



EUROPEAN CENTRAL BANK

EUROSYSTEM

# PAYMENT SYSTEMS AND MARKET INFRASTRUCTURE

ECB EZB EKT EKP

10

OVERSIGHT REPORT  
JULY 2007



EUROPEAN CENTRAL BANK

EUROSYSTEM



# PAYMENT SYSTEMS AND MARKET INFRASTRUCTURE

OVERSIGHT REPORT

July 2007



In 2008 all ECB publications feature a motif taken from the €10 banknote.



© European Central Bank, 2008

**Address**

Kaiserstrasse 29  
60311 Frankfurt am Main  
Germany

**Postal address**

Postfach 16 03 19  
60066 Frankfurt am Main  
Germany

**Telephone**

+49 69 1344 0

**Website**

<http://www.ecb.europa.eu>

**Fax**

+49 69 1344 6000

*All rights reserved. Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.*

ISSN 1831-1849 (online)



# CONTENTS

<b>INTRODUCTION</b>	<b>5</b>	<b>BOXES</b>	
<b>I THE OVERSIGHT FUNCTION OF THE ECB</b>	<b>6</b>	1	Functioning of market infrastructures during the market turbulence of mid-2007 <b>19</b>
1.1 General framework for the ECB's oversight activities	<b>6</b>	2	Basel Committee on payment and settlement systems' report on "Progress in reducing foreign exchange settlement risk" <b>26</b>
1.2 Developments in the business and legal environment and in the Eurosystem's oversight framework in 2007	<b>9</b>		
<b>2 OVERSIGHT OF MARKET INFRASTRUCTURES</b>	<b>10</b>		
2.1 Payment systems for which the ECB is the primary overseer	<b>11</b>		
2.1.1 TARGET2 and the ECB payment mechanism	<b>11</b>		
2.1.2 The payment systems of EBA CLEARING	<b>13</b>		
2.2 Systems with ECB involvement in a cooperative oversight arrangement	<b>15</b>		
2.2.1 The continuous linked settlement system	<b>15</b>		
2.2.2 The Euro CHATS system	<b>17</b>		
2.2.3 The SWIFT infrastructure	<b>17</b>		
2.3 Assessment of securities settlement systems and other activities	<b>20</b>		
<b>3 ONGOING WORK AND FUTURE PRIORITIES</b>	<b>21</b>		
<b>4 LIAISON WITH OTHER OVERSEERS</b>	<b>25</b>		
<b>ANNEXES</b>	<b>30</b>		
1 Oversight and other securities clearing and settlement related policies used by the European Central Bank (ECB)	<b>30</b>		
2 Reports and papers on oversight-related issues published by the ECB	<b>31</b>		





## INTRODUCTION

Payment and settlement systems, and central counterparties, represent some of the basic infrastructures needed for the proper functioning of market economies. They are indispensable for the efficient flow of payments for goods, services and financial assets and their smooth functioning is crucial for the practical implementation of the central bank's monetary policy and for maintaining the stability of and the confidence in the currency, the financial system and the economy in general. Via its oversight function, the European Central Bank (ECB) aims to ensure the safety and efficiency of payment and settlement systems and central counterparties operating in euro, by applying, inter alia, appropriate minimum standards and requirements to them.

The ECB attaches great importance to transparency and accountability as guiding principles not only for the conduct of monetary policy, but effectively for all its activities including the oversight of payment and settlement systems. This is also in line with the CPSS report on "Central Bank Oversight of Payment and Settlement Systems" of May 2005 which says, as a general oversight principle, that central banks should be transparent about their oversight policies. Against this background, the ECB decided to produce a dedicated publication on its oversight activities. As in the past, the ECB will continue to report regularly on its oversight policies and activities also in other regular ECB publications, such as the ECB Annual Reports, Monthly Bulletins and Financial Stability Reviews, as well as in ad hoc press releases, statements and dedicated reports on oversight issues.

With this Oversight Report 2007, the ECB informs other public authorities, market infrastructure providers and their participants, as well as the general public, of developments related to its oversight framework (Chapter 1), its actual oversight activities related to specific payment systems (Chapter 2), its ongoing work and future work priorities (Chapter 3), as well as its liaison with other overseers at the international level (Chapter 4). Future reports may also present analytical work conducted in the field of payment and settlement systems.

# I THE OVERSIGHT FUNCTION OF THE ECB

Payment systems are exposed to a wide range of risks, including legal risks, financial risks and operational risks that may result in losses for the system operator, the participants in the system, or the public at large. The objective of the ECB's oversight function, in the framework of the Eurosystem's overall oversight competence, is to ensure that these risks are managed adequately by the system operators and relevant third-party service providers. In particular, the oversight function aims to maintain systemic stability in payment systems by containing the exposure to systemic risk. In this respect, overseers are generally concerned with both individual payment systems and the payments infrastructure as a whole. The ECB's oversight function is also concerned with the efficiency of payment systems and, as payment systems are an essential vehicle for the implementation of monetary policy, it is also concerned with safeguarding the transmission channel for monetary policy.

The scope of the ECB's oversight function also includes payment instruments, such as payment cards and electronic money, as they are an integral part of payment systems and their safety and efficiency has a direct bearing on the public's confidence in the payment system as a whole and in the currency.

Securities and derivatives clearing and settlement systems are also an important component of the domestic and global financial infrastructure. Weaknesses and failures in these systems can be a source of systemic disturbance for securities markets and can spill over to other securities and derivatives clearing or settlement systems, and to payment systems with which the latter are connected, usually via the delivery versus payment (DvP) method of settlement. Payment systems, in many cases, rely on the smooth functioning of securities settlement systems for the transfer of securities used to collateralise the provision of intraday liquidity or to collateralise exposures in payment systems. Consequently, central banks, on account of their responsibility in the fields of monetary policy and payment systems, have a strong interest in the smooth

functioning of securities and derivatives clearing and settlement arrangements.

## 1.1 GENERAL FRAMEWORK FOR THE ECB'S OVERSIGHT ACTIVITIES

### LEGAL BASIS FOR THE OVERSIGHT ACTIVITIES OF THE ECB

While the oversight of payment systems has always been an implicit task of central banks, it has taken until the early 1990s for oversight to become a formal (legal) task of EU central banks. The EU Treaty recognises the importance of a safe and efficient functioning of payment systems to the stability of the financial system and thus codifies in its Article 105 (2) that it is one of the main tasks of the European System of Central Banks (ESCB) to promote the smooth operation of payment systems. This provision is mirrored in Article 3.1 of the Statute of the European System of Central Banks and of the European Central Bank. In addition, Article 22 of the Statute clarifies the tools for carrying out this task stating that "the ECB and the national central banks may provide facilities, and the ECB may make regulations, to ensure efficient and sound clearing and payment systems within the Community and with other countries". In light of the conditions laid down at the time of its development, the Treaty mentions explicitly only the smooth operation of payment systems. However, owing to the reasons mentioned above, the interest of the Eurosystem goes beyond payment systems and includes also payment instruments, critical service providers and securities clearing and settlement systems.

### THE EUROSISTEM'S OVERSIGHT FRAMEWORK APPLIED BY THE ECB

Although the Eurosystem's oversight policies and requirements in relation to payment and clearing systems could be implemented via formal legal instruments such as ECB Regulations, in practice this has not so far been the case. The definition of "standards", "minimum requirements", "expectations" etc., which are not formal ECB legal instruments, is considered to be a more flexible approach in an often fast-changing environment.

While the Eurosystem's oversight policies and requirements reflect internationally recognised standards, the details are adjusted to the specific conditions and needs of the Eurosystem. In order to ensure a level playing-field for the overseen entities and to reflect the fact that market infrastructures and payment instruments in the euro area are no longer restricted by national boundaries in terms of offering their services, but are increasingly becoming pan-European, the oversight policies and requirements are very much harmonised or even identical within the Eurosystem.

The most important oversight standards that the Eurosystem has been applying in the field of payment systems are the "Core Principles for Systemically Important Payment Systems" (global – with a customised Eurosystem assessment methodology) since January 2001, the "Oversight standards for euro retail payment systems" (Eurosystem) since June 2003 and the "Business continuity oversight expectations for systemically important payment systems" (Eurosystem) since June 2006. In the field of payment instruments, the Eurosystem issued standards for card payment schemes in January 2008.<sup>1</sup> For electronic money the Eurosystem defined minimum requirements and desirable objectives for electronic money schemes in August 1998.

Moreover, the Eurosystem publicly clarified its payment systems oversight policy stance in a series of statements on specific topics and in particular with reference to "offshore" systems, including the "Policy statement on euro payments and settlement systems located outside the euro area" of November 1998, the "Statement on the role of the Eurosystem in the field of payment systems oversight" of June 2000, and "The Eurosystem policy principles on the location and operation of infrastructures settling euro-denominated payment transactions" of July 2007. In contrast to the field of payment systems, in which the ECB acts as both standard setter and actual overseer, in the field of securities clearing and settlement, most of the ECB's activities have been focused on contributing

to the definition of recommendations that would ensure the safety and efficiency of post-trade systems. In particular, the ECB has been involved in the preparation of the CPSS-IOSCO recommendations for securities settlement systems and central counterparties and in the preparation of their adaptation to the EU context (ESCB-CESR recommendations) (see Chapter 3). Moreover, in a broader context, in September 2001, the ECB released to the public "The Eurosystem's policy line with regard to consolidation in central counterparty clearing", given the implications that central counterparty clearing could have for the smooth execution of monetary policy operations, the smooth operation of payment and settlement systems and the stability of the financial markets in general.

In this context, it can be mentioned that, in relation to Article 18 of the Statute of the ESCB and the ECB in accordance with which the Eurosystem may "conduct credit operations with credit institutions and other market participants, with lending being based on adequate collateral", the Governing Council of the ECB adopted in 1998 nine "Standards for the use of EU securities settlement systems in ESCB credit operations". Securities settlement systems in the euro area that settle Eurosystem credit operations as well as links between them must comply with these standards, which have been adopted from the perspective of the Eurosystem as user of securities settlement systems. The user standards, which are not oversight standards per se, ensure that the Eurosystem credit operations are conducted in accordance with procedures which prevent central banks from assuming inappropriate risks and ensure the same level of safety for credit operations throughout the euro area.

The Eurosystem intends to publish a comprehensive overview of its oversight framework in a dedicated oversight policy statement (see Chapter 3). This policy statement

<sup>1</sup> See also Annex 1 on the oversight policies used by the ECB.



will provide a consolidated overview of, inter alia, the legal basis, rationale, scope, methods and organisation of the Eurosystem's oversight function.

#### **PAYMENT SYSTEMS UNDER ECB OVERSIGHT**

The Treaty assigns oversight responsibilities to the ECB and the NCBs that belong to the euro area. For the purpose of effective and efficient oversight, the Eurosystem shares these responsibilities in a way that allows it to benefit from its decentralised structure, while ensuring coordination of its oversight activities and equal application of its policy stance.

For the oversight of individual systems, the Eurosystem entrusts a leading role to the central bank that is best placed to do so, either because of its proximity to the overseen entity or because of national laws that establish an oversight obligation. This is typically the case for systems with a clear national anchorage. For systems that have no clear national anchorage, the body entrusted with oversight responsibility is the central bank where the system is legally incorporated unless the Governing Council of the ECB decides to assign the oversight responsibilities to the ECB.

Such oversight responsibilities have been assigned to the ECB for the payment systems of the clearing company of the Euro Banking Association (EBA CLEARING), namely the EURO1 system as well as the STEP1 and the STEP2 systems. The oversight activities are conducted in close cooperation with the NCBs of the Eurosystem.

Moreover, the ECB leads and coordinates all TARGET2 oversight activities within the Eurosystem. It acts in close cooperation with the respective NCBs, which conduct the oversight of the local features of TARGET2 and contribute to the oversight of the central features of TARGET2 on a voluntary basis. Until its migration to TARGET2 in May 2008, the ECB payment mechanism (EPM), i.e. the ECB's TARGET1 component, has been subject to oversight by the ECB's oversight function.

At the international level, the ECB is actively involved in a number of multilateral and bilateral cooperative oversight arrangements. Examples of such multilateral arrangements are the oversight of SWIFT and of the Continuous Linked Settlement (CLS) system, which provides settlement services for payment transactions related to foreign exchange trades on a payment versus payment (PvP) basis. For the CLS, the ECB acts as the overseer for settlements in euro. An example of a bilateral arrangement is the oversight of the Euro CHATS system in Hong Kong. In general, the degree of formalisation of these cooperative oversight arrangements with non-euro area central banks depends on the systemic relevance of the respective infrastructures.

#### **TYPES OF OVERSIGHT ACTIVITIES**

The ECB conducts the oversight of the systems for which it has primary oversight responsibilities in close contact with the overseen entities and all relevant stakeholders, including other central bank functions and public authorities such as banking supervisors. The actual oversight of payment systems by the ECB comprises a wide range of activities, which can be categorised into regular and ad hoc oversight activities. Regular oversight means that the oversight function evaluates the systems' operations against the applicable standards, both from a technical and business point of view. Regular oversight includes, in particular, the assessment of the causes and the follow-up by the system operator of significant disruptions to the system. It does not replace the responsibility of the system operator to ensure the smooth functioning of the system and its continued compliance with relevant oversight policies and standards.

Ad hoc oversight activities are change-driven, i.e. they are initiated by changes in the design, functionality, legal and/or operational rules of the system. Changes in the external legal environment may also require ad hoc oversight activities. Normally ad hoc oversight activities concern only a sub-set of the applicable oversight standards. However, in case of fundamental system changes or in the event that a new system is being established, an assessment

against all applicable oversight standards is required. Fully-fledged oversight assessments of individual systems are conducted every few years. In this respect, it is also important to note that by applying the same standards to privately, and central bank, operated systems, the ECB ensures a level playing-field between these systems with regard to the applicable oversight requirements.

## 1.2 DEVELOPMENTS IN THE BUSINESS AND LEGAL ENVIRONMENT AND IN THE EUROSISTEM'S OVERSIGHT FRAMEWORK IN 2007

### DEVELOPMENTS IN THE BUSINESS ENVIRONMENT INFLUENCING THE OVERSIGHT FUNCTION

The ECB's and the Eurosystem's oversight activities are carried out in a dynamic environment that is characterised by the emergence of:

- (i) pan-European retail payment infrastructures;
- (ii) linkages between "national" retail payment infrastructures (e.g. on the basis of the "Technical Interoperability Framework for SEPA-Compliant Giro Payments Processing" developed by the European Automated Clearing House Association (EACHA)); and
- (iii) new SEPA payment instruments such as the SEPA Credit Transfer (SCT) scheme and the SEPA Direct Debit (SDD) scheme developed by the European Payments Council (EPC), as well as payment cards that are compliant with SEPA requirements.

Moreover, also changes in individual infrastructures, such as the go-live of TARGET2 in November 2007 and the extension of CLS's business model beyond the traditional settlement of FX-related transactions on a payment versus payment (PvP) basis, have had implications for the ECB's oversight function and activities.

These environmental changes affect the oversight framework applicable to the ECB

mainly in two ways. First, from an organisational perspective, the development of pan-European retail payment infrastructures and instruments as well as the "delocalisation" – within certain limits – of domestic infrastructures increases the need for close cooperation between all relevant central banks. Second, from a regulatory perspective, some of the above-mentioned environmental changes have an impact on the framework of oversight standards applied by the ECB. For example, back in 2007, the Eurosystem started to develop oversight frameworks for the new SEPA payment instruments. This work will be completed in the course of 2008 (see also Chapter 3).

### DEVELOPMENTS IN THE LEGAL ENVIRONMENT INFLUENCING THE OVERSIGHT FUNCTION

The most important legal act at the EU level that was adopted in 2007, which is relevant also from an oversight perspective, is the Payment Services Directive (PSD).<sup>2</sup> Member States should transpose the Directive into national law by 1 November 2009 at the latest. The Directive is expected to greatly facilitate the operational implementation of SEPA instruments by the banking industry, as well as their adoption by end-users, by harmonising the applicable legal framework.<sup>3</sup> This will lay the foundations for a single "domestic" euro payments market. The Directive is expected to also underpin consumer protection and enhance competition and innovation by establishing an appropriate prudential framework for new entrants to the retail payments market.

### DEVELOPMENTS REGARDING THE OVERSIGHT FRAMEWORK IN 2007

In general, changes to, or further developments of, the oversight framework of the Eurosystem and the ECB are normally agreed with the objective of reflecting relevant changes in the business and/or legal environment or of

2 Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market.

3 Following the adoption of the PSD, both Regulation 2560/2001 on cross-border payments in euro and the E-money Directive will be reviewed, and in that context also aligned with the PSD.

increasing the level of harmonisation of the oversight policies and requirements in order to ensure a level playing-field for the overseen entities across the euro area. Sometimes there may also be the need to further specify and to provide additional clarifications on earlier communicated oversight policy lines. In 2007, three significant developments took place.

On 24 July 2007, the ECB published “The Eurosystem policy principles on the location and operation of infrastructures settling euro-denominated payment transactions”. These principles detail further the position of the Eurosystem, which was outlined in 1998 in the “Policy statement on euro payment and settlement systems located outside the euro area”, in accordance with which, from both a general policy and a systemic risk perspective, the Eurosystem cannot, as a matter of principle, allow the main payment infrastructures for euro transactions to be located outside the euro area, particularly because this would put the Eurosystem’s control over the euro at risk. The principles apply to any existing or potential payment infrastructure that settles euro transactions.

On the basis of the main oversight standards applied, in 2007 the Eurosystem developed a common methodology for the oversight assessment of systemically and prominently important euro payment systems. The common methodology aims to provide the Eurosystem’s payment systems overseers with clear and comprehensive guidelines for the assessment of the relevant systems and the preparation of oversight reports. In addition, it provides payment system designers and operators with greater insight into overseers’ safety and efficiency concerns, gives operators additional incentives to continue their efforts to mitigate or limit the various risks their systems may face and, ultimately, helps to ensure the smooth functioning of their systems. Following a public consultation on the common oversight assessment methodology, the final versions of the “Terms of reference for the oversight assessment of euro systemically and prominently important payment systems against the Core Principles”

and the “Guide for the assessment against the business continuity oversight expectations for SIPS” were published on 12 November 2007.

In January 2008, the Governing Council of the ECB approved the “Oversight framework for card payment schemes – standards”. The framework, which was developed and subject to a public consultation in the course of 2007, is aimed at ensuring the safety and efficiency of four-party and three-party card payments schemes (CPS) (offering card payment services either by debit and/or credit card) operating in the euro area. It is also intended to contribute to maintaining public confidence in card payments and to promoting a level playing-field for all card schemes operating across the euro area.

The framework is based on five standards relating to legal issues, transparency, operational reliability, good governance and sound clearing and settlement processes. In order to allocate oversight efforts proportionately to the risks generated by the card schemes, a waiver policy has been defined allowing the Eurosystem to exclude card schemes – up to a certain size in terms of cards in-issue and annual average value of transactions – from the application of the oversight standards. In addition to the standards, the framework also comprises an assessment methodology and a reporting framework applied to the overseen CPS with respect to operational and fraud statistics (see also Chapter 3).

## 2 OVERSIGHT OF MARKET INFRASTRUCTURES

The ECB is involved in the oversight of several large-value and retail payment systems as well as of SWIFT, which is a global provider of secure financial messaging services. While for some of these market infrastructures the ECB has the primary oversight responsibility (see Section 2.1), for others it is involved in cooperative oversight arrangements at the international level (see Section 2.2). As mentioned in Chapter 1, the ECB also has an interest in the smooth operation of securities clearing and settlement systems. As users of securities settlement systems in

Eurosystem credit operations, the Eurosystem assesses periodically the compliance with the user standards of both securities settlement systems and links between them. Although this is not part of its legally mandated oversight activities, Section 2.3 discusses such assessments that were conducted in 2007, as well as other securities related activities.

## 2.1 PAYMENT SYSTEMS FOR WHICH THE ECB IS THE PRIMARY OVERSEER

### 2.1.1 TARGET2 AND THE ECB PAYMENT MECHANISM

#### HISTORY AND DESCRIPTION

The TARGET system, which started its operation, together with the introduction of the euro, in January 1999, is the large-value payment system providing real-time gross settlement in central bank money in euro. Until the start of migration to the new TARGET2 system in November 2007, TARGET consisted of the RTGS systems of the participating and connected NCBs, the ECB's own TARGET component, the EPM, and the telecommunications network connecting all these components commonly known as the Interlinking system. In 2007, TARGET was available for all credit transfers in euro between banks in 17 EU Member States – including the 13 euro area countries plus Denmark, Estonia, Poland and the United Kingdom.

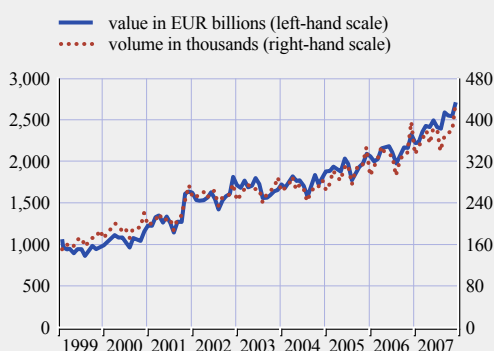
The set-up of TARGET could be characterised as a decentralised system based on a minimum harmonisation approach, governed by rules contained in the national regulations and/or contractual provisions applying for the individual national components (including the EPM). Only certain provisions, in particular on participation criteria, pricing rules, operating times, provision of intraday credit and security requirements, were harmonised across RTGS systems, as they were considered crucial from the perspective of a level playing-field for banks across the EU and for the smooth implementation of the single monetary policy of the Eurosystem.

In 2007, TARGET as a whole had about 1,000 direct and 9,300 indirect participants with over 52,000 banks (including branches and subsidiaries) accessible worldwide via TARGET. With more than 93 million transactions with a total value of €614 trillion processed in 2007, TARGET had a market share among large-value payment systems operating in euro of 89% in terms of value and 60% in terms of number of payments. In the EPM, there were six participants at end-2007. The low number is due to the fact that the ECB does not hold accounts for credit institutions, but only for foreign central banks, international institutions and other payment and settlement systems. The total number of payments processed in the EPM in 2007 was 43,000 while their total value amounted to €7 trillion.

On 19 November 2007, the Eurosystem successfully launched the migration to the second generation of the TARGET system, namely TARGET2. TARGET2 was established and now functions on the basis of a single technical platform, through which all payment orders are submitted and processed in the same technical manner. The minimum harmonisation principle of the previous TARGET generation has been replaced by a maximum harmonisation concept. The business relationships with their local participants are still maintained by the respective central banks. TARGET2 is run by

Chart 1 TARGET: Average daily volumes and values

(January 1999 – December 2007)



Source: ECB.

the Eurosystem under the ultimate responsibility of the Governing Council of the ECB. Three Eurosystem central banks – the Banca d’Italia, the Banque de France and the Deutsche Bundesbank – jointly provide the single technical infrastructure, known as the Single Shared Platform (SSP) of TARGET2, and operate it on behalf of the Eurosystem. TARGET2 is a single technical platform, however, from a legal point of view, each participating and connected NCB has its own RTGS system.

#### OVERSIGHT ACTIVITIES IN 2007

As regards the oversight of TARGET, in the TARGET1 context, each NCB and the ECB oversight function conducted the actual oversight of their respective TARGET components, while the Governing Council of the ECB had the responsibility for the system as a whole. As mentioned in Chapter 1, for TARGET2 the ECB has been assigned with primary oversight responsibilities. The ECB acts in close cooperation with the respective NCBs, which conduct the oversight of the local features of TARGET2 and contribute to the oversight of the central features of TARGET2 on a voluntary basis.

Throughout 2007, the oversight activities related to the TARGET1 system were, to a large extent, determined by the migration to TARGET2. In view of being close to the end of its lifecycle, there were almost no technical, functional or business changes in any of the

TARGET1 components. Consequently, change-driven oversight activities were not considered necessary, including for the EPM.

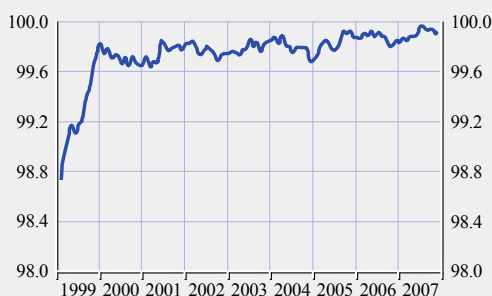
Nevertheless, TARGET overseers followed with continuous attention the functioning of the TARGET system, via, inter alia, the regular incident monitoring and reporting framework. Incidents that occurred in some of the TARGET components were assessed by the respective overseers. None of these incidents had an adverse impact on the level of compliance of TARGET1 with the applicable Core Principles. This is true also for the EPM, in which there were no significant incidents, i.e. system outages of two hours or longer, in the course of 2007. The availability ratio of the EPM reached 99.81% in the reporting period, which corresponds to the overall availability level of TARGET, as a whole (99.90%).

An important focus of TARGET overseers in 2007 was the development and the design of TARGET2. The ECB, as primary overseer, conducted, in cooperation with the relevant NCBs, a comprehensive assessment of the TARGET2 design against all applicable Core Principles on the basis of the Eurosystem’s common oversight assessment methodology, i.e. the “Terms of reference for the oversight assessment of euro systemically and prominently important payment systems against the Core Principles” complemented by the “Guide for the assessment against the Business continuity oversight expectations for SIPS”. Since the system was still under construction in the course of 2007, the oversight assessment had to be done in various steps in line with the progress being made in the project.

A number of oversight findings were identified and discussed with the TARGET2 system operator. Most issues of concern were resolved, while some outstanding issues will be followed-up by the end of 2008 on the basis of an agreed action plan. At the end of 2007, the TARGET2 oversight function concluded that TARGET2 is likely to fully observe all relevant Core Principles provided that the action plan is

Chart 2 TARGET: Overall availability

(January 1999 - December 2007; three-month moving average; percentages)



Source: ECB.

properly followed-up.<sup>4</sup> The Governing Council will take a final decision on the compliance level of TARGET2 with the applicable Core Principles towards the end of 2008. A public report on the oversight assessment of TARGET2 is envisaged to be released within the first quarter of 2009.

### 2.1.2 THE PAYMENT SYSTEMS OF EBA CLEARING

In 1985, 18 major European and international banks plus the European Investment Bank founded the ECU Banking Association (EBA) with the aim of promoting the use of the ECU in the field of payment systems. The initiative received the support of the European Commission and the Bank for International Settlements (BIS). During the initial years, the EBA developed and managed the private ECU clearing and settlement system, which cleared and settled private ECU for the member banks using the BIS as settlement agent.

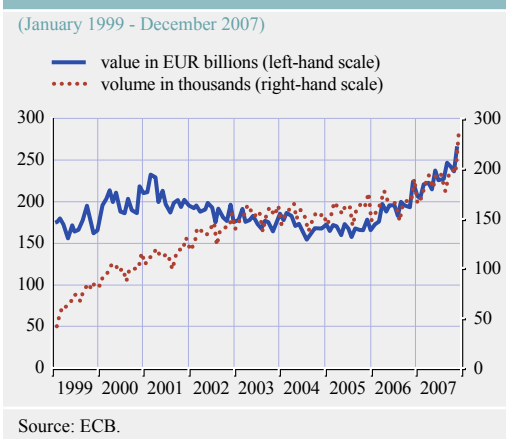
In June 1998, in preparation for the euro, the EBA was renamed the Euro Banking Association by its then 52 member banks. The private ECU clearing and settlement system underwent a complete overhaul with amendments to the processing and settlement procedures as well as the risk management features. The resulting EURO1 system for the processing of large-value payments in euro was owned and operated by EBA CLEARING, a separate entity under the umbrella of the EBA. In response to market demand, EBA CLEARING created the STEP1 and STEP2 systems in 2000 and 2003, respectively, as efficient solutions for low-value cross-border payments in euro accessible to a wide community of banks in the EU. The ECB has the primary oversight responsibility for these two systems.

### THE EURO1/STEP1 PLATFORM

#### History and description

EURO1 is a large-value payment system for cross-border and domestic transactions in euro between banks operating in the EU. The system operates on the basis of the so called Single Obligation Structure (SOS), according to which

Chart 3 EURO1: Average daily volumes and values



each participant faces only one single obligation or claim against the community of all other EURO1 participants at any given time on each settlement day. The SOS does not allow for any unwind, and payment messages are irrevocable and final upon being processed. The continuous calculation of the single position (obligation or claim) of each participant is carried out by the processing system operated by SWIFT, which acts as the processing agent for EURO1.

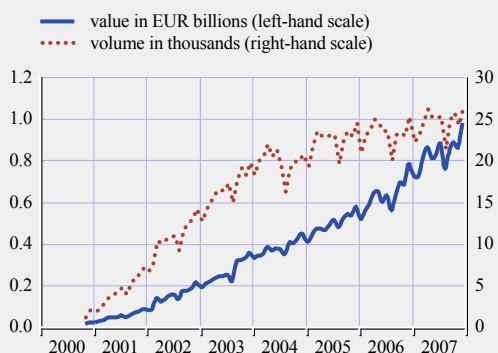
There are a number of legal, financial and operational access criteria that are to be met by any bank wishing to qualify as a system participant. The main legal requirement is to have its registered office in an OECD or EU country where the SOS is recognised and enforceable. Financial criteria require minimum levels of own funds and credit rating. Finally, a set of operational conditions require that the participant has access to an EU RTGS system and adequate technical and operational facilities.

At the end of December 2007, there were 70 EURO1 participants (also called “clearing members”). In addition, two other participation profiles, namely “sub-participation” and “pre-fund participation” cater for more specific

<sup>4</sup> Only Core Principle V (multilateral netting) is not applicable to TARGET2

**Chart 4 STEP1: Average daily volumes and values**

(November 2000 - December 2007)



Source: ECB.

market needs. The sub-participation status allows branches of a EURO1 participant to be connected directly to the system, with the EURO1 participant being fully responsible for the activities of its sub-participants. Pre-fund participation has been introduced to enable banks which do not qualify for clearing member status or which do not fulfil the financial criteria to use EURO1 for the settlement of their STEP2 obligations. At the end of December 2007, EURO1 had 60 sub-participants and nine pre-fund participants.

The EURO1 system is open for payment processing from 7.30 a.m. to 4 p.m. CET, the so-called cut-off time. Shortly after the cut-off time, EURO1 positions are settled via TARGET2 in central bank money with the ECB acting as settlement agent.

In November 2000, with the creation of STEP1, access to the EURO1 processing platform was opened to banks that did not comply with the strict EURO1 admission criteria. The STEP1 system is designed to process single cross-border transactions in euro between banks operating in the EU. It operates using the technical platform of the EURO1 system, allowing its participants – 113 at the end of December 2007 – to exchange payments with the other STEP1 participants, as well as with the entire community of EURO1 banks.

A STEP1 participant is not allowed to have a negative position at any point in time during the processing hours of the STEP1 system (7.30 a.m. to 2.30 p.m. CET, the STEP1 cut-off time), and receives its payment capacity from a EURO1 participant of its choice, acting as its settlement bank. The credit cap for a STEP1 bank has been set at €1 million, with the possibility of being extended by the settlement bank up to a maximum of €25 million. Shortly after the STEP1 cut-off time, the balances of each STEP1 bank are calculated and settled via their respective settlement banks in EURO1.

#### OVERSIGHT ACTIVITIES IN 2007

In its capacity as primary overseer, the ECB examines and requires the compliance of the EURO1 system with the Core Principles for Systemically Important Payment Systems. A first assessment was conducted in 2001 and EURO1 was found to fully observe all ten Core Principles. In 2006, the introduction of the so called Flexible Settlement Capability was assessed against the applicable standards. This Flexible Settlement Capability allows participants to shift payments capacity from TARGET to EURO1, and vice versa, in order to restore partially or totally their credit and debit capacity within their respective liquidity limits. The level of compliance with the Core Principles did not change following the introduction of this new functionality. Since then, neither EURO1 nor STEP1 have undergone functional changes which would have to be assessed, and the oversight activities have concentrated on the regular monitoring of the smooth functioning of the system. The ECB fulfils these tasks based on regular monthly statistical reporting by EBA CLEARING, bilateral meetings between EBA CLEARING and the ECB, and a regular dialogue between both parties.

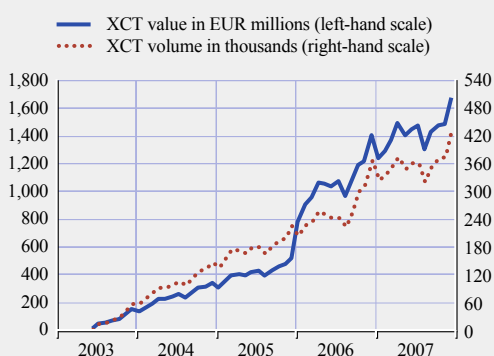
#### THE STEP2 SYSTEM

##### History and description

STEP2 is a payment system for cross-border, and increasingly also for domestic, retail payments in euro. In practical terms, it is a payment processing service that sorts and

**Chart 5 STEP2: Average daily volumes and values in XCT service**

(June 2003 - December 2007)



Source: ECB.

forwards payment orders, and computes bilateral positions between its participants on a gross basis. There are currently three different services offered within the STEP2 platform: the Credeuro (XCT) Service, for credit transfers that are in line with the CREDEURO Convention of the European banking industry; the ICT Service, especially designed for the Italian banking community in preparation for the SEPA; and the SEPA Credit Transfer (SCT) Service, launched on 28 January 2008 for the processing of credit transfers compliant with the EPC SEPA Credit Transfer Scheme Rulebook. STEP2 positions are settled in EURO1.

Participation in STEP2 is open to any financial institution with its registered office or branch in a country of the European Economic Area (EEA). STEP2 offers the possibility of direct and indirect participation. Direct participants may be either EURO1 participants who settle their STEP2 position directly, or STEP1 participants who settle their STEP2 positions via a EURO1 participant acting as their settlement bank.

The STEP2 platform is designed to offer one or more processing cycles per value date and service. Each processing cycle consists of a sending window, when banks send payment files to the system; a settlement window, when STEP2 computes the bilateral gross settlement

obligations and sends settlement instructions to EURO1; and an output window, when STEP2 delivers output information to its participants. Currently there is one processing cycle with a settlement window starting at 7.30 a.m. CET, the start-up of the EURO1 system. For the SCT Service only, an additional intraday cycle was introduced in May 2008, in order to cater for the demands arising from the migration of domestic traffic of euro area countries into the new SCT Service. The STEP2 SCT Service has more than 100 direct participants and around 3,200 indirect participants.

#### OVERSIGHT ACTIVITIES IN 2007

STEP2 has been classified by the ECB as a retail payment system of prominent importance, meaning that it has to comply with a sub-set of the Core Principles for Systemically Important Payment Systems. The ECB, in its responsibility as system overseer, assesses the safety and efficiency of the STEP2 system against the “Oversight standards for euro retail systems”. The first fully-fledged assessment was carried out in 2005, with the conclusion that STEP2 observed all relevant Core Principles.

In 2007, the ECB oversight activities vis-à-vis STEP2 focused on the new SCT Service. It was concluded that there would be no impact with regard to the compliance of STEP2 with the applicable oversight standards, nor would there be any impact on the smooth functioning of any of the related payment systems.

## 2.2 SYSTEMS WITH ECB INVOLVEMENT IN A COOPERATIVE OVERSIGHT ARRANGEMENT

### 2.2.1 THE CONTINUOUS LINKED SETTLEMENT SYSTEM

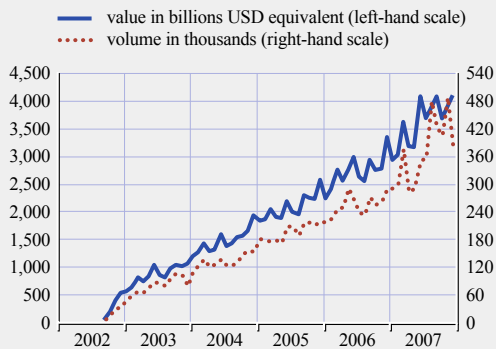
#### HISTORY AND DESCRIPTION

Following the G10 central banks’ call for action to reduce foreign exchange (FX) settlement risk, the CLS Bank was created in 2002 to provide settlement services for payment transactions related to foreign exchange trades on a payment versus payment (PvP) basis. In 2007, the CLS system settled payment transactions related



**Chart 6 CLS: Average daily volumes and values of FX transactions**

(September 2002 - December 2007)



Source: ECB.

to FX trades in fifteen of the world's mostly traded currencies averaging 368,846 sides and the equivalent of USD 3.6 trillion per day. With a share of 20% of all transactions settled in CLS, the euro has continued to be the most important currency for settlement, after the US dollar (45%).

CLS Bank is incorporated in New York and is chartered, regulated and supervised by the Federal Reserve. In accordance with the Lamfalussy principles of November 1990, which define a framework for cooperative central bank oversight of cross-border and multi-currency netting and settlement schemes and which have been updated in the CPSS report of May 2005 on "Central Bank Oversight of Payment and Settlement Systems", CLS is overseen by the G10 central banks and central banks of issue of the CLS-settled currencies. Within this cooperative CLS oversight arrangement, the Federal Reserve<sup>5</sup> is the primary overseer of CLS. The ECB is the overseer for the settlement of the euro in CLS.<sup>6</sup> Any proposed change to the business of the CLS Bank, including the inclusion of a new currency for settlement in CLS, is subject to regulatory approval.

In the course of 2007, the CLS Bank introduced changes to the criteria relating to the eligibility for membership and currencies in the CLS

system. While the minimum requirements have been somewhat lowered, CLS seeks to contain any potential risk by applying more stringent risk limits in such cases.

#### OVERSIGHT ACTIVITIES IN 2007

In light of its new business strategy, in 2007, the CLS Bank formally requested regulatory approval for the settlement of single currency payment instructions related to over the counter (OTC) Credit Derivatives calculated or matched by the DTCC Deriv/SERV Trade Information Warehouse, Non-Deliverable Forwards and FX Option Premiums. The Federal Reserve, together with the central banks participating in the cooperative CLS oversight arrangement, carried out a formal and comprehensive regulatory review process. Overseeing central banks assessed CLS as continuing to comply with the Core Principles and, at the current juncture, also fulfilling the requirements of applicable policies in individual central banks. As there were no objections made by CLS overseers, the Federal Reserve Board granted the CLS Bank regulatory approval to the proposed new services in October 2007. The Eurosystem, however, attached certain conditions to the expansion of the CLS business model, in particular a value threshold, as it views this CLS development critically. The Eurosystem believes that the main infrastructure for settling the euro should be located in the euro area in order to enable the Eurosystem to ensure the smooth operation of payment systems, efficient monetary policy implementation, and financial stability. The CLS central settlement service of OTC Credit Derivatives transactions went live in November 2008 and the NDF settlement service was launched in December 2007. The service for FX Option Premiums is expected to start in the first half of 2008.

<sup>5</sup> The Federal Reserve is represented by the Federal Reserve Board and the Federal Reserve Bank of New York.

<sup>6</sup> The ECB plays the role of overseer with respect to the settlement of the euro. NCBs from participating countries are associated with the oversight activity of the ECB in their capacity as members of the Eurosystem and as NCBs of the banks that act as settlement members of the CLS Bank.

CLS overseers' formal and comprehensive review of the CLS Bank's request for regulatory approval for including the Mexican Peso and the Israeli Shekel as new settlement currencies into the system was completed in May 2008. For information, it is noted that, in 2007, the CLS Bank prepared and published a self-assessment on the basis of the Core Principles for Systemically Important Payment Systems.

### 2.2.2 THE EURO CHATS SYSTEM

The Euro CHATS system in Hong Kong was launched in April 2003 as a euro RTGS system. It is operated by Hong Kong Interbank Clearing Limited (HKICL), a private company established in 1995 and jointly owned by the Hong Kong Monetary Authority (HKMA) and the Hong Kong Association of Banks (HKAB). Euro CHATS is linked to US dollar and Hong Kong dollar RTGS systems to allow for the PVP settlement of FX transactions related to USD/EUR and EUR/HKD trades. It also employs a DvP mechanism for the settlement of euro denominated debt securities. Transactions are settled across the books of the Standard Chartered Bank (Hong Kong) Limited which is the settlement institution of Euro CHATS. In 2007, Euro CHATS processed 40,186 transactions with a total value of €280 billion.

In July 2007, the HKMA published an assessment of Euro CHATS against the Core Principles for Systemically Important Payment Systems.<sup>7</sup> In accordance with the Lamfalussy principles for cooperative oversight, as updated in the CPSS report on "Central Bank Oversight of Payment and Settlement Systems", the HKMA has the primary oversight responsibility for Euro CHATS. Within a cooperative oversight arrangement between the HKMA and the ECB, the HKMA regularly consults the ECB (e.g. in the context of the above-mentioned Euro CHATS assessment against the Core Principles) and keeps the ECB informed about the turnover and any significant developments of the system.

### 2.2.3 THE SWIFT INFRASTRUCTURE

#### INFRASTRUCTURE DESCRIPTION

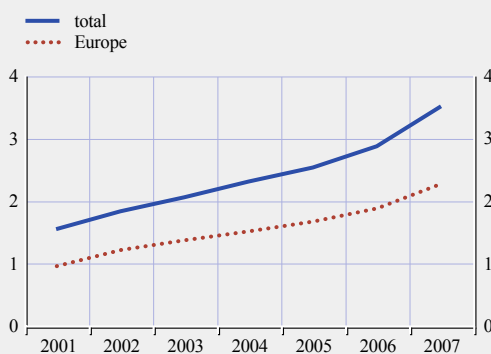
S.W.I.F.T. s.c.r.l., the Society for Worldwide Interbank Financial Telecommunication ("SWIFT") is a limited liability cooperative company, registered in Belgium, owned and controlled by its members which are mainly financial institutions. SWIFT provides secure messaging services and a variety of value-added applications to the financial community worldwide, including major euro area payment and settlement infrastructures. In 2007, SWIFT serviced 8,332 users in 208 countries. Compared with the previous year, the number of SWIFTNet FIN messages increased by 22% to more than 3.5 billion. Europe continues to be a major user with 65% of the messages being sent. SWIFT network's availability in 2007 reached 99.992%.

In 2007, SWIFT announced a strategic re-architecture programme. The core part of this programme is the establishment of an additional operating centre (OPC) in Europe complementing the existing US and European operating centres. The messaging re-architecture will enable SWIFT to increase its processing capacity and enhance its resilience and should result in all intra-European messages being processed and stored at locations in Europe.

<sup>7</sup> See [www.info.gov.hk/hkma](http://www.info.gov.hk/hkma)

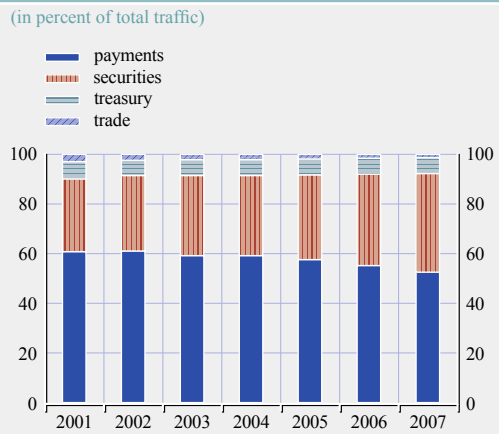
Chart 7 SWIFTNet FIN traffic

(in billions of messages; total for the year)



Source: ECB.

**Chart 8 SWIFTNet FIN traffic distribution by market**



Source: ECB.

According to SWIFT, the new European OPC will be operational by end-2009.

SWIFT is currently working on an amendment of its criteria for membership (shareholding) and participation that would also allow non-financial institutions to use its infrastructure for exchanging messages. In accordance with the proposal, the existing SWIFT User Categories would be grouped into three clusters: regulated financial institutions, non-regulated entities active in the financial industry and special purpose participants such as corporate and Closed User Group participants.

#### OVERSIGHT ACTIVITIES IN 2007

The ECB participates with the other G10 central banks in the cooperative oversight of SWIFT, with the National Bank of Belgium being the overseer with primary responsibility. The cooperative oversight focuses on the technical security, operational

reliability, business continuity and resilience of the SWIFT infrastructure. To ascertain whether SWIFT is pursuing these objectives, overseers regularly assess whether SWIFT has appropriate governance arrangements in place, risk management procedures and controls to effectively manage the potential risks it may pose to the smooth functioning of financial infrastructures utilising SWIFT and, thus, financial stability in general.

In the context of its participation in the cooperative oversight of SWIFT, the ECB worked with the G10 central banks to establish a set of high-level oversight expectations (HLE) that would be suitable for the assessment of SWIFT, taking into consideration SWIFT's existing structure, processes, controls and procedures. The oversight expectations were finalised in June 2007 and integrated into the oversight group's risk-based oversight methodology. Two of the expectations focus on management of risks, namely those dealing with Risk Identification and Management and Communication with Users. The other three HLEs deal with specific types of risk that should be managed by SWIFT, namely Information Security, Reliability and Resilience, and Technology Planning.

The HLEs provide the basis against which SWIFT has prepared a self-assessment of its infrastructure. Furthermore, the HLEs provide a framework within which the overseers organise their activities and on the basis of which a risk-based oversight plan is prepared. The five HLEs for the oversight of SWIFT as well as the rationale for the framework were presented in detail in the June 2007 Financial Stability Review of the National Bank of Belgium.

## Box I

FUNCTIONING OF MARKET INFRASTRUCTURES DURING THE MARKET TURBULENCE  
OF MID-2007

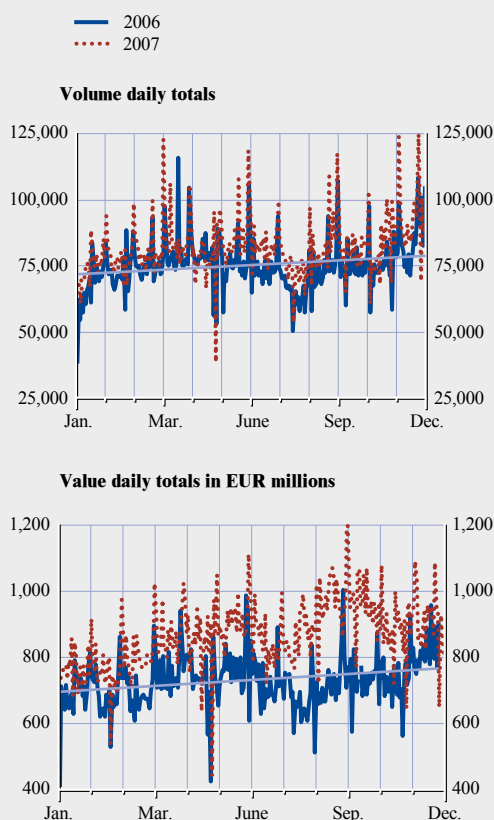
Overall, market infrastructures in the euro area and worldwide functioned smoothly during the turmoil and market participants remained confident in the smooth functioning of payment and securities settlement systems. The systems' design and functionalities (e.g. in terms of liquidity management and collateral pooling) as well as central banks policies helped the systems and their participants to meet the various challenges they faced, such as increases in traffic, price volatility, and precautionary demand for liquidity.

Several market infrastructures saw higher transaction volumes and/or values during the turmoil. The payment volume processed in the Eurosystem's own large-value payment system TARGET was in line with seasonal patterns of previous years. The values processed, however, were 6 to 10% above expectations, which was mainly attributable to an increase at the cross-border level. Two possible explanations can be given: the impact of the Eurosystem's liquidity providing operations during that time and a general preference of market participants for settling in central bank money in times of market turmoil. Indications for the latter were also provided in the securities market.

The private sector owned large-value payment system, EURO1, showed a traffic development similar to TARGET and similarly did not face any operational problems.

The most visible impact of the market turbulence in mid-2007 was experienced with CLS, where, due to high trading volumes in the FX market, in August 2007 CLS experienced significantly higher volumes compared with July 2007. In August 2007, CLS settled on a daily average 479,356 sides with a gross value of USD 3.87 trillion equivalent. Compared with July, this represented an increase of 35% in volume and 5% in value terms. On 20 August, CLS settled an, until then, unprecedented volume of 873,430 payment instructions with a gross value of USD 4.9 trillion equivalent. The funding requirements for the trades settled via CLS increased only slightly from July to August (from 1.32% to 1.46%). In September 2007, CLS settled on a daily average 423,299 sides with a gross value of USD 4.1 trillions equivalent. Compared with August, this was an 11.7% decrease in volume and 6% increase in value terms.

## TARGET inter-Member State



Source: ECB.

The exceptionally high FX market trading not only resulted in record volumes, but also led to some capacity-related problems. While CLS' core processing system experienced no problems in settling instructions, in the period 16-20 August, settlement members experienced congestion and delays in transmitting instructions to CLS as the communication gateway reached its capacity (new instructions were coming in at approximately twice the normal rate, 60,000 in comparison with 25,000-30,000 normally). With the help of different measures, CLS was able to manage these volumes and to complete settlement during this period. Also, some CLS members reported internal capacity limitations and internal queue management difficulties that further hindered them in inputting instructions. In order to provide the members with additional time for inputting transactions, CLS delayed the issuance of the initial pay-in schedule on one of these days.

As far as euro securities infrastructures are concerned, they coped very well with the flow of securities transactions that took place during the days of the turmoil. Neither delays in settlement nor exceptional increases in settlement failures were noted. CCPs reported an increase in margin requirements (both in terms of amounts and in terms of margin call frequency) and more active monitoring of margin, but no operational problems were registered.

Although during the market turbulence payment and settlement obligations were fulfilled as normal in the euro area, money market participants were temporarily reluctant to provide liquidity to each other, driven by the uncertainty about banks' individual exposures. In order to receive additional credit from the Eurosystem and to maintain "free" collateral, market participants provided additional collateral to the Eurosystem central banks. While the trend of the previous two years for total collateral in custody would have suggested an increase of about 3%, the actual increase in August 2007 was 17%. There were no indications of a shortage of eligible collateral on the part of market participants.

Despite the fact that the general experience with regard to the functioning of euro market infrastructures over the recent market turbulence period was positive, some lessons may be learned:

- (i) Effective capacity planning and stress testing are key for managing smoothly exceptionally high volumes in times of market turmoil. This concerns both the market infrastructures themselves as well as their (critical) participants.
- (ii) If the latter have to deal with increased volumes coming from customer banks in correspondent banking arrangements in which they act as service providers, they need to have effective tools in place to manage adequately their intraday liquidity and credit risks.
- (iii) The turmoil hinted at the importance of a close cooperation between, inter alia, overseers and banking supervisors to address the interdependencies between the players in the financial system as well as to consider both liquidity/credit and operational risks in the resilience frameworks.

### 2.3 ASSESSMENT OF SECURITIES SETTLEMENT SYSTEMS AND OTHER ACTIVITIES

The safety of securities settlement arrangements is critical from the perspective, inter alia, of protecting clients' assets, in the case of

the Eurosystem these are the assets of the NCBs arising from claims in the event of the operator's or a participant's default. Therefore, the Eurosystem assesses periodically the compliance with the user standards of both securities settlement systems and links between

them. The lists of eligible securities settlement systems and links are publicly available on the ECB's website. The assessments have so far been conducted on an ad hoc basis whenever a change to the operational and legal documentation of the securities settlement systems and their links has occurred. The result has been that the overall level of compliance with the standards has been high and that securities settlement systems have maintained efforts to enhance compliance further.

The Eurosystem subsequently decided to conduct regular assessments of all eligible securities settlement systems and their links proposed for assessment on a biannual basis. The preparations for such an initial complex assessment of all securities settlement systems and their links that are used to settle Eurosystem credit operations began at the end of 2007. The exercise will be completed in the course of 2008.

Securities settlement systems in Member States due to adopt the euro, as well as their links, are assessed against the user standards prior to the adoption of the euro by those Member States. Thus, in preparation for the accession to the euro area of Slovenia, Malta and Cyprus, the securities settlement systems of these Member States were assessed in 2007 and found eligible for Eurosystem credit operations. A similar assessment will be conducted for the securities settlement system of Slovakia in 2008.

### 3 ONGOING WORK AND FUTURE PRIORITIES

Looking forward to 2008, one of the primary tasks of the ECB's oversight function will be to ensure the continued compliance with its oversight standards and policies of the market infrastructures for which the ECB acts either as the primary overseer or participates in a cooperative oversight arrangement with other central banks. In addition to this ongoing priority, in 2008 there will be a number of other topics that will play a prominent role on the agenda of the Eurosystem's overseers.

These topics are related to the:

- (i) intention to increase the transparency of the existing Eurosystem oversight policies and activities via the publication of an updated oversight policy statement;
- (ii) contribution to the envisaged finalisation of recommendations in the EU in the field of securities clearing and settlement (ESCB-CESR);
- (iii) application for the first time of the Eurosystem oversight standards for card payment schemes, including a monitoring of fraud trends;
- (iv) implications that the creation of the SEPA has, or may have, from an oversight perspective;
- (v) Eurosystem's interest in the monitoring and assessment of developments in correspondent banking;
- (vi) intention to foster the resilience and business continuity arrangements of market infrastructures processing the euro;
- (vii) review of the CLS cooperative oversight arrangement; and
- (viii) development of a framework for a risk-based oversight approach which complements the current qualitative oversight.

In the following, this chapter provides a short overview of the background and the objectives behind each of these initiatives.

#### OVERSIGHT POLICY STATEMENT

On 21 June 2000, the ECB released to the public a policy statement on the role of the Eurosystem in payment systems oversight. This policy statement clarified the role that the Eurosystem as a whole plays in the field of payment systems oversight and the practical organisation of oversight activities within the Eurosystem. Although most of the aspects and principles that were presented

in this statement are still valid, the Eurosystem's oversight function itself as well as the external environment in which it operates, have further developed since then. For example, with the adoption of the "Core Principles for Systemically Important Payment Systems" of January 2001, the "Oversight standards for euro retail payment systems" of June 2003 and the "Business continuity oversight expectations for systemically important payment systems" of June 2006, which are the Eurosystem's minimum oversight standards for payment systems, there is now a fully harmonised oversight framework available which is applied by the Eurosystem central banks.

A similar development is progressing in the field of securities clearing and settlement with the envisaged finalisation of the ESCB-CESR recommendations. Moreover, the scope of Eurosystem oversight activities on the basis of a common framework has recently been extended to payment instruments. Also, integration of the payment and settlement infrastructures in euro is further progressing, as a consequence, inter alia, of the promotion of the SEPA. These changes have a significant impact on the scope and degree of cooperation between overseers within and also beyond the Eurosystem. Against this background, the ECB intends to publish an updated oversight policy statement that takes into account recent developments and that provides a comprehensive overview of, inter alia, the legal basis, rationale, scope, methods and organisation of the Eurosystem's oversight function.

#### ESCB-CESR RECOMMENDATIONS

In October 2001, the Governing Council of the ECB and the Committee of European Securities Regulators (CESR) established a joint group with the objective of ensuring close cooperation in the field of securities clearing and settlement. This group was mandated to adapt the CPSS-IOSCO recommendations for securities settlement systems, of November 2001, to the EU environment because of the fairly broad scope of these global recommendations and to provide standards that were at least as stringent as the CPSS-IOSCO recommendations. Little

progress was made since 2005, as there was some concern, inter alia, that the work of the joint group may infringe on the legislator's competence in the event that the European Commission proposed legislation in the field of clearing and settlement.

The Code of Conduct signed on 7 November 2006 by organisations providing trading and/or post-trading services, the aim of which is to foster competition, to ensure transparency of prices and services, as well as their access and interoperability, and unbundling of services and accounting among service providers, has provided an incentive to finalise the work of ESCB-CESR. As the Code of Conduct does not touch on financial stability requirements and regulatory harmonisation, it became obvious that the need for a harmonised framework for the safety and regulation of securities settlement systems and central counterparties remains. Moreover, the fact that an important component of the Code of Conduct for cash equities is to foster access and interoperability between the signatories to the Code leads to new issues with regard to the supervision of access and interoperability. Finally, the Capital Requirements Directive and the Directive on Markets in Financial Instruments (the so-called "MiFID") introduce a new regulatory framework for credit risk, which also comprises the business of custodian banks and Central Securities Depositories (CSDs) with a banking licence, and for trading in Europe, respectively, and thereby influence the post-trade business as well.

In order to achieve competitive, efficient and safe pan-European post-trading arrangements, the ECOFIN agreed in its meeting on 3 June 2008 "that the work started with the former ESCB/CESR draft 'Standards for Securities Clearing and Settlement in the EU' should be completed" and invited "the ESCB and CESR to adapt and finalise the draft by autumn 2008", respecting the following principles: (i) the adopted text should take the form of non-binding Recommendations solely addressed to public authorities; (ii) its scope should include ICSDs, and exclude custodians; (iii)

on credit and liquidity risk controls, the text should replace the former draft Standard 9 with Recommendation 9 of the CPSS-IOSCO Recommendations for securities settlement systems published in 2001.

The ESCB-CESR joint Working Group resumed its work in June 2008 in order to meet the ECOFIN mandate.

#### APPLICATION OF THE CARDS OVERSIGHT FRAMEWORK

Following the approval of the cards oversight framework by the Governing Council of the ECB in January 2008, the Eurosystem will carry out an oversight assessment of all relevant card payment schemes operating in the euro area. Card payment schemes offering services solely at the national level will be overseen by the respective NCBs, while international card payment schemes will be subject to cooperative oversight carried out by joint assessment groups consisting of experts from NCBs and the ECB. The oversight assessments are planned to be launched in the second quarter of 2008. The process will include a peer review phase aimed at ensuring a level playing-field for the oversight of card payment schemes across the euro area.

As part of the oversight of card payment schemes, the Eurosystem intends to monitor the development of card fraud in the euro area. The collection of aggregated statistical data from card payment schemes will assist the Eurosystem in evaluating financial and operational risks caused by fraudulent actions and enable it to monitor the effects of countermeasures taken by the industry. Ultimately, the availability of harmonised card fraud data may become a useful forecasting tool that could assist the Eurosystem in shaping its future fraud prevention policies in this sector. Aggregated statistics or insights are envisaged to be shared with the industry in order to foster initiatives on fraud prevention in this sector.

#### THE SEPA AND OVERSIGHT

Risks in the provision of payment instruments are generally not considered to be of such systemic relevance as is the case with large-

value payment systems and some retail payment systems of significant size. Nevertheless, the public's trust in the safety and efficiency of payment instruments has a bearing on the confidence in the currency, especially in a harmonised financial market. As mentioned in Chapter 1 of this report, the Eurosystem recently developed a harmonised policy for the oversight of card payment schemes. In the same vein, in 2008 the ECB and the NCBs of the Eurosystem will develop oversight frameworks for the new SEPA payment instruments developed by the European Payments Council (EPC), namely the SEPA Credit Transfer (SCT) scheme that was put in place as from 28 January 2008 and the SEPA Direct Debit (SDD) scheme that is envisaged for 2009. The Eurosystem will then carry out the oversight of these payment instruments on the basis of these common set of standards and assessment methodologies.

Moreover, the Eurosystem will monitor the developments with respect to the establishment of links between retail payment infrastructures, such as those envisaged on the basis of the technical interoperability framework developed by the European Automated Clearing House Association (EACHA). The assessment of the legal and operational soundness of such links is partly addressed via the oversight of the individual retail payment systems. Should the traffic processed via such links reach a significant size, the Eurosystem will have a closer look at the implications from an oversight perspective of the increasing interdependencies between the various systems, for example in terms of liquidity management. The oversight framework may have to be adapted to these emerging features of retail payment systems.

Another important factor for future developments in the euro area is the role that non-bank service providers will play in the provision of payment services and the management of the associated risks.<sup>8</sup> The landscape in this respect has been made clearer with the adoption of the Payment

<sup>8</sup> See paper on "Nonbanks and Risk in Retail Payments", by: Stuart E. Weiner, Terri Bradford, Fumiko Hayashi, Richard J. Sullivan, Zhu Wang, and Simonetta Rosati.



Services Directive (PSD) in 2007. Following its implementation, scheduled for 2009, the treatment of non-bank providers of payment services will be harmonised in the EU. In particular, this harmonisation will open up competition at the European level with the provision of such services to end-users, be they customers or merchants. Non-bank payment service providers will be granted access to payment systems, provided that certain conditions are met, and will be subject to supervision by designated authorities. This supervision envisages a simplified regulatory capital framework for initial and ongoing capital. The authorities entrusted with this supervisory function will be selected by each Member State from the range of its national authorities, including central banks. The Eurosystem may have a closer look at the implications from an oversight perspective.

#### **DEVELOPMENTS IN CORRESPONDENT BANKING**

In accordance with its mandate to promote the smooth operation of payment systems in the euro area, the Eurosystem has a direct interest in the prudent design and management of any payment and settlement arrangement processing the euro. In the broader sense, this includes not only formally established interbank funds transfer systems, but also other payment flows, in particular correspondent banking relationships in view of the potentially high values and numbers of payment transactions flowing through such arrangements. Since 1999, the Eurosystem has conducted regular surveys on developments in correspondent banking, the results of which have been presented to, and discussed with, the participating banks. The data from the 6th survey, covering the period of 17 to 28 September 2007, will be analysed and discussed in the course of 2008. In view of its responsibility for the smooth operation of the payment system and the stability of the financial system as a whole, the Eurosystem will continue to monitor and analyse the developments in this particular area of business, as some service-providing banks process more payment flows than interbank funds transfer systems.

#### **BUSINESS CONTINUITY**

In 2007, central banks in the EU started to work on concrete improvements in business continuity-related information sharing among each other and with market participants and other interested parties. The initiative is aimed at facilitating access to coherent and up-to-date information on relevant global, European and national business continuity standards and initiatives. Information sharing is considered crucial for further increasing resilience at the European level owing to the strong interdependencies between the market infrastructures, financial institutions and other participants. As a first step, EU central banks have planned to introduce on their websites dedicated web pages for business continuity related matters. This will enable interested readers, including, in particular, market infrastructures and their participants, to gain access to national and international standards and initiatives. These dedicated web pages will be interlinked and updated on a continuous basis. The central banks, mainly in their function as operator of payment infrastructures, also plan to organise and carry out business continuity exercises based on scenarios which are related to operational crisis events affecting market infrastructures and their participants across the region. All these initiatives taken together will contribute to increase the level of resilience of market infrastructures in Europe, which is one of the main oversight objectives.

#### **REVIEW OF THE CONTINUOUS LINKED SYSTEM COOPERATIVE OVERSIGHT ARRANGEMENT**

As mentioned earlier in this report, the Eurosystem considers it crucial that the main infrastructure for settling the euro be located in the euro area. Therefore, it has established a clear policy line for the location and operation of infrastructures settling euro-denominated payment transactions. In this respect, it is very important that the Eurosystem be directly involved in the oversight of the design and operation of offshore infrastructures settling the euro, in particular those of a significant size. With regard to the CLS system and, inter alia, in view of the extension of its business model, the CLS

overseers are currently reviewing the existing cooperative oversight arrangement, which is intended to ensure that participating central banks provide mutual assistance in carrying out their individual responsibilities in pursuit of their shared public policy objectives for the safety and efficiency of payment and settlement systems processing and settling payment transactions denominated in their respective currencies. All processes and activities related to the cooperative oversight of CLS will be specified in dedicated documentation, which is expected to be finalised by end-2008.

#### FRAMEWORK FOR A RISK-BASED APPROACH TOWARDS OVERSIGHT

The Eurosystem's oversight function has, to date, been using qualitative oversight standards, such as the Core Principles for Systemically Important Payment Systems, as the framework for its oversight activities. The ECB, in close cooperation with the NCBs, intends to complement this principles-based approach, which is largely based on qualitative assessments, by designing a risk-based and more quantitative approach to oversight. The major objective of this complementary framework is to help provide an understanding on which aspects of incomplete observance of the Eurosystem's oversight standards would have the most severe impact on the smooth functioning of the system, how to apply the Eurosystem's oversight standards proportionally to systems that are of less systemic importance, and to see where there is a case to pursue further improvements in system design irrespective of whether payment infrastructures comply with the Eurosystem's oversight standards.

#### 4 LIAISON WITH OTHER OVERSEERS

In addition to the cooperation with NCBs within the Eurosystem and the ESCB, the ECB liaises with overseers at the international level. For example, it regularly discusses on a bilateral basis oversight and other payment and settlement systems-related issues with major international central banks. Together with other individual central banks, the ECB has also organised joint

conferences on selected topics that are relevant from, inter alia, an oversight perspective or has participated in such events organised by other central banks.<sup>9</sup>

In Chapter 2, an overview was provided of the practical bilateral and multilateral cooperative oversight arrangements in which the ECB is actively engaged. These arrangements are designed in accordance with the Lamfalussy principles for cooperative oversight.<sup>10</sup>

The CPSS, in which the ECB participates, serves as a forum for G10 central banks to monitor and analyse developments in domestic payment, clearing and settlement systems as well as in cross-border and multicurrency settlement schemes. It undertakes specific studies in the field of payment and settlement systems at its own discretion or at the request of the G10 Governors. In recent years, the Committee has developed relationships with other central banks, particularly those of emerging market economies, in order to extend its work outside the G10 and to help strengthen the design and operation of payment and settlement systems globally.

In 2007, the CPSS conducted studies in the fields of, inter alia, FX settlement risk and clearing and settlement arrangements for OTC derivatives, to which the ECB actively contributed. As regards FX settlement risk, in July 2007 the CPSS published the consultative report on "Progress in reducing foreign exchange settlement risk", the final version of which was released to the public in May 2008.<sup>11</sup> The background and the main findings and conclusions of the study are presented in Box 2.

<sup>9</sup> Examples are the Joint Bank of England/ECB conference on "Payments and monetary and financial stability" of November 2007 and the payments conference on "Nonbanks in the Payments System: Innovation, Competition, and Risk" organised by the Federal Reserve Bank of Kansas City in April 2007.

<sup>10</sup> The Lamfalussy principles have been updated in the report on "Central Bank Oversight of Payment and Settlement Systems" of the Basle Committee on Payment and Settlement Systems (CPSS).

<sup>11</sup> CPSS report on "Progress in reducing foreign exchange settlement risk", BIS, May 2008.

## Box 2

### **BASEL COMMITTEE ON PAYMENT AND SETTLEMENT SYSTEMS' REPORT ON "PROGRESS IN REDUCING FOREIGN EXCHANGE SETTLEMENT RISK"**

Since 1974, when the German banking supervisory authority decided to close a German bank, Bankhaus Herstatt, because of heavy losses it had endured as a result of speculative FX positions it had taken, a number of cases demonstrated very clearly how risky the lack of synchronisation between the settlement of the two legs of an FX trade could be: market participants found that they also faced a principal risk. "Herstatt risk", as it has come to be known, is a risk that previously, and even for a long time afterwards, payment systems had not been designed to cope with adequately. In the mid-1990s, the CPSS created a sub-group to investigate potential solutions to the issue and a risk-reduction strategy to eliminate FX settlement risk was subsequently agreed upon by G10 central banks.<sup>1</sup> This strategy included three tracks:

#### **Track 1: Action by individual banks to control their FX settlement exposures**

Individual banks should take immediate action to apply an appropriate credit control process to their FX settlement exposures. This recognises the considerable scope for individual banks to address the problem by improving their practices for measuring and managing their FX settlement exposures.

#### **Track 2: Action by industry groups to provide risk-reducing multicurrency services**

Industry groups are encouraged to develop well-constructed multicurrency services that would contribute to the risk-reduction efforts of individual banks. This recognises the significant potential benefits of multicurrency settlement mechanisms and bilateral and multilateral obligation netting arrangements, and the G10 central banks' view that such services would best be provided by the private sector rather than the public sector.

#### **Track 3: Action by central banks to induce rapid private sector progress**

Each central bank, in cooperation, where appropriate, with the relevant supervisory authorities, will choose the most effective steps to foster satisfactory private sector action over the next two years in its domestic market. In addition, where appropriate and feasible, central banks will make or seek to achieve certain key enhancements to national payment systems and will consider other steps to facilitate private sector risk-reduction efforts. This recognises the likely need for public authorities to encourage action by individual banks and industry groups, and to cooperate with these groups, to bring about timely, market-wide progress.

In July 1998, the CPSS published its first progress report.<sup>2</sup> This report acknowledged that "encouraging progress" on all three tracks of the strategy had been made but that "more needs to be done". The creation of CLS by major private sector banks and operated by the CLS Bank International, a single-purpose bank, was a direct consequence of the central banks' FX risk-reduction strategy. The CLS started its operations on 9 September 2002. Similar PvP

<sup>1</sup> See CPSS (1996), "Settlement Risk in Foreign Exchange Transactions", BIS, March.

<sup>2</sup> See CPSS (1998), "Reducing foreign exchange settlement risk: a progress report", BIS, July.

arrangements operate elsewhere, for instance in Hong Kong, involving transactions in Hong Kong dollars, US dollars, and euro.

Ten years after the first CPSS report and four years after the launch of CLS, the G10 central banks considered the time to be right to organise a survey on whether further progress had been made or whether more needs to be done to contain FX settlement risk. This survey was conducted in 2006, including both quantitative and qualitative aspects and the findings were published in May 2008.<sup>3</sup>

Overall, the assessment of the CPSS was that the comprehensive central bank strategy for reducing FX settlement risk had achieved significant success but further action was still required. The CPSS acknowledged that progress was evidenced most visibly by the launch and growth of CLS.<sup>4</sup> This important accomplishment reflects the strong policy commitment, resources devoted and efforts made by major banks and other institutions across the globe in terms of taking up the central banks' call for industry action to reduce FX settlement risk. Notwithstanding the important contribution made by CLS, a notable share of FX settlement still generates significant risk across the global financial system and, from a systemic risk perspective, it warrants further investigation. According to data reported in the CPSS survey, 32% of total settlement obligations, i.e. approximately USD 1.2 trillion equivalent, are still settled using traditional correspondent banking. This involves FX settlement risk with sometimes long-lasting and high exposures which can, in some cases, even significantly exceed an institution's capital.<sup>5</sup>

#### Key survey facts:

Scope: 27 central banks; 109 institutions (banks and non-banks) selected to cover 80% of the FX market in each of the 15 currency areas; survey month was April 2006.

Average daily FX settlement obligations reported: total gross value of USD3.8 trillion equivalent.

#### Currency breakdown of total obligations: EUR about 20%; USD about 45%.

Breakdown of total settlement obligations according to settlement method: 55% (2.1 trillion) were settled through CLS, 32% (1.2 trillion) through traditional correspondent banking (1997: 85%), 8% (0.3 trillion) through bilateral netting, the rest by using on-us accounts and PVP mechanisms other than CLS. Most (75%) of the surveyed institutions expect CLS to increase its overall market share in industry-wide settlements over the next one to three years by at least another 10%; not least because of the growth of algorithmic trading, some institutions expect a significant increase in the market share of bilateral netting.

<sup>3</sup> See CPSS (2008), "Progress in reducing foreign exchange settlement risk", BIS, May 2008.

<sup>4</sup> For further details on the development of CLS, see the section on Continuous Linked Settlement.

<sup>5</sup> There are a number of important concepts regarding the duration of exposures: (i) Exposure duration (I period): starts at the so-called "unilateral cancellation deadline", i.e. when the instruction to pay the currency sold can no longer be revoked by the "seller" (the time when the seller becomes irrevocably committed to making the payment); ends when it receives, with finality, the currency it is buying, which is typically when its correspondent credits its account with the funds; (ii) Exposure duration (I+U period): I period plus the period of uncertainty, i.e. the time until which the institution checks/reconciles whether the funds have been finally received from the counterparties concerned. If the funds have not been credited by the end of the U period, an institution might still be exposed to principal risk.

Exposure durations: overall, little or no progress in reducing durations since 1997 (e.g. longest exposure durations seen for individual institutions lasted more than three business days for some currency pairs).

Peak day single counterparty exposures: could reach more than 10% of capital for approximately 23% of the surveyed institutions.

Banks' control of their exposures: judged overall on three specific criteria (senior level responsibility and authority, daily management procedures, measurement of exposures), only 34% of the institutions could be said to fully control their traditional FX settlement exposures; there were still 23% of the surveyed institutions that in their daily risk management did not treat FX settlement exposures in the same way as other short-term credit extensions; 63% underestimated (at least to some extent) the amount they had at risk.

Taken together, the survey results suggest that further action is needed to address the system-wide risks to financial stability posed by FX settlement exposures. Accordingly, further action is recommended for individual institutions, industry groups and central banks. One part of this strategy would be for institutions to ensure that they have in place a coherent set of risk controls and incentives across their respective business units to control their FX settlement exposures appropriately. Also included is a recommendation that central banks work with banking supervisors "to explore options that could ensure on an ongoing basis that banks apply appropriate risk management procedures to their FX settlement exposures, thereby addressing FX settlement exposures that remain large and guarding against the potential re-introduction of excessive exposures." The CPSS (and also the Eurosystem) believes that the support of banking supervisors is essential in tackling remaining FX settlement exposures that may still present systemic risk. Efforts are under way to further explore the survey's conclusions together with the Basel Committee on Banking Supervision (BCBS) and to build on the analysis and recommendations contained in the BCBS' supervisory guidance for managing settlement risk in FX transactions, issued in September 2000.

In March 2007, the BIS published the report entitled "New developments in clearing and settlement for OTC derivatives". The report identified and analysed six issues:

- (i) the risks created by delays in documenting and confirming transactions;
- (ii) the implications of the use of collateral to mitigate credit risk;
- (iii) the use of central counterparty clearing to reduce credit risk;
- (iv) the implications of OTC derivatives prime brokerage;

(v) the risks associated with unauthorised novations of contracts; and

(vi) the potential for significant market disruptions for the close-out of OTC derivatives following the default of one or more large market participant.

This report has also offered an overall assessment of progress since 1998, when the BIS published the first report on this subject entitled "OTC derivatives: settlement procedures and counterparty risk management". The report of 2007 recorded progress since 1998 in the areas of reducing backlogs, increasing the automation of the post-trading process, expanding the use of collateral, mitigating the risks of inter-dealer

single currency interest rate swaps cleared by a central counterparty, increasing the use of multilateral termination services and enhancing the efficiency of processing post-trade events with the creation of a trade information warehouse.

The report has stressed the need for further progress in the area of reducing confirmation backlogs for all OTC derivatives and not only credit derivatives, and invited market participants to identify steps to mitigate the market impact of replacing contracts following the close-out of one or more large market participant.

In parallel with the publication of the CPSS report, the G7 Finance Ministers and Governors at their February 2007 meeting in Essen requested the Financial Stability Forum (FSF) to update its 2000 report on Highly Leveraged Institutions (HLIs). The update in 2007 focused on financial stability issues relating to hedge funds and did not address any investor protection issues.

The FSF report of 2007 recorded the hedge funds' rapid expansion since the FSF's original report, and the central role for the robustness of the financial system that core intermediaries have come to play in key areas of wholesale financial markets, such as OTC derivatives. The FSF report found that while risk management techniques and capacity had been improving in the past, products and markets had become more complex. Supervisors reported that dealer firms' direct current and potential credit exposures to hedge funds were modest in relation to their capital. However, their indirect exposures, such as via wider market liquidity erosion, are difficult to gauge. Areas of continuing weakness in many funds have also been identified including, inter alia, the pricing and valuation of illiquid securities and the lack of stress testing. The FSF report identified that there had been some erosion in counterparty discipline (such as declining initial margins).

The materialisation of the risks could impose significant challenges for market participants. Work is ongoing in many of these areas, involving active supervisory and regulatory cooperation. Owing to the importance of

strengthening protection against systemic risks, the FSF made the following recommendations to support and, where relevant, build upon ongoing supervisory and private sector work:

- (i) Supervisors should act so that core intermediaries continue to strengthen their counterparty risk management practices.
- (ii) Supervisors should work with core intermediaries to further improve their robustness to the potential erosion of market liquidity.
- (iii) Supervisors should explore and evaluate the extent to which developing more systematic and consistent data on core intermediaries' consolidated counterparty exposures to hedge funds would be an effective complement to existing supervisory efforts.
- (iv) Counterparties and investors should act to strengthen the effectiveness of market discipline, including by obtaining accurate and timely portfolio valuations and risk information.
- (v) The global hedge fund industry should review and enhance existing sound practice benchmarks for hedge fund managers in the light of expectations for improved practices set out by the official and private sectors.

Finally, in April 2008 the FSF published its report on "Enhancing Market and Institutional Resilience", whereby issues relating to OTC derivatives were addressed. The FSF recommended that market participants act promptly to ensure that the settlement, legal and operational infrastructure underlying OTC derivatives markets was sound. Although the OTC infrastructure has coped well during the turmoil, an integrated operational infrastructure would ensure further reliability and robustness. Thus, the financial industry should develop a longer-term plan for a reliable operational infrastructure supporting OTC derivatives.

## ANNEXES

### I OVERSIGHT AND OTHER SECURITIES CLEARING AND SETTLEMENT RELATED POLICIES USED BY THE EUROPEAN CENTRAL BANK (ECB) I

#### POLICY DOCUMENTS RELATING TO PAYMENT SYSTEMS AND PAYMENT INSTRUMENTS:

“Report on electronic money”, ECB, August 1998.

“Policy statement on euro payment and settlement systems located outside the euro area”, ECB, November 1998.

“Role of the Eurosystem in the field of payment systems oversight”, ECB, June 2000.

“Core principles for systemically important payment systems”, Bank for International Settlements (BIS), January 2001 (adopted by the Governing Council of the ECB on 25 January 2001).

“Electronic money systems security objectives”, ECB, May 2003.

“Oversight standards for euro retail payment systems”, ECB, June 2003.

“Business continuity oversight expectations for systemically important payment systems”, ECB, June 2006.

“The Eurosystem policy principles on the location and operation of infrastructures settling euro-denominated payment transactions”, ECB, July 2007.

“Oversight framework for card payment schemes: standards”, ECB, January 2008.

#### POLICIES RELATING TO SECURITIES CLEARING AND SETTLEMENT

“Standards for the use of EU securities settlement systems in ESCB credit operations”, European Monetary Institute (EMI), January 1998.

“Standards for securities clearing and settlement in the European Union”, ESCB-CESR, September 2004.

“CPSS/IOSCO recommendations for securities settlement systems”, BIS/IOSCO, November 2001.

“CPSS/IOSCO recommendations for central counterparties”, BIS/IOSCO, November 2004.

“The Eurosystem’s policy line with regard to consolidation in central counterparty clearing”, ECB, September 2001.

1 Available on the ECB’s website under [www.ecb.europa.eu](http://www.ecb.europa.eu).

## 2 REPORTS AND PAPERS ON OVERSIGHT-RELATED ISSUES PUBLISHED BY THE ECB

“Regulating access to international large-value payment systems”, ECB Working Paper No. 22 by C. Holthausen and T. Rønde, June 2000, also published in the *Review of Financial Studies*, October 2002, vol. 15, issue 5, pp. 1561-1586.

“The role of the Eurosystem in payment and clearing systems”, Article in the ECB Monthly Bulletin, April 2002, pp. 47-59.

“The ESCB-CESR standards for securities clearing and settlement in the European Union”, Article in the ECB Monthly Bulletin, April 2004, pp. 73-84.

“Assessment of euro large-value payment systems against the Core Principles”, ECB, May 2004.

“Governance of securities clearing and settlement systems”, ECB Occasional Paper No. 21 by D. Russo, T. L. Hart, M. C. Malaguti and C. Papathanassiou, November 2004.

“An analysis of systemic risk in alternative securities settlement architectures”, ECB Working Paper No. 404 by G. Iori, November 2004.

“Assessment of SORBNET-EURO and BIREL against the Core Principles”, ECB, June 2005.

“Systemic risk in alternative payment system designs”, Working Paper No. 508 by Peter Galos and Kimmo Soramäki, ECB, July 2005.

“Result of Oversight assessment of retail payment systems in euro”, ECB, August 2005.

“The evolution of large-value payment systems in the euro area”, Article in the ECB Monthly Bulletin, August 2006, pp. 73-81.

“The securities custody industry”, ECB Occasional Paper No. 68 by D. Chan, F. Fontan, S. Rosati and D. Russo, August 2007.

“Non-banks and risk in retail payments” by: S. E. Weiner, T. Bradford, F. Hayashi, R. J. Sullivan, Z. Wang, and S. Rosati, paper for presentation at the Joint ECB-Bank of England conference on payment systems and financial stability, Frankfurt am Main, 12-13 November 2007.

“Prudential and oversight requirements for securities settlement” by D. Russo, G. Caviglia, C. Papathanassiou and S. Rosati, ECB Occasional Paper No. 76, December 2007.

“Review of statistics on payments and securities trading, clearing and settlement”, Box in the ECB Monthly Bulletin, January 2008, pp. 25-28.



