Banco de Portugal
EUROSISTEMA

Retail Payment Instruments in Portugal: Costs and Benefits

Study | July 2007

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ACRONYMS AND ABBREVIATIONS

ABC	Activity Based Costing
ACH	Automated Clearing House
APB*	Portuguese Banking Association
ATM	Automated Teller Machine
ECB	European Central Bank
BIS	Bank for International Settlements
CA*	Automatic Machine (ATM)
CAE*	Portuguese Classification for Economic Activities
CISP*	Interbank Payment Systems Committee
EBA	Euro Banking Association
EBT	Electronic Benefit Transfer
EFTPOS	Electronic Funds Transfer at Point of Sale (see POS)
ESCB	The European System of Central Banks
NIB*	Bank Identification Number
OECD	Organisation for Economic Co-operation and Development
PE-ACH	Pan-European Automated Clearing House
PIN	Personal Identification Number
POS	Point of Sale Terminal
SDD*	Direct Debit System
SEPA	Single Euro Payments Area
SICOI*	Interbank Clearing System
SIBS*	Interbank Service Company
SLOD*	Settlement System for Other Depositors
SPGT*	Payment System for Large Transactions
STEP2	EBA System for Retail Operations Processing
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TARGET	Trans-European Automated Real-Time Gross Settlement Express Transfer
TEI*	Interbank Electronic Transfer
TSC*	Retailers' Service Rate

* Portuguese acronyms used in the text

PRESENTATION BY THE GOVERNOR

1. This study, entitled “Retail Payment Instruments in Portugal: Costs and Benefits” is the first to provide essential information for an understanding of the costs and benefits of the Portuguese retail payment system.[1]

The work carried out was organised at two levels, a steering committee and a technical working group. Both included representatives of the *Banco de Portugal* and the main institutions participating in payment systems in the country. Each one selected a representative with executive and co-ordination responsiblities for the steering committee and one or more experts for the technical working group. A separate group of experts was put together at the *Banco de Portugal* to ensure continuity in the work and close coordination between participants. In addition, the study benefited from the input provided by the statistics capabilities of the *Banco de Portugal*, along with the collaboration of companies in the retail sector, which supplied the basic information needed to analyse both the use of payment instruments in large retail outlets and the costs involved.

The Portuguese retail payment system is widely recognised as a highly developed system, in terms of technology, accessibility, time-saving features and nationwide coverage. Its high level of integration, which may not be fully appreciated when just one instrument is put under the microscope, has allowed for a system that is both highly diverse and universal. The system processes millions of operations on a daily basis, both counter-based at thousands of bank branches and electronically through the ATM/POS system. Its overall quality can be recognised by what is in relative terms a very small number of complaints.

It is also a system that has returned to its users a substantial part of the productivity gains generated from on-going technological and organisational developments. This impacts both directly, through the supply of a service that is ever wider, of better quality and at a better price, and indirectly, through increasing efficiency in the banking system as a whole. Its most visible component, and the best illustration of the above, is the Multibanco system. Since 1985, the Portuguese have had at their disposal an ATM system at the cutting edge. New features are being constantly added, the country is better covered all the time and this has at no time involved costs for the consumers. The Multibanco system was developed as a single system for the whole of the banks. Without this, there would not have been the network economies, the economies of scale and the safety inherent in a single system, all of which have provided so many benefits over so many years to all those who use banking services. The Portuguese economy is small and so is each of its banks in European terms, but the economies of scale and scope have been impressive.

This study comes at a crucial moment in time. The Portuguese payment system is girding up to face two of its biggest structural challenges of recent times, both stemming from changes at European Union level. The first relates to transition to TARGET 2. This is the new European Union payment system for large-value, gross, real-time transactions, due to be up and running at the end of 2007 and with Portugal

[1] The study covers only retail payment operations, defined as transactions below 100 thousand euros, carried out by individuals or companies. They do not have to be settled in real time or gross. In fact they go through the interbank clearing process. The transactions use one of six instruments: cash, cheques, credit cards, debit cards, credit transfers and direct debit.

splicing in at the start of 2008.[2] The second stems from transition to SEPA (Single Euro Payments Area), which has been built to harmonise three electronic retail payment systems in Europe (transfers, direct debits and payment cards). These are still very different in many countries and the aim is to have a real single payments area for the euro by 2010.[3]

These are sweeping changes, but the technological advances and the preparation made in Portugal in payments systems should allow customers of Portuguese banks to step into SEPA with relatively little trouble. The systems operating in Portugal have already supplied the advantages domestically which are now being sought across the euro area.

2. This study is a rigorous analysis of the retail payments system seen as a whole. There are four aspects to the work that are worth highlighting: the technical quality that stems from the methodology, the comprehensive scope of its analysis of all the payment instruments concerned, the twin pillars of the cost/benefit analysis and its intrinsic interest as a starting point for further studies.

(a) Technical quality

The methodology is based on two fundamentals, giving it a solid foundation often missing in previous works: the way the conceptual model was conceived and designed and the care taken over obtaining primary data.

The conceptual model is based on ABC (Activity Based Costing) analysis. Apart from the technical framework normal in this kind of study, care was taken to make the adjustments needed in the data as they related to Portugal. This involved, among other things, the primary data to be compiled and meant sharing the analytical framework with all those taking part. This was only possible with a high degree of interaction at two levels: (i) multilateral, between all those taking part, in the analysis of the concepts and the resulting statistics; and (ii) bilateral, between the representatives of the participating institutions and the *Banco de Portugal*, where the essential points were to ensure the confidentiality of the primary data and the quality of the statistics produced.

In terms of the primary data, the care taken over obtaining the information always reflected certain concerns: firstly, not merely to absorb passively the data supplied by the participating institutions; secondly, to understand the differences between participants in terms of the same variables; and thirdly, to bring these differences into a framework which reflected the reality of each institution rather than interpretations stemming from different ways of collecting and collating the data.

(b) The comprehensive scope of the study

The study looks at payment instruments as a whole in terms of costs and benefits, not just individual components. In other words, it does not have the weakness inherent in a study that is based on analyses of partial equilibrium (simple or even dual). This happens when one instrument is analysed in isolation or even partially, separated from other aspects of its use. A dual, though partial analysis

[2] There are fundamental differences between TARGET and TARGET2, implying a swathe of changes in the Portuguese payments systems, both large-value and retail. The existing structure is decentralised. It operates through national platforms interconnected through the Interlinking system, which in Portugal has a communications standard different from SWIFT. TARGET 2 will be centralised, with a single shared platform across all country participants and will use SWIFT communications.

[3] The transition to SEPA will imply three major changes involving electronic transfers, direct debits and cards: (a) the disappearance of any distinction between domestic and cross-border transactions; (b) the possibility of any economic agent making payments to and from any point in the euro area in the same simple and secure way as now domestically; and (c) the development of a SEPA-compliant retail payment infrastructure.

results, for example, from a study of credit and debit cards isolated from other instruments and from their use in ATMs, being seen just from the angle of their use in POS terminals.

(c) Costs and benefits: a twin perspective

The study looks not just at costs but also at the benefits of the various retail payment instruments. This makes it more ambitious than other published studies, many of which tend to focus on just one side of the picture, either costs or benefits.

(d) Future studies: a solid starting point

The study only covers one year (2005). It was, however, carried out with great care taken over the conceptual model, over the way that the primary data were obtained and over the preparation of the results for the year in question. This meant that there was an annual data base, put together with great concern for coherence. In addition, very useful knowledge for other similar studies was accumulated. With continuity, it will be possible to have a coherent data base within a few years, covering a longer period, not necessarily sequential. The result would be unmatched in any other country.

3. Besides its intrinsic merits, the study brings together an array of important facts in the Portuguese retail payment system.

In the first place, it shows that retail payments in Portugal in 2005 had estimated costs totalling 1,139 million euros and revenues totalling 722 million. These figures represent around 0.77% of GDP in terms of costs, 0.49% of GDP in terms of revenues and a 63% cost–revenue recovery rate. In other words, revenues cover a little below two-thirds of the costs. This difference, of course, has to be covered by revenues from other banking operations.

Four of the six payment instruments analysed show upside net unit costs per transaction, i.e. costs are always higher than revenues each time a transaction is made. These are cash (1.77 euros), cheques (0.88 euros), credit transfers (0.02 euros) and debit cards (0.04 euros). The difference between costs and revenues in credit transfers and debit cards is marginal, but significant for cash and cheques. Cost-revenue coverage rates are around 4% for cash, 39% for cheques and 63% for payment instruments overall. Credit cards (including acquiring) and direct debits are the only payment instruments where the revenues generated cover the costs.

For the banking industry, therefore, the Portuguese payment system is a cost centre even if there are differences between the net unit costs of the various payment instruments. This means that part of the costs involved in the use of payment instruments are paid by bank customers as a whole and not necessarily by the customers who use these specific instruments.

The difference mentioned above becomes even more significant when considering the relative proportion of the instruments in terms of cost. The two instruments with the highest unit cost per transaction (cash and cheques) represent together almost 46% of the total costs of the system (with cash standing at 17.2% and cheques at 28.7%). Credit cards and debit cards represent almost 51% together (23.4% for credit cards and 27.1% for debit cards). Direct debits and credit transfers represent together a mere 3.5% (1.2% for the first and 2.3% for the second).

As things stand, the study shows that cash is a simpler means of payment for amounts under 8 euros, while for higher amounts, the use of debit cards leads to gains through reduction of the total costs of

payment instruments. The present situation regarding small purchases would seem to indicate good practice: expenditure on such things as newspapers, coffee, bread and milk are under 8 euros and correspond to 75% of payments at point of sale, with around 96% of such transactions being carried out with cash. But where expenditure is over 8 euros, cash accounts for around 65% of payments, a rather less rational use of the available instruments.

This study has attempted to measure the costs and benefits related to payment instruments in Portugal in 2005. All the facts collated here have given us for the first time the essential groundwork for analysing the payment system in an integrated and quantified way.

Publication comes as we are witnessing major structural changes deriving from transition to TARGET 2 and SEPA and the new directive on payment services. The moment could not be more opportune.

Lisbon, 31 July 2007

Vitor Constâncio

EXECUTIVE SUMMARY

The purpose of this study is to assess for the first time the costs and benefits of the Portuguese payment systems.

The work was organised at two levels: a steering committee and a technical working group. Both were made up of representatives of the *Banco de Portugal*, the other institutions that are members of CISP (the Portuguese interbank payment systems committee) – the Portuguese Banking Association, five banks (BES, Banco BPI, Banco Santander Totta, BCP and CGD) and Unicre. Each participating institution appointed a representative with executive and co-ordination responsiblities for the steering committee and one or more experts for the technical working group. A separate group of experts was put together at the *Banco de Portugal* to ensure continuity in the work and close coordination between participants. The project teams are detailed in Annex 1.

The work of the technical group focused on the calculation of costs and revenues relating to making payment instruments available. During meetings of this group, the representatives of the banks and other institutions provided significant contributions for the conceptual framework underlying the first phase, and for the collection of detailed quantitative information at the second phase. The steering committee set out the guidelines for the technical working group and validated the findings.

This study is organised in three parts:

Part I comprises: (i) a brief presentation of the institutional model for payment systems in Portugal, with the main milestones from the recent past; (ii) a description of the main payment system infrastructures; (iii) a brief outline of the quantitative development of payment instruments; and (iv) a comparative analysis looking at some important indicators in specific Member States of the European Union.

Part II comprises: (i) a summary of the main findings of similar studies carried out by other central banks; (ii) the methodology used for calculating costs and revenues; (iii) calculation of total costs, by nature and by unit; (iv) calculation of total revenues, by nature and by unit; (v) quality control of information supplied by the participants; and (vi) views regarding future studies.

Part III comprises: (i) the main findings from studies on the costs and benefits of payment instruments; (ii) the main findings of surveys covering consumers, small and large retail outlets, relating to which payment instruments are used at points of sale and to what extent users know about the costs of these instruments; and (iii) estimates of real and potential gains deriving from electronic payment instruments replacing paper-based instruments.

Main conclusions

1. The introduction of new payment services in the wake of technological progress in information and communications has increased choice for consumers and retailers where payments for goods and services are concerned. Electronic payment instruments provide benefits in terms of security, ease of use, convenience and time avoided in travelling, waiting and processing. Increased use therefore provides significant gains for the community in terms of welfare. This is evident in the reduction in time and cost involved in consumers using payment services. Banks also gain in their use of resources, and society gains, among other things, in terms of the legal costs involved in incorrect use of cheques.

2. The spread of electronic payment instruments in Portugal is clear evidence of the progress achieved in modernising payments systems. In 2005, transactions with payment cards accounted for 62% of the total of non-cash transactions (Table I.9), compared with 51% in 2000. The rapid growth of electronic payments and the use of the ATM and POS terminals rather than cheques are clearly visible in Table I.11, Box 2, at the end of Chapter 3. During the period 1996-2005, the number of ATMs grew at an annual rate of 11.1% and POS terminals by 13.9%. In 2005, the number of ATMs per million inhabitants was 1,310, the highest in the European Union, where the average in the euro area is 810 machines per million inhabitants. In terms of POS terminals, Portugal (with 15.2 per thousand inhabitants) is close to the euro area average (16).

3. Information and Communications Technologies (ICT) are also related to the organisational overhaul of the banks and the introduction of new distribution channels for services. Banks have invested in modernising payments systems, above all through ICT and human resources. This has led to gains as paper-based services have been replaced by electronic. There are as yet no conclusive findings from studies on the impact of ICT on the efficiency of the banking sector and the costs of payment services, but raw data suggest that electronic payment instruments are more efficient than traditional.

4. For the banking system as a whole, total costs[4] for operations related to payment systems are estimated at 1,138.7 million euros in 2005[5], representing 0.77% of GDP for that year[6] and 16% of total cost in the banking sector. Revenues generated by payment instruments stand at 722 million euros (0.49% of GDP), giving a 63.4% cost coverage rate[7] (Table II.21). The situation therefore, is one of cross-subsidisation against other banking products.

5. Related staff costs stand at 482.2 million euros[4], representing 18.7% of total staff costs and 42.3% of the costs of making these payment instruments available.

6. Costs for specialist and third-party services are the second biggest cost item, coming in at 283.5 million euros[4], representing 24.9% of costs for payment systems and 25.1% of total costs borne by the banking system in this cost item.

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[4] See Tables II.13 and II.14.

[5] This cost would be 1,168.5 million euros, i.e. 0.79% of GDP, including the payment system costs borne by the *Banco de Portugal* but excluding the costs to the Ministry of Finance for issuing coins.

[6] Compared with the 0.38% of GDP in Norway, even bearing in mind the note on methodology in Chapter 5.1. It should be noted that there are practically no more cheques in Norway, whereas they represent 0.22% of GDP in Portugal.

[7] This figure is 70% in Norway (Gresvik and Owre, 2003) and 69% in Sweden (Guibourg and Segendorf, 2004).

7. Costs on rentals and depreciations were estimated at 129.2 million euros[4] (11.3% of total costs in payments systems and 23.6% of total costs for rentals and depreciations).

8. Costs on commissions come in at 44.6 million euros[4] (3.9% of total costs of payment systems and 37.9% of total costs on commissions).

9. Total costs per instrument (Table II.15) break down as follows: (i) 17.2% for cash; (ii) 28.7% for cheques; (iii) 50.5% for payment cards and acquiring (23.4% for credit cards and 27.1% for debit cards); (iv) 2.3% for credit transfers; and (v) 1.2% for direct debits.

10. Unit costs (Table II.16) are as follows: (i) 1.85 euros for cash deposit or withdrawal over the counter; (ii) 1.45 euros per cheque drawn or deposited; (iii) 2.44 euros per credit card transaction and 0.23 euros per debit card[8]; (iv) 0.28 euros per credit transfer; and (v) 0.09 euros per direct debit instruction.

11. These results tally to a certain degree with findings from studies in Norway and Sweden, though there are differences in the periods reviewed and the methods used (Table I.1).

Table I. 1

UNIT COSTS (EUROS)

	Portugal[(a)]	Norway[(b)]	Sweden[(c)]
Cash deposit or withdrawals			
At branch counter	1.85	1.88	1.21
From ATMs	0.35	1.07	0.51
Cheques presented	1.45	2.82	2.18
Credit transfers			
At branch counter	0.74	1.63	0.73
Internet	0.07	1.00	0.13

Sources: Norway (Gresvick and Owre, 2002) and Sweden (Guibourg and Segendorf, 2004).
Notes: [(a)] data relating to 2005; [(b)] data relating to 2001; [(c)] data relating to 2002.

12. The contribution to total revenue per instrument (Table II.19) can be broken down as follows: (i) 74.5% from payment cards and acquiring, with 39.7% from credit cards and 34.8% from debit cards; (ii) 17.9% from cheques; (iii) 3.3% from credit transfers; (iv) 3.1% from direct debits; and (v) 1.2% from cash.

13. The only payment instruments where revenues generated from use cover costs are credit cards (together with the acquiring activity) and direct debits (Table II.21). Degrees of coverage are: (i) 107.5% for credit cards; (ii) 81.5% for debit cards; (iii) 4.3% for cash; (iv) 39.4% for cheques[9]; (v) 92.7% for credit transfers; and (vi) 159.5% for direct debits.

14. Surveys among consumers, small-scale and large retail outlets, carried out in 2005, show that cash has the highest share of use, followed by debit and credit cards, and cheques are only used in a

[8] Unit costs for payment cards include a range of benefits not directly related to its use as a payment instrument, such as points, air miles and insurance.

[9] If an estimate for float was included, the degree of coverage would be 53.1%. With Decree-Law 18/2007 of 22 January, the amount from available float fell, with cheques credited to customer accounts more quickly. If the present regime had been in force in 2005, and given the same volume, the degree of coverage would have been 47.7% (see footnote 51).

small number of transactions at points of sale[10] (Table III.5). However, cheques are the payment instrument most used for purchases of over 100 euros (Table III.12).

15. The survey focusing on consumers produces findings in line with studies in other countries (the U.S., Belgium and the Netherlands) to the effect that the use of electronic payment instruments (payment cards) is directly related to income and education and inversely to age (Table III.8).

16. Consumers and small-scale retailers have a low awareness of the costs involved in some payment instruments and this could constitute a hindrance to wider use of more efficient payment instruments (Charts III.1 to III.4).

17. During 2005, cash withdrawals from ATMs, rather than at bank counters, saved consumers 11.2 million hours in processing time and banks participating in this study cut costs by 46% (Table III.18).

18. For cash deposits at ATMs, estimated gains are around 443 thousand hours for customers in terms of processing time and cost cuts for the banks to the order of 4.3 million euros (Table III.18).

19. With credit transfers through ATMs, gains are estimated to be around 491 thousand hours in processing and 5.1 million euros in transaction costs. Consumers also gained around 1.5 million hours in checking balances and account entries through ATMs rather than over the counter (Table III.18).

20. Taking gross average salaries as a point of reference (as detailed in statistics for OECD countries in 2005), the benefit for the consumer comes in at around 86 million euros, corresponding to 13.6 million hours of processing time.

21. There were other benefits for consumers stemming from the use of payment cards, such as the float, points and miles. The figures for 2005 were 0.10 euros per debit card transaction and 0.23 euros per credit card transaction. Annual renewal fee for credit cards is 19.5 euros, compared with an average of 23 euros for VISA and 24 euros for MasterCard in Europe.[11]

22. Social gains stem from replacement of a more costly instrument by one that is less costly, in terms of unit cost per transaction. For example, if a third of cheques presented in 2005 had been replaced by credit transfers and direct debits in equal measure, there would have been a significant improvement in cost coverage levels for payment instruments. The cheque has a high net unit cost (0.88 euros) and if it were replaced by credit transfer and direct debit, the first with a net unit cost a tad above the break-even line (0.02 euros) and the second slightly below (-0.05 euros), there would be an improvement in the coverage rate overall from 63.4% to 66.5%.[12]

23. For transactions below 8 euros, cash is more efficient, while for transactions above this figure, use of the debit card instead of cash leads to gains in terms of lower total costs. Payments for newspapers, magazines, fruit, bread, milk and in cafés are all under 8 euros and account for 75% of payments at point of sale. Given that around 96% of payment of these goods is in cash, we are close to good practice in the use of this instrument. On the other hand, for values above 8 euros, cash accounts for around 65% of payments, a situation which is far from ideal in terms of usage. If we postulate replacement of 10 million cash withdrawals by 80 million debit card payments, we are looking at a rise in overall cost coverage from 63.4% to 64.7%.

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[10] Given developments in other European countries, it is possible that the share of debit cards will go up and cash down.

[11] See Chapter 11.1.

[12] This estimate leaves out the effects of economies of scale.

PART I – PAYMENT SYSTEMS IN PORTUGAL

1. INTRODUCTION

According to the Bank for International Settlements (BIS), *"a payment system consists of a set of instruments, banking procedures and interbank funds transfer systems that ensure the circulation of money within a given geographical area, typically a country."*

Payment systems have a fundamental role in transactions between all economic agents. As such, they make a decisive contribution to the performance of monetary and financial institutions and to economic stability. This contribution is even more evident in the context of economic globalisation.

It is worth noting here that globalisation has led to a significant increase in cross-border transactions. This, along with all the technological innovations, has led to major changes in the way payment systems operate.

The key points in the development of payment systems and instruments in Portugal are:

1. creation of SIBS in 1983;
2. creation of the Multibanco system in 1985;
3. introduction of payment services through the Multibanco in 1989;
4. start of electronic interbank cheque clearing in 1989;
5. start of electronic interbank clearing for bills of exchange in 1989;
6. start of electronic interbank transfers in 1992;
7. creation of the electronic purse in 1995;
8. advent of the RTGS system (called SPGT) in 1996;
9. phasing out of traditional cheque clearing procedures in 1998;
10. connection of the SPGT to TARGET in 1999;
11. availability of a direct debit system since 2000;
12. cheque standardisation and interbank cheque imaging in 2003, replacing centres for physical exchange;
13. connection to international operations processed through PE-ACH (the Pan-European Automated Clearing House) via STEP2 of the EBA on 12 April 2005.

Over the last three decades, interbank co-operation has played an extremely valuable role in this development. The cooperation began in the second half of the 1970s, when most of the banking system was still state-owned, and it is still in place now, in a context of increasing competition and product differentiation among the banks operating in Portugal.

2. THE WAY PAYMENT SYSTEMS OPERATE IN PORTUGAL

The role of the *Banco de Portugal* relating to payment systems is set out in Article 14 of its statutes. It is to regulate, oversee and promote the smooth functioning of these systems, above all within its participation in the European System of Central Banks (ESCB). The Bank oversees domestic payment systems, ensures their systemic stability, efficiency, security and good practice in the use of payment instruments. In the light of this, oversight of the payment systems is essential to ensure economic stability and normal service in the monetary and financial markets, domestic and international.

Oversight of payment systems is the term used to designate the responsibilities and policies of central banks in the field of payment and settlement systems. This function is carried out firstly through the issuing of instructions and norms for payment instruments. These provide a framework and regulations for operations in the interbank clearing systems, the gross settlement systems and the entries on settlement accounts open at the *Banco de Portugal*. Secondly, the central bank monitors payments activity through the provision and analysis of statistical data.

An important role is played by the Interbank Payments System Committee (CISP) in the standardisation and development of payment systems in Portugal. The *Banco de Portugal* chairs this committee and takes part in a number of its working groups. The central bank acts as a supervisor and also as a catalyst for change and innovation in the retail payment system. It also brings in the banks for definition of best practices and it nurtures interbank cooperation.

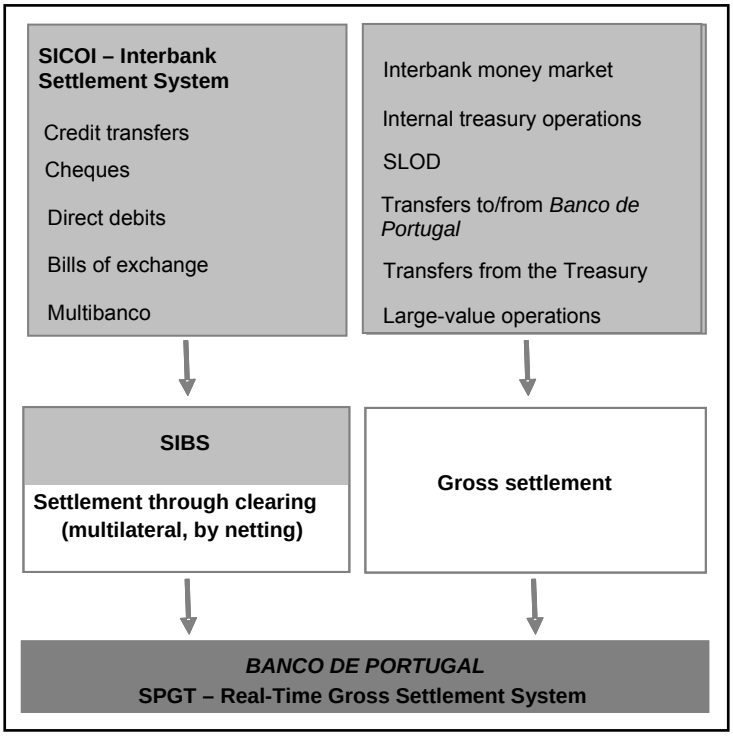
Interbank cooperation has been essential in making banking transactions automatic and in creating the network of interbank services. The creation of the Interbank Services Company (SIBS)[13] made this network universal, open to all those taking part in payment systems operations.

The work of SIBS was instrumental in generating economies of scale deriving from a more rational and effective use of the financial, technical and human resources needed to develop more advanced payment instruments and systems.

The *Banco de Portugal* also intervenes in the financial settlement of the payments systems, through two complementary means (Chart I.1): (i) real-time gross settlement, through the SPGT and SLOD; and (ii) netting through the interbank clearing system (SICOI).

[13] The company now has twenty-seven shareholders, representing practically the whole retail banking sector in the country.

Fig. I. 1 Interbank settlement systems



The main aim of the SPGT is to minimise the risks associated with large-value payments, above all systemic risk (credit and liquidity)[14], and to ensure smooth operations. The system came fully on stream on 30 September 1996 and is one of 16 domestic real-time gross settlement systems making up TARGET, which started on 4 January 1999. The main aim of TARGET is to provide an operational platform for efficient processing of transactions involved in the execution of monetary policy and provide a means for cross-border euro payments (interbank and customer) in the European Union. All domestic payments above 100 thousand euros (large-value payments) must be processed through the SPGT to ensure cover of systemic risk in the Portuguese payment system.

The SICOI system covers a large number of low-value operations. Systemic risk here is low so processing costs can be kept down. The system operates every working day, 24 hours per day. Participants use the SIBS interbank communications network for block transmission of transactions, except for the Multibanco subsystem, where transmission is done in real time. The information processed by SIBS is sorted and channelled to the drawer and drawee banks and to the *Banco de Portugal*, which settles financial balances on a daily basis.

Five subsystems make up SICOI (Table I.2). Each one has specific processing and data formats, depending on the technical specifications detailed in the respective handbook.

All cheques now go through a teleclearing process, though there is a limit above which cheques are exchanged. Since October 2003, electronic exchange of cheque imaging has replaced the previous physical exchange, which operated in four centres on mainland Portugal and in the autonomous regions of Madeira and the Azores. All cheques are machine readable (optical reading), supporting automatic

[14] Systemic risk is the most important risk to payment systems and it can have considerable impact. The risk occurs when a debtor defaults and other institutions cannot fulfil their obligations and default in turn. This can affect the whole economy (the domino effect), and for this reason regulators focus their attention on compliance with a whole series of criteria that minimise the risk.

processing and transmission of data between the participants. Large-value cheques are cleared through the same system but they are settled on a case-by-case basis through an account in the *Banco de Portuga*l. During 2005, some 172 million cheques were processed through SICOI (Table I.2).

The interbank electronic transfer system (known as TEI, from the Portuguese acronym) covers paperless credit transfers, domestic and international, up to 100 thousand euros. Standing orders are among the most common used by companies to pay their employees. A system of interbank credit transfers was started in 1992, using the SIBS data transmission infrastructure. This enables any customer to transfer funds to accounts in other banks (interbank transfers). A bank identification number (NIB) was created as part of this system and is now widely used for identification of bank accounts. During 2005, around 50 million such operations were processed through SICOI (Table I.2).

Direct debits came into the system in the last quarter of 2000 and are used for authorized payments from an account, with the transaction carried out by the recipient. The customer must issue an authorisation in accordance with *Banco de Portugal* regulations so that a range of payments can be made. A specific regulation sets out the rights and duties of those paying and the credit institutions involved. The previous system had been in operation since 1983 and was based on bilateral agreements between the creditor and each of the specific customer's banks. It is being phased out as the SDD system becomes the main collection system. There are now more than a thousand companies who receive payment through the system, among them utilities, insurers, leasing operators, publishers and clubs. During 2005, 69 million operations were carried out (Table I.2).

Bills of exchange are retained in the drawee bank, which transmits the relevant data to the accepting bank seven days before settlement date. The information is kept by SIBS for seven days in an electronic file. Customers can pay bills of exchange by debiting their account (when bills are domiciled), or in any bank branch or through an ATM. Bills in foreign currency can also be processed through the subsystem and are settled in the foreign currency through correspondent accounts via SWIFT. This service was only used for 0.5 million operations in 2005 (Table I.2).

The Multibanco covers transactions through ATMs and POS terminals, as well as homebanking, mobile phone (TeleMB) and internet (MBnet). It functions 24 hours a day, seven days a week in real time. The Multibanco is a shared network, where various types of card can be used. These are classified according to their main function: debit card, credit card and pre-paid card. At the end of 2005 there were 10,723 ATMs and nearly 147 thousand POS terminals. Around 1,228 million operations were processed (Table I.2).

The Multibanco system is operated by SIBS and came on stream in 1985. It was later extended to include EFTPOS (Electronic Funds Transfer at Point of Sale). Customers can carry out a wide range of operations through ATMs, among them:

1. Cash withdrawals;
2. Checking bank balance, account entries, Multibanco operations and low-value transactions;
3. Payments for services (water, electricity, telephone, gas, etc.);
4. Payments to the state and the public sector (taxes, duties, social security payments and others);
5. Tickets on transport operators;
6. Bookings and payment for cinemas, shows, etc.;
7. Payment of mobile phone bills;
8. Other payments and services (drafts and commercial receipts);
9. Direct debits;

10. Transfers, both to other customers in the same bank and to other banks;
11. MBNet.

Table I. 2

SICOI OPERATIONS

	2003	2004	2005	
	Volume (millions)	Volume (millions)	Volume (millions)	Value (millions of euros)
SICOI	**1,324.40**	**1,413.62**	**1,519.95**	**317,143.7**
Cheques	200.08	187.95	172.35	183,832.8
Bills of exchange	4.59	0.87	0.50	2,388.5
Interbank electronic transfers (TEI)	42.83	44.59	49.52	67,069.4
Direct debits	5.19	20.80	69.09	8,359.5
Multibanco	1,071.70	1,159.41	1,228.48	55,493.5

Source: *Banco de Portuga*l (Report on the Interbank Payment and Settlement Systems, 2005).

Any financial institution wishing to join the Portuguese payment system must: (i) request authorisation from the *Banco de Portugal* to participate directly or indirectly; (ii) have a single settlement account at the central bank.

Payment instruments such as cheques, credit transfers, direct debits, payment cards and bills of exchange are made available by financial institutions to their clients.

Financial institutions can issue credit and debit cards, either their own or brands they represent and can offer acquiring services. These services are carried out by an acquirer, who takes up the credit for merchants that accept credit and debit cards. The merchants transmit the information on a transaction to the acquirer. The latter has negotiated with the merchant to accept the brand he represents and is also responsible for compiling the information on the transaction and for settling that transaction. For each transaction made with a banking card, the acquirer pays the merchant (it acquires the credit) and charges a fee (the retailers' service rate). The acquirer is then reimbursed by the issuer and pays the issuer a fee (the multilateral interbank fee).

The acquiring service functions in Portugal as follows:

i. Acquiring the Multibanco brand is in the hands of the merchant's bank.

ii. Unicre[15] is an acquirer (using the Redunicre company) for VISA, Mastercard, Visa Electron, Maestro, Diners, JCB and Tarjeta 6000. It also issues the UNIBANCO/VISA credit cards.

iii. Banco Comercial Português (BCP)[16] acts as acquirer for the American Express and issues their cards.

iv. Banco Português de Negócios (BPN)[17], using the Netpay network, is an acquirer for Visa, Mastercard, Visa Electron and Maestro.

[15] Unicre was set up in 1974 by six domestic credit institutions and now has twenty-eight institutional shareholders.
[16] The BCP acquiring operations began in 1995.
[17] The BPN acquiring operations began towards the end of 2005.

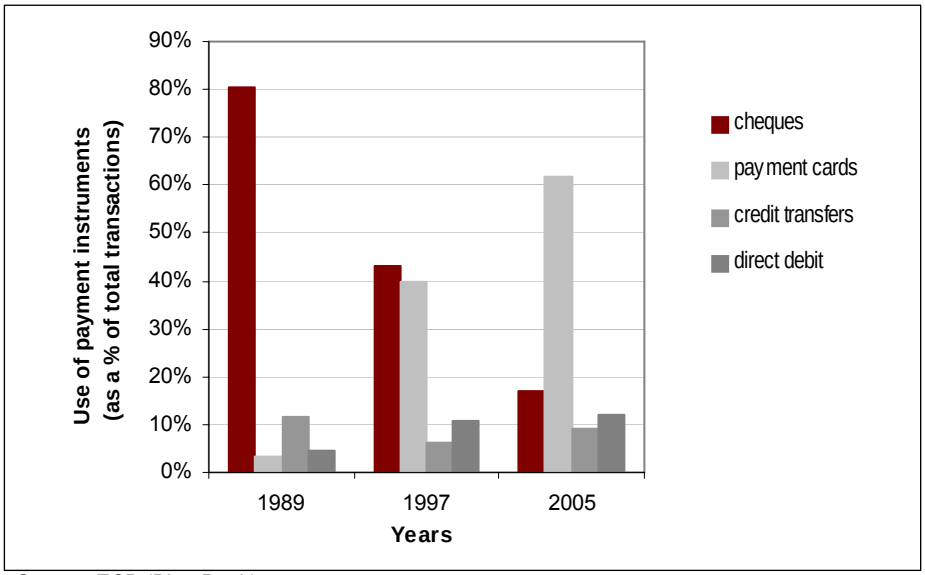
3. THE DEVELOPMENT OF PAYMENT INSTRUMENTS

3.1. In Portugal

There has been a significant increase in recent years in terms of the choices of payment instruments.

Paper-based instruments are being replaced by electronic, a fact illustrated by the opposite developments in the use of cheques and payment cards visible in Chart I.1 and Table I.3. Cheques amounted for 81% of all transactions in 1989 but only 17% in 2005, while payment cards (debit and credit) stood at 3% in 1989 and had moved to 62% in 2005.

Chart I. 1 – Development of payment instruments in Portugal



Source: ECB (Blue Book).

In terms of the number of transactions, the cheque has seen the biggest fall, from 272.9 millions in 2000 to 209.7 millions in 2005 (a fall of 5.1% per year)[18]. Payment cards have risen by 9.9% per year in the same period (Table I.3).

It is also important to analyse the change in use of payment infrastructures, above all the ATMs and POS terminals (Tables I.4 and I.5), which have played a large role in the increase of the use of electronic payment instruments.

[18] Between 2000 and 2003, the number of cheques used to make payments in the USA (Table II.8) fell at an annual rate of 4.4%, compared with 3.8% in Portugal.

Table I. 3

NUMBER OF TRANSACTIONS [1] (IN MILLIONS)

	2000	2001	2002	2003	2004	2005	
						No.	Structure (%)
Total	**1,246.6**	**1,332.9**	**1,413.0**	**1,514.8**	**1,526.4**	**1,661.9**	**-**
Cash [2]	313.3	329.9	345.1	363.3	382.2	429.1	-
Withdrawals from ATMs	275.0	300.0	323.0	342.0	366.0	387.5	-
Withdrawals at branch counter	38.3	29.9	22.1	21.3	16.1	41.6	-
Sub-total	**933.3**	**1,003.0**	**1,067.9**	**1,151.5**	**1,144.2**	**1,232.8**	**100.0**
Direct debits	113.3	119.1	121.5	143.0	144.6	149.0	12.1
Cheques	272.9	273.6	258,8	242.6	230.6	209.7	17.0
Credit transfers	71.1	41.0	62.0	90.2	76.0	112.6	9.1
Payment cards	476.0	569.3	625.6	675.7	693.0	761.5	61.8

Source: ECB (Blue Book, 2006).

Notes: [1] This includes internal transfers (within the bank), transactions cleared through SICOI (Table I.2) and large-value transactions (above 100 thousand euros).

[2] Cash is taken as the number of withdrawals carried out at bank counters and at ATMs.

The number of ATMs has been growing significantly (Table I.4), at 6.4% per year between 2000 and 2005[19], while the number of operations rose from 457 millions to 719 millions in the same period (an average growth of 9.5%). ATMs recorded 321 million transactions in 2000 and 501 million in 2005 (excluding checks on balances and account entries). This represents an average growth of 9.3%. The same trend is visible in average amount per transaction, which rose from 65.5 euros in 2000 to 78.9 euros in 2005.

Table I. 4

ATM OPERATIONS THROUGH THE MULTIBANCO NETWORK

	2000	2001	2002	2003	2004	2005
No. of ATMs	7,864	8,482	9,032	9,521	10,085	10,723
No. of operations (millions)	457.2	527.4	588.8	631.9	683.8	719.0
No. of operations excluding checking accounts (millions)	320.7	374,3	418.0	447.3	479.7	501.2
Average transaction value (euros)	65.5	68.4	70.9	72.7	75.5	78.9
No. of ATMs per thousand inhabitants	0.8	0.8	0.9	0.9	1.0	1.0
No. of operations *per capita*	44.6	50.9	56.6	60.3	65.0	68.1
No. de operations *per capita* excluding checking accounts	31.3	36.1	40.2	42.7	45.6	47.5

Sources: SIBS and INE (for the population).

Table I.5 shows the number of POS terminals in the Multibanco network, where growth was even more marked: 91 thousand in 2000 to 147 thousand in 2005 (an average rate of 10% per year). The number of POS transactions rose from 286 million in 2000 to 490 million in 2005 (a growth rate of 11.4% per year). The number of transactions per capita was 28 in 2000 and 46 in 2005. In the same period,

[19] There were 13,840 ATMs in 2005 including those on the banks' own premises, with an annual growth rate of 7.4% between 2000 and 2005.

average transaction amount rose from 129 thousand euros to 141 thousand euros, while average amount per transaction rose from 41.1 euros in 2000 to 42.3 euros in 2005.

The distribution of transactions in terms of value brackets is shown in Table I.6. This shows that around 80% of transactions carried out in POS terminals during 2005 were less than 50 euros, accounting for 39% of the value of sales.

Table I. 5

POS OPERATIONS THROUGH THE MULTIBANCO NETWORK

	2000	2001	2002	2003	2004	2005
No. of POS terminals	91,285	103,575	113,654	125,456	137,123	147,137
No. of transactions (millions)	285.7	328.6	375.3	407.7	449.5	490.1
Average amount per POS (thousand euros)	128.6	130.2	138.9	135.8	137.1	140.9
Average amount per transaction (euros)	41.1	41.0	42.0	41.8	41.8	42.3
No. of POS per thousand inhabitants	8.9	10.0	10.9	12.0	13.0	13.9
No. of transactions *per capita*	27.9	31.7	36.1	38.9	42.7	46.4

Sources: SIBS and INE (for the population).

Table I. 6

DISTRIBUTION OF POS OPERATIONS BY VALUE BRACKET (2005)

Brackets	No. of transactions (%)	Value of transactions (%)	Average value (euros)
Below 10 euros	20.3	3.2	6.74
10 euros – 50 euros	59.5	35.7	25.36
50 euros – 100 euros	13.4	21.8	68.65
100 euros – 500 euros	6.4	27.1	180.48
Above 500 euros	0.5	12.2	1,140.95
Total	100.0	**100.0**	**42.31**

Source: SIBS.

In terms of card use at POS terminals in 2005 (Table I.7), most transactions were carried out with the debit card (76.7%), though the credit card comes in with the highest amount per transaction (60.49 euros).

Table I. 7

DISTRIBUTION OF POS OPERATIONS BY TYPE OF CARD (2005)

	No. of transactions (%)	Value of transactions (%)	Average value (euros)
POS (General)	98.5	96.0	41.22
POS (FS/GG) [1]	1.5	4.0	113.25
Debit card	76.7	66.7	36.79
Credit card	23.3	33.3	60.49
Of which: domestic credit card [2]	18.4	24.4	56.10

Source: SIBS.
Notes: [1] FS – Financial sector; GG – General Government.
[2] Credit cards issued by domestic institutions.

3.2. Comparison with other countries

The international statistical comparison only covers non-cash payment instruments (cheques, credit transfers, direct debits, and debit, credit and pre-paid cards), since there are discrepancies in the criteria used to estimate the number of cash transactions. The countries chosen for analysis were Spain, Belgium, the Netherlands, Norway, Sweden and the USA. Spain was included because it has certain characteristics in common with Portugal; the others, because studies have been done on the pattern of use of payment instruments there.

Chart I.2 shows non-cash transactions per capita in 2004: there were 109 non-cash transactions per capita in Portugal, marginally above Spain but way below Belgium and the Netherlands, where the figures are particularly influenced by a higher use of credit transfers. As can be seen from Chart I.3, Portugal is the country with the lowest number of such transfers per capita.

Chart I.4 shows that the number of transactions with payment cards per capita in Portugal is close to the figure for Belgium and significantly above Spain. However, in terms of average amount per transaction, Portugal has the lowest (30 euros), with the other three countries coming in at 50 euros (Chart I.5).

The figures (volume and value) for credit transfer and payments for services would appear to be undervalued in the statistics, since they take place through the ATMs and are therefore taken as payment card operations. *Ipso facto*, figures for operations involving payment cards come in higher than they should.

Chart I. 2

NON-CASH TRANSACTIONS *PER CAPITA*

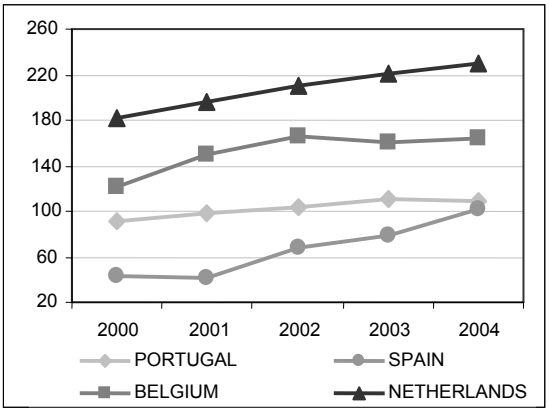
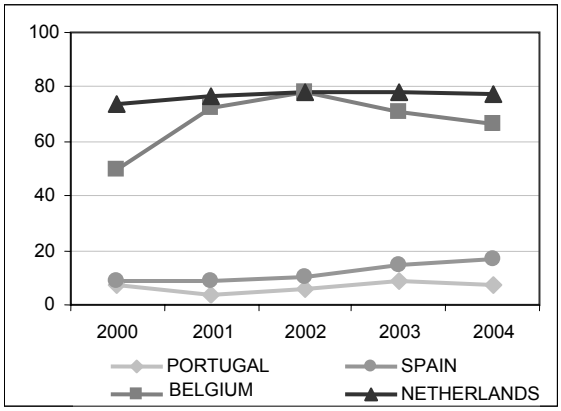


Chart I. 3

NUMBER OF TRANSFERS *PER CAPITA*



Source: ECB (Blue Book, 2006).

Chart I. 4

NUMBER OF TRANSACTIONS WITH PAYMENT CARDS *PER CAPITA*

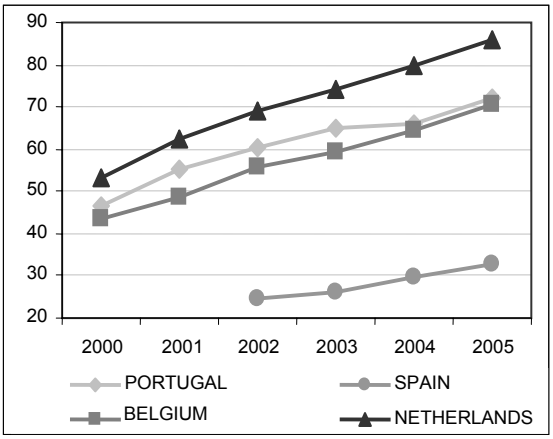
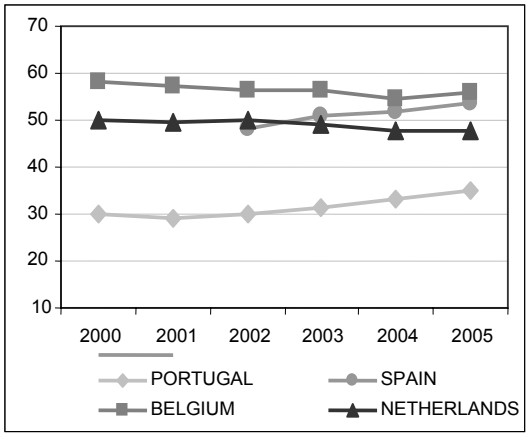


Chart I. 5

AVERAGE TRANSACTION AMOUNT WITH PAYMENT CARDS (EUROS)



Source: ECB (Blue Book, 2006).

In terms of electronic payment services, Portugal (figures for 2005) compares favourably with Norway (2005) and Sweden (2005 and 2002). In Portugal only 10% of cash withdrawals were made at bank counters, compared with 12% in Norway and 14% in Sweden (Table I.8). Considering paper-based credit transfers as a proportion of the total, Portugal stands at 13.6%, Norway at 14.1% and Sweden at 17.0% (Belgium at 16.2% and the Netherlands at 18.7%).

Table I. 8

SHARE OF TRANSACTIONS WITH PAPER-BASED PAYMENT INSTRUMENTS IN THE TOTAL NUMBER OF TRANSACTIONS IN 2005 (%)

	Portugal	Norway	Sweden
Cash withdrawals at branch counter	9.7	11.9[(1)]	13.9[(2)]
Paper-based credit transfers	13.6	14.1	17.0

Sources: Portugal – ECB (Blue Book, 2006).
Norway – Data relating to 2005, Norges Bank, Payment Statistics, Tables 20 and 24.
Sweden – Data relating to 2002, to be found in Guibourg and Segendorf (2004), and data relating to 2005 in Sveriges Risksbank (2006).

Notes: [(1)] Excluding cashback operations.
[(2)] Data relating to 2002.

Table I.9 gives a breakdown in the pattern of use of non-cash payment instruments in 2005:

– Only Portugal and the USA show a significant use of cheques, the first with 17.0% and the second with 45.3%;
– The use of payment cards in Portugal is among the highest (61.8%);
– Portugal is among the countries with the least number of credit transfers (9.1%) and has the second biggest use of direct debits (12.1%).

Table I. 9

BREAKDOWN OF THE PATTERN OF USE OF NON-CASH PAYMENT INSTRUMENTS IN 2005 (%)

	Belgium	USA	Netherlands	Norway	Portugal	Sweden
Cheques	0.8	45.3	-	0.1	17.0	0.1
Payment cards	39.0	42.5	37.0	61.4	61.8	61.2
Credit transfers	43.2	5.2	32.2	36.4	9.1	29.5
Direct debits	11.6	4.1	26.9	2.2	12.1	9.2
EP (Electronic purse)	5.4	3.9	-	-	-	-

Sources ECB, Blue Book, 2006, referring to 2005.
BIS, Red Book – Statistical update, March 2005, Table 13, referring to 2003.
Norges Bank, Payment Statistics, 2005, Table 22.

Box 1

Comparisons with other countries – statistical limitations

Every five years, the ECB publishes its Blue Book, with a description of the main settlement systems for payments and securities in the Member States and in accession countries. Statistical series are provided by the national central banks, up-dated annually and published in an annual addendum to the Blue Book.

Included in the publication, in addition to the individual situation for each country, there is a set of comparative tables. These should be analysed with some care, since they stem from different national scenarios, methods and interpretations. Only recently has the ECB moved towards a more harmonious methodology, but even so there are difficulties in interpretation, since some countries have not yet moved over to the new method. In the most recent Blue Book, some data from the comparative tables were cut out, suggesting some limitations on the comparison of data between countries and between years. These can be subsumed under two headings:

a) Methodological limitations, mainly related to:

   (i) Different methods used to collect the data. Some countries use samples and then extrapolate, others survey the entire population.

   (ii) Lack of harmonisation in the concepts relating to payment instruments, mainly in credit transfers and direct debits. Some countries always included book-entry transactions, which meant that all the automatic transactions between the customer and bank were recorded (including commissions and interest). For the purpose of harmonisation, some countries included these in their most recent data, while others will only do so for the next update.

   (iii) Breaks in series stemming from lack of revision on previous years' data.

b) Limitations inherent in the differences between Member States, in terms of culture, economy, legal framework and pricing policies. From all of this stem apparently inconsistent figures.
   Examples of such limitations are disparities in the way certain payment instruments are used. Among them are: non-use of cheques in some countries, while there is a high figure for cheque use in others; incentives for the use of cards (points, air miles and so on), while there is still resistance in other countries, above all to the use of credit cards; and the fact that in some countries there is a single national network, while in others the segmentation into a number of networks does not facilitate the generalised use of payment cards.

Table I.10 presents information from the most recent Blue Book (December 2006) with considerable dispersion but a clear trend towards greater harmonisation.

Table I. 10

NON-CASH TRANSACTIONS *PER CAPITA*

	2002	2003	2004	2005
Greece	7.8	10.1	11.3	12.8
Italy	54.9	56.4	59.1	60.2
Spain	68.0	78.7	105.5	108.0
Portugal	104.1	111.2	109.7	117.2
Ireland	72.8	74.3	77.7	137.7
Belgium	165.3	161.2	172.9	181.2
Sweden	128.8	147.2	177.0	192.4
Germany	147.5	162.7	177.1	192.6
France	218.0	222.2	227.0	228.4
Austria	125.6	213.4	217.1	230.7
United Kingdom	195.6	207.0	220.8	231.9
Netherlands	211.7	221.2	229.9	233.2
Finland	198.8	221.4	234.2	261.6
Dispersion indicators:				
Max/Min	**27.9**	**22.0**	**20.7**	**20.4**

Source: ECB (Blue Book, 2006).

Box 2

Information and communication technology and payment instruments

The changes in the Portuguese banking system since the mid-1980s are evident in the rapid switch to electronic payment instruments, in the introduction of new financial products, in organisational overhaul and new distribution channels. These changes are related to the expansion of information and communication technology (ICT) in banking operations and to innovation in banking products and services. This box looks at the impact of ICT on retail payment systems, using the results of recent research.

One of the main features in the development of Portuguese payment systems since the 1990s has been the widespread adoption of electronic payment systems (see Tables I.3, I.4 and I.5). The rapid growth of electronic payments and the use of ATMs and POS terminals to the detriment of cheques can be seen in the following table:

Table I. 11

NUMBER OF TRANSACTIONS (1996 - 2005)

	Annual rate of growth (in percentages)
Cheques	-2.4
Debit card	16.2
Credit card	23.4
Credit transfers	11.0
Direct debits	9.7
ATM (1)	8.8
POS terminals	20.3

Source: ECB (Blue Book, 2002 and 2006).
Note: (1) Cash withdrawals.

Between 1996 and 2005, the number of electronic machines grew at an annual rate of 11.1% for ATMs and 13.9% for POS terminals. In 2005, the number of ATMs per million inhabitants was 1,310, the highest in the European Union, and the average in the euro area was 810. As for POS terminals, there were 15.2 per thousand inhabitants, close to the euro-area average of 16.

ICT is also related to the organisational overhaul of banks and the introduction of new service distribution channels. One indicator showing this process is the change in the number of employees per branch. In 1987, according to information provided by the Portuguese Banking Association, the average was 39. In 2005 it was 10. Such a considerable change stems from major investment in ICT, streamlining of procedures and increased skills among employees.

Data on social factors from the Ministry of Labour and Social Security, relating to a 1986 survey of companies, shows only 3.4% of workers with a university degree, when the financial sector had 5.7%; in 2004, the first figure was up to 11.8% but the second stood at 31.7%. The increase in human capital at the banks is an aspect of the spread of ICT, innovation in products and services, the search for efficiency gains, economies of scale, improvements in distribution and quality of products and services and a reduction in response time to market demands (see Ferreira, 2003, pp 148-154).

Studies of the impact of ICT on the cost of payment instruments and services have illustrated the gains made. According to Berger (2003), the impact of ICT on the reduction of costs in the USA is very clear: *"The two main types of electronic payments processed by the Federal Reserve have had steep declines in unit costs over time. The raw data on ACH showed a decline in nominal unit costs from $0.869 per item processed to $0.176 over the 1990-2000 interval. Put into real 1994 dollars using the GDP deflator yields a decline from $0.959 to $0.158, or fall of about 83% in real unit costs. The raw data on Fedwire (used primarily for large-value wholesale payments) showed a decline in nominal unit costs from $1.029 to $0.518 or from $1.135 to $0.466 in real unit costs over 1990-2000, or a decline of about 59% in real terms."* (page 150).

Canhoto and Dermine (2003) adopted the data enveloping analysis methodology in a study of cost efficiency in the Portuguese banking sector. On the basis of this non-parametric model, they concluded that the banks achieved gains in efficiency during the period 1990-95, with the estimated efficiency indicator rising from 0.73 in 1990 to 0.93 in 1995. New banks (0.86), moreover, were more efficient than older ones (0.73).

Resende and Silva (2007) used banking data for the period 2000 to 2004 and concluded from their study using data enveloping analysis: *"… profit inefficiencies are explained, to a large extent, by allocative inefficiencies. Actually, technical inefficiency scores are, on average, extremely low, suggesting the existence of little scope for improvements on the technical component of the bank's activity. For the period 2000-2004, the average value of technical inefficiency scores is around 0.06% in case of models 2 and 3 and 0.03% for model 1, suggesting that the Portuguese banks are operating very close to the production frontier. Actually, for all the years in the sample, only one or, at most, two banks are not technically efficient."* (page 20).

On the basis of microdata supplied by those taking part in this study, unit costs for electronic payment instruments (except credit cards) are considerably lower than for instruments based on paper. Studies made by other European NCBs (see Chapter 5) support this conclusion. For example, the unit cost for withdrawing cash at a bank branch in Portugal is 1.85 euros, compared with a 0.35 euros cost at an ATM (Table II. 18). Here, the low unit costs for electronic payment instruments is closely connected to the expansion of ICT in payment systems.

PART II – ANALYSIS OF COSTS AND REVENUES IN PAYMENT SYSTEMS

4. INTRODUCTION

The available information on the use of payment instruments and on prices charged allows us to see how payment systems work. This information, however, is insufficient to assess the degree of efficiency in the system. This can only be done through a comparison between costs and prices.

Generally speaking, there is little information on the costs related to payment systems in other countries, although these costs, as a percentage of GDP, are not insignificant. So central banks in various countries have carried out studies, with different degrees of depth, in order to find ways of improving the efficiency of their payment systems.

An analysis of the information relating to costs depends to a great extent on the costing systems used by financial institutions to obtain the figures. All costing methods presuppose that making a product or service available implies the allocation of resources and therefore originates a cost.

In traditional costing methods, resources consumed over a given period and hence costs incurred are recorded within an operational cost centre (usually identified with departments). These resources and costs are then distributed by the products and services provided during the period, either directly or indirectly. Direct distribution causes no problems, but the same cannot be said of indirect allocation, where the analysis is usually based on simple criteria related to the volume of production. Traditional costing methods were originally conceived for application in large-scale industrial organisations, where the proportion of direct costs was very high and the imputation of indirect costs on the basis of output did not imply relevant distortions in the assessment of unit costs for products or services.

Currently, new production technologies and more complex and varied products have led to a significant rise in the proportion of indirect costs. These can at times reach 70% of total production costs. In these situations, where indirect costs have such relative importance for total costs, the criteria on which they are allocated can be crucial in determining unit costs and the results can be of poor quality. Indirect costs do not have the same relevance for all products and services, and applying a criterion for distributing these costs based on volume of production can lead to significant distortions. This is true, for instance, where there is product or service cross-subsidisation.

Present day scenarios focus on the high level of competition between companies and on the internationalisation of markets. In such a context, errors in decision-making based on unreliable cost information are even more serious. Traditional methods of costing have therefore been increasingly seen as inadequate. As a result, there has been greater recourse to an alternative method which obviates some of these drawbacks. It is known as ABC (Activity Based Costing). The methodology was developed by Robin Cooper and Robert Kaplan (Cooper and Kaplan, 1992), based on premises outlined by Goetz in 1949 (Goetz, 1949, p. 142).

The ABC method is based on the principle of causality. According to this, there is a cause and effect relationship between all the costs incurred by the institution and the products and services provided. The activities inherent in making these products and services available play a fundamental part in this relationship, since costs are first imputed to the activities and only then the cost of each activity is allocated to the products and services themselves.

Using the ABC method involves three phases: (i) identifying the main activities inherent in making the products and services available; (ii) costing these activities and defining the cost-driver factor for each

activity; and (iii) allocating the cost of the activities to the products and services, based on the use of the activities by the product or service during the production process.

Each activity is understood as a cluster of related tasks and procedures comprising a specific stage in the process of making a product or service available. The definition of "activity" is based on three suppositions: (i) all the work done in a certain institution can be classified as being part of a specific activity; (ii) any activity can take place in a number of functional areas; (iii) activities generally have a measurable effect; and (iv) activities can use human and non-human input.

Identifying the cluster of activities demands a specialised knowledge of the whole process involved in making a product or service available. Innes and Mitchell (1995) suggest that identification of major activities should be made through an analysis of the physical aspects of the premises and a list of all the payments made. The first allows for an assessment of how the whole physical space is being used, while the second ensures that all the resources are being considered in the analysis. This procedure is frequently accompanied by a series of interviews of the human resources involved or a time sheet to be filled in with the time distribution of tasks undertaken within a given period. This approach may lead to the identification of a wide range of detailed activities. Grouping these tasks in the main activities is made on the basis of a definition of the right level of aggregation. The basis for this is the cost/benefit criterion.

The second phase, after identification of the main activities, involves imputing costs to each activity. Some of the costs are direct, while others are distributed across a number of activities. The latter are imputed to activities through the use of cost-driver factors, which relate resources to activities.

There are three types of cost-driver factors (Kaplan and Atkinson, 1998, Chap. 3): transaction, duration and intensity. Transaction cost-drivers correspond to the number of times an activity is carried out. This kind of factor is the least rigorous, since the assumption is that the same amount of resources is needed each time the activity is performed. However, in situations where the variation in the amount of resources needed is not significant, transaction cost-drivers provide an adequate gauge of the resources used in the activity. Duration cost-drivers represent the time needed to carry out an activity. This should be used when there is a significant variation in the way this activity contributes to making a product or service available. Intensity cost-drivers involve accounting for the resources actually used for each operation. It is only justified if the resources are expensive and have significant variations.

In the third phase, the costs of the activities are allocated to the products and services on the basis of their use during the production process. In this way, the ABC model sets out the relationship between the resources used, the activities carried out and the products or services made available.

The ABC method is suitable for analysing the costs incurred by a financial institution in an area such as payment systems. This is because these institutions are operating in a highly competitive market, they have a significant proportion of indirect costs and there are major differences in the way products and services use the available resources. Using the ABC method for an analysis of payment systems means that information can be obtained on the cost of each payment instrument and of each activity inherent in making the instruments available. By identifying the cost-drivers, the method makes it possible to define the cause and effect relationship between costs and payment instruments.

5. METHODOLOGIES USED IN STUDIES CARRIED OUT IN OTHER COUNTRIES AND MAIN CONCLUSIONS

5.1 Methodologies

A bibliography of cost estimates in payment systems includes a number of studies by national central banks, using different methodologies. The studies by the central bank of Norway (Gresvik and Owre, 2002) and Sweden (Guibourg and Segendorf, 2004) focus on the costs incurred and prices used in the banking system in making various payment services available; the national banks of the Netherlands (Brits and Winder, 2005) and Belgium (*Banque Nationale de Belgique,* 2005) give cost estimates for the banking system and for the retail sector, covering an array of payment instruments. These methodologies are detailed below and a summary is given of the approach taken by the US Federal Reserve in a study on the trends in the use of payment instruments in the United States (Gerdes *et al.*, 2005).

(i) Norway

The article published by the national central bank of Norway (Gresvik and Owre, 2002) summarises the method and the findings of a study carried out in 2001. This covered costs to the banks, prices charged and income generated by the Norwegian retail payment system. The findings were compared with those obtained in previous studies from 1988 and 1994. These studies aim at improving the level of efficiency of the country's retail payment system.

A survey was made involving twenty-eight banks to obtain quantitative information on costs of production of payment instruments, their development over time and above all the relationship between costs and prices. The results published in this study reflect only the replies from seven banks, which are considered representative of the whole system due to their large market share.

The cost analysis developed in 2001 was carried out by using the ABC framework, while in the previous studies from 1988 and 1994, the national central bank applied the Contribution Margin Analysis method.

The production of payment services by the banks involves supporting functions that generate a large proportion of indirect costs; along with this, there are wide variations in how payment services are made available, and hence, also marked differences in the level of costs associated to each payment instrument. The ABC method is particularly suitable for dealing with these characteristics.

The first step involved in using the ABC method was the definition of relevant and irrelevant costs in the production of payment services. The banks' annual accounts for 2001 were used to compile data on costs. However, some of these costs were not available in the form needed and had to be estimated. Among these were rents and rentals, depreciation on property and product development costs.

As a second step, bank costs were split into four operational areas: (i) payment systems; (ii) investment and portfolio management; (iii) administration; and (iv) banking consultant services. A list of costs was drawn up for each area and this was divided into direct and indirect costs. Direct costs are those directly related to each payment service made available by the bank. They vary according to the number of transactions. Indirect costs are those that stem from the supporting functions. The banks distributed the

costs among the operational areas using allocation keys based on the time needed for a specific operation. The banks, however, were allowed to use other allocation keys for imputing costs. Some used the number of employees in the departments. Certain costs were eliminated as they were considered irrelevant to the analysis. These related to the investment/portfolio management area and part of the costs in the administration and banking consultant areas. The relevant part of the costs for overall management and banking consultant services was imputed directly to the payment systems area.

The third step was based on the definition of the twenty-six activities related to payment systems and these activities were used to distribute indirect costs. At the same time, the following payment instruments offered by banks were identified: credit transfers (electronic and paper-based), direct debits, cheques, payment cards and cash.

Direct costs were allocated to payment instruments according to the respective number of transactions.

Indirect costs were divided into those relating to personnel and those not relating to personnel. The allocation of indirect costs relating to personnel to the different activities was based on the time used by staff for each activity. On the other hand, each of the indirect costs not relating to personnel was allocated to a specific activity and costs imputed directly. In addition, indirect costs obtained for each activity were then allocated to the different payment instruments using three cost-drivers: the number of transactions carried out per payment instrument, the number of accounts where the payment instrument is made available and the number of products provided by the bank. Indirect costs are therefore obtained as a function of the activities and the cost-driver.

In a final stage, the unit costs for each bank were calculated from the total direct and indirect costs and the number of transactions. With the sum of direct and indirect costs, the total cost per bank and per payment service were obtained. This was divided by the number of transactions to come to a unit cost. To ensure anonimity, the authors calculated the average unit cost for the seven participating banks and for each payment service. This average value was taken to be the unit cost of the payment service.

(ii) Sweden

The study carried out by the country's national central bank (Guibourg and Segendorf, 2004) aimed at estimating the costs to the Swedish banking sector for the production of payment services and investigating to what extent the price structure reflects the estimated cost structure.

The study relies on cost and price data related to 2002, provided by the four biggest banks in the country, which together comprise 92% of the cards and credit transfers market and 96% of the cash market. The information collected allowed for the calculation of the price structure (variable and fixed fees), variable costs and fixed costs, for each payment instrument and channel.

The information on costs was collated for each stage of the production of payment services (transaction, clearing and settlement), for each instrument and for each channel. The following payment instruments were included: credit, debit and pre-paid cards, credit transfers (electronic, paper-based and over the counter), direct debits and cash (withdrawals from ATM and at bank branch). Data on transaction volumes were also collected, per payment instrument and per channel.

For the purpose of estimating production costs of different payment services and investigating to what extent relative prices reflect relative costs, the authors of the study constructed an "average bank" (weighted average of banks' costs). As weights, they used banks' market share for each payment instrument and channel (in terms of volume of transactions). The same procedure was used in the calculation of prices (transaction fees) charged by the "average bank".

(iii) The Netherlands

The work carried out by the *Nederlandsche Bank* (Brits and Winder, 2005) aimed mainly at quantifying the social costs inherent in the use of the following payment instruments at point of sale: cash, debit card, electronic purse and credit card. Compared with other studies, Brits and Winder took a much broader approach and included: (i) the cost for the retail sector and the central bank, as well as for the banking industry; (ii) the costs of cash, for the banking system and in terms of issuing; and (iii) the distinction between fixed and variable costs, the latter divided into variable costs with the number of transactions and variable costs with the size of the transaction.

This information made it possible to identify the most cost-efficient payment instrument for a transaction of a specific value and also to calculate the "break-even" transaction amounts, i.e. those amounts for which the cost of two payment instruments are equal.

With this in mind, social costs were defined as the sum of the internal costs borne by the parties in the payment chain (central bank, commercial banks and retailers).

The costs borne by the other entities involved in the payment chain that constitute revenues for those same entities were not taken into account since they would cancel out in the consolidation process.

In addition, total costs were defined as the sum of the internal costs with the costs cancelled out in the consolidation process and total revenues were defined as the sum of the payments received. The authors used the concept of revenue received rather than benefit, to emphasise that aspects such as safety and user convenience were not considered.

Social costs were broken down into fixed and variable costs, the latter being divided into variable costs with the number of transactions (transaction-linked) and variable costs with the size of the transaction (sales-linked). In practice, the breakdown of total costs into fixed and variable was made by applying two matrixes, one for the central and the commercial banks and the other for the retailers. These matrixes define percentages of fixed and variable costs, both for the payment instruments and for cost items. For this breakdown, a medium-term horizon of three to five years was taken, implying that a large part of the costs are variable. For example, over such a period, the costs of a banking network are fundamentally variable, since the physical and the human capital may be reallocated in case of shifts in payment patterns of consumers and retailers. The same reasoning was applied to the other cost items. It should be noted, however, that for electronic payment instruments, fixed costs constitute a large share of total costs (because of the supporting infrastructure) and the variable costs are predominantly transaction-linked.

Central bank, commercial banks and retailers supplied the data used for the study by means of a survey. To calculate the costs for the whole banking sector, the reported costs were levelled up on the basis of banks' market shares (in terms of number and value of each transaction for each payment instrument). The same approach was taken for the retail sector.

The questionnaires used for the central bank and the commercial banks aimed at obtaining the following data: (i) back-office costs (production and distribution costs, cash handling – counting, checking and packaging – and others such as telecommunications, logistics and maintenance); (ii) front-office costs (branch offices, ATMs and electronic purse loading points, including depreciation and the physical maintenance/servicing involved in IT and security); (iii) overhead costs (including the costs of head-office managing departments and central organisation as a whole; and (iv) costs of armoured car services (including the costs of delivering and collecting cash to branch offices and ATMs).

Four banks answered this questionnaire (representing together 90% of the market), as did Interpay, the body that ensures clearing procedures and plays a pivotal role in processing electronic payments.

The questionnaire used for retailers allowed data to be obtained on: (i) back-office costs (administrative costs such as preparing, emptying and checking cash registers); front-office costs (payments processing); (iii) telecommunications (including debit card costs); (iv) cash transportation; (v) depreciation and maintenance/servicing of POS terminals; (vi) the costs of losses, through theft or errors; and (vii) insurance costs.

(iv) Belgium

With the purpose of improving efficiency in the use of payment instruments, a working group to do a study on the costs and benefits of various payment instruments was set up by the *Association Belge des Banques*, the *Ministre de l'Économie* and the *Ministre de la Protection de la Consommation*.

The basis for this study was a similar work carried out in the Netherlands, in terms of aims and scope. The study was published by the National Central Bank of Belgium in 2005 and aimed at: (i) identifying and quantifying the costs inherent in the use of payment instruments at the point of sale; and (ii) putting forward recommendations as to how to reduce these costs. The only payment instruments considered were those used at the point of sale (cash, debit card, credit card and electronic purse); and the internal costs considered were those of the entities involved in the payment chain (retailers, commercial banks and the institutions responsible for the issue of legal tender (the *Banque Nationale de Belgique* and *Monnaie Royale de Belgique*).

The quantitative information used in the study came from surveys of commercial banks, retailers and consumers.

The first survey aimed at obtaining the costs borne by commercial banks for making payment services available, broken down into front-office and back-office costs, costs with cash transportation (armoured car services) and other items. The four largest banks and six medium-sized banks replied to the questionnaire. Extrapolation for total costs was made on the basis of costs for the ten respondent institutions, using the respective market share in terms of the value of deposits by individuals and non-profit associations. Costs to the banks were split into fixed costs, variable costs as a function of transaction volume and variable costs as a function of transaction value. Each bank used its own distribution method for this, based on its own cost structure.

Retailers were asked to provide information on the costs of payment services, divided into internal costs for front office, back office and others. There were replies from 1,792 points of sale and 6,179 cash registers. The data supplied was extrapolated to the whole population on the basis of the respective turnover. Some of the cost items were expressed in time units and this had to be translated into euros

using the hourly wage. Front-office costs were largely related to unskilled check-out staff and this item was taken as having a wage per hour of 16.16 euros. For the back-office, where staff is considered to have higher qualifications, the wage per hour was taken as 20.30 euros. For other costs, the wage per hour was taken as 10.22 euros.

The consumer survey involved 3,600 phone interviews and provided information on the use of payment instruments, specifically how often cash was used.

(v) The United States of America

Developments in the pattern of use of payment instruments in the United States are described in an article written by Gerdes *et al* (2005). This article analyses the findings of two 2004 Federal Reserve Board studies, one on depository institutions and the other on electronic payments[20]. The main aim of these studies was to estimate the number and value of payments carried out with different payment instruments and also the rates of change from 2002 to 2003. The payment instruments considered were: (i) cheques; (ii) debit cards; (iii) credit cards; (iv) Automated Clearing House Payments (ACH Payments); and (iv) Electronic Benefit Transfers (EBT).

The data used in the study on depository institutions were obtained through questionnaires to the commercial banks (including agencies and branches of foreign banks), savings institutions and credit unions. These questionnaires aimed at obtaining information on the number and value of debits into their accounts with each payment, during each of the months of March and April 2004. The sample involved 1,572 commercial banks, 328 savings banks and 800 credit unions. Responses were received from 869 commercial banks, 193 savings banks and 438 credit unions. Among the respondents were the 44 largest commercial banks and the most important savings banks and credit unions. The data from respondents were extrapolated for the whole population using the market share in terms of transaction deposits[21].

The study on electronic payment instruments involved collecting information through a questionnaire sent to all the electronic payment networks, card issuers and acquirers[22].

[20] Dove Consulting, 2004, 2004 Electronic Payments Study for Retail Payments Office at the Federal Reserve Bank of Atlanta, December 14.

Federal Reserve System, 2004, The Depository Institutions Payments Study – A Survey of Depository Institutions for the 2004 Federal Reserve Payments Study.

[21] In the U.S., the Federal Reserve uses the term “transaction deposits” to designate deposits where the account holder can withdraw without notice or restrictions, using any payment instruments.

[22] The “acquirer” is the entity that acquires the merchant’s credit against acceptance of the credit and debit card brands he represents. The merchants give him all the data relevant to the transactions.

5.2 Main conclusions

(i) Norway

Table II.1 summarises the findings of the study made by the central bank of Norway in 2001. The number of transactions with the various payment instruments was about 968 million in 2001. Total costs for producing payment services came to NOK 5.9 billion[23], representing around 0.38% of GDP. According to the figures from the annual accounts of the banks for 2001, the income from these domestic payment services was NOK 4.1 billion[24]. A comparison between this figure and total estimated costs led the authors to conclude that prices charged directly to customers covered 70% of banks' costs related to payment services in 2001. This is an increase over the figures reached in 1988 and 1994.

Paper-based payment services, including cheques, accounted for 27% of total costs and only 14% of the number of transactions. Electronic transfers and direct debit together accounted for 29% of total costs and for 28% of the transactions. Payment cards and cash withdrawals from ATMs accounted for 34% of total costs and 54% of the transactions, while cash withdrawals and deposits at the counter accounted for 10% of costs and 4% of transactions.

The authors maintain that direct costs represented a large proportion of total costs for electronic payment services, while in manual services, the indirect costs prevailed. This resulted in part from the fact that the analysis treated staff costs as indirect costs.

Unit costs varied widely for the various payment services. Most of the paper-based services had higher unit costs than their electronic equivalents. An analysis broken down into payment services showed that the night safe was the service with the highest unit cost, coming in at NOK 55.50, and that there were wide variations in the cost structure and cost level across the banks. Payment cards at POS terminals were the most popular payment service in Norway and accounted for 412 million transactions in 2001. This service had the lowest unit cost, at NOK 2.50, a fall from the 1994 figure. This was due in part to the fact that there were more transactions, with economies of scale coming into play. Cheques cost NOK 22.50 per transaction, covered almost totally by the price of NOK 21.06 charged. Costs for cash withdrawals in the bank's own ATM were higher than for withdrawals from other banks' ATMs, the difference being NOK 1.00.

Cash deposits or withdrawals or transfers at the counter are free of charge, so there was a unit loss involved. Paper-based credit transfers (with the exception of mail giro operations) were the only payment services where the price charged was higher than the unit cost.

The authors concluded that cost/price coverage had been increasing over time, due to the increased use of payment instruments with lower production costs (even without the increase in average prices). The wider use of direct prices has probably given a more transparent price regime towards the banks' customers. With the pricing tool and information about costs, banks can influence consumer preferences and lead them to use more efficient payment services. The authors believe that this strategy should be encouraged in the future.

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[23] Thousand million.

[24] This figure refers to the real income from domestic payment services, i.e. with any discounts to the customer already included. Estimated income from transaction prices is NOK 5 billion.

Table II. 1

STUDY BY THE CENTRAL BANK OF NORWAY – TRANSACTIONS, COSTS AND PRICES IN 2001

	No. of transactions (millions)	Total cost (millions NOK)	Unit cost (NOK)	Unit cost (euro)	Price (NOK)
Total	968	5,861			
Cash	152	1,837			
ATM own bank	66	562	8.50	1.07	2.14
ATM other banks	39	283	7.50	0.94	4.41
Withdrawal/deposits at bank counter	37	558	15.00	1.88	0.00
Transfers at bank counter	4	116	28.00	3.51	0.00
Night safe	6	318	55.50	6.96	-
Cheques	3	65	22.50	2.82	21.06
Payment cards [1]	412	996	2.50	0.31	2.24
Credit transfers	370	2,801			
Paper-based	131	1,450			
Mail giro	74	543	7.50	0.94	5.14
Giro, cash payments	12	161	13.00	1.63	27.37
Giro, account debits	38	564	15.00	1.88	18.59
Company terminal giro sent as money order	7	182	24.50	3.07	30.14
Electronic	239	1,351			
Phone giro	29	167	6.00	0.75	2.45
Internet giro	66	527	8.00	1.00	1.89
Company terminal electronic giro	144	657	4.50	0.56	2.78
Direct debit	33	162	5.00	0.63	1.42

Source: Gresvick and Owre (2002). The data were organised by Banco de Portugal.
Note: [1] Corresponding to the use of debit and credit cards at POS terminals.

(ii) Sweden

The main findings of the study conducted by the Sweden's NCB (Table II.2) are: (i) paper-based payments are most costly to produce than electronic payments; (ii) debit card payments have lower costs than cash withdrawals and credit card payments; and (iii) all payment services, except for cash, give net revenues to the "average bank". Credit transfers (together with dataclearing) lead to a net revenue of SEK 160.7 million; payment cards (together with acquiring) generate a net revenue of SEK 460.9 million, and cheques give a net revenue of SEK 4.5 million. Cash withdrawals and cheques together lead to a net cost of SEK 465.8 million. The only payment service that leads to a net cost is cash withdrawals, above all because of the very large volume of ATM transactions, the high unit cost for making cash withdrawals over the counter and the lack of any transaction fee for such withdrawals.

Table II. 2

STUDY BY THE CENTRAL BANK OF SWEDEN – TRANSACTIONS, COSTS AND PRICES IN 2002

	Cost (SEK)			Unit cost (euros)	No. of transactions (thousands)	Rate per transaction (SEK)	
	Fixed	Variable	Unit			Fixed	Variable
Payment cards							
Debit	0.43	0.23	0.66	0.07	98,834	1.76	0.00
Credit	0.62	2.85	3.46	0.38	13,419	2.54	0.00
Acquirers							
Debit	0.09	1.09	1.18	0.13	98,834	0.00	2.04
Credit	0.09	1.09	1.18	0.13	13,419	0.00	22.01
Credit transfers (sent)							
Paper	0.25	1.76	2.01	0.22	51,228	2.86	0.44
Counter	1.89	4.72	6.62	0.72	644	0.00	41,93
Electronic	0.41	0.8	1.21	0.13	66,353	4.02	0.17
Direct debits	0.25	-0.02	0.24	0.03	27,405	0.00	0.00
Credit transfers (received)							
Credit transfers	0.16	0.74	0.90	0.10	118,225	0.00	0.00
Direct debits	0.16	1.01	1.17	0.13	27,405	0.00	1.50
Dataclearing							
Internet	0.28	0.30	0.57	0.06	31,473	0.00	0.00
Received	0.05	0.18	0.23	0.03	17,123	0.00	0.00
Cash withdrawal							
OC/OT	4.50	1.37	5.87	0.64	38,301	1.65	0.00
OC/FT	0.08	5.61	5.69	0.62	30,841	1.65	0.00
FC/OT	5.15	-3.18	1.97	0.22	30,841	0.00	0.00
Counter	10.98	0.06	11.04	1.20	11,170	0.00	0.00
Cheque	18.05	1.97	20.02	2.18	932	0.00	24.82

Source: Guibourg and Segendorf (2004).
Note: OC – Own Card; OT – Own Terminal; FT – Foreign Terminal; FC – Foreign Card.

In addition, Table II.2 shows that cash distribution is financed to a large extent by cross-subsidies from other payment instruments such as payment cards and acquiring.

In short, the authors suggest that banks could reduce total production costs by adopting more cost-based price strategies. This would act as a signal for consumers to shift from cash to debit cards and from paper-based to electronic transfers, for example. The authors also conclude that fixed and variable fees cover 69% of the cost for the "average bank" in the production of payment services, while variable fees cover 114% of variable costs.[25].

(iii) The Netherlands

[25] Apparently, this result does not stem from the structure of costs and prices for the whole system as presented in Table II.2.

Table II.3 shows the main findings of the study on the costs of payment instruments at point of sale published by the Central Bank of the Netherlands in 2005 (Brits and Winder, 2005). According to these findings, the overall costs involved in carrying out 8.3 million transactions at point of sale amounted to 2.9 billion euros, 0.65% of the country's GDP. These costs were shared in roughly equal parts by the banking industry and the retail sector, with a cost to the central bank of 70 million euros related to cash. Table II.3 also shows that cash accounted for 73.5% of total costs of payment instruments, corresponding to 85.5% of transaction volume at point of sale. The debit card absorbed 18% of resources allocated to payment instruments and was used in 12.9% of transactions, while the credit card accounted for 5.7% of costs and 0.6% of transactions. Costs related to cash payments were mainly borne by the retail sector, whereas a considerable share of the costs relating to electronic payment instruments were borne by the banking industry.

Table II. 3

STUDY BY THE CENTRAL BANK OF THE NETHERLANDS – COSTS OF PAYMENT INSTRUMENTS AT POINT OF SALE TO THE PUBLIC IN 2002

	Cash		Debit card		Credit card		EP [1]		Total
	Value	% total	Value	% total	Value	% total	Value	% total	
Total cost (millions of euros)	2,122	73.5	520	18.0	165	5.7	81	2.8	2,888
Retail sector	1,157	80.7	252	17.6	11	0.8	13	0.9	1,433
Banking sector[2]	895	64.6	268	19.4	154	11.1	68	4.9	1,385
Central Bank	70	100.0	-	-	-	-	-	-	70
Transactions (millions)	7,066	85.5	1.069	12.9	46	0.6	87	1.1	8,268
Value of transactions (millions of euros)	66,263	55.7	47,177	39.7	5,300	4.5	236	0.2	118,976
Average value of transactions (euros)	9.37	-	44.13	-	115.22	-	2.72	-	14.39

Source: Brits and Winder (2005).

Notes: [1] EP – Electronic purse.

[2] Includes commercial banks, Interpay and credit card companies.

The analysis of total social costs of payment instruments is affected to a large extent by the number of transactions carried out with each payment instrument. Given this, the authors defined certain criteria for the comparison of costs of payment instruments, among them total cost per transaction and total cost per euro of sale (see Table II.4).

On average, a cash transaction costs 0.30 euros, with 53.3% of this borne by the banks and 43.3% by the retail sector.

The credit card costs 3.59 euros per transaction, of which 3.35 euros is borne by the banks. The debit card costs 0.49 euros per transaction, borne in almost equal parts by the retail sector and the banking industry.

Debit card costs represent 1.1% of sales made with this payment instrument, while the figures for cash and credit card are 3.2% and 3.1%.

The authors broke down total costs into fixed and variable costs and found that for a transaction of 11.63 euros, the cost of cash and debit card is the same. Cash is more economical for purchases below 11.63 euros, while the debit card is preferred for purchases above this figure. In both cases, however, the electronic purse is the most cost-efficient instrument.

The authors then took a scenario where 1,500 million cash transactions were replaced by 500 million electronic purse transactions and 1,000 million transactions with a debit card. Using the same fixed and variable costs, they found that this shift from cash to electronic payments led to a 106 million euro cost saving. In short, substantial cost-savings can be achieved if the electronic purse and debit cards, this latter for larger amounts, are used more often.

Table II. 4

STUDY BY THE CENTRAL BANK OF THE NETHERLANDS – COSTS OF PAYMENT INSTRUMENTS PER TRANSACTION AND PER EURO OF SALES IN 2002 (IN EUROS)

	Cash	Debit card	Credit card	EP[1]	Total
Total costs per transaction in euros	0.30	0.49	3.59	0.93	0.35
Retail sector	0.16	0.24	0.24	0.15	0.17
Banking sector[2]	0.13	0.25	3.35	0.78	0.17
Central bank	0.01	-	-	-	0.01
Total cost in cents per one euro of sales	3.20	1.10	3.11	34.32	2.43
Retail sector	1.75	0.53	0.21	5.51	1.20
Banking sector[2]	1.35	0.57	2.91	28.81	1.16
Central bank	0.11	-	-	-	0.06

Source: Brits and Winder (2005).

Notes: [1] EP – Electronic purse.

[2] Includes commercial banks, Interpay and credit card companies.

(iv) Belgium

Tables II.5 to II.7 summarise the main findings of the study published by the central bank of Belgium. Total costs of commonly used payment instruments at point of sale were estimated at 2 billion euros for 2003, 0.74% of the country's GDP. Costs borne by the retail sector amounted to 1.027 million euros, representing 50.5% of the total cost and 0.37% of GDP. Costs for the banking industry were estimated at 959 million euros, 47.1% of the total cost and 0.35% of GDP. The institutions responsible for issuing legal tender had costs of 47 million euros, 2.3% of total cost and 0,02% of GDP.

Cash accounted for 77.8% of total costs, debit cards for 14.6%, credit cards for 4.8% and the electronic purse for 2.9%.

For the commercial banks, cash accounted for 75.5% of the costs borne, with the remaining 24.5% spread between electronic payment instruments. For retailers, cash accounted for 79.1% of costs and payment cards for 16.8%.

Table II. 5

STUDY BY THE CENTRAL BANK OF BELGIUM – COSTS OF PAYMENT INSTRUMENTS AT POINT OF SALE TO THE PUBLIC IN 2003, PER SECTOR AND AS A PERCENTAGE OF GDP

	Cash	Debit card	Credit card	EP[1]	Total	
Total cost	0.58	0.11	0.04	0.03	0.74	(2,037 million €)
Retail sector	0.30	0.06	0.01	0.02	0.37	(1,027 million €)
Banking sector	0.26	0.05	0.03	0.01	0.35	(959 million €)
Central Bank[2]	0.02	-	-	-	0.02	(47 million €)

Source: *Banque Nationale de Belgique* (2005).

Notes: [1] EP – Electronic purse.

[2] Includes figures for issue of legal tender by the *Banque Nationale de Belgique* and by *Monnaie Royale de Belgique*.

In 2003, there were 3,653 million transactions at point of sale, totalling 83,230 million euros. Cash was used in 2,970 million transactions, accounting for 81.3% of volume and 62.7% of value. The debit card was the second most frequently used payment instrument, accounting for 14.8% of volume and 32.2% of value. The electronic purse came in with 2.9% of volume and 0.7% of total value. Last, there is the credit card, with 1.0% of volume and 4.4% of value.

Cash, debit card and electronic purse have similar costs per transaction, 0.53 euros, 0.55 euros and 0.54 euros, respectively. Credit cards cost 2.62 euros per transaction. The electronic purse is the payment instrument with the highest cost per euro of sales, at 10.49 cents, followed by cash at 3.03 cents, the credit card at 2.65 euros and the debit card at 1.10 cents.

Table II. 6

STUDY BY THE CENTRAL BANK OF BELGIUM – COSTS OF PAYMENT INSTRUMENTS AT POINT OF SALE TO THE PUBLIC IN 2003

	Cash		Debit card		Credit card		EP[1]		Total
	Value	% total	Value	% total	Value	% total	Value	% total	
Total cost (millions of euros)	1,583	77.8	296	14.6	97	4.8	58	2.9	2,034
Retail sector	812	79.1	152	14.8	21	2.0	43	4.2	1,027
Banking sector	724	75.5	144	15.0	76	7.9	15	1.6	959
Central Bankl[2]	47	100.0	-	-	-	-	-	-	47
Transactions (millions of euros)	2,970	81.3	539	14.8	37	1.0	107	2.9	3,653
Value of transactions (millions of euros)	52,185	62.7	26,836	32.2	3,656	4.4	553	0.7	83,230
Average transactions value (euros)	17.57	-	49.81	-	99.02	-	5.15	-	22.78

Source: *Banque Nationale de Belgique* (2005).

Notes: [1] EP – Electronic purse.

[2] Includes figures for issue of legal tender by the *Banque Nationale de Belgique* and by *Monnaie Royale de Belgique.*

Table II. 7

STUDY BY THE CENTRAL BANK OF BELGIUM – COSTS OF PAYMENT INSTRUMENTS PER TRANSACTION AND PER EURO OF SALES IN 2003

	Cash	Debit card	Credit card	EP[1]	Total
Total costs per transaction in euros	0.53	0.55	2.62	0.54	0.56
Retail sector	0.27	0.28	0.56	0.40	0.28
Banking sector	0.24	0.27	2.07	0.14	0.26
Central Bank [2]	0.02	-	-	-	0.01
Total costs in cents for one euro of sales	3.03	1.10	2.65	10.49	2.44
Retail sector	1.56	0.57	0.57	7.78	1.23
Banking sector	1.39	0.54	2.08	2.71	1.15
Central Bank [2]	0.09	-	-	-	0.06

Source: *Banque Nationale de Belgique* (2005).
Notes: [1] EP – Electronic purse.
[2] Includes figures for issue of legal tender by the *Banque Nationale de Belgique* and by *Monnaie Royale de Belgique*.

Assuming a scenario where 750 million cash transactions are replaced by 250 million transactions using the electronic purse and 500 million debit card transactions, the authors concluded that this substitution would lead to a cost saving of 58 million euros (0.02% of GDP).

(v) The United States of America

The study by Gerdes *et al* (2005) on trends in the use of payment instruments in the United States shows that some payments that were made by cheque in the past are now being made with electronic payments. In 2000, 41.9 billion cheques were used, declining to 36.6 billion in 2003 (see Table II.8). Over this period, the proportion of cheques fell from 57.8% to 45.2% in volume and from 66.7% to 59.1% in terms of value. On the contrary, the number of transactions with electronic instruments rose, largely as a result of the growing use of the debit card, which showed a 23.4% annual growth rate between 2000 and 2003. ACH payments, credit cards and electronic benefits transfers also gave an important contribution to the increase in the use of electronic payment instruments, as shown by the respective annual growth rates in terms of volume of transactions (13.4% for ACH payments, 6.8% for credit cards and 17.0% for electronic benefit transfers). Overall, there was a considerable rise in the proportion of electronic payments from 2000 to 2003, up from 42.2% to 54.8% in terms of volume and from 33.3% to 40.9% in terms of value. It is worth mentioning, however, that the value of cheques in 2003 was still higher than the total value of electronic payments.

Table II. 8

STUDY BY THE U.S. FEDERAL RESERVE – NUMBER, AMOUNT AND AVERAGE FOR TRANSACTIONS MADE BY CHEQUES AND ELECTRONIC PAYMENT INSTRUMENTS

	Transactions in 2000			Transactions in 2003			Annual average growth rate (%)
	No. (billions)	Amount (trillion $)	Average value ($)	No. (billions)	Amount (trillion $)	Average value ($)	
Total	72.4	59.7	824	80.9	66.0	815	3.8
Cheques	41.9	39.8	951	36.6	39.0	1,065	-4.4
(% of total)	57.8	66.7	-	45.2	59.1	-	-
Electronic payments	30.5	19.9	651	44.3	27.0	609	13.2
(% of total)	42.2	33.3	-	54.8	40.9	-	-
ACH Payments	6.1	18.2	2,984	8.9	24.6	2,766	13.4
Debit card	8.3	0.3	42	15.6	0.6	40	23.4
Credit card	15.6	1.3	82	19.0	1.7	89	6.8
EBT[(1)]	0.5	0.0	26	0.8	0.0	26	17.0

Source: Gerdes *et al.* (2005).
Note: [(1)] EBT - Electronic Benefit Transfer.

6. ANALYSIS OF COSTS AND REVENUES IN THE PORTUGUESE PAYMENT SYSTEM

6.1. Scope

This study covers retail payment operations, defined as transactions of less than 100 thousand euros, whether carried out by individuals or companies. The payment instruments included were: (i) cash; (ii) cheques; (iii) payment cards; (iv) credit transfers; and (v) direct debits.

Cash (notes and coins) is the mean/instrument of payment most frequently used in day-to-day commercial operations. Its importance stems from the fact that it is practical, confidential, with a high level of safety and immediate liquidity.

Given the specific characteristics of cash, it is difficult to quantify the number and value of payments made with this instrument and therefore to calculate its unit cost. In order to estimate the cost of cash, only deposits and withdrawals at credit institutions and deposits in night safes were considered. Foreign exchange operations were excluded.

Payment cards can be divided into credit, debit and pre-paid cards. These are bank cards that make it possible to acquire goods or services, make payments, withdraw bank notes and carry out other operations. For the present study, the following payment card operations were taken into account: (i) deposits and withdrawals in notes at ATMs with debit and credit cards; and (ii) payments and purchases made in Portugal with debit, credit or pre-paid card, by residents and non-residents, through ATMs and POS terminals. The use of debit and credit cards at POS terminals presupposes the existence of a contract between the retailer and the acquirer. Under this agreement, the retailer has to accept the card brand and the acquirer is responsible for POS installation[26], collection of transaction information and settlement with the acceptor/retailer. Acquiring may not in fact be a payment instrument, but the activity underlies the use of credit and debit cards to make payments at POSs. For this reason it has been included in the study. Non-bank cards, also known as private label, have been left out of the analysis.

A cheque is a payment instrument that allows funds in a bank account to be used. This study took into account all cheques on domestic institutions used by consumers (individual and companies) to make payments and purchases on Portuguese territory. Cheques issued, received or paid over the counter were included, but postal orders, vehicle fuel tokens and cheques used by a customer to withdraw cash from his/her own account were excluded.

Credit transfers are payment orders with the purpose of moving funds from the drawee's account to the beneficiary's. Domestic/national transfers by customers, intrabank[27] and interbank[28], were included in the analysis, whether carried out electronically or by using paper-based procedures (i.e. through PC or Internet, telephone, ATM or at the bank counter). Standing orders were also included as credit transfers.

Finally, direct debits were analysed in terms of debtor's and creditor's bank. For the debtors, direct debit is a means of making payments from a bank account and, for creditors, it is a way to collect the debt. The debtor needs only to issue an authorisation to a bank so that an account can be debited to an amount specified as being due on a specific date. Direct debits can be long-standing or one-off

[26] This is common practice, although optional. In a significant number of cases, retailers are the owners of the POS terminals and therefore can change the acquirer without changing the terminal.

[27] Credit transfers are intrabank when the drawee's and beneficiary's accounts belong to the same bank.

[28] Credit transfers are interbank when the drawee's and beneficiary's accounts belong to different banks.

payments. They include intrabank[29] and interbank[30], either electronic or paper-based (i.e. authorisation created and/or altered by the debtor through an ATM, PC or internet and at the counter), and those where authorisation is truncated at the payee's end.

6.2. Methodology

The model used for this study is based on ABC principles, for reasons already mentioned in relation to the advantages of applying this method to the payment systems area. The methodological model, summarised in Fig. II.1, involved two phases: the conceptual and the data collection and analysis phase. In the first, the principles were set out, along with the basic guidelines to be taken into account by the participating institutions in their collection of information. The second phase concerned, in overall terms, the compilation, consolidation, processing and analysis of information from the participating institutions.

The first phase was broken down into three stages: (i) standardisation and definition of the concepts; (ii) identification of the main activities, costs and revenues related to making payment instruments available; and (iii) definition of rules and calculation methods for allocating costs to activities and to payment instruments and for assigning revenues to the same payment instruments. As indicated in Fig. II.1, costs and revenues were analysed differently in the second and third stages.

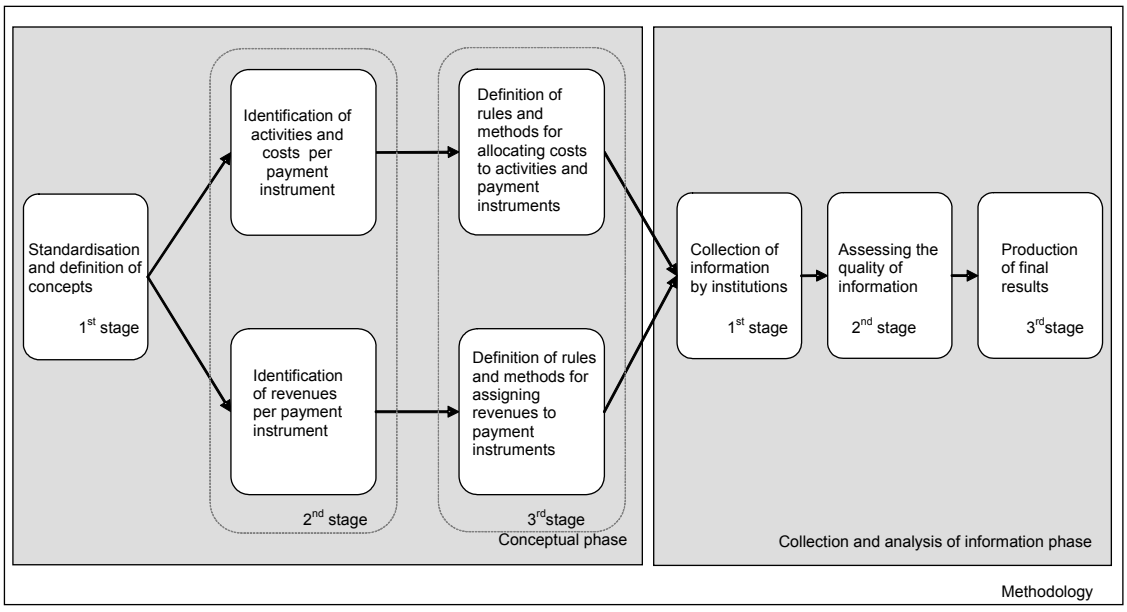

Fig II. 1 Methodological model

The first stage of the conceptual phase involved standardisation and the precise, detailed definition of concepts and terminology used in the study. The aim was to facilitate communication among all those involved in the study. The result of this first stage is the scope and delimitation of the study described in the previous section.

[29] Direct debits are intrabank when the payer's (debtor) and payee's (creditor) accounts belong to the same bank.
[30] Direct debits are interbank when the payer's (debtor) and payee's (creditor) accounts belong to different banks

The second stage aimed at identifying the activities, costs and revenues related to making each payment instrument available. The identification of activities and costs related to payment instruments was based on the ABC method. Activities were classified into three categories:

- Activities directly related to payment instruments (ADRPI);
- Activities not related to payment instruments (ANR);
- Supporting activities (ASUP), including support functions for ADRPI and ANR. Examples of supporting activities are: overall management, human resources management, logistics and asset management.

With the aim of identifying those activities that are directly related to payment instruments, each participating institution carried out an in-house survey of the main activities performed. The proposals put forward by the institutions were discussed in depth. The list of activities presented in Table II.9 reflects the consolidation of these individual proposals and provides an accurate overview of the banks' operations. Some of the activities were broken down further in sub activities, by type of channel (branch counter, internal ATM, external ATM, telephone and internet) and by type of back-up support (paper-based or electronic), so that comparisons with other countries and the economic and welfare analysis could be carried out. As an example, the activities of "cash deposit", "cash withdrawal" and "request for credit transfers" were broken down in terms of the channel used.

Table II. 9

MAIN ACTIVITIES DIRECTLY RELATED TO PAYMENT INSTRUMENTS (ADRPI)[31]

	Cash	Cheques	Direct debits	Credit transfers	Debit cards	Credit cards	Acquiring
Collection/Transport	X	X					
Withdrawal	X						
Deposit	X	X					
Safe-keeping	X	X					
Cash handling	X						
Treasury Management (stocks)	X						
Management and control of activities	X						
Procedures with false notes	X						
Cheque production		X					
Request for cheques		X					
Issue and delivery of cheques		X					
Presentation for payment		X					
Return		X		X			
Handling of post-dated cheques		X					
Cheque imaging		X					
Refund		X		X			

[31] In order to facilitate data collection in participating banks, activities were listed on a matrix relating separately to each instrument. This means that activities described here in different ways may relate to the same activity but for a different instrument. For example, "overdue credit" for cheques is the same as "overrunning credit limit and default" for credit cards.

MAIN ACTIVITIES DIRECTLY RELATED TO PAYMENT INSTRUMENTS (ADRPI)[31]

	Cash	Cheques	Direct debits	Credit transfers	Debit cards	Credit cards	Acquiring
Overdue credit		X					
Connections with central bank (cancellations)		X					
Normalisation of incidents and withdrawal of cancellations		X					
Control and fraud abuse		X		X			
Engaging new customers and analysing credit risk					X	X	
Issuing of cards					X	X	
Transaction processing					X	X	
Issuing statements					X		
Payments processing					X		
Overrunning credit limit and default						X	
Checking fraud					X	X	
Overall management					X	X	
Costs reverting to customers					X	X	
Licences VISA/MasterCard/Amex					X	X	
Service contracts			X	X			
ADC management (Creditor)			X				
ADC management (Debtor)			X				
Filing procedure (archive)			X	X			
Collection procedures			X				
Credit analysis			X				
Accounting and reports			X				
Management of purchases							X
POS management							X
Requests for transfers				X			
Transfer processing				X			
Cancellation (specific item)				X			
Cancellation (DD order)				X			
Transfers received				X			
Control of money laundering				X			
Customer service	X		X	X	X	X	
Advertising and marketing			X		X	X	
Other activities	X	X	X	X	X	X	X

The classification in the Revised Accounting Standards was used for identifying the costs related to making payment instruments available and the respective cost headings, as presented in Table II.10.

Following the ABC conceptual framework, the costs were broken down into direct costs and indirect costs, according to whether they arise from a direct and exclusive use of resources to make payment products and services available. This supposition made it possible to relate the direct and the indirect costs with the three categories of activities mentioned above, as outlined in Fig. II.2. Therefore, only the

costs associated with the activities directly related to payment instruments (taken as direct costs) and those associated with the supporting activities for the production of payment instruments (taken as indirect costs) were analysed. The information on costs associated with the activities not related to payment instruments (ANR) and to the supporting activities to ANR, was not relevant for estimating the costs of the payment instruments themselves, but it was essential for the control of total costs and hence for assessing the quality of the information. The participating institutions have a high level of similarity in terms of the structure of their activities, and therefore the proportion of costs allocated to ADRPI (*X*) and to ANR (*1-X*) was deemed to have a deviation within an acceptable range.

Table II. 10

COST HEADINGS
68 – Other commissions paid
70 – Staff costs
71 – General administrative expenses
710 – Supplies (consumables)
711 – Services
7110 – Rents and rentals (property and equipment)
7111 – Communications
7112 – Business travel and related expenses
7113 – Advertising and publications
7114 – Maintenance and repairs (property and equipment)
7115 – Transport
7116 – Staff training
7117 – Insurance
7118 – Specialist services
7119 – Other third-party services
72 – Other charges and operational expenses
76 – Losses from and provisions for imparity
77 – Depreciations
78 – Provisions
Other costs

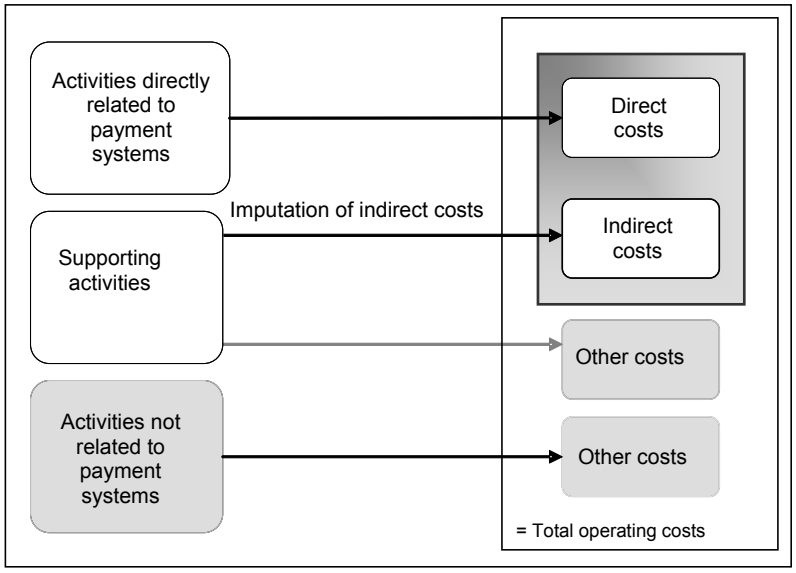

Fig. II. 2 Relationship between activities and costs

The Revised Accounting Standards were also used for identifying the main revenues generated by making each payment instrument available and the respective revenue headings (Table II.11). So, in terms of cash, the revenues taken into account were the following: revenues from night safe use, commissions on deposits and withdrawals at the branch counter and commissions on withdrawals for special customers. For cheques, revenues from issuing, as well as charges levied on the customer or retailer were included. Revenues from debit cards included the annual charge, application of the price list and the interchange fee paid by the acquirer to the institution issuing the debit and credit card used to carry out POS transactions. Revenues from credit cards comprised the ones mentioned in relation to the debit card, and also those stemming from the collection of interest on amounts due, other interest received and debt recovery. For payment cards, there is also the acquiring-related revenues, such as the monthly fees and the retailers' service rates paid to the acquirer. For credit transfers and direct debits, revenues considered relate to interbank charges on the creditor side and commissions on the debtor side.

To facilitate the task of collecting information from the participating institutions, activities, costs and revenues were structured on individualised matrixes by payment instrument. Each matrix was linked to a back-up chart, to help in filling out in detail the figures on certain costs and revenues such as the costs related to specialist services and to other operational costs and revenues from commissions received.

Table II. 11

REVENUE HEADINGS
79 – Interest and similar income
80 – Commissions received relating to cost amortised
81 – Other commissions received (interbank rates)
Other revenues

The third stage included the definition of rules and calculation methods for allocating costs to different activities (based on the ABC method) and revenues to payment instruments. The work carried out at this stage turned out to be essential to ensure that the data reported from the participating institutions is comparable, coherent, rigorous and consistent.

Regarding costs, and considering that the participating institutions have accounting systems which are not structured in accordance with the ABC method, it was necessary to transpose total costs booked in costs centres to the activities: those directly related to payment instruments (ADRPI), those not related to payment instruments (ANR) and those related to supporting activities (ASUP). As already stated, costs associated with the activities directly related to payment instruments were taken as direct costs and costs associated with the supporting activities were taken as indirect costs. The remaining costs were only taken into consideration to check that their sum with the direct and indirect costs corresponded to the total operating costs of the participating institutions.

Costs were transposed from cost centres to activities using cost drivers. The participating institutions were free to use the cost drivers that best suited their situation. Notwithstanding, staff costs account for a large proportion of total costs and there is a close relationship between these and the cost items under “General administrative expenses”. The variable “Time used by employees in carrying out their tasks” was therefore an obvious criterion for imputation of costs. Other criteria applied in the same way included the “Area occupied” for the allocation of costs with “Rentals and depreciation on property” and the ”Number of machine hours used for each activity” for the allocation of costs with “Local connections and communications”.

Since each payment instrument corresponds to a specific set of activities, total costs related to a specific payment instrument were obtained from the sum of the costs imputed to the activities needed to make the instrument available. Total costs reached were divided by the number of transactions carried out with each payment instrument to obtain the respective unit cost. For this purpose, the units were those set out in Table II.12.

The allocation of revenues to payment instruments was carried out on the basis of a direct relationship between them. This relationship had been established by identifying the origin of each kind of revenue. Total revenues relating to a specific payment instrument were calculated from the sum of all the revenues imputed to this instrument. As with the procedure involving unit costs, unit revenues were obtained by the division of total revenues by the number of transactions carried out with each payment instrument (Table II.12).

Table II. 12

UNITS USED FOR UNIT COST AND UNIT REVENUE CALCULATIONS

Payment instruments	Unit
Cash	Number of withdrawals and deposits at branch counter
Direct debits	Number of direct debit instructions
Cheques	Number of cheques presented (1)
Credit transfers	Number of transfers
Credit cards	Number of transactions
Debit cards	Number of transactions (2)

Notes: (1) Includes holder's own cheques drawn at branch counter, cheques put in and withdrawn at the same bank and cheques cleared through the clearing system.
(2) Includes purchases, payment for services and withdrawals/deposits at ATMs.

Once the first conceptual phase was complete, the ground had been laid for the second phase. The principles and guidelines were set down and collection and analysis of the information could be carried out. This second phase corresponds, by and large, to the processing of the information collected from the participating institutions. It was made up of three main stages: (i) collecting the information from the participating institutions; (ii) ensuring and assessing its quality; and (iii) detailing the final findings. Certain principles were needed to ensure the quality of the analytic results, applied during the collection phase and the *Banco de Portugal* processing phase. These were: impartiality, pertinence, reliability, the cost/effectiveness relationship, confidentiality/anonimity and transparency. Application of the cost/effectiveness relationship ensured that the production of the final results was made with optimum use of all the resources available and cutting down the work needed from the participating institutions, without jeopardising the importance of the study's objectives.

The first stage of this second phase consisted in the collection of information from the participating institutions. This involved filling in the matrixes and the related back-up charts for each payment instrument. Once the matrixes were filled in with all the details regarding costs and revenues, following the established criteria, the information was sent to the *Banco de Portugal*. To ensure that this stage was successfully carried out, the institutions were advised to use their own quality control models and took knowledge of those used by the *Banco de Portugal*.

At a second stage, the information was subject to *Banco de Portugal* quality control procedures, through tests relating to consistency, validity and dispersion. Two situations became apparent at this point: (i) inconsistency in the data supplied by the institutions; (ii) unjustified discrepancies between the structure of costs and revenues across the institutions. When either of these occurred, the *Banco de Portugal* requested clarification of inconsistencies or discrepancies and asked for the information to be reanalysed or confirmed. The following were among the important tests carried out:

- Comparison of the total costs in the matrixes with the figures in operating accounts: total costs in the matrixes had to be the same as total costs on the institution's profit and loss account.
- Comparison of the total cost structures of the participating institutions: this involved looking at the activities directly related to payment instruments (ADRPI) as a proportion of the total in each cost item and as a proportion of the institution's total costs. In addition, institutions were compared in terms of the proportion of each payment instrument in the totals of each cost item and in the institution's total costs.

- Comparison of unit costs for different payment instruments in the participating institutions, calculated by dividing the total costs for each payment instrument by the number of transactions.
- Comparison of the revenues structures of the participating institutions: this involved looking at each payment instrument as a proportion of the total in each revenue item and as a proportion of the total revenue of the institution.
- Comparison of the unit revenue from each payment instrument in the participating institutions: obtained by dividing the total revenues related to each payment instrument by the number of transactions.

For all the calculations, the *Banco de Portugal* used an array of descriptive statistics covering maximum, minimum and average values. With a view to analysing the disparities between the values supplied by each institution, the following dispersion indicators were used: the ratio between the maximum and the average, the ratio between the minimum and the average and the ratio between the maximum and the minimum.

These statistical measurements and dispersion indicators were presented to each of the institutions and their situation was analysed on a bilateral basis. The continuing bilateral interaction between *Banco de Portugal* and the participating institutions guaranteed the confidentiality of the information. In addition, the steering committee met on a multilateral basis to look at overall discrepancies in the data supplied by each institution, using the same measures and the same indicators.

In the third and final stage, when all the information had been stabilised, the sample data was consolidated and the final results produced. Here, the following figures were calculated from the sample: (i) the total costs and revenues relating to making the payment instruments available; (ii) the total costs and revenues relating to each payment instrument; and (iii) the unit cost and revenue for each payment instrument.

On the basis of the sample, the total costs of making the payment instruments available were obtained from the sum of the total costs provided by the participating institutions. The sample total costs for each payment instrument were calculated from the sum of the total costs of each payment instrument for all the participating institutions. The sample unit costs were obtained by dividing the sample total costs relating to each payment instrument by the total number of transactions made by that instrument. For this purpose, the units in Table II.12 were used. The same method was applied to obtain the figures for revenues.

The following points were also taken into account when reaching the final results: (i) the imputation of acquiring-related costs and revenues, for both debit and credit cards; (ii) the use of individual infomation in relation to commissions paid and received through the interbank tariff; (iii) the use of individual information regarding interest and similar income; and (iv) extrapolation of data to the whole Portuguese banking system.

To make collection of information easier, acquiring-related costs and revenues were detailed in a specific matrix. Because of this, it became necessary to identify a set of imputation criteria for the activity that would reflect the true nature of this business. The criteria vary according to whether the institution acts as an acquirer of debit and credit cards or just of debit cards.

For the first of these[32], the following imputation criteria were used: (i) the costs and revenues detailed in the matrix as related to the use of credit cards were imputed to credit cards; (ii) the costs and revenues detailed in the matrix as related to the use of debit cards were imputed to debit cards; and (iii) other costs and revenues in the matrix (not broken down by type of card) were imputed to credit and debit cards using the number of POS transactions for each type of card.

As for information from other institutions[33] the following imputation criteria were used: (i) costs were imputed to credit and debit cards using as allocation key the number of POS transactions for each type of card; and (ii) that part of revenue related to service commission for the supporting bank[34] was allocated to credit cards and the remainder to debit cards.

For the analysis of commissions paid and received, costs and revenues related to payments between institutions in the banking system involved in making payment instruments available were excluded from the analysis. These costs and revenues basically result from the interbank tariff[35] and are recorded as costs for one institution and revenues for another so in terms of the system they cancel out. They were set apart and not considered in the final results.

Credit cards have specific features, and in many cases they function as a means of credit, not as a payment instrument. Therefore, the revenues that appear under the heading of interest and similar income were set apart and the amounts involved were not considered as revenues from the use of the credit card as a payment instrument.

Finally, costs and revenues for the whole Portuguese banking system were extrapolated from the sample of five banks. The coefficient used for this on the cost side was the representativeness of the sample compared with total costs in the banking system[36]. Costs for the five participating banks accounted for 76.8% of the total costs in the system. The costs of Unicre were then added to the extrapolated costs for the whole Portuguese banking system. Costs for the *Banco de Portugal* were obtained separately, following the same methodology for the distribution of costs per activity[37].

The assumption for the present analysis was that unit costs for the whole Portuguese banking system and for each payment instrument were obtained from the respective sample unit costs (five participating banks and Unicre). These sample unit costs are in fact average weighted costs. In practice, the unit cost of making a specific payment instrument available for any institution in the system is the same as the average unit cost for the sample. The same method was used to reach unit revenues.

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[32] Institutions acting as an acquirer of debit and credit cards: Unicre and BCP.

[33] These are the CGD, BES, BPI and BST. The BCP acts as credit and debit acquirer so different criteria were used to impute costs and revenues stemming from the acquiring activity.

[34] Commission paid by Unicre to institutions that act as intermediary or support bank in credit card transactions.

[35] Includes the SIBS tariff and multilateral interbank commissions, also called multilateral interchange fees. These commissions are paid by the acquirer to the issuers of debit and credit cards used in POS transactions.

[36] The coefficient for extrapolating costs is:

$$\sum_{i=1}^{M} C_i \Big/ \sum_{i=1}^{N} C_i \ ,$$

where N is the number of institutions in the Portuguese banking system, M the number of participating institutions ($M < N$), C_i is the total cost of the institution i, with $i = 1, \ldots, N$.

[37] See footnote 41.

It was also assumed that the cost/revenue coverage rate in the system is the same as the unit cost/unit revenue coverage rate[38]. Given this, coverage rates for the sample and for each payment instrument were multiplied by the costs of the banking system to reach total revenues.

6.3. Findings

6.3.1. Total costs related to payment instruments

The methodology used in this study (described in the previous section) allows us to break down activities performed by the banking sector into activities directly related to payment instruments (ADRPI) and activities not related to payment instruments (ANR).

The distribution of total costs for the banking system per these two groups of activities is presented in Table II.13. This shows that Portuguese payment system costs accounted for 16.0% of total costs in the banking system[39]. In addition, breakdown of total costs into cost items shows that payment instruments are responsible for 18.7% of total staff costs, 37.9% of total commissions paid, 25.1% of costs with specialist and third-party services and 23.6% of rentals and depreciation costs.

Table II. 13

COSTS OF RESOURCES USED IN ACTIVITIES DIRECTLY RELATED TO PAYMENT INSTRUMENTS AND NON-RELEVANT ACTIVITIES (AS A PERCENTAGE)

	ANR	ADRPI	Total
Total costs	**84.0**	**16.0**	**100.0**
Staff costs	81.3	18.7	100.0
Commissions paid	62.1	37.9	100.0
Specialist and third-party services	74.9	25.1	100.0
Rentals and depreciations	76.4	23.6	100.0
Other costs (1)	92.7	7.3	100.0

Note: (1) Other costs include general administrative expenses (except for specialist and third-party services and rentals), other expenses and operating costs, losses through imparity and provisions for the year.

Total costs borne by the banking sector in making payment instruments available are estimated at 1,138.7 million euros for 2005[40], representing 0.77% of the country's GDP for the year[41] (Table II.14). Expenditure on staff and specialist services account for 67.2% of this figure. Staff costs stood at 482.2 million euros, accounting for 42.3% of the total costs. Specialist and third-party services are the second

[38] Coverage rates were calculated as the ratio of unit revenues over unit costs for each payment instrument.

[39] For the participating banks, this interval is [9.3%; 25.8%].

[40] The costs borne by SIBS are not included. In fact, costs and revenues for SIBS are approximately the same, so any adjustments would be from cost structure, and would not significantly affect the total costs relating to making payment instruments available. If SIBS costs were included in this exercise, the following changes would have to be made:

- Staff costs: +5%;
- Commissions, plus specialist and third-party services costs: -20%;
- Rentals and depreciations: +14%;
- Other costs: +7%.

[41] If *Banco de Portugal* costs were included, this would become 1,168.5 million euros, and would represent 0.79% of GDP. If opportunity costs were added in (and these are basically costs from the financial asset of non-payment of interest on credit cards and cash in hand), the cost would be 1,222.9 million euros, representing 0.83% of GDP.

biggest item, with an estimated cost of 283.5 million euros, i.e. 24.9% of total costs. Costs relating to rentals and depreciations are estimated at 129.2 million euros (11.3% of total costs) and commissions come in at 44.6 million euros (3.9% of total costs). Other costs include general administrative expenses (excepting specialist and third-party services and rentals), other operating expenses, losses through imparity and provisions. These were estimated at 199.2 million euros, 17.5% of total costs.

Table II. 14

COSTS OF RESOURCES USED IN ACTIVITIES DIRECTLY RELATED WITH PAYMENT INSTRUMENTS

	Value (million of euros)	Structure (%)	% of GDP
Total costs	**1,138.7**	**100.0**	**0.77**
Staff costs	482.2	42.3	0.33
Commissions paid	44.6	3.9	0.03
Specialist and third-party services	283.5	24.9	0.19
Rentals and depreciations	129.2	11.3	0.09
Other costs	199.2	17.5	0.14

A detailed analysis of total costs per payment instrument is summarised in Table 11.15. It shows that payment cards are responsible for 50.5% of total costs, with 23.4% for credit cards and 27.1% for debit cards. Cash and cheques together account for 45.9% of total estimated costs, with cash accounting for 17.2%[42]and cheques for the remaining 28.7%. Direct debits and credit transfers only account for 3.5% of total costs.

Cash and cheques are the payment instruments that contribute most to total staff costs (482.2 million euros), with cash at 22.4% and cheques at 39.0%. This is because these payment instruments are the only ones that are paper-based and require quite a significant amount of manual input. Payment cards account for 34.7% of staff costs, with credit cards at 15.5% and debit cards at 19.2%. Direct debits and credit transfers are the payment instruments that contribute less to total staff costs. Together, they account for only 4.0% of staff costs, confirmation of the large proportion of automatic/electronic handling, both back office and front office.

In terms of specialist and third-party services, credit cards and cheques account each for a little over 20% of costs (283.5 million euros) while debit cards come in at 39.5%. Cash stands at 12.0% and direct debits and credit transfers at around 2% each. As for rentals and depreciations, total costs for 2005 were estimated at 129.2 million euros, with cash, cheques and payment cards accounting for the largest share (cash at 20.8%, cheques at 33.7% and debit cards at 27.6%). Direct debits and credit transfers are only responsible for 3.5% of total costs with rentals and depreciations. Credit and debit cards together account for 42% of the total.

Total commissions paid (leaving out payment between the institutions[43]) was estimated at 44.6 million euros for 2005. Of this, 93.1% relates to payment cards. Most of the commissions paid (65.9%) result from debit cards operations, above all ATM withdrawals, purchases and payments for services. This relatively big figure stems from the widespread use of the debit card in Portugal. In addition, fees for the use of credit cards represent 27.2% of total commissions paid. Cheques provide 5.2% of commissions

[42] Compared with 29.4% in Norway (Table II.1). Percentages of total cost of other payment instruments cannot be compared to Portugal, since Norway has practically no cheques and presents values for payment cards in aggregate form. In addition, the costs of payment cards in Norway refer only to use at POS terminals.

[43] See Chapter 6, Section 2 for methodology.

paid, with the remaining payment instruments (direct debits and credit transfers) accounting for only 1.6% of the total. Cash withdrawals at a branch counter give 0.0% in commissions.

Credit cards account for 49.4% of other costs, with a considerable part of this allotted to insurance. Cash stands at 13.7% of this item and cheques at 15.4%.

Table II. 15

COSTS OF RESOURCES USED AND TOTAL COSTS PER PAYMENT INSTRUMENT (AS A PERCENTAGE)

	Staff costs	Comissions paid	Specialist and third-party services	Rentals and depreciations	Other costs	Total costs
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Cash	22.4	0.0	12.0	20.8	13.7	17.2
Direct debits	0.9	0.7	2.1	1.4	0.8	1.2
Cheques	39.0	5.2	22.2	33.7	15.4	28.7
Credit transfers	3.1	0,9	2.0	2.1	1.3	2.3
Credit cards	15.5	27.2	22.3	14.4	49.4	23.4
Debit cards	19.2	65.9	39.5	27.6	19.4	27.1

6.3.2. Unit costs related to payment instruments

Unit costs for the Portuguese banking system are presented in Tables II.16 and II.17. The results show that direct debits have the lowest unit cost, at only 0.09 euros per instrucion. Credit transfers cost 0.28 euros per transfer and debit cards cost 0.23 euros per transaction[44]. The unit cost for credit transfers derives in large part from staff costs, since each transfer has an implied staff cost of 0.16 euros. The unit cost for debit cards is considerably influenced by costs related to staff and to specialist and third-party services. Each debit card transaction costs 0.07 euros in staff costs and 0.09 euros in specialist and third-party costs.

The credit card has the highest unit cost at 2.44 euros per transaction[45]. Of this, 0.89 euros stems from other costs, most of them, as mentioned earlier, related to insurance. The high credit card cost also derives from staff costs (0.67 euros per transaction) and specialist and third-party services costs (0.60 euros per transaction).

The unit costs for debit and credit cards are influenced, to a large extent, by the allocation of acquiring-related costs to payment cards[46].

[44] This compares with 0.25 euros in the Netherlands (Table II.4) and with 0.27 euros in Belgium (Table II.7). In these cases, however, only debit cards used at point of sale are considered.

[45] This compares with a unit cost of 3.35 euros per transaction in the Netherlands (Table II.4) and with 2.07 euros in Belgium (Table II.7).

[46] Without acquiring costs being allocated to payment cards, the unit costs per transaction would be 0.19 euros for debit cards and 1.76 euros for credit cards.

Table II. 16

UNIT COSTS FOR THE BANKING SECTOR PER PAYMENT INSTRUMENT

	Total cost (million of euros)	Unit cost (euros)	Unit
Cash	196.3	1.85	withdrawal/deposit at branch counter
Direct debits	14.0	0.09	direct debit instruction
Cheques	327.3	1.45	cheque presented
Credit transfers	26.1	0.28	transfer
Credit cards	266.9	2.44	transaction
Debit cards	308.1	0.23	transaction
Of which:			
Cash withdrawal/deposit at ATM	-	0.35	withdrawal/deposit at ATM

Unit cost for cash withdrawal or deposit at a branch counter is 1.85 euros and 1.45 euros for cheques. Staff costs and specialist and third-party services costs account for a large part of these unit costs. In terms of cash, each withdrawal or deposit at a branch counter costs 1.02 euros in staff costs and 0.32 euros in specialist and third-party services. The figures for cheques are 0.83 and 0.28 euros respectively.

Table II. 17

UNIT COSTS FOR THE BANKING SECTOR PER PAYMENT INSTRUMENT. CONTRIBUTION OF EACH COMPONENT OF COSTS OF RESOURCES USED (IN EUROS)

	Staff costs	Comissions paid	Specialist and third-party services	Rentals and depreciations	Other costs	Total costs
Cash	1.02	0.00	0.32	0.25	0.26	1.85
Direct debits	0.03	0.00	0.04	0.01	0.01	0.09
Cheques	0.83	0.01	0.28	0.19	0.14	1.45
Credit transfers	0.16	0.00	0.06	0.03	0.03	0.28
Credit cards	0.67	0.11	0.60	0.17	0.89	2.44
Debit cards	0.07	0.02	0.09	0.03	0.03	0.23

Note: Units are as used in Table II.16.

It can be seen that paper-based payment instruments (cash and cheques) have considerably higher unit costs than the electronic instruments that may eventually replace them (debit cards, direct debits and credit transfers).

6.3.3. Payment service cost comparison with other countries

Among the studies analysed in Chapter 5, only the work carried out by the central banks of Norway (Gresvik and Owre, 2002) and Sweden (Guibourg and Segendorf, 2004) are directly comparable, since they are the only ones that relate to overall costs for their banking system (See Table II.18).

Norway and Sweden, however, use different methodologies than the one adopted for the Portuguese study, so the comparison of unit cost estimates must be made with some caution. There are added

difficulties in the fact that, for the considered countries, certain payment instruments have different features and functions, even if they have the same name.

A comparison of cash withdrawals and deposits and transfers[47] shows that unit costs for paper-based payment instruments are higher than unit costs for their electronic equivalents.

For these countries, unit costs for cash withdrawals at a branch counter are always higher than those estimated for ATM withdrawals. In the same way, transfers carried out over the counter cost a great deal more than those carried out over the internet.

Table II.18 also shows that, in terms of cash withdrawals and deposits and credit transfers at a branch counter, unit costs in Portugal are lower than in Norway but higher than in Sweden. For cash withdrawals and deposits at an ATM and credit transfers over the internet, unit costs in Portugal are lower than in Norway and in Sweden.

Table II. 18

UNIT COST COMPARISON WITH OTHER COUNTRIES [(a)]

	Unit cost (euro)
Cash withdrawal/deposit at branch counter	
Norway	1.88
Sweden	1.21
Portugal	1.85
Cash withdrawal/deposit at ATM	
Norway	1.07
Sweden	0.51
Portugal	0.35
Credit transfer (at branch counter)	
Norway	1.63
Sweden	0.73
Portugal	0.74
Credit transfer (internet)	
Norway	1.00[(b)]
Sweden	0.13
Portugal	0.07

Sources: Portugal – Participanting institutions;
Norway – Gresvick and Owre (2002);
Sweden – Guibourg and Segendorf (2004).

Notes: [(a)] Portugal – data relating to 2005; Norway – data relating 2001; and Sweden – data relating to 2002.
[(b)] Unit cost of internet credit transfers in Norway is high because this is a service which is *"relatively new and introduction costs are... high. Moreover, the computer systems have substantial surplus capacity"* (Gresvick and Owre, 2002, page 27).

6.3.4. Total revenue from payment instruments

For 2005, total revenue from payment instruments was estimated at 722.0 million euros, representing 0.49% of GDP. It should be noted that the analysis of revenues from payment instruments (described in

[47] Unit costs for credit transfers were estimated at 0.74 euros when at a branch counter and 0.07 euros via internet.

section 6.2) does not include: (i) the revenue from interbank fees, with the same norm also applied to costs; and (ii) interest from credit cards[48].

The information in Table II.19 shows that payment cards are responsible for 74.5% of total revenue from payment instruments, standing at 538.0 million euros. This relates in large measure to annuity fees and bank pricing policies. Credit cards account for 286.9 million euros and debit cards for the remainder. It should also be noted that the estimate of revenue from payment cards is strongly influenced by the fact that acquiring-related revenues are imputed here, as already explained. Revenue from cheques is 129.1 million euros, 17.9% of the total revenue from payment instruments. This figure is related above all to the revenue from issuing cheques and fees applied to customers and retailers.[49]

Table II. 19

TOTAL REVENUE PER PAYMENT INSTRUMENT

	Amount (million of euros)	Structure (%)
Total revenue	**722.0**	**100.0**
Cash	8.3	1.2
Direct debits	22.3	3.1
Cheques	129.1	17.9
Credit transfers	24.2	3.3
Credit cards	286.9	39.7
Debit cards	251.1	34.8

The remaining payment instruments (cash, direct debits and credit transfers) account together for 7.6% of total revenue. The low figure for cash derives fundamentally from the fact that most revenue is from interbank fees and is therefore not included in the analysis. Seen with this in mind, the revenue from cash comes from fees charged on withdrawals and deposits at bank counters. Most of the revenue from direct debits and credit transfers (again excluding interbank tariff) comes from fees charged respectively to the creditor and the customer issuing the instruction.

6.3.5. Net costs and coverage rates per payment instrument

Cash and cheques have the biggest net unit costs for the banking system. Cash is the payment instrument which brings in least unit revenue, with a 0.08 euro gain for each deposit or withdrawal at the counter (Table II.20). Comparing this with unit costs gives us a net unit cost of 1.77 euros for each cash deposit or withdrawal at the counter,

Every cheque presented has a net unit cost of 0.88 euros (total unit cost being 1.45 euros for each cheque and unit revenue 0.57 euros).

[48] Including interest, total estimated revenues would be 847.7 million euros, representing 0.58% of GDP.

[49] Including revenue from the float, revenue from cheques would be 173.9 million euros, representing 19.5% of the total revenue relating to payment instruments. Revenue from the float accrues to the accepting bank and derives from the fact that it has funds available between the date the cheques were deposited and the date on which they are credited to the customer's account. In this study, the float was estimated on the basis of the overnight rate for the interbank money market (annual average for 2005), and assuming a two-day availability period. Decree-Law 18/2007 of 22 January brought down this period and consequantly the value of the float (see footnote 51).

Credit cards have the highest unit revenue, with 2.62 euros per transaction, and the biggest net unit negative cost, at 0.18 euros per transaction. Each transaction with a debit card generates a unit cost of 0.23 euros per transaction and gives the banks a net revenue of 0.04 euros.

Each direct debit generates a net 0.05 euro gain, with unit cost of 0.09 and unit revenue of 0.15 euros. Each credit transfer, however, generates a 0.02 euro loss for the banking system. Credit transfers and payment cards are those payment instruments with the best balance between unit costs and the revenue generated by their use.

Table II. 20

UNIT COSTS AND REVENUES FOR THE BANKING SECTOR PER PAYMENT INSTRUMENT (IN EUROS)

	Unit cost	Unit revenue	Net unit cost	Unit
Cash	1.85	0.08	1.77	withdrawal/deposit at branch counter
Direct debits	0.09	0.15	-0.05	direct debit instruction
Cheques	1.45	0.57	0.88	cheque presented
Credit transfers	0.28	0.26	0.02	transfer
Credit cards	2.44	2.62	-0.18	transaction
Debit cards	0.23	0.18	0.04	transaction

In terms of the banking system as a whole, making retail payment instruments available costs a net 416.7 million euros (Table II.21), i.e. the revenue generated covers 63.4% of the costs.[50]

On the downside are cash, cheques and debit cards, with credit cards and direct debits coming in on the upside. The net cost of credit transfers is practically nil.

In this picture:

(i) the net cost related to cash stands at 188.0 million euros, a coverage rate of 4.3%;

(ii) the coverage rate for cheques is 39.4%, the net cost being 198.2 million euros[51];

(iii) the costs of debit cards are 57.0 million euros more than revenues, giving a coverage rate of 81.5%;

(iv) revenues from credit cards is 107.5% of the costs, giving a 20.0 million euro net profit;

(v) the net revenue from direct debits comes in at 22.3 million euros, giving a coverage rate of 159.5%.

[50] In Norway, prices cover 70% of the costs, in Sweden 69%.

[51] If revenue from the float were included, cheques would present a coverage rate of 53.1% and overall revenues generated by the use of payment instruments would cover 67.3% of costs. Decree-Law 18/2007 of 22 January brought down the float period and consequently the value of the float. With the present regime and with the volume of cheques from 2005, the coverage rate would drop to 47.7%.

Table II. 21

TOTAL COSTS AND REVENUES FOR THE BANKING SECTOR PER PAYMENT INSTRUMENT

	Costs (million of euros)	Revenues (million of euros)	Net costs (million of euros)	Coverage rate (%)
Total	**1,138.7**	**722.0**	**416.7**	**63.4**
Cash	196.3	8.3	188.0	4.3
Direct debits	14.0	22.3	-8.3	159.5
Cheques	327.3	129.1	198.2	39.4
Credit transfers	26.1	24.2	1.9	92.7
Credit cards	266.9	286.9	-20.0	107.5
Debit cards	308.1	251.1	57.0	81.5

6.3.6. Dispersion of extreme values of costs and revenues

The *Banco de Portugal*, following the first information sent by the participanting institutions, and using the methodology described[52], undertook an exhaustive quality control exercise, with tests on consistency, validity, quality and dispersion. Two situations arose as a result: (i) inconsistencies in data supplied by the participants and (ii) unjustified discrepancies between structures of costs and revenues from the participanting institutions. These situations were reviewed, clarified and/or corrected in close co-operation between the *Banco de Portugal* and the institution involved. In the case of inconsistencies in the institution's own data, there were bilateral contacts at technical level, to ensure confidentiality. For discrepancies between structures, the *Banco de Portugal* put together comparative charts to see the specific institution in terms of the sample and the information was passed on and discussed at the steering committee level. This exercise made it possible to obtain enough good quality information for the aims of the study not to be compromised. This can be seen in Tables II.22 and II.23, which relate to the proportion of each payment instrument in the total for each cost item and in the total costs for the institution[53].

[52] See Chapter 6, Section 2.

[53] The dispersion indicators in Tables II.22 and II.23 relating to the maximum/average and minimum/average for costs are obtained, for each of the items in costs of resources used, by A/B and D/B respectively, where:

$$A = Max\left(\frac{c_{ij}}{C_i}\right);\ D = Min\left(\frac{c_{ij}}{C_i}\right);\ \text{e}\ \ B = Average\left(\frac{\sum_i c_{ij}}{\sum_i C_i}\right)$$

with C_i being the total cost of the institution i (ADRPI cost) and c_{ij} the cost of the institution i with payment instrument j.

Table II. 22

DISPERSION INDICATOR FOR DATA RELATED TO THE STRUCTURE OF COSTS OF RESOURCES USED – MAXIMUM/AVERAGE

	Staff costs	Comissions paid	Specialist and third-party services	Rentals and depreciations	Other costs	Total costs
Cash	1.33	*(a)*	1.13	1.97	1.71	1.37
Direct debits	1.91	4.98	2.59	1.69	1.55	1.65
Cheques	1.20	3.40	1.44	1.53	1.24	1.26
Credit transfers	1.79	2.45	1.73	1.83	1.93	1.75
Credit cards	1.27	1.65	1.51	1.22	1.36	1.31
Debit cards	1.55	1.38	1.43	1.20	1.99	1.30

Note: *(a)* The sample average is nil.

Table II. 23

DISPERSION INDICATOR FOR DATA RELATED TO THE STRUCTURE OF COSTS OF RESOURCES USED – MINIMUM/AVERAGE

	Staff costs	Comissions paid	Specialist and third-party services	Rentals and depreciations	Other costs	Total costs
Cash	0.68	*(a)*	0.84	0.55	0.44	0.68
Direct debits	0.08	*(b)*	0.32	0.11	0.36	0.39
Cheques	0.65	*(b)*	0.61	0.30	0.71	0.76
Credit transfers	0.32	0.30	0.23	0.68	0.30	0.35
Credit cards	0.31	0.36	0.33	0.79	0.55	0.39
Debit cards	0.62	0.68	0.63	0.69	0.41	0.72

Note: *(a)* The sample average is nil.
(*b*) The sample minimum is nil.

As an illustration, let us consider the costs with staff involved with cash. This represents 22.4% of the total staff costs involved with payment instruments (Table II.15). Given that the indicator for cash/staff cost is 1.33, staff costs with cash at the institution with the biggest proportion of staff allocated to cash stand at 29.8% (= 22.4 x 1.33) and, for the institution with the lowest proportion, the figure is 15.2% (= 22.4 x 0.68).

In terms of the ratios between the maximum and the average of the sample, Table II.22 shows that the cost item with the biggest dispersion is “Commissions paid”. However, since the proportion of commissions to total costs is only 3.9%, the results in terms of total costs are not significantly affected. Total costs are considerably influenced by the item staff costs and for the two instruments with the biggest proportion in these costs (cash and cheques), the dispersion índex is between 1.33 and 1.20.

When broken down into different payment instruments, it is direct debits and credit transfers that show the biggest dispersion indexes. However, these discrepancies have relatively little impact on total costs in the banking system, given that they are the payment instruments with the least relative importance[54].

In addition, the ratio between the minimum and the average in the sample (Table II.23) confirms that the biggest dispersion occurs in the payment instruments and costs of resources used that have the least impact on overall results.

[54] See Table II.15.

Using the maximum/minimum dispersion indicator for total costs in payment instruments with most share, cash and cheques come in with similar values (2.01 and 1.65), while the indicator for credit cards is 3.37, showing a wider heterogeneity of support structures for this activity in the participating institutions.

As far as revenue is concerned, the indicators in Table II.24[55] show that all the payment instruments have quite significant levels of dispersion. Cash, direct debits and credit transfers are the most homogeneous. However, the effect of this dispersion has little impact on total revenues, since the relative proportion of these instruments in total revenue is only 7.6%[56].

Table II. 24

DISPERSION INDICATORS FOR DATA RELATED TO REVENUES – MAXIMUM/AVERAGE AND MINIMUM/AVERAGE

	maximum/average	Minimum/average
Cash	2.24	0.03
Direct debits	1.96	0.24
Cheques	1.40	0.57
Credit transfers	1.98	0.61
Credit cards	1.51	0.67
Debit cards	1.63	0.47

[55] The dispersion indicators in Table II.24, relating to the maximum/average and minimum/average for revenues are obtained, for each of the items in revenues, by E/F and G/F respectively where:

$$E = Max\left(\frac{p_{ij}}{P_i}\right);\ G = Min\left(\frac{p_{ij}}{P_i}\right);\ \text{e}\ F = Average\left(\frac{\sum_i p_{ij}}{\sum_i P_i}\right)$$

with P_i being the total revenue of the institution *i* and p_{ij} the revenue of the institution *i* with payment instrument *j*.

[56] See Table II.19.

7. FURTHER DEVELOPMENTS

This analysis of retail payment instruments in Portugal has provided an additional contribution towards the performance of the oversight policy of the *Banco de Portugal*.

It is, in fact, a work with a breadth and detail that has no match in previous studies. In addition, this is the first of its kind, and relates to one year (2005), so it does not provide for the evolution in costs and revenues for the retail payments systems. It does, however, provide a basis for an analysis of the relative efficiency of payment instruments and their contribution to economic and social welfare. The experience gained during this first work has laid the groundwork for further studies. It has also created the opportunity for improvements in various areas, among them (i) methodology and (ii) data collection and processing.

7.1. Methodology

One of the practical problems encountered is that the participating institutions do not have an accounting structure compatible with the ABC method, and this makes it difficult to evaluate the costs of payment instruments, specifically in terms of the allocation of costs to the activities. With total costs booked in costs centres, it was necessary to transpose those costs to the activities directly related to payment instruments (ADRPI) and to the respective supporting activitivies (ASUP). This transposition was carried out using cost driver factors, which the participating institutions were free to choose. If the cost drivers are very different, of course, cost estimates can come in with big discrepancies[57], with effects on the comparative and sensitivity analyses. Common or harmonised cost drivers should therefore be used in any future work of this kind.

The list of activities in Table II.9 shows that this study focused on activities directly related to making payment instruments available. Because some of these activities may not have been individually specified, a heading “Other activities” was created. Since this was considered a residual activity, the participating institutions were asked to make every effort to allocate costs to the specified activities, minimizing the possibility of overestimating this “Other activities” heading.

Each participating institution carried out an in-house survey to identify what activities were directly related to payment instruments. However, activities carried out by large banks are not necessarily the same as those performed by smaller size banks. This point was taken into account during the discussions with all participants. The different proposals were consolidated in a list of activities which, in principle, reflects every aspect of all the institutions. The approach used here could also have resulted in activities not sufficiently detailed. The level of activity aggregation is not uniform and the criterion for the definition of the adequate detail level should be the cost-benefit relationship. A more detailed list of activities would give a better perspective on banking operations in this field, and such a list is recommended for future studies, with a better description and definition of the content and scope of each activity.

As already explained, the institutions collected information by filling in individualised matrixes and the respective back-up charts, for each payment instrument. On these matrixes, activities are listed on the

[57] This is very clear in the dispersion indicators in the structure of costs. It was hoped that they would have been far less, given that the banks have a relatively homogenous range of activities.

left and the columns relate to costs and revenues by nature. However, while costs were supplied on the basis of detailed activities, revenues came in broken down into their nature. As a result, revenues could not be related to specific activities and it was impossible to reach an economic balance for each activity and each channel.

The differences between the scope of this work and studies carried out in other countries raise interesting considerations for future developments.

Firstly, studies carried out by other central banks analyse the costs and revenues related to payment instruments for the different players in the payment chain − banks, central bank, retailers and consumers. This study focused on costs and revenues for the banking system. Future work should include costs and revenues for retailers and consumers. In addition, the Portuguese payment system has specific features relating to the payment of services (electricity, water, and mobile phone payments among others) and it would be extremely interesting to involve other non-banking service providers in future studies.

Secondly, the main aim of most international studies is to analyse the pricing and cost policies involved, with a view to improving the efficiency of retail payment systems. In this study, the prices charged to consumers and retailers did not come into the equation and it is therefore difficult to measure how prices for each instrument reflect the cost of making it available.

7.2. Data collection and processing

As detailed earlier[58], the quality control of information meant that it was possible to reach a satisfactory level of quality for the aims of this study. However, there is less dispersion in terms of aggregate data relating to payment instrument than by activity and/or payment channel. Further studies should therefore put more emphasis on the analysis of activities and payment channels in order to get information of better quality when broken down. Special attention here is warranted by the advent of new channels for electronic payments, their increasing use and the adjustment of payment instruments in Portugal to the Single Euro Payment Area (SEPA). The Internet, for example, provides clear advantages both for the consumer and the banks and should be subject to in-depth analysis. As suggested above, the list of activities should be wider in scope and more detailed in content. Only in this way can better quality be obtained for activities and/or payment channels.

The dispersion of values supplied by the participating institutions may relate to any of three situations: (i) errors in the selection and reporting/collection of information (for example in the imputation of costs to payment instruments and activities); (ii) differences in reaching a figure for volume of transactions; and (iii) the existence of economies of scale and gains in efficiency. Any future studies should focus on the situations that give rise to the dispersion. In the light of this, errors in collection and reporting should be cut as much as possible and the true size of economies of scale and gains in efficiency should be measured closely.

Differences in the volume of transactions are particularly relevant for payment cards. There are in fact, distinct views on what types of operations should be considered as payment card transactions: some institutions include non-financial operations (like checking account balances and entries), others just

[58] See Chapter 6, Section 3.6.

consider operations that affect an account (such as purchases and payment of services). Also, different institutions have specific payment services: some have dual credit/debit cards (mixed cards), others separate the functions and make available “pure” debit or “pure” credit cards. It is difficult to separate credit and debit operations on mixed cards, and this can lead to double records or to the use of less realistic estimates.

PART III – ECONOMIC AND WELFARE ANALYSIS

8. Introduction

In Chapter 9 of this study, there is a summary of the main academic work on the costs and benefits of payment instruments from the point of view of "social welfare." These studies look at the variables that influence the adoption of new payment instruments, the increase in economies of scale provided by new technologies and the social benefits from replacing paper-based by electronic payment instruments. Their conclusions converge on the importance of relative price in consumer choice, the role of payment infrastructures in the spread of new instruments, the existence of considerable economies of scale for the banks in the provision of electronic payment instruments and the large potential social gains deriving from replacement of paper-based by electronic forms.

The studies on other countries' experiences conclude that the effectiveness of a pricing policy depends significantly on consumer/user knowledge of the price of services and payment channels. The findings from the surveys mentioned above suggest that only a relatively small number of consumers and small-scale retailers have a detailed knowledge of such prices.

The findings from an array of surveys involving consumer and small and large-scale retailers provide the data for an analysis of payment instruments used at point of sale. Chapter 10 summarises the main findings, these being: (i) the relatively small use of cheques; and (ii) the dominant position of cash, followed by debit card and credit card. These findings tally with other patterns of use of payment instruments in countries across Europe.

Chapter 11 uses information from banks on unit costs and processing time for payments through different channels (branch counter and ATM) to show that there are major economies of scale in unit costs relating to electronic/automatic channels. An estimate was made of "real gains already achieved" based on numbers of transactions carried out in the various channels. These gains are related to processing time and transaction costs from the use of ATMs. "Potential gains" were also calculated on the basis of the ATM replacing counter operations completely. In those cases where information with quality is available, the results are impressive.

The same chapter also has estimates of the benefits for consumers and banks from the use of more efficient payment instruments.

9. SUMMARY OF THE MAIN FINDINGS OF PUBLISHED STUDIES ON PAYMENT SYSTEMS

Research on the costs and benefits of payment instruments include a range of diverse works, built in terms of specific instruments and methodology. In addition, some studies use aggregate data per instrument, payment service or sector (banks and retailers), while others use micro-data obtained from consumer surveys.

Some studies also go beyond costs and benefits and also analyse the role of prices in the adoption of new patterns of use of electronic payment instruments. This involves, among other things, estimates of the price elasticity of demand and cross elasticities. Most of these studies suggest that prices have an important role in the choice of the most efficient payment instruments.

Other studies place a greater emphasis on the supply side, making use, for example, of ATM or POS availability indicators as a way of increasing the use of electronic payment instruments.

There are a number of variables that influence the choice of payment instruments to be used at point of sale. Some studies have noted that transaction processing time is a non-negligible cost when choosing the payment instrument to use at point of sale. Others analyse the socio-economic variables (age, income and level of education) which influence the payment instruments that are carried and used. The literature also indicates that the value of the product or service in the transaction influences the choice of payment instruments to be used at point of sale.

A number of studies provide estimates of considerable potential social gains from the spread of electronic payment instruments, replacing cash or cheques. Gains from the spread of new technology are related to economies of scale inherent in electronic systems (extremely large fixed costs and very low variable costs), to network effects (a decision to join a system depends on the numbers who have already joined) and to externalities (a participant gains more as the system is used more).

There follows a brief summary of the main studies in the literature on the costs and benefits of payment instruments.

Humphrey and Berger (1990) analyse the private and social costs of nine payment instruments in the U.S., using as basic information (i) bank costs; (ii) costs to retailers; (iii) estimated cost of use; and (iv) gains associated with consumers' float. The authors concluded that the social cost of cash was the lowest (USD 0.04 per transaction), followed by electronic transfers (USD 0.29), direct debits (USD 0.47), cheques (USD 0.79) and credit card (USD 0.88). For users, however, cheques and, to a lesser extent credit cards, provided advantage because of the float, and this resulted in more use of these instruments, with electronic instruments replacing cheques in fewer instances, with an inefficient social situation as a result.

Wells (1996) replicated the 1990 Humphrey and Berger study with new data and a more developed methodology for cheque costs. The author analysed again the excessive use of cheques in the U.S. and noticed that the float had diminished considerably since the earlier study but the cheque was still very widely used. Wells concluded that the float was not the variable that explained user preference (Table III.1).

Table III. 1

CHEQUES SOCIAL AND PRIVATE COSTS		
	Wells [1]	Humphrey-Berger [2]
Total social costs	$2.78 – 3.09	$1.00
Total private costs	$2.69 – 3	< 0
Memorandum note: float	$0.09	$1.04

Sources: Wells (1996) and Humphrey and Berger (1990).
Notes: [1] Data relating to 1993.
[2] Data relating to 1987.

Humphrey, Pulley, and Vesala (1996) used aggregate data on payment instruments and bank operating costs to measure the cost of using payment instruments in 14 OECD countries for the period 1987 to 1993. The authors analysed the price for payment services, along with the effect of economic and institutional variables on the choice of five payment instruments. They concluded that prices did not explain the difference in use between countries and across the period used for the study.

Humphrey, Willesson, Lindblom, and Bergendahl (2003) used data on operating costs in banks from 12 European countries from the period 1987-1999, and on transactions using cheques, transfers, payment cards and ATMs. They obtained estimates for composite cost functions which suggest economies of scale of around 20% in the cost of payment processing in the 12 countries. The authors concluded that costs of electronic payment instruments (bank transfers and debit cards) came in at between a third and a half of the cost of cash and cheques.[59]

Guibourg and Segendorf (2004) analysed the costs and prices of payment services in Sweden, using data supplied by Swedish banks. The authors concluded that the prices charged to users (especially consumers) differed considerably from the variable cost for most of the payment services supplied by the banks. With regard to this, the authors state: "*especially in the case of consumers, relative prices convey no information at all*".

Garcia Swartz, Hahn and Layne-Farrar (2004) reach estimates of the net social costs of various payment instruments in the U.S., on the basis of surveys on costs to retailers, information from banks and an array of hypotheses on costs and benefits for consumers. From the social point of view, the most efficient payment instruments depend on the average transaction value and the type of retailer. In this study, the highest net social cost was in the use of cash (USD 1.74 for a supermarket transaction of USD 54.00), with cheques standing at between USD 0.89 and USD 1.21, debit card between USD 0.85 and USD 0.92 and credit card the lowest at USD - 0.74.

Klee (2006b) shows that the cost in processing time for transactions also influences the choice of payment instrument, especially between debit card and cheque. Based on information from micro-data on transactions in American supermarkets, Klee's econometric results show that "*holding all else equal, on average, check transactions take approximately forty seconds longer than debit card transactions. On average, debit cards take only 70% of the amount of time a check transaction takes.*"

Humphrey, Kim and Vale (2001) used data on costs and prices at Norwegian banks for the period 1989-1995 to obtain estimates on price elasticity for cash withdrawals from ATMs (-0.5), cheques (-1.07) and debit card at POS terminals (-0.29). The authors concluded that the Norwegian policy of aligning

[59] These figures in Portugal are within the interval [5% - 20%] (see Table II.16).

payment service prices with production costs led to an increase in the use of electronic payment instruments. In the process, there was a considerable cut in the social costs.

Borzekowski and Kiser (2006) looked at the micro-data from a 2004 survey of American consumers. Using econometric regressions, they found evidence that "*results indicate that debit is primarily replacing cash and cheques*". The authors also concluded that: "*we find that substitution patterns are somewhat asymmetric; for example, removing debit would send consumers to cash, checks, and credit, in that order, but removing checks would divert payments equally to debit and cash, then to credit.*"

Ron Borzekowski, E. K. Kiser and S. Ahmed (2006) also used a 2004 survey of American consumers and came up with an estimate of price elasticity of significant import: a 1.8% rise in the price for transactions with debit cards meant the probability of a 12% fall in use. With increasing age, the debit card is used less frequently. These findings on the influence of social and demographic variables on the choice and use of payment instruments are in line with studies by Kennickell and Kwast (1997) and Klee (2006a). Klee's work (2006a) was based on micro data from the "*Survey of Consumer Finances"* for 1995 to 2001 carried out by the Federal Reserve. It shows that "*families that are younger, higher income, and better educated are more likely to use electronic payment instruments, and more than one payment instrument*."

Loix, Pepermans and Van Hove (2005) used micro-data from a 2004 survey of Belgian consumers to show that: (i) the age variable has a negative impact on availability of debit cards in a consumer's wallet or purse, but no impact on availability of credit cards; (ii) the income variable has a positive impact on use of debit and credit cards; and (iii) level of education has a nil effect on availability of debit cards but a positive effect on availability of credit cards.

Bolt, Humphrey and Uittenbogaard (2005) compare the Norwegian experience with the Dutch in terms of the spread of electronic payment instruments and pricing policy for payment services. The authors used aggregate data on debit card transactions per capita, cash withdrawals from ATMs and transfers, both electronic and over the counter, for the period 1990-2004. They obtained estimates of cost equations for these services taking into consideration the availability of ATMs, and POS terminals and prices for services paid by consumers. They concluded that "*the effect of terminal availability on relative debit card and ATM use exceeds that for pricing since the terminal elasticities are larger. This implies that convenience, safety, and other non-price attributes of different payment instruments are themselves an important inducement to change payment use, as long as terminals are available, than is price (…) the shift to electronic payments could have been speeded up when pricing is combined with terminal availability*."

Bento (2004) presents estimates of the social gains from the introduction of automatic infrastructures for electronic payments in Portugal, such as ATMs and POS terminals. A wide network of ATMs gives a saving of 620 million euros per year in time spent going to a bank and waiting in order to withdraw cash. The banks also save in costs related with cash withdrawals. With customers using ATMs more and more, the saving is in the order of 40 million euros per year. The POS network also had a positive effect on generation of business, with estimated gains of around 300 million euros. The author concluded that *"the Portuguese payment system generates economic value of around 1,060 million euros per year."*

10. ASSESSMENT OF PAYMENT INSTRUMENTS IN PORTUGAL: FINDINGS FROM SURVEYS OF CONSUMERS AND RETAILERS

In 2005 Unicre sponsored two surveys in order to collect information on the use of payment cards in Portugal. One involved 1,800 interviews of consumers, the other 1,200 interviews of retailers. This chapter uses the findings from these surveys to look at the use of payment instruments in Portugal. The survey of retailers did not cover companies with more than 100 employees, so the *Banco de Portugal* carried out its own survey of major commercial outlets, thus providing a complement to the Unicre survey.

10.1. Consumer survey

The following points were covered in this survey: (i) the choice of payment instruments and the variables that determined such use; (ii) preferences; (iii) the image of payment instruments; (iv) general payment habits; (v) the most highly valued features of specific payment instruments; and (vi) knowledge of the costs of cheques and cards, both debit and credit. The survey involved residents, both genders, aged 15 or more and with a bank account (held by one person or jointly). The technical specifications are in Annex 2. The main findings of the survey are as follows.

In terms of payment instruments held, Table III.2 shows that:

- Most Portuguese have at least two means that they use for payment: cash (notes and coins) and at least one debit card.
- All Portuguese use notes and coins, and over a third (38%) have cheques.
- In the field of cards, the debit card plays a dominant role. More than 80% of people have at least one bank card[60], and more than three-quarters (77%) have one or more debit cards. In addition, 24% of people hold a credit card.

Information on the payment instruments that people have in their wallet or purse at the point of purchase (Table III.2) suggests that:

- 100% carry notes and coins;
- around 30% also carry cheques;
- 75% have at least one debit card and 22% a credit card. These figures show that there is a very high rate of penetration for debit cards.

When these results are compared with those obtained for American consumers (Table III.2), it can be seen that the latter carry most frequently credit cards (60%), and debit cards (53%). Only 40% carry cheques with them.

[60] See Table III.4.

Table III. 2

CONSUMERS – PAYMENT INSTRUMENTS IN WALLET OR PURSE (AS A PERCENTAGE)

	Portugal [1]		USA [2]	
	Possession	Availability	Possession	Availability
Cash	100	100	100	95
Cheques	38	29	83	39
Debit cards	77	75	62	53
Credit cards	24	22	65	60

Sources: Portugal – Unicre (Survey on payment instruments: households).
USA – David C. Stewart, Global Concepts, 2005, FRS Payments Study.
Notes: [1] Data relating to 2005.
[2] Data relating to 2004.

Table III.3 shows a correlation between income and holding electronic payment instruments in wallet or purse. Among consumers with a high monthly income after tax (more than 1,250 euros), 90.0% have a debit card and 54.8% have a credit card. Among consumers with a net income between 751 euros and 1,250 euros, the figure for debit cards drops to 87.0% and credit cards to 29.5%. When net income is below 750 euros, 64.3% of consumers have a debit card and 12.9% a credit card.

Table III.3 also shows that holding cheques is positively related to income: 41.8% of those consumers with monthly income after tax of over 1,250 euros hold cheques, whereas 13.9% of housewives and students hold them.

Table III. 3

CONSUMERS – PAYMENT INSTRUMENTS IN WALLET OR PURSE BY LEVELS OF MONTHLY INCOME[61] (AS A PERCENTAGE)

	Cash	Cheques	Debit cards	Credit cards
Total	99.8	29.0	75.1	21.7
More than 1250 euros	99.8	41.8	90.0	54.8
Between 751 euros and 1250 euros	99.7	28.1	87.0	29.5
Below 750 euros	99.8	28.3	64.3	12.9
Housewives/students	100.0	13.9	71.8	11.7

Source: Unicre (Survey on payment instruments: households)

Table III.4 shows that 57.2% of those surveyed only have a debit card, 20.0% have a debit card and credit card, 3.7% only have a credit card and 19.1% don't have any payment card. The percentage of consumers without any payment card increases with age. A look at just two points on the scale reveals that: (i) 6.0% of those aged 18-34 don't have any payment card; and (ii) 30.8% of those aged 55-64 don't have any payment card.

[61] Personal monthly income after tax (euros/month).

Table III. 4

CONSUMERS – PAYMENT CARDS IN WALLET OR PURSE BY GENDER AND AGE BRACKET (AS A PERCENTAGE)

	Only have debit card	Have debit card and credit card	Only have credit card	Have no card
Total	**57.2**	**20.0**	**3.7**	**19.1**
Gender				
Male	48.7	50.7	56.7	49.5
Female	51.3	49.3	43.3	50.5
By age bracket				
18-24 years	79.2	9.9	4.8	6.0
25-34 years	66.5	23.8	4.4	5.3
35-44 years	59.1	26.1	5.0	9.8
45-54 years	49.8	33.6	2.7	13.9
55-64 years	50.2	15.0	4.1	30.8
Over 64 years	36.3	9.8	1.0	52.8

Source: Unicre (Survey on payment instruments: households).

The survey provided data on payment instruments that consumers choose to have in their wallet or purse, and it also illustrated patterns of payment, in terms of overall use and the differences in choice of instrument at point of sale, depending on the purchase.

For the analysis of differences in choice of payment instrument at point of sale, a series of purchasing situations was considered through a breakdown according to amounts and frequency. The findings are presented in Table III.5 and show the following:

- 88.6% of transactions at point of sale are in cash, 9.8% with debit card, 1.1% with credit card and only 0.4% with a cheque (this pattern holds for both genders).
- Cash is preferred for low-value purchases (up to 30 euros) and for goods most frequently purchased, such as newspapers, magazines, coffee, fruit, bread and milk, restaurant meals and day-to-day clothing.
- For purchases above approximately 80 euros, such as supermarket/hypermarket shopping, household appliances, travel and furniture, the debit card is preferred.
- For day-to-day purchases at an average value (between 30 and 80 euros), such as day-to-day clothing and supermarket/hypermarket, credit cards are used more than cheques (but both at levels considerably lower than cash or debit card).
- For occasional high-value purchases (above approximately 280 euros), such as household appliances, travel or furniture, cheques are used more than credit cards.

Table III. 5

CONSUMERS – PAYMENT INSTRUMENTS PREFERENCES AT POINT OF SALE BY TYPE OF PURCHASE

	Cash (%)	Cheques (%)	Debit card (%)	Credit card (%)	Average purchase (euros)
Total	**88.6**	**0.4**	**9.8**	**1.1**	**10.37**
By type of purchase					
Newspapers, magazines, coffee	98	0	2	0	2.2
Fruit, bread, milk	91	1	8	0	8.0
Restaurant	79	0	19	2	17.1
Day-to-day clothing	59	0	37	4	30.4
Supermarket/hypermarket	43	2	49	6	81.1
Household appliances	31	15	45	9	279.1
Travel	34	14	41	11	475.4
Furniture	28	25	36	11	537.3

Source: Unicre (Survey on payment instruments: households).

A number of published studies, and indeed the work set up by Unicre, have noted that the image of payment instruments in Portugal has considerable influence over the use of specific payment instruments at point of sale. Table III.6 gives a picture of how ten attributes affect use of specific payment instruments. The results are consistent with previous Tables showing what payment instrument people prefer and what they carry around with them.

Portuguese consumers see certain attributes in debit cards: security, ease of use, acceptance by most retailers and control over expenditure. Cash is associated with acceptability and control over expenditure ,but it is also within the reach of everybody and does not cost much to use. Credit cards are valued as they have certain attributes related to access to credit and prestige. Cheques are similar, though to a lesser extent, but they are also seen as high on security and control of expenditure.

These attributes, however, are not seen in the same light by all consumers. The findings set out in Table III.6 (on a scale of 0 to 10) also show:

- cash is top of the points scale valuation at 8.8;
- debit cards come in just above the average, at 6.4;
- cheques have an average value of 3.5, higher only than credit cards[62];
- credit cards are the least appreciated, coming in at an average of 2.9.

It is worth noting that 47% of consumers in the survey said they did not like credit cards at all, thus giving them a zero value. For cheques, 29% are of the same opinion.

[62] The fact that the credit card is more often used than cheques may be related with cost of processing time. This is an important element in consumer choice, as seen in studies carried out in retail outlets in the Netherlands and the USA. These studies suggest that processing times gives cash an advantage (19 seconds in the Netherlands and 35 seconds in the USA), followed by debit card (26 seconds in the Netherlands and 50 seconds in the USA) and by the credit card (28 seconds in the Netherlands and 55 seconds in the USA). In the Netherlands, the electronic purse is the most efficient (14 seconds). In general, processing time is the reason most often given for choice of instrument (Jonker, 2005). Processing cheques takes considerably longer (77.53 seconds in the USA, E. Klee, 2006 b, Paper or Plastic).

Jonker (2005), in a study of the Dutch consumers' valuation of payment instruments, found: (i) debit cards are seen as safe, fast and easy to use; (ii) cash is the cheapest and given high points for ease of use, speed and security; and (iii) credit cards are the most expensive.

Table III. 6

CONSUMERS – ATTRIBUTES AND VALUATION IN PAYMENT INSTRUMENTS (IN PERCENTAGE TERMS UNLESS OTHERWISE INDICATED)

	Cash	Cheques	Debit card	Credit card
Safest	9.1	16.2	13.2	7.8
Easiest/most practical to use	10.6	7.5	14.7	6.5
Most acceptable everywhere	13.2	7.2	11.7	3.1
Available to everyone	13.2	7.6	10.2	2.2
Best for controlling expenditure	11.0	13.2	12.1	4.2
Brings more advantages from use	7.9	8.1	8.9	13.3
Cheapest to use	12.9	6.5	10.2	2.6
Give most discounts on purchases	9.0	6.8	6.1	7.8
Makes credit easier	6.3	12.9	5.7	30.4
Gives more prestige	6.8	13.9	7.2	22.0
Total	**100.0**	**100.0**	**100**	**100.0**
Memorandum item:				
Average valuation (scale 0 to 10)	8.8	3.5	6.4	2.9
Percentage of consumers who do not like it at all (added value = zero)	0	29	15	47

Source: Unicre (Survey on payment instruments: households).

As regards the determinants of the use of payment instruments (Table III.7), the findings suggest that:

- The age variable influences the choice of payment instrument for transactions at point of sale, with those over 55 using cash more frequently than those from other age groups (in more than 90% of transactions) and using payment cards less frequently.
- The income variable is related to the choice of payment instrument for transactions at point of sale, with those on lower income (such as housewives, students and those earning less than 750 euros) using notes and coins more frequently and payment cards less so. On the other hand, consumers with average to high income (above 751 euros) use electronic payment instruments more frequently.
- In the same way, the use of payment instruments at point of sale is also influenced by education. Those with minimum schooling (6 years) use cash and cheques more frequently. On the other hand, those with a higher level of education use debit and credit cards more frequently.

These results are in line with those found in the literature[63].

[63] See Chapter 9.

Table III. 7

CONSUMERS – PAYMENT INSTRUMENTS USED IN TRANSACTIONS BY GENDER, AGE, MONTHLY INCOME AND EDUCATION LEVEL (AS A PERCENTAGE)

	Cash	Cheque	Debit card	Credit card
Total	**88.6**	**0.4**	**9.8**	**1.1**
By gender				
Male	88.4	0.4	9.8	1.3
Female	88.8	0.5	9.8	0.9
By age bracket				
18-24 years	89.4	0.1	9.7	0.7
25-34 years	85.9	0.2	12.8	0.9
35-44 years	87.1	0.2	10.9	1.7
45-54 years	86.9	0.6	11.0	1.4
55-64 years	90.6	0.5	7.8	1.1
Over 64 years	94.4	1.1	4.1	0.4
By income				
More than 1250 euros	81.4	0.3	15.9	2.2
Between 751 and 1250 euros	86.2	0.1	12.1	1.4
Below 750 euros	91.9	0.7	6.8	0.5
Housewives/students	91.6	0.1	7.5	0.7
By education level				
6 years of schooling	94.2	0.8	4.5	0.5
12 years of schooling	87.0	0.2	11.5	1.3
University	80.4	0.3	17.3	1.9

Source: Unicre (Survey on payment instruments: households).

Results of consumer surveys in Portugal are similar to those carried out in other countries (Table III.8).

Table III. 8

USE OF PAYMENT INSTRUMENTS – COMPARISON WITH OTHER COUNTRIES

	Cash	Cheques	Debit cards	Credit cards
Number of transactions (in percentage terms)				
Portugal (2005)	88.6	0.4	9.8	1.1
USA (2005)	33.0	11.0	33.0	19.0
Belgium (2003)	81.3	-	14.8	1.0
The Netherlands (2002)	85.5	-	12.9	0.6
Value of transactions				
Portugal (2005)	56.9	4.1	31.8	6.4
Belgium (2003)	62.7	-	32.2	4.4
The Netherlands (2002)	55.7	-	39.7	4.5
Average value per transaction (euros)				
Portugal (2005)	6.65	87.37	33.78	69.92
Belgium (2003)	17.57	-	49.81	99.02
The Netherlands (2002)	9.37	-	44.13	115.22

Sources: USA – American Bankers Association/ Dove Consulting, Consumer Payment Preferences, 2005.

Belgium – Banque Nationale de Belgique, Coûts, avantages et inconvénients dês différents moyens de paiement, 2005.

The Netherlands – Brits, H. and C. Winder, *Payments are no free lunch*, De Nederlandsche Bank NV, Occasional Studies Vol. 3 no. 2/2005

Portugal – Unicre (Survey on payment instruments: households).

In terms of the proportion of cash used in transactions, the data for Portugal are high but in line with other European countries. The USA is different, with a smaller proportion of cash in transactions and a very high use of credit card and cheques. In terms of value of transactions, Portugal, Belgium and the Netherlands are very similar. Cash is top in terms of the value of payments at point of sale, followed by debit cards (with around 32 to 40%) and credit cards (with around 4 to 6,5%).

As for average transaction amount per payment instrument, there are considerable differences in absolute values. However, in terms of ranking of the average transaction value, all the countries studied place cash as the payment instrument for the lowest average value, followed by debit cards and then credit cards. The average outlay for Portugal was 10.37 euros, compared with 22.78 euros for Belgium and 14.39 euros for the Netherlands.

The Unicre survey also collected information on Portuguese consumers' perception of the price they pay for their payment instruments (debit and credit cards and cheques). This is important, since there are hardly any examples of a price having to be paid at point of sale in Portugal. The clearest costs are those paid by consumers for cheque books and the annual payment for debit and credit cards. However, more than half of those who possess these payment instruments said they did not know how much they cost.

As illustrated in Fig. III.1, 49% of consumers who used cheques for purchases in shops in 2005 said they knew what the cost of cheques was. Fig. III.2 shows that when asked about the cost of a cheque acquired at an ATM, only 25% from the same group said that they knew what the cost was. The perceived average cost for a cheque book (containing 25 cheques on average) was 0.5 euros per cheque and 1.1 euros for a cheque acquired at an ATM.

Fig. III.1 Perception of the cost of cheque books

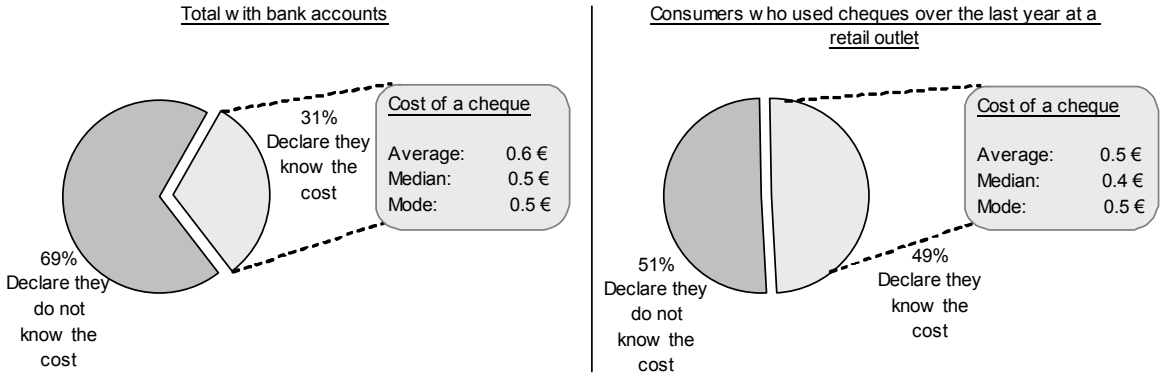
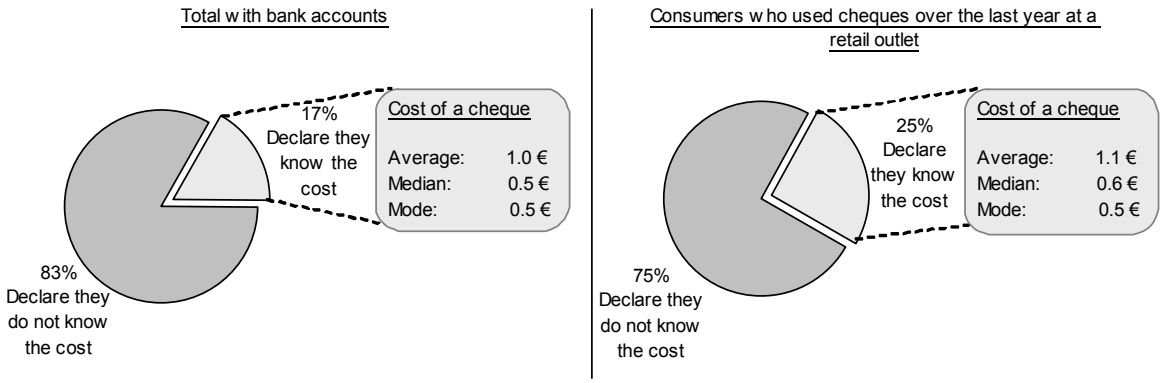


Fig. III.2 Perception of the cost of a cheque at ATM



As for payment cards, 38% of those holding a debit card and 41% of those holding a credit card state that they know the annual charge (Fig. III.3). The average annual charge perceived is 8.8 euros for debit cards and 14.5 euros for credit cards. It is also important to note that a considerable number of people in the survey stated that they did not pay an annual charge (and in fact this is what is most frequently mentioned for both types).

On top of this, the majority of credit card holders do not know the interest rate applied on the outstanding balance for their card. The information presented in Fig. III.4 shows that only 18% of those who have a credit card state that they know the interest rate applied. For those who have a credit card and pay in instalments, this figure is 23%. The average rate perceived is 8.9% for those who have a credit card and pay the total amount and 10.5% for those who pay in instalments.

Fig. III.3 Perception of the cost of annual charge for debit and credit cards

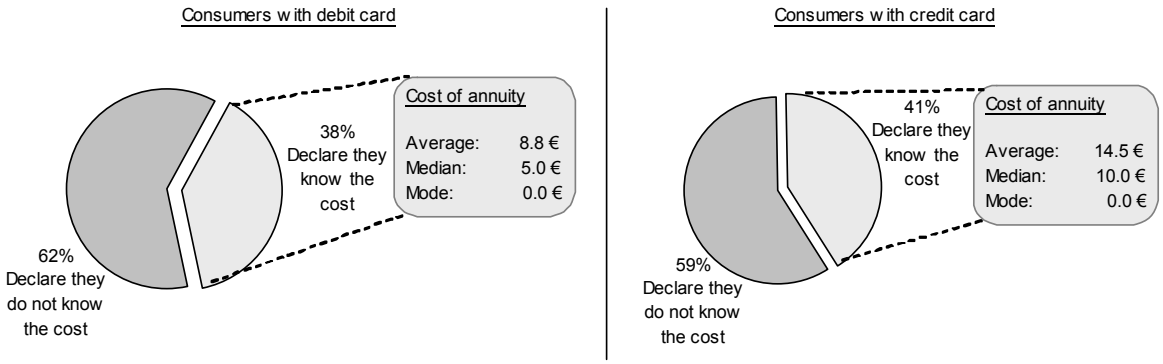
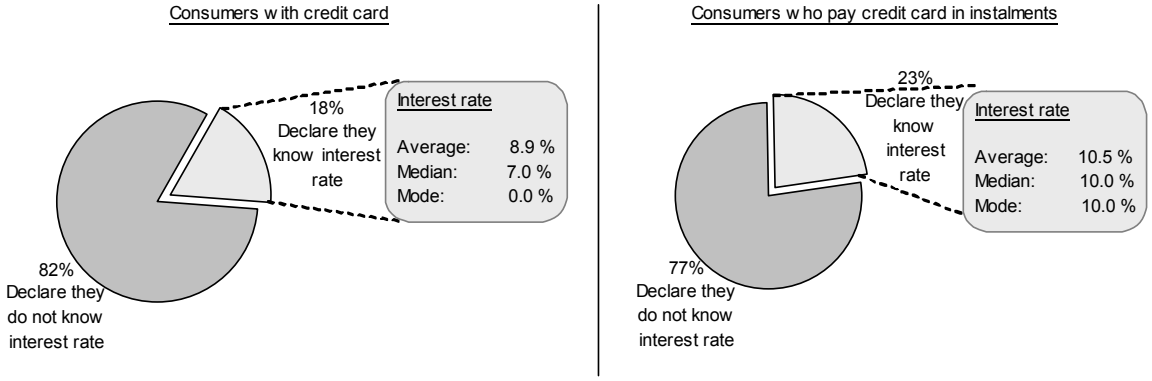


Fig. III.4 Perception of the interest rate for credit cards



The findings revealed by this survey lead to the conclusion that the consumers' knowledge of the costs of holding payment instruments is clearly insufficient for them to opt for the most efficient instrument at point of sale.

10.2. Survey of retailers

There were various aims for this survey, among them the collection of information on patterns of payment instrument use and the costs related to handling and management. The survey only covered small-scale retailers (those with less than 100 employees). The technical data are in Annex 3.

In terms of payment instruments accepted (Table III.9) it is clear that:

- All retailers accept cash as a means of payment.
- Cheques are accepted by 66% of retailers and debit cards by 27%.
- Only 11% of retailers accept credit cards.

These findings suggest that there is a relatively low rate of acceptance for electronic payment instruments. The rates are considerably below those pertaining in Belgium (Table III.9).

Table III. 9

RETAILERS – ACCEPTANCE OF PAYMENT INSTRUMENTS (AS A PERCENTAGE)

	Portugal	Belgium
Accept cash	100	100
Accept cheques	66	-
Accept debit cards	27	93
Accept credit cards	11	69
Accept others [(1)]	4	61

Sources: Portugal – Unicre (Survey on payment instruments: retailers).
Belgium – Banque Nationale de Belgique (2005).
Note: [(1)] store card, pre-paid card and electronic purse.

As can be seen in Table III.10, acceptance of cheques and payment cards is related to the average amount of the purchase. Where cheques are concerned, 66% of retailers accept this payment instrument, but the rate goes up as the average amount of sales increases: for sales with an average value lower than or equal to 15 euros, the acceptance rate is 49%, but this goes up to 85% for sales above 25 euros. A similar situation occurs with payment cards, although the thresholds are lower: for average sales lower than or equal to 15 euros, only 12% of retailers accept payment cards, while for an average value above 25 euros, the acceptance rate is 45%.

Table III. 10

RETAILERS – ACCEPTANCE OF CHEQUES AND PAYMENT CARDS, PER AVERAGE SALE VALUE (AS A PERCENTAGE)

	Below 15 euros	From 15.1 to 25 euros	Above 25 euros	Total
Cheques				
Accepted	49	81	85	66
Not accepted	51	20	15	34
Payment cards				
Accepted	12	42	45	27
Not accepted	88	58	55	73

Source: Unicre (Survey on payment instruments: retailers).

The results of the survey also suggest that there is a strong link between the size of the company (in terms of number of employees) and the use of electronic payment instruments for transactions (debit cards and credit cards). The information in Table III.11 confirms this, as the following facts illustrate:

- For retailers with only one employee, 91.5% of payments were made in cash, whereas in outlets with more than 20 employees, this percentage was 71.6%.
- For outlets with only one employee, 3.4% of payments were made with debit card and 0,1% with credit card, whereas in outlets with more than 20 employees the figures were 23.0% and 2.3%, respectively.
- The use of cheques did not vary significantly according to the size of the retailer, its use being in 2.2% of cases where there was only one employee, 3.8% in retailers with between 10 and 19 employees and 2.3% where there were more than 20 employees.

Table III. 11

RETAILERS – USE OF PAYMENT INSTRUMENTS, ACCORDING TO COMPANY SIZE, MEASURED BY NUMBER OF STAFF SERVING (AS A PERCENTAGE)

	Cash	Cheques	Debit card	Credit card	Others
Staff on service:					
1	91.5	2.2	3.4	0.1	2.8
2 to 9	85.8	2.4	10.7	0.8	0.3
10 to 19	78.2	3.8	15.0	1.5	1.5
20 to 99	71.6	2.3	23.0	2.3	0.9
Total	**87.9**	**2.4**	**7.7**	**0.5**	**1.6**

Source: Unicre (Survey on payment instruments: retailers).

Data on purchase value (Table III.12) show that cash is the most frequently used instrument for low-value payments. Transactions up to 50 euros account for 98% of the total and most of them involve cash. For purchases below 100 euros, cash is the means of payment most frequently used, followed by debit card a long way behind. For purchases above 100 euros, cheques are used more than any other payment instrument. The credit card is considerably below the other payment instruments in terms of use, with maximum use for purchases between 100 euros and 1,000 euros. Each sale using cash therefore has an average value of 13.5 euros and each transaction with a cheque comes in at an average of 145.3 euros. The average figure for debit cards is 35.4 euros and for credit cards it is 117.7 euros.

Table III. 12

RETAILERS – USE OF PAYMENT INSTRUMENTS AND STRUCTURE OF TRANSACTIONS PER SALES VALUE BRACKET

	Cash	Cheques	Debit card	Credit card	Others	Total
Sales value (in terms of percentage)						
Below 10 euros	94.1	0.6	3.5	0.2	1.7	61.4
Between 10 and 20 euros	84.6	2.4	11.1	0.5	1.4	28.0
Between 20 and 50 euros	65.1	8.6	23.0	2.0	1.3	8.6
Between 50 and 100 euros	44.3	23.7	25.9	4.3	1.9	1.5
Between 100 and 500 euros	22.4	45.1	20.4	11.0	0.8	0.3
Between 500 and 1000 euros	15.1	60.2	14.0	10.8	2.2	0.1
Above 1000 euros	14.8	65.9	9.1	8.0	1.1	0.1
Total	**87.9**	**2.4**	**7.7**	**0.5**	**1.6**	**100.0**
Average value of transaction (euros)	13.5	145.3	35.4	117.7	17.5	18.9

Source: Unicre (Survey on payment instruments: retailers).

When asked about time spent handling cheques and cash[64] (Fig. III.5), 67% of retailers who accept cheques said they spent on average 9.4 minutes per day on this activity. However, only 24% of retailers who accept cheques said they had costs involved with handling and management[65]. This came out at 3.3 euros per day on average (Fig. 3.6). Retailers state that they spend on average 17.5 minutes per day on handling notes and coins (Fig. III.5). However, only 24% of retailers who accept cash mentioned that they had costs involved with handling notes and coins[66] (Fig. III.6). This comes out at 4.3 euros per day on average. In short, the survey suggests that handling of cash brings costs above those for handling cheques, both in terms of time (minutes/day) and money (euros/day).

[64] The time spent on handling cheques and cash includes, among other things, time spent preparing cash tills, end-of-day cash management, cheque verification, visits to bank branch for deposits and to pick up small change.

[65] Cost of cheque handling and management covers expenditure on the retailer's cheque-related business such as problems with cheques without cover.

[66] Cost of cash handling and management includes mistakes when giving change, theft and so on.

Fig. III.5 Time spent handling cheques and cash

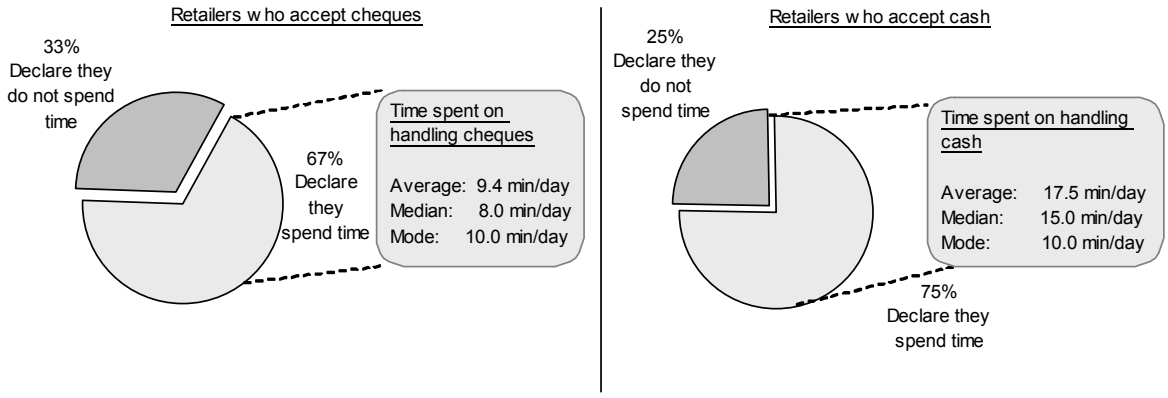
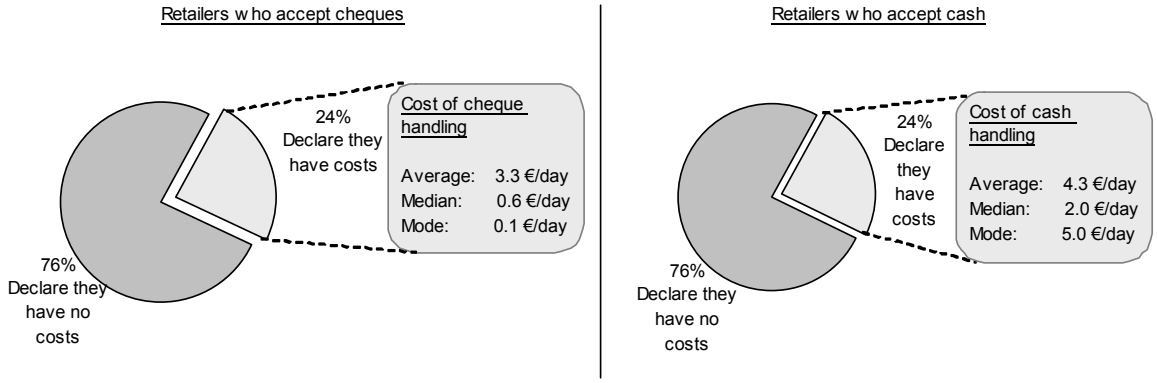


Fig. III.6 Cost of handling and management of cheques and cash



In terms of payment cards, retailers incur costs when joining a card scheme and putting in the terminals, as well as with monthly payments and discounts. The survey found that retailers have very little knowledge about the costs involved in accepting the various kinds of payment instrument, irrespective of the scheme they are on. This may lead to less efficient choices when it comes to the payment instruments given preferential treatment.

10.3. Survey of large retail outlets

The survey undertaken by Unicre only covered companies with less than 100 employees and it was felt that this needed to be complemented by further work, so the *Banco de Portugal* made a survey of large outlets.

The aim of this survey was to gather information on the use of payment instruments at point of sale during March 2006. Specific focus was put on the pattern of use, the average payment amount for each type of instrument and an estimate of the costs borne by the companies from the use of various payment instruments. With this in mind, 23 questionnaires were sent to a short list of companies with more than 100 employees. The questionnaire is in Annex 4.

The companies surveyed were: (i) non-specific wholesalers – CAE 519; (ii) non-specialist retailers – CAE 521; (iii) retail operations in specialist trade in new goods – CAE 524; and (iv) restaurants – CAE 553.

There were 16 replies to the 23 questionnaires sent out, a 70% response rate, from businesses within the CAE categories 521 and 524. However, among the replies there were 3 that were excluded, 2 for insufficient information, the other for deviating significantly from the standard.[67] No statistical treatment was given to non-replies.

There were also 8 replies from companies that had not been on the short list, but were part of a commercial group which included one of the short-listed. After consultation of the statistical files of Portugal's National Statistical Institute, five were used in the analysis.

Table III. 13

SAMPLE REPRESENTATIVENESS FOR THE QUESTIONNAIRE FOR LARGE RETAIL OUTLETS (AS A PERCENTAGE)

	Replies received		Valid replies	
	Total – proportion of companies in the sector	Total – companies with more than 100 employees	Total – proportion of companies in the sector	Total – companies with more than 100 employees
Staff on service	14.1	52.7	13.2	49.6
Turnover	23.6	62.5	21.6	57.2

Source: INE (Statistical Unit Files, 2004, extract from June 2006).

For the final results, 18 companies with valid replies were considered. Overall, these replies correspond to 13.2% of the staff and 21.6% of the turnover for the sectors concerned, using as reference figures based on National Statistical Institute information for 2004 (Table III.13). Leaving out companies with less than 100 staff, the replies account for 49.6% of staff and 57.2% of turnover.

The results are presented in Table III.14:

- Cash is the payment instrument most used in large outlets, both in terms of numbers of transactions and value of purchase. It accounts for 66.1% of all transactions and 38,5% of total sales during the month in question.
- The debit card is used in fewer transactions (21.1% of total purchases) but not far from cash in terms of sales (37.3% of total purchases).
- The credit card accounts for 6.8% of transactions, representing 16.3% of total purchases.
- The cheque is the payment instrument used the least, acounting for only 0.1% of transactions and 1.1% of the total sales.

These results point to a pattern of use which is the same as Unicre found for small-scale retailers, apart from the relative positions of cheque and credit card, which are inverted. The cheque is fourth and the credit card third in large retail outlets and the opposite is found in small retailers.

[67] Data from two respondents were adjusted. The total value of payments with Visa Electron was supplied and was included in credit cards, therefore, the following adjustments were adopted: (i) the number of payments with Visa Electron was estimated using the total payments made and the average value of each payment; (ii) the number and value of payments made with Visa Electron were subtracted from credit cards and added to debit cards.

Table III. 14

USE OF PAYMENT INSTRUMENTS IN LARGE OUTLETS (AS A PERCENTAGE)

	Cash	Cheques	Debit card [b]	Credit card [b]	Store/customer card	Others	Total
No. of transactions (% of the total)	66.1	0.1	21.1	6.8	1.1	4.8	100
Small-scale retailers[a]	*87.9*	*2.4*	*7.7*	*0.5*	*n.a.*	*1.6*	*100*
Amount of transactions (% of the total)	38.5	1.1	37.3[a]	16.3%[a]	4.5	2.3	100
Small-scale retailers[a]	*62.8*	*18.1*	*14.4*	*3.2*	*n.a.*	*1.5*	*100.0*

Source: *Banco de Portugal* – QIP, 2006 (Questionnaire on payment instruments carried out by the *Banco de Portugal* in retail outlets with more than 100 staff).

Notes: [a] Results from the survey of small-scale retailers carried out by Unicre.
[b] Ajusted figures (*Visa Electron*).

Table III.15 provides a comparison between the value per transaction found by the *Banco de Portugal* and the figures obtained by Unicre in their survey. The following facts stand out:

- Cash is the means of payment for the lowest amounts in large retail outlets and small-scale retailers (around 13 euros).
- The payment instrument most used for the largest purchases is the cheque, though slightly more in the small-scale retailers (145.28 euros) than in the large outlets (115.45 euros).
- The average value for transactions with debit card is 33.30 euros in the large retail outlets and 35.38 euros in the small-scale retailers.
- Finally, the amount per transaction for the credit card is 49.62 euros in the large retail outlets and 117.67 euros in the small-scale retailers. This divergence[68] can be justified by the following facts: (i) the credit card is less accepted by small-scale retailers[69] compared with large retail outlets, unlike the cheque; and (ii) there are differences in the type of purchases with a credit card in the two kinds of business (Table III.5).

In terms of the information on processing costs for payment instruments overall, only 7 companies sent valid replies, although the sample thus obtained is representative. The number of transactions and the value of the purchases used to calculate unit costs represent 64.3% of total transactions and 54.7% of total sales. For the 7 replies, the average cost was estimated at 18.9 cents per transaction and 0.9 cents per euro of sale. These figures are not far from those obtained for the retail sector in the Netherlands and Belgium (Table III.16).

[68] Of the same order of magnitude after consideration of the weighted value with shop/customer cards.
[69] As mentioned in Chapter 10, Section 2, only 11% of retailers accept credit cards.

Table III. 15

VALUE PER TRANSACTION (EUROS)

	Large outlets [a]	Small-scale retailers [b]
Cash	13.23	13.48
Cheques	115.45	145.28
Debit card [c]	33.30	35.38
Credit card [c]	49.62	117.67
Store/customer card	111.87	-
Others	34.53	17.45
Total	**22.14**	**18.87**

Source: *Banco de Portugal* – QIP, 2006.

Notes: [a] Average weighted value, where the weights used correspond to company share of sales in 2004.
[b] Results from the survey of small-scale retailers carried out by Unicre.
[c] Ajusted figures (*Visa Electron*).

Table III. 16

UNIT COSTS FOR THE RETAIL SECTOR (IN CENTS)

	Per transaction	Per 1 euro of sales
Portugal	18.9	0.9
The Netherlands	17.3	1.2
Belgium	28.1	1.2

Sources: *Banco de Portuga*l – QIP (2006), Table II.4 and Table II.7.

11. ESTIMATES OF THE BENEFITS FOR CONSUMERS AND BANKS DERIVING FROM THE USE OF MORE EFFICIENT PAYMENT INSTRUMENTS

This chapter looks at some estimates of costs and benefits for consumers and banks deriving from the use of different payment instruments and channels. These estimates were obtained from the information supplied by participants (the banks, Unicre and SIBS), specifically in relation to: (i) costs related to processing transactions; (ii) revenues; (iii) average processing time; (iv) number and value of transactions carried out; and (v) other quantitative information on payment cards. The information from the banks and Unicre can be found in Annex 5.

Using the information relating to costs and processing time for the same payment service provided through different channels (at the branch or through an ATM), the real and potential benefits deriving from the use of the most efficient alternative were assessed, both for banks and consumers. The benefits for consumers are in terms of gains in processing time and for the banks in terms of decrease in costs.

The number of transactions used for this exercise corresponds only to the participating banks[70] and Unicre, so the gains underestimate the benefits for the whole banking system.

In addition, the information on costs and revenues was used to compare the change in coverage of costs from the revenues deriving from the replacement of a less efficient by a more efficient payment instrument.

In none of the cases do the estimates of gains take into account the economies of scale underlying the new information and communication technologies.

11.1. Estimated benefits for consumers and banks

The advent of new payment services in the wake of technological progress in information and communications has increased choice for consumers where payments for goods and services are concerned. Electronic payment instruments provide considerable gains in security, ease of use, convenience, processing time, and others. In many cases, however, the benefits are of a qualitative nature and are therefore difficult to quantify. ATMs are a good example. They are available 24 hours a day and are more accessible, with a network considerably more widespread than any bank branch network.

The following methodology was used to estimate the benefits[71]:

a) Survey of the banks to obtain the following information: (i) the number of transactions; (ii) cost per transaction and (iii) average processing time.
b) Assessment of the effective benefit by applying to the number of transactions carried out the differential in time and cost of the two alternatives (branch counter and ATM).
c) Assessment of the potential benefit by appying the differential in time and cost of the two alternatives (branch counter and ATM) to the number of transactions carried out with the payment instrument that consumes most resources.

[70] Account balance and entry checks through the Multibanco network were included in the calculation of gains.

[71] This methodology relating to the estimates of benefits is similar, by and large, to the study by Stavins (1997) on the gains stemming from the electronic cheque replacing the traditional cheque in the USA.

So, two alternatives for the same payment service were considered (branch counter and ATM). Knowing that there are different resources used for each, data was obtained on average processing time, costs per transaction and the number of transactions for the following services: cash deposits, cash withdrawals, credit transfers and checking balance and entries on the account (Table III.17). The data show that the average processing time at an ATM is less than at the branch counter and cost per transaction for a payment service at an ATM is also smaller. Taking cash deposits as an example, and for the consumers, the difference in processing time for the two alternatives is on average 97 seconds. For the banks the difference in cost per transaction is 0.26 euros (Table III.17). So the customer gains 97 seconds by using an ATM, while the banks cut the cost by 0.26 euros.

Table III. 17

AVERAGE PROCESSING TIMES, COSTS PER TRANSACTION AND NUMBER OF TRANSACTIONS

	Average processing time (in seconds)	Cost per transaction (in euros)	No. of transactions (in millions)
Cash deposit [(a)]			
Branch counter	158	0.93	56.5
ATM	61	0.67	16.4
Cash withdrawal [(a)]			
Branch counter	129	0.88	22.1
ATM	35	0.20	431.1
Credit transfers			
Branch counter	271	0.74	5.9
ATM	60	0.14	8.4
Checking account balance			
Branch counter	70	n.a.	n.a.
ATM	36	n.a.	79.8
Checking account entries			
Branch counter	57	n.a.	n.a.
ATM	40	n.a.	155.7

Sources: Participants - banks, Unicre and SIBS.

Note: [(a)] The unit cost for the activity "cash deposit" was estimated at 0.93 euros at branch counter and 0.67 euros at an ATM. For the activity "cash withdrawal", the unit cost was estimated at 0.88 euros at branch counter and 0.20 euros at an ATM. These unit costs are not comparable with the unit cost calculated for cash (1.85 euros, see Table II. 16) because cash includes all the costs related to deposits/withdrawals at a branch counter, such as all the costs related to collection/transport, withdrawal, deposit, safe-keeping and handling of cash at the branch, plus physical treasury management, central management and control, procedures with forged notes, customer service and other activities.

On the basis of this, the real and potential benefits for consumers and banks were calculated. The results are presented in Table III.18.

Taking up the example of cash deposits, the real benefit for consumers who currently use the ATM is a saving in transaction processing time of 443 thousand hours. For those who currently make cash deposits at the branch counter, the potential benefit is a saving of 1,523 hours in processing time, simply by replacing the branch counter by the ATM. For the banks, the real benefits (from deposits currently made at an ATM) and potential benefits (by consumers opting for the ATM instead of the branch counter) are estimated at 4.3 million euros and 14.7 million euros in cost savings, respectively.

The average gross hourly wage in Portugal in 2005, according to OECD data, was 6.34 euros. Therefore, the real savings in processing time for consumers corresponds to 86 million euros for 2005.

To sum up, making new payment services available (ATM, internet and telephone) has led to considerable benefits for both consumers and banks, both in processing time and in costs.

Table III. 18

ESTIMATED BENEFITS TO CONSUMERS AND BANKS FROM REPLACING BRANCH COUNTER OPERATIONS WITH ATMS

	Real benefit	Potential benefit
Cash deposit		
Consumers (in thousands of hours)	443	1,523
Banks (in millions of euros)	4.3[(a)]	14.7
Cash withdrawal		
Consumers (in thousands of hours)	11,207	575
Banks (in millions of euros)	289.9[(b)]	14.9
Credit transfers		
Consumers (in thousands of hours)	491	347
Banks (in millions of euros)	5.1	3.6
Account and entry checking		
Consumers (in thousands of hours)	1,487	n.a.
Banks (in millions of euros)	n.a.	n.a.
Total		
Consumers (in thousands of hours)	**13,628**	**2,445**
Banks (in millions of euros)	**299.3**	**33.2**

Sources: Participants - Banks, Unicre and SIBS.

Notes: [(a)] Corresponding to a reduction in costs on cash deposits of around 0.7% of total costs.

[(b)] Corresponding to a reduction in costs relating to cash to the order of 46% of total costs.

Tables III.19 and III.20 present estimates of (quantifiable) benefits and costs for the consumer deriving from payment cards.

Benefits from using the debit card are estimated at around 8.33 euros per card and 0.10 euros per transaction, while costs stand at 3.57 euros per card and 0.04 euros per transaction. The average annual fee for a debit card is estimated at 2.9 euros,[72] compared with the European average of 9 euros (CE 2007, page 99).

The benefits from using the credit card are estimated at 8.00 euros per card and 0.23 euros per transaction, compared with a cost of 36.29 euros per card and 1.06 euros per transaction. The average annual fee for a credit card is 19.5 euros, compared with an average 23 euros for a VISA and 24 euros for a MasterCard in Europe (CE 2007, page 98).

[72] This estimate was based on total revenues from annual debit card fees and the total number of debit cards issued, irrespective of whether they are being use or not.

Table III. 19

BENEFITS AND COSTS OF DEBIT CARD

	Benefits (thousand euros)	Costs (thousand euros)
Benefits	1,482.0	n.a.
Access to ATMs [a]	71,087.2 [b]	n.a.
Annual fee	n.a.	25,055.0
Other costs [c]	n.a.	6,009.2
Total	**72,569.2**	**31,064.2**
Per transaction (euros) (POS and withdrawals of cash at ATMs)	0.10	0.04
Per card (euros)	8.33	3.57

Sources: Participants – Banks.

Notes: [a] Gains deriving from the use of the ATM network (available 24/7) such as journey, waiting and processing time (Table III.18, compared with branch counter), account and entry checking, ticket purchase, payment to public administration, low-value payments and others.

[b] Monetary value estimated for gains in processing time against branch counter (Table III.18).

[c] Including other costs stemming from the price list, such a request for a replacement card.

Table III. 20

BENEFITS AND COSTS OF CREDIT CARD

	Benefits (thousand euros)	Costs (thousand euros)
Float	9,640.2	n.a.
Points/air miles	10,536.9	n.a.
Annual fee	n.a.	49,042.1
Other costs [a]	n.a.	42,478.2
Total	**20,177.1**	**91,520.3**
Per transaction (in euros)	0.23	1.06
Per card (in euros)	8.00	36.29

Sources: Participants - Banks and Unicre.

Note: [a] This item includes other costs stemming from the price list, e.g. a request for a replacement card.

11.2 Benefits from replacing payment instruments

The gains for society come from replacing an instrument with a higher unit transaction cost by one with a lower unit cost, so an estimate of the benefits was obtained, involving (i) replacement of cheques by bank transfers and direct debit and (ii) replacement of transactions in cash by debit card.

The results obtained in part II of this study were used for this, specifically those relating to unit costs and revenues for the banking sector from making each payment instrument available. These results are summarised in Table III.21.

Table III. 21

UNIT COSTS AND BENEFITS FOR THE BANKING SECTOR PER PAYMENT INSTRUMENT (IN EUROS)

	Unit cost	Unit revenue	Net unit cost	Unit
Cash	1.85	0.08	1.77	withdrawal/deposit at branch counter
Direct debit	0.09	0.15	-0.05	direct debit instruction
Cheques	1.45	0.57	0.88	cheque presented
Credit transfers	0.28	0.26	0.02	transfer
Debit cards	0.23	0.19	0.04	transaction

Source: Table II.20.

So, if one-third of cheques presented in 2005 had been replaced by credit transfers and direct debits, the quantity being the same, a significant improvement would have resulted in the degree of coverage of the costs associated to making payment instruments available.

Replacing cheques by credit transfers and direct debits means a fall in the use of a payment instrument with a high net unit cost (0.88 euros per cheque) and an increase in others with a unit cost that was slightly positive in one case (0.02 euros for credit transfers) and negative for the other (-0.05 euros for direct debits). As a result, the coverage rate moves from 63.4% to 66.5%.

As for the estimate of gains deriving from the replacement of cash by debit card, the unit cost of a deposit or withdrawal from a branch counter is 1.85 euros, compared with 0.23 euros for a debit card transaction (Table III.1). This corresponds to an 8.0 margin. A cash withdrawal may give rise to a number of payments, so the replacement of 8.0 transactions of cash withdrawals by debit card would be neutral in terms of total cost for the payment instruments. In 2005, the average value of withdrawals was 64.62 euros at the ATM, and taking this figure as representative, for transactions with values below 8 euros (=64.62/8.0), the use of cash would be more efficient, while for higher amounts, the use of a debit card leads to gains in terms of the total costs of payment instruments (Table III.22). Table III.5 shows an amount below 8 euros for purchases of newspapers, magazines and expenditure in cafés and on fruit, bread and milk. These correspond to 75% of purchases at point of sale. Around 96% of payments for these goods were made with cash, a situation close to good practice in the use of payment instruments. For purchases above 8 euros, the use of cash comes in at 65% of the payments, a situation very far from an ideal use of payment instruments.

To reach a better estimate of the gains from replacing cash by debit cards, a simulation was made. This involved replacing 10 million cash withdrawals by 80 million debit card payments. In this scenario, the coverage of costs would rise from 63.4% to 64.7%.

Table III. 22

ESTIMATES OF AN EFFICIENT USE OF CASH AND DEBIT CARD

No. of transactions *(1)*	Average value of the transaction (euros) *(2)*	Cost of use of debit card (euros) *(3)*	Gains in cost of transaction (euros) *(4) = 1,85 – (3)*
2	32.31	0.46	1.39
4	16.16	0.92	0.92
6	10.77	1.39	0.46
8	8.08	1.85	0.00

REFERENCES

REFERENCES

American Bankers Association/Dove Consulting, 2006, "2005/2006 Study of Consumer Payment Preferences".

Banque Nationale de Belgique, 2005, "Coûts, avantages et inconvénients des différents moyens de paiement", Dec.

Bento, V., 2004, "O papel económico-social do sistema de pagamentos português", na Conferência dos Sistemas de Pagamentos (a conference presentation on the economic and social role of the payment system in Portugal given in the Payment Systems Conference).

Berger, Allen, N., 2003, "The economic effects of technological progress: evidence from the banking industry", Journal of Money, Credit and Banking, 35, 2, 141-176.

BIS, Red Book – Statistical update, March 2005, Table 13, referring to 2003.

Bolt, W., Humphrey, D. B., and Uittenbogaard, R., 2005, "The effect of transaction pricing on the adoption of electronic payments: a cross-country comparison", Federal Reserve Bank of Philadelphia, Nov.

Borzekowski, R., Kiser, E. K. and Ahmed, S., 2006, "Consumers' use of debit cards: patterns, preferences and price response", Federal Reserve Board, Working Paper 16.

Borzekowski, R. and Kiser, E. K., 2006, "The choice at the checkout: quantifying demand across payment instruments", Federal Reserve Board, Working Paper 17.

Brits, H. and Winder, C., 2005, "Payments are no free lunch", in De Nederlandsche Bank NV Occasional Studies Vol. 3 no. 2/2005.

Canhoto, Ana and J. Dermine, 2003, "A Note on Banking Efficiency in Portugal: New vs. Old Banks." Journal of Banking and Finance 27, 2087-2098.

European Commission / Competition Directorate, 2007, "Report on the retail banking sector inquiry", January.

Cooper, R. and Kaplan, R. S., 1992, "Activity-based Systems: Measuring the Costs of Resource Usage", in Accounting Horizons, 1-13.

De Nederlandsche Bank (Working Group on Costs of POS payment Product), 2004, "The Costs of Payments: survey on the costs involved in POS payment products", March.

Dove Consulting, 2004, 2004 Electronic Payments Study for Retail Payments Office at the Federal Reserve Bank of Atlanta, December.

Evans, D. and Schmalensee, R., 2005, "The Economics of Interchange Fees and their Regulation: An Overview," in Interchange Fees in Credit and Debit Card Networks: What Role for Public Authorities? Federal Reserve Bank of Kansas City.

Federal Reserve System, 2004, The Depository Institutions Payments Study – A Survey of Depository Institutions for the 2004 Federal Reserve Payments Study.

Ferreira, Fernando Alberto Freitas, 2003, Inovação Tecnológica no Sistema Financeiro Português: evolução e perspectivas, Pé de Página, Coimbra (a work on technological innovation in the Portuguese financial system, looking at developments and prospects).

Garcia-Swartz, D., Hahn, R. W., and Layne-Farrar, A., 2004, "The Move toward a Cashless Society: A Closer Look at Payment Instrument Economics," Working Paper 04-20, AEI-Brookings Joint Center, October.

Garcia-Swartz, D., Hahn, R. W. and Layne-Farrar, A., 2004, "The economics of a cashless society: an analysis of the costs and benefits of payment instruments", AEI- Brookings Joint Center for regulatory studies, September.

Gerdes, G.R., Walton, J.K., Liu, M.X. and Parke, D.W., 2005, "Trends in the use of payment instruments in the United States", Federal Reserve Bulletin, Spring, 180-201.

Goetz, B., 1949, "Management, planning and control: A managerial approach to industrial accounting", McGraw-Hill.

Gowrisankaran, G., and Stavins, J., 1999, "Network externalities and technology adoption: lessons from electronic payments", mimeo.

Guariglia, A. and Loke, Y. J., 2004, "What determines the value and volume of noncash transactions? Evidence from a panel of European and North American countries", Applied Economics, 36, 291-303.

Guibourg, G. and Segendorf, B., 2004, "Do Prices Reflect Costs? A study of the price and cost structure of retail payment services in the Swedish banking sector 2002", Working Paper Series 172, Sveriges Riksbank.

Gresvik, O. and Owre, G., 2002, "Costs and Income in the Norwegian Payment System 2001 – An Application of the Activity Based Costing Framework*", Norges Bank, Economic Bulletin Q4.*

Hancock, D. and Humphrey, D. B., 1998, "Payment transactions, instruments, and systems: a survey", Journal of Banking and Finance 21, 1573-1624.

Hayashi, F. and Klee, E., 2003, "Technology adoption and consumer payments: evidence from survey data", Review of Network Economics, Vol. 2-2 (June), 175-190.

Humphrey, D. B. and Berger, A., 1990, "Market failures and resource use: economic incentives to use different payment instruments", in D. Humphrey (ed.), The U.S. Payments System: Efficiency, Risk, and the Role of the Federal Reserve, Kluwer Academic Publishing, Norwell.

Humphrey, D. B., Kim, M., and Vale, B., 2001, "Realizing the gains from electronic payments: costs, pricing and payment choice", Journal of Money, Credit and Banking, vol. 33, no. 2 (May), 216-234.

Humphrey, D. B., Pulley, L. B., and Vesala, J. M., 1996 "Cash, Paper, and Electronic Payments: A Cross Country Analysis", Journal of Money, Credit, and Banking, Vol. 28-4 (November), 914-939.

Humphrey, D. B., Willesson, M., Lindblom, T., and Bergendahl, G., 2003, "What Does it Cost to Make a Payment?", Review of Network Economics, Vol. 2-2 (June), 159-174.

Humphrey, D. B., Willesson, M., Lindblom, T., and Bergendahl, G., 2003, "Cost Savings from electronic payments and ATMs in Europe", Federal Reserve Bank of Philadelphia, Working Paper 03-16, August.

Innes, J. and Mitchell, F., 1995, "Activity-based costing", in Issues in Management Accounting (eds. D. Ashton, T. Hopper and R.W. Scapens), Prentice-Hall, 115-136.

Jonker, N., 2005, “Payment instruments as perceived by consumers – a public survey”, De Nederlandsche Bank, Working Paper 053.

Kaplan, R. S. and Atkinson, A. A., 1998, “Advanced management accounting”, Prentice Hall.

Kennickell, A. B. and Kwast, M. L., 1997, “Who uses electronic banking? Results from the 1995 Survey of Consumer Finances”, Federal Reserve Board.

Klee, E., 2006a, “Families’ use of payment instruments during a decade of change in the US payment system”, Federal Reserve Board, Working Paper 1.

Klee, E., 2006b, “Paper or plastic? The effect of time on check and debit card use at grocery stores”, Federal Reserve Board, Working Paper 2.

Loix, E., Pepermans, R. and Van Hove, L., 2005, “Who’s afraid of the cashless society? Belgian survey evidence”, mimeo.

Observatório do Comércio, 2000, “Estudo Sobre Taxas e Outros Encargos Relativos aos Pagamentos com Cartões de Crédito e Débito em Portugal” (a business think tank study on rates and charges in payments with credit and debit cards in Portugal).

OECD, 2007, Taxing Wages, 2005/06

Office of Fair Trading, 2004, Credit card survey, OFT709.

Markose, S. M. and Loke, Y. J., 2003, “Network effects on cash-card substitution in transactions and low interest rate regimes”, Economic Journal, 113, 456-476.

Resende, Joana and Elvira Silva, 2007, “A Profit Efficiency Perspective on the Future Strategic Positioning of the Portuguese Banks”, University of Oporto, Faculty of Economics, DP0702.

Stavins, J., 1997, “A Comparison of Social Costs and Benefits of Paper Check Presentment and ECP with Truncation”, New England Economic Review, 27-44.

Stavins, J., 2001, “Effect of consumer characteristics on the use of payment instruments”, New England Economic Review, 19-31.

Stewart, D. C., 2005, Federal Reserve Payments Study, Global Concept

Stix, H., 2003, “How do debit cards affect cash demand? Survey data evidence”, Oesterreichische Nationalbank, Working Paper 82.

Stix, H., 2004, “The impact of ATM transactions and cashless payments on cash demand in Austria”, Oesterreichische Nationalbank, Q1/2004.

Sveriges Risksbank, 2006, The Swedish Financial Market.

Wells, K. E., 1996, “Are checks overused?”, Federal Reserve Bank of Minneapolis, Quarterly Review, 2-12.

Unicre, 2005, “Survey on payment instruments: households”.

Unicre, 2005, “Survey on payment instruments: retailers”.

ANNEXES

Annex 1

Table A1. 1

PROJECT TEAMS	
	Participants
Coordination	
Banco de Portugal	Orlando Caliço
Steering Committee	
Portuguese Banking Association	Jorge Patrício Paul
BES	Paulo Santos Paula Ferreira Borges (*)
Banco BPI	António Borges Amaral Pedro Silva Carvalho (*)
Banco Santander Totta	Nuno Frias Costa António David (*)
BCP	Diogo Campello Jorge Almeida (*)
CGD	Leonor Machado
SIBS	Pedro Hipólito
Unicre	Maria João Carioca
Banco de Portugal	Adelino Aguiar Carlos Neves
Permanent Group of Specialists at *Banco de Portugal* (support to Steering Committee)	
Banco de Portugal	Fernando Chau
	Ana Filipa Carvalho
	Maria Tereza Cavaco
	Paula Matos
Technical Working Group	
Portuguese Banking Association	Pedro Sacadura Orvalho
BES	Bruno Pinho Dinora Barroso (*)
Banco BPI	Cristina Marques
Banco Santander Totta	Susana Rolita Melo (*) Olga Pinto Coelho
BCP	Diogo Campello Jorge Almeida (*)
CGD	Sofia Marta Helena Carvalho (*)
SIBS	Sofia Monteiro
Unicre	Susana Venâncio
Banco de Portugal	José Rocha Martins Ana Margarida Meneses Ana Cristina Guerreiro

Note: (*) Participants involved in the first part of the work.

Annex 2

Methodology used for the consumer survey

This consisted of 1,797 interviews of individuals, over 15 years old, from a representative regional sample. The information was based on a personal interview with a structured questionnaire on paper. The interview took approximately 35 minutes.

The breakdown of interviewees is as follows:

Table A2.1

SAMPLE BREAKDOWN – CONSUMERS

		Sample		Total with bank accounts
		No. of observations	%	%
Sex	Total	1797	100.0	100.0
	Male	1060	59.0	49.5
	Female	737	41.0	50.5
Age	15-24 years	228	12.7	15.7
	25-34 years	454	25.3	20.0
	35-44 years	413	23.0	18.6
	45-54 years	249	13.9	15.3
	55-64 years	214	11.9	13.1
	Over 64 years	239	13.3	17.2
Income bracket (euros/month)	Over 1250	184	13.8	11.0
	Between 751 and 1250	337	25.3	25.0
	Below 750	578	43.4	47.0
	Housewives/students	234	17.6	17.0
Education level	University or other form of tertiary education	200	11.2	9.5
	12 years schooling	961	53.7	50.0
	6 years schooling	629	35.1	40.5
Occupation	Middle/sénior management	237	13.2	10.3
	Specialist professional/owner of small business	244	13.6	9.0
	Employee in business/terciary/public service	261	14.5	11.1
	Skilled worker	247	13.7	17.8
	Unskilled worker	181	10.1	9.4
	Retired/unemployed	393	21.9	25.3
	Student	149	8.3	10.2
	Housewife	85	4.,7	6.9

The survey covered preferences in payment instruments, what consumers used, what they had in their wallet or purse and what was available for them to use at point of sale. It detailed the number and value of transactions during the survey period relating to eight types of purchase: (i) newspaper, magazine or coffee in a café; (ii) fruit, bread and milk; (iii) restaurant meal; (iv) pullover; (v) supermarket/hypermarket shopping; (vi) household appliances; (vii) journey; and (viii) furniture.

With the perceived attributes of each payment instrument, the data from the survey made it possible to examine consumer payment preferences in terms of cost, ease of use and control of expenditure. This

provided a value scale for the payment instruments as used in the eight types of purchase. The breakdown of information as per age, income and education level gives a picture which is in line with other studies pointing to the increased use of electronic payment instruments by younger people, with more schooling and higher income.

Annex 3

Methodology used for the retail survey

This survey was carried out on mainland Portugal and comprised companies with less than 100 employees. Their main activity was retail (sales outlets open to the public). A sample from the 215,676 on the files of the Portuguese National Statistical Institute (INE) was selected. The survey consisted of personal interviews, with a structured questionnaire on paper, covering 1,159 retailers, and lasting approximately 30 minutes. There was no proportional breakdown into sub-sectors. Respondents were staff who had responsibility for accepting payment instruments. The weighting procedure followed the population figures for the INE report on companies (*Inquérito Harmonizado de Empresas*) of 2003.

The breakdown of interviewees is as follows:

Table A3.1

SAMPLE BREAKDOWN – RETAILERS

		No. of observations	%
Size (No. of employees)	Total	1159	100.0
	Only 1	201	17.3
	From 2 to 9	664	57.3
	From 10 to 19	177	15.3
	From 20 to 49	99	8.5
	From 50 to 99	18	1.6
Sector	Car and truck servicing and repairs	82	7.1
	Parts and accessories for cars and trucks	19	1.6
	Sales, servicing and repair of motorcycles, parts and accessories	11	0.9
	Sales of petroland diesel for motor vehicles	35	3.0
	Retail trade (non-specialist)	108	9.3
	Retail trade (food, drink, tobacco in specialist outlets)	127	11.0
	Retail trade (pharmaceutical products, cosmetics, hygiene)	35	3.0
	Retail trade (other new goods in specilist outlets)	368	31.8
	Retail trade (second-hand, shop-based)	6	0.5
	Repair of personal and household goods	24	2.1
	Hotels,hostals etc.	41	3.5
	Camp sites and other short stay accommodation	5	0.4
	Restaurants	122	10.5
	Cafés, bars and snack bars	147	12.7
	Canteens and suppliers of meals to households	6	0.5
	Telecommunications	10	0.9
	Travel agents and related business	6	0.5
	Car and truck rentals	7	0.6

Annex 4

Banco de Portugal
DEPARTAMENTO DE ESTATÍSTICA

Questionnaire

Payment Instruments

RESPONDENT DETAILS

Name:

Position:

Telephone: Fax: E-mail:

Please note any points you consider worth mentioning:

COMPANY DETAILS

Tax identification number:

Company name:

Registered office (address):

Post code: - District:

Telephone: Fax: E-mail:

Please note any points you consider worth mentioning :

PAYMENT INSTRUMENTS USED BY CUSTOMERS

1. Using a month as a point of reference (e.g. March 2006), give the number and value of payments made by your customers with each payment instrument (unit: thousands of euros):

	Cash	Cheque	Debit card	Credit card	Store/customer card	Others	Total
Number							
Value							

2. For payments made with store/customer card, please indicate how the balance was cleared:

	Cash	Cheque	Debit card	Credit card	Direct debit	Transfer	Total
Number							
Value							

COST OF PROCESSING PAYMENT INSTRUMENTS USED BY CUSTOMERS

3. Using a month as a point of reference (e.g. March 2006), give the cost handling the following payment instruments (unit: thousands of euros):

	Cash[73]	Cheque[74]	Debit card[75]	Credit card[75]	Store/customer card[76]	Direct debit[75]	Transfer[75]	Others	Total
Personnel costs									
Other costs									

[73] Indicating all related direct costs, such as preparation of cash registers, control and handling at end of business (closing the cash register), costs with transport and cash deposit at bank branch and insurance costs.

[74] Indicating all related direct costs, such as control and handling of cheques, costs with transport and cheque deposit at bank branch and insurance costs.

[75] Indicating all related direct costs, such as control and handling of the payment instrument, monthly fees/commissions payable, costs with control and processing of payments and insurance costs.

[76] Indicating all related direct costs, such as control and handling of store/customer cards, costs with processing payments and insurance costs.

Glossary – Description of payment instruments

Cash: All payments made with notes and coins in euros.

Cheque: All payments made with cheques.

Debit card: All payments made with debit card (card tied to a current account).

Credit card: All payments made with credit card (card tied to a specific account and a credit line).

Store/customer card: All payments made with store/customer card issued by your company (card tied to a specific client-account and a credit line).

Direct debit: All payments made with direct debit authorised on a customer account.

Bank transfer: All payment orders transferring funds from customer account to your company.

Other: All payments made with other instruments, such as discount vouchers, luncheon vouchers and so on.

List of companies that replied to the questionnaire:

1) Auchan Companhia portuguesa de hipermercados, S.A.
2) BERSHKA (Portugal) Confecções, Unipessoal, Lda.
3) CARREFOUR (Portugal) – S.A.
4) Dia Portugal – Supermercados, S.A.
5) Feira Nova – Hipermercados, SA
6) FNAC Portugal
7) KIDDYS CLASS (Portugal) – Confecções, Lda.
8) Leroy Merlin Portugal – Sociedade Bricolage, S.A.
9) Livraria Bertrand – Sociedade comércio livreiro, S.A.
10) Modelo, Continente Hipermercados, S.A.
11) Office Centre Portugal – Eq. de Escritório, Lda.
12) OYSHO (Portugal) – Confecções, Unipessoal, Lda.
13) Pingo Doce Distribuição Alimentar, S.A.
14) PULL & BEAR (Portugal) – Confecções, S.A.
15) Sport Zone – Comércio de Artigos de Desporto, S.A.
16) STRADIVARIUS (Portugal) – Confecções, Unipessoal, Lda.
17) Worten – Equipamentos para o Lar, S.A.
18) ZARA Portugal – Confecções, Unipessoal, Lda.

Annex 5

Information requested from participants relating to costs and benefits for consumers and banks

Participants were asked to provide information on the use of each payment instrument, specifically: (i) average processing time; (ii) number of transactions; (iii) average value of transactions; (iv) costs and revenues; and (v) other quantitative information on payment cards.

In terms of items (i), (ii) and (iii), details were requested as follows:

- Cash:
  - Deposited (at branch counter and ATM);
  - Withdrawn (at branch counter and ATM).

- Cheques:
  - Deposited (at branch counter and ATM);
  - Cashed (at branch counter);
  - Issued (at branch counter);
  - Returned (at branch counter).
  - Requested (via internet and via telephone);
  - Cancelled (via internet and via telephone)
- Debit cards:
  - Cash deposited at ATM;
  - Cash withdrawn at ATM;
  - Cheque deposited at ATM;
  - Payment for purchases and services at ATM;
  - Credit transfers at ATM;
  - Account balance and entries or bank account number checked at ATM.
- Credit card:
  - Cash withdrawn at ATM;
  - Payment for purchases and services at ATM;
  - Account balance and entries or bank account number checked at ATM.
- Credit transfers:
  - Received (at branch counter);
  - Orders issued (at branch counter);
  - At ATM;
  - Via internet;
  - Via telephone.
- Direct debit:
  - Instructions given (at branch counter, ATM and via internet).
- Others:
  - Checking:
    - Account balance (at branch counter, ATM and via internet);
    - Account entries (at branch counter, ATM and via internet).

        - Bank account number (via internet and via telephone).
    - Payment of services (via internet and via telephone).

A second area of information related to revenues from payment instruments and considered:

- Cash:
    - Night safe;
    - Deposit and withdrawal fee at branch counter;
    - Withdrawal fee for special customers.
- Cheques:
    - Income from issuing;
    - Other income from charges to customer or retailer.
- Debit card:
    - Annual fee;
    - Interchange fee;
    - Other commissions/income;
    - Retailer service fee;
    - Monthly commissions and other fees charged to retailer.
- Credit card:
    - Annual fee;
    - Interchange fee;
    - Other commissions/income;
    - Retailer service fee;
    - Monthly commissions and other fees charged to the retailer.
- Credit transfers:
    - Revenues collected.
- Direct debit:
    - Commissions charged to the creditor;
    - Other commissions.

The third area of information related to the specific costs of some payment instruments:

- Cheques:
    - Control of fraud and illicit use.
- Debit cards:
    - Benefits from points/miles.
- Credit card:
    - Free float;
    - Benefits from points/miles.

Other information relating to payment cards, ATM and POS:

- Number of debit and credit cards in active use;
- Number of ATMs and number of transactions carried out at ATMs:
- Debit card:
    - Number and value of cash deposits and withdrawals at ATMs;

  - Number and value of cash/cheque deposits at ATMs;
  - Number and value of payments for purchases and services at POS;
  - Number and value of credit transfers at ATMs;
  - Number of account balance and entry checks at ATMs.
- Credit card:
  - Number and value of cash deposits at ATMs;
  - Number and value of deposits of valuables at ATMs;
  - Number and value of payments for purchases and services at POS;
  - Number and value of credit transfers at ATMs;
  - Number of account balance and entry checks at ATMs.
- Number of POS terminals and number of transactions at POS:
- Number of transactions and value per payment bracket.
- Debit card:
  - Number and value of payments for purchases and services per CAE.
- Credit card:
  - Number and value of payments for purchases and services per CAE.