bloc “long-term” Government Bond Index (maturities above one year): index characteristics and money market interest rates**



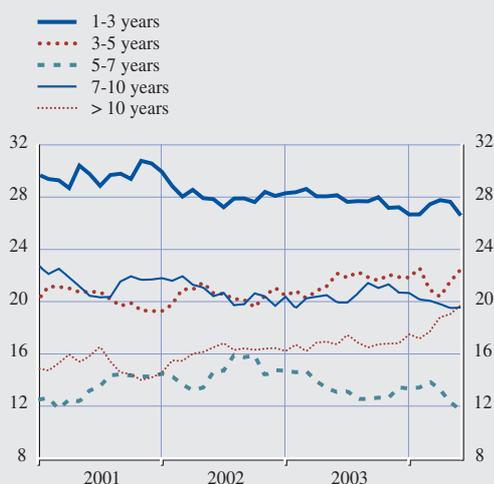
Sources: Bloomberg and Deutsche Bundesbank calculations.

from the repayment of the principal, the smaller the duration. The duration is also used as a rough approximation for the interest sensitivity of a bond's price. A shorter duration implies smaller interest rate sensitivity since an investor who receives a larger portion of the discounted stream of cash flows at an early date may take advantage of reinvestment opportunities should the interest rate rise. The investor who expects interest rates to rise (fall) in the future will therefore choose to hold bonds with a shorter (longer) duration. From the issuer's point of view the opposite is true. Faced with a relatively low (high) interest rate environment in the present but an expected rise (fall) in interest rates in the future, an issuer will prefer, all other things being equal, to issue long-term (short-term) bonds today. However, debt management by governments also has to take account of other factors affecting their financing costs, such as the liquidity of bond issues. Since investors demand compensation for risks through higher yields

<sup>1</sup> It is therefore denoted in units of time, such as years.

**Chart B Shares of maturity ranges in the euro area long-term government bond index**

(Share in per cent for maturity range)



Sources: Bloomberg and Deutsche Bundesbank calculations.  
 Note: Based on face value data for the Bloomberg/ EFFAS Euro Bloc Government Bond Index covering bonds with maturities above one year and for the corresponding maturity range Euro Bloc sub-indices. The monthly shares in per cent are given for the period of January 2001-June 2004.

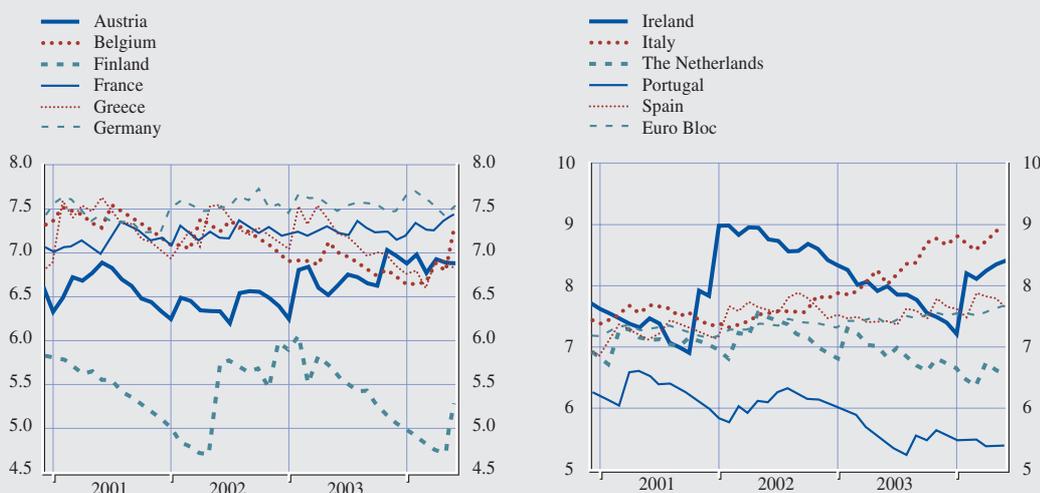
and a high liquidity of bonds implies a lower liquidity risk for the investor, a government may benefit, all other things being equal, from better financing terms if it concentrates on a small number of liquid benchmark bond issues rather than on a larger number of smaller issues. Depending on market shares and concentrations of issue activities in certain maturity ranges, a government's management of issues may over time have a significant impact on the development of the average maturity structure of government debt in the euro area. However, the development of debt duration depends not only on new issues, but also on the duration structure of outstanding debt.

To illustrate the aggregate development of euro area government debt duration over time, Chart A looks at some characteristics of the Bloomberg/EFFAS Euro Bloc government bond index.<sup>2</sup> This representative index is available for bonds with maturities above one

year. Also included is the three-month Euribor, to capture trends in money markets. As Chart A shows, the average life – as a measure of weighted-average maturity of bonds – and the average

**Chart C Government long-term bond indices of euro area member countries: average life**

(average life, years)



Sources: Bloomberg and Deutsche Bundesbank calculations.  
 Note: December 2000-June 2004.

<sup>2</sup> For further details of the index, see Bloomberg.

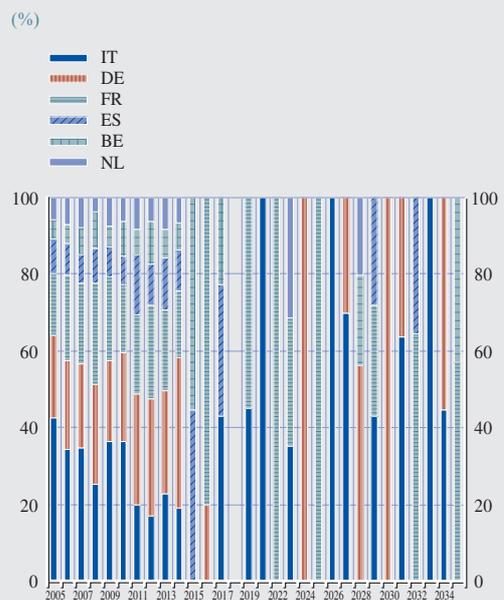
adjusted duration<sup>3</sup> of the bond index has increased over time. This has coincided with a decreasing trend in the index's average coupon. These trends in average life and adjusted duration are visible throughout 1999 and until June 2004. However, in the period since 2001, which is characterised by a relative decline in the average yield and short-term interest rates, the development has been more pronounced. Governments may therefore have taken advantage of the relatively favourable interest rate environment by increasing the debt duration. A corresponding picture emerges in Chart B for the period after 2001. A comparison of the shares in the face value of Bloomberg/EFFAS sub-indices disaggregated by maturity ranges shows a decreasing trend for the face value share of the one to three-year maturity segment and an increasing trend for the share of bonds with maturities above ten years. This matches the observation that the average life and the adjusted duration for the full maturity range increased over this period. However, as Chart C shows, the trends in maturity distribution evolved differently in different countries. The average life of the indices covering bonds with maturities above one year shows, for example, a declining trend for Portugal, while a strong increase from 7.45 years in December 2000 to 8.94 years in June 2004 is observed for Italy. As argued above, such different developments in the cross-country indices' average life trends over time may at least partly reflect the countries' individual management strategies for structuring government debt.

<sup>3</sup> Bloomberg's average adjusted duration is a market-value weighted index based on the duration of the bonds. For details see Bloomberg.

OATs (obligation assimilable du Trésor) with a constant maturity of ten years. These bonds

were issued for the first time on 9 April 1996. This market segment accounts for 3% of the amount outstanding of French government bonds.

**Chart 6 Maturity spectrum occupancy by the six biggest euro area sovereign issuers**



Sources: Bloomberg, Deutsche Bundesbank calculations.

The Italian Treasury also operates in niches with its floating rate issues, with a share of outstanding debt that has decreased from 20% in 2001 to 17% in 2003 as gross issuance did not reach the value of redemption.

### HARMONISATION IN PUBLIC DEBT MANAGEMENT THROUGH TRANSPARENCY AND STANDARDISATION

One competitive disadvantage of the euro-denominated sovereign bond market relative to other bond markets has resulted from the perception of the investors as 12 self-contained countries. Each country's specific legislation and regulatory framework combined with its own strategy for managing public debt made unification of the debt market difficult. As already demonstrated, the characteristics of the sovereign bond market are, on the whole, relatively homogenous but with a growing

tendency to move towards niches. Nevertheless, harmonisation in public debt management is observable as individual debt managers endeavour to achieve greater transparency in their strategies and to develop standardised tools for issuing debt.

One trend is towards greater transparency, with information about public debt being published on the internet and in periodical bulletins and annual reports. One example is the standardisation in the regularly published and pre-announced issuance calendar. Every country has a calendar which contains the date and the planned issue volume. However, the calendars vary in terms of the time horizon. Some plan for the next three months and others for the next whole year. In addition, the binding character of the issue calendar differs with regard to the time as well as to the issuance volume.

For the primary market procedure nearly all countries' issuing activities generally use the traditional auction method. However, a method combining an auction procedure with the use of syndication is also becoming more common. The secondary market activity traditionally takes place in the wholesale over-the-counter (OTC) market. In the euro area the widely recognised need to create the facilities necessary for cross-border trading gave rise to one technological innovation. Designed by the Italian MTS Group, the London-based EuroMTS was set up as an electronic trading system for euro benchmark bonds with a pool of instruments including government bonds of every eligible issues within the EU.

Another trend in the trading environment is the virtually exclusive use of primary dealer systems as competition between issuing Member States has intensified and the national governments need to broaden their investor base throughout Europe and beyond. Therefore nearly all euro area countries have implemented a primary dealer system. The primary dealers are obliged not only to buy securities when issued, but also to set ask and bid prices in the

secondary market. In order, in particular, to increase the attraction for international investors, the extension of the working relationship to foreign primary dealers increased. The emergence of an international corps of primary dealer banks present in a majority of EU sovereign issuers is an interesting phenomenon.

### MARKET INTEGRATION ADVANCED

As mentioned above, a certain degree of fragmentation still exists in the euro area government bond market as well as in the European bond market. Structural discrepancies such as the non-unification of tax structures along with different accounting rules, settlement systems, market conventions and issuing procedures do not make it easy to integrate the government bond market.

The introduction of the euro removed exchange rate risk for euro area investors by reducing the home bias of investments within the euro area. This contributes to an increase of cross-border investments within the euro area while maintaining the ongoing integration of the euro bond market. Furthermore, the Euro area government bond market has gained in importance as developments in the international portfolio composition show a tendency to an increase in the shares of non-residents' investments in euro denominated bonds. This led to the suggestion that the introduction of the euro has contributed to a geographical reallocation of portfolios.

### 3.2 DEVELOPMENTS IN THE EURO-DENOMINATED NON-GOVERNMENT BOND MARKET

Non-government issuing activity has gained increasing importance since the introduction of the euro. From end-2000 to end-2003 the outstanding amount of private (non-government) debt securities issued by euro area residents rose from €3,052 billion to €4,558 billion, which is an increase of almost 50%. The amount outstanding issued by non-financial

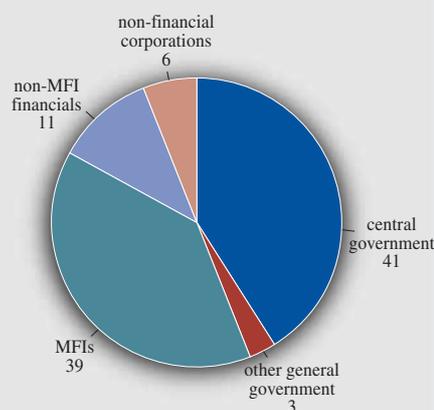
euro area corporations in the same period grew even more strongly, by 58%. In continental Europe, which particularly exemplified the traditionally strongly bank-based nature of financing structures, government bonds and bank debt securities have dominated the market for decades and still do. Nevertheless, Pfandbriefe-like and corporate issuing is catching up.

There are a variety of reasons why other issuers have increased their recourse to the bond market, especially in the period up to 2001. First, the introduction of the euro led to greater market integration and, at least in part, to the development of a homogeneous euro capital market which represented real competition for the US dollar-denominated capital market. Major M&A activity in the corporate sector ensued as the 1990s came to a close. In addition, the hi-tech boom ushered in an enormous demand for investment, especially among IT and telecommunications enterprises. For the first time, many enterprises took major recourse to the bond market to cover their financing needs.

In addition, demand-side reasons also played a role. The low-interest rate environment on the money and capital markets caused investors to look increasingly for higher-yielding investment opportunities. Conversely, the low interest rate level made it more attractive for prospective borrowers to issue bonds too. The introduction of the euro led to the abolition of legal or contractual investment restrictions for many institutional investors which were previously not allowed to invest in foreign currencies. Thus, as pension funds and insurance companies were not currency-constrained any longer, the pool of “domestic” investors was enlarged considerably by the introduction of the euro. The elimination of currency risk within the euro area broadened the demand for other diversification opportunities, especially by means of credit spreads. These factors have contributed to the share of corporate bonds in European bond market issuing activity rising from just under 10% to over 14% between 1999 and 2001. This process was promoted by a distinct easing of the budgetary situation of central government in many European countries; government borrowing was reduced, affording opportunities to “crowd in” private issuers. Whether there really was a “crowding-in” effect observable in the markets cannot be said definitively. One indication could be an increase in private issuance in market segments (concerning, for example, maturity spectrum and risk characteristics) that governments are vacating. It is in fact difficult to detect those shifts in issuance activity and attribute them beyond doubt to the “crowding-in” effect, as different influences on market activities cannot be separated clearly from each other. The post-2001 economic slump, the unfavourable developments in capital markets and a series of economic scandals (Enron, WorldCom etc.) all led to investors becoming increasingly risk-averse beginning in 2001, in some cases reversing the previous years’ trends. The percentage of overall euro-denominated bond market issuance accounted for by corporate bonds declined sharply between 2001 and 2002, rising only slightly to a mere 8.5% in 2003.

**Chart 7 Breakdown of gross issuing volumes of long-term euro-denominated bonds by type of (euro area) issuer 2003**

(in per cent)



Source: ECB securities database.

Despite its impressive growth the segment of non-government issuance is still confronted with several problems which might deter investors from taking positions in these market segments.

Institutional investors in particular might stay away from the private bond market because of a relative lack of liquidity.<sup>6</sup> While government bonds issued by the large EU Member States tend to amount to €15 billion to €20 billion per line, the standard size of a corporate bond is only one-tenth of that amount or even less. Mainly due to issuance volumes on this scale, secondary market activity remains comparatively low. Other important factors limiting the secondary market activity are related to the specific nature of the risk which is traded. Trading private credit is much more information sensitive than trading (similar or even larger volumes of) government credit. In addition, the credit market is characterised by irregular and asymmetric flows of information which is another reason why market makers have so far limited their willingness to commit capital and resources to guaranteeing liquidity in the market and therefore trading tight spreads on a continuous basis.

Nevertheless, some progress has been made: among corporate bonds the share of small issues below €500 million decreased from about 40% of total issuance in 1999 to well below 20% in 2003.<sup>7</sup>

An additional problem is the relatively limited supply of hedging instruments for non-government issues. The most commonly used instruments for the hedging of bond positions are bond futures. These are typically developed on the basis of government bonds. When these futures are used to hedge financial or corporate bonds, major basis risks are incurred. In case of financial turmoil the losses on riskier assets can lead to a “flight to quality” with the result that the prices of government and non-government bonds move in opposite directions. This was indeed the case after the LTCM crisis in 1998.

There is a key interrelation between the liquidity of a market and the existence of hedging opportunities. Without the possibility to hedge positions efficiently, the tendency to invest in this market remains subdued. The development of indices in non-government bonds and the introduction of futures and exchange-traded funds based on these indices may be a possible answer to these problems. The success of the “Jumbo-Pfandbrief” in Germany shows a possible way to solve the liquidity problem in a formerly arcane, fragmented market through the enlargement of issue sizes. However, even in the case of the flourishing Jumbo market, the introduction of a futures contract in 1998 did not succeed and the contract was discontinued some six months later. Another possible solution to the liquidity problem could be to increase the issue size or to issue bonds fungible with previous bonds with a limited set of maturities. The transparency of the private bond market can be improved by quotations on electronic trading systems.

The further role of non-government issuance in bond markets will largely depend on the role that market-based financing plays in the future. As banks have to adjust to the new supervisory rules of Basel II, bank loans may become more expensive and the disintermediation tendencies in the financial sector might become stronger. On the demand side the pool of investors will be enlarged as the problems of ageing societies become more immediate and the pension systems in many European countries move towards funded pension plans.

### TYPES OF NON-GOVERNMENT BONDS

The following paragraphs offer some information about the different types of non-government

6 See F. Fabozzi and M. Choudhry, “The handbook of European fixed income securities”, 2004, according to which no more than 20% of investment-grade corporate bonds outstanding are traded regularly: “The rest are locked away in investors’ portfolios...trading tends to be concentrated in newer and larger issues.”

7 European Commission, Quarterly bond market note, December 2003, “Special Feature: Five years of EMU – Evolution of the euro-denominated bond market since 1999”.

bonds in Europe. Most of the data presented in this section are based on statistics published by the European Commission.<sup>8</sup> Unless otherwise indicated, the data refer to the issuance of bonds, not to amounts outstanding. New market developments can be observed earlier in issuance activity than in amounts outstanding.

### BANK DEBT SECURITIES

Although the corporate bond market has attracted particular attention following the introduction of the euro, the non-government bond market in all euro area countries is still dominated by bank debt securities. This segment encompasses numerous different types of bonds, ranging from unsecured bank debt securities to covered bonds (mostly Pfandbriefe), which were at first issued only by German mortgage banks. Unsecured bank debt securities are considered in this paragraph although they bear more resemblance to corporate bonds than to Pfandbriefe or other covered bonds. “Jumbo Pfandbriefe”, on the market since the mid-1990s, are regarded by many investors as an alternative to government bonds because of their high liquidity and first-class credit rating. In 1999 German issuers accounted for around 95% of all Pfandbriefe issued in the market. Although German banks still accounted for more than 70% of the issuance of euro-denominated Pfandbriefe in 2003, in the meantime a number of European countries (e.g. Spain, Luxembourg and Ireland) have passed legislation legalising the issuance of covered bonds.

Along with government bonds, bank debt securities have traditionally played a dominant role in European bond markets, which is an indicator of the dominant role of banks in Europe’s financing structures. The dominance of bank debt securities might be explained by the privileged treatment of bank debt in the capital adequacy regime of the current Basel Accord.<sup>9</sup> Bank debt securities share the common traits of being small to medium-sized issues (the proportion of newly issued financial bonds with an issuance volume below €500 million was almost 50% in 2003) and have

credit ratings ranging from good to very good. The dominance of financial bonds also explains why the average rating in the investment grade bond market in Europe is considerably higher than in the United States (around Aa1, compared to A3 in the USA).<sup>10</sup> An important difference to the government bond sector lies in the large percentage of variable rate instruments, which in 2003 accounted for over 40% of the issue volume.

The agencies can be regarded to a certain extent as a subset of the market for financial bonds. Most agencies are financial services providers which concentrate on particular financing functions, such as housing or the promotion of small and medium-sized enterprises. In most cases these agencies are, at least implicitly, equipped with a state guarantee and therefore have first-class credit ratings. More than 80% of the agencies active in the European bond market are rated AAA. Since the introduction of the euro this segment has been dominated by the benchmark programmes of KfW and Freddie Mac, but this dominance has weakened as Freddie Mac retreated from the euro denominated market in the wake of an accounting irregularity in 2003.

Issuance by agencies has increased slowly but steadily in recent years, both in absolute terms and as a percentage of total issuance. In 2003 agency issuance accounted for 4% of total issuance in the euro bond market. The average volume of a single agency issue has increased continuously since 1999, and issues below €500 million accounted for only 10% of this market segment in 2003. In 2003 about 60% of agency issues had a maturity of between three and seven years. In the past three years 85% to 90% of newly issued agency bonds were fixed rate coupon bonds.

<sup>8</sup> Informative charts about structural developments are contained in the statistical annex to European Commission (2003); more detailed figures are presented in the statistical annexes to the European Commission’s monthly and quarterly bond market notes.

<sup>9</sup> Fabozzi/Choudhry (2004), p 174.

<sup>10</sup> Fabozzi/Choudhry (2004), p 174.

### ASSET-BACKED SECURITIES (ABSs)

The strong growth in asset-backed securities (ABSs) began as early as the mid-1990s. Even after the economy began to slump in 2001, the share of ABSs in issuing activity largely held firm. Many banks and other financial services providers use the asset securitisation function of ABSs specifically to remove risk from the balance sheet and improve balance sheet ratios, which means that, in difficult market phases, the demand for securitisation may in fact tend to rise. ABSs are generally long-term variable rate instruments with an excellent credit rating. The proportion of issues with a maturity of more than ten years has increased considerably since 1999 and stood at 70% in 2003. The percentage of floating-rate issues in the same year was more than 90%. Credit rating has been a major factor in the success of ABSs in the market. The credit quality of an ABS issue is completely independent of the rating of the originator, with the result that ABS issuance has profited from the “flight into quality” since 2001. The percentage of AAA-rated ABSs rose to nearly 100% by as early as the end of 2002 in the light of difficult market conditions and investors’ pronounced risk aversion. In 2003 ABSs accounted for just over 4% of all euro area issuing activity, and this figure has remained largely unchanged over the past three years. ABS are particularly widespread in Italy, a country in which this instrument is also used intensively by general government. Other euro area countries, such as France and Germany, are underrepresented in this segment because these countries have well-developed markets for Pfandbriefe and/or covered bonds. This clearly reduces the need for mortgage-backed securities (MBSs), a key subset of ABSs.

### CORPORATE BONDS

This segment saw the strongest growth in the three years following the introduction of the euro, despite the fact that the size of the euro area corporate bond market continues to pale in comparison with that of the US market. The outstanding volume of euro-denominated corporate bonds grew by 95% from end-1998 to end-2003, compared to a growth rate of only

37% in the case of financial bonds (excluding covered bonds). The corporate segment particularly highlights the differences in corporate financing structures between the United States and Europe. Although the debate about the advantages and disadvantages of bank-based versus market-based financial systems has not been settled finally,<sup>11</sup> it is an undisputed fact that bank-based economies also benefit from a developed corporate bond market. Corporates are the segment of the bond market which benefits most from the trend towards disintermediation. One expected consequence of the new regulatory regime of Basel II is that bank loans will be granted on much stricter conditions, at least for companies with lower credit ratings. Even in cases where bank loans are readily available, companies have an interest in broadening their financing basis in order to increase their flexibility. For example, bond financing offers better opportunities for companies to incur long-term debt with a maturity above ten years as banks might be reluctant to grant loans with such long maturities.

Corporate bonds tend to have the lowest credit ratings in the bond market and are therefore the most strongly affected by economic downturns. This was reconfirmed after the 2001 economic slump, although a key structural difference to the US corporate bond market lies in the low percentage of speculative grade issues in the euro area. In the euro area, these make up only around 10% of the corporate bond market, compared with around 40% in the USA. If one includes the fact that market capitalisation in the euro area is relatively low compared with the USA, Europe may be said to be an emerging market for “junk bonds”. This holds true, although the divide between investment and non-investment grade issues is not as strong as it is in the US, as investor guidelines in Europe are less strict.<sup>12</sup> After the beginning of the

11 For an overview, see A Demigürc-Kunt and V Maksimovic, “Funding growth in bank-based and market-based financial systems: Evidence from firm-level data”, *Journal of Financial Economics*, Vol 65, Issue 3, September 2002, pp 337-363.

12 Fabozzi/Choudhry (2004).

economic downturn in 2001, many prominent companies (among them British Airways, ABB, Ericsson and Ahold) became “fallen angels”, that is they were downgraded from investment grade to non-investment grade.

The proportion of smaller issues (up to €500 million) has decreased considerably since the introduction of the euro (from 40% to below

20%). Nevertheless, the percentage of issues above €2 billion, which was more than 30% in 2001, also decreased to less than 10% in 2003. A study<sup>13</sup> by Paul Harrison in 2001 stressed the

<sup>13</sup> Paul Harrison, “The impact of market liquidity in times of stress on the corporate bond market: pricing, trading, and the availability of funds during heightened illiquidity”, paper presented at the BIS Third Joint Central Bank Conference on Risk Measurement and Systemic Risk, 2001.

### Box 3

#### RECENT DEVELOPMENTS IN CORPORATE BOND SPREADS IN THE EURO AREA

Taking the aggregate euro area government bond market as a reference point, euro area corporate bond yield spreads are calculated as the difference between yields on corporate bond indices and the

yields on the relevant euro area government bond indices.<sup>1</sup> Since this investigation of recent corporate bond spread developments concentrates on spread tendencies in the cross-sectional dimensions – first for the maturity spectrum, then for the rating spectrum – the government bond reference category will be adjusted to match the respective cross-sectional dimensions.

**Chart A Investment grade corporate bond spreads by maturity ranges**

(in bp)

**Euro area corporate bond indices (investment grade): yield spreads against euro area government bond indices, by maturity buckets**



Sources: Merrill Lynch and Deutsche Bundesbank calculations.

following in October 2001.<sup>2</sup> The second, much stronger peak came in October 2002<sup>3</sup> (for the aggregate corporate bond index, the spread amounted to 120 bp at the end of October 2002,

For the maturity dimension of investment-grade corporate bond spreads, each spread is calculated against a government bond index with a corresponding maturity range. As Chart A shows, one can identify three distinct phases since the start of EMU. The first phase – until roughly the end of 2000 – is characterised by an increasing trend in corporate bond spreads across the maturity spectrum. The subsequent period until about the end of October 2002 saw two pronounced peaks in spreads, with a downswing in-between. The first clear jump in spreads occurred in September 2001, with the peak

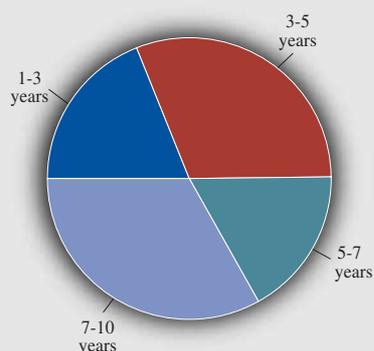
<sup>1</sup> To be more precise, Merrill Lynch offers so-called option-adjusted spreads (OAS spreads, defined against the swap curve) for their respective indices. The corporate bond yield spread is therefore calculated as the difference between the OAS spreads on the corporate bond index in question and the respective direct government bond index.

<sup>2</sup> This coincides with global developments in capital markets after the shock of the terrorist attack on the USA on 11 September 2001.

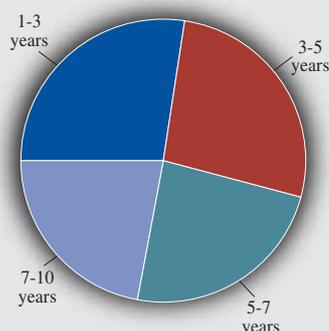
<sup>3</sup> Looking at short-term interest rate conditions in the money markets, the peaks in the three-month Euribor occurred in November 2000 and a smaller one in May 2002. From then on until December 2003, short-term interest rates declined strongly (from 3.46% to 2.15% per annum). While the decline in short-term interest rates started earlier, the positive development in liquidity conditions probably contributed to the spread compression observed after October 2002.

Chart B Shares in face values of corporate bond indices, by maturity ranges

Shares in face values in December 2000, euro area corporate bond indices by maturity ranges



Shares in face values in December 2003, euro area corporate bond indices by maturity ranges



Sources: Merrill Lynch and Deutsche Bundesbank calculations.

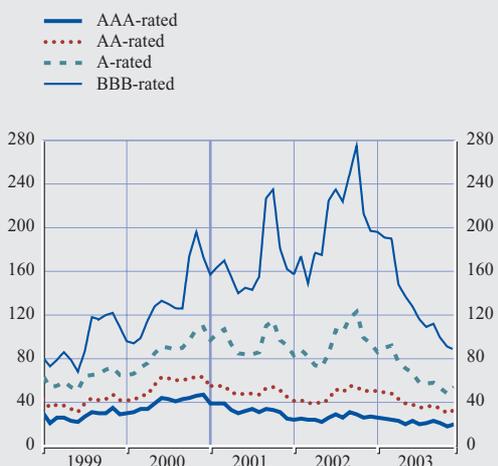
compared to 92 bp at the end of October 2001). The last phase – from November 2002 until end of 2003 – finally saw a strong compression in corporate bond spreads across the maturity spectrum. Spreads did not decrease to the levels of early 1999, but – apart from the 1-3 years maturity bucket – were lower than at the beginning of 2001. Overall, investment-grade corporate bond yield spreads across the maturity spectrum show a great deal of co-movement in the last phase, especially after September 2001. Since then, the particular behaviour of the corporate bond yield spread for the 1-3 year maturity range seems to have vanished, while its share in the face values of the indices in the 1-10 year range increased (compared with the end of 2000, see Chart B).

Chart C highlights the development of corporate bond spreads along the rating dimension only. In this case, all spreads are defined relative to the AAA-rated direct government bond index. The spread for the AAA-rated corporate bond index thus captures the higher risk quality of corporate bonds versus government bonds belonging to the same rating class. A slight decline in the overall yield spread trend since 2001 is best seen in AAA-rated corporate bonds. Since lower ratings can be expected to correspond to higher risks within the corporate bond index sector, corporate bond spreads against government bond yields with AAA-rating increase with lower corporate bond ratings. In addition, with lower ratings the cyclical

Chart C Corporate bond spreads in the rating dimension

(in bp)

Euro area corporate bond indices (investment grade): yield spreads against AAA-rated government bonds, by ratings of corporate bonds

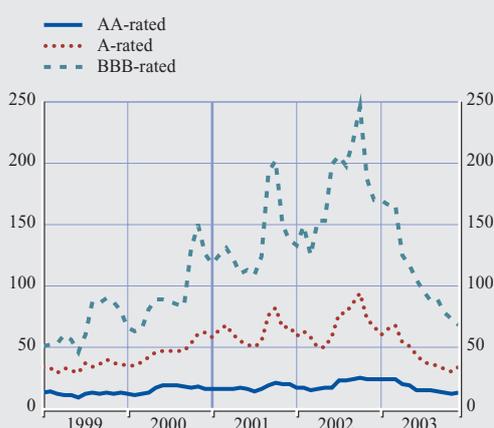


Sources: Merrill Lynch and Deutsche Bundesbank calculations.

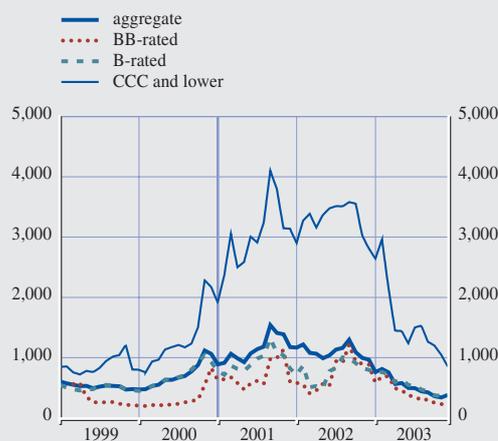
**Chart D Yield spreads against AAA-rated corporate bonds**

(in bp)

**Euro area corporate bond indices (investment grade): yield spreads against euro area AAA-rated corporate bond index, by rating classes**



**Euro high yield indices: yield spreads against euro area AAA-rated corporate bond index, aggregate and by rating classes**



Sources: Merrill Lynch and Deutsche Bundesbank calculations.

development over time increases. Focusing on the 2001-2003 period, the peaks of September/October 2001 and October 2002 show up strongly for the spreads of corporate bonds with A and BBB ratings, i.e. at those times the risk compensation worked as a multiplier of development across the rating spectrum. The same general pattern of more pronounced peaks with lower ratings can be replicated when the spreads are defined with respect to the AAA-corporate bond index.

The degree of risk in terms of default and recovery are, of course, of a much larger scale for the so-called high-yield corporate bond segment. However, this segment has experienced dynamic growth in recent years.<sup>4</sup> Chart D therefore compares the corporate bond spreads – now calculated against AAA-rated corporate bonds – for the lower grade investment rating categories and for the high-yield corporate bond sector. The spreads in the investment grade sector are clearly dwarfed by those in the high-yield sector. However, for the high risk, high-yield sectors with B ratings and below, the peaks in September/October 2001 are higher than those in October 2002. Moreover, the general spread compression observed for the corporate bond sector after October 2002 was particularly strong for the very high risk segment comprising high-yield corporate bonds with CCC ratings and below. The yield spread compression in general, but in particular for the high yield sector, points to a special development in capital markets since October 2002. This phase of bond yield spread compression has probably been influenced by factors such as the high liquidity in markets and the search for yields in capital markets. These factors have also been linked in the literature to the yield spread compression observed in the latter phase for other high risk bond categories, such as for emerging markets bonds.<sup>5</sup>

<sup>4</sup> Nevertheless, it is still small compared with the investment-grade corporate bond segment.

<sup>5</sup> See International Monetary Fund, Global Financial Stability Report, April 2004.

importance of liquidity for the corporate bond market. He showed that issuance is more strongly curtailed in the case of a liquidity shock than after credit quality shocks. The study also pointed to the importance of liquidity for the composition of the bond market. If liquidity is restricted, investors emphasise the size and “familiarity” of issues, and so for smaller and less prominent companies market access becomes difficult. The proportion of longer maturities of newly issued bonds rose distinctly during the period from 2001 to 2003. Obviously the issuers tried to take advantage of the comparably favourable financing conditions in recent years. In the first half of 2004 there were also a lot of buybacks and bond exchanges in the corporate bond market. In most cases the aim of these activities was to issue bonds with even longer maturities in order to lock in the low interest rate level. In 2003 more than 80% of the newly issued corporate bonds were fixed rate coupon bonds. This proportion has been largely unchanged in recent years.

The percentage of issuers not residing in the euro area (most of which are based in the United States and the United Kingdom) is, at 40%, very high in the corporate bond segment. It is worth noting that corporate bonds are often issued at international financial centres. This shows that integration to form a truly single euro area capital market is still far from being a reality. The most important banking locations where corporate bonds are issued are London and Luxembourg. In the case of bank debt securities, the percentage of offshore issues is much lower since they are still generally subject to significant national legislation, especially that governing the issuing of Pfandbriefe. Legislators in individual countries have accordingly been particularly active, especially in their quest to create a legal framework for the issuing of covered bonds based on the German Pfandbrief.

## 4 MARKET INFRASTRUCTURE

In the past few years, the stronger competition owing to the introduction of the euro has accelerated the process of market infrastructure reshaping and has involved trading, clearing and settlement stages. The different components of the financial market places developed new services and rationalised ownership structures. Strong synergies, the need to lower costs and the drive to strengthen the position of the main management companies spurred integration between the trading platforms and the settlement systems.

### THE TRADING SECTOR

#### THE PRIMARY MARKET

Between 2001 and 2003 trends in the evolution of the primary market infrastructure included more extensive use of the internet and widespread recourse to syndication in government securities issuance. The development of electronic systems – which enhance speed, reliability, transparency and cost-effectiveness, contributing to securing the cheapest borrowing terms – was less important than in the secondary market, principally because most European countries had already fully automated government debt issuance processes.

At present, almost every Member State has an electronic auction or tap issuance system; the remaining countries are planning to implement such a procedure in the near future (for example, the United Kingdom, Czech Republic and Slovakia). Moreover, in the past three years some countries improved their auction systems in order to handle different types of operations (e.g. buy-back and exchange operations), to reduce the time between the auction cut-off and the awarding of bids (the “awarding time”, which has become an important parameter of competition among sovereigns)<sup>14</sup> and to make access easier for non-resident operators by reducing some of the technical requirements for participation.

In the period under review, syndication was used – especially by the smaller countries – in

order to achieve a high initial outstanding volume and thus rapidly build up liquidity in a particular issue. However, bigger countries also have begun to use this placement method more frequently in order to reduce risks related to the issuance of innovative products or, more generally, when major uncertainty exists about investor demand.<sup>15</sup> In fact, such a placement system helps to remove much investor reluctance by means of reduced price uncertainty and outright provision of high liquidity.

In the syndication process, electronic systems – in particular the internet – are used in several ways: issuers and lead managers<sup>16</sup> can disseminate information quickly to a large number of potential investors; investors can directly enter bids into the system through the sales representatives; electronic book-building provides the issuer and the syndicate with real-time information on the bidding process, thus enhancing pricing transparency. Finland, Portugal and Spain have used the internet as a tool in syndicate transactions, but their experience indicates that, although the investors have the technical facilities needed to enter bids directly into the system, contact with the sales team continues to be very important.

The direct placement of government securities with retail investors, used by Spain and Sweden, although technically possible, has also remained limited, principally for reasons relating to the high cost and the limited knowledge about this investment alternative.

#### THE SECONDARY MARKET

The euro denominated bond secondary market has been characterised by the growing use of multilateral electronic trading systems, related

<sup>14</sup> The shortness of the awarding time reduces the risk for bidders, as they are informed more quickly about their positions. As a result, the probability of unexpected moves in market prices is also reduced.

<sup>15</sup> Italy, for example, has been using syndication for initial issues of index-linked and ultra-long bonds.

<sup>16</sup> The lead managers are a pool of primary dealers active in the domestic market, which is selected by the issuer, and in charge of providing the demand.

to their benefits in terms of lower costs, higher liquidity, transparency and easier cross-border trading. The trend was clearly visible in the more homogenous and liquid government bond sector.

In the first phase, because of the large size of the OTC bond market, competition among trading markets caused the proliferation of new trading platforms, these taking the form of regulated markets and alternative trading systems (ATSs).<sup>17</sup> Consolidation initiatives have begun to emerge only recently, accompanied by moves away from the use of smaller less successful trading platforms.<sup>18</sup>

Platform vendors have contributed to encouraging the adoption of electronic trading by adding or enhancing features and services in their trading systems such as connectivity for automated trade processing, pre-trade services such as research, analysis and calculation software, post-trading linkages and services tailored to the syndicated underwriting of new issues.

In its last review of electronic transaction systems for fixed income markets, the Bond Market Association identified 77 systems operating in the United States and Europe in late 2003, as opposed to 11 in 1997. Of these platforms, 31 were based principally in Europe.<sup>19</sup> All the systems identified supported the government bond market. However, over the past three years, due to competition, platform vendors and traders have also accelerated their adoption of electronic execution for less liquid products such as corporate debt securities, asset-backed and mortgage-backed securities.<sup>20</sup> The latter trend was less significant for inter-dealer platforms. In fact, in relationships between intermediaries concerning less liquid financial instruments, traditional trading channels continue to be largely predominant, despite the existence of devoted segments on several platforms. On the basis of the BMA survey and information from European central banks, Table 4 lists the principal electronic bond trading systems used in the EU.<sup>21</sup>

Among dealer-to-dealer platforms, MTS and Icap/BrokerTec are the most widespread; other important platforms are Eurex Bond and E-Speed.

In particular, MTS Group, the first wholesale electronic market in the euro area, reinforced its leadership in government securities transactions and promoted the integration of the euro denominated bond market by broadening the range of securities traded and services offered and by exporting its platform to other European countries: between 2001 and 2003 the number of national markets using the MTS platform rose from 5 to 12. Among the new EU Member States, Poland announced in October 2003 the implementation of a domestic government bond market based on the MTS system. Like MTS Italy, all the other domestic MTSs are quote-driven and based on the obligation for market makers as a whole to quote two-way prices during the day. The rules of each market, however, such as conditions of access, obligations of market-makers, list of traded securities etc are established by shareholders in accordance with national law. Because all national MTS use the same platform as MTS Italy, participants in the market can employ the same workstation to access all the MTS markets they have joined, thus benefiting from economies of scale. Moreover, some MTS

17 According to the FESCO definition, an ATS is “an entity which, without being regulated as an exchange, operates an automated system that brings together buying and selling interests – in the system and according to rules set up by the system’s operator – in a way that forms, or results in, an irrevocable contract.” This is a broad definition which captures any trading functionality regardless of whether the functionality operates bilaterally or multilaterally.

18 In May 2001 the acquisition of the dealer-to-customer platform BondClick by MTS Spa, to create BondVision, was widely seen as the starting point of a consolidation of the sector. Among the subsequent events witnessing the new trend we can mention the take-over of the British regulated market Coredeal Ltd by MTS Spa, with the subsequent integration of Coredeal and Euro MTS platforms (2002), and the closing of Jiway, the regulated market of OM Group (2002).

19 This does not include systems focused principally on retail or individual investors.

20 At the end of 2003 the majority of the systems were platforms on which multiple types of bonds can be traded.

21 It must be underlined that the high number of platforms, their heterogeneity and the dynamism of the sector makes it difficult to give an exhaustive picture.

markets (e.g. Belgium, Finland and Denmark) drew up an agreement for reciprocal access, which makes the operators of each market dealers on the other markets, too.

Some MTS markets were provided with new functionalities and services. For example, since 2003 the Italian, Finnish and Portuguese platforms have allowed exchange operations to be managed, and MTS Spain and MTS Portugal have activated a segment dedicated to T-bills.

Other developments concerned EuroMTS, the “super-wholesale” element of MTS Group, based in London, where benchmark government bonds of several euro area countries are traded. In the past two years MTS Group, in collaboration with Euronext, started the diffusion of new bond indices on EuroMTS, EMTX and EMTXi, which respectively provide a synthetic indication about the trend of the fixed income and inflation-linked government securities market in the euro area.

Finally, in 2003 a new platform, NewEuro MTS, was activated to trade euro-denominated government securities issued by the new EU Member States in order to promote the efforts of those countries towards integration into the euro bond market. At present, nine bonds (issued by Poland, Hungary, Lithuania, the Czech Republic, Slovakia) are listed on the platform.

The other principal dealer-to-dealer system used in Europe, BrokerTec, is a global fixed income platform founded in 1999 and recently acquired by ICAP, the world’s largest inter-dealer broker. The system provides participating dealers with execution and straight-through processing. It allows the trading of a large range of US fixed income securities and European government bonds (Belgian, Dutch, French, German, Spanish and Austrian).

A number of euro area countries have seen the beginning of electronic repo trading on dealer-to-dealer platforms, which are already quite

well developed in many Member States (especially on Icap/BrokerTec and MTS Italy). In Germany, Eurex Bonds introduced a repo trading facility via the “euro repo” web-based platform; in Spain a repo segment was activated on MTS Spain. According to ISMA,<sup>22</sup> together with the development of European repo market, the share of electronic trading continued to grow steadily over the past three years, reaching 20% of the total value of repo contracts at the end of 2003. Electronic trading is not yet widely used for swaps, despite the existence of two platforms (E-MIDER and AT-FOX), owing to the fact that swap operations are not sufficiently standardised.

The application of electronic trading to relationships between intermediaries and institutional investors has also showed significant developments in recent years, with progressive diffusion and the use of dealer-to-customer platforms, of which TradeWeb and BondVision are the most important.<sup>23</sup>

In recent years the supervisory authorities have continued to examine the implications of the growing use of electronic trading systems for the structure and functioning of the financial market. From the supervisory perspective, crucial aspects are: (i) the risk of liquidity being split up between different platforms, which would undermine efficient price formation; (ii) the tendency of intermediaries to carry out in-house netting of orders of opposite signs received from customers (known as internalisation); (iii) the difficulty of distinguishing clearly between regulated markets, other trading platforms and trading

22 International Securities Market Association, European repo market survey No 6, conducted December 2003, published in March 2004, p 6.

23 TradeWeb is an auction system which links 24 fixed-income securities leaders with more than 1,500 buy-side institutions in North America and Europe. Products traded on the platform include different types of fixed-income securities, both European and US. BondVision is a regulated market, launched by MTS Group in August 2001, which allows primary dealers to trade euro government securities over the internet directly with institutional investors by means of a competitive auction. The platform, used in many EU Member States, has registered significant growth regarding both operators and transactions since its launch.

activity performed by individual intermediaries; and (iv) the disaster recovery capabilities to guarantee the continuity of services.

In July 2002 the Committee of European Securities Regulators (CESR) published the “Standard for Alternative Trading Systems”, under the Investments Services Directive (ISD), aiming to ensure the protection of both the users of ATSs and the integrity of the market.

In April 2004, the ISD was amended by the adoption of the Financial Instruments Markets Directive (FIMD). For the first time, taking into consideration the consequences of the ATS development, a Directive establishes a comprehensive regulatory framework governing the organised execution of investors’ transactions by regulated markets, other trading systems (called multilateral trading facilities or MTFs<sup>24</sup>), and banks and investment firms practising systematic internalisation. This new environment ensures adequate transparency in price formation, whatever the venue, establishing pre-trade transparency obligations, which, however, are limited to equities. The extension of transparency obligations to bonds can be adopted by individual EU Member States for their investment firms and is to be discussed, as a general rule, within two years following approval of the Directive. The impact of the new Directive on the bond market will probably depend on that decision.

### THE POST-TRADING SECTOR

The evolution of European post-trading systems has continued to be directed towards the improvement of stability and the search for higher levels of operational efficiency.

In this context, clearing and settlement systems have been pushed towards a common paradigm characterised by increasing integration of services providers, stronger diffusion of schemes for settlement in central bank money, more extended use of central counterparty functions, and activation of new services such

as greater use of services such as securities lending and guarantee management.

### THE SETTLEMENT SIDE

The search for efficiency gains has reinforced a dynamic movement towards consolidation among EU settlement providers. Progress in this process has been achieved, both in the form of structural changes and strategic measures. Consolidation has involved mergers of institutions providing similar services (“horizontal consolidation”) and mergers of institutions providing different but integrated services (“vertical consolidation”).

In the period under review, at a local level, reforms towards horizontal consolidation were adopted in Spain, where the two central depositories, SCLV (for equities and corporate bonds) and CADE (the book entry system for public debt), were unified to establish a single central securities depository (CSD) for all instruments (Iberclear). In Italy the national central depository (Monte Titoli) extended its functions to settlement activities, which had been managed by the central bank until 2003. In the United Kingdom the settlement of government bonds was integrated into the security settlement system for equities and bonds, CREST, in 2000. The settlement of money market securities was integrated into CREST in 2003.

At the EU level, horizontal consolidation, which had already started when Clearstream International<sup>25</sup> and Euroclear Group<sup>26</sup> were set

<sup>24</sup> An MTF is defined as a multilateral system, operated by an investment firm or by a person who manages the business of a regulated market (the “market operator”), which brings together multiple third-party buying and selling interests in financial instruments – in the system and in accordance with non-discretionary rules – in a way that results in a contract in accordance with the provisions of Title II of the Directive. From a micro structural point of view, the definition is less broad than ATS, as it excludes bilateral systems.

<sup>25</sup> Clearstream International is the holding company for the international central securities depository (ICSD) Clearstream Banking Luxembourg and for the German CSD Clearstream Banking Frankfurt, the result of the merger between Cedel and Deutsche Börse Clearing.

<sup>26</sup> The group originated from the merger of Euroclear and the national CSDs SICOVAM (France) and later on NECIGEF (The Netherlands).

up, continued with the merger of CREST with the Euroclear Group in September 2002.

At the beginning of 2004 another initiative was the signing of a letter of intent between the Finnish and Swedish CSDs (APK and VPC, respectively) concerning their merger to create a joint CSD group within the Nordic area (NCSD). The creation of a Finnish-Swedish CSD is aimed at facilitating the harmonisation of rules and settlement processes and promoting the development of a common technology platform in order to increase the efficiency and hence the competitiveness of the Nordic region as a financial market.

As far as vertical consolidation is concerned, similar interventions were implemented (i) in Germany and in Italy, where the companies managing the stock exchanges (Deutsche Börse AG and Borsa Italiana SPA) became the main or exclusive shareholders of the national clearing and settlement systems; and (ii) in Spain, where a single holding company Bolsas y Mercados Espanoles (BME) was incorporated to integrate both the Spanish stock markets and the post-trading systems.

At the EU level, Deutsche Börse AG took over Clearstream International completely in 2002. Thus at present Deutsche Börse constitutes a wholly integrated securities processing chain comprising trading, clearing and settlement, thereby maintaining a high degree of interoperability of its diverse trading systems and of its CSDs with other CSDs.

Regarding technical innovations in procedures, new settlement models were introduced in Germany and in Italy in 2003. Basic features of the German procedure are prefunding which results in the elimination of unwinding risks as well as earlier finality in the morning before TARGET opening. The new Italian system is aimed at combining the advantages of net and gross settlement, moving forward the transaction settlement to the early morning of the settlement day, reducing liquidity needs and permitting the efficient use of collateral in

respect of intraday credit from the central bank. In the United Kingdom the settlement system, CREST, moved to full delivery-versus-payment (DVP) in central bank money in 2001. As noted, the integration of the settlement of money market securities into CREST took place in 2003. In Sweden, the securities settlement system (VPC) made a substantial change in its settlement procedures. In November 2003 VPC replaced its net settlement procedures with gross settlement combined with automatic collateralisation thereby eliminating the risk of unwinding.

Finally, many countries (e.g. Greece, Poland, Slovakia, Malta, Hungary) are taking (or have already taken) various steps, such as improved linkages and intra day multi-batching as opposed to end-of-day processing, which will allow the shortening of the trade settlement cycles and the introduction of real-time gross settlement and DVP.

#### THE CLEARING SIDE

Demand for clearing and central counterparty service have developed rapidly in Europe in the past few years as a means of reducing operational and credit risks, enhancing efficiency in the usage of capital and lowering transaction costs. The demand was partly related to the increasing use of electronic trading platforms with trader anonymity. In addition, the greater use of central counterparties is often cited as a factor able to reduce the heterogeneity of national systems. Moreover, larger efficiency gains would occur if further cross-border consolidation of central counterparties were to take place.

In this field, the initiatives to improve the efficiency and stability of systems included various merger combinations among services providers and the gradual extension of central counterparty activities to the cash market, both for equities and bonds.

The most important initiative for the consolidation of the European markets infrastructure was the merger in December 2003

of two of Europe's leading central counterparties, London Clearing House Ltd of the UK and Clearnet SA of France, to form the LCH.Clearnet Group ("LCH.Clearnet"). The combined range and penetration of the two companies makes the group the largest and most diversified central counterparty in Europe. The group is planning to further expand its bond market coverage. The harmonisation of the technical platforms of LCH and Clearnet, which is already under way, will facilitate an expansion of cross-border services and the group has stated publicly that it is open to further mergers.

Eurex Clearing and Cassa di Compensazione e Garanzia, the central counterparties for the German and Italian domestic derivatives markets respectively, launched central counterparty activities on the cash equity market in 2003. In addition, Cassa di Compensazione e Garanzia signed an agreement with Clearnet to establish a central counterparty service for Italian government transactions on MTS Italy.

Eurex Clearing is going to expand its business to include OTC bonds and repos in the near future. In Spain, a new company, Meffclear, was created in 2003 for the purpose of clearing public debt transactions.

#### **INTEGRATION OF EUROPEAN POST-TRADING SYSTEMS AND REGULATORY INITIATIVES**

Even if European clearing and settlement systems consolidated on a national basis and reached significant progresses in their functionality, the rather limited process of integration developed at the EU level, and the consequent fragmentation of post-trading infrastructures, still represents an obstacle to cross-border transactions, due to their complexity and high costs.

In recent years the authorities and market participants have stepped up their efforts to establish principles, common methods and standards to promote competition, efficiency and security in the provision of post-trading services.

Two reports, known as the Giovannini reports were published in 2001 and in 2003, with the aim of identifying inefficiencies in EU clearing and settlement arrangements and devising a strategy to eliminate them. The first report identified 15 barriers as the sources of those inefficiencies, based on market practice/regulatory requirements, tax procedures and issues of legal certainty. The second report proposed a strategy for the removal of the 15 barriers, based on an appropriate sequencing of actions, a clear allocation of responsibility (between private sector agents and publish authorities) and realistic deadlines for each action (consistent with the deadline set for the full implementation of the FSAP). The report also analysed the possible integration models for EU clearing and settlement systems, showing that alternative structures could emerge in the consolidation process and that, at this stage, an ex-ante assessment of these structures does not allow preference to be given to a particular solution.

In 2003 another important contribution came from the Joint Working Group set up by the European System of Central Banks (ESCB) and the Committee of European Securities Regulators (CESR) which, on the basis of the G10-IOSCO recommendations, published a consultive paper in order to define common European standards for stability, efficiency, transparency and investor protection to guide supervisory authorities, CSDs, SSSs, central counterparties and other institutions that provide similar services.

The final report, titled "Standards for securities, clearing and settlement in the European Union" was approved by the Governing Council and the CESR in October 2004.

From a legal point of view, a significant step is represented by the Collateral Directive. The Directive aims to help to create a clear and uniform pan-EU legal framework for the use of collateral to limit credit risk in financial transactions, lowering credit losses and encouraging cross-border business.

**Table 4 Principal electronic systems for bonds used in Europe**

System/ Market name	Managing company	User country	Regulated market <sup>1)</sup>	Type of trading <sup>2)</sup>	Type of operations	System type <sup>3)</sup>	Daily average turnover in EUR millions (2003) <sup>4)</sup>
AIAF	Mercado de Renta Fija S.A.	Spain	Yes	Wholesale	Cash/Rep	D2D	8
AUTOBAHN	Deutsche Bank	Germany	No	Wholesale	Cash	D2C	N/A
BLOOMBERG	Bloomberg L.P.	EU	No	Wholesale/Retail		D2C	N/A
BOND VISION	MTS Group	EU	Yes	Wholesale	Cash	D2C	680
BUDAPEST STOCK EXCHANGE (MMTS)	Budapest Stock Exchange Ltd	Hungary	Yes	Retail	Cash	D2D	N/A
MTS-POLAND	MTS CETO SA	Poland	No	Wholesale/Retail	Cash/Rep	D2D	173
EBOS II	Bratislava Stock Exchange	Slovakia	Yes	Wholesale/Retail	Cash/Rep	D2D, D2C	107
ESTONIAN CSD	Hex Tallin Group	Estonia	Yes	Wholesale		D2D	N/A
E-SPEED	Cantor Fitzgerald	EU	No	Wholesale/Retail	Cash/Rep	D2D	N/A
EUREXBONDS	Deutsche Bourse A.G.	Germany	Yes	Wholesale	Cash/Rep	D2D	1,000
EUROMOT	Borsa Italiana Spa	Italy	Yes	Retail	Cash	D2D	15
EUROMTS	MTS Group	EU	No	Wholesale	Cash/Rep	D2D	2,400
EURONEXT LISBON	Euronext Group	Portugal	Yes	Retail	Cash	D2C	5
HDAT	Bank of Greece	Greece	Yes	Wholesale	Cash	D2D	2,725
ICAP/BROKERTEC	Icap	EU	No	Wholesale	Cash/Rep	D2D	N/A
INSTINET	Reuters	EU	No	Wholesale/Retail		D2D, D2C	N/A
MARKET AXESS	Market Axess	Ireland	No	Retail	Cash	D2C	N/A
MATS	Malta Stock Exchange	Malta	No	Retail	Cash	D2D	1
MOT	Borsa Italiana Spa	Italy	Yes	Retail	Cash	D2D	566
MTS AMSTERDAM	MTS Group	Netherlands	No	Wholesale	Cash	D2D	500
MTS ASSOCIATED MARKET	MTS Group	Belgium Denmark	No	Wholesale	Cash	D2D	593 500
MTS AUSTRIA	MTS Group	Austria	No	Wholesale	Cash	D2D	115
MTS FINLAND	Division of MTS	Finland	No	Wholesale	Cash	D2D	250
MTS FRANCE	MTS Group	France	No	Wholesale	Cash	D2D	N/A
MTS GREECE	MTS Group	Greece	No	Wholesale	Cash	D2D	220
MTS GERMANY	MTS Group	Germany	No	Wholesale	Cash	D2D	870
MTS IRELAND	MTS Group	Ireland	No	Wholesale	Cash	D2D	N/A
MTS ITALY	MTS Group	Italy	Yes	Wholesale	Cash/Repo	D2D	8,400
MTS PORTUGAL	MTS Group	Portugal	Yes	Wholesale	Cash	D2D	503
MTS SPAIN	MTS Group	Spain	No	Wholesale	Cash/Repo	D2D	724
SAM	Bourse de Louxemburg	Luxembourg	Yes	Retail		D2C	1.47
SAXESS	OMX Exchanges	Sweden	Yes	Wholesale	Cash	D2D	N/A
SENAF	Senaf S.A.	Spain	Yes	Wholesale	Cash/Repo	D2D	1,002
TLX	TLX S.P.A.	Italy	Yes	Wholesale/Retail	Cash	D2D	46
TRADE WEB	Thomson Financial	EU	No	Wholesale/Retail	Cash	D2C	N/A
TRADING SYSTEM OF THE RIGA STOCK EXCHANGE (AS400)	Riga Stock Exchange	Latvia	Yes	Retail	Cash	D2D	1

Sources: Bond Market Association; Bond study questionnaires; web sites.

1) As defined in the Investment Services Directive and Financial Markets Instruments Directive.

2) Wholesale/retail.

3) Dealer-to-dealer system (D2D)/dealer-to-customer system (D2C).

4) Cash operations only.

Moreover, in April 2004, the European Commission, taking into account the described reports and initiatives, adopted a Communication which set out, for the first time, overall Commission policy on this subject and presented possible courses of action to improve the cross-border post-trading environment. The Communication proposes the preparation of a framework directive on clearing and settlement by late 2005.

Another interesting development is the Hague Convention on the law applicable to certain rights in respect of securities held with an intermediary. This international treaty determines the exact jurisdiction of securities in custody. After the ratification of this treaty, the law of the country of the intermediary will apply, in line with the place of the relevant intermediary approach (PRIMA), and no longer the law of the country of the issuer or of the CSD or of the owner of the securities.

## 5 MARKET TRENDS

Various trends observable in the development of the euro bond market. This chapter focuses on innovative instruments and technologies taking centre stage in this process.

### 5.1 COVERED BOND MARKET

The European covered bond market has witnessed interesting developments in recent years. While the issuance of covered bonds declined until 2001, mainly due to the sharp reduction in the issuance of German Pfandbriefe, a recovery started as of 2001, bringing the absolute issuance volume back to the 1999 levels of nearly €250 billion in 2003. The total volume of covered bonds outstanding in the EU at the end of 2003 surpassed €1.5 trillion. However, apart from the rising volumes since 2001 as well as the continuous product innovations, the interesting feature in this market segment is the growing share of issuance from European countries other than Germany, whose covered bonds nonetheless still dominate the market. Not only are well-established covered bond markets showing increased issuance, but new markets have also been developed or are about to come into being. This is accompanied by the modernisation of existing covered bonds legislation in several countries, while other countries have adopted a covered bonds legislation, or will soon do so. These developments show the dynamism in the covered bond market in a pan-European context.

#### DEFINITION AND TYPES OF COVERED BONDS

Covered bonds are used by banks to refinance loans secured by mortgages or loans to the public sector. In this respect, covered bonds can be defined as full recourse debt instruments secured (covered) by collateral pools, namely mortgage assets and/or claims against public sector entities. From the issuer's point of view, the covered bonds form part of the liabilities of the institution. They are linked to a certain amount of cover assets, but normally not to a specific set of assets. In contrast to asset-backed and mortgage-backed securities, the

cover assets remain on the balance sheet of the originator (or, in a few cases, they are segregated through the transfer to a separate entity, for example in the form of a limited liability partnership). Covered bonds, therefore, constitute "on-balance-sheet securitisation". Since covered bonds are full recourse creditworthiness of the issuer. As a consequence, the rating of the issuer is a starting point for the rating to be attached to the covered bond. However, the range of different types of covered bonds is wide, and some types come close to resembling structured finance products as in some cases securitisation techniques are used in order to achieve greater de-linkage from the issuer/originator.

In general, a distinction can be made between the following three types of covered bonds. First, regular, or "plain vanilla" covered bonds, for which asset quality, cash flow adequacy and counterparty risk are determined by a legal framework. Second, structured covered bonds, which are structurally enhanced in order to further reduce credit risk and, by de-linking from the fundamental credit rating of the issuer, achieve a higher rating. This credit enhancement can, for example, consist in a higher than legally required over-collateralisation, i.e. the cover assets exceed the issued covered bonds. Finally, the third type of covered bonds might be called "replicated" covered bonds, meaning that the covered bond framework is determined by private law, as a legal framework for covered bonds does not exist in all countries.

#### THE EUROPEAN COVERED BOND MARKET

Issuance of covered bonds represents around 15% on average of the gross issuance of euro-denominated bonds, corresponding to around €220 billion per year on average since 2001. A rather substantial increase in issuance activity was observed in 2003. Overall, the amount outstanding of covered bonds was over €1,550 billion at the end of 2003. Covered bonds have been mainly issued with maturities between two and ten years. Around 80% of total issuance is fixed rate coupons. Around 65% of the covered

bonds are rated AAA. The share of non-rated bonds remains relatively high at 15%, due to the share of smaller-sized German Pfandbriefe.

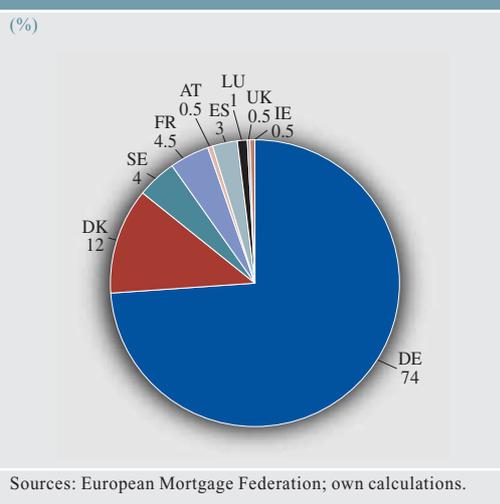
German Pfandbriefe account for by far the largest share of covered bonds, although the share has declined.<sup>27</sup> Since 1999, and in particular since 2001, the decline in issuance of German Pfandbriefe is, at least partly, offset by an increasing issuance of covered bonds in other European countries. These developments underline the dynamism in the covered bond market in a pan-European context.

Apart from Germany, the most noteworthy issuance of covered bonds – mainly related to the well-established mortgage markets in the respective countries – is found in Denmark and Sweden<sup>28</sup> and in France and Spain. There has also traditionally been a relatively sizeable issuance of covered bonds in Austria and Luxembourg. Finally, Ireland launched the issuance of covered bonds at the start of 2003 and the United Kingdom in July 2003. Whereas the other countries mentioned have a legal framework for covered bonds, issuance in the United Kingdom is carried out under a private legal structure based on UK common law and contract law, i.e. these covered bonds are an example of “replicated” covered bonds.<sup>29</sup> Developments with respect to a covered bond framework – either to enhance or introduce covered bonds legislation or to follow the example of the United Kingdom – are presently under way in Italy, Belgium, the Netherlands and Portugal.<sup>30</sup>

#### SUPPLY FACTORS: THE ISSUER SIDE

Covered bonds are a refinancing instrument used by credit institutions to fund their mortgage and/or public sector loans. Given the importance in terms of the size of its mortgage loan business in particular, a substantial part of the asset side of a bank’s balance sheet requires the best means of funding. In view of disintermediation trends, issuance of covered bonds via the capital market as a means of raising funds offers an alternative to retail

Chart 8 The European covered bond market



funds, i.e. deposits. Furthermore, covered bonds offer the possibility of extending the maturity profile of the liability side of a bank’s balance sheet. With mortgage loans generally having a long-term orientation, covered bonds enable the credit institution to better balance the maturity profile between the asset and liability sides of its balance sheet, which is also desirable from a more general financial stability point of view. In the effort to maximise returns on equity, another advantage offered by covered bonds is their lower funding costs compared to asset-backed securities. While the credit institution generally remains exposed to the credit risk, market risk, prepayment risk and

27 In this respect, implications might also arise from the abolition of the German Landesbank guarantee mechanisms as of July 2005.

28 It is noted that only part of the overall Danish and Swedish covered bonds issuance is denominated in euro.

29 The further development of the UK covered bond market will also be influenced by the final opinion of the UK Financial Services Authority, which signalled at the end of August 2004 that it might restrict covered bond issuance to 4% of a bank’s total assets.

30 Germany: Pfandbriefe (Hypotheken- and Öffentlicher Pfandbrief), Denmark: realkreditobligation, Greece: ktematekes omologies, Spain: cédulas hipotecarias/cédulas territoriales, France: obligation foncière, Ireland: covered bond, Italy: obbligazione fondiaria, Luxembourg: lettre de gage, Austria: Pfandbriefe (Hypotheken- and Öffentlicher Pfandbrief), Portugal: obrigações hipotecárias, Netherlands: pandbrief, Finland: hypoteekkilaina, Sweden: bostadsobligation, United Kingdom: covered bond.

other risks inherent in the underlying mortgage loans, covered bonds offer cheaper financing because the bonds are covered not only by the underlying mortgage (and public sector) loans, but also by the credit institution's reserves and other own funds. Lower funding costs are also related to the fact that covered bonds often enjoy a higher liquidity than asset-backed securities (in particular in the case of German Jumbo Pfandbriefe and, due to increasing issuance size, also in other countries). In general, as covered bonds so far only represent a fraction of the overall amount of mortgage loan and public sector financing, growth potential for covered bonds will prevail for some time to come.

#### DEMAND FACTORS: THE INVESTOR SIDE

From an investor's point of view, covered bonds are based, as a minimum, on the creditworthiness of the issuing credit institution. However, they involve the additional security of a claim on the underlying mortgage or public sector loan, as well as either a strict legal framework or contractually fixed credit enhancements. This makes covered bonds an attractive high-quality investment opportunity. Furthermore, investors seek alternative ways to invest their capital, which is also offered by covered bonds. More specifically, covered bonds present an additional instrument for asset class diversification and, in view of the issuance activity in several countries, also for geographical diversification (within and outside the euro area) of the investment portfolios of institutional investors. In a more general context, this is also fostered by the trend towards savings disintermediation, i.e. households' orientation towards capital market investments with horizons longer than traditional bank deposits, a development which is induced by, inter alia, both the demographics of an ageing population and the necessity to undertake private pension investments.

#### CURRENT DEVELOPMENTS

Apart from the mentioned numerous initiatives in several countries regarding covered bonds legislation or the creation of new covered bond markets two further aspects relevant for future development can be highlighted.

First, implications for the future development of the European covered bond market arise from the transposition of Basel II through the new Capital Adequacy Directive in the European context. At present, the only legislative reference to covered bonds is contained in Article 22 (4) of the Directive on undertakings for collective investment in transferable securities (the UCITS Directive). The Capital Adequacy Directive in turn makes reference to the relevant provisions contained in the UCITS Directive. Today, the existing Capital Adequacy Directive stipulates as a general rule that securities in accordance with Article 22 (4) of the UCITS Directive may be risk-weighted at 10% at the discretion of national supervisory authorities. The European Commission worked on the definition of covered bonds and the risk-weighting in the new Capital Adequacy Directive, both under the internal ratings-based approach as well as under the revised standardised approach. The outcome, also by comparison with asset-backed (and mortgage-backed) securities, will influence the future development of the European covered bond market.<sup>31</sup>

Second, issuance activity in many European countries, which is accompanied, as recalled above, by numerous initiatives regarding covered bonds frameworks (legislation or private structures), might also present investors with a certain difficulty. Due to the fact that there is no harmonised pan-European covered bond framework, investors need to keep themselves informed about the various issuance

<sup>31</sup> The draft new Capital Adequacy Directive was released on 14 July 2004. The EU Commission would like to introduce privileged treatments for covered bonds. The implementation date for the proposed Directive is foreseen for end 2006, with a transition period by 2007.

structures, which might also require knowledge of local features. In this respect, an initiative of the European Mortgage Federation can be mentioned. The European Mortgage Federation (which at present represents around 70% of the market capitalisation of European covered bonds) announced on 1 July 2004 the creation of a “European Covered Bond Council”, i.e. a European platform for covered bonds that should bring together covered bond issuers, credit analysts, investment bankers, rating agencies and other interested market participants. This Council, officially to be launched in November 2004, will focus on the developments shaping the economic and regulatory environment of covered bonds at the EU level.

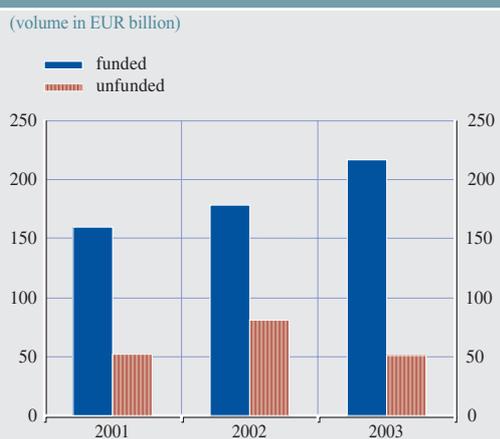
## 5.2 SECURITISATION MARKET

Off-balance-sheet term securitisation did not take off in Europe until the late 1990s. It has seen impressive growth rates since then and has now become an established asset class in the European fixed income market (see Chart 9). According to Moody's,<sup>32</sup> total (funded and unfunded) issuance volumes rose to €268 billion in 2003 and expectations are that securitisation issuance will continue to grow and even outstrip corporate bond issuance in 2004.

### KEY ASSET CLASSES AND INSTRUMENT CHARACTERISTICS

The goal of off-balance-sheet securitisation is to ensure that the credit quality of an asset-backed security (ABS) is based solely on the quality of the assets and the credit enhancement backing the obligation, without any regard to the originator's own creditworthiness. For this purpose, the originator or owner of the financial assets transfers those assets to a bankruptcy-remote special purpose vehicle (SPV). A difference is made between cash structures, whereby the net proceeds from the notes issued by the SPV are used to purchase the pool of assets<sup>33</sup>, and synthetic structures, that used

Chart 9 European term securitisation



Source: Moody's.

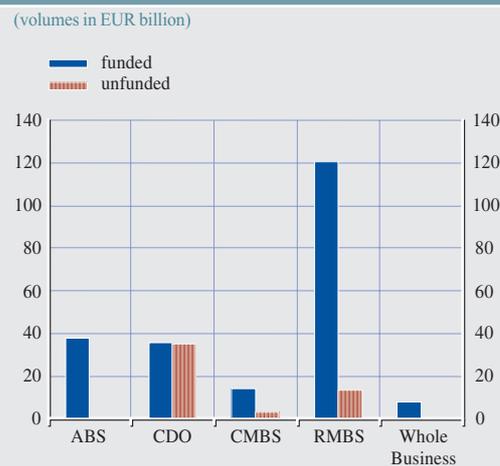
credit risk derivatives to achieve the credit risk transfer from the risk shedder to an SPV. Synthetic structures can be both “funded” through the issuance of credit-linked notes, whereby the risk taker has to provide upfront funding in the transaction, or “unfunded” if they rely on credit default swaps. In the latter case funding is provided by the risk taker only upon occurrence of a credit event. In Europe the de-linkage of the credit risk of financial assets from that of the originator has been an effective way to bring the demand for and the supply of highly rated capital market instruments together. Around 80% of all European securitisation issuance has been rated AAA.

<sup>32</sup> Issuance data includes rated true-sale transactions as well as fully and partially funded synthetic transactions of assets domiciled in Europe and issued by European originators. In the case of the latter, only *rated* super senior swaps or credit default swaps are included. Since the statistical framework for off-balance-sheet securitisation has not yet been established and the market is very much a rated market, rating agencies have so far been the main data source. Moody's has the broadest data coverage among the rating agencies since it includes not only publicly rated transactions in its issuance volumes, but also private placements rated by Moody's. However, since unrated synthetic structures are not captured by the data, volumes underestimate the actual credit risk transfer that has taken place via securitisation structures.

<sup>33</sup> This needs to be conducted in a manner that results in a “true sale”, i.e. removing the assets from the bankruptcy or insolvency estate of the originator.

In terms of asset classes, the residential mortgage-backed securities (RMBS) market is the most established and dynamic market segment, accounting, at €133.5 billion, for around 50 % of the overall European securitisation market in 2003 (see Chart 10). There is a trend towards a bigger issuance size, fungible issues and multi-currency deals in order to meet foreign investor demand, and secondary market liquidity has started to improve. Those trends are most pronounced in the United Kingdom and the Netherlands but have started to surface also in other European RMBS markets, in particular in Spain and Italy. With the exception of Germany, true-sale transactions dominate in Europe. The second biggest asset class is collateralised debt obligations (CDOs) with issuance volumes of €70.9 billion in 2003. The European CDO market is essentially synthetic (92% synthetic issuance in 2003 according to Moody's). The market started off with balance sheet CDOs, driven by regulatory capital arbitrage, but today synthetic arbitrage CDOs outpace balance sheet CDOs. In terms of issuers, the CDO market has been dominated by large, internationally active banks. One of the main attributes of the European CDO market has been its rapid ability to innovate. Recent developments include the shift towards single-tranche CDOs, a continuous expansion of CDO collateral types and the development of credit indices that permit highly standardised trades. Non-mortgage based ABSs form the third biggest asset class (€37.9 billion issuance volume in 2003). Consumer assets are the main underlying asset class (46%), driven by multiple issuance from UK credit card master trusts. Public asset transactions rank second, dominated by transactions of the Italian Treasury, which has been the most active European government user of securitisation techniques. Other asset classes include commercial mortgage-backed securities (CMBSs) and more exotic asset classes such as inventories, future cash flows or whole-business securities (WBS), non-performing loans, private equity and project finance, which are mainly a feature of the UK market.

**Chart 10 European term securitisation volumes by asset type in 2003**



Source: Moody's.

Typically, “pass-through” structures are used for assets such as mortgage loans, consumer loans and trade receivables, whereby periodic payments are passed through to the investor. As a consequence of the early amortisation features in those deals, prepayment risk can be substantial. In recent years, a growing number of ABSs in Europe have been offered with floating, rather than fixed, rates of interest.

#### LARGE CROSS-COUNTRY DIFFERENCES

With respect to the degree of development of the securitisation market there are still large differences between European countries. One explanatory factor is that legal, regulatory, tax and accounting rules applicable to securitisation transactions differ widely between various European jurisdictions. In certain common law jurisdictions, such as the United Kingdom, different types of securitisation structures have been able to evolve without legislative interventions. In some other jurisdictions characterised by civil legal codes (France, Spain, Italy, Portugal), specific laws had to be adopted to allow the securitisation market to develop. In jurisdictions such as Germany, legal and tax arrangements have long prevented the evolution of true-sale securitisation, and transactions have been predominantly

structured synthetically to circumvent those arrangements. In some countries (Greece, Luxembourg), specific securitisation laws have been introduced only recently, while in other countries (Finland and the central European countries) there is still a lack of a domestic securitisation law. However, the examples of Belgium and Sweden show that a favourable legal and tax framework alone is not sufficient to foster the development of the domestic securitisation market.

In addition, the driving forces behind securitisation may vary widely. So far issuers in Europe have mainly been banks, with corporates accounting only for a small percentage of overall securitisation activity. Securitisation undertaken by banks can be motivated by the desire to free up regulatory or economic capital, to reduce the cost of funding, to improve the risk management of the balance sheet by reducing the exposure to a specific sector or class of debtors, to achieve greater diversification in asset sources or to tap into new investor groups, and to create tradable securities that could serve as acceptable collateral in the credit operations of the Eurosystem.<sup>34</sup>

For example, the relative lack of securitisation issuance volumes in some continental Europe countries may be explained by the fact that banks in those countries enjoy a more comfortable funding position. In countries with an established tradition of covered bond structures (such as Germany and Denmark), covered bonds have served as an efficient and relatively cheap funding mechanism for mortgage banks in residential mortgage markets. In Germany, in particular, the driver for securitisation has therefore been regulatory capital relief and not reduced funding costs. In other countries, such as Belgium and Sweden, the retail deposit base has remained strong, reducing the pressure on banks to diversify funding channels. Moreover, in Belgium, the above-average credit rating of the larger Belgian banks enables easy access to the capital market.

Moreover, the existence of large commercial and mortgage banks has so far been a necessary prerequisite for the securitisation market to develop. Only large banks reach the critical issuance size which justifies the high structuring costs of securitisation transactions on a stand-alone basis. The lack of critical mass is an important hindrance to the securitisation market in smaller countries such as Belgium and Sweden, as well as in central European countries. Smaller banks would have to pool their portfolios to achieve enough critical mass. The Spanish regional savings banks have taken this route. Since 1999, several Spanish domestic multi-seller deals have come on to the market. However, with the exception of Spain, multi-originator transactions have been rare in the European securitisation market.

Overall, the securitisation market remains highly fragmented in Europe. Only synthetic arbitrage CDO transactions have moved away from single-jurisdiction deals towards transaction-backed multinational portfolios, and there are number of synthetic pan-European CMBS deals (20% of the CMBS sector in 2003).

#### FACTORS SHAPING THE FUTURE

On the supply side, growth prospects are mixed. On the one hand, securitisation has not yet achieved its full potential in a number of countries. For example, true-sale securitisation is still underdeveloped in Germany. The funding needs of German banks have become more pressing over the past two years, however, and interest is growing in tapping alternative funding sources via true-sale securitisation. In order to improve the conditions for true-sale transactions in Germany, the True Sale Initiative (TSI) was launched in June 2003 by thirteen German banks under the lead-management of KfW Bankengruppe. The bundled lobbying power of the TSI achieved exemption for German

<sup>34</sup> In the Netherlands a few sizeable programmes were launched in 2002 and 2003 for this purpose.

resident SPVs from trade tax on bank receivables. However, the original ambitions of the initiative to set up a multi-seller platform that would buy and pool bank loans and issue highly liquid, standardised securities have been scaled down. It remains to be seen how many deals the TSI securitisation infrastructure will attract. Nonetheless, expectations are that German banks will increasingly tap the true-sale securitisation market in one way or another. At the same time a number of countries (Italy, the Netherlands, Spain, France, the United Kingdom) are expected to make a foray into the synthetic market, following in the footsteps of Germany. In addition, more governments seem to be becoming interested in using off-balance-sheet securitisation as a funding tool. The Portuguese government recently launched a sizeable public asset securitisation. Moreover, eastern European markets may supplement the issuance by traditional markets, even though they still have a long way to go.

On the other hand, the treatment of ABSs under Basel II and International Financial Reporting Standards (IFRS) accounting rules may reduce the attraction of off-balance-sheet securitisation to issuers, since they remove the incentives to use them for regulatory or economic capital management purposes. The RMBS market may be particularly affected if securitisation becomes predominantly a funding vehicle because, as a funding tool, RMBS will have to face the competition of (structured) covered bond markets.

The demand side has seen a continuous broadening of the investor base. According to Merrill Lynch, it includes not only hedge funds and arbitrage-driven ABS CDO managers, but also a far broader array of institutional investors such as pension funds, insurance firms and of traditional bank investors. However, it remains to be seen whether the increased demand represents a structural shift, with investors deciding to move a portion of their overall portfolio permanently into the ABS market, or whether it has been driven mainly by

a search for yield, following the tightening in the corporate bond markets. The real test of how committed investors are to the securitisation market will come when credit markets start to soften and spreads start to widen again.

All-in-all, off-balance-sheet securitisation is likely to continue to grow. However, it remains to be seen whether explosive growth rates seen over recent years can be maintained.

### 5.3 CORPORATE AND HIGH-YIELD BOND MARKET

Since mid 2003 European corporate bond spreads have come down to exceptionally low levels. In the high-yield bond segment (characterised by high risk), spreads were at their all-time lows in April 2004. They haven't recovered much since then. It stands to reason that the global low interest rate environment may have promoted this trend. Yield-seeking behaviour may have led investors to pursue riskier investment strategies. One might therefore ask how bond spreads could be expected to react to a potential turnaround in interest rates, which has already started at the short end of the yield spectrum in the US and Great Britain. The determinants of the movement of spreads need to be studied before this question can be answered with any measure of reliability.

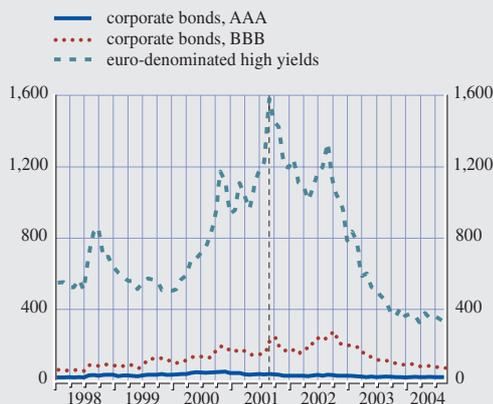
#### MARKET SITUATION

For quite some time both absolute and relative<sup>35</sup> corporate bond spreads have been falling sharply in the euro area. This movement has been particularly evident in the area of speculative bonds. As of 30 September 2004, euro area high-yield bond spreads, at 326 bp, were only around one fifth of their September 2001 peak (1,578 bp). The investment grade segment saw a trend reversal in October 2002 across maturities. At the end of September 2004, instruments with a residual maturity

<sup>35</sup> The relative corporate bond spread is the ratio between the spread and the government bond yield.

**Chart 11 Spreads on corporate bonds in euro area by bond grade**

(end-month data)



Source: Merrill Lynch.

**Chart 12 Spreads on investment-grade corporate bonds in the euro area by maturity**

(end-month data)



Source: Merrill Lynch.

of one to five years, at an average of 41 bp, were at around 29% of their October 2002 levels (141 bp).

When assessing the development of corporate bond spreads and their possible impact on financial markets and the real economy, it needs to be borne in mind that in the euro area bank-based financing is still the dominant source of corporate finance. In the near future it will probably continue to be the most important source of external financing in many European countries.

One possible reason for this is that the issuance of bonds is primarily viable for companies with larger financing needs, whereas economic structures in many European countries are dominated by small and medium-sized enterprises. Some euro area countries – like France – nevertheless have a long tradition of corporate financing via the bond market. In September 2003 the outstanding amount of corporate bonds as a percentage of GDP in France amounted to 23%. This figure is almost on par with the USA's corporate bonds, which total 26% of GDP.<sup>36</sup> In contrast, the amount of corporate bonds outstanding in Germany was around 7% of GDP at the end of that year. The

high-yield segment that – due to its highly volatile movements – is particularly preferred by market watchers amounted to only 6% of the European corporate bond market at the end of 2003.

Most countries did not witness the development of a broad corporate bond market until the euro was introduced. Growth rates in these countries, however, were impressive. In Italy corporate bond markets grew by more than 1,100% between 1998 and the third quarter of 2003. In Germany markets grew by more than 600% in the same period. In the United States market growth was only 22%.<sup>37</sup> These dynamics have probably been propelled by the introduction of the euro, catalysing the integration of the euro area financial markets. Increased financing needs, caused by the technology boom and corporate restructuring, and the increasing importance of institutional investors on the demand side of the corporate bond market further triggered the remarkable rates of growth. Not least, European bond markets have benefited from the fact that

<sup>36</sup> Deutsche Bundesbank, "Recent developments in the corporate bond market", Monthly Report, April 2004.

<sup>37</sup> Deutsche Bundesbank, "Recent developments in the corporate bond market", Monthly Report, April 2004.

**Table 5 Loans and market capitalisation of bonds in the euro area in % of GDP**

(annual averages)	1999	2000	2003
Bonds issued by non-financial corporations	4.3	5.3	7.0
Of which high yields			6.0
Loans by domestic banks to non-financial corporations	39.5	41.6	41.9
Central government bonds	52.3	51.3	52.4

Sources: ECB, Bloomberg, Merrill Lynch, Deutsche Bundesbank.

corporate bonds had already proved successful in the United States, which in this regard can be considered a pioneer country.

#### QUANTITATIVE MODELLING OF BOND SPREAD DYNAMICS

The detailed results of the quantitative modelling of bond spread behaviour are posted in the annex A.<sup>38</sup> Observation of the spreads of BBB-rated bonds with seven to ten years to maturity<sup>39</sup> yields the following findings<sup>40</sup> for the period between June 1999 and December 2003:

- Within the longer-term equilibrium relationship, changes in the three-month money market rate cause spreads to move in the same direction, along the lines of macroeconomic portfolio modelling.<sup>41</sup> Portfolio theory<sup>42</sup> suggests that lower levels of feasible portfolio returns (given a certain amount of risk) tend to be accompanied by shifts to riskier portfolio investments. The currently very low interest rate levels are giving market participants an incentive to shift their assets to relatively risky but more lucrative assets in order to yield optimal risk-return patterns. Such a demand shift results in an increase in the prices of comparatively risky assets and in diminished yield spreads.
- Corporate spreads are driven by a rise in the corporate sector debt to earnings ratio (dte-ratio), which serves as an indicator for the supportability of indebtedness and solvency of the companies in the market. In line with option price theory<sup>43</sup>, yield spreads, taken as

risk premia, rise with the probability of the lender default.

- Accelerating GDP growth increases the spreads of BBB-rated corporate bonds in the short term. Increasing economic growth boosts expected yields on investments in the stock market and expected back payments – due to reduced probability of default – in the highly speculative high-yield corporate bond segment. This in turn leads to a shift away from BBB investment-grade bonds.
- An increase in relative gross issues of corporate bonds tends to reduce the corporate spread. This unexpected result can be explained by the increase in market liquidity resulting from increased bond issuance

38 Allowing for potential endogeneity of several variables as well as for potential non-stationarity of time series, a vector error correction model is created. The modelling closely follows that in G. DeBond, “Euro area corporate debt securities market: first empirical evidence”, Working Paper No 164, European Central Bank, August 2002.

39 The spreads of corporate bonds against government bonds were approximated by data from the Merrill Lynch Global Index System, adjusted for the 10-year swap spread. BBB-rated bonds are at the lower end of investment-grade bonds. Their primary attraction lies in having greater liquidity than speculative grade bonds. In addition, their volumes developed more consistently during the observation period than those of the other rating segments.

40 For the estimate of the spread, the model has a goodness-of-fit of 58%. The adjusted R2 is 40%.

41 J. Tobin and W. C. Brainard, “Pitfalls in Financial Model Building”, American Economic Review, Vol 58, No 2, May 1968, pp 99-122.

42 H. Markowitz, “Portfolio Selection”, Journal of Finance, Vol 7, No 1, 1952, pp 77-91.

43 R. C. Merton, “An Intertemporal Capital Asset Pricing Model”, Econometrica, Vol 41, No 5, September 1973, pp 867-887. For a modified version of the Merton model see F. A. Longstaff and E. Schwartz, “A Simple Approach to Valuing Risky Fixed and Floating Rate Debt”, Journal of Finance, Vol. 50, 1995, pp 789-821.

and leading to increased attractiveness of investment in corporate bonds. The current broadening and deepening of the European corporate bond market is expected to continue in the future. This gives reason to believe that its dampening impact on spread movements will continue unabated.

Supplementary estimates across segments and maturities show that in a pronounced high interest rate environment investors are willing to add BBB-rated corporates to their portfolios only if they receive much higher spreads than on AAA-rated corporates or financial corporates. Greater volatility of short-term interest rates thus tends to have a greater impact on spreads for BBB-rated corporate bonds than on those for AAA-rated corporate bonds.

#### POSSIBLE IMPLICATIONS

The rapid growth and considerable rise in the liquidity of the corporate bond market are becoming more important for monetary policy makers for several reasons:

- Corporate spreads are increasingly becoming a qualified information variable for monetary policy, thanks to rapid and precise data availability combined with high information content. Empirical studies show that spread movements and the term structure of corporate bonds may complement the term structure of government bonds in terms of informational content.<sup>44</sup> Given the tendency for external corporate financing to be increasingly oriented towards the capital market, this market segment, in monetary policy terms, will come under yet more intense scrutiny in the future.
- A maturing corporate bond market, as an increasingly feasible way of financing, adds to the diversification of corporate financing, possibly leading to an optimisation of capital allocation. In particular, it could help, for example, to cushion the effects of potential shocks in the banking sector.<sup>45</sup> A stable financial market environment with low transaction costs and low interest rate

volatility – with regard to the sensitivity of spreads – will have a decisive influence on movements in the European bond market as an additional, stable financing channel.

- It is advisable to keep a close eye on the corporate bond market with regard to financial market stability. Capital flows tend to be more volatile in bond markets than they are in bank-based financing. However, the correlation between the two is low.<sup>46</sup>
- Econometric modelling of bond spread behaviour suggests that spread movements are positively correlated with the interest rate level. They therefore work as an amplifier in the monetary transmission process. Interest rate rises exert an additional restrictive impact through corporate bond spreads. The consequence might be that interest rates rising sharply from today's very low levels will also lead to a considerable increase in spread premia.

#### 5.4 CREDIT DERIVATIVES MARKET

The market for credit derivatives has expanded rapidly in recent years, and credit derivatives are on the way to becoming one of the most successful financial innovations in recent history. This chapter covers the development of the global and European credit derivatives market, highlighting the integration of credit markets in

<sup>44</sup> See, for example, B. Bernanke, "On the Predictive Power of Interest Rates and Interest Rate Spreads", NBER, Working Paper No 3486, 1990.

<sup>45</sup> See E. P. Davies, "Multiple avenues of intermediation, corporate finance and financial stability", IMF, Working Paper, 01/115, 2001. It should be noted at this juncture, however, that a scenario with greater difficulty of access to the capital market owing to a recession is probably more likely than that of crisis situations relating to bank-oriented raising of external capital. On this subject, see P. Artus, "Rating, cycle économique, cycle financier", CDC IXIS Flash 2001-221, Banque de France, 2001, "Le cycle financier facteurs amplificateurs et réponses envisageables par les autorités monétaires et financières", Bulletin de la Banque de France, No 96, November 2001, pp 41-65, and H. Hesse and H.-H. Kotz, "Financial Cycles, Real Cycles and Monetary Policy", R. Pethig and M. Rauscher, "Challenges to the World Economy", Festschrift for Horst Siebert, Berlin, 2003.

<sup>46</sup> Deutsche Bundesbank, "Zur Regulierung der europäischen Wertpapiermärkte", Monthly Report, July 2004.

Europe. Particular attention is paid to credit default swaps (CDSs), which are the most important instrument among credit derivatives. CDSs are used for various purposes, such as trading and market making, hedging and management of credit risks related to regulatory and economic capital. The recent development of CDS indices will further enhance transparency and liquidity in the market.

### CHARACTERISTICS OF CREDIT DERIVATIVES

With credit derivatives, credit risk can be unbundled from other risks embedded in a financial instrument, thus allowing the separation of credit risk from the underlying credit relationship. This allows the transfer of risk to other sectors that lack direct origination capabilities. Credit derivatives are typically traded over the counter, taking into account the specific needs of both counterparties in the contract. Credit derivatives comprise a variety of instruments, such as CDSs, total return swaps, which encompass all the economic risks involved in a credit transaction, and credit spread options.

CDSs are credit protection contracts in which the buyer of protection can insure himself for a specific period against the likelihood that a given issuer will default by paying a periodic premium to the protection seller during the contract period or until the occurrence of a credit event. The seller of protection agrees that, in the case of a defined credit event, he will make a contingent payment amounting to the difference between the par value of the underlying asset and its market value after default. A CDS transaction does not generally entail a direct contractual relationship with the reference entity. A specific reference asset is only strictly required in the case of a cash settlement. In the case of a physical settlement the buyer of protection typically has a “cheapest to delivery” option allowing the market to provide important mitigation of the squeeze risk, which is still relatively high in the repo market for cash instruments.

In addition to merely separating off credit risk, credit derivatives make it possible to combine

credit risk exposure in new ways; for example, CDSs provide the basis for more complex structured credit products. Synthetic collateralised debt obligations (CDOs) can be formed by a portfolio of single CDS contracts. Such securitised instruments have rapidly gained in popularity. The smooth transition between securitised products and credit derivatives is symbolised by hybrid products, most notably credit-linked notes (CLNs). With CLNs the principal debt will be repaid only if the defined credit event does not occur.

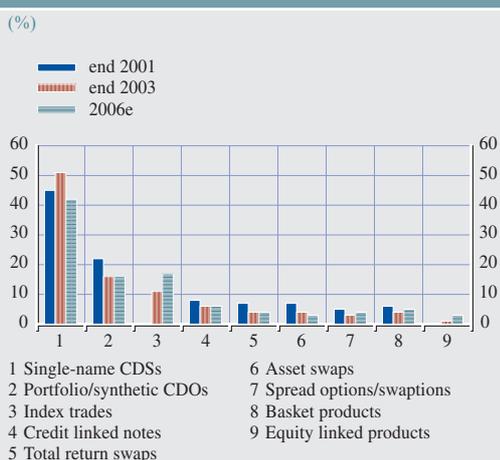
### STRUCTURE OF THE CREDIT DERIVATIVES MARKET

The British Bankers' Association (BBA) estimates that the credit derivatives market grew worldwide from a total notional amount of USD 180 billion in 1997 to USD 2 trillion at the end of 2002. According to the recently published BBA Credit Derivatives Report 2003/2004, the notional amount is estimated to USD 3.5 trillion by the end of 2003 and is expected to rise to USD 5.0 trillion by the end of 2004. The BBA report reveals that single-name CDSs make up roughly 51% of the overall credit derivatives market. This share is expected to decline until 2006 in favour of an increasing use of CDS indices, which are a very recent phenomenon in the market. The largest share of credit derivatives is written on corporate assets, which has partly arisen from the increase in synthetic securitisation. These figures are in line with other studies assessing global credit derivatives markets.<sup>47</sup>

<sup>47</sup> According to the recent market survey by the International Swaps and Derivatives Association (ISDA), the global notional amounts of CDSs outstanding actually grew from USD 2.2 trillion at the end of 2002 to USD 3.6 trillion at the end of 2003 (see ISDA Market Survey, 2004). A Standard & Poor's study put the value of the CDS market at USD 3 trillion at the end of the first quarter of 2003 (see *Demystifying Banks' Use of Credit Derivatives*, Standard & Poor's, December 2003).

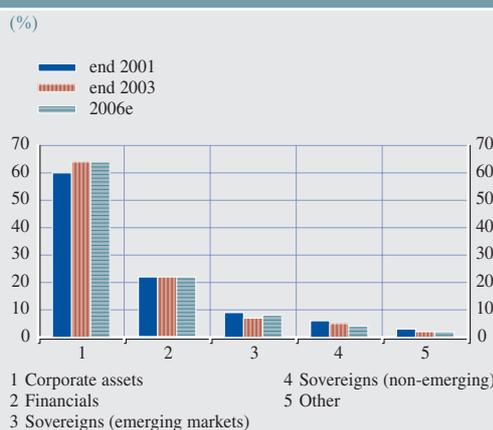
The rating agency Fitch has conducted a credit derivatives survey of around 200 financial institutions active mainly as protection sellers (see *Global Credit Derivatives: A Qualified Success*, Fitch Ratings, September 2003). The survey showed that these entities sold USD 1.7 trillion worth of protection, of which about one-third originated in Europe. On balance, about two-thirds of European banks were net sellers of protection. In particular, Germany's Landesbanks and a number of banks in the Benelux countries were active as protection sellers, taking risks from larger, global banks based mainly in the USA.

Chart 13 Global distribution of instruments



Source: BBA Credit Derivatives Report 2003/2004.

Chart 14 Underlying reference entities



Source: BBA Credit Derivatives Report 2003/2004.

The growing popularity of credit derivatives stems from the increasing importance of risk management for financial institutions. Most of the large global investment banks and securities houses trade for their own account to buy protection for their credit portfolios or against counterparty risk arising in other OTC derivatives transactions (related to interest rate swaps, for instance). In addition, financial institutions can reduce credit concentration and regulatory capital without affecting the underlying credit relationships by purchasing credit protection. As active market participants, banks also provide their customers with market liquidity.

Protection sellers may have various objectives of which the most prominent are making profit on the credit derivative's premia and diversification of credit risks (i.e. taking risks which are still not well represented in a portfolio). Market participants are increasingly adopting portfolio theory considerations in their investment decisions focusing on risk/return profiles. Historically low yields have also boosted the search for more attractive investments. Credit derivatives provide the opportunity to invest in higher yield segments associated with sufficient liquidity by selling credit protection. Globally, the insurance sector

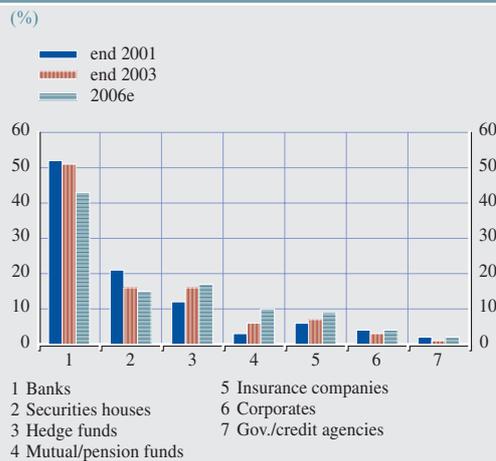
is a net risk taker. Insurance companies can sell protection on the assets side through investment in securities such as CDO or CLN and on the liabilities side by entering into single name or portfolio CDSs.

With respect to European markets, the activities of EU banks in risk transfer were assessed by the Banking Supervision Committee (BSC) of the ESCB.<sup>48</sup> The BSC survey, which covers over 100 banks, revealed that in 2002 and 2003 the credit risk transfer markets continued to perform quite well with regard to market size, liquidity and innovation. Regarding net positions there is a regionally mixed picture. Whereas Belgian, Spanish, French, Italian, Dutch, Portuguese, Swedish and medium-sized Irish banks are mainly net buyers of protection, banks from Denmark, Greece, Luxembourg, some Austrian banks, smaller regional German banks and large Irish banks were found to be net protection sellers.<sup>49</sup>

48 See European Central Bank, "Credit risk transfer by EU banks: Activities, risks and risk management", May 2004.

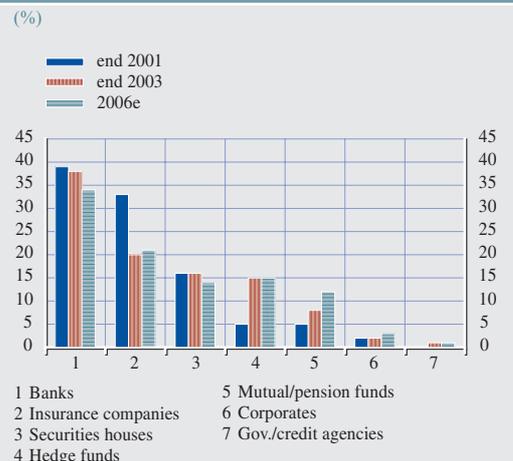
49 Some Member States also published surveys on their national markets. According to these reports, the surveyed banks in Germany and France account for €397 billion in risk taking (selling protection) and €393 billion in risk shedding (purchasing protection).

**Chart 15 Buyers of credit protection**



Source: BBA Credit Derivatives Report 2003/2004.

**Chart 16 Sellers of credit protection**



Source: BBA Credit Derivatives Report 2003/2004.

The aforementioned studies show that the bulk of transactions are cross-border deals taking place predominantly within the global banking system, with large US banks as the most important counterparties. The vast majority of reference obligations are rated A or better and CDSs account for the largest share of trades. However, the information available from private and public data sources is still not adequate to evaluate the redistribution of credit risk and the resulting risk concentration.

### MARKET EFFICIENCY AND TRANSPARENCY

It is essential for the further development of this segment that credit derivatives markets function smoothly. However, market imperfection could be the result of a number of different factors.

One potential drawback might be the fact that protection buyers, when they are also the originators of credit, have inside information about the risk they transfer and therefore a potentially unfair advantage. In addition, the possibility of easily shedding credit risks via credit derivatives might lower the risk aversion of banks, potentially increasing their willingness to invest in riskier business also associated with a more expansive credit policy.

Transparency with respect to the content and risks of credit derivatives contracts is crucial to avoiding adverse selection problems.

With regard to a review of CDS markets, transparency was promoted by the introduction of CDS indices constructed from CDS portfolios consisting of diverse single name CDSs. The most frequently traded index families were Dow Jones TRAC-X and iBoxx, which are composed of numerous regional and sectoral sub-indices. In mid-2004 the two competing sets of indices were merged into Dow Jones iTraxx indices. The new indices bring together 20 market makers and they are transparent, rule-based and administered by a jointly owned private company, IIC. The improvements in standardisation, transparency and the increase in market size recently persuaded derivatives exchanges to give up their reservations against the introduction of futures on credit derivatives. It may be presumed that at the end of 2004 futures on iTraxx CDS indices will be tradable on the big futures exchanges around the world. In addition, institutional investors which, owing to investment restrictions, are not trading in credit derivatives at present might be attracted by greater transparency and the regulatory environment of an exchange.

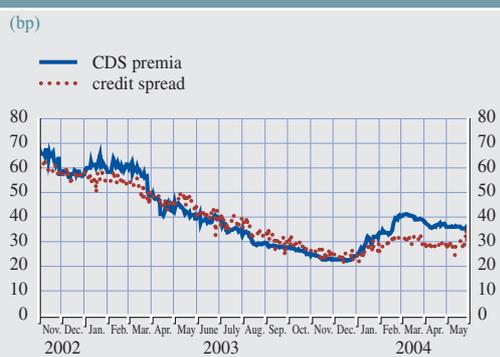
In order to promote the evolution of a standardised market, the International Swaps and Derivatives Association (ISDA) released its Credit Derivatives Definitions in 1999 (last amended in 2003). The majority of credit derivatives are documented according to ISDA definitions. The fast-growing volumes and the efforts to standardise contractual terms helped the credit derivatives market to outperform parts of the corporate bond market with respect to liquidity. Furthermore, credit derivatives markets are characterised by relatively low transaction costs. These qualities positively affect price discovery capabilities, which is an important function of secondary markets. Moreover, integration of credit markets contributes to the promotion of the price discovery process by facilitating the adjustment of prices in different markets to new information.

The following paragraphs look at CDSs and bond markets in the context of existing inter-relationships and their price discovery capabilities.

### RELATIONSHIP BETWEEN CDS AND BOND MARKETS

Due to arbitrage relationships, credit spreads and CDS prices should be closely linked. However, various features of bonds and CDS run counter to the arbitrage assumptions. For instance, various bonds include options, which make them callable, puttable, convertible, subordinated or structured. Moreover, taxation and liquidity restraints may distort arbitrage relationships. Small issues and implied options often hamper adequate pricing of corporate bonds and the possibilities of borrowing and short-selling those bonds are limited. As a result, temporary or non-generic factors affect corporate bond prices. Some of these shortcomings can be overcome through credit derivatives, and the shortening of positions becomes quite easy when buying protection through CDSs. However, there is also a counterparty default risk associated with CDSs, and physically settled CDSs contain a cheapest-to-delivery option which allows the protection seller to choose between the delivery of a number of different bonds in the event of a default. Thus,

Chart 17 CDS premia and credit spreads for Vattenfall



Source: Bloomberg.

the yield spread between a risky bond and a risk-free security and CDS spreads cannot always be fully attributed to credit risk and do not necessarily coincide.

Chart 17 illustrates the relationship between CDS and bond spreads for Vattenfall, the Swedish utility. At a first glance the two time series are closely linked, although the CDSs seem to show a higher volatility.<sup>50</sup> This is a pattern also observed for many other companies.

### EMPIRICAL EVIDENCE

An empirical analysis will shed more light on the degree of integration and price-setting behaviour of both markets. Hasbrouck (1995) and Gonzalo and Granger (1995) have empirically analysed price discovery processes by means of common factor models using the vector error correction approach.<sup>51</sup> Blanco et al (2004) applied these models to the CDS and corporate bond markets.<sup>52</sup>

50 The standard deviation of CDS spreads (13.15) is slightly higher than for credit spreads (12.65).

51 See J. Hasbrouck, "One Security, Many Markets: Determining the Contribution to Price Discovery", *Journal of Finance*, Vol 50, 1995, pp 175-199; and J. Gonzalo and C. W. J. Granger, "Estimation of common long-memory components in cointegrated systems", *Journal of Business and Economic Statistics*, Vol. 13, 1995, pp 27-35.

52 See R. Blanco, S. Brennan and I. W. Marsh, "An empirical analysis of the dynamic relationship between investment-grade bonds and credit default swaps", Bank of England, Working Paper No 211, 2004.

The basic idea behind these approaches is that price movements are responses to new information. Price discovery means the very first response to new information and implies that the market, which is leading in price discovery, is moving first as new information are revealed. Thus, the leading market is setting a new price (in this case, a new risk premia) deviating from the price equilibrium that exists between both markets before the new information came up. The second market is following the leading market, moving to the new price with a time lag and a new price equilibrium between both markets is established.

The results of an empirical analysis presented in Appendix B are in line with the findings of Blanco et al (2004) suggesting that the CDS market dominates the price discovery process in a large segment of corporate credit markets, although the bond market is not insignificant in this respect.

These discrepancies in price discovery might be caused by different information inflows introduced by different market participants with different incentives in both markets.

## CONCLUSION

The remarkable development of credit derivatives markets in Europe and the ongoing integration of European credit markets contribute to the evolution of liquid markets facilitating the efficient pricing and trading of credit risks. The majority of credit derivative transactions are cross-border deals taking place predominantly within the global banking system. Recent innovations will further improve the potential for growth in the credit derivatives market. In this context, the new iTraxx indices and the intended launch of futures on these indices will offer investors diversification and accessing exposure to market direction with a single liquid transaction.

CDSs, which also provide the basis for more complex structured instruments, fulfil an important function in secondary credit markets with respect to price discovery and risk allocation. The possibility of transferring credit risk in liquid markets and an efficient price setting process facilitates the efficient allocation of credit risk.

## 5.5 INFLATION-PROTECTED FINANCIAL INSTRUMENTS

Inflation-linked bonds is a small but growing segment of the euro bond market. Most of the EU national treasuries which have already issued some inflation-linked bonds are tending to increase their issuance (United Kingdom, Sweden, France, Italy and Greece), whereas the German Treasury is expected to start to issue in 2005. In parallel, the market for inflation-linked derivatives has picked up over the past three years, expanding the hedging and trading opportunities of inflation risk.

### THE GROWING MARKET FOR INFLATION-LINKED BONDS

An inflation-linked bond (ILB) is a bond whose coupons and principal are linked to a consumer price index. For ILBs issued within the euro area the linking index is the HICP excluding tobacco or, in the case of one of the two French ILBs (OATi), the French CPI index excluding tobacco. The coupons and the principal are linked to the price index with a lag due to the production time of the indices.<sup>53</sup> Within the euro area, ILBs have a guaranteed principal, which means that investors are protected from deflation. ILBs are by nature long-term bonds, maturing between 2008 and 2032.

Issuance of ILBs is an old practice which was historically often used in a high inflation environment by governments which wanted to

<sup>53</sup> This time lag (usually three months) exposes investors to inflation when the bond is close to maturity. In fact, the indexation mechanism will not take account of the evolution of inflation in the three months preceding the maturity date.

Table 6 Outstanding amounts of the main European ILBs at the end of May 2004

	UK	France	Italy	Sweden
Market value (EUR billions or equivalent)	130	65	23	21
Number of indexed bonds	9	6	2	5

Source: UK Debt Management Office (DMO), end of May 2004.

meet a demand from investors for real yield.<sup>54</sup> Nonetheless, examples of issuance remained isolated. The auction of an indexed Gilt by the UK Treasury in 1981 was the first attempt to create a modern and liquid market for ILBs. The second turning point in the growing ILB market took place in a low inflation environment, with the decision of the US and French Treasuries to issue ILBs in 1997 and 1998 respectively. Since then, within the euro area, Italy, Greece and Austria each issued ILBs in 2003 and Germany may issue one in 2005. Of the non-euro area Member States, Poland (1992), Sweden (1994) and Hungary (1995) have experienced issuance of ILBs.

Within the EU, Treasuries have tended to increase their issuance of ILBs over the past three years in response to a strong demand for secure long term assets by investors who have a high aversion to inflation risk. In absolute terms, the most active issuers over the last two

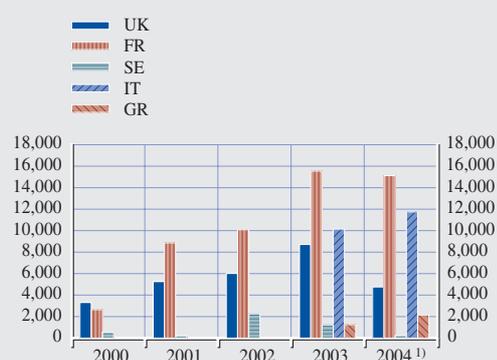
years have been the French and Italian Treasuries, although Greece has also financed a significant share of its issuance via ILBs.

As regards the inflation-linked bonds issued by non-central-government agents, only the UK market reaches a significant size. Most of the time, non-government issuers are utilities or agencies. However, the development of this ILB market is restrained by the lack of liquidity which leads investors to demand a high liquidity premium, pushing up the relative funding cost of ILBs for non-government issuers, especially corporates.

<sup>54</sup> Apparently the first inflation-linked bond was issued in Massachusetts in 1780. From that year until the 1970s the other main ILBs were issued by the governments of Finland (1945), Sweden (1952), Iceland (1955), Israel (1955), Brazil (1964), Chile (1966), Colombia (1967) and Argentina (1972). For further details on the emergence of ILBs, see R. Shiller, "The Invention of Inflation-Indexed Bonds in Early America", NBER Working Paper No 10183, December 2003.

Chart 18 Issuance of ILBs by EU central governments

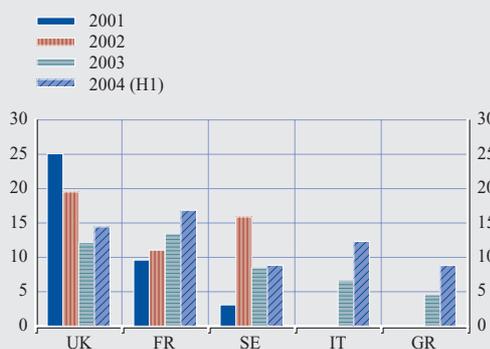
(EUR millions)



Source: Bondware.

1) Data in 2004 up to end-June.

Chart 19 Issuance of ILBs by EU central governments as a percentage of the total



Even with regard to government bond issuance, the ILBs have a reputation for being less liquid than the traditional sovereign bonds. For instance, the bid-ask spread can be set, depending on the bonds, four or five times as wide for an ILB as for a traditional bond. The relative lack of liquidity is due, of course, to the size of issuance, but also to the technical characteristics of the ILB. For instance, all other things being equal, a longer indexation lag reduces liquidity because arbitrage opportunities are more difficult to assess and hedging strategies are also trickier to implement.

In July 2004, the electronic trading platform EuroMTS launched a new market dedicated to the trading of inflation-linked securities. An index of ILBs was also created at the same time. The index currently includes nine bonds: one Greek, two Italian and six French inflation-linked bonds. It should provide a reliable benchmark and is likely to contribute to promoting the liquidity of the bonds included in the index.<sup>55</sup>

#### THE REASONS FOR THIS DEVELOPMENT

There are three basic reasons for issuing ILBs: to reduce the cost of funding, to broaden the investor base, and to manage the issuer's assets and liabilities.<sup>56</sup>

As far as the first reason is concerned, by issuing an ILB a treasury or a corporate can save the inflation risk premium. Indeed, according to the Fisher relation between nominal and real interest rates, the nominal rate is a sum of the real rate, the inflation expected by the market and a premium which is mainly an inflation risk premium. By neglecting the other premia (especially the liquidity premium), the linear approximation of the Fisher relation is that:

$$\text{nominal rate} = \text{real rate} + \text{expected inflation} + \text{inflation risk premium},$$

thus:

$$\begin{aligned} \text{break-even rate}^{57} &= \text{nominal rate} \\ &\quad - \text{real rate} \\ &= \text{expected inflation} \\ &\quad + \text{inflation risk premium} \end{aligned}$$

The inflation risk premium remunerates uncertainty about the *ex post* real yield of a nominal bond, but in the case of an ILB this uncertainty is almost completely ruled out for investors. Therefore, the issuer can basically save the inflation risk premium because he accepts the inflation risk.

A treasury can also take advantage of ILBs if it deems market inflation expectations to be too high. This is sometimes the case when markets fall victim to adaptive expectations or a nominal illusion which could lead to an over-estimation of the inflation break-even rate, especially during periods of inflation slowdown.<sup>58</sup> Nevertheless, the growing efficiency of the bond market and the decrease in the break-even rate toward levels more or less in line with the long-term inflation expectations no longer allows for such opportunistic issuance.

The second reason for issuing ILBs is the possibility of attracting long-term institutional investors (e.g. pension funds) which have a

<sup>55</sup> All euro-denominated inflation-linked government bonds of a minimum of €2 billion supported by at least eight market makers and with at least one year to maturity will be eligible for trading on the platform.

<sup>56</sup> Other justifications for issuing ILBs are also sometimes mentioned by some treasuries, such as improving the credibility of their anti-inflationary policy (although this argument is questionable insofar as indexation can make it easier to spread inflationary pressures and treasuries are not responsible for keeping inflation low) or offering a public instrument useful for managing macroeconomic risk and assessing inflation expectations.

<sup>57</sup> The precise definition of the break-even rate is: break-even rate = (1 + nominal rate) / (1 + real rate) - 1.

<sup>58</sup> From this point of view, the issuance of the first indexed Gilt by the UK Treasury in 1981 was a very cheap funding.

specific interest in interest-linked instruments for assets and liabilities management (ALM) purposes. In addition, this aim of broadening the investor base often explains the choice of inflation for the reference index. Bonds linked to the national CPI, as opposed to the HICP, allow for a better ALM for local investors at the expense of a reduction in the overall number of potential investors. The different issuing strategies of euro-area governments illustrate this point. Among central government issuers, only France has issued two types of ILBs (indexed on the national CPI and the HICP).<sup>59</sup> Other countries have so far chosen to use the HICP, without ruling out the possibility of issuing ILBs linked to their own CPI.

According to the third reason, issuers are also attracted by ILBs in order to manage their balance sheet exposure. Agents such as governments, which have revenues linked to inflation (mainly through VAT), may be interested in linking the cost of their funding in order to smooth the cyclical pattern of deficit through the inflation cycle.

As regards risks taken by issuers, the main specific drawback of ILBs for issuers comes from the fact that investors demand a liquidity premium to invest in ILBs because of the relative shallowness of this new market.<sup>60</sup> From the investor's point of view, adding an ILB to a portfolio can improve the risk-return trade-off of the portfolio and provide suitable tools with which to manage the assets and liabilities of investors.

Introducing an ILB into a portfolio improves the risk-return attributes of the portfolio by diversification. Indeed, thanks to the introduction of an ILB in a portfolio the efficient frontier is significantly positively shifted because ILBs usually have low correlation coefficients with other assets. Thus, empirical evidence suggests that the volatility of the price of an ILB is usually lower than that of a traditional bond. However, ILBs have another advantage for investors: they are in essence risk-free assets since their price

depends solely on the variability of the real yield curve. Indeed, ILBs enable the investors to lock in an ex ante real yield. This feature of ILBs is valuable for agents who have to manage the saving of their clients (insurance companies, pension funds, etc) over the long term in order to maintain the purchasing power of their capital. In this context a "buy and hold" strategy enables inflation-adverse agents to protect themselves efficiently against inflation risk.

The other origin of the strong demand for indexed products comes from the need to manage the assets and liability items on the balance sheet. One of the standard factors of demand consists in the desire to match liabilities that are correlated to inflation. This is typically the case for defined benefit pensions funds, as retirement benefits depend on the final salary, or for property and casualty insurance companies, given that indemnities closely follow price levels. Furthermore, the new accounting framework should further encourage investors to better immunise their balance sheet against inflation risk. Indeed, under those new rules, if the variations of liabilities are not well hedged by a parallel move on the asset side, the shareholders' equity would decrease significantly. Furthermore, regulation can influence the demand for inflation protection. For instance, the recent partial linkage to the French CPI of the remuneration of the French tax-exempt saving accounts (such as "livret A"), which represent very large amounts,<sup>61</sup> gave a strong incentive to the banks managing ILBs to look for inflation protection as a means of ensuring an effective ALM.

<sup>59</sup> The Lazio region in Italy recently launched an ILB linked to the Italian CPI.

<sup>60</sup> The cost effectiveness of the ILBs for Treasuries is very difficult to assess owing to the uncertainty about the inflation rate in the long term. Nevertheless Sack and Elsasser estimated that the differential cost of the US issuance programme of ILBs in comparison with a nominal equivalent programme was around USD 3 billion between October 1997 and January 2003. See B. Sack and R. Elsasser, "Treasury inflation-indexed debt: a review of the US experience", FRBNY Economic Policy Review, May 2003.

<sup>61</sup> The total volume of indexed savings accounts is around €300 billion. These accounts have been linked to the three-month Euribor and the French CPI in equal measure since 1 July 2004.

The risks borne by buyers of ILBs include: the possibility of there being a slight bias in market expectations of inflation, the fact that the coupons are linked to inflation with a time lag, the mismatch between the linking index and the relevant index for the investor, etc. Nevertheless, these drawbacks seem limited compared with the flaws of the other hedging strategies such as investing in the money market, in equities, in real estate or in gold, all of which provide very poor and impure inflation hedging. Institutions have therefore turned to ILBs and inflation derivatives for more precise and effective protection. However, the demand for ILBs has so far clearly outpaced supply, putting a limit on the effectiveness of inflation-related ALM through ILBs. This situation is unlikely to improve in the coming years given the increasing protection needs associated with population ageing and the accompanying growth in pension funds assets,<sup>62</sup> even if inflation derivatives may help to bridge the gap between the demand and the supply of indexed products.

## THE EMERGENCE OF THE INFLATION DERIVATIVES MARKET

The derivatives market is mainly a swap market although more sophisticated products, such as options on inflation, are now available.

Basically, an inflation swap is a contract between an inflation “receiver” who pays a fixed rate versus an inflation-indexed rate (floating or fixed). The inflation “payer” pays the indexed rate, thereby bearing the inflation risk. In this market, the final inflation payers are the same as in the ILBs market – utilities, retailers and other agents whose revenues are linked to inflation. However in the case of a swap transaction, a hedging bank manages the mismatch of needs between the counterparties, implementing structured inflation transactions.

The inflation swap market has developed strongly in countries in which ILBs are

<sup>62</sup> Notably in the countries, such as Germany and France, that recently introduced pension funds.

### Box 4

#### EXAMPLES OF INFLATION SWAPS

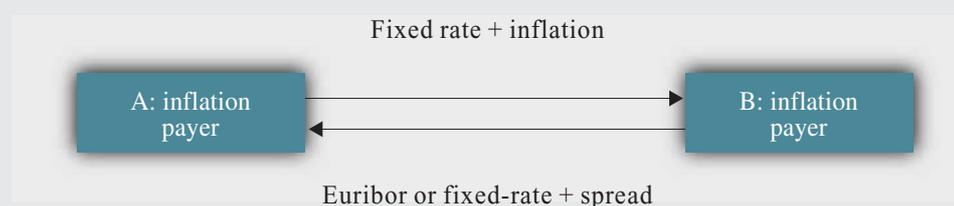
Let us imagine a swap between A, an inflation payer, and B, a person who wants to hedge inflation risk. In this example the swap is a zero coupon, the index is the HICP and the maturity date is 30 June 2014, the starting date is 1 July 2004, the indexation lag is equal to three months and the fixed leg of the swap is equal to 2%.

On 30 June 2014:

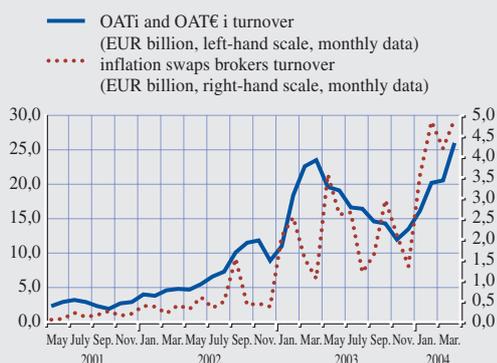
A pays:  $[\text{HICP March 2014} / \text{HICP March 2004}] * \text{notional}$

B pays:  $[(1 + 2\%)^{10} - 1] * \text{notional}$

Inflation swaps can also pay regular coupons. In this case, which is more common, the swaps generally look like this:



**Chart 20 Turnover in the secondary market for French ILBs and for the euro inflation swap market**



Sources: Agence France Trésor and ICAP plc.

available for hedging the position of the inflation payer, which is why most of the contracts are linked as ILBs to the euro HICP excluding tobacco, to the UK RPI, or to the French CPI excluding tobacco. The trades usually have a maturity within a range of 5 to 15 years.

The growth of this market is a consequence of the needs of investors and issuers not being satisfied by the ILB market. As regards the protection seller, the main advantage of the derivatives and swaps market comes from the convenience, the speed and the low barriers to entry of a swap contract by comparison with a bond issue. Thanks to derivatives, protection buyers can obtain a very flexible product, possibly tailor-made, which directly fits the inflation exposure of investors in terms of maturity, underlying index, size and timing of cash flows. Buyers of the fixed leg of the swap do not have to manage the maturity mismatches, the reinvestment of coupons, the credit risk of issuers and so on. To summarise, the derivative market provides efficient tools to enhance the process of matching the needs of the different market participants, but what are the drawbacks?

The main disadvantages associated with the derivatives market are the lower liquidity and the lower break-even point offered by swaps.

From this point of view, the existence of indexed bonds for certain maturity dates provides an anchor which underpins the liquidity of both the swaps and the ILBs for those specific points of the curve.

The relative lack of liquidity makes the hedging of short-term inflation risk through the swap market very tricky. Market participants wishing to take short-term positions on the level of the HICP can use the OTC options market that has been managed by Deutsche Bank and Goldman Sachs since May 2003.

Nevertheless, apart from the inflation swap market, the other derivatives markets are still in their infancy; their development could offset the scarcity of ILBs and complete the set of instruments available for efficient hedging against inflation risk.

## 5.6 REAL-TIME INDICES AND EXCHANGE-TRADED FUNDS

Several means exist by which financial innovation can contribute to lowering the cost of investing in diversified portfolios of corporate bonds. One possible approach is through the development of exchange-traded funds (ETFs), which allow a diversified portfolio to be bought or sold through a single transaction. Another way in which innovation could help to lower transaction costs would be through the development of OTC and exchange-traded derivatives based on portfolios of corporate bonds, with delivery taking place either in cash or through ETFs. A prerequisite for the development of ETFs and related derivative contracts is the existence of indices whose integrity is beyond doubt among market participants and that comply with certain market-oriented characteristics: price computation, index features, bond eligibility criteria and rebalancing should be rule-based, transparent and replicable. Moreover, fair prices should be transparent and made available in (almost) real time. This chapter highlights the development of both real-time indices and (fixed income) ETFs.

## IMPEDIMENTS TO THE DEVELOPMENT OF THE CORPORATE BOND MARKET

Recent developments and trends in the corporate bond market were highlighted in Chapters 3 and 5. In addition to the introduction of the euro, there are many elements that have played a role in fostering or hindering the development of the corporate bond market. An environment of low nominal yields, for instance, has encouraged an appetite for the yield pick up provided by non-sovereign bonds and thus bolstered demand for corporate debt. However, several elements that may have hindered the development of the corporate bond market are the lower level of liquidity provided by these instruments, the higher transaction costs incurred by investors and the difficulty of hedging easily and cheaply positions held in this market.

Corporate bonds tend to incur higher transaction costs than government bonds and other benchmark bonds, such as Jumbo Pfandbriefe. The main reasons for that are the lower outstanding amounts of each bond and the difficulties for dealers trying to hedge positions in an environment of asymmetric, discontinuous and not always publicly available information. The first issue also affects bonds issued by governments of “smaller” euro area countries.<sup>63</sup> Beyond the question of liquidity as such is the question of the number of transactions that an institutional investor needs to perform to build up a fully diversified corporate bond portfolio, as opposed to a government bond portfolio. For asset managers who measure their performance against bond indices this implies additional transaction costs as well as costs associated with the difficulty of monitoring a larger number of issuers and instruments and associated with the complexity of replicating market indices which in most cases have not been designed for this purpose.

One additional problem raised by investment or dealing in corporate bonds is the question of the availability of appropriate hedging instruments. Bond futures and interest rate swaps (IRSs)

have so far been the most commonly used instruments for hedging positions held in the bond market. Bond futures and IRSs, however, mainly allow the hedging of market risk and not credit risk exposure. In fact, when using them to hedge corporate bond portfolios, one incurs a basis risk which obviously increases with the volatility of the underlying spreads between government and corporate bonds.<sup>64</sup> All other things being equal, this credit risk is likely to deter investors from taking positions in corporate bonds or to lower the price of these bonds through the incorporation of a premium compensating for this particular risk.<sup>65</sup> Important financial innovations in the credit derivatives market which provide tools to address in particular the remaining credit risk are described in Chapter 4.4. In this context it should be recalled that iTraxx indices are based on credit derivatives and allow the complete separation of other risks embedded in cash portfolios (like interest rate risk) from credit risk, which is not the case for ETFs which are funded investment tools.

The following paragraphs describe recent innovations targeted at a specific set of investors, such as private individuals or less sophisticated asset managers, in order to help them to tackle some of the aforementioned drawbacks of the bond market.

## DEVELOPMENTS IN THE INDEX SECTOR

An important development, whose consequences have probably not yet all materialised, is the development of real-time indices, i.e. market indices computed and published in real time throughout the trading day. The importance of market indices to support investment in any market segment is well known. Indices serve several purposes.

<sup>63</sup> By way of illustration, the overall public debt of many new EU Member States amounts to less than the standard size of one bond issued by the largest sovereign issuers. The same applies, of course, to corporate issuers.

<sup>64</sup> Note that this applies also to investment in government bonds other than those underlying the futures contracts.

<sup>65</sup> There are of course other ways to hedge positions in corporate bonds, such as swaps, CDSs, etc.

They serve to convey to investors the objective of a fund. They also serve risk management and performance measurement purposes.

However, indices can also fulfil other roles. They may be used as references in the drafting of financial contracts, in particular derivatives. This is standard practice for instance in the swap market, where references such as the EONIA or EURIBOR are customarily used to that end. In principle, the possibility of using indices as references for cash-settled futures contracts may also be considered or, indeed, for the development of any other type of derivative instrument that can be used to hedge positions in any market.

In fact, in any market, the availability of hedging instruments appears to be crucial to the development of the underlying market. Without the possibility of offsetting rapidly and at low cost the specific risks induced by entering into a transaction with customers, intermediaries (e.g. market makers) would be far less able or willing to provide liquidity for the secondary market. Hedging instruments, in practice, often tend to become the actual reference for the pricing of the instruments that they are used to hedge, as opposed to the other way round. It may be argued, for instance, that the “true” benchmark for the euro area government bond market is the Bund futures contract rather than the underlying government bond.

The development of futures based on one corporate bond or a basket of corporate bonds would in principle facilitate the management of market risk associated with dealing in corporate bonds but would in practice be difficult because of the small outstanding amount of each corporate bond and/or the costs associated with the management of a basket.

Tradable indices or futures contracts settled in cash and based on the value of an index would seem to provide a convenient solution here. They would broadly reflect the behaviour of prices of corporate bonds and would therefore be convenient for hedging a large

range of instruments. They would also be relatively free of the problems (e.g. squeezes of the underlying asset) sometimes associated with futures contracts. This requires, however, the computation and publication (preferably in real time) of indices with a high degree of integrity and reliability.

Against this background, the development of such indices must be seen as having potentially significant consequences. One series of such real-time indices which cover sovereign and non-sovereign issuers has been developed by iBoxx, a fixed income provider established for that purpose. iBoxx, which was founded by Deutsche Börse and seven investment banks, currently computes real-time price and total return indices for investment grade corporate bond indices in euro and pound sterling on the basis of indicative quotations provided primarily by a growing number of dealers (nine at present). The indices have been jointly set up with the aim of addressing the tracking and hedging concerns by selecting liquid bonds, limiting their number per index and excluding special bond types.

The limitation of such an innovative process is that iBoxx index prices do not result from market makers’ binding quotations or executed trades. Furthermore, an important complementary step which has been missing so far points to market jointly agreed rules for computing asset swap spreads, based on the same swap yield curves. In other words total return indices, which represent the performance of a market, should be also expressed in terms of spreads providing an “objective” measure to be referenced for financial contracts (similarly to CDS indices). This would, inter alia, solve the computational problem raised by the different methods existing for computing asset swap spreads but most importantly would help market participants to reduce mispricing between the cash and the derivative credit markets through more efficient arbitrage. Beyond the application of total return indices, price indices are useful for retracing market movements. The potential of asset swap spread

indices, which should be tradable by a large number of dealers with jointly agreed rules, may be somehow comparable to the recently exploded CDS indices.

EuroMTS and Euronext have also jointly developed indices for European government bonds, which are published in real time (the EuroMTS index or EMTX). While this initiative has not yet extended to non-sovereign bonds, this may take place in the future (e.g. on the basis of the EuroCredit MTS coverage). The extension to real time indices of non-sovereign bonds would provide a similar level of transparency and integrity as indices for bond markets that have existed in equity markets for years and have allowed the development of hedging instruments in these markets.

#### DEVELOPMENT OF FIXED INCOME EXCHANGE-TRADED FUNDS

A development which has resulted from the setting-up of related real-time indices and which may be instrumental in allowing the corporate bond market to develop further is the introduction of fixed income exchange-traded funds (ETFs).

ETFs are similar to mutual funds in that they represent a fractional ownership in an underlying portfolio of securities. Typically, the underlying portfolio is built up with the view of replicating a given market index.

A particularity of ETFs, however, is that they track the performance of market indices or sub-indices, allowing investors to buy or sell an entire market in one trade, through a single security. They are traded on an exchange or over the counter, in a way similar to individual stocks. This implies that investors do not normally purchase shares (or redeem them) from the fund itself. They purchase shares from – or sell them to – dealers or other investors, without incurring any transaction for the underlying portfolio. Another key element is that prices are available for ETFs at any time during trading hours and are updated on a real-time basis (according to demand and supply).

The first ETFs were based on equities. On 29 January 1993 the first ETF tracking the S&P 500 index was launched. The ETF market has developed rapidly since then, especially in recent years. By the end of June 2004 the European ETF market totalled about €21 billion assets under management (AUM) accounting for some 10% of the global ETF market. After the United States, the European market is the most rapidly growing ETF market, almost matching the Japanese market in size and clearly outrunning it in terms of trading volumes.

Fixed income ETFs, which are a relatively recent phenomenon, have only really started to develop in the past few years. In the USA the first one was launched in July 2002. The first quarter of 2003 saw the launch of the first fixed

**Table 7 ETF assets under management**

(EUR millions)				
Country/region	End-June 2004	End-March 2004	End-December 2003	
USA	145,882	132,517	119,659	
Europe	21,027	20,483	16,230	
Japan	24,254	23,478	21,937	
Canada	4,212	4,717	4,078	
Hong Kong	3,221	3,291	3,137	
Taiwan	1,085	1,124	923	
ETF total	201,948	188,403	168,333	

Sources: Morgan Stanley ETF Strategies; Bloomberg.

Table 8 European ETF assets by type of exposure as at 30 June 2004

Type of exposure	No of ETFs	Total assets (EUR millions)	% total
Regional euro area	13	7,255	34.5
European country	16	6,828	32.5
Fixed income	12	2,156	10.2
Regional Europe	6	1,762	8.4
International	13	1,705	8.1
European sectors	33	869	4.1
Euro area sectors	10	271	1.3
Other	2	159	0.8
Global sectors	3	16	0.1

Sources: Morgan Stanley ETF Strategies; Bloomberg.

income ETFs available to European investors and by the end of June 2004 the volume of fixed income ETFs amounted to €2.2 billion.<sup>66</sup> The European market clearly has the potential to develop into a relatively liquid market accessible to a growing number of investors, i.e. to asset managers, hedge funds, and institutional and individual investors and traders.

#### COMPARATIVE ADVANTAGES OF EXCHANGE-TRADED FUNDS

Fixed income ETFs provide private investors with several benefits over and above what is available from the more traditional investment vehicles. Diversification is a major concern for any investor seeking exposure to corporate bonds. However, adequate diversification is difficult to achieve for small portfolios. For this reason, many private investors seeking exposure to bond markets tend to favour funds. Compared with traditional funds one of the biggest advantages of ETFs is the very low level of fees.<sup>67</sup>

As ETFs are index-tracking strategies, the fund holdings and risk exposures are completely transparent to the investor, giving the investors the return on a specific market. Apart from lower fees, ETFs trade intra day and can be sold short, unlike traditional funds. This allows investors to accept shorter-term, or immediate, exposure in a market or to use ETFs to hedge themselves against specific short-term event risks.

Many institutional investors gain their exposure to bonds not by investing directly in the bonds themselves but rather by holding CDSs or by utilising futures or swaps within their portfolios. However, with futures contracts, the investor does not receive any coupon income and each quarter he must roll from one contract to the next, incurring transaction and administrative costs. Moreover, no futures contracts exist on corporate portfolios and it is therefore difficult to gain large exposure given the liquidity available.

As long as the bulk of fixed income investment took the form of government bonds – especially in countries where governments typically concentrate issuance on a few benchmark issues – the advantages of ETFs in this sector were perhaps limited. This may be changing, especially in Europe, for the following reasons:

- Demand for corporate bonds implies the purchase of very diversified portfolios with many small issues. This is a situation more akin to investment in equity markets, and therefore investments in ETFs may be more attractive as ETFs seek to give investors exposure to a diversified credit portfolio, through a tradable product;

<sup>66</sup> The first was the eb.rexx German government bond ETF, launched in February 2003 by Index change and primarily targeted at German retail investors. The second was the iBoxx Euro Corporate Bond ETF, launched in March 2003 by iShares, primarily targeted at institutional investors, but accessible to retail investors, too.

<sup>67</sup> According to Fitzrovia, the average total expense ratio (TER) for fixed-income ETFs is 17 basis points per annum, which is far below the average 99 basis points charged by fixed-income funds in Europe.

**Table 9 The features of ETFs and traditional funds**

Feature	ETF	Closed-end fund	Ordinary mutual or open-end fund
Pricing	Real-time share price. Portfolio values updated throughout day. May trade at tiny discounts or premiums. Pricing very transparent.	Real-time share price. End-of-day net asset value. May trade at a substantial discount or a steep premium.	End-of-day net asset value.
Trading shares	Trades as a stock. Can use limit orders to buy or sell at your price or better. Can also trade intraday.	Trades as a stock. Can use limit orders to buy or sell at your price or better. Can only trade once a day.	Transactions normally occur at the end-of-day net asset value. Can only trade once a day.
Average expense ratios	0.15%	1.05% for managed government and corporate bond funds.	0.35% for index-based funds; 1.05% for managed government and corporate bond funds.
Management	Index-based	Actively managed adding a layer of management risk.	Actively managed adding a layer of management risk.
Portfolio choices	Limited at present to sovereigns and high-grade corporate portfolios.	Wide assortment of taxable and tax-free portfolios.	Wide assortment of taxable and tax-free portfolios.
Transaction costs	Brokerage commission, bid-ask spread, and potential price impact of large trades.	Brokerage commission, bid-ask spread, and potential price impact of large trades.	Generally none if no-load fund is purchased through fund company.
Leverage	Unleveraged	Many use leverage to boost yields, which adds volatility.	Unleveraged
Can be sold short	Yes	No	No
Transparency	Portfolio of bonds disclosed monthly or even daily.	Portfolio of bonds must be reported at least semi-annually.	Portfolio of bonds must be reported at least semi-annually.

- EU (and euro area) enlargement implies that broad government bond indices now also encompass a much larger number of smaller bonds, as opposed to a US Treasury index, for example. There may therefore also be a particular interest in ETFs in the European government bond sector.

#### FACTORS AFFECTING THE DEVELOPMENT OF THE ETF MARKET

Beyond the arguments mentioned above, which may foster the development of the fixed-income ETF market, there are also various obstacles and market forces that may obstruct its development:

- An ETF is not a product that banks are keen to offer as it cannibalises their higher margins products. This is manifestly evident observing the limited number of banks involved in this business.
- The constant duration may be rather a rigid feature for investors and it exposes them to

market risks that a more active management may limit. This is more relevant for fixed income ETFs than equity ETFs because coupon cash flows play a larger role than dividends.

- Fixed income ETFs offer fewer advantages than equity ETFs in terms of differential fee compared with normal index funds.
- At present, ETFs make up a very niche segment and therefore a limited product innovation (in a way confirmed by the US fixed income ETF market) because it is not really supply driven.

To allow this product innovation to be really a market innovation, educational effort is needed to change the approach of financial advisors and fund managers: instead of concentrating on tactical allocation and thus specific individual assets (which can be easily and cheaply replicated with ETF), financial advisors and banks would have to steer their clients towards strategic allocation and therefore

the relative weight that should be attributed to equities, credit, currency, etc., including the geographical and sectorial exposure. This would allow final investors to save management costs and pay for the real added value provided by asset managers or financial advisors in terms of strategic allocation. Mainly non-sophisticated investors would gain a lot from this process.

At present the agents which appear really committed to this educational effort for fixed income ETFs are mainly the stock exchanges which are already quoting the instruments (Borsa Italiana, Euronext Group and Deutsche Börse), the few fixed income ETF managers (mainly IndEXchange, BGI and Lyxor Int AM) with BGI as the only issuer of corporate ETFs, and electronic trading platforms like EutoMTS, Eurex Bonds and Bond-Vision.

The involvement of electronic trading platforms should be regarded favourably as it could also result in the extension of underlying instruments to non-sovereign bonds, in particular corporate bonds, and in a movement of institutional investor trading from OTC to more transparent markets. At the same time, the involvement of exchanges is very important to further broaden the investor base and develop innovative derivative products (e.g. options and futures), enhancing the availability of instruments used by more sophisticated investors for trading and hedging purposes.

A combination of the elements described above would naturally lead to increased liquidity for the underlying bonds, resulting in a virtuous cycle for real-time non-sovereign indices, corporate in particular, with fairer prices.

## CONCLUSION

The development of real-time indices and exchange-traded funds in the bond market – and in the corporate bond segment, in particular – is interesting to monitor because it may allow two impediments to the development of this market to be mitigated: the lack of convenient hedging

instruments and the relatively high transaction costs associated with fully diversified portfolios composed of many small issues.

More specifically, the development of these two products may increase the attractiveness of the corporate bond market for investors and intermediaries, and therefore trigger the development of this market.

It is mainly in the interest of private investors that these products are developed, in particular with varied range in the fixed income non-sovereign sector, for various currencies and regional exposure. At the same time, innovations in the strategical investment approaches will lead more and more asset managers to benefit from these products, fostering suppliers (including banks) to be more proactive and therefore transforming this product innovation into a real market innovation.

## 5.7 RATING AGENCIES

Since the advent of the euro, rating agencies have been playing a pivotal role in the development of the euro bond market, as providers of independent credit assessments on bond issuers' creditworthiness. Yet, the coverage of credit ratings in Europe is still under-developed compared with the United States as a consequence of a greater reliance on bank intermediation. This section focuses on the coverage of credit ratings in Europe, compared with the USA, but also on the coverage in terms of European sectors and across European countries. While highlighting a catching up effect, the section also discusses the factors that might further the use of ratings in Europe in the future.

## CREDIT RATINGS AND THE GROWTH OF THE EURO BOND MARKET

The European bond market has been growing very rapidly since the launch of the euro. One of the factors underpinning this growth has been

the increasing coverage and use of credit ratings provided by rating agencies. Yet, credit ratings are still significantly less frequently available in Europe compared to the US. Both general structural factors and specific European drivers explain the role of rating agencies in the European bond market.

Traditionally, the use of credit ratings has always expanded hand in hand with the *growth of debt capital markets*. This was for instance the case in the US during the twentieth century, as the number of rated issuers grew (and at times retreated) in response to the ups and downs of the bond market<sup>68</sup>. It reflects the essential role of credit ratings<sup>69</sup> in a market-based economy, which is all about transparency and the gathering, treatment and dissemination of information in the market. By providing investors with an independent opinion on an issuer's creditworthiness, credit ratings allow the imbalance of information between issuers and investors to be reduced. Hence ratings can help to broaden the issuer's investor base, potentially adding the benefit of more favourable financing conditions. Furthermore, even sophisticated investors may not have the expertise or knowledge to analyse the myriad of potential debt investments available to them across different industries and countries. Having a simple and easily understandable summary of a credit assessment in the form of a rating symbol (e.g. AAA) assists them in selecting the bonds they want to invest in. Finally, ratings contribute to the process of price formation in the bond market, as shown by several academic contributions on the link between ratings and credit spreads<sup>70</sup>.

*The advent of the euro and the integration of European financial markets* conferred an even more determinant role to credit ratings. By eliminating currency risk, the use of the euro allowed bond investors to focus on credit risk while the enlargement of their investment universe increased their need for simple indicators of this risk. Indeed, investors diversified their portfolios and turned to bonds from the eleven other euro area countries.

However, as they knew issuers from these countries less than issuers from their home country, they required credit ratings as a condition for them entering the market. Hence, the euro naturally broadened the investor base of issuers but at the expense of increased competition, a good rating increasingly becoming a quasi-prerequisite for raising funds in the euro bond market.

However, *the slow financial disintermediation process in Europe* explains why, despite the strong drivers to a greater use of ratings, the latter remains limited compared to the US. According to the Bank for International Settlements, bank loans represent around 50 to 70% of banks' financial assets in Europe against 25% in the US. Banks theoretically have the capacity to assess and monitor internally their debtors' creditworthiness and hence have little need for external credit ratings. Furthermore, the traditional approach of corporate finance in Europe i.e. based on close and continuous relationships between creditors and borrowers, was perceived in many countries as mitigating the need for an independent credit assessment. Therefore, corporations started to ask for credit ratings chiefly when they started to tap the bond market either to get more financing or to obtain it on better terms.

Finally, the landscape of the use of credit ratings in the European bond markets would not be complete without mentioning the dramatic growth of the *structured finance market* (i.e. ABSs, MBSs and CDOs) since the late 1990's. This market is in nature a fully rated market, in the absence of a real "issuer". Therefore, the rating is essential as an opinion on the credit

68 For more details, see Richard Sylla, "A Historical Primer on the Business of Credit Ratings", conference on "The Role of Credit Reporting Systems in the International Economy", World Bank, March 2001.

69 On the expanding use of ratings, see Banque de France, Financial Stability Review, June 2004, and ECB working paper No 16, "Market dynamics associated with credit ratings: a literature review".

70 For example R. Cantor and F. Packer, "Sovereign Credit Ratings", Current Issues in Economics and Finance, Vol 1, No 3, Federal Reserve Bank of New York, June 1995, pp 1-6.

quality of both the underlying assets and the structured transaction.

### ASSESSING CREDIT RATING COVERAGE IN EUROPE

Measuring credit rating coverage in Europe entails many practical difficulties. Deriving a ratio of coverage of credit ratings is not trivial, starting with the difficulties with the numerator, i.e. what is meant by credit rating and ending with the denominator, i.e. to which universe of companies should the number of rated companies be compared<sup>71</sup>.

Regarding the numerator, credit ratings in this study will be understood as issuer ratings awarded by the three major rating agencies. While industry sources count more than 150 rating agencies<sup>72</sup>, only three of them (Moody', S&P, Fitch) have the capability to rate all types of issuers on a global scale. Additionally, the choice of the issuer rating, as opposed to asset ratings, simplifies the data gathering, and still offers a consistent measure since it corresponds to the rating of a senior unsecured bond of the issuer. Moreover, it should be borne in mind that a comparison between the three ratings agencies' figures is of limited significance due to the

differences in rating methodologies. Turning now to the denominator, it can take many forms (see Table 10). The number of rated companies can be compared to the number of issuers in the bond market (including unrated bond issuers) or to the number of companies listed on the stock exchange, as these two broad categories can be viewed as proxies for market-financed companies. The comparison with the number of companies with a turnover above a certain threshold can also be meaningful, as the higher the size and the turnover of the company, the more likely it is to ask for a rating and/or issue marketable debt.

Unsurprisingly, the coverage in Europe appears substantially less extensive than in the US. When considering the EU-wide turnover threshold for defining large-size enterprises (€50 mn<sup>73</sup>), around 10% of large-size enterprises are rated (vs. 65% in the US). However, this proportion increases to close to

71 For more insights into the difficulty of assessing rating penetration, see Basel Committee on Banking Supervision, report of the working group on "Credit ratings and complementary sources of credit quality information", August 2000.

72 For more information about other rating agencies, see Basel Committee supra.

73 €50 million is also used for distinguishing a large-size company in the Basle II framework.

Table 10 Coverage of issuer ratings in Europe and the US in July 2004

	EU-15 Moody's	EU-15 S&P	EU-15 Fitch	USA Moody's	USA S&P	USA Fitch
No of rated companies <sup>1)</sup>	1,223	1,352	650	2,991	4,189	1,230
As a % of bond issuers <sup>2)</sup>	57	63	30	60	84	25
As a % of listed companies	23	25	12	57	80	23
As a % of companies with turnover above € 50 m	10	11	5	65	92	27

Source: Moody's; S&P; Fitch; World Federation of Stock Exchanges; Bureau Van Dijk; TRACE database; Bloomberg.

Notes: Issuer Ratings are understood as long-term senior issuer ratings. Financial Strength Ratings (for banks and insurance companies) are excluded. General government issuers (i.e. central, regional and local governments) are excluded. Published ratings awarded on the basis of public information (sometimes referred to as "unsolicited ratings") are included. This type of rating mainly concerns the insurance and corporate sector in Europe, depending on the agencies.

1) In the table, the number of Long-term issuer ratings covers differences in methodologies as regards in particular the insurance sector. Whereas S&P grants a Long Term issuer rating to any insurance company to which it grants a Financial Strength rating – FSR –, Moody's and Fitch do not systematically grant long-term ratings to insurance companies to which they have granted an FSR but only to those bound to issue bonds. FSR ratings for the insurance sector are respectively in EU-15 (515 for S&P, 128 for Fitch and 106 for Moody's). The high number of S&P insurance ratings also comes from a higher proportion of ratings based on public information (sometimes referred to as "unsolicited ratings").

2) It is possible that data on bond issuers are subject to some double counting effects due to different name spelling which deflates somewhat the calculated percentage.

**Table 11 Issuer ratings by sector and region in July 2004**

	Banks			Other financials (including insurance) <sup>1)</sup>			Corporates			General government		
	Moody's	S&P	Fitch	Moody's	S&P	Fitch	Moody's	S&P	Fitch	Moody's	S&P	Fitch
EU-15	472	304	395	82	515	41	669	533	214	133	182	79
US	295	400	484	480	1,636	222	2,216	2,028	524	n/a	n/a	n/a

Source: Moody's; S&P; Fitch.

Notes: For the US, general government is not relevant for comparison purposes as it would correspond to the "US public finance" sector including states, municipalities, universities etc, e.g. some 22,000 issuers for Moody's.

1) In the table, the number of Long-term issuer ratings covers differences in methodologies as regards in particular the insurance sector. Whereas S&P grants a Long Term issuer rating to any insurance company to which it grants a Financial Strength rating – FSR –, Moody's and Fitch do not systematically grant long-term ratings to insurance companies to which they have granted an FSR but only to those bound to issue bonds. FSR ratings for the insurance sector are respectively in EU-15 (515 for S&P, 128 for Fitch and 106 for Moody's). The high number of S&P insurance ratings also comes from a higher proportion of ratings based on public information (sometimes referred to as "unsolicited ratings").

25% when taking as a reference the number of listed companies. More puzzling is the still high number of unrated issuers in the European bond market (e.g. according to Bloomberg, 237 unrated issuers from the industrial sector). European corporates, unlike their US counterparts, can still rely on "domestic name recognition" for raising funds without being rated. Also, publicly-owned companies can still rely on State sponsoring.

#### CREDIT RATING COVERAGE BY SECTOR

The industry sector profile of rated entities in Europe has changed substantially over the past ten years, showing increased diversification in terms of issuer types. It nevertheless remains fairly concentrated relative to the US, notably on the banking sector.

The coverage by sector in Europe evidences three trends:

- While all central governments have been rated for years if not decades, the number of regional and local governments asking for ratings has been rapidly increasing in the wake of decentralisation in some Member States (e.g. Italy);
- Banks and other financials (including insurance) still represent a large proportion of rated issuers in Europe, together accounting for 40% of the total (vs. 25% in

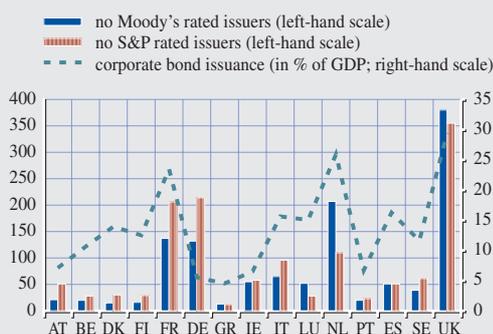
the US). Banks are massively rated, given the importance of ratings-based market practices (e.g. assessing creditworthiness and limits in financial transactions on the basis of ratings);

- Corporate rating coverage is clearly lagging behind compared to the US, but it is quickly expanding. For example, the number of European corporates rated by Moody's has more than doubled between 1997 and 2003 from 242 to 512. Part of the lag with the US has regulatory grounds since any corporate's issuance above USD 50 millions must be rated by at least two Nationally Recognized Statistic Rating Organizations (NRSRO).

#### CREDIT RATING COVERAGE: COMPARISONS BETWEEN EUROPEAN COUNTRIES

In the same way that rating penetration is different in the United States and the EU, it is also different within the EU. This is vastly a result of the existence of different financial structures (see Chart 21) with more or less financial disintermediation – as measured by corporate bond issuance as a percentage of GDP. The size of the country seems to play a role as well, as an issuer can hardly issue in the bond market below a critical mass of EU 500 million or €1 billion per issue. Overall, three groups of countries emerge in decreasing order of rating penetration: a first group of significantly disintermediated economies (the

**Chart 21 Number of issuer ratings and disintermediation rate in EU-15 in July 2004**



Sources: Moody's; S&P; BIS; IMF.

Note: General government issuers are excluded.

United Kingdom, the Netherlands); a second group of large-size but bank-based economies (DE, FR) and finally a group of smaller bank-based economies.

#### DRIVING FACTORS OF THE USE OF CREDIT RATINGS IN EUROPE

Albeit remaining modest, the coverage of credit ratings in Europe is expanding very quickly<sup>74</sup>. Yet, rating agencies estimate that there is still a huge potential for growth. Moody's estimates that there are 1,500 unrated institutions in Europe with annual revenues of at least €1 billion. Notwithstanding the continuous disintermediation trend, other structural factors might drive the use of ratings in Europe in the years ahead:

- *The ongoing internationalisation/europeanisation of fixed income portfolios:* As the geographical diversification of portfolios is not over, it will remain a strong source of demand for ratings in the European bond market. At year-end 2002, the IMF Coordinated Portfolio Investment Survey (CPIS) indicates that euro area investors represent on average 64% of foreign investors in euro area bonds.
- *The regulatory demand for ratings:* In the past, regulatory demand for ratings has

given a strong support for the use of ratings. Currently, ratings are required by regulators in a variety of fields<sup>75</sup>. In the next few years, the reform of the capital accord (Basle II) will surely affect the need for and use of ratings, although it is still difficult to predict precisely in which way.

- *New market-based methods to assess credit risk:* New methods derived from equity prices, subordinated bond prices or CDSs are emerging as quasi-substitutes for ratings. They reflect the “market” view of the creditworthiness of a corporation, rather than the opinion of a particular agency. They are increasingly used, including by the agencies themselves for cross-checking purposes. However, it remains to be seen whether such measures can be meaningful independently from ratings.

#### 5.8 IMPACT OF THE FSAP ON THE BOND MARKET AND PROGRESS TOWARDS INTEGRATION

This chapter highlights some major results of the Financial Services Action Plan (FSAP) of relevance for the European bond market. Furthermore, it summarises the current state of completion of the overall FSAP.

The FSAP, adopted by the European Commission in 1999, and endorsed by the Lisbon European Council in March 2000, presents to date the most ambitious initiative to foster the integration of capital markets and to achieve a single market for financial services in the EU. The four strategic objectives underlying the FSAP relate to the single EU market for wholesale financial services, open and secure retail markets, state-of-the-art prudential rules and supervision, and wider conditions for an optimal single financial market (namely tax and

<sup>74</sup> This is also evident from the geographical split of revenue generation by rating agencies. Moody's generates only 25% of its revenues in Europe, but European revenues increased on average by 37% annually in the period from 1997 to 2003.

<sup>75</sup> See European Parliament, “Report on role and methods of rating agencies”, Draft report, January 2004 and Banque de France Financial Stability Review June 2004.

corporate governance issues). The most important measures of relevance for the European bond market that have so far been adopted, are the following.

- Directive 2002/47/EC on financial collateral arrangements. This Directive was adopted on 6 June 2002 with a transposition deadline that passed on 27 December 2003. It is related to the part of the FSAP on measures against systemic risks in securities settlement. The aim of the Directive was first to eliminate the substantive legal differences between Member States' civil and insolvency law which impede cross-border securities transactions. The Directive also seeks to resolve the main problems affecting cross-border use of collateral in wholesale financial markets. It proposes to abolish existing administrative burdens and complexities, creating a clear framework of legal certainty in the field of collateral by (a) ensuring that an effective and simple Community regime exists for the creation of collateral; (b) providing limited protection of collateral arrangements from some rules of insolvency law, particularly those that would inhibit the effective liquidation of collateral or cast doubt on the validity of techniques currently used; (c) creating legal certainty with regard to cross-border provision of collateral, in the form of book-entry securities, by extending the principles already applied under the Settlement Finality Directive to determine where such securities are located; (d) restricting the imposition of onerous formalities on either the creation or the enforcement of collateral arrangements and ensuring effective agreements permitting the collateral taker to re-use the collateral for their own purposes under pledge structures, the classic way of providing collateral.
- Directive 2003/71/EC on prospectuses of 4 November 2003. The transposition deadline for this Directive is 30 June 2005. This Directive belongs to the part of the FSAP on measures for raising capital on an EU-wide basis and addresses issues related to the prospectuses, i.e. the disclosure documents, containing key financial and non-financial information which a company makes available to potential investors when it issues securities to raise capital and/or when its securities should be admitted to trading on exchanges. This Directive will make it easier and cheaper for companies to raise capital throughout the EU on the basis of approval from a regulatory authority ("home competent authority") in one Member State. It will reinforce protection for investors by guaranteeing that all prospectuses, wherever issued in the EU, provide them with the clear and comprehensive information that they need.
- Directive 2004/39/EC of 21 April 2004 on markets in financial instruments. The transposition deadline for this Directive is the end of May 2006. This Directive, which corresponds to the part of the FSAP on measures for establishing a common legal framework for integrated securities and derivatives markets, updates the former Investment Services Directive and is a core component of the FSAP. Its objective is to give investment firms an effective "single EU passport", allowing them to operate throughout the EU on the basis of authorisation in their home Member State. Whilst stimulating investment within the EU, the legislation also aims to ensure investor protection by providing more precise rules on the conduct of investment firms' business, reinforced "best execution" obligations, and a comprehensive pre and post-trade transparency regime. For the time being, this obligation is restricted to shares, but it could be extended to bonds in the future. The new Directive also sets out to ensure fair competition between regulated markets (stock exchanges), multilateral trading facilities or alternative trading systems and off-exchange transactions. In this respect, investment firms and banks will be allowed to "internalise" client orders, i.e. to execute them in-house without going through a regulated market in accordance with the requirements of the directive.

- Commission Communication on Clearing and Settlement issued on 28 April 2004. This consultative communication outlines the direction for further work in order to achieve an efficient, integrated and safe market for securities clearing and settlement which is crucial for an integrated and efficient European capital market. The ultimate target is a framework Directive for pan-European clearing and settlement, aimed at increasing the efficiency and safety of cross-border clearing and settlement, while at the same time ensuring a level playing field among the different providers of clearing and settlement services. As already highlighted by the two Giovannini reports of 2001 and 2003, the present market infrastructure for cross-border securities settlement poses barriers to further integration. The Commission identified three core principles for the proposed framework Directive, that are to be more clearly defined in accordance with the comments received in the consultation. These core principles encompass (i) the granting of comprehensive rights of non-discriminatory access to and choice of clearing and settlement systems in the EU; (ii) a common regulatory and supervisory framework for the authorisation, recognition, regulation and supervision of securities clearing and settlement systems; and (iii) appropriate governance arrangements and transparency requirements for securities settlement systems and central counterparties, as these can become a source of instability for the financial system in the event of a higher degree of consolidation throughout the EU. The ECB, among other parties that were invited to submit their views, published the Eurosystem's response on 29 July 2004. In its answer, the ECB made reference to, among other things, the ESCB/CESR standards for securities clearing and settlement systems that could usefully provide the basis for the upcoming level 2 comitology work.
- The Proposal for a Directive on transparency requirements for securities issuers approved

by the ECOFIN Council on 11 May 2004. Entry into force of this Directive is scheduled for autumn 2004, with a transposition deadline two years later. This Directive improves financial reporting by security issuers and should also lead to better dissemination of information on issuers among Member States.

As such, the measures foreseen in the FSAP, with a final deadline of implementation by 2005, have been delivered in full and on time. Naturally, regulation alone does not guarantee an integrated single market. The measures concluded under the FSAP have to be implemented at Member State level in a consistent and timely manner, and national supervisory practices should converge. It is still too early to finally evaluate to what extent the FSAP has achieved its objectives. With this in mind, in 2003 the European Commission initiated a monitoring process to assess the state of integration of European financial markets. One line of assessment is being followed with the help of four expert groups of market participants. The four sectoral groups relating to banking, insurance, securities and asset management were set up in November 2003 and delivered their respective reports in May 2004, open for public comment until 10 September 2004. Another line of assessment is the Commission's first annual "Financial Integration Monitor" report published in May 2004. It provides initial documentation of changes in the level of cross-border integration in key financial segments over recent years. Furthermore, in June 2004 the Financial Services Committee, a forum composed of representatives of the Ministers of Finance from the Member States, a collective view of integration of financial services in the EU and on the remaining challenges, for consideration by the ECOFIN Council.

As concerns the euro area bond market, a recent study proposing a number of measures to quantify the state and evolution of financial integration in the euro area came to the conclusion that a rather high degree of

integration can be observed.<sup>76</sup> Nonetheless, further integration may be possible. First, yields of similar or identical credit risk and maturity have not entirely converged, possibly due to differences in liquidity and availability of related derivative markets. Second, while government bond yields are now mainly determined by common news, idiosyncratic factors continue to be relevant, in particular in

the two-year and five-year maturity segments, but less so for ten-year government bonds (see Box 5).

<sup>76</sup> See Baele et al, "Measuring financial integration in the euro area", European Central Bank, Occasional paper No 14, April 2004. It is noted that this study refers to the euro area financial markets and not to the euro-denominated financial markets. The latter are located both within and outside the euro area and are the subject of the MOC bond market study.

### Box 5

#### DEGREE OF INTEGRATION IN THE EURO AREA MARKETS FOR GOVERNMENT BONDS

One way of monitoring the degree of integration in financial markets is to do so directly on the basis of market prices. The more closely the market prices for comparable financial instruments converge (law of one price), the more integrated the financial markets are deemed to be. In fully integrated markets, the market participants have access to the same information and face the same transaction costs. Furthermore, the pricing should depend solely on the structure of the financial instrument and not, for example, on the place of issuance or custody.

The extent to which the euro area markets for government bonds are already integrated is illustrated by the reaction of European government bonds to fluctuations in the price of selected benchmark bonds. It is assumed that the price movements of both the benchmark bonds and the other bonds in the euro area are based on common factors affecting prices. The chart below shows the average regression coefficients which are measured by the reaction of European government bonds to a 1% price change in German government bonds. The estimates relate to

**Average elasticity of European government bonds with respect to German sovereigns**



Sources: Bloomberg, own calculations.

national price indices calculated by Bloomberg for European government bonds with a maturity of seven to ten years. The regression coefficients are the result of estimates using weekly data and a moving two-year window, and, owing to the design of the estimation approach, they can be measured directly as elasticity.

The nearer the coefficient is to 1, the more closely the European government bonds track movements in the price of the German benchmark bonds. It is striking that since monetary union came into force in 1999, movements in European government bond yields have increasingly coincided. The elasticity of European government bonds with regard to movements in the price of the German benchmark bonds is currently 0.98. Viewed in terms of prices, the integration of the euro area markets for government bonds is remarkably far advanced.

# ANNEX A

## QUANTITATIVE ANALYSIS OF CORPORATE BOND SPREAD DYNAMICS

ANNEX A

Vector error correction estimates: Sample: June 1999 – December 2003; 55 observations; t-statistics in [ ]

Cointegration restrictions: B(1,1)=1, B(1,3)=0, B(1,5)=0; LR test for binding restrictions (rank = 1):

Chi-square(2) 2.455

Probability 0.293

**Cointegrating equation:**

**CointEq**

BBB-spreads(-1)	1.000
3M-MONEY(-1)	-78.527
	[-9.244]
GDP_GROWTH(-1)	0.000
DTE-RATIO(-1)	-66.640
	[-6.094]
ISSUES (-1)	0.000
C	312.433

<b>Error correction:</b>	<b>D(BBB-SPREADS)</b>	<b>D(3M-MONEY)</b>	<b>D(GDP-GROWTH)</b>	<b>D(DTE-RATIO)</b>	<b>D(ISSUES)</b>
CointEq	-0.488	-0.000	3.05E-05	0.003	-0.001
	[-3.885]	[-0.111]	[ 0.033]	[ 3.387]	[-0.857]
D(BBB-SPREADS(-1))	0.307	-0.002	0.000	0.000	0.001
	[ 2.101]	[-1.077]	[ 0.264]	[ 0.266]	[ 0.584]
D(BBB-SPREADS(-2))	-0.143	0.002	-0.001	-0.000	0.002
	[-0.988]	[ 1.294]	[-1.017]	[-0.110]	[ 1.378]
D(BBB-SPREADS(-3))	0.206	-0.002	-0.000	-0.001	0.001
	[ 1.424]	[-1.458]	[-0.403]	[-0.463]	[ 0.606]
D(3M-MONEY(-1))	-6.519	0.579	0.149	0.258	0.036
	[-0.314]	[ 2.876]	[ 0.970]	[ 1.551]	[ 0.168]
D(3M-MONEY(-2))	-23.705	-0.101	-0.051	0.292	-0.175
	[-1.233]	[-0.541]	[-0.359]	[ 1.896]	[-0.883]
D(3M-MONEY(-3))	-35.721	0.106	-0.133	0.288	-0.001
	[-1.745]	[ 0.533]	[-0.880]	[ 1.757]	[-0.003]
D(GDP-GROWTH(-1))	76.347	-0.104	0.785	-0.308	-0.018
	[ 3.187]	[-0.448]	[ 4.423]	[-1.605]	[-0.073]
D(GDP-GROWTH(-2))	-2.457	0.105	0.101	-0.100	-0.025
	[-0.083]	[ 0.367]	[ 0.460]	[-0.422]	[-0.082]
D(GDP-GROWTH(-3))	-15.557	0.147	-0.141	-0.227	0.170
	[-0.689]	[ 0.672]	[-0.844]	[-1.256]	[ 0.733]
D(DTE-RATIO(-1))	7.516	-0.165	0.165	-0.000	-0.462
	[ 0.415]	[-0.943]	[ 1.232]	[-0.003]	[-2.479]
D(DTE-RATIO(-2))	-9.668	0.128	-0.140	0.206	-0.013
	[-0.509]	[ 0.696]	[-0.998]	[ 1.353]	[-0.066]
D(DTE-RATIO(-3))	22.204	-0.118	-0.041	0.024	-0.287
	[ 1.321]	[-0.723]	[-0.326]	[ 0.177]	[-1.659]
D(ISSUES(-1))	-23.164	-0.0433	-0.006	-0.011	-0.713
	[-1.578]	[-0.305]	[-0.053]	[-0.090]	[-4.722]
D(ISSUES(-2))	4.481	-0.026	0.030	-0.355	-0.436
	[ 0.26]	[-0.159]	[ 0.235]	[-2.584]	[-2.471]
D(ISSUES(-3))	-3.263	-0.068	0.001	-0.205	-0.608
	[-0.197]	[-0.427]	[ 0.006]	[-1.549]	[-3.581]
C	0.456	0.004	-0.009	-0.001	0.032
	[ 0.203]	[ 0.161]	[-0.513]	[-0.045]	[ 1.364]
R-squared	0.580	0.387	0.669	0.457	0.518
Adj. R-squared	0.403	0.128	0.529	0.229	0.316
Jarque-Bera test for multivariate normality: p-value=0.1091; LM-test (AR=4): p-value=0.4779.					

Notes: BBB-SPREADS: Merrill Lynch BBB corporate bond spreads, defined as the sum of the option-adjusted spread of BBB corporate bonds with 7-10 years to maturity and the 10-year swap spread in basis points. 3M-MONEY: 3-month EURIBOR. GDP-GROWTH: annual growth rate of EU real GDP. Monthly values are interpolated from quarterly observations. DTE-RATIO: debt to earnings ratio of the non-financial corporate sector, approximated by the log ratio of the sum of non-financial corporate debt (loans to and outstanding amount of debt securities issued by non-financial corporations) relative to a proxy of "corporate earnings" (DJ Euro Stoxx50 divided by the corresponding price-earnings ratio). ISSUES: relative gross issues of debt securities issued by non-financial corporations relative to those issued by the government (central government plus other government).

## ANNEX B

# EMPIRICAL EVIDENCE OF PRICE DISCOVERY IN THE CDS AND BOND MARKETS

The empirical analysis is restricted to financial and non-financial companies, which are the most important reference entities in the European CDS market. In order to explore long-term relationships and short-term dynamics in pricing credit risk, vector error correction models (VECMs) using Johansen's procedure to test for the existence of cointegrating relationships are estimated for each reference entity:

$$\Delta p_{CDS,t} = \lambda_1 (p_{CDS,t-1} - c - \alpha p_{CS,t-1}) + \sum_{i=1}^q \beta_{1i} \Delta p_{CDS,t-i} + \sum_{i=1}^q \delta_{1i} \Delta p_{CS,t-i} + \varepsilon_{1t} \quad (1)$$

$$\Delta p_{CS,t} = \lambda_2 (p_{CDS,t-1} - c - \alpha p_{CS,t-1}) + \sum_{i=1}^q \beta_{2i} \Delta p_{CDS,t-i} + \sum_{i=1}^q \delta_{2i} \Delta p_{CS,t-i} + \varepsilon_{2t} \quad (2)$$

with  $\varepsilon_{1t}$  and  $\varepsilon_{2t}$  as independent, identically distributed (IID) residuals.

The coefficients  $\lambda_1$  and  $\lambda_2$  measure the speeds at which the CDS market and the bond market, respectively, adjust towards equilibrium. Hence, if  $\lambda_1$  turns out to be (significantly) negative, CDS prices adjust towards the long-run relationship. This means, that the CDS prices are following the

Table 12 Estimation results

	N obs	C	$\alpha$ (t-stat)	$\lambda_1$ (t-stat)	$\lambda_2$ (t-stat)	GG
Barclays	501	-8.599	-2.027 (-6.83)	-0.007 (-1.35)	0.073 (4.73)	0.91
Commerzbank	714	19.46	-0.998 (-17.44)	0.015 (1.61)	0.070 (7.68)	1.27
Deutsche Bank	624	1096.4	-45.78 (-7.18)	0.000 (-0.25)	0.005 (7.17)	0.99
San Paolo	522	31.82	-1.088 (-4.10)	0.000 (0.07)	0.072 (3.73)	1.00
Alcatel	651	125.2	-1.446 (-28.25)	-0.076 (-5.01)	0.020 (2.10)	0.21
Deutsche Telekom	503	54.05	-1.628 (-20.05)	-0.003 (-0.24)	0.027 (3.34)	0.90
France Telecom	399	1.623	-0.976 (-24.61)	0.002 (0.14)	0.080 (3.95)	1.03
Telefonica	507	-21.2	-0.798 (-12.35)	-0.018 (-1.46)	0.042 (3.79)	0.70
DaimlerChrysler	507	-36.7	-1.056 (-8.87)	-0.061 (-2.96)	0.017 (1.15)	0.21
Renault	505	0.59	-1.000 (-31.26)	-0.088 (-3.14)	0.082 (3.48)	0.48
Parmalat	270	-50.5	-1.005 (-20.40)	-0.171 (-3.17)	0.066 (3.07)	0.28
Endesa	508	12.660	-1.448 (-18.82)	-0.055 (-2.47)	0.022 (1.60)	0.29
RWE	408	63.83	-2.796 (-18.21)	-0.016 (-1.26)	0.066 (4.03)	0.81
Vattenfall	408	8.848	-1.277 (-8.38)	0.004 (0.39)	0.050 (2.90)	1.09
Total	518	6.835	-2.035 (-7.70)	-0.004 (-0.63)	0.098 (4.97)	0.96

Note: European corporates' CDS and bond data are taken from Bloomberg. CDS spreads for five years' maturity were chosen, since this is the benchmark maturity in the CDS market. The corresponding corporate bond yields were calculated as a weighted interpolation of bond yields with maturities of longer and shorter than five years in order to derive bond yields for five years' maturity for each point in time. The bonds included are exclusively liquid euro-denominated bonds with fixed rates which are not puttable, callable, convertible, subordinated or structured. Bond spreads are calculated as the difference between the generated bond yields and the five-year euro swaps rate. All data refer to mid-market prices on a daily basis covering the period from October 2001 to June 2004.

bond prices temporarily and the bond market is therefore leading in terms of price discovery. Whereas, if  $\lambda_2$  is (significantly) positive, the bond market reacts to deviations from equilibrium and the CDS market accounts for price discovery.

The Johansen cointegration test indicates for 68% of the analysed companies a cointegrating relationship at the 5% level. For 32% of reference entities no unique cointegrating relationship could be found, which may be caused by the aforementioned factors affecting the arbitrage relationship or, to be more speculative, might be interpreted as indicating imperfect integration. The estimation results – including the coefficients of the cointegrating vector  $[1, \alpha, c]$  – are presented in Table 12 and refer to entities with a unique long-term relationship. The lag length for the dynamic part of the VECMs is determined by Akaike's information criterion.

An illustrative way to present the contribution to price discovery is the Gonzalo and Granger measure  $GG = \lambda_2 / (\lambda_2 - \lambda_1)$ . For  $GG < 0.5$  the bond market leads with respect to price discovery, and for  $GG > 0.5$  the CDS market makes the greater contribution to price discovery.

At 87%, the CDS market plays an important role in price discovery ( $\lambda_2$  is significantly positive), whereas the bond market contributes to price discovery in 33% of all cases ( $\lambda_1$  is significantly negative). The Granger and Gonzalo measure indicates that the CDS market is leading in pricing credit risk in 67% of reference entities, whereas the bond market is more relevant in 27%. In one regression (Renault) the results are ambiguous.

## GLOSSARY

**Alternative trading systems (ATSs):** systems that offer other means of trading than established exchanges. They operate electronically (lowering transaction costs) and focus on services that are not always provided by established exchanges (e.g. central limit order book, after hours trading or direct access for institutional investors).

**Arbitrage:** profiting from differences in prices when the same security, currency or commodity is traded in two or more markets.

**Asset-backed securities (ABS):** bonds which are generated by “special purpose vehicles” in order to transform illiquid assets of a certain corporation (the “originator”) into transferable securities. ABS are issued in several tranches with different credit quality.

**Assets under management:** assets managed by a financial institution which are beneficially owned by clients.

**Bank certificates of deposit (CDs):** short-term securities issued by banks.

**Benchmark:** value used as a reference or means of comparison for measuring the performance of an investment.

**Benchmarking:** basing the investment allocation on an industry standard and/or on a fixed securities index.

**Bid-ask spread:** differential prevailing in the market between the bid price and the offered price.

**BIS:** Bank for International Settlements.

**Bon à taux fixe (BTF):** French Treasury bill.

**Bond rating:** ranking of a bond’s quality in terms of default risk. Bonds are rated from a high of AAA (highly unlikely to default) to a low of D (issuer already in default).

**Bonos del Estado (Bonos):** Spanish Treasury bonds with an original maturity of between two and five years.

**Bons du Trésor à taux fixe et à intérêt annuel (BTAN):** negotiable fixed-rate medium-term French Treasury notes with annual interest. On issue their maturity is either two or five years.

**Broker:** firm which operates in a market on behalf of other participants to arrange transactions without being a party to the transactions itself.

**Bubill:** German Treasury bill.

**Buoni Ordinari del Tesoro (BOT):** Italian Treasury bill.

**Buoni Poliennali del Tesoro (BTP):** Italian Treasury bonds with an original maturity of three to thirty years.

**Capitalisation:** see Market capitalisation.

**Central counterparty:** an entity which interposes itself as the buyer to every seller and as the seller to every buyer of a specified set of contracts.

**Certificati di Credito del Tesoro zero coupon (CTZ):** Italian government debt instrument issued at discount with an original maturity of up to two years.

**Certificati di Credito del Tesoro (CCT):** Italian Treasury floating rate securities with a seven-year original maturity.

**Central securities depository (CSD):** a facility for holding securities which enables securities transactions to be processed by book entry. Physical securities be immobilised by the depository or securities may be dematerialised (i.e. so that they exist only as electronic records). In addition to safekeeping, a central securities depository may incorporate comparison, clearing and settlement functions.

**Clearing:** the process of transmitting, reconciling and, in some cases, confirming the payment order and the securities transfer prior to settlement. In the context of repos, this can have three separate aspects: confirmation/matching, netting and clearing with the central counterparty.

**Cointegration:** in econometrics non-stationary time series are cointegrated if there exists a linear relationship that is stationary. The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship among the variables.

**Collateralised debt obligation (CDO):** a structured debt security backed by a portfolio of assets; see synthetic collateralised debt obligation.

**Commercial paper (CP):** short-term obligations with maturities ranging from 2 to 270 days issued by banks, corporations and other borrowers. Such instruments are unsecured and usually discounted, although some are interest bearing.

**Confirmation/matching:** the process of ensuring that the two counterparties agree with regard to the terms of the transaction – price, asset(s), value dates, settlement data, including relevant account numbers – before the payment and transfer orders are sent for settlement.

**Convertible bond:** bond exchangeable for equity at a set price.

**Corporate bond spread:** difference between the interest rate of fixed income instruments issued by corporations and the rates of debt obligations without default risk.

**Counterparty:** the opposite party in a financial transaction.

**Credit default swap:** credit derivative transaction in which the buyer of protection can insure himself against default by a particular issuer for a specific period by paying a periodic premium to the protection seller.

**Credit derivative:** an OTC derivative designed to transfer credit risk from one party to another.

**Credit risk:** the risk that a counterparty will not settle an obligation for the full value, either when due or at any time thereafter.

**Credit linked note (CLN):** debt security which is fully paid back only if an agreed credit event has not occurred, otherwise the repayment is reduced by the agreed contingent payment.

**Credit spread option:** option to buy a bond at the future market price and obtaining the price associated with an agreed “strike spread”.

**Cross margining:** netting of margin requirements for the simultaneous sale and purchase of securities.

**Crossing network:** system which matches buy and sell at a price determined in another market. Such systems play no part in price discovery.

**Currency risk:** the risk that the operations of a business or the value of an investment will be affected by changes in exchange rates.

**Dealer:** firm whose primary business is entering into transactions on both sides of wholesale financial markets and seeking profits by accepting risks in these markets.

**Defined benefit insurance policies:** policies for which the benefits are defined ex ante.

**Depository:** an agent with the primary role of recording securities either physically or electronically and keeping records of ownership of these securities.

**Derivative:** a financial contract whose price depends on the value of one or more underlying reference assets, rates or indices. For analytical purposes, all derivatives contracts can be divided into basic building blocks of forward contracts or options or combinations thereof.

**Disintermediation:** the investment in or borrowing from financial markets directly, without the use of financial intermediaries such as banks.

**Electronic trading:** in broad terms, this refers to any use of electronic means of sending orders (bids and offers) to the market where their automated execution is performed.

**EMU:** Economic and Monetary Union.

**End-user:** an entity that takes positions for investment or hedging purposes. An end-user often deals on one side of the market only.

**EU:** European Union.

**EURIBOR:** the euro area interbank offered rate for the euro, sponsored by the European Banking Federation (EBF) and the Association Cambiste Internationale (ACI). It is an index price source covering dealings from 48 prime banks.<sup>77</sup>

**Euro overnight index average (EONIA):** the overnight rate computed as the euro area interbank offered overnight rate for the euro. It is computed as a weighted average of all overnight unsecured

<sup>77</sup> Number of panel banks as of November 2004.

lending transactions in the interbank market, initiated within the euro area by the contributing panel of 48 prime banks.<sup>78</sup>

**Euronext:** company created on 22 September 2000 through the merger of the exchanges of Amsterdam, Brussels and Paris. The Lisbon and Porto exchanges joined later.

**European Master Agreement:** legal contract sponsored by the European Banking Association and the European Savings Association which aims to consolidate into a single set of harmonised documents various master agreements used within the euro area and certain neighbouring countries, particularly for repurchase transactions and securities lending.

**European System of Central Banks (ESCB):** the European Central Bank and the national central banks of the EU Member States.

**Eurosystem:** the European Central Bank and the national central banks of the EU Member States, which have adopted the euro.

**Exchange traded funds (ETFs):** a fund that is traded on a stock exchange like a share.

**Financial services action plan (FSAP):** elaborated and adopted by the European Commission in 1999, the action plan was endorsed by the Lisbon European Council in March 2000, which set a deadline for its implementation of 2005 at the latest. Its purpose is to improve the single market in financial services in order to reap the full benefits of the euro. The action plan suggests indicative priorities and time-scales for legislative and other measures to tackle three strategic objectives, namely ensuring a single market for wholesale financial services, open and secure retail markets and state-of-the-art prudential rules supervision.

**Futures:** agreement to buy or sell a specific amount of a commodity or financial instrument at a particular price on a stipulated future date.

**General collateral:** collateral which, owing to its homogeneous features, is broadly accepted.

**Hedge fund:** private investment partnership whose offering memorandum allows for the fund to take both long and short positions, to use leverage and derivatives, and to invest in many markets.

**Hedging:** strategy to offset investment risk.

**High-yield bonds:** bonds rated BB and below.

**Home bias:** tendency of investors to limit their holdings to the domestic market.

**Investment grade bonds:** bonds rated at least BBB.

**International central securities depository (ICSD):** a central securities depository which clears and settles international securities or cross-border transactions in domestic securities.

**Junk bond:** high-yield bond with a credit rating of BB or below.

<sup>78</sup> Number of panel banks as of November 2004.

**Liquid (market):** the three aspects of liquidity are tightness in bid-ask spreads, depth and resiliency. It is characterised by the ability to transact in a market without significantly moving prices.

**M&A:** mergers and acquisitions.

**Market capitalisation:** value of a corporation as determined by the market price of its issued and outstanding common stock.

**Market maker:** dealer obligated to quote buy and sell prices in return for certain privileges within a market (sometimes used to refer to anybody who provides quotes).

**Monetary financial institutions (MFIs):** financial institutions forming the money-issuing sector of the euro area. They include the ECB, the NCBs of the euro area countries, and credit institutions and money market funds located in the euro area.

**Mortgage bond:** bond issue secured by a mortgage on the issuer's property, the lien on which is conveyed to the bondholders by a deed of trust.

**Mutual funds:** investment company that raises money from shareholders and invests the proceeds (also investment funds).

**Net asset value:** is calculated for an investment fund by taking the market value of all securities owned plus all other assets such as cash, subtracting all liabilities, then dividing the result (total net assets) by the total number of shares outstanding.

**Netting:** the process of offsetting cash or securities positions. Through netting, the gross positions are reduced. This is particularly true for the cash side, as all cash is fungible, this is not necessarily true for assets.

**Non-collective investment funds:** funds not managed on a collective basis but on behalf of an individual institution, or possibly of an individual. Important institutional investors include pension funds and insurance companies, which might delegate the management of funds to an external fund manager or within the financial group to which it belongs. By contrast with collective investments, "non-collective investments" may be characterised as private placements not marketed to the general public but established by direct contracts between the investor and the fund manager.

**Non-stationarity:** see stationarity.

**Obligaciones del Estado:** Spanish Treasury bonds with initial maturity of more than five years.

**Obligations assimilables du trésor (OAT):** French fungible Treasury bonds with original maturities from seven to thirty years.

**Obligations linéaires-lineaire obligaties (OLO):** Belgian fungible medium and long-term Treasury bonds with original maturity of up to thirty years.

**OECD:** Organisation for Economic Cooperation and Development.

**Option:** an option is a financial instrument which gives the owner the right, but not the obligation, to buy or sell a specific underlying asset (e.g. a bond or a stock) at a predetermined price (the strike or exercise price) on or up to a certain future date (the exercise or maturity date). A call option gives the holder the right to purchase the underlying asset at an agreed exercise price, whereas a put option gives the holder the right to sell it at an agreed exercise price.

**OTC (over-the-counter):** bilateral transactions not conducted on a formal exchange.

**Passive management:** a style of investment management, which seeks to replicate the performance of a market index. Passive management is also called index management.

**Pfandbriefe:** German mortgage bonds.

**Primary dealer:** selected credit institution authorised to buy and sell original issuance of government securities in direct dealing with the Treasury.

**Primary market:** market for new issues of securities.

**Quote-driven market:** usually a decentralised market where a class of participants, possibly market makers, post bid and offer quotes, often indicative, with prices being determined through bilateral negotiation.

**R-squared:** measure of quality to fit in econometrics. Ranging from 0% to 100%, R-squared shows what percentage of a variable's movement is explained by the applied model.

**Real-time gross settlement (RTGS) system:** a settlement system in which processing and settlement take place on an order-by-order basis (without netting) in real time (continuously).

**Remote access:** access to a system granted to a participant which has neither its head office nor any of its branches located in the country where the system is based.

**Repo/repurchase agreement:** an agreement to sell an asset and to repurchase it at a specified price on a predetermined future date or on demand. Such an agreement is similar to collateralised borrowing, although it differs in that the seller does not retain ownership of the assets. Sale and repurchase agreements are also termed repo transactions and are traded on the repo market.

**S&P 500:** Standard and Poor's stock index of the 500 leading US companies.

**Secondary market:** exchanges and over-the-counter markets where securities are bought and sold subsequent to the original issuance, which took place in the primary market.

**Settlement:** completion of a transaction by exchange of instruments and funds.

**Special collateral:** collateral other than general collateral.

**Standard & Poor's (S&P):** index provider.

**Stationarity:** in econometrics a time series is said to be (weakly) stationary if the mean and auto-covariances of the series do not depend on time. Any series that is not stationary is said to be

non-stationary. Standard inference procedures do not apply to regressions which contain a non-stationary dependent variable or integrated regressors.

**Swap:** an agreement on an exchange of payments between two counterparties at some point(s) in the future and according to a specified formula.

**Swap spread:** difference between the fixed rate of an interest rate swap and the government bond rate.

**Synthetic collateralised debt obligation:** redistributes the risk inherent in a portfolio of CDS across a number of tranches that have a strict seniority ordering.

**TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system):** the RTGS system for the euro. It is a decentralised system consisting of 15 national RTGS systems, the ECB payment mechanism (EPM) and the interlinking mechanism.

**Treasury bill:** short-term government debt instrument issued at a discount with a maturity of one year or less.

**Treaty:** refers to the Treaty establishing the European Community. The Treaty was signed in Rome on 25 March 1957 and entered into force on 1 January 1958. It established the European Economic Community (EEC), which is now the European Community (EC), and is often referred to as the “Treaty of Rome”. The Treaty on European Union (which is often referred to as the “Maastricht Treaty”) was signed on 7 February 1992 and entered into force on 1 November 1993. The Treaty on European Union amended the Treaty establishing the European Community and established the European Union. The “Treaty of Amsterdam”, which was signed in Amsterdam on 2 October 1997 and entered into force on 1 May 1999, and most recently the “Treaty of Nice”, which was signed on 26 February 2001 and entered into force on 1 February 2003, amended both the Treaty establishing the European Community and the Treaty on European Union.

**UCITS:** undertakings for collective investment in transferable securities.

**Vector autoregression (VAR):** in econometrics an approach in which every endogenous variable in the system is treated as a function of the lagged values of all of the endogenous variables in the system.

**Vector error correction (VEC):** a VAR that restricts the long-run behaviour of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics.

**Warrant:** a security that entitles the holder to buy a proportionate amount of common stock at a specified price, usually higher than the price at the time of issuance, for a period of years or in perpetuity.

**Zero coupon bond:** a security issued at discount or one which delivers a single coupon at maturity.

