



EUROPEAN CENTRAL BANK

# INDICATORS OF FINANCIAL INTEGRATION IN THE EURO AREA

SEPTEMBER 2006

BCE ECB EZB EKT EKP





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## INDICATORS OF FINANCIAL INTEGRATION IN THE EURO AREA

SEPTEMBER 2006



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## EXECUTIVE SUMMARY

*This report presents the second ECB annual assessment of the degree of integration in the different financial segments of the euro area. It is based on a set of financial integration indicators that are published semi-annually on the ECB website. While many important dimensions of the financial system (such as the money, bond, equity and banking markets) were covered in the first report, for the second report the ECB decided to widen the scope by including the following additional indicators: quantity-based indicators for the main market segments; indicators related to market infrastructures; and new indicators on banking markets. The available evidence suggests that the degree of integration varies greatly depending on the market segment and is correlated with the degree of integration of the underlying infrastructure. The unsecured money market has been fully integrated since the introduction of the euro. The repo market is also highly integrated. The full integration of the large-value payment systems has been instrumental in achieving this result. Similarly, government bond markets became considerably more integrated in the run-up to Economic and Monetary Union (EMU). The corporate bond market too received a major boost following the introduction of the euro and has achieved a high degree of integration. Progress has also been made in the integration of euro area equity markets, where equity returns are increasingly determined by specific factors that are common to euro area countries. However, the euro area securities infrastructure underpinning both bond and equity markets is not yet sufficiently integrated. With regard to the euro area banking markets, while interbank and capital market-related activities show signs of increasing integration, retail banking continues to be fragmented. This lack of integration in retail banking markets is also apparent in the differences in the provision of retail payment services, as the fragmented underlying infrastructure reveals.*

## I INTRODUCTION

This report presents the ECB's annual assessment of the degree of financial integration in the different financial markets segments of the euro area. Like the first issue of September 2005, it is based on a series of indicators that are regularly updated and published on the ECB's website.<sup>1</sup> The focus is on euro-denominated instruments, with particular attention to price differences across euro area countries. While the first issue of the report already covered many dimensions of the financial system (such as the money, bond, equity and banking markets), other important areas – such as market infrastructures and corporate banking – were not discussed. The ECB has therefore decided to widen the scope of the second report by including additional indicators, and in particular by extending the scope in three main directions.

First, quantity-based indicators have been systematically computed for the main market segments. These indicators are used to investigate the extent to which investors have diversified their portfolios across euro area countries. They usefully complement price-based indicators, as investors in financially integrated markets will increase their holdings of non-domestic assets to maximise the benefits from international diversification.<sup>2</sup>

Second, the report includes indicators about the market infrastructures, in recognition of the fact that these play a significant role in the ongoing process of financial integration. Rather than devoting a separate chapter to these indicators, it has been decided to allocate them to the main market they serve. This choice inevitably produces some overlaps, as the same infrastructure sometimes serves different markets. However, the main focus of interest here is not in the degree of integration of market

1 For the biannual updates of the indicators, see <http://www.ecb.int/stats/finint/html/index.en.html>.

2 Following the numbering used in the annex, the new indicators belonging to this first group are numbers 2, 13, 14, 15, 24, 25 and 34.

infrastructure per se, but rather the extent to which the provision of their services is conducive to the integration of the respective market. The aim is to present a comprehensive picture of each market segment, taking into account the role played by market infrastructures.<sup>3</sup>

Third, the section on banking markets has been substantially enhanced. Since banking is a multi-product market, encompassing wholesale as well as retail components, it is particularly challenging to assess the degree of financial integration. Compared to the first report, the banking market section now includes a range of indicators on the cross-border presence of euro area banks, as this provides a useful way of understanding how banks – and financial institutions in general – try to extend their services beyond national boundaries, thus contributing to the further integration of this market segment. The report also contains indicators related to corporate banking.<sup>4</sup>

Additionally, the report covers the development of new synthetic credit risk transfer (CRT) instruments such as credit derivatives and synthetic collateralised debt obligations (CDOs), and examines how they may contribute to promoting the completeness and integration of credit and bond markets.<sup>5</sup>

In future the ECB intends to continue to develop the set of relevant indicators for financial integration (e.g. to cover the insurance markets), depending on data availability and quality.

The report is structured as follows. Sections two to five analyse the money, bond, equity and banking markets respectively. Each section presents an overall assessment of the current degree of financial integration and discusses the evolution of the indicators in more detail. The annex contains all the indicators and methodological notes.

## 2 MONEY MARKET

*The euro area money market is characterised by a high degree of integration. The unsecured money market reached a stage of “near-perfect” integration almost immediately after the introduction of the euro. The available indicators suggest that the repo market has reached an advanced degree of integration as well. The degree of integration in the money markets has been accompanied and sustained by the full*

3 The new indicators of the second group are numbers 3, 4, 5, 17, 18, 19, 20, 41 and 42 in the annex.

4 The new indicators of the third group are numbers 26, 27, 28, 29, 30, 38, 39 and 40a-b in the annex.

5 The new indicator is number 16 in the annex.

**Figure 1a Cross-country standard deviation of the average overnight interbank lending rates across euro area countries**

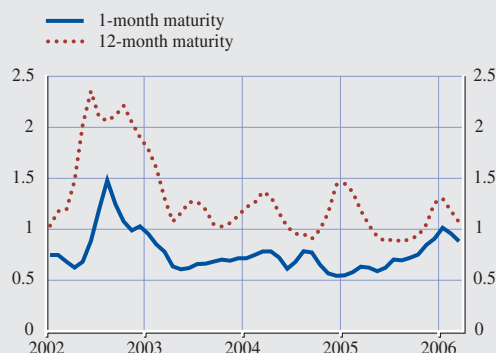
(basis points)



Sources: European Banking Federation and ECB calculations.

**Figure 1b Cross-country standard deviation of interbank repo rates across euro area countries**

(basis points)



Sources: European Banking Federation and ECB calculations.

integration of the large-value payment systems.

## 2.1 PRICE-BASED INDICATORS

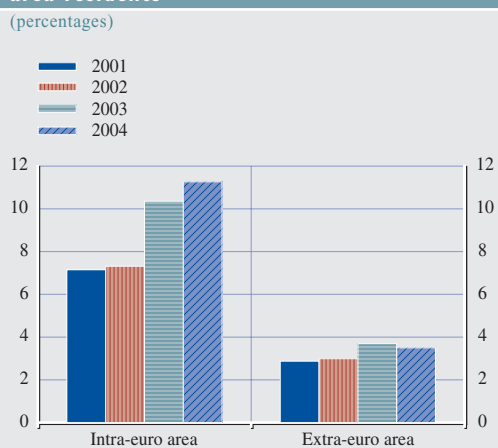
The money market, which can broadly be defined as the market for interbank short-term debt or deposits, consists of various segments. The financial integration of the money markets can be analysed on the basis of the dispersion of lending rates offered by different banks in each market segment. This section discusses the indicators for the unsecured interbank market and the repo market.

Figures 1a and 1b show the cross-country standard deviation for the EONIA (euro overnight index average) and EUREPO (the benchmark rate for secured money market transactions in the euro area), respectively. According to Figure 1a, the cross-sectional standard deviation of the EONIA lending rates across euro area countries fell sharply to close to zero following the introduction of the euro, and remained stable thereafter. Figure 1b shows the same type of indicator as plotted in the previous figure, applied to the one-month and 12-month EUREPO rates, which were created in 2002. These indicators suggest that a high degree of integration also exists in the euro area repo market.

## 2.2 QUANTITY-BASED INDICATORS

Figure 2 plots the share of short-term debt securities<sup>6</sup> issued by euro area residents and held by other euro area residents. Overall, this has increased from 7% in 2001 to 11% in 2004. To control for global developments in this market segment, the histograms on the right side of Figure 2 reflect the share of short-term debt securities issued by euro area residents and held by non-euro area residents. The plot shows that both the level and the increase over time of these indicators are more pronounced for the intra-euro area market. Despite the high level of integration suggested by price-based indicators, the degree of cross-border activity in euro area short-term debt securities remains limited when compared

**Figure 2 The degree of cross-border holdings of short-term debt securities issued by euro area residents**



Sources: Bank for International Settlements (BIS), International Monetary Fund (IMF) and ECB calculations.

Note: "Intra-euro area" is defined as the share of short-term debt securities issued by euro area residents and held by residents (excluding central banks) in other euro area countries. "Extra-euro area" is defined as the share of short-term debt securities issued by euro area residents and held by non-residents (excluding central banks) of the euro area. IMF data are only available up to 2004.

to the corresponding indicators for bond and equity markets (see Figures 7 and 14 below).

## 2.3 INFRASTRUCTURE: LARGE-VALUE PAYMENT SYSTEMS

Large-value payment systems (LVPS) are mostly used for interbank payment transactions. In particular, they are used to settle interbank money market operations.<sup>7</sup> Before the introduction of the euro in 1999, the LVPS market was fragmented, with only domestic LVPS operating in legacy currencies. Inter-Member State payments, i.e. payments across national borders, within the EU were typically made via correspondent banking. With the introduction of the euro, however, the principles for the provision of payment services within the euro area fundamentally changed. The existence of the single currency and the effective conduct of the single monetary policy required inter-

<sup>6</sup> Short-term debt securities encompass treasury bills, commercial paper and bankers' acceptances that usually give the holder the unconditional right to a stated fixed sum of money on a specified date.

<sup>7</sup> They are also used, for instance, to settle the cash leg of securities trades and the euro leg of foreign exchange trades.



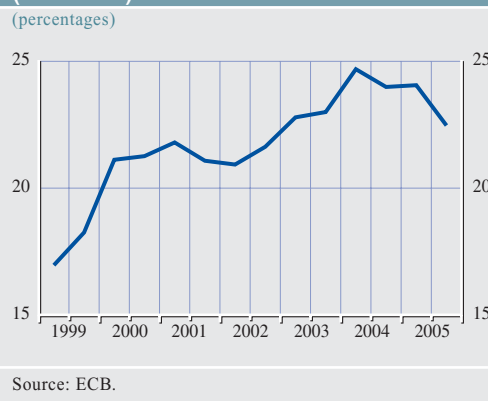
Member State payments within the euro area to be in principle no different from payments within each country.

While there were as many as 17 LVPS in 1998, this number had dropped to six by 1999 owing to the launch of TARGET, the Trans-European Automated Real-time Gross settlement Express Transfer system. TARGET links the national real-time gross settlement systems of the 15 EU Member States at that time plus the ECB payment mechanism (EPM) into a single system. It is instrumental for the processing of inter-Member State payments between almost all credit institutions within the euro area in real-time, and at a harmonised transaction fee.

Since the introduction of the euro, two of the remaining six systems have closed down. Of the remaining four systems, most of the traffic is processed by TARGET and EURO1, a private net settlement system, with TARGET the larger of the two.

The share of inter-Member State payments in the total number of payments processed by TARGET accounted for about 17% in the first half of 1999 (see Figure 3). In the second half of 2005, the share of inter-Member State payments accounted for 22.5% after having reached a peak of 24.7% in the first half of 2004. The decrease depicted from the first half of 2005 to the second half of 2005 is explained by a relatively stronger increase in the number of intra-Member State payments<sup>8</sup>. These developments suggest that there is increasing demand for large-value or time-critical payments on an inter-Member State basis. Similarly, the share of inter-Member State payments in the total value of payments processed in TARGET has increased from 25.7% in 1999 to 33.8% in the second half of 2005 (see Chart 5 in the annex). The share of inter-Member State traffic is larger in terms of value than in terms of the number of transfers. In fact, TARGET may attract in particular high-value payments, whereas banks may prefer to process lower value inter-Member State payments via EURO1.

**Figure 3 TARGET: share of inter-Member State payments to total payments (in volume)**



### 3 BOND MARKETS

*With the introduction of the euro and the removal of exchange rate risk, government bond yields have converged in all countries and increasingly tend to be driven by common factors. The importance of local factors has not, however, completely disappeared. Differences in liquidity as well as in the availability of developed derivatives markets tied to the various individual bond markets may partly account for these divergences. Additionally, bond yields in different countries also reflect differences in perceived credit risks. The impact of the latter factor should however not be seen as an indication of a lack of integration. The euro area market for corporate bonds has grown considerably in recent years, and the available evidence suggests that it is already reasonably well integrated. The finding that bond markets are highly integrated is broadly confirmed when looking at the share of cross-border activity in the long-term debt instruments market. At the same time, the euro area securities settlement infrastructure remains fragmented. In addition, anecdotal evidence suggests that an important factor contributing to the integration of financial*

<sup>8</sup> One reason behind the increase in the number of intra-Member State payments lies in the closure of a domestic LVPS, whose traffic became intra-Member State payments in TARGET. Another is a change in policy for handling payments of the State Treasury in one euro-area country.

markets is the development of synthetic CRT products.

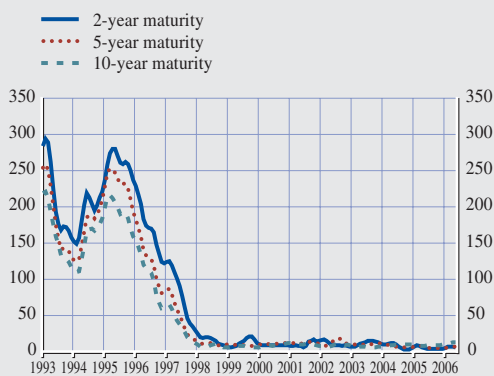
### 3.1 PRICE-BASED INDICATORS FOR GOVERNMENT BONDS

A simple direct measure of integration in the government bond markets is based on the standard deviation of yield differentials with respect to a benchmark bond (for instance, the German bond for ten-year bonds, or the French bond for two and five-year bonds). Given comparable maturities and other relevant characteristics, it can be concluded that the higher the degree of integration, the lower the dispersion of yield differentials across euro area countries.

Figure 4 shows the evolution over time of the standard deviations of the government yield spreads over the German bonds (for ten-year bonds) and the French bonds (for two and five-year bonds). The figure shows that, after the significant drop in the run-up to Economic and Monetary Union (EMU), the dispersion of yield differentials has remained close to zero since 2001.

**Figure 4 Standard deviation of government bond yield spreads for two, five and ten-year maturities**

(basis points)



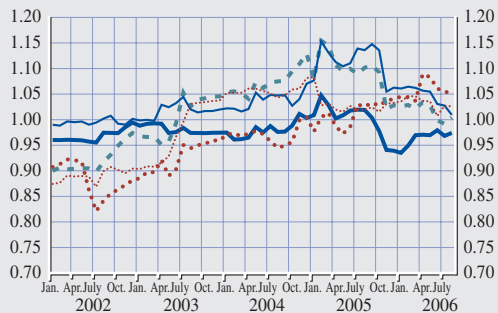
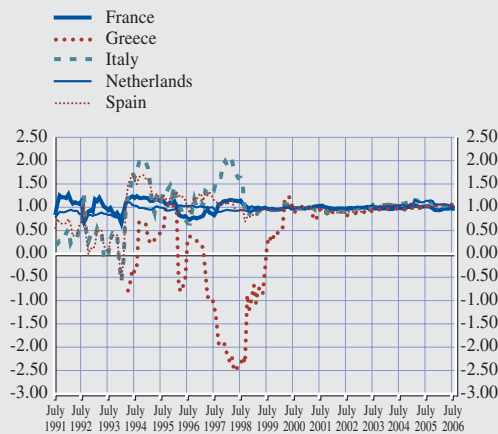
Source: ECB.

Note: As a benchmark, the German government bond yield is taken for ten-year maturity bonds and the yield on the French government bond for two and five-year maturity bonds. Greece is included in the calculation of standard deviation for all maturities after joining the euro area in 2001.

In assessing the previous indicator, it should be borne in mind that movements related to changes in the market's credit risk perceptions (which may affect the dispersion of the spreads) do not signal a variation in the degree of integration. This issue is partly addressed by the so-called "beta convergence" indicator, which is based on the economic intuition that the more integrated the market is, the more bond yields should react to common factors instead of local factors. Hence, changes in credit risk perceptions of individual governments should not affect the beta coefficient, which represents the estimated correlation of changes in the ten-year government bond yield of a given country with changes in the German

**Figure 5 Evolution of beta coefficients for selected countries**

(ten-year government bond yields; 18-months rolling regression)



Source: ECB.

Note: Based on a model regressing national ten-year government bond yields on benchmark German ten-year government bond yields.

ten-year government bond yield. Figure 5 shows the evolution of the estimated beta coefficients. The coefficients varied substantially up to 1998, but then converged afterwards towards 1, the perfect integration level. Greek bond yields only converged after 2001, following the adoption of the euro. The most recent developments in this indicator, as shown in the lower chart of Figure 5, suggest that the euro area government bond market has reached a quite advanced stage of integration.

### 3.2 PRICE-BASED INDICATORS FOR CORPORATE BONDS

The yield on a corporate bond denominated in euro typically depends on a number of factors, such as the credit rating, time to maturity, liquidity and the cash flow structure. In the ideal case of perfect integration, the impact of these specific factors should be identical across countries. Using the same set of specific factors, it is possible to obtain measures of the degree of corporate bond market integration by investigating whether or not risk-adjusted yield spreads have a systematic country component.

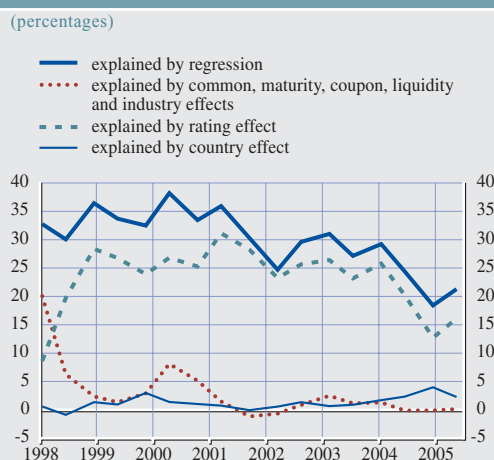
In an integrated market, the proportion of the total yield spread variance that is explained by country effects should be close to zero.

Following this approach, the indicator shows that the euro area corporate bond market is quite well integrated, with country effects only explaining a very small proportion of the cross-sectional variance of corporate bond yield spreads (see Figure 6).

### 3.3 QUANTITY-BASED INDICATORS FOR LONG-TERM GOVERNMENT AND CORPORATE BOND MARKETS

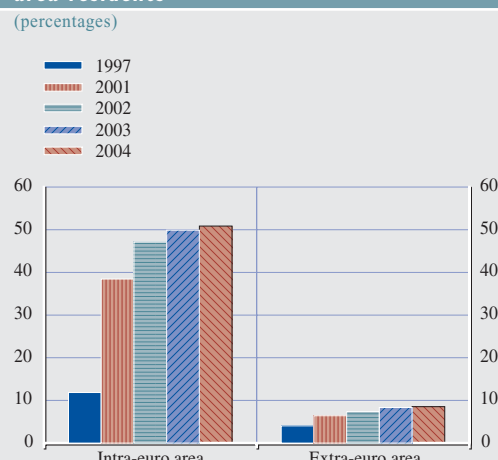
The finding that bond markets are highly integrated is broadly confirmed when looking at the share of cross-border activity in the long-term debt instruments market. Euro area investors considerably increased their holdings of euro area cross-border assets (as a share of their total international portfolio) between 1997 and 2004 (see Figure 7 below). Over this period, the share of intra-euro area cross-border holdings of long-term debt securities increased markedly, by 39 percentage points. This increase

**Figure 6 Proportion of cross-sectional variance of explained by various factors**



Sources: Bloomberg and ECB calculations.

**Figure 7 The degree of cross-border holdings of long-term debt securities issued by euro area residents**

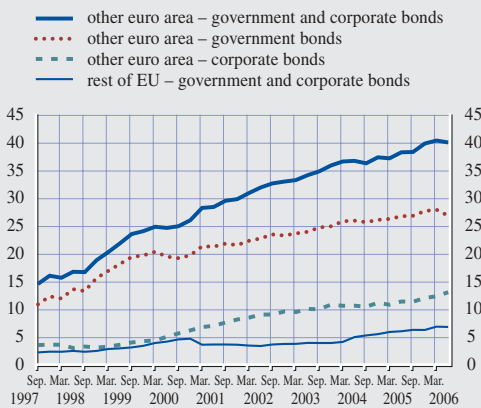


Sources: BIS, IMF and ECB calculations.

Note: "Intra-euro area" is defined as the share of long-term debt securities issued by euro area residents and held by residents (excluding central banks) in other euro area countries. "Extra-euro area" is defined as the share of long-term debt securities issued by euro area residents and held by non-residents (excluding central banks) of the euro area. IMF data are only available up to 2004.

**Figure 8 Share of MFI cross-border holding of debt securities issued by euro area and EU non-MFIs: outstanding amounts by residency of the issuer**

(percentages)



Source: ECB.

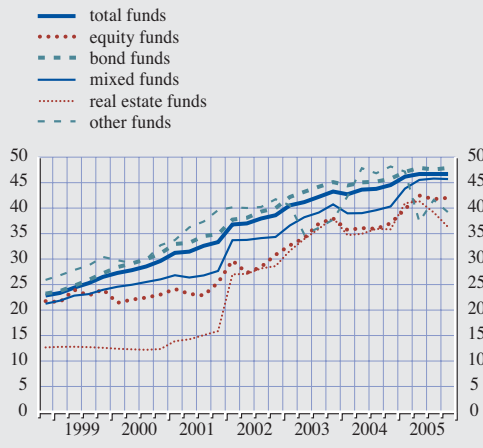
is striking when compared to developments in the extra-euro area holdings of euro area securities, which remained very low. It can thus be concluded that EMU has had a particularly sizeable impact on regional financial euro area integration in the fixed income market.

Figure 8 shows the development of holdings of debt securities issued by governments and non-financial corporations from other euro area countries and held by euro area monetary financial institutions (MFIs). Overall, MFIs have strongly increased their cross-border holdings since the end of the 1990s, from 15% to 40%. In particular, the holding of debt securities issued by non-financial corporations has increased remarkably from a very low basis.

Figure 9 shows the proportion of non-domestic euro area debt securities in the portfolio of euro area investment funds. In common with Figures 7 and 8, the large increase in the total share (from 23% to 47%) provides strong evidence supporting the extensive intra-euro area diversification of euro area investment fund holdings.

**Figure 9 Investment funds holdings of debt securities issued in other euro area countries as a share of total holdings of debt securities**

(percentages)



Source: ECB.

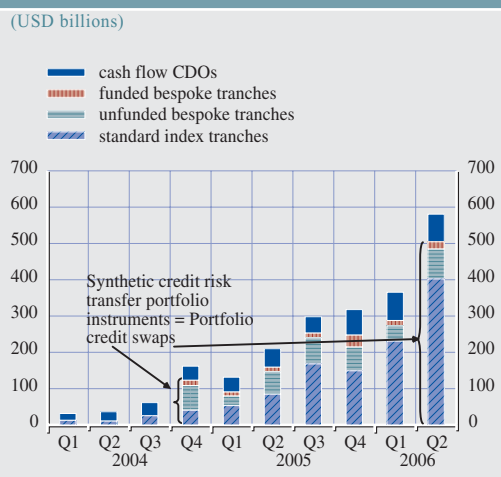
### 3.4 IMPACT OF SYNTHETIC CREDIT RISK TRANSFER INSTRUMENTS ON THE INTEGRATION OF BOND MARKETS

The advent of synthetic credit risk transfer (CRT) instruments such as credit derivatives and synthetic collateralised debt obligations (CDOs)<sup>9</sup> promotes market completeness and as such affects the functioning and development of credit markets as well as the financial integration of corporate bond markets.

From a financial integration perspective, synthetic CRT instruments promote three main aspects: i) easier access to credit risk exposure; ii) smoother market linkages with lower transaction costs; and iii) price transparency of credit risk. The impact of synthetic CRT instruments on the integration of credit markets is nevertheless difficult to assess in quantitative terms. The absolute size of the relevant markets,

<sup>9</sup> CDOs are securities issued in tranches of varying seniority backed by a portfolio of credit instruments such as bonds, loans or other assets. In contrast to cash-flow instruments, synthetic CDOs generate exposure to underlying assets not by buying bonds or loans outright, but by referencing issuer/debtor names or assets through credit derivatives.

**Figure 10 Global CDO issuance in notional terms**



Sources: BMA cash flow CDOs, Creditflux regarding other tranches.

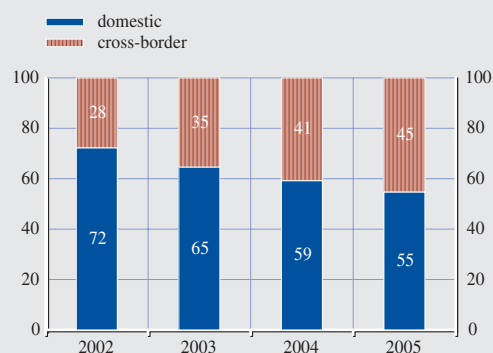
Note: Notional amount, not adjusted for the riskiness of different tranches. Portfolio credit swaps consist of synthetic CDOs. The term “unfunded” implies that the principal amount is not transferred between the two parties, while “bespoke” denotes customised, tailor-made, non-index or non-standard tranches (see also the annex, indicator 16).

together with a careful assessment of qualitative indicators<sup>10</sup>, may provide information on the relevance of these instruments.<sup>11</sup>

Figure 10 displays the global developments in CDO issuance in notional terms. It shows that CDOs which are related to the cash market, so-called cash flow CDOs, only represent a fraction of the synthetic CDO market. Although data are only available at a global level, anecdotal evidence suggests that the relative share of synthetic CDOs is high in Europe. The rapid growth of synthetic CDOs in Europe may point to a more integrated market for credit risk, possibly reflecting the market’s response to the prevailing segmentation in the underlying cash market. CDOs are complex credit risk portfolio products that in economic terms maximise their value to the investment bank (arranger) and the investor if the assets backing the obligation are highly diversified. In addition, the dominant players in this market are international institutions which structure products according to their global needs and not according to national frameworks. Restrictions in the underlying cash market in Europe (e.g. national

**Figure 11 Share of domestic and cross-border collateral used for Eurosystem credit operations**

(as a percentage of total collateral provided to the Eurosystem)



Source: ECB.

regulatory barriers, legal difficulties to the transfer of loans, a less developed market infrastructure) limit the capacity to diversify cash credit risk portfolios across countries. Therefore, pan-European portfolios are increasingly being built up in synthetic form, where regulatory barriers are low.

### 3.5 INFRASTRUCTURE: SECURITIES CLEARING AND SETTLEMENT SYSTEMS

In the field of securities markets, the degree of integration of the underlying financial infrastructures is of the utmost importance, since efficient and safe securities clearing and settlement systems are a necessary condition for integrated capital markets, as well as for the sound execution of monetary policy, the smooth functioning of payment systems and the preservation of financial stability. Since the start of EMU, a process of integration and

<sup>10</sup> E.g. common market standards, legal documentation, trading and post-trading market standards and infrastructure.

<sup>11</sup> It should be noted that currently available sources provide neither a geographical split nor a weighting of the riskiness of the different tranches.



consolidation in the European clearing and settlement landscape has been underway. However, despite the single currency, the euro area securities infrastructure remains fragmented.

In general, the establishment of links between securities settlement systems (SSSs) for the Eurosystem's monetary policy operations reflects the network model of market infrastructure integration. It is logical that the more links there are between SSSs, the higher the degree of interoperability and connectivity. In particular, the number of eligible links for Eurosystem credit operations between euro area SSSs increased considerably in the first two years of EMU (see Chart 17 in the annex). Nevertheless, their total use for cross-border collateral purposes in the Eurosystem remains relatively limited.

Another proxy for the degree of integration of the euro area securities market infrastructure is the number of securities infrastructure providers. The number of legal entities operating a central securities depository (CSD) declined from 21 in 1998 to 19 in 2005, while the number of central counterparties (CCPs) for financial instruments (derivatives and securities) decreased from 13 to seven over the same period. In recent years, however, only relatively modest progress has taken place in the consolidation of CSDs and CCPs. Most consolidation activities have been purely legal mergers rather than technical integration, which means that CSDs and CCPs still operate and serve their own markets on separate technical platforms. However, harmonisation projects designed to achieve complete technical integration of activities and services have currently started and are being pursued by some CSDs and CCPs. Moreover, most of the consolidation activity has taken place within the euro area, although there has also been some cross-border consolidation between entities located in the euro area and non-euro area entities. At the moment, cross-border settlement of bonds is mainly carried out by

only two international central securities depositories (ICSDs).

SSSs play a crucial role in the Eurosystem's collateral framework as they provide the infrastructure that allows counterparties to transfer collateral to the Eurosystem. As shown in Figure 11, the share of cross-border collateral held by the Eurosystem has increased significantly, from 28% in 2002 to 45% in 2005. This indicator reveals that counterparties have increasingly substituted domestic with foreign collateral over recent years. In other words, the increase in the relative share of cross-border collateral indicates an increase in market participants' cross-border business, which shows the growing Europeanisation of collateral use within the euro area.

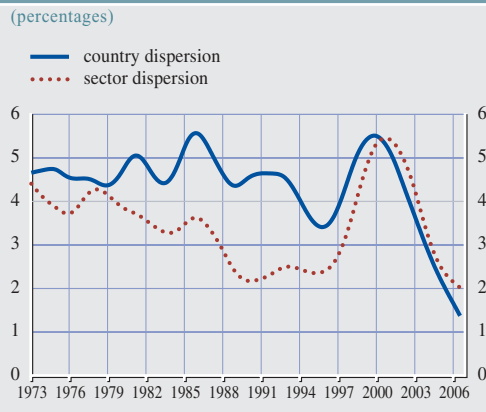
## 4 EQUITY MARKET

*The measures of euro area equity market integration indicate a rising degree of integration. First, since the end of 2000, the advantages of sectoral diversification seem to have surpassed those of geographical diversification. Recent data suggest increased correlations of both country and sector returns. Second, equity returns in the euro area countries are increasingly determined by common factors. Third, quantity indicators point to the fact that euro area investors have diversified their equity portfolio holdings within the euro area as a consequence of the introduction of the euro. In spite of this, there still appears to be room for further integration. As discussed in sub-section 3.5, the euro area securities settlement infrastructure remains fragmented and not yet sufficiently integrated.*

### 4.1 PRICE-BASED INDICATORS

In an integrated equity market, prices should mainly be driven by common factors rather than country-specific ones. Therefore, the more integrated the market, the greater the benefits of diversification through sector-based equity investment strategies rather than through

**Figure 12 Filtered cross-country and cross-sector dispersions of euro area equity returns**



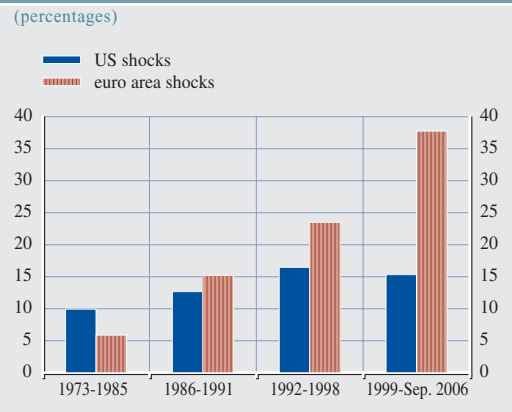
Sources: Thomson Financial Datastream and ECB calculations.  
 Note: The chart shows Hodrick-Prescott filtered cross-sectional dispersions in monthly euro area country and EMU sector returns.

country-based ones. By comparing the level of cross-sector dispersion with the cross-country dispersion of the equity returns, it is therefore possible to derive financial integration indicators.

Figure 12 plots the country and sector dispersions in monthly stock returns over time. Over nearly the entire sample, the cross-country dispersion has been higher than the cross-sector dispersion. The difference between country and sector dispersions narrowed in the late 1990s and the sector dispersion was broadly equal to the country dispersion from 2001 onwards, suggesting a possible shift in the asset allocation paradigm from country-based to sector-based strategies. At the same time, however, both dispersions have strongly decreased, making it more difficult to assess the relative advantage of sector over country diversification.

Alternative indicators of financial integration in equity markets can be derived from factor models. Under the assumption that equity returns in the euro area countries react to a local and a global factor – proxied respectively by shocks in aggregate euro area and US equity

**Figure 13 Proportion of variance in local equity returns explained by euro area and US shocks**



Sources: Thomson Financial Datastream and ECB calculations.  
 Note: For each period, the first column shows the unweighted average of the relative importance of euro area-wide factors, other than US equity market fluctuations, in the variance of individual euro area countries' equity market returns (the "variance ratio"). The second column shows the unweighted average of the relative importance of US equity market fluctuations for the variance of euro area equity market returns.

markets – it is possible to measure the proportion of the total domestic equity volatility that can be explained by local and global factors respectively (the "variance ratios").<sup>12</sup> Ceteris paribus, a higher variance ratio that can be associated with euro area-wide changes is an indication of a more integrated euro area equity market, signalling that national stock market returns are increasingly driven by common news. Figure 13 shows that the variance ratios have increased over the past 30 years with respect to both euro area-wide and US shocks, although the rise has been the strongest for the former. This suggests that regional euro area integration has proceeded more quickly than worldwide integration, even though the level of the variance explained by common factors (about 35% for euro area shocks and 15% for US shocks) reveals that local shocks are still relatively important.

<sup>12</sup> An alternative indicator measures the intensity (beta) with which euro area and world shocks are transmitted to national equity markets. The part of local return fluctuations that is not explained by common factors can be interpreted as the reaction to purely local news. Thus, higher spillover intensity suggests a higher degree of equity return co-movements across countries (i.e. a higher level of integration) (see Chart 22 in Annex 1).

## 4.2 QUANTITY-BASED INDICATORS

The quantity-based measure of euro area equity market integration also indicates a rising degree of integration in equity markets. Euro area residents increased their holdings of euro area international assets (as a share of their total international portfolio) between 1997 and 2004. Over this period, the share of the intra-euro area allocation of equity securities increased markedly by almost 15 percentage points (see Figure 14), while the share of euro area equity assets held abroad (labelled “extra-trade”) is much lower and increased only slightly in the period under review. This implies that euro area investors have reallocated their equity portfolio holdings within the euro area as a consequence of the introduction of the single currency.

In the euro area the infrastructure for equities is more or less the same as for bonds, since most of the CSDs and CCPs provide services across products. However, the equities market infrastructure is less integrated than the one for bonds. Whereas the cross-border settlement of bonds is largely concentrated in two ICSDs, i.e.

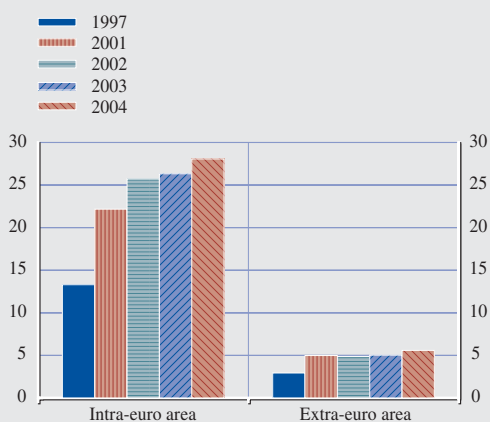
largely without the involvement of national CSDs, the opposite is true for the cross-border settlement of equities, most of which are settled within the national CSDs rather than the ICSDs. The equities market infrastructure is therefore relatively fragmented, and further infrastructure integration is also hindered by other qualitative barriers, such as differences in settlement cycles and in the handling of corporate events and taxation.

## 5 BANKING MARKETS

*Banking markets encompass interbank (or wholesale) activities, capital market-related activities and retail banking activities. The indicators reveal that the euro area retail banking markets continue to be fragmented, whereas euro area interbank (or wholesale) market and capital market-related activities show solid signs of increasing integration. The finding that the degree of integration in retail banking markets is low is also supported by the comparatively low cross-border presence of euro area banks in other euro area countries. Furthermore, the cross-country dispersion of the same types of interest rates for retail banking products remains high among euro area countries and the respective cross-border banking activity is generally low. In contrast, quantity-based indicators for wholesale and capital market-related securities transactions indicate a rising share of cross-border activity. Corporate banking indicators suggest that this market segment is also fairly integrated, although further progress could still be warranted. Finally, with regard to banking market infrastructures, the situation for retail payment infrastructures is still characterised by a high level of fragmentation, which supports the general picture that the integration of retail banking markets remains limited.*

**Figure 14** The degree of cross-border holdings of equity issued by euro area residents

(percentages)



Sources: IMF, Thomson Financial Datastream and ECB calculations.

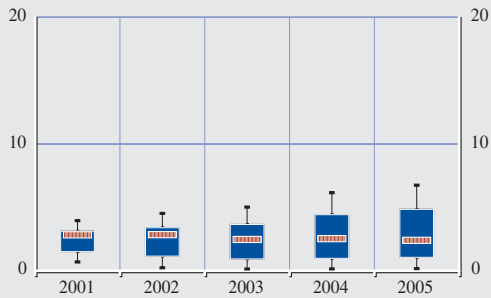
Note: “Intra-euro area” is defined as the share of equities issued by euro area residents and held by residents (excluding central banks) in other euro area countries. “Extra-euro area” is defined as the share of equities issued by euro area residents and held by non-residents (excluding central banks) of the euro area. The last available IMF data are from 2004.

### 5.1 CROSS-BORDER PRESENCE

The banks’ euro area cross-border presence, i.e. their presence in euro area countries other than their home country, can be assessed using

**Figure 15 Dispersion of total assets of euro area bank branches across euro area countries**

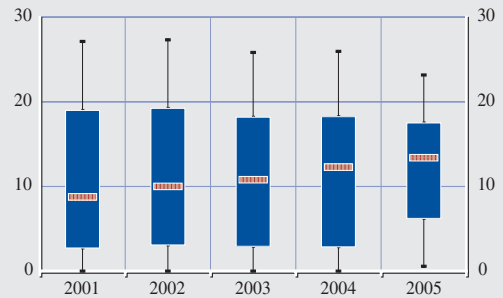
(expressed as a percentage of the total assets of the euro area banking sector)



Source: ECB, Banking Supervision Committee.  
 Note: The lower and upper markers show the minimum and maximum observations for each of the 12 euro area countries, respectively. The bottom and top of the box provide the first and the third quartile. The line in the box gives the median share of assets of branches of all euro area countries.

**Figure 16 Dispersion of total assets of euro area bank subsidiaries across euro area countries**

(expressed as a percentage of the total assets of the euro area banking sector)



Source: ECB.  
 Note: See Figure 15.

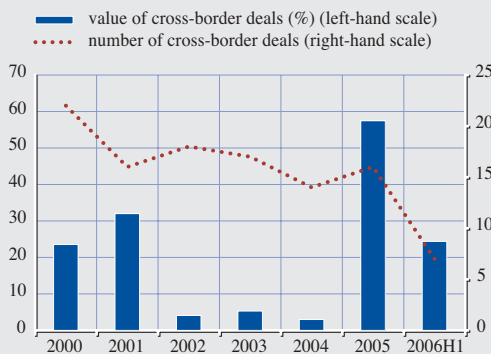
various indicators. One possible way to measure this is to monitor the development of branch and subsidiary structures over time. As Figures 15 and 16 show, the share of assets of branches and subsidiaries in another euro area country generally remains fairly limited in both cases. However, in terms of the median share of assets, the figures show that over the past five years the share of subsidiaries established in other euro area countries has been increasing, while the median share of assets of branches has been rather constant at low levels. Overall, the greater

part of euro area banks' assets in other euro area countries is still related to the subsidiary rather than the branch banking structure.

Another indicator for the cross-border presence of euro area banks is their cross-border merger and acquisition (M&A) activity, as displayed in Figure 17. Overall, while on average over the past few years there has been much less cross-border banking consolidation than domestic consolidation, the indicator does reveal that there has been a relative increase in euro area cross-border M&A transactions. This was particularly the case in 2005, when several large-value euro area cross-border M&A transactions were conducted, amounting to over 50% of the total M&As in the euro area banking system.

**Figure 17 Euro area bank cross-border M&As deal values of assets purchased**

(as a percentage of the total euro area banking system M&As)



Sources: Bureau van Dijk (Zephyr database) and ECB calculations.  
 Note: M&A deals include both controlling and minority stakes.

## 5.2 PRICE-BASED INDICATORS

Integration in the retail bank market can be measured directly by looking at the dispersion of interest rates on loans and deposits from banks to non-financial corporations and households. Figure 18 shows that the euro area cross-country dispersion of bank interest rates has remained relatively high (compared to the government bond market, for example) since January 2003. In particular, there are marked

differences between individual euro area countries' interest rates on loans to households for consumption purposes. The dispersion of interest rates is lower in the case of loans for house purchase, which suggests that the products and credit risk are more homogeneous in this instrument category, and that increased competition within countries contributes to more similar interest rate levels.<sup>13</sup> However, the dispersion still remains high when compared with interest rates on debt securities.

### 5.3 QUANTITY-BASED INDICATORS

The share of cross-border holdings of non-domestic (euro area in particular) securities issued by MFIs in the total holdings has increased markedly in recent years. This indicates some strengthening of financial linkages among euro area banking institutions (see Figure 19).

### 5.4 CORPORATE BANKING INDICATORS

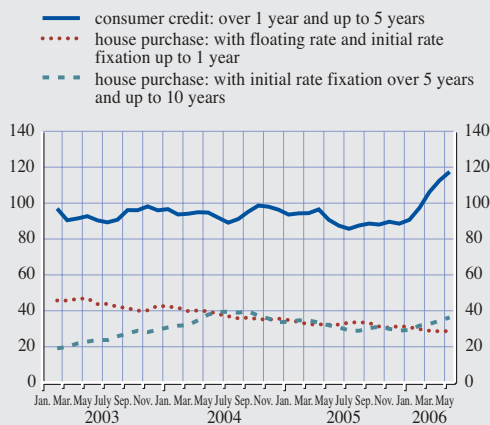
Figure 20 displays the cross-country standard deviation of gross fees on bond issues charged to euro area resident firms, which varies

between 0.20% and 0.35%. Further dispersion measures are displayed in the annex, such as the median fees (which are around 0.50% to 0.70%) (see Chart 38a in the annex). The convergence of intermediaries' fee levels can be seen as a sign of tighter competition and therefore indicates a higher degree of integration in securities issuance in the euro area. In this respect, it must be noted that relatively extreme values, which affect the cross-country standard deviation, are not necessarily an indication of incomplete integration of this market segment, as fees for a specific bond issuance transaction may also depend to a large extent on the complexity of the activity or the reputation or size of the firm.

13 Differences in bank interest rates are due not only to asymmetric conditions in national economies – such as credit and interest rate risk, firm size, industrial structure and the degree of capital market development – but also to institutional factors (e.g. differences in taxation, regulation and the effectiveness of supervision), as well as to financial structures, such as the degree of bank financing in relation to capital market financing, and the openness and competitiveness of market participants across euro area countries. The ECB, together with the national central banks (NCBs), has undertaken a comprehensive analysis of the cross-country interest rate differentials in the euro area. For more details, see ECB report on “Differences in MFI interest rates across euro area countries”, September 2006.

**Figure 18 Cross-country standard deviation of MFI interest rates on loans to households**

(basis points)

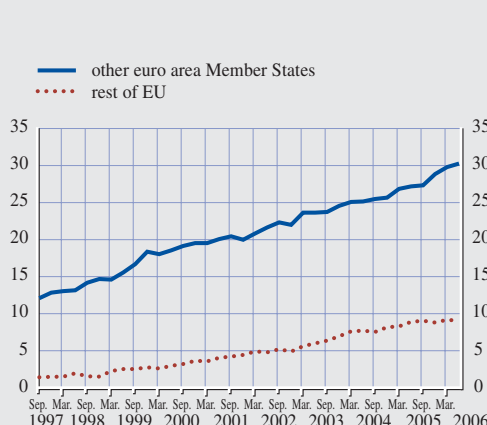


Source: ECB.

Note: The measure is based on MFI interest rates on new business. The data are smoothed by calculating a three-month centred moving average of the standard deviation.

**Figure 19 MFI holdings of securities issued by MFIs: outstanding amounts by residency of the issuer as a share of total holdings, excluding the Eurosystem**

(percentages)

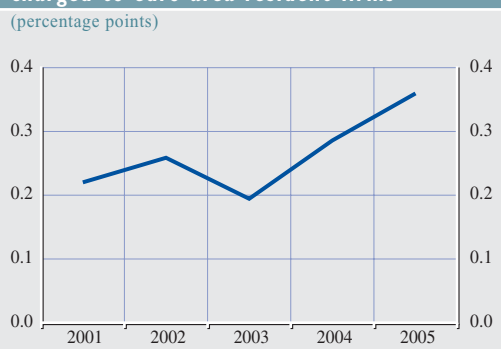


Source: ECB.

Note: This indicator shows securities held by euro area MFIs and issued by MFIs resident in other euro area Member States and non-euro area EU Member States.

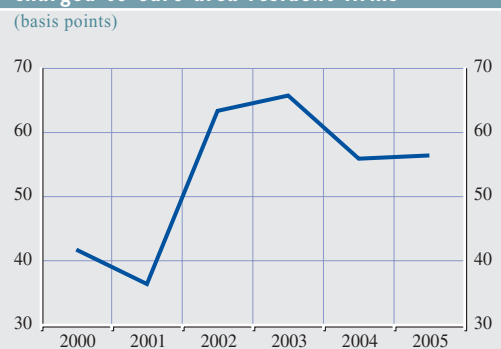


**Figure 20 Euro area cross-country standard deviation of gross fees on bond issues charged to euro area resident firms**



Source: Bondware.

**Figure 21 Euro area cross-country standard deviation of spreads on syndicated loans charged to euro area resident firms**



Sources: Dealogic (Loanware) and ECB calculations.  
Note: The spread (in basis points) is calculated over the base rates (e.g. LIBOR).

Figure 21 shows the cross-country standard deviation of the average margins on syndicated loans charged to euro area resident firms, which vary between 40 and 65 basis points. Further dispersion measures are displayed in the annex. Average interest margins on all euro area syndicated loans increased irrespective of the borrower's creditworthiness, reaching around 180 basis points in the past few years. However, this increase did not result from structural changes in the syndicated loan market, but rather from a general increase in credit risk. Furthermore, available studies indicate that the syndicated loan market has recently gained in importance, and that the increased share of loans has a cross-border dimension.<sup>14</sup> At the same time, the indicators displaying the cross-country standard deviation reveal the continued existence of differences across euro area countries. Overall, the euro area syndicated loan market is undergoing a substantial change, evolving from a rarely used financing instrument that mainly involves domestic lenders, to a more mature financing instrument that benefits from an increase in liquidity and market integration.

## 5.5 INFRASTRUCTURE: RETAIL PAYMENT SYSTEMS

In 2005, there were 15 retail payment systems, compared to 19 in 1998. Over the same period, the number of automated clearing houses (ACHs) almost remained unchanged and stood at seven in 1998 and 2005. In contrast to the developments in the area of LVPS, the situation in the retail payment infrastructures today does not differ substantially from the time before EMU. The current retail payment systems are still tailored towards the individual circumstances of the respective national markets. Contrary to large-value payments, procedures, instruments and services offered to customers in the field of retail payments have not yet been harmonised. These shortcomings are being addressed in the context of the SEPA (Single Euro Payments Area) project, which aims at enabling customers to make retail payments throughout the whole euro area as safely and efficiently as in the national context today.

<sup>14</sup> See for example the chapter entitled "The EU syndicated loan market" in the ECB report on "EU banking structures," October 2005. Furthermore, there have been signs that an increasing number of loans are arranged by euro area banks to borrowers located in another euro area country. A recent BIS study on the degree of integration of this market reports that, for the euro area, the percentage of funds provided via syndicated lending by banks where the nationality was the same as that of the borrower decreased from 43% (in 1993-1998) to 38% (in 1999-2000) ("The syndicated loan market: Structure, development and implications", *BIS Quarterly Review*, December 2004, pp. 75-89).

# ANNEX INDICATORS OF FINANCIAL INTEGRATION AND METHODOLOGICAL NOTES

Money market indicators					
Price-based indicators					
No.	Indicator	Description	Computed/Model-based	Sources	Periodicity <sup>1)</sup>
1a	Cross-country standard deviation of the average overnight interbank lending rates across euro area countries	The measure is based on average overnight rates for each of the euro area countries, as reported by EONIA banks	Computed	EBF/ECB	M
1b	Cross-country standard deviation of interbank repo rates across euro area countries	Based on the quotes reported by EUREPO panel banks of one-month and 12-month repo rates	Computed	EBF	M
1c	Cross-country standard deviation of unsecured interbank lending rates across euro area countries	The measure is based on the unsecured one-month and 12-month lending rates	Computed	EBF	M
Quantity-based indicators					
2	The degree of cross-border holdings of short-term debt securities issued by euro area residents	This indicator measures the degree of cross-border holdings of short-term debt securities among euro area Member States	Computed	BIS/IMF/ECB	Y
Infrastructure (large-value payment systems)					
3	Total number of large-value payment systems (LVPS) in the euro area	Total number of euro area LVPS in the euro area	Computed	ECB, LVPS	Y
4	The share of inter-Member State payments in volume	Share of volume of inter-Member State payments through all LVPS to total volume of payments processed by LVPS	Computed	ECB, LVPS	H
5	The share of inter-Member State payments in value	Share of value of inter-Member State payments through all LVPS to total value of payments processed by LVPS	Computed	ECB, LVPS	H
Government bond market indicators					
Price-based indicators					
6	Standard deviation of government bond yield spreads for two, five and ten-year maturities	Based on euro area country yields on two, five and ten-year government bonds	Computed	ECB	M
7	Evolution of beta coefficients	Based on 18-month rolling regression of changes in country yields for ten-year government bonds with respect to changes in yields for the benchmark (German) ten-year government bond	Model-based	ECB	M
8	Average distance of intercept/beta from values implied by complete integration	Based on the same model as Indicator 7	Model-based	ECB	M
9	Variance ratio	Based on the same model as Indicator 7	Model-based	ECB	M

1 M=Monthly; Y=Yearly; H=Half-yearly; Q=Quarterly.

### Corporate bond market indicators

#### Price-based indicators

No.	Indicator	Description	Computed/Model-based	Sources	Periodicity <sup>1)</sup>
10	Proportion of cross-sectional variance explained by various factors	Based on the Merrill Lynch EMU corporate bond index; the measure is derived by running a regression of spreads relative to a set of variables including rating and country dummies	Model-based	Bloomberg	M
11	Estimated coefficients of country dummies	Based on the same model as Indicator 10	Model-based	Bloomberg	M
12	Cross-sectional dispersion of country parameters	Based on the same model as Indicator 10	Model-based	Bloomberg	M
<b>Quantity-based indicators for government and corporate bond markets</b>					
13	Share of monetary financial institution (MFI) cross-border holdings of debt securities issued by euro area and EU non-MFIs: outstanding amount by residency of the issuer	The indicator measures the extent to which MFIs other than the Eurosystem hold specific assets issued by residents of other countries, in particular by residents of other euro area Member States	Computed	ECB	Q
14	The degree of cross-border holdings of long-term debt securities issued by euro area residents	This indicator measures the degree of cross-border holdings of long-term debt securities among euro area Member States	Computed	BIS/IMF/ECB	Y
15	Investment funds' holdings of debt securities issued in other euro area countries as a share of total holdings of debt securities	The indicator shows the share of investment funds' holdings of all securities other than shares (including money market paper) issued by residents of the euro area outside the Member State in which the investment fund is located	Computed	ECB	Q
16	Global collateralised debt obligations (CDOs) issuance in notional terms	While the impact of synthetic credit risk transfer (CRT) instruments on the integration of credit markets is very difficult to assess in quantitative terms, the absolute size of the relevant markets can provide significant information on the relevance of these instruments	Computed	BIS/Creditflux/ Bond Market Association	Q
<b>Infrastructure: securities clearing and settlement systems</b>					
17	Total number of eligible links for Eurosystem credit operations	Total number of eligible links in the euro area	Computed	ECB	Y
18	Total number of central securities depositories (CSDs) in the euro area	Total number of CSDs in the euro area	Computed	ECB	Y
19	Total number of central counterparties (CCPs) in the euro area	Total number of CCPs in the euro area	Computed	ECB	Y
20	Share of domestic and cross-border collateral used for Eurosystem credit operations	Value of cross-border and domestic collateral to total value of collateral used for Eurosystem credit operations	Computed	ECB	Y

1 M=Monthly; Y=Yearly; H=Half-yearly; Q=Quarterly.

Equity market indicators					
Price-based indicators					
No.	Indicator	Description	Computed/Model-based	Sources	Periodicity <sup>1)</sup>
21	Filtered cross-country and cross-sector dispersions of euro area equity returns	Based on monthly cross-sectional Hodrick-Prescott filtered total equity returns in country and sector indexes, respectively	Model-based	Datastream	M
22	Euro area and US shock spillover intensity	The indicator is derived from a model specifying euro area-wide and US (global) shocks to estimate the average sensitivities of country returns to common factors	Model-based	Datastream	Y
23	Proportion of variance in local equity returns explained by euro area and US shocks	The indicator is derived from a model specifying euro area-wide and US (global) shocks to estimate the proportion of total domestic equity volatility explained by common factors	Model-based	Datastream	Y
Quantity-based indicators					
24	The degree of cross-border holdings of equity issued by euro area residents	These indicators measure the degree of cross-border holdings of equity securities among euro area Member States	Computed	IMF/ECB	Y
25	Investment funds' holdings of equity issued in other euro area countries as a share of total holdings of equity	The indicator shows the share of investment funds' holdings of all shares and other equity (excluding investment fund shares/units) issued by residents of the euro area outside the Member States in which the investment fund is located	Computed	ECB	Q
Banking market indicators					
Cross-border presence					
26	Dispersion of number of euro area bank branches across euro area countries (expressed as a percentage of the total number of banks)	This indicator describes the development over time of the share of the number of branches of euro area banks within euro area countries to the total number of domestic credit institutions	Computed	ECB	Y
27	Dispersion of number of euro area bank subsidiaries across euro area countries (expressed as a percentage of the total number of banks)	This indicator describes the development over time of the share of the number of subsidiaries of euro area banks within euro area countries to the total number of domestic credit institutions	Computed	ECB	Y
28	Dispersion of total assets of euro area bank branches across euro area countries (expressed as a percentage of the total assets of the euro area banking sector)	This indicator describes the development over time of the share of assets of branches of euro area banks within euro area countries other than the home country to the total amount of domestic credit institutions' assets	Computed	ECB	Y

1 M=Monthly; Y=Yearly; H=Half-yearly; Q=Quarterly.

<b>Banking market indicators</b>					
<b>Cross-border presence</b>					
No.	Indicator	Description	Computed/Model-based	Sources	Periodicity <sup>1)</sup>
29	Dispersion of total assets of euro area bank subsidiaries across euro area countries (expressed as a percentage of the total assets of the euro area banking sector)	This indicator describes the development over time of the share of assets of subsidiaries of euro area banks within euro area countries other than the home country to the total amount of domestic credit institutions' assets	Computed	ECB	Y
30	Euro area cross-border bank merger and acquisition (M&A) deal values of assets purchased (as a percentage of the total euro area banking system M&As)	This indicator gives the development over time of the share of euro area cross-border bank M&A activities to the total M&As of the euro area banking system	Computed	Bureau van Dijk (Zephyr database)/ECB	Y
<b>Price-based indicators</b>					
31	Cross-country standard deviation of MFI interest rates on loans to non-financial corporations	Based on MFI interest rate statistics	Computed	ECB	M
32	Cross-country standard deviation of MFI interest rates on loans to households	Based on MFI interest rate statistics	Computed	ECB	M
33	Cross-country standard deviation of MFI interest rates on deposits from households	Based on MFI interest rate statistics	Computed	ECB	M
<b>Quantity-based indicators</b>					
34	Non-interbank deposits – percentage of business with other euro area countries and EU Member States	The indicator measures the extent to which MFIs other than the Eurosystem hold deposits placed by residents of other countries, in particular by residents of other euro area Member States	Computed	ECB	Q
35	MFI holdings of securities issued by MFIs: outstanding amounts by residency of the issuer (as a share of total holdings, excluding the Eurosystem)	The indicator measures the extent to which MFIs other than the Eurosystem hold specific assets issued by residents of other countries, in particular by residents of other euro area Member States	Computed	ECB	Q
36	MFI loans to non-MFIs: outstanding amounts by residency of the counterpart (as a share of total loans granted by MFIs, excluding the Eurosystem)	The indicator measures the extent to which MFIs other than the Eurosystem hold specific assets issued by residents of other countries, in particular by residents of other euro area Member States	Computed	ECB	Q
37	MFI loans to MFIs: outstanding amounts by residency of the counterpart (as a share of total loans granted by MFIs, excluding the Eurosystem)	The indicator measures to which extent MFIs other than the Eurosystem hold specific assets issued by residents of other countries, in particular by residents of other euro area Member States	Computed	ECB	Q
1 M=Monthly; Y=Yearly; H=Half-yearly; Q=Quarterly.					



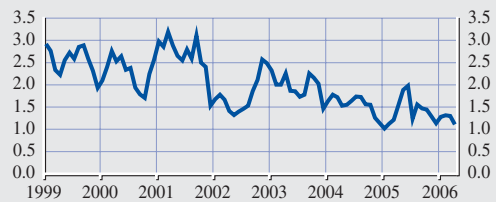
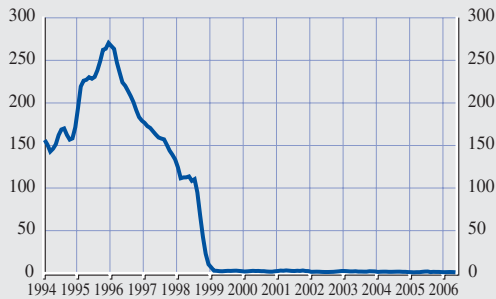
Corporate banking indicators					
No.	Indicator	Description	Computed/Model-based	Sources	Periodicity <sup>1)</sup>
38a and 38b	Euro area cross-country standard deviation and further dispersion measures of gross fees on bond issues charged to euro area resident firms	These two indicators display the dispersion across euro area countries of gross fees on bond issues, whereby the gross fees are composed of total commissions for management, underwriting and selling a new issue, expressed as a percentage of the nominal amount of the issue	Computed	Bondware	Y
39	Euro area cross-country dispersion measures of gross fees on equity issues charged to euro area resident firms	This indicator displays the dispersion of gross fees on equity issues, whereby the gross fees are composed of total commissions for management, underwriting and selling a new issue, expressed as a percentage of the nominal amount of the issue	Computed	Bondware	Y
40a and 40b	Euro area cross-country standard deviation and further dispersion measures of spreads and fees, respectively, on syndicated loans charged to euro area resident firms	These two indicators display the dispersion across euro area countries of the weighted average of spreads and fees, respectively, on syndicated loans where the borrower is from a euro area country. The average margin is the spread, in basis points, over base rates. The average fee is calculated as a difference between the average all-in pricing weighted by the margin	Computed	Dealogic (Loanware) and ECB calculations	Y
Infrastructure (retail payment systems)					
41	Total number of retail payment systems in the euro area	This indicator counts the total number of retail payment systems in the euro area	Computed	ECB	Y
42	Total number of automated clearing houses (ACHs) in the euro area	This indicator counts the total number of retail payment systems which operate in the form of an ACH in the euro area	Computed	ECB	Y

1 M=Monthly; Y=Yearly; H=Half-yearly; Q=Quarterly.

# MONEY MARKET

**Chart 1a Cross-country standard deviation of the average overnight interbank lending rates across euro area countries**

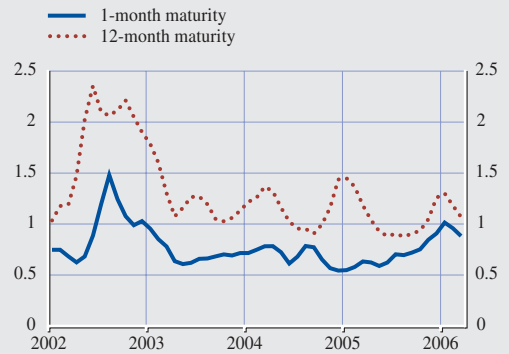
(61-day moving average; basis points)



Sources: European Banking Federation and ECB calculations.

**Chart 1b Cross-country standard deviation of interbank repo rates across euro area countries**

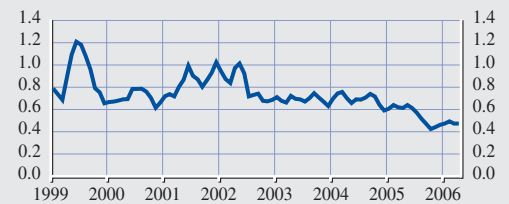
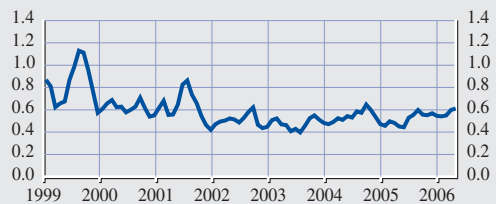
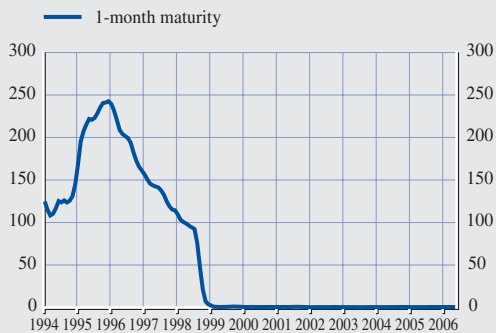
(61-day moving average; basis points)



Sources: European Banking Federation and ECB calculations.

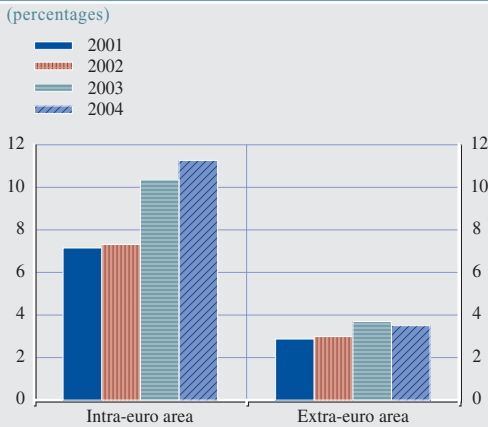
**Chart 1c Cross-country standard deviation of unsecured interbank lending rates across euro area countries**

(61-day moving average; basis points)



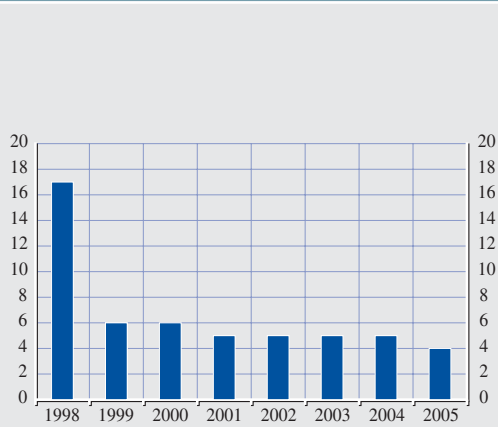
Sources: European Banking Federation and ECB calculations.

**Chart 2 The degree of cross-border holdings of short-term debt securities issued by euro area residents**



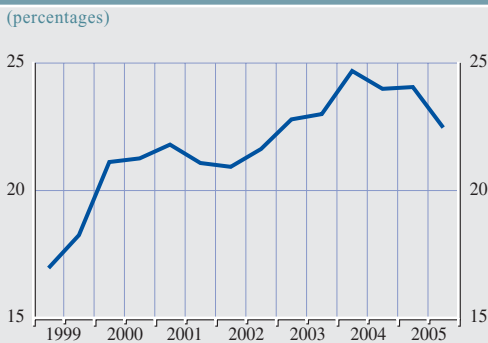
Sources: Bank for International Settlements (BIS), International Monetary Fund (IMF) and ECB calculations.  
 Note: "Intra-euro area" is defined as the share of short-term debt securities issued by euro area residents and held by residents (excluding central banks) in other euro area countries. "Extra-euro area" is defined as the share of short-term debt securities issued by euro area residents and held by non-residents (excluding central banks) of the euro area. IMF data are only available up to 2004.

**Chart 3 Total number of large-value payment systems (LVPs) in the euro area**



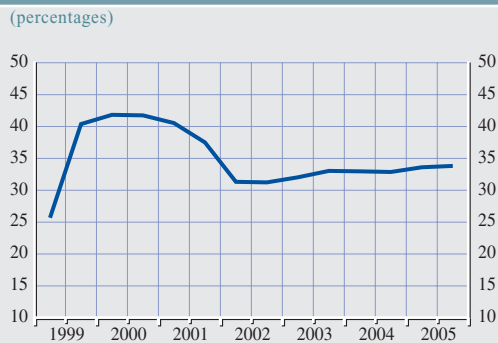
Source: ECB.  
 Note: The indicator covers the current Member States of the euro area that had adopted the euro at the time to which the statistics relate for the whole series.

**Chart 4 TARGET: share of inter-Member State payments to total payments (in volume)**



Source: ECB.

**Chart 5 TARGET: share of Inter-Member State payments to total payments (in value)**

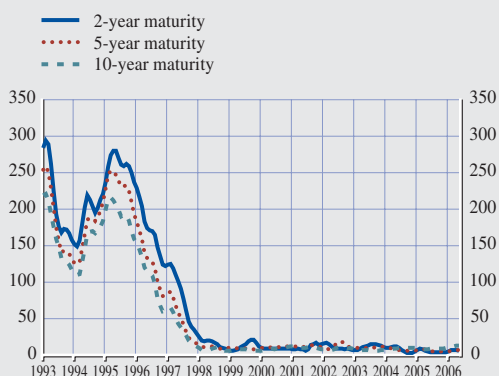


Source: ECB.

# GOVERNMENT BOND MARKET

**Chart 6 Standard deviation of government bond yield spreads for two, five and ten-year maturities**

(61-day moving average, basis points)

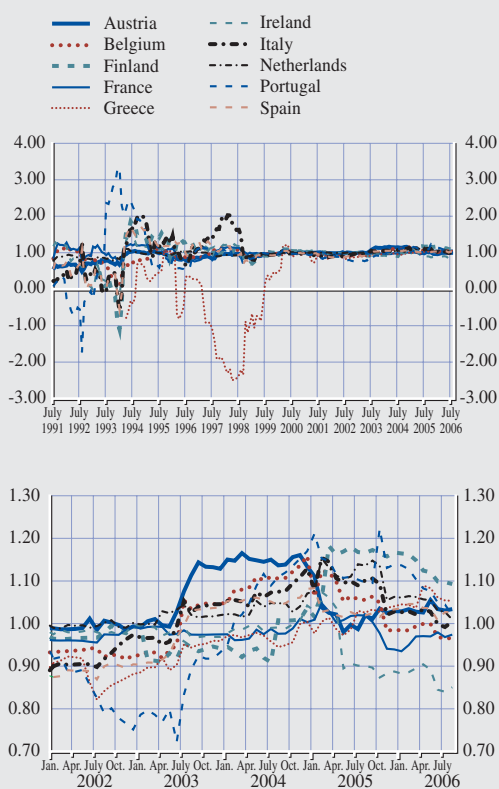


Source: ECB.

Note: As a benchmark, the German government bond yield is taken for ten-year maturity bonds and the yield on a French government bond for two and five-year maturity bonds. Greece enters the calculation of standard deviation for all maturities upon the date of its entry into EMU in 2001.

**Chart 7 Evolution of beta coefficients for selected countries**

(10-year government bond yields; 18-months rolling regression)

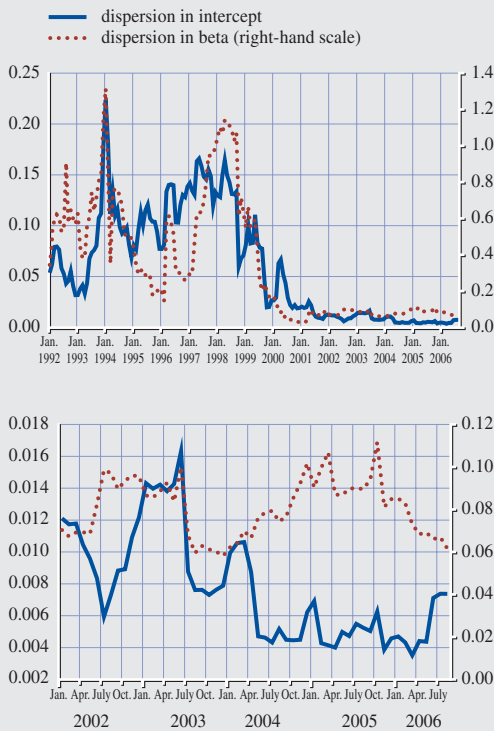


Source: ECB.

Note: Based on a model regressing national 10-year government bond yields on benchmark German ten-year government bond yields.

**Chart 8 Average distance of intercept/beta from values implied by complete integration**

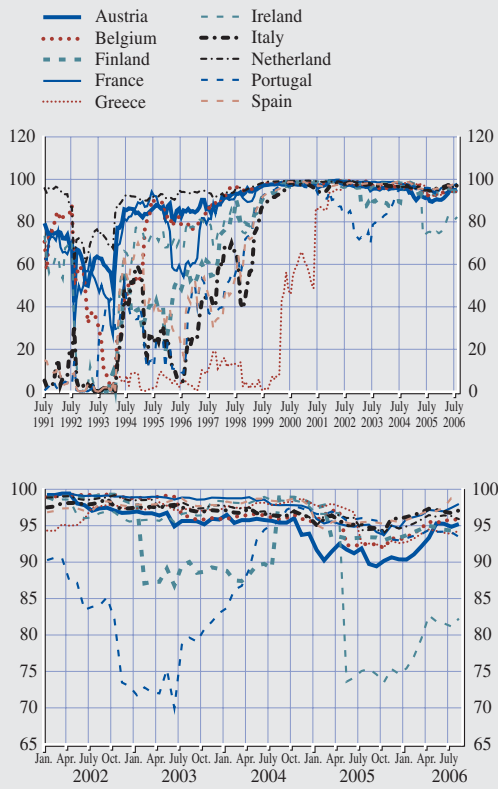
(ten-year government bond yields; 18-months rolling regression)



Source: ECB.  
Note: See Chart 7.

**Chart 9 Variance ratio**

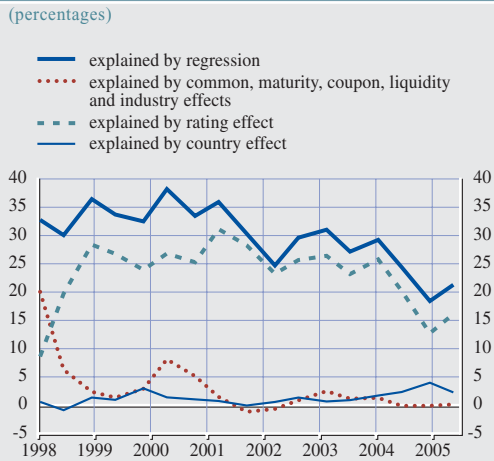
(ten-year euro area government bond yields; 18-months rolling regression)



Source: ECB.  
Note: See Chart 7. The proportion of the variance of national ten-year government bond yields is explained by the variance in the benchmark German ten-year government bond yield.

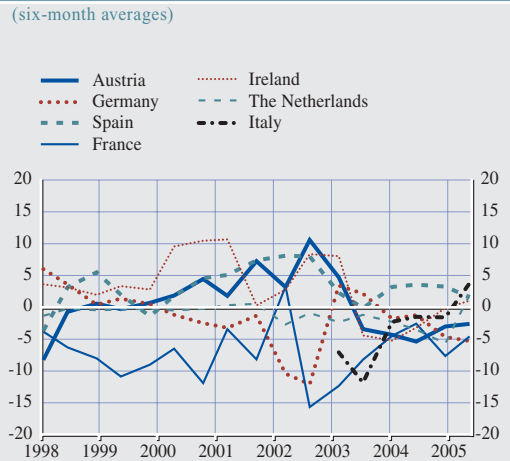
# CORPORATE BOND MARKET

**Chart 10 Proportion of cross-sectional variance explained by various factors**



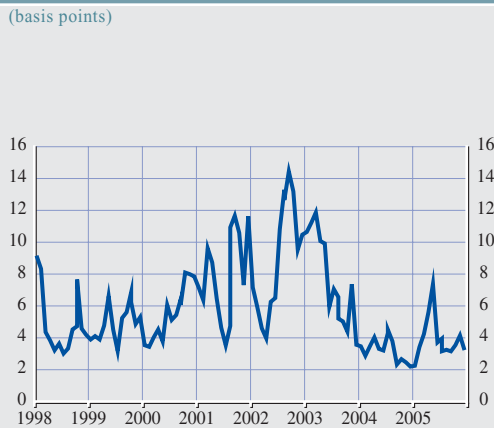
Source: Bloomberg and ECB calculations.

**Chart 11 Estimated coefficients of country dummies**



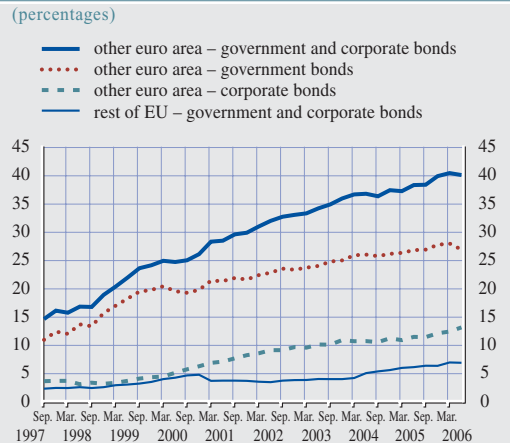
Sources: Bloomberg and ECB calculations.

**Chart 12 Cross-sectional dispersion of country parameters**



Sources: Bloomberg and ECB calculations.

**Chart 13 Share of MFI cross-border holdings of debt securities issued by euro area and EU non-MFIs: outstanding amounts by residency of the issuer**

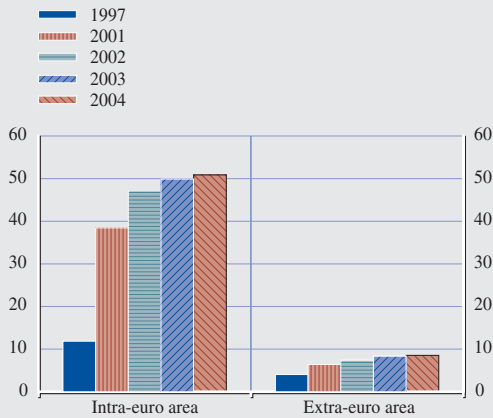


Source: ECB.



**Chart 14 The degree of cross-border holdings of long-term debt securities issued by euro area residents**

(percentages)

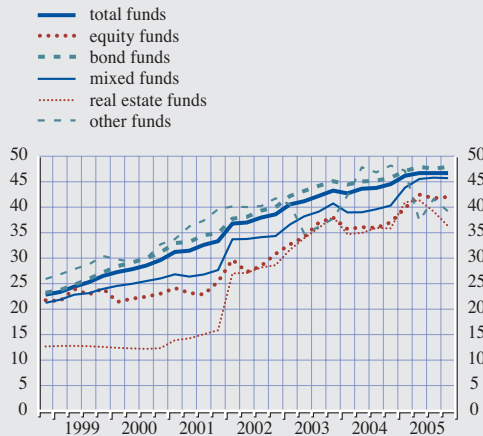


Sources: BIS, IMF and ECB calculations.

Note: "Intra-euro area" is defined as the share of long-term debt securities issued by euro area residents and held by residents (excluding central banks) in other euro area countries. "Extra-euro area" is defined as the share of long-term debt securities issued by euro area residents and held by non-residents of the euro area (excluding central banks). IMF data are only available up to 2004.

**Chart 15 Investment funds' holdings of debt securities issued in other euro area countries as a share of total holdings of debt securities**

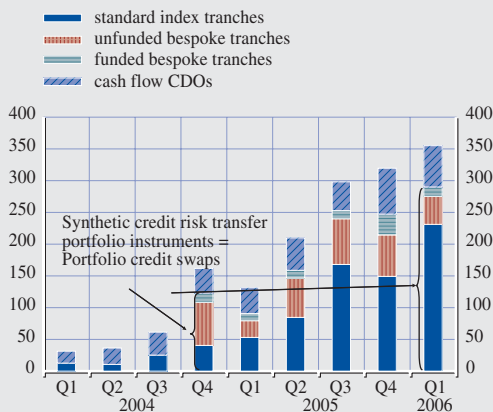
(percentages)



Source: ECB.

**Chart 16 Global collateralised debt obligations (CDO) issuance in notional terms**

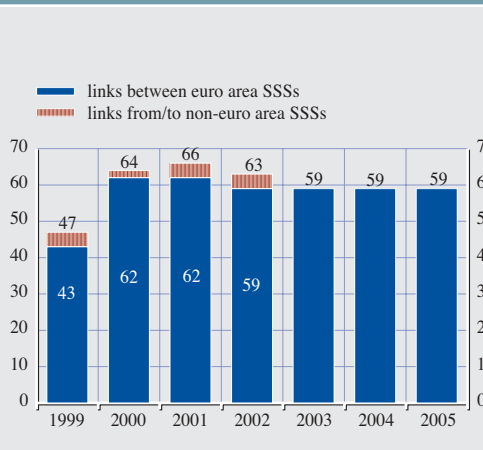
(USD billions)



Sources: BMA cash flow CDOs, Creditflux regarding other tranches.

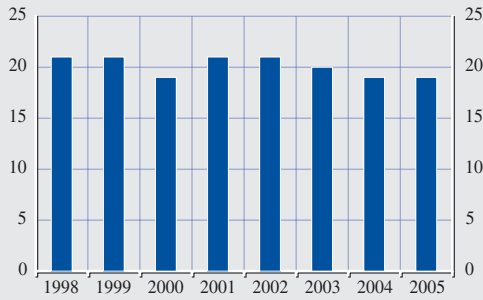
Note: Notional amount, not adjusted for the riskiness of different tranches. Portfolio credit swaps consist of synthetic CDOs. The term "unfunded" implies that the principal amount is not transferred between the two parties, while "bespoke" denotes customised, tailor-made, non-index or non-standard tranches (see also the annex, indicator 16).

**Chart 17 Total number of eligible links for Eurosystem credit operations in the euro area**



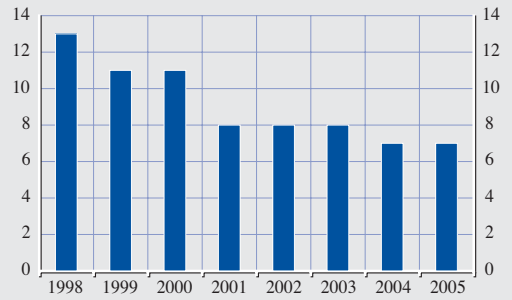
Source: ECB.

**Chart 18 Number of CDSs in the euro area**



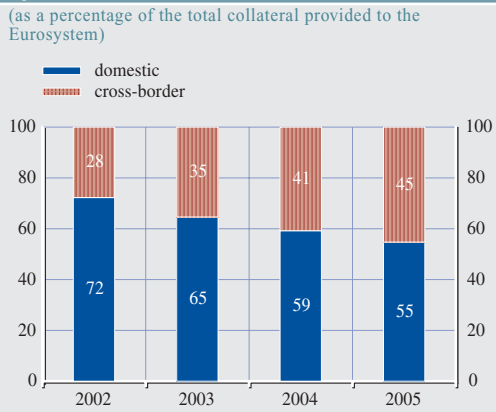
Source: ECB.  
Note: The indicator covers the Member States that had adopted the euro at the time to which the statistics relate.

**Chart 19 Number of CCPs in the euro area**



Source: ECB.  
Note: The indicator covers the Member States that had adopted the euro at the time to which the statistics relate.

**Chart 20 Share of domestic and cross-border collateral used for Eurosystem credit operations**  
(as a percentage of the total collateral provided to the Eurosystem)

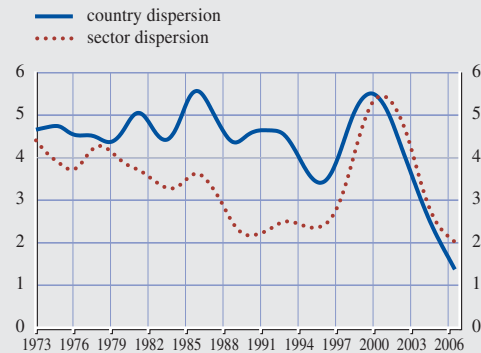


Source: ECB.  
Note: The series covers the Member States that had adopted the euro at the time to which the statistics relate.

# EQUITY MARKET

**Chart 21 Filtered cross-country and cross-sector dispersions of euro area equity returns**

(percentages)

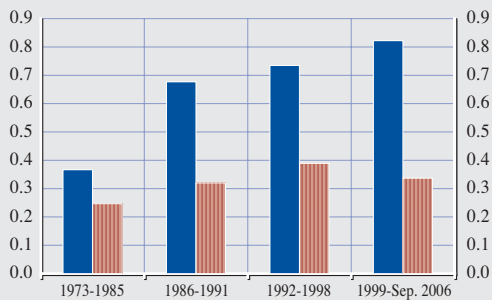


Sources: Thomson Financial Datastream and ECB calculations.

Note: The chart shows Hodrick-Prescott filtered cross-sectional dispersions in monthly euro area country and EMU sector returns.

**Chart 22 Euro area and US shock spill-over intensity**

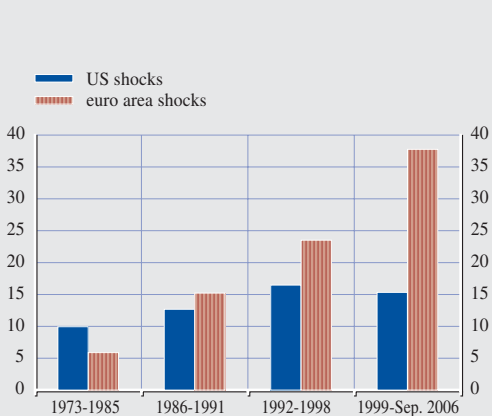
(percentages)



Sources: Thomson Financial Datastream and ECB calculations. Note: For each period, the first column shows the unweighted average intensity by which euro area-wide equity market fluctuations, other than those from US, are transmitted to local euro area equity markets. The second column shows the unweighted intensity by which US equity market fluctuations are transmitted to local euro area equity market returns.

**Chart 23 Proportion of variance in local equity returns explained by euro area and US shocks**

(percentages)

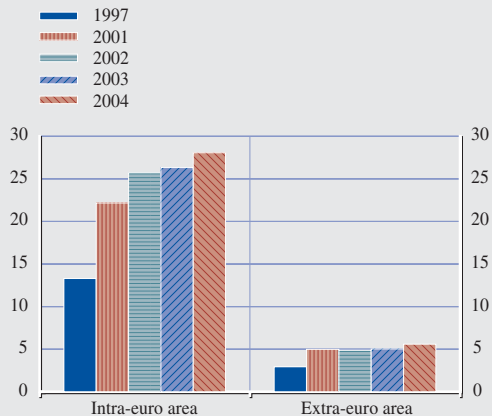


Sources: Thomson Financial Datastream and ECB calculations.

Note: For each period, the first column shows the unweighted average of the relative importance of euro area-wide factors, other than US equity market fluctuations, in the variance of individual euro area countries' equity market returns ("the variance ratio"). The second column shows the unweighted average of the relative importance of US equity market fluctuations for the variance of euro area equity market returns.

**Chart 24 The degree of cross-border holdings of equity issued by euro area residents**

(percentages)

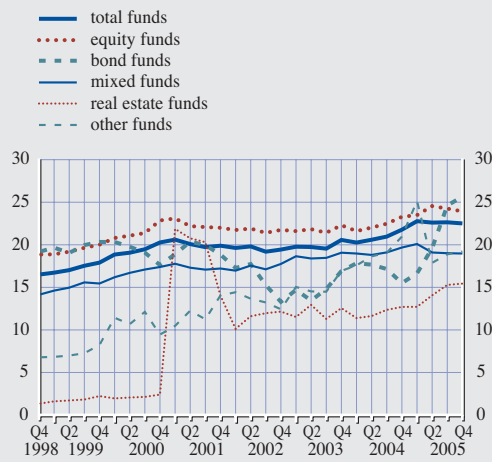


Sources: IMF, Thomson Financial Datastream and ECB calculations.

Note: "Intra- euro area" is defined as the share of equity issued by euro area residents and held by residents (excluding central banks) in other euro area countries. "Extra-euro area" is defined as the share of equities issued by euro area residents and held by non-residents of the euro area (excluding central banks). The

**Chart 25 Investment funds' holdings of equity issued in other euro area countries as a share of total holdings of equity**

(percentages)

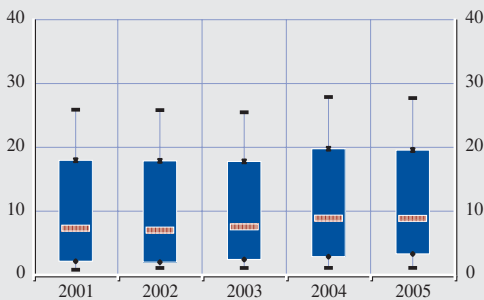


Source: ECB.

# BANKING MARKETS

**Chart 26 Dispersion of number of euro area bank branches across euro area countries**

(expressed as a percentage of the total number of banks)

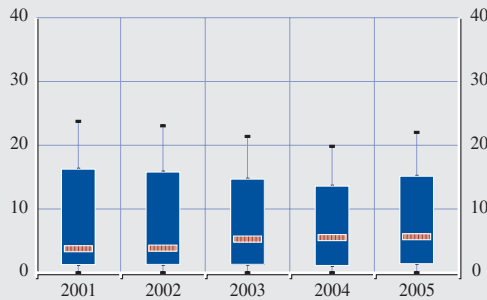


Source: ECB.

Note: The lower and upper markers give the minimum and maximum observation for each of the 12 euro area countries, respectively. The bottom and top of the box provide the first and the third quartile. The line in the box gives the median share of the number of branches of all euro area countries.

**Chart 27 Dispersion of number of euro area bank subsidiaries across euro area countries**

(expressed as a percentage of the total number of banks)

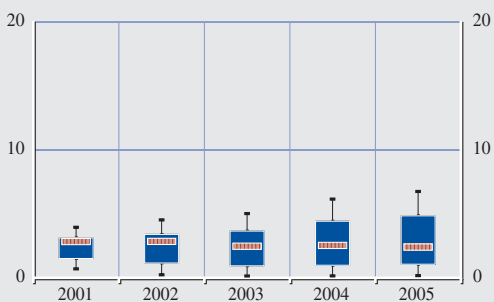


Source: ECB.

Note: See Chart 26.

**Chart 28 Dispersion of total assets of euro area bank branches across euro area countries**

(expressed as a percentage of the total assets of the euro area banking sector)

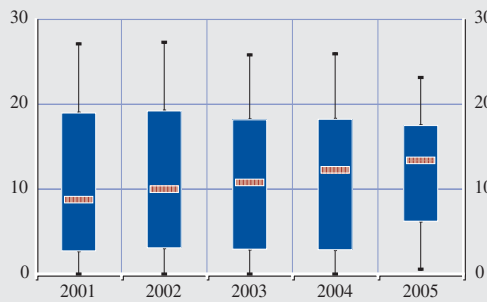


Source: ECB.

Note: See Chart 26.

**Chart 29 Dispersion of total assets of euro area bank subsidiaries across euro area countries**

(expressed as a percentage of the total assets of the euro area banking sector)

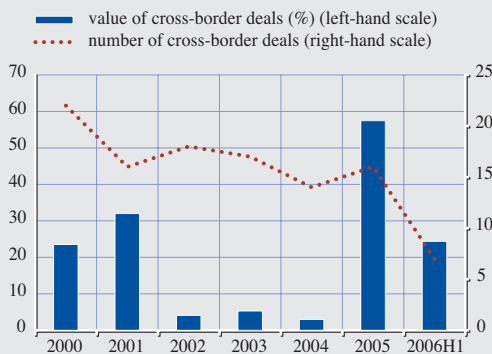


Source: ECB.

Note: See Chart 26.

**Chart 30 Euro area cross-border bank M&A deal values of assets purchased**

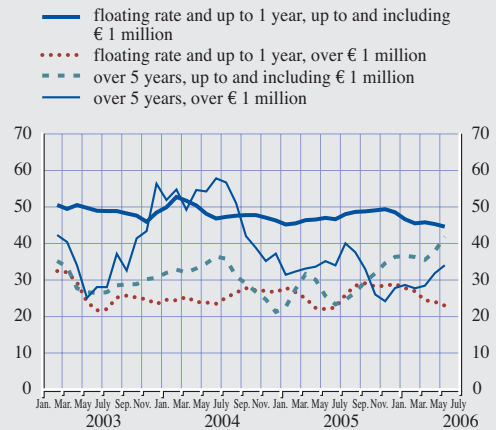
(as a percentage of the total euro area banking system M&As)



Sources: Bureau van Dijk (Zephyr database) and ECB calculations.  
Note: M&A deals include both controlling and minority stakes. Data for the year 2006 cover the first half of the year.

**Chart 31 Cross-country standard deviation of MFI interest rates on loans to non-financial corporations**

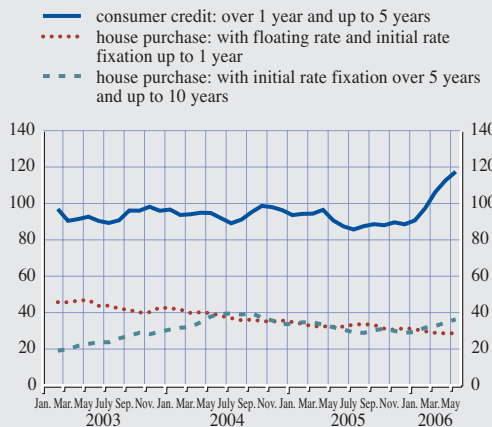
(basis points)



Source: ECB.  
Note: The measure is based on MFI interest rates on new business. The data are smoothed by calculating a three-months centred moving average of the standard deviation.

**Chart 32 Cross-country standard deviation of MFI interest rates on loans to households**

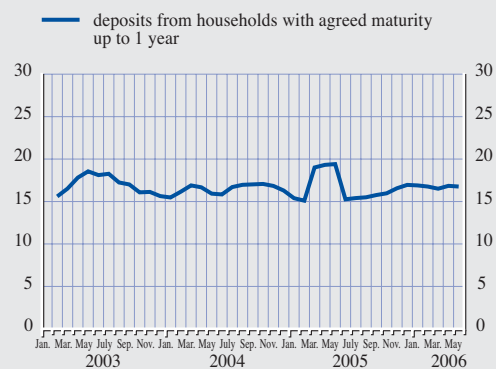
(basis points)



Source: ECB.  
Note: The measure is based on MFI interest rates on new business. The data are smoothed by calculating a three-months centred moving average of the standard deviation.

**Chart 33 Cross-country standard deviation of MFI interest rates on deposits from households**

(basis points)

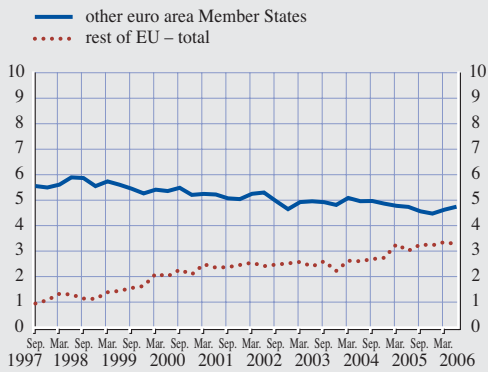


Source: ECB.  
Note: The measure is based on MFI interest rates on new business. The data are smoothed by calculating a three-months centred moving average of the standard deviation.



**Chart 34 Non-interbank deposits – percentage of business with other euro area countries and EU Member States**

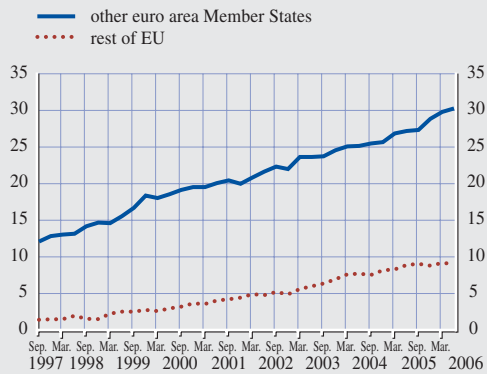
(percentages)



Source: ECB.  
Note: The indicator shows non-interbank deposits with euro area MFIs.

**Chart 35 MFI holdings of securities issued by MFIs: outstanding amounts by residency of the issuer**

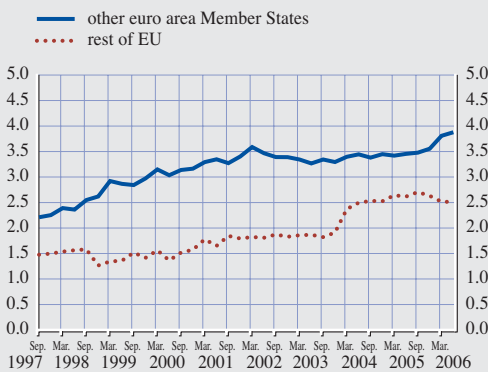
(percentages; as a share of total holdings, excluding the Eurosystem)



Source: ECB.  
Note: The indicator shows securities held by euro area MFIs and issued by MFIs resident in other euro area Member States and non-euro area (EU) Member States.

**Chart 36 MFI loans to non-MFIs: outstanding amounts by residency of the counterpart**

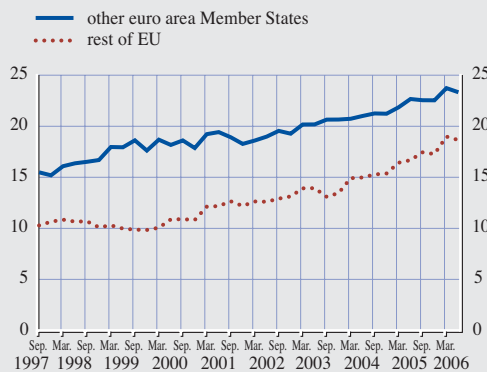
(percentages; as a share of total loans granted by MFIs, excluding the Eurosystem)



Source: ECB.

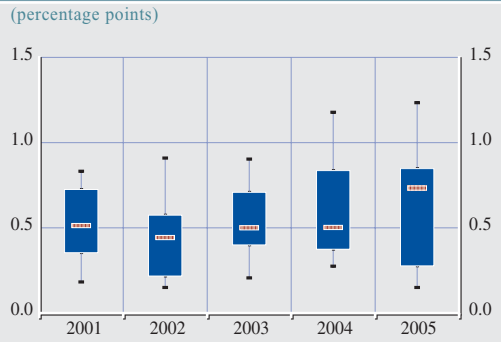
**Chart 37 MFI loans to MFIs: outstanding amounts by residency of the counterpart**

(percentages; as a share of total loans granted by MFIs, excluding the Eurosystem)



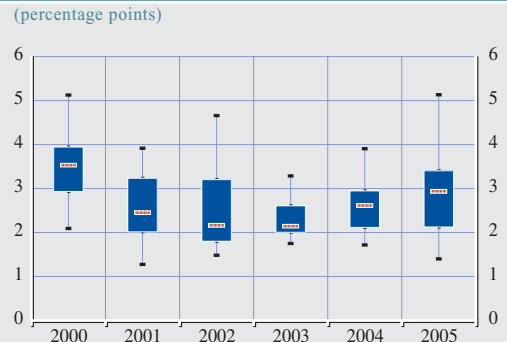
Source: ECB.

**Chart 38a Euro area cross-country dispersion measures of gross fees on bond issues charged to euro area resident firms**



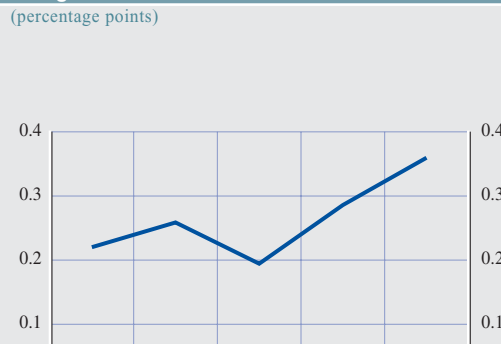
Source: Bondware.  
 Note: The lower and upper markers show the minimum and maximum observations for each of the 12 euro area countries, respectively. The bottom and top of the box provide the first and the third quartile. The line in the box gives the median gross fees of all euro area countries.

**Chart 39 Euro area cross-country dispersion measures of gross fees on equity issues charged on euro area resident firms**



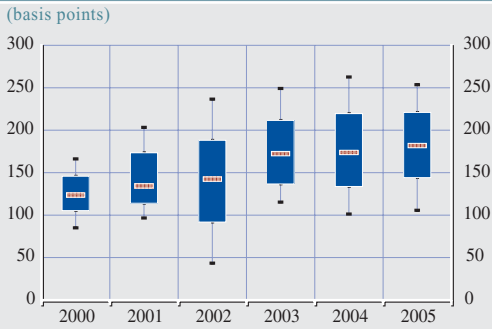
Source: Bondware.  
 Note: See Chart 38a.

**Chart 38b Euro area cross-country standard deviation of gross fees on bond issues charged to euro area resident firms**



Source: Bondware.

**Chart 40a Euro area cross-country dispersion measures of spreads on syndicated loans charged to euro area resident firms**



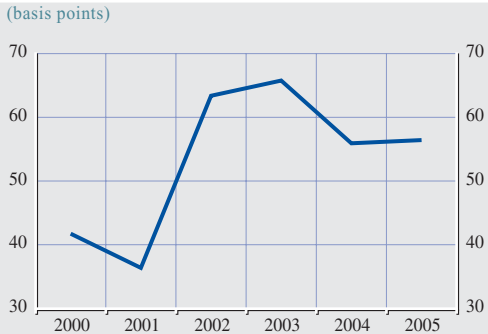
Sources: Dealogic (Loanware) and ECB calculations.  
Note: See Chart 38a.

**Chart 41 Number of retail payment systems in the euro area**



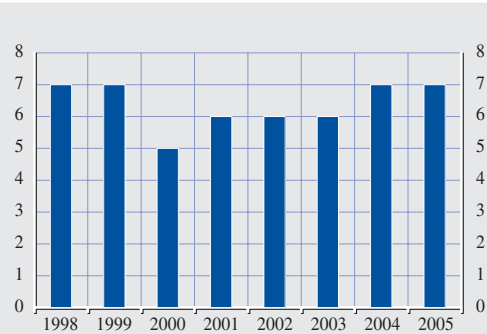
Source: ECB.  
Note: The series covers the Member States that had adopted the euro at the time to which the statistics relate.

**Chart 40b Euro area cross-country standard deviation of spreads on syndicated loans charged on euro area resident firms**



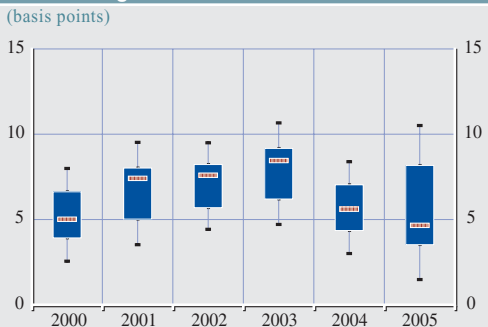
Sources: Dealogic (Loanware) and ECB calculations.  
Note: The spread (in basis points) is calculated over base rates (e.g. LIBOR).

**Chart 42 Number of automated clearing houses in the euro area**



Source: ECB.  
Note: The series covers the Member States that had adopted the euro at the time to which the statistics relate.

**Chart 40c Euro area cross-country dispersion measures of fees on syndicated loans charged to euro area resident firms**



Sources: Dealogic (Loanware) and ECB calculations.  
Note: See Chart 38a.

# METHODOLOGICAL NOTES<sup>1</sup>

## MONEY MARKET INDICATORS

### PRICE-BASED INDICATORS

#### Standard deviations of money market rates (Indicators Ia, Ib and Ic)

#### COMPILATION

The European Banking Federation (EBF) makes available business frequency (daily) data at the level of individual institutions for both unsecured and secured interbank short-term debt or deposits. These data cover the EONIA and EURIBOR (unsecured lending) as well as the EUREPO for different maturities.<sup>2</sup> Data on the EONIA SWAP INDEX can also be used.<sup>3</sup>

For each dataset, the indicator is the unweighted standard deviation ( $D_t$ ) of the average daily interest rates prevailing in each euro area country. The number of euro area countries ( $n$  in the formula below) reflects the number of countries that had adopted the euro in the reference period:

$$D_t = \sqrt{\frac{1}{n} \sum_c (r_{c,t} - r_t)^2} \quad (1)$$

where  $r_{c,t}$  is the unweighted average of the interest rate  $r_{i,t}^c$  reported by each of the  $m_c$  panel banks at time  $t$  in a given country  $c$ :

$$r_{c,t} = \frac{1}{m_c} \sum_i r_{i,t}^c \quad (2)$$

The euro area average  $r_t$  is calculated as the unweighted average of the average interest rates  $r_{c,t}$ .

The data are smoothed by calculating a 61-(business) day centred moving average of the standard deviation, transformed into monthly figures taking the end-of-month observation of the smoothed series.

For the indicative series prices (EURIBOR, EUREPO, EONIA SWAP INDEX), the data are corrected for obvious outliers.

## ADDITIONAL INFORMATION

EONIA stands for the euro overnight index average. It is the effective overnight reference rate for the euro, and is computed as a weighted average of all overnight unsecured lending transactions undertaken in the interbank market and initiated within the euro area by the contributing banks. The EONIA is computed with the help of the ECB on behalf of the EBF. Every day on which TARGET (the Trans-European Automated Real-Time Gross Settlement Express Transfer system) is open, each EONIA panel bank reports to the ECB its aggregate volume of intraday unsecured lending transactions and the weighted average lending rate for these transactions. All lending transactions carried out before the closing of TARGET at 6.00 p.m. (C.E.T.) have to be reported. The banks contributing to the EONIA are the same as the EURIBOR panel banks (composed of banks resident in the euro area and in other EU Member States, as well as some international banks).

The EURIBOR (euro interbank offered rate) is the benchmark rate of the large euro money market that has emerged since 1999.

The EUREPO is the benchmark rate of the euro repo market that has emerged subsequent to the introduction of the euro in 1999. It is the rate at which one prime bank offers funds in euro to another prime bank when the funds are secured by a repo transaction using general collateral.

EONIA SWAP INDEX is the average rate at which a representative panel of prime banks provide daily quotes that each panel bank believes is the mid-market rate of EONIA swap quotations between prime banks. An "EONIA swap" is an interest rate swap transaction, where one party agrees to receive/pay a fixed rate to

1 For additional technical background on some indicators, see L. Baele, A. Ferrando, P. Hördahl, E. Krylova and C. Monnet (2004), "Measuring financial integration in the euro area", ECB Occasional Paper No 14.

2 For further information, see <http://www.euribor.org/default.htm> and <http://www.eurepo.org/>.

3 See ECB Monthly Bulletin, May 2006, "The contribution of the ECB and the Eurosystem to European financial integration", p. 67.

another party, against paying/receiving a (floating) EONIA rate.

Every panel bank delivers its quotations for the last three instruments directly to Moneyline Telerate on each day that TARGET is open. Moneyline Telerate is responsible for computing the aggregate indices and for providing the underlying data to the EBF. Data for EUREPO rates start in March 2002 when the EUREPO index was introduced. The EONIA SWAP index was launched on 20 June 2005.

For all of the aforementioned rates, reported rates are considered to be the national rates of country X if the reporting bank is located there. However, the counterparty of the transaction is not known, and the reported interest rate could thus potentially (in part) refer to transactions with a bank outside country X.

## QUANTITY-BASED INDICATORS

### The degree of cross-border holdings of short-term debt securities issued by euro area residents (Indicator 2)

#### COMPILATION

These indicators measure the degree of cross-border allocation of short-term debt securities, i.e. securities with an original maturity of up to one year among euro area Member States.

*Intra-euro area* is defined as the share of short-term debt securities issued by euro area residents and held by other euro area residents (excluding central banks):

$$\frac{\sum_i \sum_{j \neq i} Outstock_{j,t}}{\sum_i MKT_{i,t} + \sum_i TOutstock_{i,t} - \sum_i TInstock_{i,t}} \quad (3)$$

$i, j \in \{\text{euro area countries}\}$

where  $Outstock_j$  denotes the value of assets issued by residents of euro area Member State  $i$  and held by residents of euro area Member State  $j$  ( $i \neq j$ );  $MKT_i$  stands for market capitalisation in country  $i$ ,  $TOutstock_i$  is the total foreign assets held by country  $i$ ; and  $TInstock_i$  is the total foreign liability of country  $i$ .

*Extra-euro area* is defined as the share of euro area short-term debt securities held by non-residents of the euro area (excluding central banks). The measure takes the following form:

$$\frac{\sum_i \sum_r Outstock_{r,t}}{\sum_r MKT_{r,t} + \sum_r TOutstock_{r,t} - \sum_r TInstock_{r,t}} \quad (4)$$

$i \in \{\text{euro area countries}\}$   
 $r \in \{\text{rest of the world}\}$

where  $Outstock_r$  denotes the value of assets issued by residents of euro area Member State  $i$  and held by non-residents of the euro area  $r$  (*rest of the world*);  $MKT_r$  stands for market capitalisation in country  $r$ ,  $TOutstock_r$  is the total foreign assets held by country  $r$ ; and  $TInstock_r$  is the total foreign liability of country  $r$ .

#### ADDITIONAL INFORMATION

The indicators are built on the basis of the IMF's Coordinated Portfolio Investment Survey (CPIS), which is conducted on an annual basis and undertaken by national compilers. Short-term debt securities encompass Treasury bills, commercial paper and bankers' acceptances that usually give the holder the unconditional right to a stated fixed sum of money on a specified date. These instruments are usually traded on organised markets at a discount and have an original term to maturity of one year or less.

### INFRASTRUCTURE: LARGE-VALUE PAYMENT SYSTEMS (LVPS)

#### Total number of LVPS in the euro area (Indicator 3)

#### COMPILATION

This indicator counts the absolute number of LVPS in the euro area at the end of each year. The indicator covers the current Member States of the euro area that had adopted the euro at the time to which the statistics relate for the whole series.

#### ADDITIONAL INFORMATION

LVPS, also known as wholesale systems, can be defined as systems that generally process very large amounts. Such amounts are mainly exchanged

between banks or participants in the financial markets, and usually require urgent and timely settlement.

#### The share of inter-Member State payments (Indicators 4-5)

##### COMPILATION

One indicator shows the share of the volume of inter-Member State payments in the total number of payments processed in the TARGET system.

Another indicator shows the share of the value of inter-Member State payments in the total value of payments processed in the TARGET system.

##### ADDITIONAL INFORMATION

The TARGET system is the Real-Time Gross Settlement (RTGS) system of the euro. TARGET consists of the national RTGS systems of the 12 euro area countries and of the ECB payment mechanism (EPM). In addition, the national euro RTGS systems of Denmark, Poland, Sweden and the United Kingdom are also connected to TARGET. These 17 systems are all interlinked in order to provide a uniform platform for the processing of euro payments.

A TARGET inter-Member State payment is a payment between counterparties maintaining an account with different central banks that participate in TARGET. The remainder of TARGET payments are intra-Member State payments. An intra-Member State payment is a payment between counterparties maintaining an account with the same central bank.

The expected launch in November 2007 of TARGET2, which will replace the current decentralised system with a single technical platform, means that the concept of inter-Member State traffic will be reviewed.

#### GOVERNMENT BOND MARKET INDICATORS

##### Standard deviation of government bond yield spreads (Indicator 6)

##### COMPILATION

The cross-country standard deviations of government bond yield spreads for two, five and ten-year maturities are calculated on the basis of daily data for the government bond yield spreads relative to the government bond yield in the country selected as a benchmark for the calculation (Germany for ten-year maturities and France for two and five-year maturities). The standard deviation ( $S_t$ ) takes the following form:

$$S_t = \sqrt{\frac{1}{n} \sum_c (y_{c,t} - y_{b,t})^2} \quad (5)$$

where  $y_{c,t}$  denotes the yield on the government bond of euro area country  $c$  with the relevant maturity on day  $t$  and  $y_{b,t}$  is the yield on the government bond of the country selected as a benchmark for that maturity (i.e. Germany or France).

In a second step, data are smoothed by calculating a 61-(business) day centred moving average of the standard deviation, transformed into monthly figures taking the end-of-month observation of the smoothed series.

The standard deviation of ten-year government bond yield spreads is based on bonds from Belgium, Greece, Spain, France, Ireland, Italy, the Netherlands, Austria, Portugal and Finland. For the five-year maturities, the government bonds of Belgium, Germany, Greece, Spain, Ireland, Italy, the Netherlands, Austria, Portugal and Finland are used. For the two-year maturities, the measure is based on bonds from Belgium, Germany, Greece, Spain, Italy, the Netherlands, Austria, Portugal and Finland. Greece enters the standard deviation calculations for all maturities upon the date of its entry to EMU. In the case of Luxembourg, no benchmark bond exists for the residual maturities of close to two, five or ten years.



### ADDITIONAL INFORMATION

Not all government debt in the euro area is fully substitutable in terms of perceived credit risk or liquidity of the relevant bonds. This might affect the yields on the selected bonds and thus the computed indicator.

### Evolution of beta coefficients (Indicator 7)

#### COMPILATION

If bond markets are fully integrated and country-specific changes in perceived credit risks do not occur, bond yields should only react to news common to all markets. That is, changes in the bond yields of individual countries should react exclusively to common news, which is reflected in a change of the benchmark government bond yield. To separate common from local influences, the following regression is run:

$$\Delta R_{c,t} = \alpha_{c,t} + \beta_{c,t} \Delta R_{ger,t} + \varepsilon_{c,t} \quad (6)$$

where  $\alpha$  denotes a country-varying and time-varying intercept;  $\beta$  is a country-dependent and time-dependent beta with respect to the benchmark (German) bond yield;  $\Delta R$  is the change in the bond yield, and  $\varepsilon$  is a country-specific shock.

The conditional betas are derived by estimating the above regression using the first 18 months of monthly averages. Subsequently, the data window is moved one month ahead and the equation is re-estimated, until the last observation is reached. A time series for  $\beta_{c,t}$  is then obtained.

### ADDITIONAL INFORMATION

The outcome of the econometric specification depends on the selection of the most appropriate benchmark bond; in this case the ten-year German government bond. In addition, one should not expect that common factors can fully explain changes in local bond yields, as “local news” concerning credit and liquidity risks will continue to have an impact on local yields.

### Average distance of intercept/beta from values implied by complete integration (Indicator 8)

#### COMPILATION

This indicator is derived using regression (6), as for the previous indicator. From the individual country regressions, the unweighted average  $\alpha_{c,t}$  and  $\beta_{c,t}$  values are calculated and measured in proportion to the values implied by complete market integration (0 and 1, respectively). The analysis is based on monthly averages of government bond yields.

### ADDITIONAL INFORMATION

Same as for Indicator 7.

### Variance ratio (Indicator 9)

#### COMPILATION

This indicator measures the proportion of the variance of local (country-specific) yields that can be explained by the variance of the benchmark (German) ten-year government bond yields; i.e. the “variance ratio”. The indicator is derived from the same 18-month rolling regression as for the previous two indicators (see equation (6) above). The total variance of local yields is given by:

$$Var(\Delta R_{c,t}) = \beta_{c,t}^2 Var(\Delta R_{b,t}) + Var(\varepsilon_{c,t}) \quad (7)$$

and the variance ratio by:

$$VR_{c,t} = \frac{\beta_{c,t}^2 Var(\Delta R_{b,t})}{Var(\Delta R_{c,t})} \quad (8)$$

Hence, a variance ratio close to one is obtained when the beta approaches one and when the volatilities of the local and the benchmark bond yield changes are of a similar magnitude. The analysis is based on monthly averages of government bond yields.

### ADDITIONAL INFORMATION

Same as for Indicators 7 and 8.

## CORPORATE BOND MARKET

### Proportion of cross-sectional variance explained by various factors (Indicator 10)

#### COMPILATION

This indicator is derived by estimating the following equation using an Ordinary Least Squares (OLS) regression technique:

$$SP_{c,r}^i(\tau, t, z_t) = \alpha_i + \sum_{r=1}^K \gamma_{r,t} CR_{i,t}^r + \sum_{s=1}^2 \delta_{s,t} S_{i,t}^s + \varphi_i z_t^i + \sum_{c=1}^N \beta_{c,t} C_{i,c,t} + e_{i,t} \quad (9)$$

where  $SP_{c,r}^i(\tau, t, z_t)$  is the yield spread for corporate bond  $i$  at time  $t$  issued in country  $c$  with  $\tau$  years to maturity, with credit rating  $r$  and set of instruments  $z_t$ .  $\alpha$  is an intercept common to all corporate bonds,  $CR_{i,t}^r$  is a rating dummy which takes a value of one when corporate bond  $i$  belongs to rating category  $r$  at time  $t$  and zero otherwise, and  $S_{i,t}^s$  is a sector dummy which takes a value of one for financial corporations and zero for non-financial corporations. The parameter vector  $\varphi$  groups the sensitivities of the various corporate bonds to the instruments contained in  $z_t^i$ , namely time to maturity, liquidity, and coupon of the  $i$ th bond. As a proxy of liquidity, we use the ratio of days that the bond has been traded relative to the total number of trading days within every time interval.  $C_{i,c,t}$  is a country dummy that equals one when corporate bond  $i$  belongs to country  $c$  at time  $t$ , and zero otherwise.

The sample is composed of 2,082 individual bonds that are used in the Merrill Lynch EMU corporate bonds index, which incorporates euro-denominated investment-grade bonds with a minimum size of issue of EUR 100 million. Bonds rated below investment grade and asset-backed bonds are excluded from the analysis. In addition, bonds with less than one year to maturity and bonds which were traded less than once per week in a given four-week time interval are excluded. All euro-denominated bonds not issued in a euro area country are eliminated, as well as data for countries that do not have at least ten corporate bonds at

every time interval. Thus, the analysis is based on sample of bonds issued in seven countries in the sample: Austria, France, Germany, Ireland, Italy, the Netherlands and Spain. Italy has been included in the regression analysis since June 2003.

The indicator represents the proportion of cross-sectional variance that can be explained by the various components (common, rating, sector, maturity, liquidity coupon and country effects) over time.

#### Estimated coefficients of country dummies (Indicator 11)

#### COMPILATION

As a test for integration, it is tested whether the country parameters  $\beta_{c,t}$  in equation (9) are zero, or at least converge towards zero.

#### Cross-sectional dispersion of country parameters (Indicator 12)

#### COMPILATION

This indicator is derived by calculating the average size of the estimated country dummies derived from equation (9). An overall decrease in the dispersion of the country effects would be an indication of increasing integration in the corporate bond market.

#### Quantity-based indicators for government and corporate bond markets

#### Share of MFI cross-border holdings of non-MFI debt securities issued by euro area and EU non MFIs (Indicator 13)

For this indicator, see Indicators 34-37 of the banking markets below.

#### The degree of cross-border holdings of long-term debt securities issued by euro area residents (Indicator 14)

## COMPILATION

These indicators measure the degree of cross-border allocation of long-term debt securities, i.e. debt securities with an original maturity above one year, among euro area Member States.

*Intra-euro area* is defined as the share of long-term debt securities issued by euro area residents and held by other euro area residents (excluding central banks):

$$\frac{\sum_i \sum_{j \neq i} \text{Outstock}_{j,t}}{\sum_i \text{MKT}_{i,t} + \sum_i \text{TOutstock}_{i,t} - \sum_i \text{TInstock}_{i,t}} \quad (10)$$

$i, j \in \{\text{euro area countries}\}$

where  $\text{Outstock}_{j,t}$  denotes the value of assets issued by residents of euro area Member State  $i$  and held by residents of euro area Member State  $j$  ( $i \neq j$ );  $\text{MKT}_i$  stands for market capitalisation in country  $i$ ,  $\text{TOutstock}_i$  is the total foreign assets held by country  $i$ ; and  $\text{TInstock}_i$  is the total foreign liability of country  $i$ .

Extra-euro area is defined as the share of euro area long-term debt securities held by non-residents of the euro area (excluding central banks). The measure takes the following form:

$$\frac{\sum_i \sum_r \text{Outstock}_{r,t}}{\sum_r \text{MKT}_{r,t} + \sum_r \text{TOutstock}_{r,t} - \sum_r \text{TInstock}_{r,t}} \quad (11)$$

$i \in \{\text{euro area countries}\}$   
 $r \in \{\text{rest of the world}\}$

where  $\text{Outstock}_r$  denotes the value of assets issued by residents of euro area Member State  $i$  and held by non-residents of the euro area  $r$  (rest of the world);  $\text{MKT}_r$  stands for market capitalisation in country  $r$ ,  $\text{TOutstock}_r$  is the total foreign assets held by country  $r$ ; and  $\text{TInstock}_r$  is the total foreign liability of country  $r$ .

## ADDITIONAL INFORMATION

The indicators are built on the basis of the IMF CPIS conducted on an annual basis and undertaken by national compilers. The IMF does not report

data for Germany, Luxembourg and Greece for 1997; for this reason, the geographical breakdown of asset allocation for Germany has been estimated using an annual database on international investment positions from the Deutsche Bundesbank, while 1997 data for Greece and Luxembourg bond assets have been estimated keeping constant the geographical counterparty share to 2001 levels and adjusting for the growth rate of the asset value over the period 1997-2001, using asset value developments in the euro area (excluding Luxembourg and Greece). Long-term debt securities encompass instruments such as bonds, debentures and notes that usually give the holder the unconditional right to a fixed cash flow or contractually determined variable money income and have an original term to maturity of more than one year.

## Investment funds' holdings of debt securities issued in other euro area countries as a share of total holdings of debt securities (Indicator 15)

### COMPILATION

The indicator shows the share of investment funds' holdings of all securities other than shares (including money market paper) issued by residents of the euro area outside the Member States in which the investment fund is located. The composition of the euro area is adjusted as of the reference period in which a new Member State adopts the euro.

### ADDITIONAL INFORMATION

Data are available for all investment funds and broken down by type of investment fund. Data are partially estimated.

## Global collateralised debt obligations (CDOs) issuance in notional terms (Indicator 16)

### COMPILATION

The impact of synthetic CRT instruments on the integration of credit markets is very difficult to assess in quantitative terms. The absolute size of the relevant markets, together with a careful assessment of qualitative indicators (for example common market standards, legal documentation, trading and post-trading market standards/

infrastructure), can in any case provide significant information on the relevance of these instruments.

The data displayed for the CDO market come from the Bank for International Settlements (BIS) (<http://www.bis.org/publ/quarterly.htm>), Creditflux (<http://www.creditflux.com>) and the Bond Market Association ([http://www.bondmarkets.com/assets/files/TBMA\\_Global\\_CDO\\_Issuance\\_Data\\_2q2006.pdf](http://www.bondmarkets.com/assets/files/TBMA_Global_CDO_Issuance_Data_2q2006.pdf)).

Data are provided both for funded and unfunded bespoke tranches. The term “bespoke” is a synonym for tailor-made, customised or non-standard products. The distinction between funded and unfunded instruments can be drawn either from the perspective of the risk shedder, i.e. whether the risk shedder receives funds in the transaction; or from the perspective of the risk taker, i.e. whether the risk taker has to provide upfront funding in the transaction. For some instruments such as credit default swaps (unfunded according to both definitions) and asset-backed securities (funded under both definitions), both criteria coincide. Other transactions such as synthetic CDOs involve an upfront payment by the risk taker, although the funds are not transferred to the risk shedder but instead invested in securities held by a special purpose vehicle (SPV). For the purpose of this report, the notion of funded is from the risk shedder’s perspective (see also Committee on the Global Financial System, Credit risk transfer 2003, <http://www.bis.org/publ/cgfs20.pdf>).

#### **INFRASTRUCTURE: SECURITIES CLEARING AND SETTLEMENT SYSTEMS**

##### **Total number of eligible links in the euro area (Indicator 17)**

#### **COMPILATION**

This indicator counts the absolute number of eligible links used between securities settlement systems (SSSs) for Eurosystem credit operations. The indicator refers to the eligible links in operation at the end of each year.

#### **ADDITIONAL INFORMATION**

To be eligible, links have to comply with the ECB Standards for the use of EU SSSs in Eurosystem credit operations. The figures provided reflect the outcome of the assessment of links between SSSs carried out by the Eurosystem upon request from an SSS. As from 2003, figures refer only to eligible links between SSSs located in the euro area, as the ECB Governing Council has decided that, since 1 July 2003, only securities issued and held in an SSS located in the euro area are eligible for Eurosystem credit operations.

##### **Total number of central securities depositories (CSDs) and central counterparties (CCPs) in the euro area (Indicators 18 and 19)**

#### **COMPILATION**

The first indicator counts the total number of all legal entities located in the euro area that operate a CSD. A CSD is viewed as an entity which holds and administers securities or other financial assets, holds issuance accounts and enables transactions to be processed by book-entry. Assets may exist either in a physical but immobilised form, or in an electronically dematerialised form within the CSD.

The second indicator counts the total number of all legal entities located in the euro area that operate a CCP. A CCP is considered to be an entity that interposes itself between the counterparties to trades, acting as a buyer to every seller and seller to every buyer of a specified set of contracts.

#### **ADDITIONAL INFORMATION**

These indicators represent integration activities that can be observed at the euro area level. However, when interpreting these indicators, it should be borne in mind that integration has occurred not only between entities operating in the euro area, but also at the EU level. For example, in the field of horizontal CSD consolidation, the CSDs of Finland and Sweden, APK and VPC, merged in 2004. Following the merger, VPC continues to be an independent company while APK, previously owned by OMX, is now 100% owned by VPC. However, APK and VPC continue

to exist as legal entities and to operate technologically separate systems, but under a common name (Nordic CSD Group).

LCH.Clearnet Group is an example of a purely legal horizontal merger in the field of CCP clearing. As a result of a series of mergers, LCH comprises two entities that remain separate both in their operations and in their clearing platform. Only the Clearnet leg of the consolidation process, which has seen the French, Dutch, Belgium and Portuguese CCPs merge, represents true technical integration. While LCH.Clearnet SA provides clearing services for the Euronext markets, LCH.Clearnet Ltd performs clearing activities for the UK market. True technical integration has also taken place within the Swedish-based OMX Group, with all infrastructures for the trading and clearing of Finnish derivatives moving from Finland to Sweden by the end of 2004. As a result, there are no longer any CCPs resident in Finland.

These indicators are based on information published in the ECB Blue Book statistics for the respective years.

#### **Share of domestic and cross-border collateral used for Eurosystem credit operations (Indicator 20)**

##### **COMPILATION**

The indicator measures the proportion of eligible assets used domestically – i.e. within the same country – and across national borders – i.e. between euro area countries – to collateralise Eurosystem credit operations. This indicator is built by aggregating the data reported monthly by the Eurosystem national central banks (NCBs) to the ECB on the domestic use and cross-border use (composed of both the Correspondent Central Banking Model (CCBM) and links data).

##### **ADDITIONAL INFORMATION**

In the current framework, counterparties may transfer cross-border collateral to the Eurosystem via two main channels: the CCBM, which is provided by the Eurosystem; and the links, which represent a market-led solution. The CCBM remains the principal channel, even if the

proportion of collateral held through links has relatively increased. For example, in 2005, the use of collateral via the CCBM represented 81% of the total amount of cross-border collateral, compared to just 19% for the links.

## **EQUITY MARKET INDICATORS**

### **PRICE-BASED INDICATORS**

#### **Filtered cross-country and cross-sector dispersions of euro area equity returns (Indicator 21)**

##### **COMPILATION**

This indicator is derived by calculating the cross-sectional dispersion of both sector and country index returns for the euro area countries.<sup>4</sup> Data refer to the EMU global sector indices provided by Datastream, and are calculated on a weekly basis from January 1973 onwards. They include (reinvested) dividends and are denominated in euro.

The cross-sectional dispersions are filtered using the Hodrick-Prescott smoothing technique, which provides a smooth estimate of the long-term trend component of the series.

##### **ADDITIONAL NOTES**

The indicator is useful for uncovering structural changes in the aggregate euro area equity market, but is less informative about changes in individual markets.

#### **Euro area and US shock spillover intensity (Indicator 22)**

##### **COMPILATION**

This measure is equivalent to the bond market news-based indicators (e.g. Indicator 10). However, empirical evidence suggests that equity returns are significantly driven by global factors.

<sup>4</sup> This indicator is based on an approach first presented by K. Adjaouté and J.-P. Danthine (2003), "European financial integration and equity returns: A theory-based assessment", in V. Gaspar et al., "The transformation of the European financial system", Second ECB Central Banking Conference, May.

For this reason, both euro area-wide shocks and US shocks (as a proxy for global factors) are included in the assessment of common news.

To calculate the relative importance of euro area-wide and US stock market fluctuations on local stock market returns, the stock market returns of individual countries are modelled as having both an expected component as well as an unexpected one,  $\varepsilon_{c,t}$ .<sup>5</sup> The unexpected component is then decomposed into a purely local shock ( $e_{c,t}$ ) and a reaction to euro area ( $\varepsilon_{eu,t}$ ) news as well as world (US) news ( $\varepsilon_{us,t}$ ):

$$\varepsilon_{c,t} = e_{c,t} + \beta_{c,t}^{eu} \varepsilon_{eu,t} + \beta_{c,t}^{us} \varepsilon_{us,t} \quad (12)$$

where  $\beta$  represents the country-dependent sensitivity to euro area and US market changes (of the unexpected component of equity returns), respectively.

In order to investigate the development of the betas over time, three dummy variables are introduced representing the periods 1986-1992, 1992-1998 and 1998-2006.

For each period, the indicators report the unweighted average intensity by which euro area-wide equity market shocks, other than those from the US, are transmitted to local euro area equity markets and the unweighted average intensity by which US equity market shocks are transmitted to local euro area equity markets.

Data refer to the EMU global sector indices, and are calculated on a weekly basis from January 1973 onwards.

#### ADDITIONAL INFORMATION

To distinguish global shocks from purely euro area shocks, it is assumed that euro area equity market developments are partly driven by events in the US market. It is furthermore assumed that the proportion of local returns that is not explained by common factors is entirely due to local news.

#### Proportion of variance explained by euro area and US shocks (Indicator 23)

##### COMPILATION

To compare the relevance of euro area and US shocks across average changes in country returns, the indicators report the variance ratios, i.e. the proportion of total domestic equity volatility explained by euro area and US shocks, respectively. The indicator is derived by assuming that the total variance of individual country-specific returns is given by:

$$\sigma_{c,t}^2 = h_{c,t} + (\beta_t^{eu})^2 \sigma_{eu,t}^2 + (\beta_t^{us})^2 \sigma_{us,t}^2 \quad (13)$$

where  $h_{c,t}$  is the variance of the local shock component. The euro area variance ratio is then given by:

$$VR_{c,t}^{eu} = \frac{(\beta_t^{eu})^2 \sigma_{eu,t}^2}{\sigma_{c,t}^2} \quad (14)$$

and correspondingly for the US. The conditional variances are obtained from a standard asymmetric GARCH (1,1) model.

For each period, the indicators report the unweighted average of the relative importance of euro area-wide factors, other than US equity market fluctuations, for the variance of individual euro area countries' equity market indexes (the "variance ratio"), and the unweighted average of the relative importance of US equity market fluctuations for the variance of euro area equity markets.

Data refer to the EMU global sector indices, and have been calculated on a weekly basis from January 1973 onwards.

#### ADDITIONAL INFORMATION

The variance ratio is derived assuming that local shocks are uncorrelated across countries and that they are similarly not correlated with the euro area and US benchmark indices.

<sup>5</sup> The expected return is obtained relating euro area and US returns to a constant term and to the returns in the previous period. The conditional variance of the error terms is governed by a bivariate asymmetric GARCH (1,1) model.



## QUANTITY-BASED INDICATORS

### The degree of cross-border holdings of equity issued by euro area residents (Indicator 24)

#### COMPILATION

These indicators measure the degree of cross-border allocation of equity securities among euro area Member States.

The *intra-euro area* is defined as the share of equity securities issued by euro area residents and held by other euro area residents (excluding central banks):

$$\frac{\sum_i \sum_{j \neq i} \text{Outstock}_{j,t}}{\sum_i \text{MKT}_{i,t} + \sum_i \text{TOutstock}_{i,t} - \sum_i \text{TInstock}_{i,t}} \quad (15)$$

$i, j \in \{\text{euro area countries}\}$

where  $\text{Outstock}_j$  denotes the value of assets issued by residents of euro area Member State  $i$  and held by residents of euro area Member State  $j$  ( $i \neq j$ );  $\text{MKT}_i$  stands for market capitalisation in country  $i$ ,  $\text{TOutstock}_i$  is the total foreign assets held by country  $i$ ; and  $\text{TInstock}_i$  is the total foreign liability of country  $i$ .

Extra-euro area is defined as the share of euro area equity securities held by non-residents of the euro area (excluding central banks). The measure takes the following form:

$$\frac{\sum_i \sum_r \text{Outstock}_{r,t}}{\sum_r \text{MKT}_{r,t} + \sum_r \text{TOutstock}_{r,t} - \sum_r \text{TInstock}_{r,t}} \quad (16)$$

$i \in \{\text{euro area countries}\}$   
 $r \in \{\text{rest of the world}\}$

where  $\text{Outstock}_r$  denotes the value of assets issued by residents of euro area Member State  $i$  and held by non-residents of the euro area  $r$  (rest of the world);  $\text{MKT}_r$  stands for market capitalisation in country  $r$ ,  $\text{TOutstock}_r$  is the total foreign assets held by country  $r$ ; and  $\text{TInstock}_r$  is the total foreign liability of country  $r$ .

#### ADDITIONAL INFORMATION

The indicators are built on the basis of the IMF CPIS conducted on an annual basis and undertaken by national compilers. The IMF does not report data for Germany, Luxembourg and Greece for 1997. The 1997 geographical breakdown of asset allocation for Germany has been estimated using an annual database on international investment positions from the Deutsche Bundesbank. 1997 data for Greece and Luxembourg equity assets have been estimated keeping constant the geographical counterparty share to 2001 levels, and adjusting for the growth rate of the equity value over the period 1997-2001 using equity value developments in the euro area (with the exception of Luxembourg and Greece). Equity securities encompass all instruments and records that acknowledge, after the claims of all creditors have been met, claims on the residual values of enterprises. Shares, stocks, participations or similar documents (such as American Depository Receipts) usually denote ownership of equity.

### Investment funds' holdings of equity issued in other euro area countries as a share of total holdings of equity (Indicator 25)

#### COMPILATION

The indicator shows the share of investment funds' holdings of all shares and other equity (excluding investment fund shares/units) issued by residents of the euro area outside the Member States in which the investment fund is located. The composition of the euro area is adjusted as of the reference period in which a new Member State adopts the euro.

#### ADDITIONAL INFORMATION

Data are available for all investment funds and broken down by type of investment fund. Data are partially estimated.

## BANKING MARKET INDICATORS

### CROSS-BORDER PRESENCE

**Dispersion of number of euro area bank branches/subsidiaries across euro area countries (expressed as a percentage of the total number of euro area credit institutions) (Indicators 26-27)**

#### COMPILATION

These two indicators describe the development over time of the share of the number of branches and subsidiaries of euro area banks (credit institutions) within euro area countries to the total number of domestic credit institutions. Setting up branches or subsidiaries is one way of integrating across borders the euro area banking markets. A population can be described by the following dispersion measures: the minimum value, the first quartile (25th percentile), the median value (50th percentile), the third quartile (75th percentile) and the maximum value. The two indicators display these dispersion measures: the minimum and maximum observations are shown by the lower and upper markers respectively, the first and the third quartile are found at the bottom and top of the box respectively, and the line in the box denotes the median across euro area countries. The number of branches/subsidiaries in a euro area country other than the home country is expressed as the percentage of the total number of credit institutions of the euro area home country for a given year.

#### ADDITIONAL INFORMATION

These indicators are built on the basis of ECB Guideline ECB/2003/02 (as amended). The measures have been corrected in order to offset the effect of possible outliers.

**Dispersion of total assets of euro area bank branches/subsidiaries across euro area countries (expressed as a percentage of the total assets of the euro area banking sector) (Indicators 28-29)**

#### COMPILATION

These two indicators describe the development over time of the size of assets of branches and subsidiaries of euro area banks within euro area countries other than the home country. These indicators complement the information on the number of branches and subsidiaries, as provided by Indicators 26-27. The same explanations hold as for Indicators 26-27.

#### ADDITIONAL INFORMATION

See Indicators 26-27.

**Euro area cross-border bank M&A deal values of assets purchased (as a percentage of the total euro area banking system M&As) (Indicator 30)**

#### COMPILATION

This indicator provides euro area bank M&A activities as a further measure of the degree of the euro area cross-border integration of banking markets. The indicator is calculated on the basis of data contained in Bureau van Dijk Zephyr's database, together with ECB calculations. The numerator is composed of all intra-euro area cross-border bank M&As. M&A deals include both controlling and minority stakes. The denominator is composed of all euro area banking system M&As, i.e. domestic, intra-euro area cross-border, and M&As where the acquirer is resident in the euro area and the counterpart is outside the euro area.

#### ADDITIONAL INFORMATION

A similar chart can be found in the ECB Financial Stability Review.

### PRICE-BASED INDICATORS

**Cross-country standard deviation of MFI interest rates (Indicators 31-33)**

#### COMPILATION

The price measures for credit market integration are based on MFI interest rates (MIR) on new business reported to the ECB (in accordance with Regulation ECB/2001/18), at a monthly frequency as from January 2003.

In detail, the following instrument categories are considered:

Loans to non-financial corporations:

- loans up to EUR 1 million: floating rate and up to one year initial rate of fixation,
- loans up to EUR 1 million: with initial rate fixation of over five years;
- loans over EUR 1 million: floating rate and up to one year initial rate of fixation;
- loans over EUR 1 million: with initial rate fixation of over five years.

Loans to households:

- consumer credit: over one year and up to five years;
- house purchase: floating rate and up to one year initial rate of fixation;
- house purchase: with an initial rate fixation over five years and up to ten years.

Deposits from households:

- with agreed maturity up to one year.

For the purpose of measuring financial integration, it would be preferable to compute the dispersion of rates as measured by the standard deviation using unweighted interest rates at the level of individual MFIs. However, these data are not available at the ECB and, therefore, weighted rates and standard deviations are calculated instead.

The following general notation is used for each of the above categories of loans or deposits:

$r_{c,t}$  = the interest rate prevailing in country  $c$  in month  $t$

$b_{c,t}$  = business volume in country  $c$  corresponding to  $r_{c,t}$

$w_{c,t} = \frac{b_{c,t}}{B_t}$  is the weight of country  $c$  in the total euro area business volume  $B$ :  $B_t = \sum_c b_{c,t}$

The euro area MIR is computed as the weighted average of country interest rates  $r_{c,t}$  taking the country weights  $w_{c,t}$

$$r_t = \sum_c w_{c,t} r_{c,t} \quad (17)$$

The euro area weighted standard deviation takes the following form:

$$M_t = \sqrt{\sum_c (r_{c,t} - r_t)^2 w_{c,t}} \quad (18)$$

The data are smoothed by calculating a three-month centred moving average of the standard deviation.

## ADDITIONAL INFORMATION

Harmonised MIRs have only recently been established, with data available as of January 2003.

## QUANTITY-BASED INDICATORS

**Cross-border deposits, loans and securities holdings [also for quantitative indicators on the government and corporate bond markets] (Indicators 34-37)**

## COMPILATION

These indicators display the geographical counterparty diversification of loans granted by euro area MFIs (excluding central banks) to the general government, to non-MFI counterparties and to other MFIs, respectively resident in other euro area countries and in non-euro area EU Member States.<sup>6</sup> Similar indicators are computed for deposits with MFIs and securities held by euro area MFIs and issued by non-MFIs and MFIs, respectively.

<sup>6</sup> Since May 2004, the group has comprised Denmark, Sweden, the UK and the new EU Member States. Between January 2001 and May 2004, Denmark, Sweden and the UK formed this group, while before January 2001 Greece was also included.

#### ADDITIONAL INFORMATION

These indicators are built on the basis of the national aggregated MFI balance sheet data reported to the ECB, at a monthly and quarterly frequency (in accordance with ECB Regulation ECB/2001/13).<sup>7</sup>

These balance sheet items are transmitted on a non-consolidated basis. This means that the positions with foreign counterparties include those with foreign-controlled branches and subsidiaries.

#### CORPORATE BANKING INDICATORS

##### **Euro area cross-country standard deviation and further dispersion measures of gross fees on bond/equity issues charged to euro area resident firms (Indicators 38a, 38b and 39)**

#### COMPILATION

These indicators display the euro area cross-country standard deviation and further dispersion measures of gross fees on bond and equity issues, respectively, whereby the gross fees are composed of total commissions for management, underwriting and selling a new issue, expressed as a percentage of the nominal amount of the issue. The standard deviation ( $S_t$ ) takes the following form:

$$S_t = \sqrt{\frac{1}{n} \sum_c (f_{c,t} - f_t)^2} \quad (19)$$

where  $n$  = the 12 euro area countries,  $f_{c,t}$  denotes the average percentage gross fees on bond or equity issues, respectively, of euro area country  $c$  at year  $t$ , and  $f_t$  is the average fee of all euro area countries. The standard deviation ( $S_t$ ) is displayed in the main body of the report. Further dispersion measures are displayed in this annex. For these statistics, the same explanations presented for Indicators 26-29 apply.

#### ADDITIONAL INFORMATION

Data are taken from Bondware.

##### **Euro area cross-country standard deviation and further dispersion measures of spreads and fees, respectively, on syndicated loans charged to euro area resident firms (Indicators 40a, 40c and 40b)**

#### COMPILATION

These indicators display the euro area cross-country standard deviation and further dispersion measures of the weighted average of spreads and fees, respectively, on syndicated loans where the borrower is from a euro area country. The average margin is the spread, in basis points, over the base rates (e.g. LIBOR). The average fee is calculated as a difference between the average all-in pricing weighted by the margin. The standard deviation ( $S_t$ ) takes the following form:

$$S_t = \sqrt{\frac{1}{n} \sum_c (f_{c,t} - f_t)^2} \quad (20)$$

where  $n$  = the 12 euro area countries;  $f_{c,t}$  denotes the average margin or fee, respectively, of euro area country  $c$  at year  $t$ ; and  $f_t$  is the average margin or fee, respectively, of all euro area countries. The standard deviation ( $S_t$ ) is displayed in the main body of the report. Further dispersion measures are displayed in this annex. For these statistics, the same explanations as used for Indicators 26-29 apply.

#### ADDITIONAL INFORMATION

Data are taken from Loanware.

#### INFRASTRUCTURE: RETAIL PAYMENT SYSTEMS

##### **Total number of retail payment systems and automated clearing houses (ACHs) in the euro area (Indicators 41 and 42)**

#### COMPILATION

The first indicator counts the total number of retail payment systems in the euro area. A retail

<sup>7</sup> These data cover the MFI sector excluding the Eurosystem and also include data on money market funds (MMFs). It is not yet possible to derive indicators that strictly refer to banking markets. Consequently, as MMFs typically invest in inter-MFI deposits and short-term securities, the indicators displaying data for these assets are somewhat affected by the MMFs' balance sheet items.

payment system is viewed as a funds transfer system which handles large volumes of payments of relatively low value in such forms as cheques, credit transfers, direct debits and ATM and electronic funds transfer at point of sale (EFTPOS) transactions.

The second indicator counts the total number of retail payment systems which operate in the form of an ACH in the euro area. Contrary to those retail payment systems that operate manually or in real-time processing mode, an ACH is viewed as an electronic clearing system in which payment orders are exchanged among financial institutions at a central data processing centre.

#### **ADDITIONAL INFORMATION**

These two indicators are based on the information and definitions reported in the ECB Blue Book for the respective years. When interpreting these statistics, it should be born in mind that the data collection for the ECB Blue Book is currently a voluntary exercise. It is at the discretion of the respective NCBs to select the systems on the basis of their significance in the national context to be reported to the Blue Book.

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