

Kemppainen, Kari

**Working Paper**

## Competition and regulation in European retail payment systems

Bank of Finland Discussion Papers, No. 16/2003

**Provided in Cooperation with:**

Bank of Finland, Helsinki

*Suggested Citation:* Kemppainen, Kari (2003) : Competition and regulation in European retail payment systems, Bank of Finland Discussion Papers, No. 16/2003, ISBN 952-462-065-0, Bank of Finland, Helsinki,  
<https://nbn-resolving.de/urn:nbn:fi:bof-20140807186>

This Version is available at:

<https://hdl.handle.net/10419/211949>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



---

# BANK OF FINLAND DISCUSSION PAPERS

---

16 • 2003

Kari Kemppainen  
Research Department  
9.6.2003

## Competition and regulation in European retail payment systems

Suomen Pankin keskustelualoitteita  
Finlands Banks diskussionsunderlag

---



**Suomen Pankki  
Bank of Finland  
P.O.Box 160  
FIN-00101 HELSINKI  
Finland  
☎ + 358 9 1831**

**<http://www.bof.fi>**

---

# BANK OF FINLAND DISCUSSION PAPERS

---

16 • 2003

Kari Kemppainen  
Research Department  
9.6.2003

## Competition and regulation in European retail payment systems

The views expressed are those of the author and do not necessarily reflect the views of the Bank of Finland.

The author wishes to thank participants of the Bank of Finland Research department workshops for valuable support and comments.

Suomen Pankin keskustelualoitteita  
Finlands Banks diskussionsunderlag

---

<http://www.bof.fi>

ISBN 952-462-065-0  
ISSN 0785-3572  
(print)

ISBN 952-462-066-9  
ISSN 1456-6184  
(online)

Suomen Pankin monistuskeskus  
Helsinki 2003

# Competition and regulation in European retail payment systems

Bank of Finland Discussion Papers 16/2003

Kari Kemppainen  
Research Department

## Abstract

In this study, the interaction between the competition-cooperation nexus and regulation in retail payment systems is analysed by applying the main lessons from the theory of network industries. This is justifiable on the grounds that the payment systems industry inherently has many characteristics in common with network industries. On the other hand, since the provision of payment services also has many special characteristics, the regulatory tools commonly used in many other network industries cannot be applied directly. In general, the main role of payment system regulators is to provide a level playing field for different service providers. To secure dynamic efficiency, the regulators also need to ensure adequate incentives for innovation and investment. In this respect, it is important that they do not take too restrictive an attitude towards cooperation among payment service providers. In addition to general policy analysis, the study also analyses developments in the European retail payment system field and the roles and aims of market participants.

Key words: Competition policy, payment systems, retail payments, network economics

JEL classification numbers: D49, G28, L98

# Kilpailun ja sääntelyn vaikutus eurooppalaisten pienten maksujen järjestelmien kehitykseen

Suomen Pankin keskustelualoitteita 16/2003

Kari Kemppainen  
Tutkimusosasto

## Tiivistelmä

Tässä tutkimuksessa analysoidaan kilpailun, yhteistyön ja sääntelyn välistä yhteyttä pieniä maksuja välittävissä järjestelmissä. Tutkimusongelmaan sovelletaan verkostotalouden teoriaa. Tämä on mahdollista, koska maksupalvelutoimialalla on useita samoja piirteitä kuin verkostotoimialalla. Kuitenkin maksupalvelutoimialalla on myös eräitä erityispiirteitä, joiden vuoksi kaikkia perinteisen verkostotoimialan sääntelyyn käytettyjä työkaluja ei sellaisinaan voida soveltaa maksujärjestelmien sääntelyyn. Maksujärjestelmien sääntelijöiden ensisijaisena tavoitteena on taata tasapuoliset kilpailuedellytykset kaikille maksupalveluiden tuottajille. Dynaamisen tehokkuuden turvaamiseksi sääntelijöiden tulee myös varmistaa, että kannustimet innovaatioihin ja investointeihin säilyvät. Yhteistyötä maksupalveluiden tarjoajien kesken ei kuitenkaan tulisi rajoittaa liikaa. Tutkimuksessa analysoidaan lisäksi pienten maksujen järjestelmien kehitystä Euroopassa sekä palveluntarjoajien ja sääntelijöiden erilaisia rooleja ja tavoitteita.

Avainsanat: kilpailupolitiikka, maksujärjestelmät, pienet maksut, verkostotaloustiede

JEL-luokittelu: D49, G28, L98

# Contents

Abstract .....	3
Tiivistelmä .....	4
<b>1 Introduction .....</b>	<b>7</b>
<b>2 Institutional framework.....</b>	<b>12</b>
2.1 Key parties involved in retail payment systems in the euro area .....	15
2.2 Current cross-border retail payment systems in the euro area.....	20
<b>3 Retail payment systems as a network industry .....</b>	<b>24</b>
3.1 Definition of retail payments .....	24
3.2 Special characteristics of retail payments.....	24
3.3 Network effects in retail payment systems .....	27
3.4 A brief review of related research .....	31
<b>4 Retail payment networks and public policy.....</b>	<b>34</b>
4.1 Market structure issues in payment networks.....	34
4.2 Standardisation issues.....	38
4.3 Role of joint ventures and shared networks.....	41
4.4 Antitrust issues in payment systems .....	43
4.5 Regulatory tools in network industries .....	45
<b>5 Competition and regulation in European retail payment systems .....</b>	<b>48</b>
5.1 The competition-cooperation nexus in retail payment systems.....	48
5.2 Potential roles of regulators in retail payment systems .....	51
5.3 Future developments in the European retail payment markets.....	53
<b>6 Conclusions .....</b>	<b>56</b>
References.....	58
Internet sites .....	67
Glossary .....	68





# 1 Introduction

The smooth operation of payment systems is often taken for granted both in the academic literature on financial integration and in practical policy considerations. However, recent developments in the European integration process have clearly indicated the critical role of payment systems as part of the financial integration process. In this context, the smooth and efficient functioning of payment systems, especially at the cross-border level, has been emphasised. When analysing the payment system efficiency issues, the interaction between the competition-cooperation nexus and regulation has been put forward. While *competition* among payment service providers<sup>1</sup> has commonly been seen as an important contributor to efficiency, the need for *cooperation* in building infrastructures as well as in defining and implementing standards has also been raised due to the specific characteristics of the payment industry. In this context, also the appropriate role of *regulation*, or more generally, the need for government intervention to maximise social welfare, has been debated. In essence, the focal point in the debate has been the trade-off between competition and cooperation, and the potential impact of regulatory intervention.

Much of the discussion in the European Union has been provoked by the pricing and costs of cross-border retail payments. Dissatisfied with the development efforts by the banking sector, the European Parliament and the Council adopted Regulation (EC) No. 2560/2001 on Cross-border Payments in Euro (RPE) in December 2001.<sup>2</sup> The RPE obliges banks to reduce charges for cross-border payments of up to EUR 12,500 (EUR 50,000 as of January 2006) to the level of those of corresponding domestic payments. The RPE applies to card payments and ATM (Automated Teller Machine) withdrawals as from 1 July 2002 and to cross-border credit transfers as from 1 July 2003. This policy intervention was strongly criticised by the banking sector that argued for a market-driven solution.

At the national levels, competition issues have been raised by authorities, especially in the card payments area, where the role of interchange fees has recently been surveyed by regulatory authorities (eg in Australia, EU, and USA). Moreover, general competition issues in financial markets were studied eg in Australia and in the United States already in the late 1990s. In Australia, the Financial System Inquiry, the Wallis Report (1997) released in April 1997, proposed a regulatory structure to ensure a competitive, efficient and flexible

---

<sup>1</sup> In this study, *payment service providers* are defined to be financial institutions in general ('banks' unless otherwise stated). The term *payment* is used as a synthetic term for any kind of money transfer executed by a financial institution in the form of both credit and debit transfer as in Malaguti (1996).

<sup>2</sup> See the Official Journal of the European Communities (2001), L 344/13, 28.12.2001.

financial system consistent with financial stability, integrity and fairness. The most visible outcome of the report in the payment systems area was the establishment of Payment Systems Board within the Reserve Bank of Australia. The Payment Systems Board has concentrated on payment systems regulation and has initiated studies and provided reports on payment systems competition and efficiency. In the United States, the Rivlin Committee (1998) examined the role of the Federal Reserve as a payment service provider dealing also with the competition issues in the area. More recently competition issues have been analysed in the UK. The Cruickshank review (H.M. Treasury, 2000a) investigated UK banking services and concluded that there was a profound lack of competition in the payment systems. According to the review, this was caused by the *underlying economic characteristics of the industry, where network effects place a natural limit on the level of competition*. HM Treasury subsequently issued a consultation document (H.M. Treasury, 2000b) on competition in payment systems, where it announced its intention to give the Office of Fair Trading (OFT) responsibility for regulation of payment systems and new powers aimed at promoting effective competition in payment systems for the benefit of consumers.<sup>3</sup> Also in the Netherlands, the so-called ‘working group Wellink’ has recently signalled some shortcomings of the Dutch market for retail payments with respect to the organisation of debit card payments, pricing of consumer payments, infrastructure and accessibility.<sup>4</sup> Moreover, many national central banks have dealt with competition issues as part of their payment system oversight duties. The BIS has published three reports on retail payment issues (BIS 1999, 2001 and 2002), where the role of central banks in facilitating competition and efficiency has also been discussed.

Along with the public interest, the interest in the payment systems issues has also increased since the 1990s both in academic circles and in central banks.<sup>5</sup> In the area of large-value payment systems, the focus has mainly been on the risk

---

<sup>3</sup> The OFT has already been examining the pricing of credit card interchange fees.

<sup>4</sup> For a comprehensive survey of Dutch retail payment markets and the main issues therein, see Bolt (2003). A summary discussion of the main conclusions of the Wellink Report (2002) can be found in De Nederlandsche Bank’s Quarterly Bulletin, June 2002, p. 37–43.

<sup>5</sup> See for early general surveys and policy papers eg, Hopton (1983), BIS (1990) and Borio et al (1992). Other, more theoretical and empirical studies include, *inter alia*, Angelini and Giannini (1993), Schoenmaker (1993), Schoenmaker (1995), Calomiris and Kahn (1996), Berger et al (1996), McAndrews (1997b), Folkerts-Landau (1997), McAndrews (1998), McAndrews and Roberds (1999), McAndrews et al (1999), Kauko (2000), McAndrews and Roberds (2000), Holthausen and Rochet (2001), Mantel and McHugh (2001), McAndrews et al (2001), Gangulny and Milne (2002a), Gangulny and Milne (2002b), and Weinberg (2002). For applications of network economics in payment systems area and their theoretical and empirical modelling, see eg Carlton and Frankel (1995), Saloner and Shephard (1995), McAndrews (1996a), McAndrews (1996b), McAndrews and Rob (1996), McAndrews (1997a), Guibourg (1998), Guibourg (2001), Leibbrandt (2001), and Gowrisankaran and Stavins (2002).

and efficiency issues in net and gross settlement systems. Recently these issues have also been analysed empirically by using a simulation model.<sup>6</sup> Academic research in the area of retail payment systems has been rather scarce in general, but intense in some special areas, eg in the pricing of card payments.<sup>7</sup> Less attention has been paid to the general assessment of regulation and public policy intervention in retail payment systems given '*the network nature*' of the business.

In the present study, retail payment systems are analysed as networks and they are looked at as institutional and infrastructural arrangements for transaction, clearing and settlement processes. The main aim of this study is to review academic literature on networks and regulation of networks and assess their applicability to retail payment systems. Based on that, policy implications are then discussed and European developments are evaluated. It should, however, be stressed that the study does not attempt to cover all the systems in work in the retail payment system field; it mainly concentrates on the credit transfer -type of systems leaving thus largely out many other systems, most notably card payment systems. Accordingly, this study cannot offer a full-scale picture of the many-faceted retail payment system field. Instead, it aims at providing a comprehensive discussion on competition, cooperation and regulation issues by applying some key findings of network economics literature.

The study is organised as follows. In Chapter 2, the institutional framework of retail payment systems in the European Union / euro area is presented emphasising the fragmented structure of the field. Furthermore, the roles and policy targets of the key parties involved in the retail payment systems in the euro area are also analysed. Thereafter, the main current cross-border retail payment systems in the euro area are presented. Chapter 3 starts with the short 'BIS-based' definitions of the retail payment systems and describes the special characteristics of retail payments that distinguish them from large-value payments. Thereafter, the network effects in retail payment systems are analysed from the viewpoint of the network economics theory. The starting point of an economic analysis of payment systems is *the fact that payment service providers often compete directly in the provision of retail payments instruments and services to end-users but they also co-operate in shared payment networks ('upstream cooperation combined with downstream competition')*<sup>8</sup>. This is then combined with traditional lessons from the network economics literature and the main findings are discussed. Chapter 3 ends with a brief review of related research carried out in the

---

<sup>6</sup> See for example, Koponen and Soramäki (1998) for a simulation approach of intraday liquidity needs in a modern interbank payment system, for liquidity optimisation analyses see Leinonen and Soramäki (1999), and for gridlock resolution analysis Bech and Soramäki (2001).

<sup>7</sup> Seminal analysis of card payment systems was Baxter (1983). More recent studies are Balto (2000), Reserve Bank of Australia (2000), Rochet and Tirole (2000), Wright (2000), Schmalensee (2001), Wright (2001a), Wright (2001b), and de Grauwe and Rinaldi (2002).

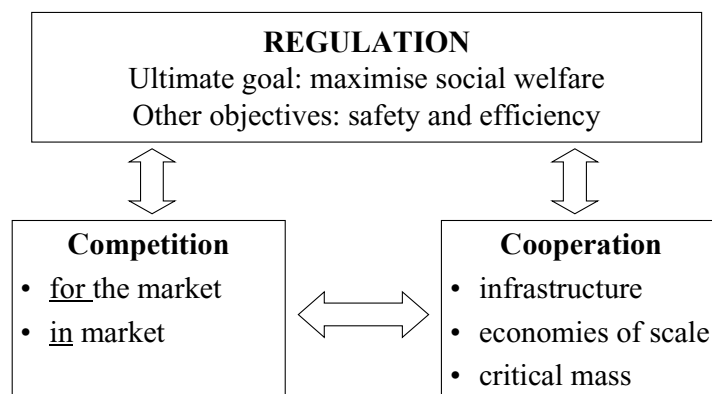
<sup>8</sup> This characterisation of retail payment system is taken from McAndrews and Rob (1996).

applications of network economics in payment systems, and this will serve as useful background for the later policy discussions.

The first three chapters lay out the theoretical framework of the study which is summarised in Figure 1, where the interaction of the competition, cooperation and regulation is also highlighted. In the remaining three chapters, the focus is on the network effects in payment systems and their implications on the policy considerations. In Chapter 4, general implications for competition policy and regulation are discussed. Market structure issues, standardisation and joint ventures are also examined. Thereafter, antitrust issues, especially regarding network exclusivity, are briefly analysed. Moreover, the regulatory tools used in other network industries are described and their applicability in the context of retail payment systems is assessed. In Chapter 5, the cooperation-competition nexus in retail payment systems is evaluated based on the main findings from the previous chapters. The role of regulatory authorities in shaping the competitive environment and investment incentives is also assessed. In addition, some prognoses for the European retail payment markets are presented. Finally, Chapter 6 summarises the main findings of the study.

Figure 1.

#### General framework of the study



#### Role of regulators:

Provide competitive environment (contestable markets)  
and investment/innovation incentives

The Figure 1 demonstrates the interrelationship among competition, cooperation and regulation in the field of (retail) payment systems. Because of the ‘network economics nature’ of retail payment systems, competition and cooperation issues are closely tied. On the one hand, competition among systems is needed in order to have contestable markets that are commonly believed to have a positive influence on the efficiency of the systems. On the other hand, a certain degree of cooperation is also needed so that the potential economies of scale as well as

critical mass of users can be achieved. From regulators' point of view, the critical question is whether *competition for the market* (ie competition between systems) or *competition in the market* (ie service competition using same system or compatible systems) would lead to the most efficient outcome.

From public authorities' point of view, the ultimate goal in payment system regulation (or more broadly in payment system oversight) is to ensure smooth operation of financial markets so that social welfare can be maximised (or social cost minimised). In the payment systems field, this goal can be achieved by requiring and ensuring that the systems are both safe and efficient. The public authorities' task is challenging because there can be a certain trade-off between safety and efficiency requirements. In fact, it is the safety requirement that is to be fulfilled first, and only thereafter the efficiency requirement steps in. This is very clear in large-value payment systems where systemic risk and potential disruptive contagion effects are great. To a lesser extent, this also applies to retail payment systems where the potential of system risk is also present, although not in so pronounced a way as in large-value payment systems. Accordingly, the safety requirement for retail payment systems is well recognised but, as the present study focuses on the competition and efficiency issues in retail payment systems, the following analysis assumes that safety requirement is fulfilled and concentrates then purely on efficiency and competition issues.<sup>9</sup>

---

<sup>9</sup> Naturally, it must be emphasised that the safety requirements pose certain constraints on the efficiency and competition issues in payment systems eg when determining access of potential participants in the systems. In the strict sense, the term 'efficiency' in this study should be read to refer to 'safety constrained efficiency'. For the sake of convenience, the term 'efficiency' is, however, used.

## 2 Institutional framework

In the European Union, cross-border retail payments and their pricing have attracted the attention of policy-makers ever since the creation of the single market in 1992. According to the pricing surveys by the European Commission<sup>10</sup>, the market operators have made hardly any progress and the prices of cross-border payments have remained at high levels and their execution times a lot longer compared to domestic retail payments. Several underlying background factors have delayed the development. One of the main factors is probably the existence of different national payments systems, which have developed within different historical contexts, with different governance, access, pricing and transparency traditions as well as different legislative environments. As a result, the current retail payment infrastructure in European Union is still fragmented and it is largely based on traditional national payment habits and characteristics. The reasons for this situation are many-faceted. On the one hand, payment service providers (mainly banks) have emphasised that ‘there is no business case’ to develop and invest in new cross-border retail payment infrastructures because there is not sufficient demand for these services. On the other hand, the authorities and consumer associations have maintained that the current high prices are the principal obstacle to activating and expanding the demand for these services. In general, this situation is similar to the so-called *Catch-22 dilemma*<sup>11</sup> or the *chicken-and-egg-problem*. Osterberg and Thomson (1998) have applied the Catch-22 dilemma in the network externalities in retail payment innovations. According to them, a consumer’s benefits from having a new payment instrument depend on how many businesses will take it in payment. On the other hand, merchants and service providers will refuse to invest in the systems needed to accept the new payment instrument until they are sure that there will be enough consumer demand to justify the expense. According to Osterberg and Thomson, this *interdependence of demand* will remain an obstacle until the innovation achieves critical mass, either in its own time or with the authorities’ help.

At the practical level, the fragmented structure of retail payment methods and systems in the EU countries can be clearly seen when looking at the EU payment statistics (ECB 2002). Based on the statistics, one can distinguish *giro-based countries* where credit transfers are in the dominant position and *cheque-based countries*. Finland, Sweden, Austria, Germany, the Netherlands and Belgium can

---

<sup>10</sup> For related press releases and background reports, see the European Commission’s website: [http://europa.eu.int/comm/dgs/health\\_consumer/library/press/press\\_consumer\\_en.html](http://europa.eu.int/comm/dgs/health_consumer/library/press/press_consumer_en.html).

<sup>11</sup> For the original context of the dilemma, see Joseph Heller’s ‘*Catch-22*’, Simon and Schuster, New York, 1961. The other interpretation of this phenomenon is the familiar *chicken-and-egg-problem* (no supply thus no demand, or no demand thus no supply) which is shortly discussed in the payment systems context in Chapter 4.1.

be described as ‘giro-countries’ whereas in France, UK and Ireland cheques are still dominant even though their relative share has been declining in recent years. Generally speaking, the development of payment system infrastructures in different countries is likely to have been influenced by some sort of *path-dependence*<sup>12</sup> (‘history matters’) where the key ingredients are infrastructure of service providing sector (banks), national payment traditions and legislative environment. Each national payment system has its own membership criteria, standards and practices that have evolved over time.

Another factor that has surely had a great influence on national development paths, especially in the past, has been *the slow and imperfect integration of the international financial markets*. Accordingly, national payment systems have been developed to correspond with the national circumstances. However, in recent years, global financial market integration has gained momentum (especially in Europe because of the EMU), and the pressure to have compatible global systems has clearly increased. A third factor affecting the development of national payment systems is the statistical observation that ‘*payment habits are slow to change*’. This applies especially to consumers<sup>13</sup>, and, to a lesser extent, also to enterprises. It is obvious that all these three factors have had influence on the development of payment systems, but, only the coming years will tell, if the recent advances in payment transfer technology, accelerating financial integration process and strengthening global financial linkages will change the picture. In the European Union / euro area, the introduction of euro notes and coins and potential cross-border bank mergers along with regulatory measures is likely to accelerate the development. However, the heterogeneity of payment methods in the EU is still quite strong as can be seen in Figure 2.

---

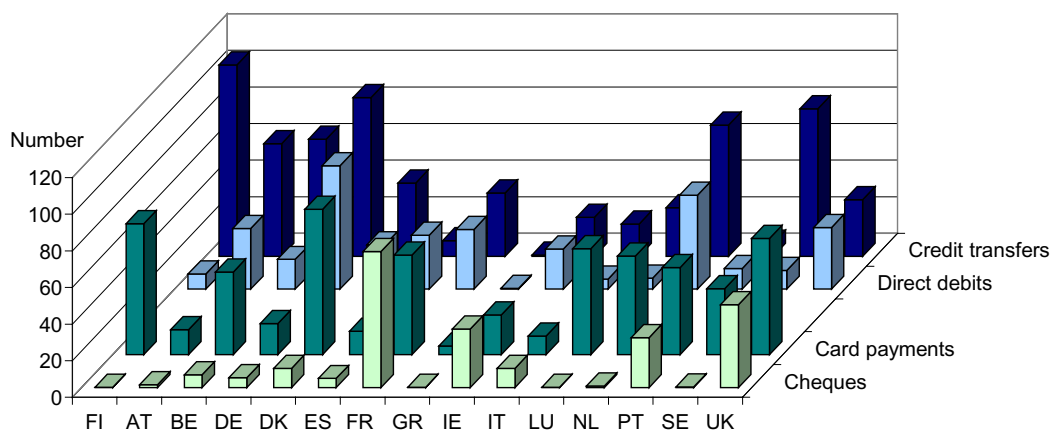
<sup>12</sup> The most well-known (but nowadays also disputed) example in the context of efficiency and path-dependence is the QWERTY-keyboard system.

<sup>13</sup> This can be clearly seen in some European countries (see Figure 2) and especially in the United States, where the cheque continues to be an important payment medium.



Figure 2.

### Number of cashless payments per inhabitant in EU countries, 2000



Source: European Central Bank.

Figure 2 supports the argument that the retail payment infrastructure in the EU (as well as in the euro area) consists of 15 *heterogeneous payment areas* was valid in year 2000, and there has not been drastic changes even thereafter. From cost-efficiency point of view, it has been claimed that the national retail payment systems work in an efficient way (at least when asked from the payment service providers), even though national differences exist. For example, some countries still rely on paper-based payment instruments whereas in other countries more efficient electronic payment methods are already widely used. However, it is clear that the present situation in retail payments area stands in sharp contrast to the official aim of forming a *Single Payment Area* in the EU. Furthermore, it has also been claimed that the present heterogeneity in the retail payments area can potentially hinder the development of efficient cross-border retail payment systems. The idea behind this argument is that the heterogeneity in payment media demand makes it more difficult to develop truly compatible systems or one common cross-border system because of different national needs.

In the area of large-value payments, more progress towards the Single Market goal has been achieved; and today TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system) and Euro 1 -payment systems are offering payment services in the EU-wide scale. However, the development in the retail payment systems has been slow and cross-border payments today are still to a large extent effected using traditional correspondent banking arrangements or some club-type arrangements with limited membership. As a natural consequence, the prices for cross-border retail payments have remained high. The Regulation of cross-border payments in euro adopted by the European Commission was aimed as regulatory remedy to correct the situation and facilitate the development, and it

also led the banking sector to react and increase their development efforts. In the next section, the roles and aims of the key parties involved in retail payment systems in the euro area are described.

## 2.1 Key parties involved in the retail payment systems in the euro area

In principle, the key parties that are involved in the development process of retail payment systems can be grouped into three groups: (i) *End-users*, (ii) *Payment service providers*, and (iii) *Regulators*. In the following, their motives and roles are discussed. In addition, their main concerns as well as their recent actions are presented in the European context.

### (i) End-users

In retail payments, customers (ie consumers and enterprises) are the end-users of the services. Accordingly, their adoption pattern of new payment instruments plays an important role in shaping the future payment systems. As in many other network industries, users' expectations about the future usage of different instruments affect their actual development also in retail payment systems. Often the need for 'coordination of expectations' is emphasised, because users need to form their expectations (and their respective decisions) on which technology will be widely used by other users. The practical problem is that very often the decision on which payment method is chosen depends on the present price and availability of usage points of the payment instruments. When the present users are few and price is high, the new payment medium cannot achieve the critical mass needed to achieve economies of scale in its production and thus to survive over the long run. In a practical context, the previous observation that 'the payment habits are slow to change' is relevant when new payment methods are introduced to customers. Moreover, the indirect pricing, which is commonly used in many payment methods, also affects users' adoption decisions.

Accordingly, when aiming at payment system efficiency, 'the incentives of payment system users'<sup>14</sup> play an important role in fostering efficiency of retail payment systems. In the euro area, consumer associations have recently made complaints against the service providers on the price discrepancies that have

---

<sup>14</sup> In fact, the behaviour and usage decisions of payment system/method users finally decide which systems survive. Therefore, along with investment incentives for payment service providers, 'the usage incentives for customers' are also decisive when searching for efficiency in payment systems.

continued to prevail between domestic and cross-border payments, even after the introduction of the euro as the single currency in the area.

(ii) Payment service providers

The banking sector has traditionally been and still is the main payment service provider even though some new service providers are now emerging (see the short discussion at the end of Section 2.2). As in any other industry, appropriate incentives for innovation and investments ('Need for the existence of a real business case' as many bankers have phrased it) are crucial when establishing payment system infrastructure. Accordingly, without sufficient incentives, the development of efficient infrastructure is doomed to be slow. In the context of cross-border retail payments, the banking sector has emphasised that the slow development of the systems was due the low demand for these payments (lack of a real business case). However, after the adoption of the Regulation of cross-border payments in Euro (RPE), the banking sector 'was forced' to act. In the aftermath of the RPE, the banking sector activated and published a White Paper: *Euroland: Our Single Payment Area!*<sup>15</sup>. In the White paper, the banking sector emphasises the crucial need for a pan-European payment infrastructure in order to be able to respond to the request of the Regulation. In this context, the development of a pan-European Clearing House with fair and open access has been advocated. Further, the components of payment schemes (infrastructure elements, standards, rules etc.) should be developed in a concerted way.

As a concrete reaction to the Regulation on cross-border payments in euro, European banks and banking associations have also established a European Payments Council (EPC) in June 2002 to represent the industry and to support the development of *the Single Euro Payment Area (SEPA)*. The European Payments Council has established 5 working groups in the following areas: Payment Instrument, Infrastructure, STP (Straight-Trough Processing), Cards and Cash. Moreover, the European banking sector has signalled that they are prepared to move forward the necessary harmonisation of payment systems and instruments, as much as possible through self-regulation. In their opinion, legislation and regulation should only be used where the sufficient harmonisation cannot be achieved by other means.

The final aim of the EPC is to achieve a real domestic market for euro payments, and the EPC has published the first status report on progress achieved

---

<sup>15</sup> European Payments Council (2002): '*Euroland: Our Single Payment Area!*', May 2002. <http://www.europeanpaymentscouncil.org>.

towards the SEPA.<sup>16</sup> According to the EPC, European banks have already established rigorous standards to comply with the Regulation. The EPC has approved two market conventions that will be the key tools to meet the 1<sup>st</sup> July 2003 deadline in the Regulation. The first convention, the *CREDEURO Convention*, establishes a standard for the execution of a ‘basic’ bank-to-bank pan-European credit transfer, which will allow participating banks to give guarantees to their customers as regards information requirements, execution time (3 days from acceptance to beneficiary credit), and remittance information transmitted. The second convention, the *Interbank Charging Principles (ICP) Convention*, establishes a standard procedure for achieving end-to-end certainty in charging methods, and allowing for the instructed amount to be credited to the beneficiary customer in full. Moreover, the EPC members have approved the Pan-European Automated Clearing House (PEACH) as the preferred model of the industry for credit and debit transfers. The PEACH (provided neither by a single company, nor by a single technical system) should be ‘country neutral’, owned and used by banks, with central banks as potential users or facilitators for technical access. In conclusion, the EPC states that the fully integrated European payments infrastructure will be achieved in steps. First, for credit transfers, in combination with the existing clearing and settlement systems, then a pan-European infrastructure, that bridges current domestic and cross-border payments, will develop.

Additional driving forces for further developments in cross-border retail payment field are likely to be new emerging payment initiatives. As discussed in Section 2.2, some new payment initiatives are now emerging, but currently the traditional payment service providers (ie banks and their associations) are still dominating the field. It remains to be seen whether new providers will reach ‘the critical mass’ for their systems, and thereby form new real competing entities against the traditional payment service providers.

### (iii) Regulators

In the EU/euro area, the European Commission (the Commission) and the European Central Bank (ECB)/European System of Central Bank (ESCB) along with competition authorities are the main regulators in the payment service field. Their respective, partly overlapping roles, will be discussed next.

---

<sup>16</sup> For the details of the first status report, see the EPC press release with links to the related documents on 3<sup>rd</sup> of April 2003, <http://www.europeanpaymentscouncil.org>.

## The European Commission

When fulfilling its role in promoting the development of the Single Market, the European Commission has been active in facilitating financial market integration. Since the beginning of the 1990s, the Commission has been arguing that high costs for cross-border money transfers are inhibiting the Single Market development and financial market integration. In this context, the Commission has formulated the following objectives for the single payment area:

- to make the Internal Market the domestic market
- to promote efficient and secure payment means and systems
- to enhance customer protection and strengthen consumer confidence relating to all payment means
- to ensure competition on equal terms in a level playing field.

In pursuing these goals, the Commission has assumed a more active role in recent years. The fact that the charges for cross-border retail credit transfers have remained high over the years prompted the European Parliament and the Council to adopt Regulation (EC) No 2560/2001 on Cross-border Payments in Euro (RPE) in December 2001. With the Regulation, the Commission aims at facilitating the expansion of the '*Single Market*' concept to cover the money transfers and payment systems markets as well. The adoption of the regulation was seen as the ultimate tool to foster the development of a market where, according to the Commission, 'no substantial development efforts by market participants' was observed before that.

The Commission is also working to harmonise the legal framework for payment services in order to facilitate the development of the Single Payment Area in the internal market. The Commission has drafted and recently organised a public consultation on the working document where it has outlined the principal ingredients and legislation needs for the Single Payment Area.<sup>17</sup>

## European Central Bank/European System of Central Banks

The ESCB/ECB's interest in the efficiency of payment systems is based on the Article 105(2) of the Treaty and the Article 22 of the Statute. According to these, *the ESCB shall promote the smooth operation of payment systems*. This also includes facilitating and ensuring the efficiency of payment systems. In the area of

---

<sup>17</sup> European Commission (2002): *A Possible Legal Framework for the Single Payment Area in the Internal Market*, Working Document, 2002.

[http://europa.eu.int/comm/internal\\_market/en/finances/payment/area/index.htm](http://europa.eu.int/comm/internal_market/en/finances/payment/area/index.htm).

retail payment systems, the Eurosystem has focused on the importance of providing efficiency and safety standards for retail payment instruments and euro retail payment systems with the aim of fostering the achievement of a single euro payment area. In principle, both the safety and efficiency targets are important, and in many cases, as in the large-value payment systems where potential for systemic risk is bigger than in retail payments, the safety requirement is the first one to be achieved.<sup>18</sup>

The ECB/ESCB has communicated its policy stance on retail payment issues by publishing various reports and studies. The ECB has published two reports *Improving Cross-Border Retail Payment Services – the Eurosystem’s view* (September 1999) and *Improving Cross-Border Retail Payment Services – Progress Report* (September 2000) in which it highlighted inefficiencies and set objectives for cross-border retail payments. Moreover, the ECB Monthly Bulletin article in February 2001 *Towards a Uniform Service Level for Retail Payments in the Euro Area* examined the variety of issue in retail payments area. In November 2001, the ECB prepared a report (at the request of the Ecofin Council) *Towards an Integrated Infrastructure for Credit Transfers in Euro*, in which it reviewed ways to remove obstacles that are the origin of the high costs of retail cross-border credit transfers and provided an overview of measures to improve the payment infrastructures.

Regarding the euro area development, the ECB<sup>19</sup> has argued that *the lack of competition among banks explains the lack of progress with regard the price level of cross-border credit transfers, whereas the lack of co-operation on standards and infrastructures explains the lack of progress in reducing the cost of processing cross-border transfers*. This quotation nicely reveals the ‘network nature of payment systems’ that has strong effects on the innovation and competition in the area. On the one hand, cooperation among service providers is needed on establishing standards and infrastructures in order to have a large enough customer base for their services (‘*network effect*’). On the other hand, agreement on common standards increases competition and may thus reduce service providers’ incentives for the increased compatibility (‘*competition effect*’). Accordingly, the crucial question for policy-makers and regulators is to find measurers that maximise social welfare in this type of environment.

To summarise, one of the most essential tasks in the future for all the key parties involved in the development of retail payment systems is to strengthen

---

<sup>18</sup> Here it should be emphasised that the present study concentrates on efficiency issues in retail payment systems, and, accordingly, the safety requirements are acknowledged but they are left out of the analysis. This is done for the sake of simplicity, even though safety requirements also have potential effects on the cooperation and competition issues.

<sup>19</sup> ECB (2001c): *Towards an Integrated Infrastructure for Credit Transfers in Euro*, November 2001.

their cooperation so that overlapping development efforts can be avoided, and that efforts can be focused on the most relevant issues. On regulatory side, the cooperation between the Commission and the ECB/ESCB is crucial in order to avoid the situation, where too extensive and overlapping regulation would act as an impediment to the development. Furthermore, the roles of competition authorities and other regulators (including central banks as overseers of the payment systems) in the quest for the payment systems efficiency are not totally clear both at the national as well as at the European level. This is likely to require further cooperation efforts at least at the European level.

## 2.2 Current cross-border retail payment systems in the euro area

In general, development in cross-border retail systems has been rather slow but recently more progress has been achieved in the EU/euro area. Along with the traditional correspondent bank relations, there are also a few ‘club-type systems’ to execute cross-border retail payments, mainly in the area of credit transfers. In the following, the existing systems are described.<sup>20</sup>

### **Correspondent banking**

At least up until now, the formation of Monetary union has only had rather a limited impact on the cross-border retail payments, with the exception of the traditional correspondent banking business where the effects has been clearly visible. The number of correspondent relationships has been diminishing, and the correspondent banking business is adjusting to a lower activity level after the introduction of the euro currency. At the same time, there has also been concentration to a few major banks. The driving factors behind these developments have been a few new payment system initiatives, technological innovation and general financial sector consolidation. As a result of the increasing concentration, the nature of traditional correspondent banking business has also been changing and its general importance has diminished.

Apart from bilateral correspondent arrangements among banks, some networks have been established between groups of banks for the purpose of enabling customers to make low-value retail payments across borders. All of them can be argued to be sort of ‘club arrangements’ requiring direct or indirect

---

<sup>20</sup> The descriptions rely heavily on the ECB Bluebook (various issues); most recent developments are obtained from [www.finextra.com](http://www.finextra.com).

participation status to the system. In the following, the main systems in this field are described.

## **TIPANET**

TIPANET (Transferts Interbancaires de Paiement Automatisés) is a network of member banks from the co-operative banking sector which have set up an arrangement for the execution of cross-border bulk payments. The respective local payment systems can be accessed via the receiving correspondent banks. Co-operative banks from six countries set up an association called TIPA Group, S.C in 1993. TIPANET is a network of 11 co-operative banks from 8 countries not only in Europe but also overseas, namely in Canada. In addition some banks have established their own international correspondent networks, which apply TIPANET standards, without being members of TIPA Group, S.C. For example, German co-operative banking association has an international clearing network with 25 partners in 18 countries. TIPANET processes credit transfers, direct debit and cheques, of which credit transfers account for the biggest share of the transactions processed. The settlement of payments takes place via existing reciprocal accounts (loro and nostro accounts), which correspondents hold for each other. The conditions for settlement are agreed bilaterally between the banks concerned. Fees are charged individually by each participant bank. The fees are often differentiated according to the type of customer and the way in which the payment instructions are submitted (paper-based or in electronic form).

## **Eurogiro**

Eurogiro was established in 1989 as a co-operation between the postal and giro organisations to build a network for the exchange of cross-border payments. The participants act as correspondents for each other. Eurogiro has 40 members in 38 countries in Europe, Asia, Africa and North and South America (December 2002), and all EU countries are covered. Today, not all participants belong to the postal bank sector; some commercial banks also act as access points in some countries. Eurogiro processes credit transfers and cash-on-delivery orders. The payments are executed through reciprocal accounts (loro and nostro accounts) which the correspondents hold for each other. Eurogiro is run by Eurogiro Network A/S, which is based in Denmark. It is a limited company and is owned by 16 European post office banks / postal financial services companies. Eurogiro has laid down some internal standards, which must be met by participants in order to be able to process payments via the network. Eurogiro's strategy is to provide low value payments/bulk payments cost efficiently and create value-added services for members of the club.



## **S-Interpay**

S-Interpay was set-up in 1994 by the German savings banks and their central institutions, the Landesbanken and Girozentralen, to facilitate cross-border payments. Since then the system has expanded and it now consists of a network of correspondent banks in the EU and beyond. Detailed access criteria are not published. However, participants are mainly from the savings banks sector. The services of S-Interpay are available to all members of the European Savings Bank Group, and in principle, also to other commercial banks. In general, one bank in each country functions as the central correspondent for that country. The correspondent 'collects' all payment orders, which are to be transferred abroad from the participants. These payment orders are transferred to the foreign correspondent, which will then convert the data into domestic format and process the payment within the relevant local payment system. The network only handles cross-border credit transfers for amounts of up to EUR 10,000.

## **STEP 1 (Euro Banking Association)**

The STEP 1 initiative of the Euro Banking Association (EBA) entered into operation on 20 November 2000. The main aims of STEP 1 are to enable the reduction in the execution time of cross-border retail payment instructions, to foster the use of industry standards for messaging in order to enhance STP within banks and to develop and encourage the adoption of European business practices in the execution of cross-border retail payment instructions. STEP 1 has two-tier membership: the Euro 1 clearing members and, in addition, any other bank which is not a member of Euro 1 but acquires a status of a STEP 1 bank and uses a Euro 1 clearing bank as a 'settlement bank' for its low-value payments. The EBA's STEP 1 arrangement is open to all banks which have a system office located in the Member State of the EU and are either Euro 1 banks or have appointed a Euro 1 bank to act as their settlement agent within Euro1. STEP 1 uses the technical platform of Euro 1 for the processing of low-value payments. There were 209 STEP 1 banks (STEP 1 banks and directly accessible subparticipants) in February 2003.

## **STEP 2 (Euro Banking Association)**

The Euro Banking Association is also proceeding with the development of the new Euro currency automated Clearing House for interbank payments, STEP 2. The new pan-European ACH (Automated Clearing House) went live in pilot phase in 28 April 2003 with 32 banks, and the membership is planned to be

expanded gradually. STEP 2 provides a pan-European ACH solution for processing bulk payments. The European Payments Council has labelled STEP 2 as a *PEACH (Pan-European Automated Clearing House)* and promotes strongly the initiative. The payment orders processed in STEP 2 are commercial transfers in euro that are non-time critical and formatted according to agreed technical standards. STEP 2 participants have to be financial institutions having their registered office or a branch in the EU.

### **Other initiatives**

In general, it can be noted that new service providers are entering to the retail payment markets currently dominated by the traditional banks and their joint ventures as primary service providers.<sup>21</sup> Recently, new initiatives have been launched in the area of retail payments, especially in card payments. For example, Visa EU and some Swedish and Spanish banks have agreed on a Visa P2P system in November 2002.<sup>22</sup> The system, known as Visa Direct, has been developed to enable banks to comply with the Regulation on cross-border payments in euro. Visa Direct uses Visa connections, systems and account numbers to provide banks with a plug-and-play package for entering the European money transfer market. To transfer money, all the sender needs to know is the email address or account number of the recipient. Transactions may be initiated by phone, over the Web or in person at the branch. The scheme is initially open any Visa EU cardholder but this will be widened to other Visa regions and payment schemes in the future.

The Visa-initiative is facing competition from alternative payment systems, such as eBay-owned PayPal, which has recently introduced sterling and euro currency transfers, and mobile payment operators, including Paybox and Vodafone. Furthermore, Money Remittance Offices, like Western Union, Money Gram among others) provide cross-border cash transfer services and have increased their corresponding agency offices. At this stage, it is difficult to predict the future success of the new competing initiatives as new systems are being introduced at an accelerating speed but, historically, only very few of the new initiatives have turned out to be successful and viable. However, it can be stated that competition from other than the traditional payment service providers is clearly increasing. All these developments are likely to foster competition and, thereby, facilitate improvements in efficiency in the payment service industry.

---

<sup>21</sup> For a recent review of new retail payment methods in Finland and at international level, see Jyrkönen and Paunonen (2003).

<sup>22</sup> See Visa press release 14.11.2002: [http://visaeu.com/press\\_release/press122.html](http://visaeu.com/press_release/press122.html).

In recent years, completely new ideas for a payment system infrastructure have also been proposed.<sup>23</sup> These ideas are based the utilisation of the modern internet technology, and if applicable in the future, they will have a revolutionary impact on the competition and contestability of the whole payment system market.

## 3 Retail payment systems as network industry

### 3.1 Definition of retail payments

According to the BIS (2002) report, retail payments can be characterised and contrasted with other types of payments in the following way. *First*, retail payments are typically made in large numbers by large numbers of transactors and typically relate to purchases of goods and services in both the consumer and business sectors, rather than, for example to the settlement of transactions between financial institutions. *Secondly*, retail payments are made using a much wider range of payment instruments than large value payments and in more varied contexts, including, for example payments made in person at a point of sale as well as for remote consumer and commercial transactions. *Thirdly*, retail payment markets are characterised by extensive use of private sector systems for the transaction process and for clearing.

The above characterisations nicely reveal the complex and many-faceted nature of retail payments. It also points out the fact that retail payments differ from large-value payments in many aspects. Therefore, it is useful to examine the special characteristics of retail payments more closely before moving into analysing the retail payment systems as a network industry.

### 3.2 Special characteristics of retail payments

#### **Strong linkage to other banking services**

One fundamental characteristic of retail payment services is that they are strongly linked to other banking services, like deposits. In fact, one could argue that the payments are not themselves final products but, instead, essential services provided as part of general banking service. It has also been claimed that payment services are often treated as loss leaders as part of the whole banking service

---

<sup>23</sup> For an overview and description of the new payment system infrastructure proposal (the so-called E-settlement), see Leinonen (2000); and for the technical set-up, Leinonen, Lumiala and Sarlin (2002).

package. This can be clearly seen eg in the pricing of payment services where indirect pricing through cross-subsidisation is common. Payment services are offered free or underpriced but, at the same time, they are implicitly charged through low interest on transaction account balances.<sup>24</sup> This is a very important issue because direct pricing of payment services can be used to influence consumers' choice of payment instruments. In fact, direct pricing of payment services has been gaining popularity in recent years. The proponents of this direct pricing approach have welcome this development and have stated that this has increased the efficiency of payment systems by guiding the customers to use the most efficient payment instruments.<sup>25</sup>

Retail payment instruments and systems possess also other inherent features that differentiate them from goods and services of traditional industries. In the following, some fundamental features are shortly discussed.<sup>26</sup>

### **The presence of two final customers**

A typical account-based payment transfer is service provided to two final customers: the payer making the payment and the payee receiving the payment. In order for a payment to be executed, both the payer and payee must be able to access the same system or compatible/interoperable payment systems. The situation is, in principle, similar to telecommunications services where there are also two customers.<sup>27</sup> The ability to make and receive payments or telecommunications requires that the sender and recipient have access to the same system or compatible systems. In fact, this compatibility issue is of crucial importance in all 'network industries', and it will be discussed more in detail in Section 3.3. Furthermore, the presence of two final customers also affects the pricing of retail payment services. In principle, it allows for three different charging options. The service can be charged to the payer (OUR), to the payee receiving the payment (BEN) or divided between them (SHARE). In addition to direct payments charges, charges are also levied indirectly through the practise of offering low interest transaction accounts as discussed already above.

---

<sup>24</sup> For theoretical analyses on the determination of deposit interest and bank service charges, see eg Tarkka (1995). For issues on cost recovery and pricing in payment services, see eg Humphrey, Keppler and Montes-Negret (1997).

<sup>25</sup> See for example, Humphrey, Kim and Vale (2001) as well as Norges Bank (2002a) and (2002b).

<sup>26</sup> The following part is an adapted list of features provided by Gangulny and Milne (2002a).

<sup>27</sup> Even though similar in many aspects, the payment service and telecommunication industries do have some fundamental differences. In principle, information is exchanged in both (telephone call and payment information in payment message need have a compatible system through which messages are transferred between the customers), but in payment services also the settlement of money transfer need to take place.

## **Multiple payment service providers and need for cooperation**

In principle, an account-based payment may involve five different parties. In addition to two final customers, there are two banks providing them with transaction facilities and some interbank payment arrangement (payment system) for effecting the settlement between the two banks. In this kind of environment, interesting cooperation and competition puzzle arises. The operation of the interbank payment arrangements and the determination of interbank charges require cooperation among banks but, at the same time, they are competitors in most aspects of their business. This brings competition policy considerations into the picture. In principle, it is possible that a group of dominant banks operates payment systems and sets payment charges so as to restrict or even rule out new entrants. It may also be argued that, even if payment systems are not operated so as to create barriers to entry in payment provision, cooperation between banks may still result in pricing structures that are unfavourable to consumers.

## **Interdependence of investment decisions**

Investment decisions on new payment systems are also influenced by the special characteristics of the industry. Cooperation requirement in payment service provision along with the usage externalities for customers (a widely accepted payment instrument is more attractive to customers) leads to a situation in which investment returns depend on the level of investment made by other banks and businesses. Another implication of these investment interdependencies is that the private rate of return to investment may be very much lower than the social rate of return. In principle, when everybody is making investments on his own, the potential externalities cannot be internalised as in the case of cooperative joint ventures. Accordingly, it is very likely that the absence of payment service joint ventures (based on the lack of cooperation among service providers or restrictions set by regulatory authorities) can potentially lead to ‘underinvestment’ that can only be corrected by providing a more favourable investment environment eg by tolerant regulation. In the extreme case, the public sector could also provide the infrastructure needed given the ‘public good nature’ of payment systems, especially in the field of retail payments. This view could also be supported by the ‘universal service obligation’ -requirement and non-discrimination principle (ie ‘everybody should get access to systems’). However, it should be noted that it is not clear, how the public intervention would affect the payment systems safety and efficiency requirement; and, perhaps even more importantly, the general market contestability.

## Ownership through private joint ventures or public sector

Commonly retail payment systems are jointly owned by participating banks or they are in public ownership (central bank).<sup>28</sup> The mutual ownership (eg in the form of joint ventures) reflects the cooperative nature of payment provision services. The ownership structure can play an important role in the access to the system especially if some sort of exclusivity rights are used. Therefore, the ownership question must be carefully dealt with in order to provide 'a level playing field' to all market players. However, another aspect that is related to ownership and access to payment systems is safety. Totally open access to a payment system may endanger the smooth working of the system if some of the participants cannot fulfil their obligations as required. In fulfilling their statutory role in payment system oversight, central banks are obliged to take all the necessary actions to limit the contagion effects of systemic risk inherent in all payment systems, including retail payment systems. Accordingly, along with the efficiency requirements, the safety issues must also be taken into account in ownership and access considerations.

### 3.3 Network effects in retail payment systems

The importance of network characteristics has been recognised in many modern industries like transportation and communications industries among others. The development of systematic framework for their analysis was started in mid 1980s by Katz and Shapiro (1985) and Farrell and Saloner (1986).<sup>29</sup> A central feature of networks is that network goods or services exhibit *network externalities* (also called *network effects* by some authors).<sup>30</sup> In a nutshell, this means that adding another customer adds value to the existing customers of the network. In this context, the telephone or fax system has often been used as a demonstrative example. Many authors have argued that networks play an integral part also in financial markets and in payment systems. For example, McAndrews (1997a) analyses network effects in payment systems and he defines a network good or service as having two main characteristics:

---

<sup>28</sup> For a recent survey and analysis on the roles of central banks in payment services provision, See Khiaonarong (2003).

<sup>29</sup> For an analysis of the basic structures of networks see eg Economides (1996). Economides has also done extensive research in many areas of network industries: see eg Economides and Salop (1992), Economides (1993), Economides, Lopomo and Woroch (1996), Economides (1996), Economides and Flyer (1997).

<sup>30</sup> This study uses both terms (network externality and network effect) in interchangeable way.

- (i) the value a person gets from the product increases as more people consume it
- (ii) the technique a firm chooses to produce the product will depend on technique chosen by other firms.

Both these characteristics can be identified in the retail payment service provision. Concerning point (i), the more widely a payment instrument is accepted, the more benefits it brings to a consumer using it (demand side externality). Concerning point (ii), economies of scale in production of payment services foster the industry's willingness for cooperation (common standards, joint network ownership) in providing these services (supply side externality). Naturally, both these characteristics cannot be observed in their pure forms in real life. However, for example, in the adoption process of ATM-networks and payment cards they clearly have played a major role.

### **Complementarity, compatibility and standards**

In network markets, there are *complementarities* between users and/or products, which give rise to network externalities. Network externalities can be classified into two types: direct and indirect externalities (Katz and Shapiro 1985, Economides 1996). For direct network externalities, the complementarities exist between users of the same product or service, and for indirect network externalities, the complementarities exist between products or services in different markets. In other words, direct network externalities are generated through the direct effects of the number of the agents consuming the same product, whereas indirect network externalities arise when the value of product increases as the number of the complementary goods or services increases (sometimes also referred to as 'the hardware-software paradigm').

In retail payment systems complementarity plays an important role. For example, in credit card systems the complementarity is straightforward: as more people use credit cards, more merchants are induced to add terminals, since allowing customers a convenient means of payment will potentially increase their sales, and as more merchants permit card payment, the value of to the customer of having a credit card increases too (McAndrews, 1997a). At the system level, compatibility is of crucial importance in enabling interoperability of systems (very clearly eg in ATM-systems).

Along with complementarity, *compatibility* between products is also essential for the existence of network externalities. In essence, for complementarities to be exploited, interaction channels are needed: products, users or systems need to interact. This means that complementary products or systems must operate on the same or compatible standard. According to Economides (1996), it is compatibility that makes complementarity actual and is thus crucial in network industries. In

payment systems, compatibility can, in principle, be achieved by adherence to technical standards. However, it should be emphasised that '*technical compatibility*' does not necessarily mean that different systems or actors can truly interact. The interaction can be limited by exclusivity arrangements that hinder or restrict the interaction. What is also needed is '*commercial compatibility*' that ensures that technically compatible products or systems really can interact because it is possible to limit the technical compatibility by eg rules and entry requirements of systems.

The process of setting *standards* for network components is vital to achieving the compatibility that makes network complementarity fully possible.<sup>31</sup> According to McAndrews (1997a), setting standards can be done by the market place, through co-operation (industry forums on setting standards), or by authorities. In payment systems, compatibility can be achieved by agreement on common technical standards, infrastructural arrangements or through interbank cooperation (eg as in 'payment clubs or common systems' discussed in Section 2.2). In many retail payment systems (most clearly eg in credit transfer systems), standards have traditionally been set 'domestically' by national authorities and/or banking associations, and as a consequence, domestic retail payment systems work rather efficiently in many countries. At cross-border level, standardisation has been more problematic on the one hand, because of higher number of different parties involved and, on the other hand, because of strict adherence to the adopted domestic standards in different payment methods.<sup>32</sup> At the international level, SWIFT (the Society for Worldwide Interbank Financial Telecommunication) has been successful in developing and implementing internationally accepted standards for interbank payments. At the European level, the European Committee for Banking Standards (ECBS) has been developing and advocating IBAN (International Bank Account Number) and IPI (International Payment Instruction) standards.<sup>33</sup> An obvious drawback in the work of the ECBS has been the fact that it lacks the power of enforcing the adoption of the formulated standards. In this regard, any standard, no matter how excellent it might be in improving the efficiency of the payment systems, is of little value when it is not adopted by a sufficiently large service provider group. However, the recent establishment of the European Payment Council (EPC) is likely to foster the concentrated effort of setting and adopting common standards in European payment traffic. The authorities can also play a role in standard setting process. For example, the

---

<sup>31</sup> For a review of key policy aspects of standard setting in industries with network effects, see Gandal (2002).

<sup>32</sup> In this context, it should be emphasised that international card payment networks, like eg Visa and Mastercard, stand in sharp contrast to the previous statement that, however, fits well to the development of international credit transfer standards.

<sup>33</sup> For more information on the IBAN and IPI standards as well as other standardisation projects, see the homepage of the European Committee for Banking Standards [www.ecbs.org](http://www.ecbs.org).



ECB/ESCB has emphasised its role as the catalyst for the development in the European payment system standardisation process. A natural way for central banks to support efficiency improving standards is to require their usage in their own payment systems.

### **Economies of scale in production**

Many network industries are subject to economies of scale in production due the significant investment in infrastructure needed to start the operation (large fixed costs) and a relatively small marginal cost for services produced over the existing infrastructure. As in the case of traditional industries, this supports the existence of large production units. It is often argued that payment systems are subject to economies of scale because of the significant investment in infrastructure needed to start the operation (large fixed costs) and a relatively small marginal cost for services produced over the existing infrastructure. This argument is of relevance eg for electronic payment transfers processed by a clearing house where critical mass of payments is seen as a prerequisite for the establishment of such system. It should, however, also be stressed that it is possible that new solutions for future payment systems (eg internet-based systems) may change this situation.<sup>34</sup>

### **Consumption externalities and expectations**

A consumption externality can be defined as the increasing utility that a user derives from consumption of a product as the number of other users who consume the same product increases (some authors have labelled this as ‘demand side economies of scale’). In network industries, consumers’ expectations about the future size of the network play an important role in the actual size that the network achieves. This means that expectations are in fact often self-fulfilling. In retail payment services, these consumption externalities also clearly exist. Any payment system, like a giro system, is of no value for a customer if no other customer is participating in the system. Expectations of the future size of the payment network are also crucial, and the difficulty of achieving a critical mass of users tends to limit the adoption of new payment instruments.<sup>35</sup>

---

<sup>34</sup> See Leinonen (2000) and Leinonen et al (2002).

<sup>35</sup> See eg Guibourg (1998).

## **Switching costs**

In network industries, consumers and firms often have to face costs if they are willing to switch from one network to another. If high enough, these switching costs may effectively lock the users to the existing system and provide barriers that prevent them from entering into another network. Switching cost may lead to inefficiency by preventing users from adopting a new superior technology. Shy (2001) argues that switching costs affect price competition in two opposing ways. First, if consumers are already locked-in using specific products, firms may raise prices knowing that consumers will not switch unless the price difference exceeds the switching cost to a competing brand. Second, if consumers are not locked-in, brand-producing firms will compete intensively by offering discounts and free complementary products and services in order to attract consumers who later on will be locked in the technology.

Switching costs are also present in the payment service industry, at least in an indirect way. According to Shy (2001), switching costs can be significant in many service industries including banking. From the customers' point of view, the cost associated with switching between banks (ie closing an account in one bank, and opening an account and switching the activities to a different bank) could reach 6 per cent of the average account balance (Finnish data). Accordingly, some sort of lock-in effect may prevent customers from frequently switching among banks and payment service providers. Also from the payment service providers' point of view, switching costs can also be significant: eg upgrading or changing to a new payment system may require large investments in computer systems and training.

## **3.4 A brief review of related research**

The literature on network effects in retail payment systems is not very large, and most of the research is conducted by just a few authors. This literature is briefly discussed below.

Early studies of network effects in retail payment systems were empirical studies in the area of credit card and ATM networks. Carlton and Frankel (1995) focus on whether intrasystem competition or intersystem competition is socially more beneficial. Their analysis suggests that the society's welfare does not entirely depend on the number of competing networks in the market. In case of ATM networks, the authors reported increasing volumes and declining costs after the merger of the competing ATM systems. According to them, the potential benefits of intrasystem competition should be taken into account in the antitrust considerations.

Saloner and Shephard (1995) test for the existence and magnitude of network externalities in the rate of adoption of ATM technology. They examine whether the two findings – (i) a network's value increases in the number of locations it serves (the 'network effect') and (ii) the number of its users (the 'production scale effect') – in the network economics literature can be observed on banks' adoptions of automated teller machines. They use U.S. data and find that these effects have an important effect on the adoption decision for ATM technology. They argue that the main finding is that banks with many branches adopt ATMs earlier than banks with fewer branches, adjusting for the number of depositors. Furthermore, an ATM network is more valuable to depositors when it has many geographically dispersed ATMs because of the convenience it provides.

Theoretical modelling of network effects in retail payment systems is presented in McAndrews and Rob (1996). They study ATM networks and model the competition for members between wholesale switches and the role joint ownership can play in attracting members. They stress the following features of the industry. First, the vertical structure of production: firms in downstream industry (banks) serve end-users (customers) and buy network (switch) services from upstream firms. Second, the upstream industry exhibits economies of scale on the production side as well as network externalities from the demand side. In this set up, they compare competition between two solely owned switches with competition between one solely owned and one jointly owned switch. According to McAndrews and Rob, the key finding is that the joint ownership of the wholesale switch eliminates the double marginalization. Moreover, the joint ownership results in more concentrated markets, in which the network externality is more fully exploited. The jointly owned networks also possess an advantage over solely owned networks in that they achieve critical mass with smaller membership. Furthermore, McAndrews and Rob also identify costs to joint ownership and are able to draw two conclusions. First, the costs of decision-making in a jointly owned facility are likely to be higher than in a solely owned one. Second, the costs of raising capital are likely to be higher as well. Hence, quickly adapting to technical changes that require large capital investments might be more problematic for a jointly owned switch.

In a related study McAndrews (1996a) analyses the pricing in vertically integrated network switches in the context of ATM networks. He utilises the framework of McAndrews and Rob (1996) where a group of downstream retail banks own and operate the upstream network switch and models the pricing and output behaviour of the group of owners as the number of its members varies. He draws two conclusions. Firstly, the more inclusive is the ownership group in the vertically integrated network, the more likely the network adopts a flat fee pricing schedule. Secondly, the output of the downstream industry initially rises as the ownership group expands, but then contracts as the ownership group includes all of the downstream firms (ie joint venture becomes overinclusive).

McAndrews (1996b) presents a model of wholesale and retail fee setting for ATM network services. He shows that retail ATM fees are dependent on the demand-side network effect and economies of scale in production of the services. These, in turn, are functions of the size of the ATM network. The ATM fees are regressed on the ATM network size and other variables (like state income and banking market concentration) in a reduced form estimation. His results suggest that both network effects in demand and economies of scale influence retail ATM network service fees, with economies of scale becoming dominant for the largest ATM networks.

Guibourg (2001) analyses the causes and extent of network externalities in the EFTPOS market (Electronic Funds Transfer at the Point Of Sale). She conducts an empirical analysis of network effects on the EFTPOS markets (G-10 countries, Australia and the Nordic countries). She concludes that the degree of market concentration and the degree of interoperability (the use of common standards) are crucial variables in the exploitation of network externalities. She also examines the trade-off between competition effects and network effects and shows that the more symmetric banks are in acquiring the market, the more likely the common standards are adopted. However, the larger the gains from differentiation, i.e. the stronger the competition effects in relation to network effects, the more likely is the adoption of different standards.

Gowrisankaran and Stavins (2002) analyse the causes and extent of network externalities for ACH-electronic payments using a quarterly panel data set on individual bank adoption and usage of ACH. Their data consist of an 11-quarter panel (1995:Q2 to 1997:Q4) of the number of ACH transactions for financial institutions that purchased ACH services from the Federal Reserve. They develop three methods of identifying network externalities. The first method identifies network externalities from the clustering of ACH adoption. The second method identifies them by examining whether banks in areas with higher market concentration or larger competitors are likely to adopt ACH. The third method identifies them by examining whether ACH adoption by smaller branches of large banks affects the adoption by local competitors. According to Gowrisankaran and Stavins, all three identification methods reveal significant evidence of network externalities (more clearly at the bank level than at the individual customer level) and the magnitude of network externalities is estimated to be moderately large. Based on their results, the authors draw two policy implications. First, because ACH is underused relative to its socially optimal usage level, the Federal Reserve should attempt to encourage ACH adoption and usage. Second, other high-technology industries may also be characterised by network externalities.

## 4 Retail payment networks and public policy

According to the BIS (2002) report, it is widely recognised that safe and efficient retail payment systems and instruments are in the public interest, because they contribute towards the broader effectiveness of the financial system, in particular to consumer confidence and to the smooth and efficient functioning of commerce. Furthermore, public authorities can influence on the efficiency of retail payment systems by applying competition and regulatory measures. In this context, the challenge for public authorities is to take into account the fact that the network characteristics of the retail payment industry do have very strong implications for the general performance of the market, and thereby also on the effectiveness of their regulatory measures and actions. Accordingly, this section first concentrates on the market structure issues in network industries like tipping, excess inertia/momentum, path-dependence and underproduction, and assess them in the context of retail payment systems. Thereafter, standardisation issues are examined both from the theoretical and technical aspects. The analysis continues with a discussion of joint ventures and antitrust issues in retail payment systems. In the last section, regulatory tools used in network industries are presented and their applicability in retail payments is briefly assessed.

### 4.1 Market structure issues in payment networks

As stressed in the earlier chapters, the vertical structure of the industry is common in retail payment markets. Accordingly, the basic industry framework can be generalised as follows:<sup>36</sup>

*Payment service providers (banks) compete directly in the provision of retail payments instruments and services to end-users but, at the same time, they also co-operate in shared payment networks.*

In other words, it can also be said that there is ‘upstream cooperation combined with downstream competition’. This poses several challenges to public authorities, because from efficiency standpoint, it is desirable to take advantage of economies of scale by means of cooperation between market players, but, at the same time, there is a risk that such arrangements may end up to be anti-competitive. From a competition policy point of view, cooperation at one level may lead to collusive behaviour also at the other level. This is the crucial point in assessing the trade-off between competition and cooperation. Straightforward

---

<sup>36</sup> See McAndrews and Rob (1996).

application of economic theory to this question will need to be supplemented by taking into account the external environment factors. Without careful scrutiny, it is impossible to say *ex ante* whether *competition in the market* or *competition for the market* leads to the most efficient outcome.

According to the BIS (2002) report, market competition or contestability is the main route to maintaining efficiency in the retail payments markets. As emphasised above, a particular characteristic of these markets is that competition among market participants needs to coexist with the mutual cooperation that is required in the context of their participation in certain infrastructure arrangements. In this context, a key issue is whether the market participants by themselves achieve an adequate balance between competition and cooperation to benefit market users. In other words, public authorities should consider whether the market structure supports innovation and new market entrants and whether existing access restrictions serve to promote or impede competition and contestability.

Commonly cooperation is required among market participants in the context of their participation in certain infrastructure arrangements that also possess some of the characteristics of public utility. The issue in such cases is whether this cooperation results in support competition for improvements in overall market efficiency. The BIS (2002) report argues further that established networks are a typical context in which this issue will arise. On the one hand, they have the potential to provide a stepping stone for innovation, but, on the other hand, they are also in a position to create entry barriers that impede competition and innovation. Entry barriers can be created either by imposing access restrictions or by more indirect means, for example by a choice of standards and rules that are inappropriate, difficult or costly for other initiatives to adopt. The rationale for such choices is likely, at least in part, to reflect a desire to protect the franchise.

A related question is whether competition between different systems or competition in one system is better for overall market efficiency. If excluded entrants to a particular system decided to establish their own system that is more efficient and they are also able to attract enough customers (critical mass) for the new system to survive, market efficiency will be better. However, if they do not succeed, the customers of the excluded entrants will surely leave them and become customers of the existing system. This clearly points out the importance of market dynamics in network industries that strongly affects the market structure. In the following, some key market dynamics implications in network industries are discussed.

## Tipping

A peculiar, network industry specific effect, ‘tipping’<sup>37</sup> (a dominance of one network service provider) can also be seen in retail payment systems. At the national level, it is common that only one major retail payment system exists. In some cases, two or more systems may exist in parallel but they are often dedicated to different payment instruments (paper-based vs electronic).<sup>38</sup> The existence of one dominant system is normally explained by the economies of scale in production as well as positive demand side externalities. However, heterogeneity in demand for different payment instruments may facilitate the existence of more than one system.

## Excess inertia / excess momentum

Network markets also may tend to get locked-in to obsolete standards or technologies (*excess inertia*). Users tend to stick with an established technology even when total surplus would be greater were they to adopt a new but incompatible technology (Katz and Shapiro, 1994). Today’s consumers may be reluctant to adopt a new technology if they must bear the cost of transition from one technology to the next, and if most of the benefits of switching will accrue to future users (Farrell and Saloner, 1986). According to Katz and Shapiro (1994) network markets may also exhibit the opposite of excess inertia, which they call ‘insufficient friction’ (sometimes also referred to as *excess momentum*). In this case, the market may be biased in favour of a new, superior, but incompatible technology. Katz and Shapiro call the reason as ‘stranding’: today’s buyers may ignore the costs they impose on yesterday’s buyers by adopting a new and incompatible technology. Accordingly, those who previously bought the old technology are stranded. Both effects are also possible in payment service markets, but as in many network markets, excess inertia is claimed to be the dominant characteristic. A clear example is the slow development of e-money adoption where the service providers have long waited for its start-up but customers have been reluctant to start to use it. In most of the EU countries, the usage of e-money has been low: Luxembourg, Belgium and Denmark reporting

---

<sup>37</sup> According to Besen and Farrell (1994), several properties of network markets distinguish them from more conventional markets and affect the strategies that firms pursue. Network markets are often ‘tippy’: the coexistence of incompatible products may be unstable, with a single winning standard dominating the market (*tipping*). The dominance of the VHS videocassette recorder technology and the virtual elimination of its Betamax rival is often used as an example.

<sup>38</sup> In practical considerations, the choice faced by a customer is card vs credit transfer in giro-countries and card vs cheque in cheque-countries.

the highest figures 6,3%, 3,6% and 1,0% respectively of total volume of cashless transactions, others countries below 1 per cent (ECB 2002).

### **Path dependence**

In network markets *history matters*: network market equilibria often cannot be understood without knowing the pattern of technology adoption in the earlier periods.<sup>39</sup> This means that the effects of decisions by early adopters on the decisions of later adopters are often significant in network markets. Because buyers want compatibility with the installed base, better products that arrive later may be unable to displace poorer, but earlier products and standards. In payment systems, path dependence can be seen in the development of national payment systems and, especially, in the slow change of national payment habits. In the EU, the division of giro- and cheque countries has prevailed even though the countries have had access to the same payment technology – at least in recent years. Environmental factors, like legislation and regulation, may have also contributed to this phenomenon. Consequently, the Commission has started efforts to harmonise the legislative environment in financial market in the member countries. However, path dependence may still play a role in the world where payment habits are slow to change.

### **Critical mass and chicken-and-egg problem**

*Critical mass or installed base* of network facilities plays a crucial role in the start up and growth of a network. The start up problem is often referred to as the ‘*chicken-and-egg*’ problem: many consumers are not interested in purchasing the good because the installed base is too small, and the installed base is too small because an insufficiently small number of consumers have purchased the good.<sup>40</sup> Consumers’ expectations of the future size of the network have thus an important role in the actual size the network achieves. According to Katz and Shapiro (1985), the growth of network can be self-fulfilling in nature. In the payment area, the slow adoption of e-money schemes serves again as a good example.

---

<sup>39</sup> See eg Liebowitz and Margolis (1995).

<sup>40</sup> This is also similar to the *Catch-22* dilemma discussed shortly in Chapter 2.



## Underproduction

Network effects may also lead to possible *underproduction* of network goods or services. According to McAndrews (1997a), the market production of network services may often be inefficiently low because using a network imposes an external effect on other users of network, an effect these other users typically disregard in making their own production decisions. For example, when deciding whether to join a service network (buying a fax machine is often used as an example), consumers do not take into account the benefit to other users of the resulting larger network. Accordingly, the equilibrium network size is smaller than the social optimum, when social benefits of joining a network exceed the private benefits. In the payment systems area, where economies of scale are claimed to be present at least in the electronic payments, a few authors (eg Gowrisankaran and Stavins, 2002) have argued that the underproduction is the most relevant problem and it should be corrected eg by actions of relevant authorities.

## 4.2 Standardisation issues

As in any communication industry, standardisation issues are of importance in the retail payment industry as well. In fact, standard setting is one of the most critical aspects of payment system design and operation. In essence, all payment systems must set certain standards for accepting and processing payment instructions. The BIS (2000) report defines technical standards, business standards and interoperability standards in the following way.

### 1) Technical standards

Technical standards establish common rules with respect to features of payment instruments or systems, for example rules with respect to message formats or communication protocols used in the exchange of payment information. For the development of payment systems, technical standards play an important role. The common agreement on technical standards for retail payments is important both at domestic and, especially, at the international level for smooth functioning of all type of payments (including cross-border payments).

## 2) Business standards

Business standards are agreements, often by means of legal contract, between providers of payment instruments and systems that stipulate the procedures, legal interpretation, and/or technical standards to be adopted as common guidelines or rules for the interbank transaction, clearing and settlement process.

## 3) Interoperability standards

Providers of payment services may choose to cooperate beyond the level of applying the same business standards. They may decide to allow the reciprocal use payment instruments by means of an agreement on interoperability. The degree of cooperation can vary from acting as a remote mailbox (sending all instruments and payments immediately to the issuing institution) to acting fully on behalf of the issuing institution (actually performing part of the processing of the payment).

In general, standards can have several positive effects on efficiency and competition. Agreements on the technical standards can lead to lower development and operational costs for processing payments. Standards can also facilitate compatibility that can enable consumers and providers to choose the best technology available, thereby favouring an optimal path of development of technology. According to the BIS (2000) report, full compatibility between different providers' standards may lead to a large installed base for that technology. However, setting standards is a complicated process and it can potentially bring along several problems as well. First, the premature adoption of a standard may cause a technology to become 'locked-in' because of the difficulty of switching to a new and more efficient technology. Second, it can lead to excessive delay in choosing a standard as alternative producers compete to become the market-leading standard. Third, agreements on standards, in some cases, can be used to limit competition in particular markets. Accordingly, it can be concluded that standardisation has both positive and negative effects on competition and efficiency, and these effects are likely to differ depending on whether static or dynamic efficiency is looked at. General effects of standardisation are discussed more thoroughly at the end of this subchapter.

According to McAndrews (1997a), standards can be set by (i) market place, (ii) industry forums for setting standards or (iii) government (regulator). Market players are likely to have the best knowledge in the field, and, therefore, standards set by them (cases (i) and (ii)) are likely to lead most efficient outcomes. Regulators may have the disadvantage of having less accurate information and,

therefore, be prone to choose inferior standards. The advantage of the regulator setting the standards is that the standards can be set relatively quickly, whereas market players may end up in a long bargaining process before being able to agree on the common standard.<sup>41</sup>

In practice, standard setting involves both the defining and implementing the standards. Definition of standards as such can be a lengthy process involving a lot of bargaining by different interest groups. After the definition of standards, their implementation can take time as well and sometimes their enforcement may even require measures by public authorities. If some sort of market failure or slow progress by market participants is detected, intervention by regulatory authorities is needed. However, because of market dynamics that are likely to lead rather extreme market structures especially in the network industries, it may well be difficult to judge whether the current problem is really a market failure or not.

Standards to the payment service industry are often formulated in some sort of standard setting bodies in which the service providers are represented. This has worked rather well at national levels, and now further efforts are also made at the international level. For example, in the European Union, the European Committee on Banking Standards (ECBS) has made progress in developing the standards for the International Bank Account Number (IBAN) and for the International Payment Instruction (IPI). However, it can be argued that, because the ECBS lacks any enforcement power, the adoption of these standards has been rather slow even though, at least the IBAN, could facilitate a lot the execution process of cross-border payments. In the EU, only after the regulatory intervention by the Commission (Regulation on the Cross-border Payments in Euro, RPE), the adoption process has gained a momentum. Accordingly, this provides some positive evidence on the effects of regulatory intervention by public authorities in facilitating the implementation of the common standards.

## **Standards and competition**

According to Besen and Farrell (1994), standardisation is a process where firms explicitly or implicitly agree to make their products compatible. Agreeing on a standard may eliminate competition between technologies, but it does not eliminate competition altogether. Instead, it channels it into different and more conventional dimensions, such as price, service and product features. A fundamental question for firms facing horizontal competition in a network market is whether inter-technology competition to become a standard (*competition for the market*) will be less or more profitable than the ordinary intra-technology

---

<sup>41</sup> McAndrews (1997a) uses the setting of the gauge width in U.S. railway system as a demonstrative example.

competition to be expected (*competition in the market*) if rivals' product are compatible. Moreover, Shapiro (2000) argues that standards shift the locus of competition: incompatible systems compete for the market, whereas compatible products compete in the market.

In retail payment systems, cooperative standard setting enhances compatibility through an industry-wide standard and thereby consumers will benefit from strengthened network effects. On the other hand, standardisation constrains product variety and possibly limits available paths for innovation intended to create future technology generations. Furthermore, with coordinated standard setting, there could also be an increased risk of cooperation being extended to the product market stage (Martin, 1996). In retail payment systems, this could lead to a collusive behaviour in the pricing of payment transactions.

Finally, it is worth pointing out that the standardisation in international retail payment industry is generally at rather a low level (card payments being an exception), compared with the mobile telephone industry for example. In the mobile telephone industry the SMS-standard is widely accepted whereas eg in retail credit transfers a commonly and widely accepted standard is still lacking although progress has been made recently – at least in the European Union. The reasons for the slow development are numerous. One is probably the age or maturity of the industry and, as a consequence, the previously described path-dependence argument. To put it very strongly, one can argue that the mobile phone industry started some decades ago from scratch whereas the payment service industry has long roots and national payment systems have been developed in their somewhat isolated and divergent domestic regulatory and legislative environments. In retail payments, national standards have been developed and adopted, and it has proved to be difficult to find uniform international standards that would be directly accepted by many countries. Moreover, in retail payment system field, investments already made in old systems may restrain participants' willingness to invest in new systems or upgrade old systems because of the large sunk costs. Finally, also the number and heterogeneity of service providers is much larger in retail payments than in telecommunication field which, in turn, is likely to make it more difficult reach an international consensus on the standards.

### 4.3 Role of joint ventures and shared networks

While competition among sellers of goods and services generally yields the most efficient outcome, markets with network externalities may benefit from

cooperation among providers of the underlying service or good.<sup>42</sup> Given the special characteristics of retail payments (see section 3.2), joint ventures and shared ownership are inherently important in payment networks. The reasons for this are obvious. Firstly, joint ventures make it easier to achieve the critical mass when the network is established. Secondly, joint ventures help in the utilisation of the potential economies of scale in production. For example, when new banks participate in the payment network, the participants can share the costs of network. Also the transaction volumes increase, allowing for better utilisation of economies of scale in production. All these arguments would support the existence of joint ventures and shared networks without any stronger regulatory intervention.

However, the case for retail payment systems is in practice more complicated than the simplified description above. As stated earlier, in payment systems, service providers have some inherent incentives to work together because this collaboration often results in efficiency for the payment system, but there is nothing to guarantee that such form of ownership will reduce the problem of monopoly pricing. For example, McAndrews and Rob (1996) have found that there is a positive correlation between the degree of monopoly in a given payment network and shared ownership. Accordingly, the potential danger of abusing market power is clearly present and complicates the decision-making of regulatory authorities substantially. When limiting cooperation in order to eliminate the potential abuse of market power, the regulator should also bear in mind that unexploited positive network externalities could also imply efficiency losses. This could happen for example, when the size of networks is limited by regulators to foster intersystem competition. Based on the above, one can conclude that a decision over allowing joint ventures depends on whether the regulator prefers intersystem competition or intrasystem competition.<sup>43</sup> When making the decision, the external environment is also of importance; does it hinder or favour competition and market contestability? This cannot be answered without taking all the external factors, including market structure and competition legislation among others, into account.

Other aspects related to the role of joint ventures and market efficiency are also of relevance. For example, according to Guibourg (1998), joint ownership can have a positive effect on technological development. She argues that, when strategic decisions on technological innovation must be made, consumers'

---

<sup>42</sup> In the industrial organisation literature, issues related to R&D joint ventures and market power have been rather extensively analysed. Some authors have stressed that research joint ventures can be used as an instrument by which firms leverage their market power in the product market (see eg Röller et al, 2000).

<sup>43</sup> For a general discussion on the issues related to the competition and microeconomic policy, see eg Stenbacka (2002).

expectations about the range of system are decisive. If companies must rely on unilateral decisions, it may take a long time before new technology is introduced. Furthermore, the old system already has an installed base, which is rarely compatible with the new technology. In principle, everyone would like to switch to superior technology, but wants a sufficient number of others to switch first. Joint ownership or joint development projects may have a positive effect on market expectations about the spread of new technology. Another important aspect in joint ventures is their governance and the decision-making procedures. For the adoption of new innovations, it has been argued that the joint ventures often 'move at pace of slowest'. It has also been stated that the decisions are commonly dictated by the largest shareholders to protect their interests. Finally, the antitrust issues may become more pronounced in joint ventures, and these will be analysed next.

#### 4.4 Antitrust issues in payment systems

Carlton and Frankel (1995) argue that joint ventures, particularly those involving networks that contain many industry participants, present some of the most interesting and difficult antitrust issues. Along with many beneficial effects for customers, payment networks may also be able to engage in collective actions that allow their members to exercise market power. Because networks often exhibit significant economies of scale, rival systems may not exist or may be unable to constrain the dominant system's pricing significantly. Moreover, economies of scale can make it hard for a relatively small network to compete and grow if the dominant network is significantly larger. In this set-up, the question is whether competition between networks is needed and an antitrust intervention against dominant network is grounded. According to Carlton and Frankel, antitrust intervention should take place only when the economic effects of intervention are well understood and there is clear evidence that benefits (efficiency improvements through increased competition) from intervention outweighs the harm (loss in the utilisation of economies of scale).

In general, the goal of antitrust legislation is to maximise the benefits society obtains from competition (or minimise the losses from the lack of competition). Payment systems networks that are formed as joint ventures by competing financial institutions, like other type of joint ventures, present difficult antitrust issues because competing firms must cooperate to provide the service. Some authors have stated that the way to resolve these difficult issues is to use antitrust intervention to ensure that multiple payment networks remain separate and compete with one another (competition for the market). However, Carlton and Frankel (1995) argue that this simple policy recommendation is inadequate.

Instead, a thorough analysis of the competitive effects of any proposed antitrust intervention in these networks must be done before such intervention in these can be justified on the grounds of increasing society's welfare. In essence, this clearly points out the difficulty in judging theoretically whether competition between systems (competition for the market) or competition in one system (competition in the market) is better for society's welfare on whole. As a consequence, before any antitrust intervention, the specific market environment should first be studied and taken into account.

In network industries, access and exclusion considerations have received a lot of attention because of the nature of industry. For example, Balto (1995, 1999) argues that exclusivity arrangements have been at issue in some of the most important joint venture and network antitrust decisions. He categorises the anticompetitive and procompetitive effects of joint network exclusivity as follows.

#### Anticompetitive effects of network exclusivity

1. Foreclosure of new entrants
2. Enhancement of the ability to exercise market power
3. Enhancement of opportunity for cartel activity
4. Deterrence of innovation

#### Procompetitive effects of network exclusivity

1. Promoting network competition
2. Encouraging promotional services by preventing free-riding
3. Reducing supply and demand uncertainty
4. Recovering network investments.

As stated already earlier, the most important task for the regulator is to define which of the above effects are stronger in the situation that is analysed. Even though originally not tailor-made for payment system issues, the above list can be used in determining the importance of network exclusivity in that field as well. However, the most difficult task is to evaluate each of sub-items in quantitative terms and then strike the overall balance.

Balto (1999) further discusses the procedure of how to apply antitrust analysis of network exclusivity. He puts down the procedure as follows:

- A. Careful scrutiny of market power: defining relevant markets
- B. Analysis of market power
- C. Realistic assessment of de facto exclusivity.

In principle, this methodology can be applied to assessment of exclusivity in payment systems where the definition of relevant markets plays a crucial role. This is especially important when thinking of cross-border payment market, like the euro area, where national borders should not play a role any more. Furthermore, as in any ‘network exclusivity assessment’, the quantitative analysis of market power, as well as assessment of de facto exclusivity, remains ultimately somewhat a subjective decision even though economic theory can provide some guidance in the assessment.

## 4.5 Regulatory tools in network industries

Regulatory tools in network industries rely on the regulation theory developed for the regulation of natural monopolies and oligopolies. In network industries, firms having economies of scale in production and facing consumption externalities, can obtain substantial market power in the absence of regulation. In essence, the aim of regulation is to provide ‘a fair framework’ (‘or a level playing field’ as commonly used in the context of payment system competition) under which both safety and efficiency are safeguarded, and innovation incentives to develop new products and services are not hindered.

According to Laffont and Tirole (1993), a theory of regulation should reflect the regulatory environment and it must be consistent with the firms’ and regulators’ information structures, constraints and feasible instruments. Mason and Valletti (2001), in turn, argue that the biggest concern calling for regulation of access charges in network industries is that an integrated incumbent may use its monopoly position in some segments to sustain or expand market power in other segments that are potentially subject to competition. This is a classic problem of the leverage that has attracted considerable attention in the literature on bundling. In fact, the analogy is close since an incumbent may make entry to a market unprofitable in different ways: eg by product design or virtual tying through pricing. Mason and Valletti (2001) discuss the basic regulatory tools applied in many network markets (especially in the telecommunication field). Based on that, the following broad categorisation can be made:

- (a) Price regulation based on
  - Long-run incremental costs
  - Cost-based rules
  - Efficient component pricing rule
  - Ramsey charges and global caps.



(b) Access and supply regulation based on

- Entry conditions
- Bundling of services.

Without going into the details of the above tools, some considerations relevant in payment systems are briefly discussed next. In the payment system area, the direct applicability of any of these basic tools is questionable, because reliable accounting data for costs and revenues concerning only payment transaction operations are often not directly available and they may be difficult to obtain. According to market practitioners, payment services are commonly treated as part of the general banking products that the service providers are offering to their customers. This can also be clearly seen in their pricing, where indirect pricing and cross-subsidisation are still commonly used (see section 3.2). Also the division of fixed costs over different activities is burdensome and normally requires some subjective decisions. Accordingly, it can be concluded that the direct application of these tools would be very difficult in payment system industry.

### **Network complements and pricing**

Mason and Valletti (2001) argue that in the past it was commonly believed that network industries exhibit strong economies of scale. For this reason, it was preferred to have a single supplier in order to avoid wasteful duplication of resources. In order to avoid excessive monopoly charges, the ‘natural’ monopolist was either owned directly by the state or heavily regulated. Mason and Valletti argue further that this view has been challenged in past few decades. Poor quality of services offered by incumbents and the asymmetries of information between the regulator and the regulated firm have offered additional arguments for liberalising the entire sector. One clear example can be found in the privatisation of railways that has taken place in many countries in recent years.

In recent years, the telecommunication industry has also received pronounced attention by regulatory authorities in many countries. Consequently, regulatory attention is now more often devoted to the design of an appropriate market structure and to monitoring particular behaviour of the incumbent. Also new regulatory methods have been introduced for regulating network industries. In many cases, *access pricing* has been adopted to regulate bottleneck-type industries. This has very often been done in the form *two-part tariffs*. In the telecommunication area, interconnection disputes have arisen in a context in which the access provider is the vertically integrated historic operator and the newcomer is operator concentrating on the mobile phone networks.

In principle, the fact that the bottleneck owner is allowed to compete against other firms means that there is a danger that the incumbent will set access charges which make entry difficult or even deny access on reasonable terms. This may suggest that the access price should be set low, in order to counteract the anti-competitive attitude of the incumbent. However, if the access price is set too low, inefficient entry may occur. In payment system field, the situation can even be more problematic. Too low access prices combined with completely open access to a payment system may adversely affect the security and stability of the system if the participants cannot fulfil their obligations in a timely fashion. Depending on the system design, this could lead to the contagion of systemic risk jeopardising the functioning of the whole market. Accordingly, it is crucial in any network industry that the whole competition situation with the potential repercussion effects are carefully analysed and all the external factors taken into account, before applying any regulatory intervention method.

### **Access prices and investments**

One of the most important issues in the economics of regulation is how to encourage firms to innovate and invest in infrastructure. According to Mason and Valletti (2001), there is a trade-off between optimal access regulation in static and dynamic framework. If static regulation reduces the use of monopoly power over the infrastructure, then it also reduces profits that can be earned by the investor/owner of the facility. Accordingly, access regulation based on simple cost-recovery rules can discourage investments and even lead to a underinvestment. Moreover, there exists also a free-riding problem if market participants know beforehand that the regulator grants access to everybody to any new system that has been developed. Mason and Valletti conclude that, when using economic terms, the nature of ex-post access regulation does have a clear impact on ex-ante incentives to invest.

In the presence of infrastructure competition, like eg in the payment service production, the regulator's problem is many-faceted. One is the desire to have a downstream level playing field while ensuring the incumbent can recover its upstream fixed costs or some social obligations. This clearly is relevant in payment systems where a desire or sometimes even a claim by market participants to have a level playing field is often debated. In this context, the access and entry considerations are the most crucial ones. Mason and Valletti (2001) discuss these in the context of communication networks but the main ideas are also applicable in payment networks. According to them, the regulator may want to promote particular entry modes, where the typical *dilemma is between (1) facility-based and (2) service-based competition*. The danger in the first case is that it may involve unnecessary duplication of infrastructure. This refers to (i)

*the competition for market* -situation where competition between different systems is emphasised. In the second case, where the entrant leases the incumbents' access facilities, the environment can become more intrusive. This, in turn, refers to the *(ii) the competition in the market* -situation. In the two situations, *(i)* and *(ii)*, there are also differences in the regulators' attitude towards the mode of competition. In the first case, the regulator can rely more on direct competition than on regulatory intervention whereas in the second case, more regulatory intervention is needed in order to provide fair access and a level playing field.

All the above issues are also of relevance in the payment system area because, as already emphasised in Section 3.2, there are multiple payment service providers and, clearly, a need for cooperation. Because payment service provision is cooperative and because of usage externalities, returns on investments depend on the level of investments made by other banks and businesses. Accordingly, it can be concluded that appropriate investment incentives do play an important role in facilitating payment systems competition, and payment systems regulators should take that into account when fostering market competition and contestability in the field.

## 5 Competition and regulation in European retail payment systems

### 5.1 The competition-cooperation nexus in retail payment systems

Economic theory does not give a clear-cut answer to the question of whether competition in services in a single network, or competition between several networks is best for dynamic efficiency. In practice, regulatory choices can be geared towards either services competition or infrastructure competition. As pointed out before, this refers to *competition in the market* and *competition for the market*. The basic question for the regulatory authorities is, which form of competition should be promoted. When taking a position on the question, the industry characteristics and external environment requirements need to be critically evaluated. In essence, the industry-specific issues are relevant when facilitating contestable markets.

As discussed in Chapter 3, certain characteristics of the payment systems indicate that competition rules of traditional industries cannot be directly applied to payment service industry. In payment systems, the main factor to be considered is that a certain degree of cooperation among operators in the provision of

payment services is highly desirable (if not even prerequisite), if the system is to function efficiently. By network cooperation or cooperation among payment service providers, it is possible to avoid overlapping investments and unnecessary and inefficient duplication of networks, as well as extend services to a larger population. While in many other markets it is evident that competition between service providers leads both to benefits for consumers and to increased efficiency for the market as a whole, in the provision of payment services the customers themselves may require providers of the service to reach certain degree of cooperation, because this normally provides more access and destination points in the system. Therefore, the competition-cooperation nexus is of special importance in retail payment systems where a certain degree of cooperation among service providers needs to exist (and, in principle, needs to be tolerated by the regulatory authorities) in order to achieve viable and efficient payment systems. In a broader context, the compatibility of competing systems, or at least the existence of common standards, also have a positive influence on market efficiency.

### **European competition law and cooperation**

According to Vesala (2000), European competition law allows banks to engage in cooperation in payment networks provided that the cooperation has no adverse impact on price competition. He summarises the basic elements of the competition policy guidelines as follows. Firstly, a clear distinction between interbank and bank-client relations; cooperation in the former is tolerated provided there is no adverse impact on competition in bank-customer relations. Secondly, the Commission has clearly stated that attempts to block entry to shared payment systems, and hence protect participants from outside competition, would be regarded as violations of the antitrust rules of the EU. Finally, EU competition provisions would be breached if the system were open in principle but entry conditions were discriminatory, ie if the levied entry charge and unit compensation for the services provided by the 'host network' exceeded the true economic cost of operating the network (including interest on initial investment, depreciation and goodwill). (Commission of the EC (1992), CEPS (1994)).

Based on the above, it can be concluded that, joint ventures in the payment systems area, should be more easily tolerated by authorities because of potential scale economies and increased cost-efficiency. However, at the same time, 'fair and open' access to systems by other potential participants is a prerequisite for that tolerance. The principal problem for the relevant authorities is related to the question of *how to define 'fair and open' access*. In this context, the natural first step is to define carefully the relevant markets where contestability is to be ensured. Furthermore, another question is *who are the relevant authorities: are these competition authorities as general competition regulators and/or central*

*banks as overseers of the payment systems?* In fact, this question is similar to the question related to the on-going discussion in the field of banking stability, which is extensively surveyed by Carletti and Hartmann (2002). They examine the relationship between competition policies and policies to preserve stability in the banking sector by surveying both theoretical and empirical literature. They also analyse the relative roles of competition and supervisory authorities by reviewing bank merger cases in the G-7 industrialised countries. As a general conclusion, the authors argue that a wide variety of approaches exists: some countries give a stronger role to prudential supervisors than to competition authorities while in other countries the situation is just the opposite.

In addition, Carletti and Hartmann (2002) also claim that cartel cases play a greater role in the application of competition policy to the banking sector, in particular regarding payment systems because these are characterised by natural monopoly features. According to them, abuses of dominant position seem to have remained of rather low importance in antitrust practice so far, despite the large number of bank mergers occurring in many countries during recent years. In general, it can be concluded that the roles of central banks and competition authorities are not yet fully defined in the payment systems field, even though the ultimate goal of both authorities is the same: increasing efficiency by ensuring a level playing field and contestable markets.

### **Innovation and competition policy**

Innovation incentives have often also been emphasised as an integral part of the competition and efficiency goal. The traditional IO-literature gives some insights into the relationship between innovation and competition policy. Martin (1996), among others, proposes that R&D cooperation can provide tacit collusion. According to him, the heart of the economic analysis of tacit collusion is that firms hold back from expanding output in the short run, even though it would be profitable to do so, because of the threat of future lost profit once rivals realise that some firm is cheating on output restriction. More specifically, if firms decide to form an R&D joint venture, it is because they expect it to be profitable. Martin (2001) argues further that it follows from this that the threat to break up an R&D joint venture could be part of a punishment strategy used to create incentives for firms to restrict output. Valletti and Cambini (2003) also reach a similar conclusion in their analysis of investment and network competition in their model of two-part pricing that is commonly used in telecommunication industry.<sup>44</sup>

---

<sup>44</sup> For a comprehensive discussion on competition policy issues in innovative industries, see eg Encoua and Hollander (2002).

In principle, the same line of reasoning could also be applied to the shared payment systems (joint ventures) where, the innovation efforts at least are concentrated. Generally speaking, in payment systems the relevant decision variable would be the price instead of the output. Accordingly, when applying IO-theory's prediction of market behaviour in the payment system area, tacit collusion could be a possible outcome. Therefore, it is possible that the cooperation at one level (upstream market, ie operation and development of shared systems for money transfers) can lead to collusive behaviour at the other level (downstream market of providing payment services). Whether the prediction proves to be correct, requires a comprehensive empirical assessment. However, it must be emphasised that this assessment is likely to be very difficult to be carried out, because in the payment systems market, indirect pricing (consumers buy packages of banking services, and do not necessarily pay for single money transfers) is very commonly used.

## 5.2 Potential roles of regulators in retail payment systems

The debate on the potential roles of regulators and authorities in facilitating the development in the payment system area has been going on for several years in the European Union. In the area of large-value payment systems, the case for the operational involvement of central banks has been grounded, among others, by the following arguments: safeguarding the transmission channel of monetary policy, limiting the systemic risk inherent in large value payment systems, and facilitating the integration of the financial markets in the Single Market. Generally speaking, it can be argued that much progress in the development of the geographically integrated systems in the large value payments has been achieved. Today, the publicly owned TARGET-system as well as the privately owned Euro 1 -system are offering safe and reliable large-value payment services on the EU-wide scale and are competing with each other in commercial payments.

In contrast to large-value payment systems, the progress in cross-border retail payment systems (card payment systems are a clear exception) has been slow, and the current retail payment infrastructure in the European Union is still very fragmented, based often on the 'traditional' national payment habits. As discussed in Chapter 2, the reasons for this situation are many-faceted. The payment service providers have argued that 'there is no business case' for investing in new cross-border retail payment systems, because there is insufficient demand for these services. The authorities and regulators, in turn, have stated that low demand for the cross-border services stems from their high prices and poor quality. In general, this situation is similar to the famous *chicken-and-egg problem* or *Catch-22 dilemma*. According to the present survey, this phenomenon can be explained by

network externalities (or networks effects) that are clearly present in retail payment markets. The *interdependence in demand* for the retail payment services by customers (as well as their future expectations on the sizes of payment networks) is likely to remain an obstacle until the new payment innovations achieve critical mass. According to the theory of network economics, this could happen either by the efforts of service providers (eg establishment of joint ventures and shared networks) or with authorities' help and actions.

In both cases, the authorities or regulators need to take certain actions. In the first, '*market-driven case*', the regulators need to tolerate the formation of the joint ventures and shared networks, but, at the same time, they need to ensure by different antitrust measures (access to systems, pricing etc) that a level playing field prevails and markets remain contestable. In the second, '*authority-driven case*', the spectrum of possible actions is wide. The authorities can foster the competitive environment and investment incentives in the field by tolerant regulatory measures (eg allow for competing 'payment clubs'). Moreover, the authorities can also 'act as a catalyst or facilitator' for development (eg participation by authorities in developing and enforcing payment standards). As a stronger measure, they can resort to a specific regulation (like the EU Regulation on the cross-border payments in euro that obliges the service providers to act in a certain way, or prohibition of the 'float' in payment transfers as in Norway). Finally, as the ultimate measure, the authorities can also become 'operationally active' by establishing their own systems to provide payment services. This could happen when the authorities judge that reliable and efficient payment systems are not provided by the market players. In this context, the *universal service obligation* principle as well as *public good character* of payment services are used as supportive arguments for the operational involvement. However, it should be emphasised that the operational involvement option has been under discussion among the relevant European authorities, but currently it is not seen as a necessary action. Instead, the following roles of public authorities have recently been put forward in the international fora:<sup>45</sup>

**(i) Fostering competitive environment and investment incentives**

Use of regulatory tools in providing a level playing field but also safeguarding innovation and investment incentives in payment systems.

**(ii) Developing and enforcing generic standards**

Catalyst / facilitator role of public authorities.

In general, it can be stated that the proposed roles of public authorities rely on more or less indirect ways to improve efficiency in the retail payment system

---

<sup>45</sup> See, for example, BIS (2002) and ECB (2001c).

field. The idea behind them is that the development process should be left to market participants that have the best practical knowledge of the field. Accordingly, the development process should be fostered without any strong regulatory or operational involvement by the authorities. The main task for the authorities is to provide a level playing field and an external (legislative) environment where innovation incentives to develop new and more efficient systems are guaranteed.

In some countries the authorities have, however, assumed a more active role. For example in Norway, changes to traditional charging conventions in the pricing of retail payment services have been promoted by authorities<sup>46</sup>. Instead of applying the principle of indirect pricing backed by cross-subsidies, direct (cost-based) pricing to guide customers towards using the most efficient payment methods has been strongly promoted. In general, this has been seen to foster the replacement of ‘old-fashioned’ paper-based payment instruments by more modern electronic payment methods.

All in all, it can be concluded that the promoter and facilitator role of public authorities is of great importance in facilitating efficiency in payment systems. In essence, the authorities should try to facilitate the development by providing the supportive external environment including up-to-date and non-discriminatory legislation. Other type of involvement, eg at the operational level, may only become warranted in such circumstances where a clear market failure is detected after a comprehensive market study.

### 5.3 Future developments in the European retail payment markets

The landscape of the European retail payment markets is today still fragmented even after the introduction of euro notes and coins as an ultimate manifestation of monetary integration process. In general, it can be argued that the EU still consists of 15 (and with the accession countries even more) heterogeneous payment areas instead of one single payment market. However, it must be understood that the development of Single Market in the retail payment system area cannot take place overnight, and that the development of systems is characterised by path-dependence and slow change of payment habits. In this context, it must also be recognised that many national payment systems are already functioning efficiently but what have been lacking are the well-functioning and efficient cross-border retail payment methods to contribute the financial integration process in the Europe.

---

<sup>46</sup> See Norges Bank (2002a) and (2002b).



In fact, it was exactly the above observation that finally triggered the European Commission and Parliament to adopt Regulation EC No. 2560/2001 on Cross-Border Payments in Euro (RPE) in December 2001. The RPE obliged banks to reduce charges for cross-border payments of up to EUR 12,500 (EUR 50,000 as of January 2006) to the level of those of corresponding domestic payments. The Regulation applies to card payments and ATM withdrawals as from 1 July 2002 and to cross-border credit transfers as from 1 July 2003. This policy intervention was strongly criticised by the payment service provider sector that argued for a market-driven solution. However, it should be noted that the RPE has already had some positive development effects in the retail payment systems field. It has even been argued that it was only after the usage of the regulatory power (RPE) that the payment service providers were forced act. Accordingly, in the aftermath of the RPE, the banking sector activated and formed a new cooperation body of their own, the European Payment Council (EPC).<sup>47</sup> In principle, the EPC should be able to address the potential difficulty of reaching consensus among wide and divergent participant group.

The EPC has signalled that the payment service providers are prepared to move forward the necessary harmonisation of payment systems and instruments, as much as possible through self-regulation. In their opinion, legislation and regulation should only be used where the harmonisation cannot be achieved by other means. As a concrete measure to facilitate the development and smooth adaptation of RPE, the European banking sector is advocating the establishment of a pan-European ACH as quickly as possible. In practice, the Euro Banking Association's STEP 2 -system should act as a PEACH (Pan-European Automated Clearing House) and provide a pan-European system for processing bulk payments. In the light of network theory, the crucial question for the viability of the systems is that it attracts sufficient number of payments processed through it (the critical mass requirement discussed in section 4.1) in order to facilitate cost-recovery. Accordingly, the volumes of pure European cross-border credit transfers may not be sufficient to ensure the critical number of payments and, therefore, also part of the national / domestic volumes of retail payments should be directed through it as well.

Another factor that will have an effect on the European retail payment landscape is the recent emergence of new payment initiatives. For example, card payment providers are expanding their traditional field of business and entering credit transfer markets currently dominated by the banks and their joint ventures as primary service providers. For example, Visa EU has launched its Visa Direct initiative that has been developed to enable payment service providers to comply

---

<sup>47</sup> For the general framework, see the publication of the EPC (2002): '*Euroland: Our Single Payment Area!*'; and for the details of their first status report, the internet site of the EPC: <http://www.europeanpaymentscouncil.org>.

with the RPE. Competition is also intensifying by alternative new, non-bank payment service providers, like PayPal that has recently introduced sterling and euro currency transfers as well as mobile payment operators, like Paybox and Vodafone. Also companies like Western Union and MoneyGram, which provide cross-border cash transfer services, have increased their activities. In general, it can be concluded that competition from other payment service providers, besides the traditional banks, is clearly increasing. This development is going to foster competition and innovation among service providers, and, thereby, also likely to facilitate improvements in efficiency in payment service industry.

In assessing the roles of public authorities as payment system regulators, the following competencies in the EU / euro area are worth stressing. The public authorities, like the European Commission and the ECB/ESCB, have their respective, and partly overlapping roles in facilitating the development and promoting efficiency in the retail payment systems field. The Commission is currently working on the harmonisation of the EU legal environment in payment systems and the ECB has continued to stress its role as a catalyst eg in defining and implementing new standards in the euro payment system field. Accordingly, it can be concluded that the authorities and regulators have recognised their role in facilitating the development towards the Single Payment Area. In fact, this reflects some key findings of the present study on the interaction between the competition-cooperation nexus and regulation where industry-specific network effects do play an important role and need to be taken into account by the regulatory authorities. In an ideal situation, market players would provide the most efficient solutions and regulatory authorities would be in charge of their oversight. Moreover, the authorities should ensure that the markets remain contestable but at the same time provide such a legislative and regulatory environment that does not form obstacles for efficiency-enhancing cooperation (eg development of common standards, business practices etc) among payment service providers.

## 6 Conclusions

As in any other network industry, the crucial question for regulators in retail payment systems is whether competition in services in a single network (*competition in the market*) or competition between several networks (*competition for the market*) is best for the efficiency. There is no universal answer to that question because the industry-specific and external factors play a decisive role in practical applications of regulatory policy. In payment systems, the main industry-specific factor to be considered is that a certain degree of cooperation among payment service providers is needed for the system(s) to function efficiently. The reason for this is that there are several parties involved in money transfers: sender, service provider, receiver, and their respective institutions. The essential requirement from the cost-efficiency point of view, is that all these, or their institutions, are connected to the same system or compatible systems. In a nutshell, *it is the compatibility that is the key requirement for the payment system efficiency by making payment system market contestable*. Accordingly, the regulatory authorities should concentrate their efforts on facilitating compatibility in the payment system market eg by developing and enforcing common standards. As a result, competition in the market would increase, and the need for resorting to the secondary regulation tools, like price regulation, would diminish.

An additional prerequisite for efficiency is that a viable payment system needs to achieve a *critical mass of users* so that the potential economies of scale in payment production can be realised. Therefore, it is no wonder, that the payment system industry is dominated by joint ventures and shared networks that facilitate the acquisition of installed base of users. In the same vein, also *the chicken-and-egg problem* has proved hard to overcome for many new payment initiatives as witnessed eg by the slow development of e-money schemes in many countries.

The network nature of payment systems has also strong implications on the competition and innovation in the area. On the one hand, cooperation among service providers is needed on establishing standards and infrastructures in order to have a large enough customer base for their services (*network effect*). On the other hand, agreement on compatibility or common standards potentially increases competition and may thus reduce service providers' incentives for the increased compatibility (*competition effect*). Accordingly, the key question for regulatory authorities is to find the correct measures that maximise social welfare in this type of environment.

One of the most essential future tasks for all the key parties involved in the development of retail payment systems is to strengthen the cooperation at all levels in order to avoid overlapping development efforts, and to focus on the most relevant issues. Recently, the following roles of public authorities have been advocated in the international fora: *i) Fostering competitive environment and*

*innovation incentives* (using regulatory tools in providing a level playing field but also safeguarding innovation and investment incentives in payment systems), *ii) Developing and enforcing generic standards* (catalyst and facilitator role of public authorities, resort to regulatory intervention only if seen appropriate eg in the enforcement of commonly agreed standards). In the presence of common standards, competition in the market (referring to the payments market in general) facilitates efficiency in the industry. The payment system regulators should recognise this and direct their regulatory interventions accordingly. In the European regulatory field, cooperation between the Commission and the ECB/ESCB is crucial to avoid a situation where extensive and overlapping regulation acts as an impediment to the development. Furthermore, the roles of competition authorities and other regulators, including central banks as overseers of the payment systems, in the quest for the payment systems efficiency are to a certain extent unclear both at the national and the European level. Therefore, further cooperation efforts are needed, and commonly agreed and applied payment standards at the global level would naturally be the most preferable outcome.

## References

- Angelini, P. – Curzio, C. (1994) **On the Economics of Interbank Payment Systems**. Banca D'Italia Discussion Paper no. 193.
- Balto, D. (1995) **Access Demands to Payment Systems Joint Ventures**. Harvard Journal of Law & Public Policy, vol. 18, no. 3.
- Balto, D. (1999) **Networks and Exclusivity: Antitrust Analysis to Promote Network Competition**. George Mason Law Review, vol. 7, 3523–3576.
- Balto, D. (2000) **The Problem of Interchange Fees: Costs without Benefits?** E.C.L.R., Issue 4.
- Baxter, W. (1983) **Bank Interchange of Transactional Paper: Legal and Economic Perspectives**. Journal of Law and Economics, 26, 541–588.
- Bech, M. – Soramäki, K. (2001) **Gridlock Resolution in Interbank Payment Systems**. Bank of Finland Discussion Paper 9/2001, Financial Markets Department, Bank of Finland.
- Berger, A. – Hancock, D. – Marquardt, J. (1995) **A Framework for Analysing Efficiency, Risks, Costs, and Innovations in the Payment System**. Journal of Money Credit and Banking, vol. 28, no. 4.
- Besen, M. – Farrell, J. (1994) **Choosing How to Compete: Strategies and Tactics in Standardisation**. The Journal of Economic Perspectives, vol. 8, Issue 2, 117–131.
- BIS (1990) **Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries**. (Lamfalussy Report). Prepared by the Group of Experts on Payment systems of the Central Banks of the Group of Ten Countries, Bank for International Settlement, Basel.
- BIS (1999) **Retail Payments in Selected Countries: a Comparative Study**. Report of the Working Group on Retail Payment Systems, Committee on Payment and Settlement Systems, Bank for International Settlement, Basel.

- BIS (2001) **Clearing and Settlement Arrangements for Retail Payments in Selected Countries.** Report of the Working Group on Retail Payment Systems, Committee on Payment and Settlement Systems, Bank for International Settlement, Basel.
- BIS (2002) **Policy Issues for Central Banks in Retail Payments.** Report of the Working Group on Retail Payment Systems, Committee on Payment and Settlement Systems, Bank for International Settlements, Basel.
- Bolt, W. (2003) **Retail Payments in the Netherlands: Some Facts and Some Theory.** Research Memorandum WO no. 722, Research Department, De Nederlandsche Bank.
- Borio, C. – Russo D. – van den Bergh, P. (1992) **Payment System Arrangements and Related Policy Issues: A Cross-country Comparison.** SUERF Papers on Monetary Policy and Financial Systems no. 13, Société Universitaire Européenne de Reserches Financières, Tilburg.
- Calomiris, C. – Kahn, C. (1996) **The Efficiency of Self-regulated Payment Systems: Learning from the Suffolk System.** Journal of Money, Credit and Banking, vol. 28, issue 4, 766–797.
- Carletti, E. – Hartmann, P. (2002) **Competition and Stability: What's special about Banking?** ECB Working papers no.146.
- Carlton, D. – Frankel, A. (1995) **Antitrust and Payment Technologies.** Federal Reserve Bank of St. Louis Review, 41–54.
- CEPS (1994) **European Payment Systems and EMU.** Working Party Report 11, Centre for European Policy Studies.
- Commission of the EC (1992) **Making Payments in the Internal Market.** Discussion Paper, COM 90 447 final, Commission of the European Community.
- de Grauwe, P. – Rinaldi, L. (2002) **A Model of the Card Payment System and the Interchange Fee.** CESIFO Working Paper no. 796, Category 6: Monetary Policy and International Finance.
- ECB (1999) **Improving Cross-border Retail Payments: the Eurosystem's View,** September 1999.

- ECB (2000) **Improving Cross-border Retail Payments: Progress Report**, September 2000.
- ECB (2001a) **Towards a Uniform Service Level for retail Payments in the Euro Area**. Monthly Bulletin, February 2001.
- ECB (2001b) **Payment and Securities Settlement Systems in the European Union (Bluebook)**.
- ECB (2001c) **Towards an Integrated Infrastructure for Credit Transfers in Euro**, November 2001.
- ECB (2002) **Payment and Securities Settlement Systems in the European Union: Statistical Addendum**.
- European Commission (2002) **A Possible Legal Framework for the Single Payment Area in the Internal Market**. Working Document, 2002. [http://europa.eu.int/comm/internal\\_market/en/finances/payment/area/index.htm](http://europa.eu.int/comm/internal_market/en/finances/payment/area/index.htm)
- Economides, N. (1993) **Network Economics with Application to Finance**. Financial Markets, Institutions & Instruments, vol. 2, no. 589–597.
- Economides, N. (1996a) **Network Externalities, Complementarities, and Invitations to Enter**. European Journal of Political Economy, vol. 12, 211–232.
- Economides, N. (1996b) **The Economics of Networks**. International Journal of Industrial Organisation, vol. 14, no. 6, 673–699.
- Economides, N. – Flyer, F. (1998) **Compatibility and Market Structure for Network Goods**. Discussion Paper EC-98-02, Stern School of Business, N.Y.U.
- Economides, N. – Salop, S. (1992) **Competition and Integration among Complements, and Network Market Structure**. The Journal of Industrial Economics, vol XL, no. 1.
- Economides, N. – White, L. (1994) **Networks and Compatibility: Implications for Antitrust**. European Economic Review, vol. 38, 651–662.

- Economides, N. – Lopomo, G. – Woroch, G. (1996) **Regulatory Pricing Policies to Neutralize Network Dominance**. *Industrial and Corporate Change*, vol. 5, no. 4, 1013–1028.
- Encoua, D. – Hollander, A. (2002) **Competition Policy and Innovation**. *Oxford Review of Economic Policy*, vol. 18, no. 1, 63–79.
- European Payments Council (2002) **Euroland: Our Single Payment Area!** White Paper, <http://www.europeanpaymentscouncil.org>.
- Farrell, J. – Saloner, G. (1986) **Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation**. *American Economic Review*, vol. 76, 940–955.
- Folkerts-Landau, D. (1997) **Wholesale Payments and Financial Discipline, Efficiency, and Liquidity**. IMF Working Paper WP/97/154, International Monetary Fund.
- Gandal, N. (2002) **Compatibility, Standardization, and Network Effects: Some Policy Implications**. *Oxford Review of Economic Policy*, vol. 18, no. 1, 80–91.
- Gangulny B. – Milne, A. (2002a) **Do We Need Public Policy Intervention in UK Retail Payment Systems and if so How?** Mimeo, Version 1.4, City University Business School, London.
- Gangulny B. – Milne, A. (2002b) **UK Retail Payments: Competition, Regulation, and Returns to Innovation**. Mimeo, version 1.1, City University Business School, London.
- Gowrisankaran, G. – Stavins, J. (2002) **Network Externalities and Technology Adoption: Lessons from Electronic Payments**. NBER Working Paper 8943, May 2002.
- Guibourg, G. (1998) **Efficiency in the Payment System – a Network Perspective**. *Quarterly Review* 3, Sveriges Riksbank, 5–24.
- Guibourg (2001) **Interoperability and Network Externalities in Electronic Payments**. Sveriges Riksbank Working Paper Series no. 126.
- Heller, J. (1961) **Catch-22**. Simon and Schuster, New York.



- H.M. Treasury (2000a) **Competition in UK Banking: a Report to the Chancellor of Exchequer** (Cruickshank Review)
- H.M. Treasury (2000b) **Competition in Payment Systems: A Consultation Document.**
- Holthausen, C. – Tirole, J.-C. (2002) **Efficient pricing of Large-value Interbank Payment Systems.** ECB Working Paper 184.
- Hopton, D. (1983) **Payment Systems: A Case for Consensus.** Bank for International Settlements, Basle.
- Humphrey, D. – Keppler, R. – Montes-Negret, F. (1997) **Cost Recovery and Pricing of Payment Services; Theory, Methods and Experience.** Mimeo, World Bank, Washington D.C.
- Humphrey, D. – Moshe, K. – Vale, B. (2001) **Realizing the Gains from Electronic Payments: Costs, Pricing and Payment Choice.** Journal of Money Credit and Banking, 33, 216–234.
- Jyrkönen, H. – Paunonen, H. (2003) **Card, Internet and Mobile Payments in Finland.** Bank of Finland Discussion Papers 8/2003, Financial Markets Department, Bank of Finland.
- Katz, M. – Shapiro, C. (1985) **Network Externalities, Competition and Compatibility.** American Economic Review, vol. 75 (3), 424–444.
- Katz, M. – Shapiro, C. (1994) **Systems Competition and Network Effects.** The Journal of Economic Perspectives, vol. 8, Issue 2, 93–115.
- Kauko, K. (2000) **Microeconomics of Innovation: Oligopoly Theoretic Analyses with Applications to Banking and Patenting.** Bank of Finland Studies E:18.
- Khiaonarong, T. (2003) **Payment Systems Efficiency, Policy Approaches, and the Role of Central Bank.** Bank of Finland Discussion Papers 1/2003.
- Koponen, R. – Soramäki, K. (1998) **Intraday Liquidity Needs in a Modern Payment System: A Simulation Approach.** Bank of Finland Studies E:14.

- Lacker, J. – Weinberg, J. (1998) **Can the Fed be a Payment System Innovator?** Federal Reserve Bank of Richmond, Economic Quarterly, vol. 84, no. 2, 1–25.
- Laffont, J.-J. – Tirole, J. (1993) **A Theory of Incentives in Procurement and Regulation.** The MIT Press, Cambridge Massachusetts.
- Leibbrandt, G. (2001) **The Dynamics of Payment Networks.** Paper presented at 23rd SUERF Colloquium, Brussels, 27 October 2001.
- Leinonen, H. (2000) **Re-engineering Payment Systems for the E-world.** Bank of Finland Discussion Papers 17/2000, Financial Markets Department, Bank of Finland.
- Leinonen, H. – Lumiala, V.-M. – Sarlin, R. (2002) **Settlement in Modern Network-based Payment Infrastructures – Description and Prototype of the E-settlement Model.** Bank of Finland Discussion Papers 23/2002, Financial Markets Department, Bank of Finland.
- Leinonen, H. – Soramäki, K. (1999) **Optimizing Liquidity Usage and Settlement Speed in Payment Systems.** Bank of Finland Discussion Paper 16/1999.
- Liebowitz, S. – Margolis, S. (1995) **Path Dependence, Lock-in and History.** Journal of Law, Economics and Organization, vol. 11, 205–226.
- Malaguti, M. (1996) **A New Approach to Interbanking Cooperation. The Application of EC Competition Rules to the Payments Market.** CEPS Research Report no. 18, Center for European Policy Studies.
- Mantel, B. – McHugh, T. (2001) **Competition and Innovation in the Consumer e-Payments Market?** Considering the Demand, Supply and Public Policy Issues, Emerging Payments Occasional Working Paper Series, (EPS-2001-4), Federal Reserve Bank of Chicago.
- Martin, S. (1996) **R&D Joint Ventures and Tacit Product Market Collusion.** European Journal of Political Economy, vol. 11, no. 4, 733–741.
- Martin, S. (2001) **Industrial Organization: A European Perspective.** Oxford University Press, Oxford, UK.

- Mason, R. – Valletti, T. (2001) **Competition in Communication Networks: Pricing and Regulation**. Oxford Review of Economic Policy, vol. 17, no. 3, 389–415.
- McAndrews, J. (1995) **Antitrust Issues in Payment Systems: Bottlenecks, Access, and Essential Facilities**. Federal Reserve Bank of Philadelphia, Business Review, 3–12.
- McAndrews, J. (1996a) **Pricing in Vertically Integrated Network Switches**. Federal Reserve Bank of Philadelphia, Working Paper No. 96-19.
- McAndrews, J. (1996b) **Retail Pricing of ATM Network Services**. Federal Reserve Bank of Philadelphia, Working Paper No. 96-12.
- McAndrews, J. (1997a) **Network Issues and Payment Systems**. Federal Reserve Bank of Philadelphia, Business Review, 15–25.
- McAndrews, J. (1997b) **Banking and Payment System Stability in an Electronic Money World**. Federal Bank of Philadelphia, Working Paper 97-9.
- McAndrews, J. (1998) **ATM Surcharges**. Federal Reserve Bank of New York, Current Issues in Economics and Finance, vol. 4, no. 4.
- McAndrews, J. – Rob, R. (1996) **Shared Ownership and Pricing in a Network Switch**. International Journal of Industrial Organisation, vol. 14, no. 6, 727–745.
- McAndrews, J. – Roberds, W. (1999) **Payment Intermediation and the Origins of Banking**. Staff Reports, Federal Reserve Bank of New York, no. 85.
- McAndrews, J. – Roberds, W. (2000) **The Economics of Check Float**. Federal Reserve Bank of Atlanta, Economic Review, vol. 85, no. 4, 17–27.
- McAndrews, J. – Roberds, W. – Kahn, C. (1999) **Settlement Risk Under Gross and Net Settlement**. Staff Reports, Federal Reserve Bank of New York, no. 86.
- McAndrews, J. – Hannan, T. – Kiser, E. – Prager, R. (2001) **To Surcharge or Not to Surcharge: An Empirical Investigation of ATM Pricing**. Federal Reserve Bank of New York.

- Norges Bank (2002a) **Payment services have become more efficient.** Press release, 6 November 2002.
- Norges Bank (2002b) **Banks' Costs and Income in the Payment System in 2002.** By Gresvik, O. – Øwre, G., Economic Bulletin Q4.
- Official Journal of the European Communities (2001) **Regulation (EC) No 2560/2001 of the European Parliament and of the Council of 19 December 2001 on Cross-border Payments in Euro.** L 344/13, 28.12.2001.
- Osterberg, W. – Thomson, J. (1998) **Network Externalities: The Catch-22 of Retail Payment Innovations.** Economic Commentary, Federal Reserve Bank of Cleveland.
- Reserve Bank of Australia (2000) **Debit and Credit Card Schemes in Australia.** A Study of Interchange Fees and Access.
- Rivlin Committee (1998) **The Federal Reserve in the Payment Mechanism.** Committee on the Federal Reserve in the Payments Mechanism, Federal Reserve System.
- Rochet, J.-C. – Tirole, J. (2000) **Competition among Competitors: the Economics of Payment Card Associations.** Mimeo, University of Toulouse.
- Röller, L.-H. – Siebert, R. – Tombak, M. (2000) **Strategic Choice of Partners: Research Joint Ventures and Market Power.** CEPR Discussion Paper no. 2617.
- Saloner, G. – Shephard, A. (1995) **Adoption of Technologies with Network Effects: an Empirical Examination of the Adoption of Automated Teller Machines.** Rand Journal of Economics, vol. 26, no. 3.
- Shapiro, C. (2000) **Competition Policy in the Information Economy.** In E. Hope ed. Competition Policy Analysis, Routledge Studies in the Modern World Economy.
- Schmalensee, R. (2001) **Payment Systems and Interchange Fees.** NBER Working Paper 8256, National Bureau of Economic Research.
- Schoenmaker, D. (1993) **Externalities in Payment Systems: Issues for Europe.** Financial Markets Group. London School of Economics, London.

- Scheoenmaker, D. (1995) **A Comparison of Alternative Interbank Settlement Systems.** LSE Financial Markets Group Discussion paper no. 204, ESRC Research Centre, London.
- Shy, O. (2001) **The Economics of Network Industries.** Cambridge University Press, UK.
- Shy, O. – Tarkka, J. (2001) **Stock Exchange Alliances, Access Fees and Competition.** Bank of Finland Discussion Papers 22/2001.
- Stenbacka, R. (2002) **Microeconomic Policy in the New Economy.** Finnish Economic Papers, vol 15, no. 2, 59–75.
- Tarkka, J. (1995) **Approaches to Deposit Pricing: a Study in the Determination of Deposits Interest and Bank Service Charges.** Bank of Finland Studies E:2.
- Valletti, T. – Cambini, C. (2003) **Investments and Network Competition.** Mimeo.
- Vesala, J. (2000) **Technological Transformation and Retail Banking Competition: Implications and Measurement.** Bank of Finland Studies E:20.
- Wallis Report (1997) **Final Report: Financial Systems Inquiry.** AGPS.
- Weinberg, J. (2002) **Pricing of Interbank Payment services.** Federal Reserve Bank of Richmond, Economic Quarterly, vol. 88, no. 1, 51–66.
- Wellink Report (2002) **Tariff Structure and Infrastructures in Dutch Retail Payments.** De Nederlandsche Bank's Quarterly Bulletin, 37–43.
- Wright, J. (2000) **An Economic Analysis of a Card Payment Network.** Mimeo, University of Auckland.
- Wright, J. (2001a) **Efficient Card Payment Systems.** Mimeo, University of Auckland.
- Wright, J. (2001b) **Determinants of Optimal Interchange Fees in Payment Systems.** Mimeo, University of Auckland.

## Internet sites

[www.abe.org](http://www.abe.org)

The Euro Banking Association

[www.bis.org](http://www.bis.org)

The Bank for International Settlements, including CPSS (the Committee on Payment and Settlement Systems) publications and links to central banks.

[www.bof.fi](http://www.bof.fi)

Bank of Finland

[www.ceps.be](http://www.ceps.be)

The Centre for European Policy Studies

[www.ecb.int](http://www.ecb.int)

European Central Bank

[www.ecbs.org](http://www.ecbs.org)

The European Committee for Banking Standards

[www.europa.eu.int](http://www.europa.eu.int)

The server of the European Union

[www.europeanpaymentscouncil.org](http://www.europeanpaymentscouncil.org)

European Payments Council

[www.stern.nyu.edu/networks](http://www.stern.nyu.edu/networks)

Prof. Nicholas Economides' homepage including links to research papers on the economics of network

[www.finextra.com](http://www.finextra.com)

Information website for a variety of financial markets issues including payment systems

[www.visaeu.com](http://www.visaeu.com)

Visa EU

# Glossary

## **ACH**

Automated Clearing House. An electronic clearing system where payments are exchanged among financial institutions, primarily via magnetic media or telecommunication networks, and handled by data-processing centre.

## **ATM**

Automated Teller Machine

## **EBA**

Euro Banking Association

## **ECBS**

European Committee on Banking Standards, established in 1992 by Europe's three credit sector associations to enhance European technical banking infrastructure by developing standards when clear business and commercial interest has been identified. ECBS has developed eg IBAN and IPI standards.

## **EFTPOS**

Electronic Fund Transfer at Point Of Sale

## **EPC**

European Payments Council. A cooperation body established by the European banks and banking associations in June 2002 to represent the industry and facilitate the development of the Single Euro Payment Area.

## **Euro 1**

Large-value payment system operated by the Euro Banking Association.

## **IBAN**

International Bank Account Number

## **IPI**

International Payment Instruction

## **PEACH**

Pan-European Automated Clearing House

**RPE**

European Parliament and the Council adopted Regulation (EC) No. 2560/2001 on Cross-border Payments in Euro in December 2001. The RPE obliges banks to reduce charges for cross-border payments of up to EUR 12,500 (EUR 50,000 as of January 2006) to the level of those of corresponding domestic payments. The RPE applies to card payments and ATM withdrawals as from 1 July 2002 and to cross-border credit transfers as from 1 July 2003.

**RTGS**

Real-time gross settlement system. A gross settlement system where processing and settlement takes place in real time (continuously).

**SEPA**

Single Euro Payment Area, an initiative by the European Payments Council.

**STEP 1**

Retail payment system operated by the Euro Banking Association

**STEP 2**

Retail payment system for bulk payments by the Euro Banking Association, planned to start operation in Q3 /2003. Step 2 -system is also proposed to operate as PEACH.

**TARGET**

Trans-European Automated Real-time Gross settlement Express Transfer system, A payment system for euro payments; it consist of 15 EU central banks' RTGS-systems and the Payment Mechanism of the European Central Bank.



## BANK OF FINLAND DISCUSSION PAPERS

ISSN 0785-3572, print; ISSN 1456-6184, online

- 1/2003 Tanai Khiaonarong **Payment systems efficiency, policy approaches, and the role of the central bank.** 2003. 69 p. ISBN 952-462-025-1, print; ISBN 952-462-026-X, online. (TU)
- 2/2003 Iftekhar Hasan – Heiko Schmiedel **Do networks in the stock exchange industry pay off? European evidence.** 2003. 44 p. ISBN 952-462-027-8, print; ISBN 952-462-028-6, online. (TU)
- 3/2003 Johanna Lukkarila **Aasian, Venäjän ja Turkin rahoituskriisien vertailua.** 2003. 57 p. ISBN 952-462-029-4, print; ISBN 952-462-030-8, online. (KT)
- 4/2003 Samu Peura – Esa Jokivuolle **Simulation-based stress testing of banks' regulatory capital adequacy.** 2003. 41 p. ISBN 952-462-035-9, print; ISBN 952-462-036-7, online. (RM)
- 5/2003 Peik Granlund **Economic evaluation of bank exit regimes in US, EU and Japanese financial centres.** 2003. 60 p. ISBN 952-462-037-5, print; ISBN 952-462-038-3, online. (TU)
- 6/2003 Tuomas Takalo – Otto Toivanen **Equilibrium in financial markets with adverse selection.** 2003. 45 p. ISBN 952-462-039-1, print; ISBN 952-462-040-5, online. (TU)
- 7/2003 Harry Leinonen **Restructuring securities systems processing – a blue print proposal for real-time/t+0 processing.** 2003. 90 p. ISBN 952-462-041-3, print; ISBN 952-462-042-1, online. (TU)
- 8/2003 Hanna Jyrkönen – Heli Paunonen **Card, Internet and mobile payments in Finland.** 2003. 45 p. ISBN 952-462-043-X, print; ISBN 952-462-044-8, online. (RM)
- 9/2003 Lauri Kajanoja **Money as an indicator variable for monetary policy when money demand is forward looking.** 2003. 35 p. ISBN 952-462-047-2, print; ISBN 952-462-048-0, online. (TU)
- 10/2003 George W. Evans – Seppo Honkapohja **Friedman's money supply rule vs optimal interest rate policy.** 2003. 22 p. ISBN 952-462-049-9, print; ISBN 952-462-050-2, online. (TU)

- 11/2003 Anssi Rantala **Labour market flexibility and policy coordination in a monetary union.** 2003. 48 p. ISBN 952-462-055-3, print; ISBN 952-462-056-1, online. (TU)
- 12/2003 Alfred V. Guender **Optimal discretionary monetary policy in the open economy: Choosing between CPI and domestic inflation as target variables.** 2003. 54 p. ISBN 952-462-057-X, print; ISBN 952-462-058-8, online. (TU)
- 13/2003 Jukka Vauhkonen **Banks' equity stakes in borrowing firms: A corporate finance approach.** 2003. 34 p. ISBN 952-462-059-6, print; ISBN 952-462-060-X, online. (TU)
- 14/2003 Jukka Vauhkonen **Financial contracts and contingent control rights.** 2003. 33 p. ISBN 952-462-061-8, print; ISBN 952-462-062-6, online. (TU)
- 15/2003 Hanna Putkuri **Cross-country asymmetries in euro area monetary transmission: the role of national financial systems.** 114 p. ISBN 952-462-063-4, print; ISBN 952-462-064-2, online. (RM)