THE EVOLUTION OF LARGE-VALUE PAYMENT SYSTEMS IN THE EURO AREA

Large-value payment systems (LVPS), which are also known as wholesale systems, can be defined as systems that generally process payments of very large amounts. These are mainly exchanged between banks or between participants in the financial markets, usually requiring urgent and timely settlement. Payment systems in general and LVPS in particular can be qualified as the "transportation system"[1] of a monetary system. This reflects their utmost importance for the proper functioning of financial markets and, more generally, for the stability of the currency. This article examines the development of LVPS, paying particular attention to euro area systems. Section 1 provides a brief overview of the global evolution of LVPS over the last few decades. Section 2 focuses on the euro area, examining the changes initiated by the introduction of the euro. Section 3 indicates the main trends that are to be expected in the near future.

1 GENERAL EVOLUTION OF LARGE-VALUE PAYMENT SYSTEMS

In the 1970s, the processing of payments was typically paper-based, entailing a number of manual interventions and long processing times. In many countries, there were separate systems processing different types of payment instruments, such as cheques or credit transfers. Most systems used some form of netting, settling obligations between parties on a net basis. In addition, settlement of the final positions often took place only on the next day.

Owing to technological developments, a move from paper to electronic media for the transmission, processing and settlement became possible at reasonable costs; however, net settlement continued to dominate for many years. The electronic processing of payments with a higher level of automation allowed for decreasing processing prices. In turn, this facilitated the settlement of strongly increasing transaction volumes in the financial markets.

At the end of the 1980s, the issue of payment systems started to rank higher on the agendas of central bank decision-makers. This was related to an increased awareness that financial markets assumed that obligations in a payment system were settled with finality, i.e. without any remaining risks, as soon as they received the notification of incoming payments. However, credit risks in a net settlement system are extinguished only with the settlement of all net positions in the system, which sometimes only occurred on the next day. As a result, the failure of one participant to meet its obligations at the time of settlement could lead to the unwinding of payments that other participants had already treated as final. This could lead to a domino effect since other participants might not be able to meet their obligations either (systemic risk).

As a result, in 1990, the central banks of the Group of Ten countries drew up the Lamfalussy report[2], which set out prudential rules for interbank netting schemes to reduce the risks in such systems. De facto, the report introduced additional costs in order to prevent the creation of systemic risk in case of a failure of one or several major participants. While some net settlement systems adapted their systems to the new rules set by the Lamfalussy report, most countries moved to real-time gross settlement (RTGS) systems. Systemic risk considerations have not only led to the real-time gross settlement of payments, but also to settlement schemes such as delivery versus payment (DVP) in securities settlement and payment versus payment (PVP) in foreign exchange transactions. DVP and PVP mechanisms respectively ensure that the final transfer of assets or currency occurs if, and only if, a final transfer of another asset or currency takes place.

1 This expression is attributed to Tommaso Padoa-Schioppa, former member of the ECB's Executive Board.

2 "Report of the Committee on Interbank netting schemes in central banks of the Group of Ten countries", BIS, November 1990.

Table 1 Transactions in payment systems operating in euro

(daily averages in 2005)

Systems	Number of payments (thousands)	Value of payments (EUR billions)	Average size (EUR thousands)
All euro LVPS	566	2,479	4,380.97
All euro retail payment systems	92,504	61	0.66

Sources: ECB and NCBs.

An RTGS system is a settlement system in which processing and settlement take place on an order-by-order basis (i.e. without netting) and in real time (i.e. continuously). Hence, payments become irrevocable and final immediately after booking on the accounts. The idea of RTGS processing was not completely new since, in contrast to net settlement systems, it requires a lower degree of concentration. In particular, in federally-structured countries, such as Germany and the United States, payment systems already combined features of net and gross settlement. In addition, significant advances in technology made real-time gross settlement an affordable solution for a wider range of payments.

In parallel, while most systems in the 1970s and early 1980s did not distinguish payments according to size, it became increasingly common to do so. This is explained in part by the higher costs of processing time-critical large-value payments more swiftly and with additional safety measures, compared with processing less urgent payments. As a result, payment systems now usually belong to different categories according to the type of payments processed, with some systems processing primarily large-value (i.e. wholesale) payments which are often time critical, and other systems processing mainly retail payments which are non-time critical transactions of a rather small average value (see Table 1). Payments can either be settled in central bank or commercial bank money, i.e. liabilities of a central bank or commercial bank that take the form of a deposit which can be used for settlement purposes. As central bank money is the most secure settlement asset, settlement in central bank money is preferable, particularly for large-value payments.

Nowadays, large-value payment systems settle predominantly in RTGS mode, while retail payment systems often use some form of net settlement. With further technological advances, the differences between the two types of settlement are blurring, inducing some systems to transform themselves into so-called hybrid systems, which combine the liquidity-saving features of net settlement with the safety and efficiency of real-time settlement.

2 EVOLUTION OF LARGE-VALUE PAYMENT SYSTEMS IN THE EURO AREA

In the 1990s, the development of LVPS in the EU was shaped by two objectives:

– response to the Lamfalussy report;
– preparation for EMU.

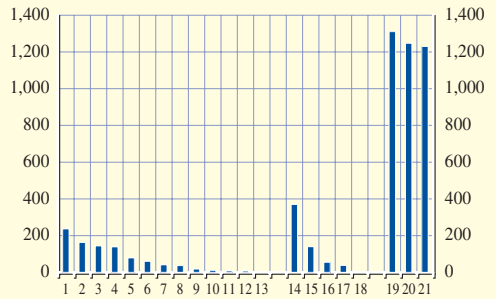
The EU central banks concentrated on developing a euro area-wide RTGS system, which was required for achieving the integrated euro area money market as a prerequisite for the conduct of a single monetary policy. It was agreed in December 1993 to develop such a euro area-wide RTGS system by linking the domestic RTGS systems of each EU Member State.

2.1 LARGE-VALUE PAYMENT SYSTEMS AT THE TIME OF THE INTRODUCTION OF THE EURO

Before the introduction of the euro in January 1999, only domestic LVPS operating in legacy currencies existed (see Chart 1). The prevalent way for making cross-border payments within the EU was via correspondent banking.

Chart 1 The situation of large-value payment systems in 1998

(EUR billions; daily average)

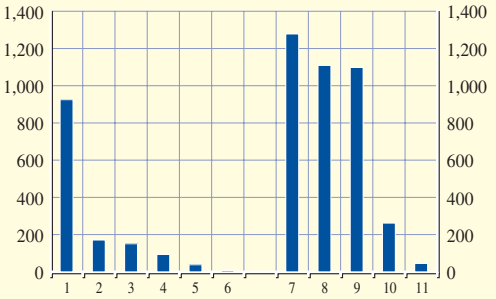


1 CHAPS (UK)
2 TBF (FR)
3 BI-REL (IT)
4 SLBE (ES)
5 ELS (DE)
6 TOP (NL)
7 K-RIX (SE)
8 ELLIPS (BE)
9 SGPT (PT)
10 DN Inquiry and Transfer System (DK)
11 IRIS (IE)
12 BOF-RTGS (FI)
13 ARTIS (AT)
14 EAF (DE)
15 SNP (FR)
16 ECU Clearing (EU)
17 SPI (ES)
18 POPS (FI)
19 CHIPS (US)
20 BOJ Net (JP)
21 Fedwire (US)

Sources: ECB Blue Books and BIS Red Books.
Note: Euro-HERMES (Greece) and LIPS-Gross (Luxembourg) were launched on 4 January 1999.

Chart 2 The situation of large-value payment systems in 1999

(EUR billions; daily average)



1 TARGET (EU)
2 EURO1 (EU)
3 EAF (DE)
4 PNS (FR)
5 SPI (ES)
6 POPS (FI)
7 Fedwire (US)
8 CHIPS (US)
9 BOJ Net (JP)
10 CHAPS Sterling (UK)
11 K-RIX (SE)

Sources: ECB Blue Books and BIS Red Books.

With the introduction of the euro on 1 January 1999, the principles for the provision of payment services within the euro area changed. The existence of a single currency in several countries meant that cross-border payments within the euro area were in principle no different from payments within each country. The conduct of a single monetary policy required a single money market to be set up covering all euro area countries. The latter was greatly facilitated by the creation of a euro area-wide LVPS – the Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET) – for the processing of large-value payments in euro.

Altogether, at the time of the introduction of the euro, there were six euro LVPS in the euro area: TARGET, EURO1, EAF, PNS, SPI and POPS (see Chart 2).

TARGET

TARGET is the RTGS system of the euro and eliminates the credit risk inherent in net settlement systems, settling credit transfers with immediate finality and therefore reducing systemic risk, although it is rather liquidity intensive.

Besides its above-mentioned and most important function, i.e. to serve the needs of the Eurosystem's monetary policy, TARGET was developed to provide a safe and reliable mechanism for settling payments across the euro area on an RTGS basis and to increase the efficiency of such payments. To achieve these objectives, TARGET offers the possibility to transfer central bank money at an inter-Member State level as smoothly as in the domestic market, making it possible to re-use these funds several times a day.

TARGET is a decentralised system. It was set up by interlinking the existing national RTGS systems of the then 15 EU Member States and the ECB Payment Mechanism (EPM) into a single system to enable the processing of inter-Member State payments within the euro area. A unique feature of TARGET is that its euro payment services are available across a wider area than that in which the single currency has been adopted. The TARGET Agreement is the legal instrument via which some non-euro area NCBs have connected to TARGET and adhere to the rules and procedures of the system. As regards the provision of intraday liquidity, these

non-euro area NCBs are allowed to offer only limited amounts of intraday liquidity in euro to their credit institutions on the basis of a deposit in euro held with the Eurosystem. Safeguards have been established to ensure that non-euro area credit institutions are always in a position to reimburse intraday credit in good time, thus avoiding any need for overnight central bank credit in euro.

Since its launch in 1999, TARGET has been the largest euro LVPS. In 1999, TARGET had a market share of 70% in value and 52% in the number of payments processed in euro area LVPS. In 1999 TARGET processed a daily average of about 239,500 payments with a total value of €925 billion.

EURO1

The EURO1 system of the EBA Clearing Company is a euro net settlement system owned by private banks. It is the second largest euro LVPS. EURO1 evolved from the ECU clearing system which was established in 1985 to settle ECU transactions between its private member banks. As the ECU was not a fully-fledged currency with an issuing central bank, the settlement mechanism of the system was very complex. With the introduction of the euro, the system was transformed to operate on the basis of a single obligation structure (SOS)[3]. The system settles the final positions of its participants at the end of the day via TARGET. In 1999 the system had 65 member banks and processed daily on average 48,000 transactions with a total value of €172 billion. EURO1 is used as an alternative to TARGET for interbank payments which do not need to be settled via TARGET.

EAF, PNS, SPI and POPS

At the time of the introduction of the euro in 1999, there were four other large-value payment systems: EAF in Germany, PNS in France, SPI in Spain and POPS in Finland. They represented different types of systems: SPI was a multilateral net settlement system, POPS was a bilateral net settlement system, and EAF and PNS were hybrid systems, combining elements of both gross and net settlement systems. The largest at the time was EAF, which in 1999 attracted about 50,000 transactions per day with an average daily value of €150 billion. It was followed by PNS, which in 1999 had a daily turnover of 20,000 transactions for a value of €90 billion. The turnover of SPI and POPS was about €4 billion and €1 billion per day, respectively. The systems focused on the banks in their respective countries.

2.2 EVOLUTION OF LARGE-VALUE PAYMENT SYSTEMS AFTER THE INTRODUCTION OF THE EURO

2.2.1 MAJOR CHANGES

Since the introduction of the euro, the euro area environment has been subject to a number of major changes. New systems processing the euro have been introduced, notably CLS for the settlement of foreign exchange transactions. At the same time, smaller systems have closed down. The main changes are described in detail in the following section.

Introduction of the Continuous Linked Settlement system

The introduction of the Continuous Linked Settlement (CLS) system was a landmark in the payment systems landscape, not only for the euro area, but also for payment systems around the world.

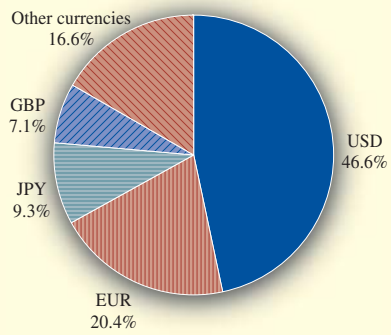
CLS was created as a private sector response to the heightened awareness of risk on the part of public authorities. After studying the risks in foreign exchange settlement, central banks highlighted as one major area of concern the risks stemming from the time difference in the settlement of the two currency legs of foreign exchange transactions, with transactions spanning different time zones with only partial overlap. Central banks encouraged the private

3 The SOS is a legal structure whereby on each settlement day each participant will have only a single obligation or a single claim towards the community of all other participants. Each time a transaction is processed in the system, the single obligation or single claim of each participant is recalculated. This construction means that no unwinding of positions can take place.

sector to establish a solution for addressing credit and liquidity risk in foreign exchange settlement.

CLS is a system for the simultaneous settlement of both currency legs of foreign exchange transactions in gross settlement mode, i.e. on a PVP basis. Positions are funded via the RTGS systems of the eligible currencies, i.e. in central bank money. CLS thus largely eliminates foreign exchange settlement risk. CLS went live on 9 September 2002 with seven eligible currencies. The euro was, and continues to be, the second largest currency, accounting for 20% of transactions in 2005, and averaging €343 billion per day (see Chart 3).

Chart 3 CLS currency distribution in 2005



Source: CLS.

In reaction to user needs, CLS broadened the range of eligible currencies to 15 by the end of 2004. These currencies now cover almost 95% of the estimated total worldwide foreign exchange turnover. The inclusion of further currencies is still under consideration, but needs to be weighed carefully, taking into account the costs of inclusion, the additional traffic that can be brought to the system and the risk reduction in foreign exchange settlement achieved through inclusion of the currency.

CLS represents a specialised solution for handling foreign exchange transactions, bringing about an outflow of these types of transactions from other systems and arrangements. In contrast with simulations performed before CLS went live, this outflow was significantly smaller than expected for the euro LVPS. This is generally thought to result from growing activity in the foreign exchange market, which resulted in an overall increase in payments to be settled, as well as from the redirection of some traffic from correspondent banking arrangements.

Closing down of EAF and SPI

Two of the six systems which existed at the time of the introduction of the euro, namely EAF and SPI, have closed down, illustrating the trend towards consolidation in the LVPS industry. This consolidation can be attributed to both technical developments and a reaction to user needs. Technical progress has made it possible to include liquidity savings features into the RTGS system, which has brought it closer to a net settlement system in terms of liquidity needs. This approach was used in the case of RTGS^{plus}, the German TARGET component, which was overhauled and supplemented with liquidity-saving features which partly already existed in EAF. The reduction in the number of euro area LVPS led to an increased concentration of payments traffic on the remaining systems. Most of the traffic from the closed EAF and SPI was redirected to the national TARGET components of Germany (RTGS^{plus}) and Spain (SLBE). This is a natural occurrence since the payments processed in EAF and SPI were of high to medium value, and the participating banks were also participants in the national TARGET components.

Introduction of euroSIC and EuroCHATS

Outside the euro area, the Swiss euroSIC system and the EuroCHATS system in Hong Kong were launched to process euro transactions. Their common characteristic is that they both settle in commercial bank money and not in central bank money. Since both systems are turning over comparatively low volumes and values, such a settlement in commercial bank money is in line with existing oversight standards.

EuroSIC commenced operation in 1999 and settles its transactions in accounts held with SECB Swiss Euro Clearing Bank, a bank incorporated in Germany. It offers a direct link for euro payments to TARGET, via the German RTGS system. EuroSIC currently has 1,626 participants in and outside Switzerland. In 2005 it processed about 11,000 payments per day with a total average daily value of €2.9 billion.

The EuroCHATS system in Hong Kong was launched in 2003 as an RTGS system, settling with Standard Chartered Bank in London. It runs in parallel to a clearing system in US dollars. Both systems are interlinked with the clearing system in Hong Kong dollars, enabling PVP settlement of foreign exchange transactions between the three currencies. The systems are also interlinked to the securities settlement system, allowing for a DVP mechanism of debt instruments denominated in euro and in US dollars. In 2005, the euro clearing system had 24 direct and 22 indirect participants. On average, it processed 40 transactions daily with a total value of €1.3 billion.

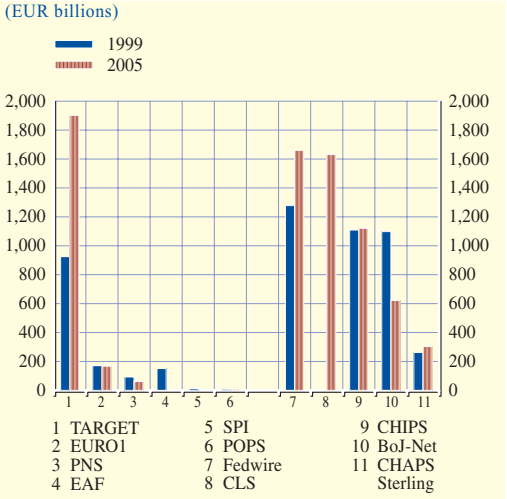
The existence of both systems illustrates the business opportunities that are seen by market infrastructures outside the euro area for the processing of euro payments. It is noteworthy that the number of payments processed by euroSIC is higher than that of 10 of the 17 national TARGET components. However, compared with the value of TARGET traffic, the value processed in euroSIC and in EuroCHATS is less than 1% for each.

2.2.2 ANALYSIS OF THE EURO AREA MARKET FOR LARGE-VALUE PAYMENT SYSTEMS

Since 1999, the number and value of payments processed in euro area LVPS has increased. This is true for CLS which has witnessed a strong increase in its business since its introduction, as well as for TARGET, for which the value processed has gone beyond the level of Fedwire, the RTGS system of the United States (see Chart 4).

In the euro area, the Eurosystem's RTGS system TARGET and the private net settlement system

Chart 4 Evolution of the daily average value of transactions



Sources: ECB Blue Books, BIS Red Books and Bank of England Payment Systems Oversight Report 2005.

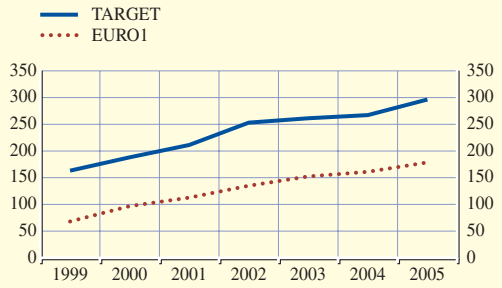
EURO1 have the largest market share. This structure, consisting of a coexisting public RTGS system and a private non-RTGS system, resembles the one in the United States.

As the TARGET system settles in central bank money in real time, it attracts large-value payments in particular. It is mandatory for some operations to be processed in TARGET, i.e. payments directly connected with the Eurosystem's central bank operations, settlement operations of large-value net settlement systems operating in euro and CLS liquidity funding operations in euro. Typically these payments only represent a very small part of the TARGET traffic. In practice, TARGET attracts a large share of interbank and customer payments, which are usually of a relatively high value and/or urgency. By illustration, TARGET accounted for 89% of the value and 59% of the number of payments that flowed through all LVPS operating in the euro area in 2005.

From 1999 to 2005, TARGET traffic increased yearly by 10.5% in terms of the number of payments and by 12.8% in terms of the value of processed payments. In the same period, EURO1, the second largest LVPS in the euro

Chart 5 Number of payments

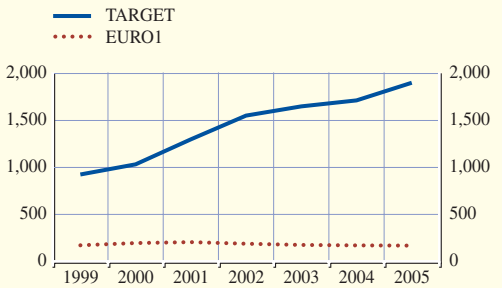
(daily average; thousands; annual data)



Sources: ECB and EBA.

Chart 6 Value of payments

(daily average; EUR billions; annual data)



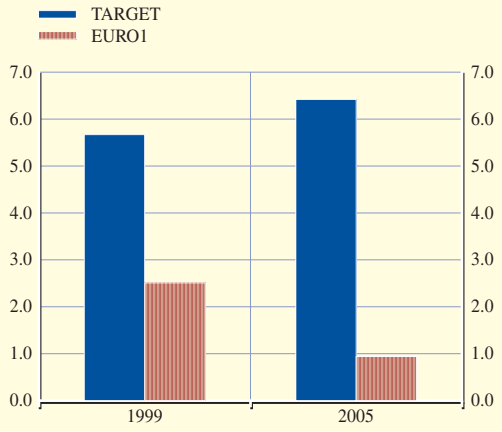
Sources: ECB and EBA.

area, increased the number of processed payments by 17.4% per year (see Charts 5 and 6). In terms of value, the EURO1 traffic remained almost unchanged, leading to a decreasing average value of transactions. This indicates a trend towards specialisation by EURO1 in the processing of smaller-value payments, typically commercial payments. In 2005, EURO1 had 70 participants and was turning over on average 171,000 transactions per day with a total value of €171 billion.

Indeed, a comparison of the average value of TARGET and EURO1 payments confirms this development. In 2005 a TARGET payment averaged €6.4 million and was seven times higher than the average value of a EURO1 payment (€0.9 million). In comparison with 1999, the average value of a TARGET payment increased by 13%, whereas the average value of a EURO1 payment decreased by 63% (see Chart 7). In fact, EURO1 increasingly processes customer payments of medium to low value (e.g. retail payments). This segment rose rapidly in the first four years of operation of EURO1 and has since stabilised at more than half of the number of payments and one-seventh of the value of payments processed in EURO1.

Chart 7 Average value of payments

(EUR millions)



Sources: ECB and EBA.

Table 2 Distribution of payment flows in TARGET in 2005

(percentages)

	Value	Volume
ELLIPS (BE)	3.5	2.3
KRONOS (DK)	0.8	0.1
RTGSplus (DE)	28.3	47.0
HERMES (GR)	1.1	1.8
SLBE (ES)	15.3	8.9
TBF (FR)	24.9	5.7
IRIS (IE)	1.1	1.4
BI-REL (IT) [1)]	6.7	13.6
LIPS-Gross (LU)	1.4	0.7
TOP (NL)	5.0	5.9
ARTIS (AT)	1.4	3.8
SPGT (PT)	0.7	1.4
BOF-RTGS (FI)	0.7	0.4
Euro RIX (SE)	0.4	0.1
CHAPS Euro (UK)	7.7	6.7
EPM (ECB)	0.8	0.1
	100.0	100.0

1) The figures for BI-REL (IT) also include the figures for SORBNET EURO (PL).

Not all national RTGS systems that TARGET links together use the system to the same extent, as can be seen from Table 2. While in some countries TARGET is largely used for large-value interbank payments (for example in France and Spain, owing to the existence of a second LVPS), other countries (such as Germany and Italy) also channel rather high shares of commercial payments through their national TARGET component. A comparison of the processed value and number of payments per country shows this. While in 2005 the average value of a TARGET payment in France was €28.2 million and €11.1 million in Spain, the average value was €3.9 million in Germany and €3.2 million in Italy.

3 FUTURE EVOLUTION OF LARGE-VALUE PAYMENT SYSTEMS IN THE EURO AREA

The launch of TARGET2 in November 2007 will mark a significant change in the processing of large-value payments in the euro area. TARGET2 will be based on a Single Shared Platform (SSP), which has been developed and will be provided by a group of three central banks, namely the Banca d'Italia, the Banque de France and the Deutsche Bundesbank on behalf of the Eurosystem. With TARGET2 the Eurosystem contributes to European financial integration while keeping decentralised relations between national central banks and the users. Four strategic orientations can be identified as drivers for the development of TARGET2: harmonisation, consolidation, robustness and cost efficiency.

HARMONISATION

TARGET2 will be harmonised in both technical and functional terms and will result in the further harmonisation of business practices in the processing of large-value payments in the euro area. In technical terms, there will be a single user interface and fully harmonised payments message formats, with SWIFT as the network service provider. In functional terms, TARGET2 will offer a comprehensive, harmonised set of features. Among these are liquidity optimisation mechanisms (e.g. payment prioritisation, reservation of liquidity for different payment priorities, bilateral and multilateral sender limits), intraday pooling of liquidity within groups of accounts, consolidated real-time information on account balances and waiting queues as well as harmonised procedures for the settlement of ancillary systems. TARGET2 will also be harmonised in terms of pricing. The current differentiation of domestic and cross-border fees will become obsolete and the principle "same service, same price" will be applied for all participants in the system irrespective of their location. In general, the TARGET2 pricing scheme should be attractive for those participants that account for a very large share of the current TARGET1 transactions as well as for smaller users. Hence, the TARGET2 pricing will, overall, be lower compared to TARGET1, which should contribute to an increasing efficiency of payments processing in commercial banks.

CONSOLIDATION

Most visible is the technical consolidation of TARGET2 by moving from TARGET1's "system of systems" architecture to a single platform which is jointly used by all participating central banks. The technical consolidation of TARGET2, the features the new system will provide and the harmonisation of interfaces and services will, in turn, enable banks to consolidate the organisation of their large-value payments business and to better integrate their euro liquidity management. In the advent of TARGET2, further consolidation in the LVPS landscape is expected with the likely closure of the French PNS system with – or shortly after – the migration of the French banking community to TARGET2.

ROBUSTNESS

The use of a single shared platform necessitates strict requirements with regard to robustness and business continuity measures. TARGET2 will be based on a "two sites – two regions" concept. This means that the payments and accounting processing services of TARGET2 will run in either of the two geographically far

distant regions. In addition, each region will have two identical sites available. Hence, in case of emergency a failover between the two sites within a region (intra-region failover) or a failover between the regions (inter-region failover) can take place to restore full processing capacity within a short timeframe.

COST EFFICIENCY

TARGET2 will improve cost efficiency for the benefit of users and central banks. Although the harmonisation of features, the technical architecture and the level of robustness will raise costs compared with one of today's individual TARGET components, the consolidation of the technical infrastructure will considerably reduce the overall TARGET2 costs if compared to TARGET1.

In addition, the system-wide available liquidity-saving features will allow banks to manage their liquidity more efficiently across the euro area by means of liquidity reservations, sender limits and liquidity-pooling features.

Furthermore, TARGET2 might reinforce competition among banks. This is due to the principle of "same service, same price" applied in TARGET2, which will make competitive advantages owing to national pricing differences disappear.

The decision to develop TARGET2 also took account of the enlargement of the EU and the euro area. If the new Member States had joined the TARGET1 architecture, it would have increased the number of interconnected national RTGS systems. As a result, this would have contradicted the four above-mentioned strategic orientations.

4 CONCLUSION

The introduction of the euro in 1999 was a landmark for LVPS in Europe, leading to a number of changes: first, the creation of TARGET as the euro area-wide RTGS system facilitating the conduct of a single monetary policy. Second, a process of consolidation of LVPS systems in the euro area. Indeed, since 1999, the number of LVPS systems has decreased from six to four, with TARGET and EURO1 being the largest systems. The structure is comparable to that in the United States, where the LVPS market is also shared between a public RTGS system and a private non-RTGS system. Third, the introduction of specialised systems. Most prominent was the introduction of CLS, a system specialised in the handling of foreign exchange transactions. In addition, the introduction of off-shore systems located outside the euro area and settling euro payments in commercial bank money was observed.

In the future, the introduction of TARGET2 is expected to have major implications on the euro area. The TARGET2 system will bring a consolidation at central bank level through the creation of a single shared platform and will most likely lead to consolidation of payments processing at bank level. In addition, TARGET2 will lead to the continued consolidation of LVPS systems in the euro area.