

# **Payment Behaviour in Poland – The Benefits and Costs of Cash, Cards and Other Non-Cash Payment Instruments**

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## **ABSTRACT**

*The aim of this article is to present the benefits and costs of cash, cards and implicitly other non-cash payment instruments from the perspective of different parties. The data basis of the analysis is Polish and European macro statistics on the payment market and the survey of consumers' payment behaviour in Poland. It is argued that the cost-benefit approach is the best method for the economic efficiency assessment of payment instruments which well explains their current usage in Poland. Cash is held in high esteem by Poles because of its many benefits that dominate its costs and benefits of cards.*

Keywords: cash, cards, payment habits, cost-benefit approach

JEL Codes: D12, D24, D61, E41, G21, O33

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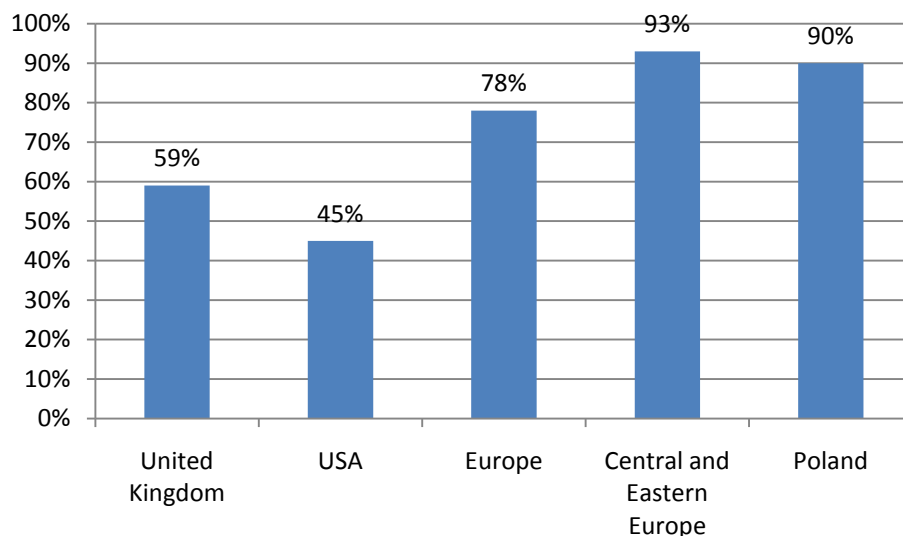
## Poland as compared to other countries – the usage of cash and non-cash payment instruments

### Poland: macro cash statistics

The global volume of non-cash transactions amounted to 260 billion in 2009, after sustained annual gains of 6.8% since 2001 (Capgemini 2011: 8). Globally, non-cash transaction volumes have proved resilient to the effects of the financial crisis, however the pace of the annual growth in 2009 was slightly lower (5.2%) than the compounded annual growth in the years before the beginning of the crisis (7.2% *per annum* in the period 2001-2007).

Despite their continuous growth, non-cash transactions are still not the dominant retail payment media. There are countries in which more than 95% consumer payments take place in cash (McKinsey 2009).

Figure 1. Share of cash in retail payments by countries or regions (2008).



Source: based on Delnevo R. (Bank Machine), *The challenge of ATM operators. Can cash remain on its throne?*, a presentation shown at the meeting of ATM operators in Poland held under the auspices of the ATM Industry Association Europe, 10 September 2010 (Retail Banking Research data).

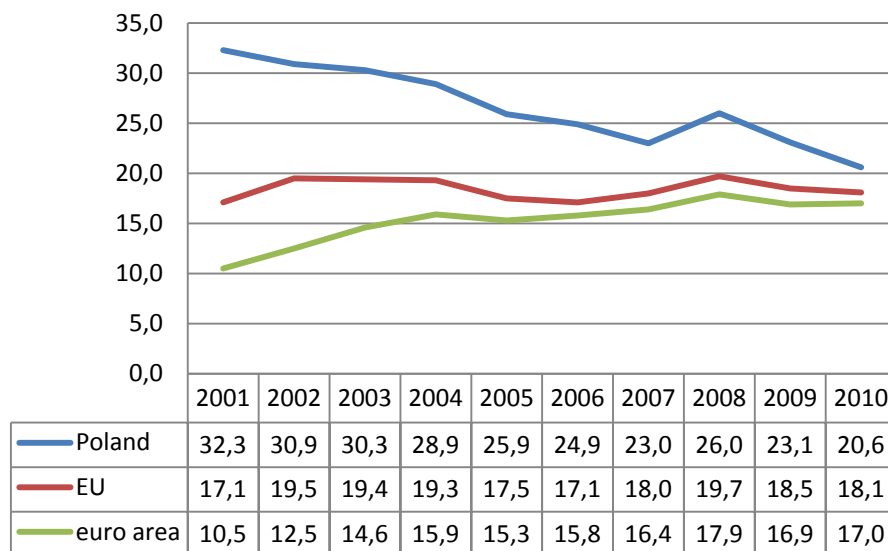
In general, in more developed countries the number of cash payments is lower (see figure 1 - United Kingdom, USA), while in less developed countries - higher (see figure 1 - Poland). Cashless payments are particularly popular in Scandinavian countries. In 2008 in Finland, Norway and Sweden, the share of cash payments was below 50% (Liikanen 2008). In the value of retail transactions the share of cash is relatively smaller than in the number of transactions. In the country which probably has the most cashless society in the world, Iceland, banknotes and coins accounted for only 9% of the purchased value at Points-Of-Sale, other transactions were mainly conducted using debit and credit cards (Liikanen 2008).

Over the last years, the share of cash payments has steadily been decreasing. According to the data from the British UK Cards Association (formerly APACS) in the UK in 2000, consumers paid in cash for 73% purchases, whereas in 2010 for 53% (20 percentage

points less) (Delnevo 2010). This trend also occurs in other countries, although the process it is not always as rapid as in the UK.

In spite of the decline in the share of cash in the total number of transactions, the amount of cash in many countries is growing – not only in nominal, but often in real terms. Between 2002 and 2008 the value of euro cash in circulation was increasing in nominal terms at a rate of approximately 19% *per annum* (11%, excluding € 200 and € 500 banknotes), while the value of non-cash transactions – by about 14% annually and the number of non-cash transactions *per capita* – by 4% (compare Capgemini 2010: 14 and EPC 2007b: 3). The two figures below show the share of cash in the money aggregate M1, the first chart (figure 2) – in the period 2001-2010, while the second chart (figure 3) – in 2010, but for a wider range of countries.

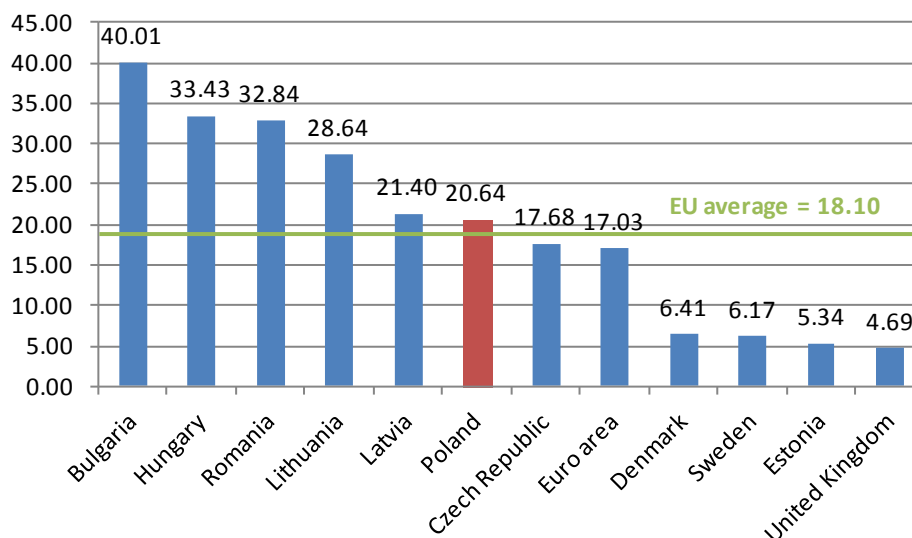
Figure 2. Cash value as a percentage of narrow money (M1) over the years 2001-2010.



Note: EU estimations, 2010 weighted average across 28 EU countries, 2001-2009 NBP estimations.  
 Source: NBP and ECB data (Statistical Data Warehouse).

In Poland the share of cash in the monetary aggregate M1 has been gradually decreasing (figure 2). On average, in the European Union it fluctuates from one year to another and in the eurozone it is even going up. In the latter case, the increase in the share of cash in M1 relates to the role of the euro as an international currency (compare below). The sudden rise of the cash value as a percentage of narrow money in 2008 was due to the failure of the Lehman Brothers bank and the outbreak of the global financial crisis. A part of society relies on cash more than on deposit money and in hard times withdraws money from banks. This anomaly of the demand for banknotes and coins shows that some events may easily lead to a banking panic.

Figure 3. Share of cash in M1 in 2010 – cross-country comparison (in %).



Note: EU average – estimations.

Source: ECB data (Statistical Data Warehouse).

The cross-country comparison of chosen countries indicates, that at the end of 2010 in Poland, the share of cash in M1 was 3.61 percentage points higher than in the eurozone and 2.54 higher than the estimated average level for the whole Community (figure 3). One country from the Central and Eastern Europe region – the Czech Republic was characterised by a slightly lower share of cash in M1 as compared to Poland. In other CEE countries not belonging to the euro area there were relatively more banknotes and coins. In some developed countries of Western Europe and in one Baltic country the cash value as a percentage of narrow money stood at less than 6.5% (Denmark, Sweden, Estonia, United Kingdom).

The phenomenon of the increase in currency in circulation with a simultaneous decrease in the share of the notes and coins in the total number of transactions can be explained by the growing role of cash as a store of value. Cash does not bring interest income, and its real value decreases due to inflation, so it should not be used for hoarding purposes. However, empirical studies show that individuals often save in cash<sup>1</sup>. This can easily be noticed especially in the case of currencies which act as international ones (euro, pound sterling, U.S. dollar). In accordance with the estimates of the European Payments Council (EPC) only between 40% and 60% of issued cash circulates and is used in transactions, while the rest is hoarded (EPC 2007b: 8).

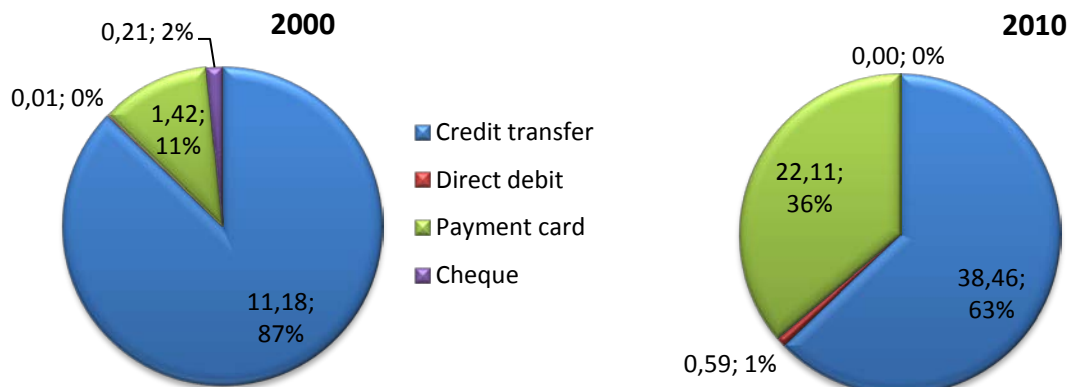
It does not change the fact that in the European Union about 8 in 10 retail transactions are made in cash (EPC 2007a: 2). In 2008, according to RBR (2010), 388 billion payments were made in the EU, including 301 billion in cash (78%).

<sup>1</sup> The omnibus survey conducted by the PBS DGA between 18 and 20 February 2011 on a nationwide representative sample of 1,048 adult Poles showed that 47.6% Poles who admitted to having savings (29.6% of the total population) declared that they kept them either in cash or on a transactional account, usually non-interest bearing or very low-interest-bearing (Kowalczyk 2011).

Also, the results of foreign studies show that cash is often used as a store of value or as a medium of exchange in the gray and black markets. According to the research of Humphrey *et al.* (2004: 231) conducted in Norway, 67% of the whole stock of cash in circulation acted as a savings asset or means of payment in the shadow economy. It can be assumed that this cash was used not only by individuals but also companies.

### Non-cash payments – the development between 2000 and 2010

Figure 4. Number of non-cash transactions *per capita* and share of payment instruments, Poland – comparison 2000 and 2010.



Note: The first figure on pie charts indicates the number of transactions performed by non-MFIs (non-banks) with a given non-cash payment instrument annually and the second indicates the share of a payment instrument in the total number of non-cash transactions.

Source: NBP data.

In the period from 2000 to 2010 there was a sudden increase in the number of non-cash transactions *per capita* (figure 4). In 2000 one Pole performed on average 12.85 non-cash transactions, while 10 years later as many as 61.16. In this period definitely the proportion of the use of various payment methods changed. Cheques practically disappeared from circulation, whereas the significance of payment cards increased. During this decade, the share of payment cards in the number of non-cash transactions increased by 25 percentage points, to 36%. Payment cards are now mainly used to pay at physical Points-Of-Sale and to withdraw cash at ATMs. The increase in the number of transactions using cards at Points-Of-Sale is connected with the replacement of cash transactions by card transactions. All over the world, cards, especially credit cards, are commonly used in remote transactions (*MOTOIO, Mail Order, Telephone Order, Internet Order*). However, in Poland the credit transfer and cash on delivery are the most common ways of remote payments for long-distance shopping (compare the chapter “Payment habits of Polish consumers”). The credit transfer may be initiated in either paper or electronic form. The latter is becoming more and more common, and thus the costs of credit transfers are decreasing. Between 2000 and 2010 the number of credit transfers *per capita* increased by over 27%, however their share in the number of non-cash transactions decreased from 87% to 63%. It was caused by the above mentioned rapid increase in the number of transactions made with payment cards. The direct debit is an instrument preferred for settlements by mass creditors because it gives them the control over the repayment of the debt. Poles, however, do not trust this form of payment, which is confirmed by statistics (in 2010 there were 0.59 direct debits *per capita*). Poles prefer to pay their bills with different payment instruments – by credit transfer or in cash. Credit transfers can be executed using the electronic banking service or they can be initiated in some other ways, for example by telephone or in a bank branch. Cash payments in Poland are made at the creditor’s cash desk, at a bank cash counter, through a bank agent, at a post-office or using the terminals of such agents as *Via Moje Rachunki, Unikasa, TransKasa* and *Żabka*. Terminals accepting cash payments have been installed in Polish stores and petrol stations.

Table 1. Poland as compared to other EU countries in non-cash statistics (2010).

| Statistics   | EU average<br>( <i>per capita</i> ) | Poland<br>( <i>per capita</i> ) | Poland's position as<br>compared to other EU<br>countries |
|--|-------------------------------------|---------------------------------|---|
| Number of overnight deposits                             | 1.29                                | 0.99                            | 22 out of 25  |
| Number of payment cards issued                           | 1.45                                | 0.84                            | 26 out of 27  |
| Number of card payments                                  | 68.05                               | 22.11                           | 22 out of 27  |
| Number of credit transfers                               | 47.89                               | 38.46                           | 17 out of 27  |
| Number of direct debits                                  | 43.90                               | 0.59                            | 25 out of 27  |
| Number of transactions with non-cash payment instruments | 172.84                              | 61.17                           | 24 out of 27  |

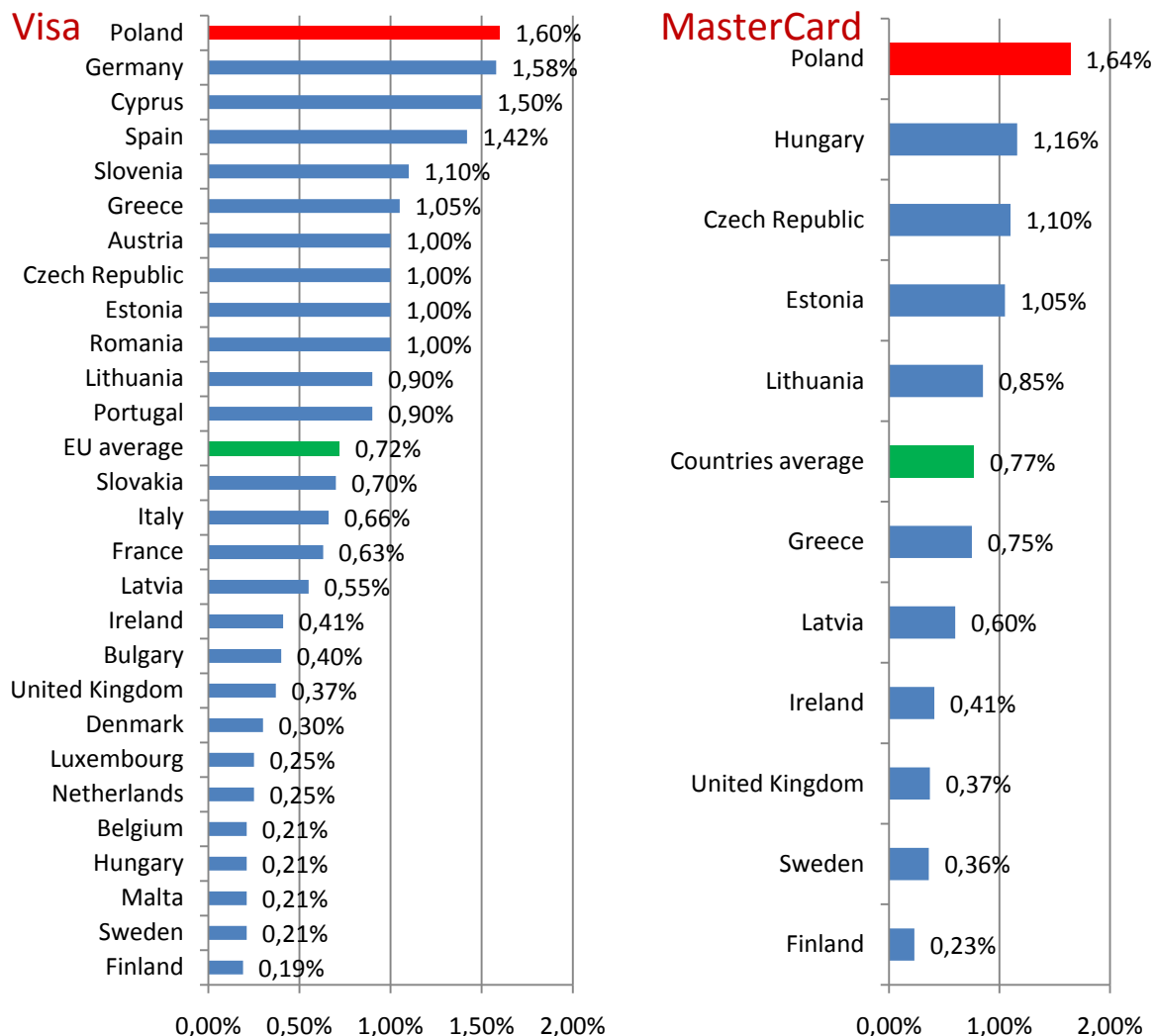
Source: ECB data (Statistical Data Warehouse).

Poland does not rank the highest in the non-cash circulation development as compared to other EU countries. According to the ECB statistics (table 1) Poland's highest position in the EU ranking was 17 (out of 27 countries) in the number of credit transfers *per capita*. The statistics, that is the number of overnight deposits *per capita* and payment cards issued *per capita*, do not reflect the real situation and may hide the phenomenon of financial exclusion. Both the numbers are close to one, while in fact the number of unbanked Poles is much higher than these statistics suggest. On the other hand, Poles are open to innovations. Contactless technology in Poland develops rapidly. It can be estimated that already 1/3 of cards in circulation are equipped with RFID (Radio-Frequency Identification) tags. Polish consumers willingly execute proximity payments. The number and value of such payments is growing quickly. Regarding contactless card technology Poland is one of the three most dynamically growing markets in Europe. The others are the UK's and Turkey's markets.

A general problem of payment markets worldwide is the low cost transparency of payment instruments, which impedes the transformation of payment habits towards a social optimum (Górk 2009b). Currently, payment service providers, that is mostly banks, apply mainly opaque charging conventions (compare Bergman *et al.* 2007, Leinonen 2008). Cost-based pricing would steer consumers from dear to low-cost payment methods (compare Humphrey *et al.* 2005 and 2008, Enge and Øwre 2006,). In the end, all costs/charges are paid by consumers. However, when charges are not transparent, consumers face biased costs. Therefore, introducing transaction fees and cost-based pricing would bring serious changes to the payments market (compare De Grauwe *et al.* 2006, Van Hove 2008). Cost savings for society would arise as a consequence of a better allocation of resources. Nevertheless, there are serious barriers to the enforcement of the cost-based pricing. *Inter alia* banks and international payment organisations resist any changes in pricing conventions for many reasons (Górk 2009a and 2009b). Payment markets are two-sided. The successful strategy to increase the number of card payments is to apply the skewed pricing strategy through hiding the cost of cards from consumers under the merchant service charge and forbidding surcharging. On the other hand, the cost of cash is also not communicated to consumers. Traditionally, banks do not charge cash withdrawals or deposits in bank branches and often at ATMs. As a result, clients using cash may not be aware of banking costs related to cash management.

In Poland the situation on the payments market has become quite hard. Cash circulation is prevalent and at the same time the costs of cards are very high.

Figure 5. Interchange fees in card payments in Europe (2011).



Note: Fee tiers as of September 2011, *Visa debit, full EMV, consumer* percentage fees; the percentage fee after the inclusion of a flat fee element *Debit MasterCard, full EMV, consumer, general*. The Debit MasterCard is not issued in all countries. In some countries MasterCard fee tiers are set by local banks. In some countries the information on MasterCard fee tiers is not disclosed.

Source: Visa and MasterCard websites and the NBP data.

Interchange fees on card non-cash transactions in Poland are generally the highest in Europe (figure 5), with the exceptions of some types of cards. One can ask the question of why there are such great differences in interchange fee tiers among countries and whether real resource costs of cards in Poland justify these differences?

High merchant service charges discourage merchants from accepting card payments. In effect, the expansion of the POS terminal network in Poland is hindered and even a new Visa project called “Big Idea” does not help it. According to the NBP and ECB data, in December 2010 Poland had 6 595 POS terminals per one million inhabitants, and only Romania had less (4 995). In the EU there were 17 561 POS terminals per one million inhabitants and in the euro area 19 873.

Poland is also characterised by a low density of the ATM network. At the end of 2010 there were 431 cash dispensers per one million inhabitants (the fourth last place in the



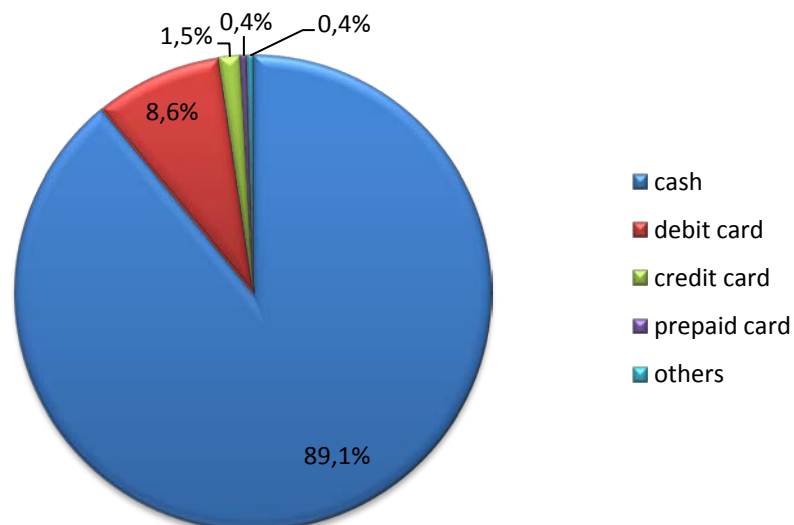
European Community). In the EU at the same time twice as many ATMs per one million inhabitants (866) were installed. ATMs are the main distribution channel of cash to Polish consumers (compare next chapter) but the growth of the network was seriously slowed down after the reductions in ATM interchange fees in the Visa and MasterCard systems in 2010. The reductions of 63-66% were introduced quite abruptly by MasterCard without consulting major ATM operators in Poland. Visa with their member banks followed the MasterCard's decision shortly. The interchange fee is the main source of income for ATM owners. Consequently, the profitability of the ATM business fell considerably in 2010 and 2011 (compare Górk 2011b and Górk 2012).

### Payment habits of Polish consumers

In this chapter payment habits of Poles are described according to the findings of the research conducted in the fourth quarter of 2010 and in the first quarter of 2011 *inter alia* by the author (project supported by the Economic Research Committee of the National Bank of Poland; Polasik, Marzec, Fiszeder, Górk 2012). Only the main findings which have relevance to the costs and benefits of cash, cards and other non-cash payment instruments are presented below.

#### Payments at physical Points-Of-Sale

Figure 6. Share of payment instruments in purchase transactions conducted over a month at physical Points-Of-Sale in Poland (2010/2011).



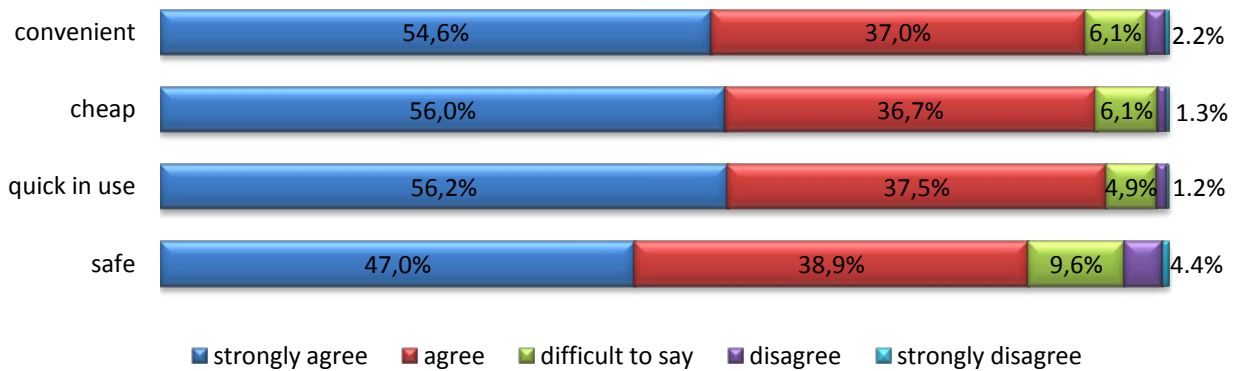
Source: Polasik M., Marzec J., Fiszeder P., Górk J., *Modelling the Usage of Retail Payment Methods on the Polish Market*, National Bank of Poland Working Papers 1/2012 (265), research conducted in the project supported by the Economic Research Committee of the National Bank of Poland, sample: n=2974. The project financed from the resources of the National Bank of Poland.

The survey revealed that in purchase transactions at physical Points-Of-Sale (POS) the share of cash was at the level of 89.1% (figure 6). According to the McKinsey consulting agency, in 2007 in Poland cash accounted for 94% of payments (McKinsey 2009: 10) and in 2002 for 98% (McKinsey 2005: 5). In terms of the number of transactions in Poland, cash is thus gradually being replaced by other payment instruments, particularly by payment cards, with which Polish consumers made 10.5% purchases. The remaining part (0.4%) comprised

payments with vouchers, installment purchases, etc. Among payment cards the most popular were debit cards (8.6%) followed by credit card (1.5%) and prepaid cards (0.4%).

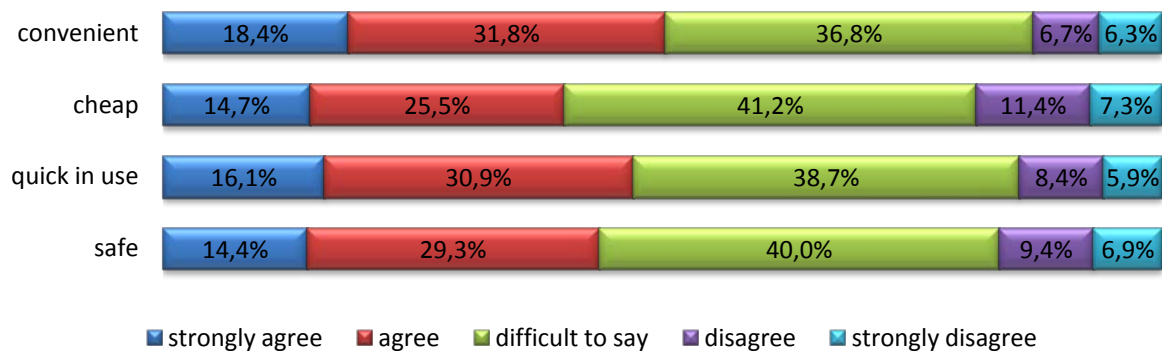
### The perception of cash and debit cards

Figure 7. Perception of cash by Polish consumers (2010/2011).



Note: The numbers may not add due to rounding. The disagree and strongly disagree answers summed up.  
 Source: Polasik M., Marzec J., Fiszeder P., Górka J., *Modelling the Usage of Retail Payment Methods on the Polish Market*, National Bank of Poland Working Papers 1/2012 (265), research conducted in the project supported by the Economic Research Committee of the National Bank of Poland, sample: n=2974.

Figure 8. Perception of debit card by Polish consumers (2010/2011).



Note: The numbers may not add due to rounding.  
 Source: Polasik M., Marzec J., Fiszeder P., Górka J., *Modelling the Usage of Retail Payment Methods on the Polish Market*, National Bank of Poland Working Papers 1/2012 (265), research conducted in the project supported by the Economic Research Committee of the National Bank of Poland, sample: n=2974.

More than 90% of Poles think that payment in cash is convenient (91.6%), cheap (92.7%) and quick (93.7%). Cash safety rates lower. 85.9% of the respondents agree that this payment method is secure (see figure 7). As for debit cards, 50.2% of Poles consider this payment method as convenient, 40.2% as cheap, 47% as quick in use, and 43.7% as safe. However, each of the four criteria evaluated by Poles regarding debit cards obtained from 36.8% to 41.2% of the “difficult to say” answers (see figure 8).

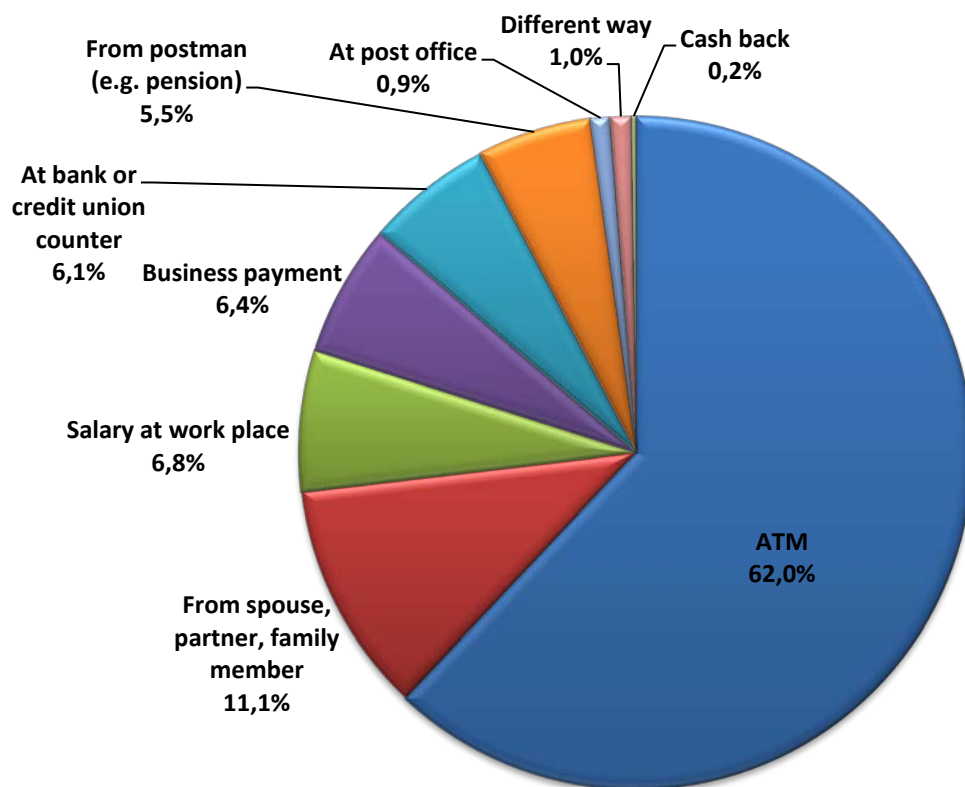
The attachment of Poles to cash is also confirmed by other studies. In the years 2009-2010 Maison made a qualitative and quantitative analysis. It revealed that part of the Polish society, especially those people who do not have a bank account or use it very rarely, are characterised by a strong, emotional attitude to physical currency. Describing this phenomenon in Poland Maison coined the term: “cult of cash” (2010).

The development of non-cash payments in Poland is also affected by the opinion of merchants. A study conducted in Poland between 2007 and 2008 on a sample of 30 large stores and 111 additionally selected smaller shops showed that under various criteria, cash was always seen as the best method of payment (Polasik and Maciejewski 2009: 119-124). Banknotes and coins were compared with the credit card, debit card, contactless and mobile payments. All payment methods were evaluated by merchants under such criteria as: the cost, the security of payment, the popularity among current and potential clients, the ease of transaction servicing by salespersons, the perceived duration of a transaction at a counter and the time of clearing and settlement of funds.

The overall positive perception of cash by consumers and merchants does not speed up the development of non-cash payments in Poland. However, the fraction of the “difficult to say” answers in the case of debit cards indicates that an intense promotion of payment cards, which is *nota bene* taking place currently, may with time change the perception of payment cards by Polish consumers.

### How Poles obtain cash

Figure 9. How Poles withdraw and/or obtain cash (2010/2011).



Note: The numbers may not add due to rounding.

Source: Polasik M., Marzec J., Fiszeder P., Górk J., *Modelling the Usage of Retail Payment Methods on the Polish Market*, National Bank of Poland Working Papers 1/2012 (265), research conducted in the project supported by the Economic Research Committee of the National Bank of Poland, sample: n=2974.

Poles obtain cash in different ways. Cash withdrawal at a bank, a credit union counter or via an automated teller machine is of primary character, because cash is directly transferred to a consumer by a bank or an independent ATM deployer and there is no other intermediary. Other ways of obtaining cash are of secondary character. Banknotes and coins are at first

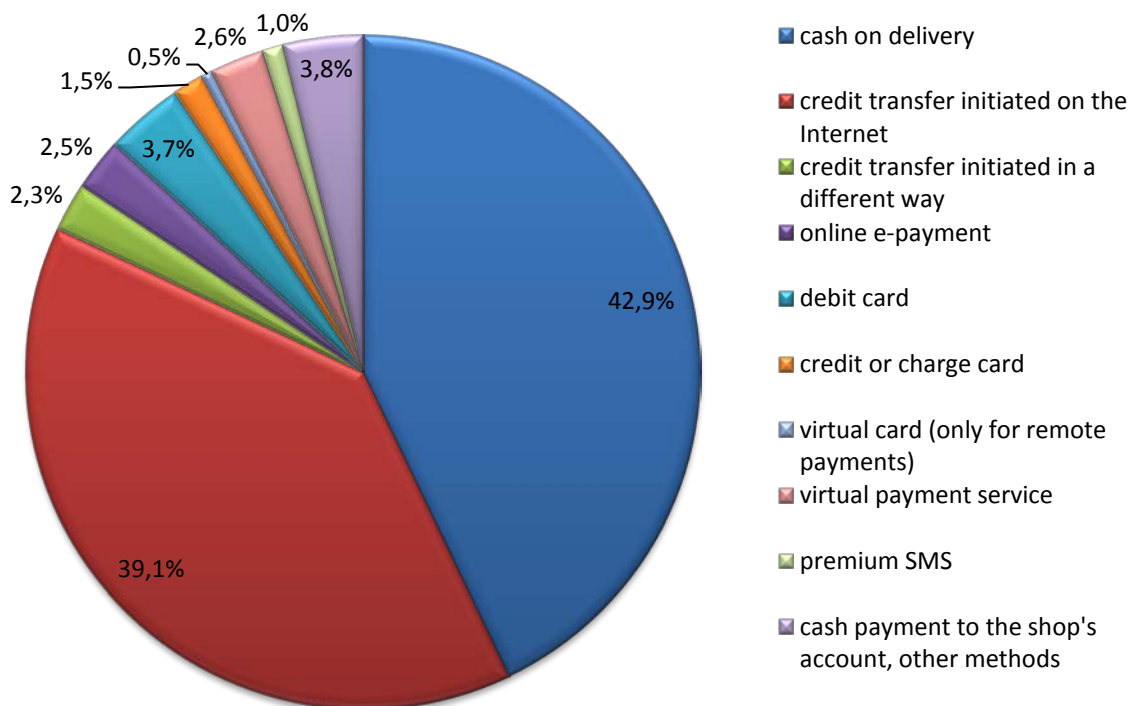
distributed directly by banks or through automated teller machines, however, later they are passed between consumers and businesses.

Based on the survey data (figure 9) one can state that 62% of all the situations of acquiring cash are connected with withdrawing cash at ATMs and only 6.1% are withdrawals of cash at bank or credit union counters. The rest, nearly 32% of all the operations are of secondary character. Over 13% of the operations are salary transfers at a workplace (6.8%) and business payments (6.4%), where a person runs its own small business and gets paid for a service rendered. 11.1% of cash is transferred directly to a consumer by his/her spouse, partner or a family member and these operations have usually much to do with running a household. Money transfers between family members play a big role in the whole economy. Still, 5.5% of all the operations of getting cash are pensions or social benefits delivered in cash by a postman. 0.9% are withdrawals at a post office. These traditional ways of obtaining cash are popular amid the least banked society groups such as pensioners. Changes in this area occur slowly.

### How Poles pay on the Internet

The survey results revealed that almost half of the Polish society use the world wide web several times a week or more often. However, only some Poles surfing on the Internet (38%) buy goods or services in e-shops and online auctions. On average, one Internet user pays for merchandise online 0.65 times a month. On the other hand, the most active e-shoppers make even a dozen or more Internet purchases a month.

Figure 10. Share of payment methods in total number of purchase payments on the Internet (2010/2011).



Note: The numbers may not add due to rounding.

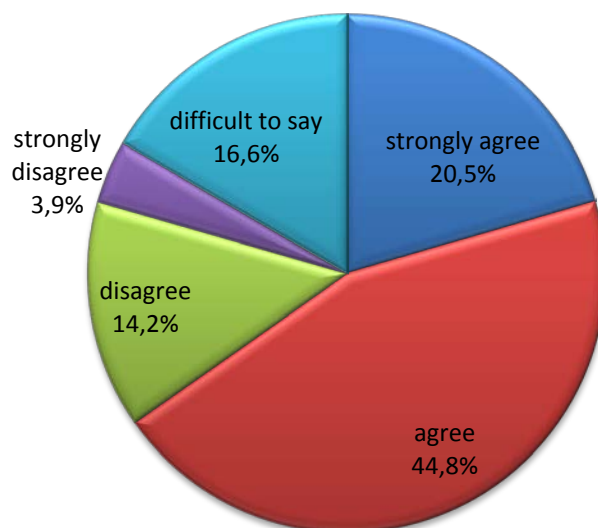
Source: Polasik M., Marzec J., Fiszeder P., Górk J., *Modelling the Usage of Retail Payment Methods on the Polish Market*, National Bank of Poland Working Papers 1/2012 (265), research conducted in the project supported by the Economic Research Committee of the National Bank of Poland, sample: clients of Internet shops n=390, clients of Internet auctions n=294 and clients buying Internet services n=106, number of payments N=1153.

A wide range of payment methods is available in Polish e-commerce. Two of them, however, are the dominant forms of payments, they are: cash on delivery (42.9%) and a credit transfer initiated on the Internet through a bank customer electronic banking service (39.1%). Together, these two payment methods account for 82% of all online purchases in Poland (figure 10). When an online e-payment (2.5%) and a credit transfer initiated in a different way, mainly at a bank counter or at a post office (2.3%), are added to credit transfers initiated via the Internet (39.1%), they already account for more online purchases than cash on delivery (43.9% against 42.9%). The online e-payment service is provided in Poland by the so-called Internet payment integrators (e.g. DotPay, Płatności.pl, Przelewy24). The online e-payment is a more convenient method of payment for a client, based on a credit transfer. After choosing the e-payment option, the client is redirected from a store webpage to his bank website, where, after a successful login, he can see a pre-filled form of a credit transfer, which he only has to confirm and authenticate (second level authentication). He does not need to fill in the details of the credit transfer. For an Internet seller this option has this advantage that he is instantly informed about the incoming transfer of money which is guaranteed by the service provider. Neither payment cards nor virtual payment services (e.g. the domestic PayU system, the international PayPal system) have gained popularity among Polish Internet consumers. 5.7% of online purchases are executed with payment cards and 2.3% via virtual payment services. The latter number is the same as the number of cash payments to the store's account (at a post office or elsewhere). The remaining methods of online payments account for 1.5% of the total number of purchases on the Internet in Poland.

### Poles' attitude to the anonymity of payments

Payment instruments feature different degrees of anonymity from the consumer's viewpoint. This issue also concerns merchants. At physical Points-Of-Sale debit and credit card transactions can be quite easily traceable, whereas cash still remains highly anonymous.

Figure 11. Do Poles want to be anonymous when paying for goods and services?



Note: The numbers may not add due to rounding. Respondents were asked to either agree or disagree with the following statement: "I prefer when my payment in a shop is anonymous so as nobody could check, what I bought and when".

Source: Polasik M., Marzec J., Fiszeder P., Górka J., *Modelling the Usage of Retail Payment Methods on the Polish Market*, National Bank of Poland Working Papers 1/2012 (265), research conducted in the project supported by the Economic Research Committee of the National Bank of Poland, sample: n=2974.

It turns out that almost 2/3 of Poles want to be anonymous at Points-Of-Sale. 16.6% of Polish consumers do not have a definite opinion about this matter and 18.1% have nothing against the fact that their transactions are recorded and possibly can be traced (figure 11). This is an important piece of information for companies that want to introduce new payment solutions. If such solutions provided the users with a certain degree of anonymity and exhibited other features desirable for consumers they could become successful on the Polish market. People want to be anonymous for different reasons. For some of them anonymity means more freedom and independence they are not ready to give up for loyalty points and a record keeping benefit accompanying card payments. For others anonymity is important because they work in a shadow economy. According to Schneider (2010) the size of an unofficial economy in 2009 in Poland was considerable (25.9% of the annual GDP) and much higher than in countries characterised by a bigger share of electronic payments (e.g. United Kingdom, Netherlands, Finland). Poles value their privacy and fear that either state employees or bank employees could have access to sensitive information.

### **The concepts of private and social costs**

The costs of payments can be considered and calculated from the perspective of various payment actors/stakeholders/participants. The main parties in the payment chain are (compare Gresvik and Haare 2009: 7):

- the central bank,
- commercial banks,
- subcontractors, that is institutions supporting banks and intermediating payment transactions (clearing houses, acquirers, payment organisations, cash handling companies including Cash-In-Transit)
- merchants,
- consumers.

The costs may be estimated all together or separately for different payment instruments. The basic payment instruments are: banknotes and coins, credit cards, debit cards, electronic money (hardware/software), credit transfers and direct debits. However, it is sometimes necessary to divide payment instruments more narrowly – e.g. Visa or MasterCard payment cards, cards verified with a PIN or signature, the Proton electronic purse, PayPal electronic money, etc.).

Each party has its own private costs and benefits (including revenues) which can be attributed to a given payment instrument. The costs and benefits may be of pecuniary or non-pecuniary character (pecuniary items: fees, charges, material costs, wages, etc., non-pecuniary items: time costs – e.g. consumers' shoe leather costs or merchants' tender time costs, externalities, etc.). The costs and benefits can be aggregated and consolidated using social or net social cost concepts. The latter relies more explicitly on benefits (possibly both: pecuniary and non-pecuniary), while in the case of the social cost concept these benefits are in the background of the analysis – the revenues of one party net out against the costs of another party in a payment chain and the non-pecuniary benefits are not included (like the range of an acceptance base, anonymity/privacy, the perceived ease and convenience of use, immediate settlement, record keeping, credit option, card rewards, etc.). Non-pecuniary costs and benefits are not expressed in monetary units. In order to quantify them one must use an appropriate converter (e.g. an average hourly wage). The conversion often requires making some arbitrary assumptions.

Social (societal) costs are the costs of the resources, in terms of the capital and labour, that are put into the production of payment services. Social costs are calculated by extracting payment participants' payment revenues (from fees, tariffs) from their total private costs. Alternatively, the social cost is the sum of all internal costs made by the relevant parties in the payment chain in order to carry out transactions. Private costs include all costs, including the fees paid, borne by payment participants (compare Brits and Winder 2005: 13-18, Bergman *et al.* 2007: 4-6, Górká 2009b: 132, Turjan *et al.* 2011: 10).

Net social costs are social costs corrected for social benefits. They are derived from private costs and benefits which exclude transfer payments, that is double counting of some items (compare Garcia-Swartz *et al.* 2006a and 2006b, Simes *et al.* 2006).

### **Payment cost studies in the world**

Over the past decade eleven extensive studies of the costs of payment instruments have been carried out in the world – Netherlands (Bank of Netherlands 2004, Brits and Winder 2005), Belgium (Bank of Belgium 2005, Quaden 2005), Sweden (Guibourg and Segendorf 2004, Bergman *et al.* 2007), Australia (Reserve Bank of Australia 2007), Finland (Takala and Viren 2008), Norway (Gresvik and Haare 2009), Hungary (Turjan *et al.* 2011), USA (Garcia-Swartz *et al.* 2006a and 2006b), Australia (Simes *et al.* 2006), Norway (Gresvik and Øwre 2003), Portugal (Bank of Portugal 2007).

The above mentioned studies on payment costs can be divided into three groups according to the cost methodology used:

1. The social cost methodology: studies in the Netherlands, Belgium, Sweden, Australia 2007, Finland, Norway 2009, Hungary (group I).
2. The net social (marginal) cost methodology: studies of Garcia-Swartz *et al.* USA and Simes *et al.* Australia (group II).
3. The private and social cost methodology with the use of the Activity Based Costing (ABC) method for evaluating banks' costs: studies in Portugal and Norway 2003 (group III).

The studies of groups I and III were either conducted entirely or supported by central banks. The surveys differ between each other significantly although they use similar cost concepts. Therefore, the comparison between all the results ought to be made cautiously. Each country has its own unique payment structure and payment culture, different institutional solutions, governing business and legal rules. The surveys do not have the same scope. They do not necessarily cover all payment stakeholders and the same payment instruments. Most of them focus only on physical Points-Of-Sale and do not comprise remote payments. The surveys are based either on the primary or secondary data. In addition, the data in the cost studies comes from different years.

The author has quite thoroughly analysed all the studies (Górká 2008, 2009a, 2009b, 2011, 2012). Below only a short description and conclusions are given.

The study of group I shows that in the light of social costs from among payment instruments used in POS payments (Górká 2009b: 35-36):

- the electronic purse is the cheapest one (it is however not available in all countries; its costs were measured in Belgium and the Netherlands),
- cash is cheaper than debit cards in low value payments: up to EUR 11.63 in Netherlands, EUR 10.24 in Belgium, EUR 7.55 in Sweden, EUR 30.67 in Australia, about EUR 15 in Finland, about EUR 8 in Portugal; above these thresholds a debit card is cheaper.
- the debit card is always cheaper than the credit card,
- the credit card and cheque are the most expensive payment instruments.



- Moreover, among payment instruments available on the Internet the cheapest ones are: the credit transfer, direct debit and network money.

The studies of group II have revealed that in principle from the payment methods available at Points-Of-Sale, the electronic ones (debit and credit cards) are cheaper and the paper ones (cash and cheques) more expensive. According to Garcia-Swartz *et al.* and Simes *et al.* the cheapest payment method is using a PIN-authorized debit card. Cash is a relatively cheap means of payment in low value transactions. The shift from cash and cheques to electronic payments is beneficial, however the distribution of costs and benefits is not balanced. Certain groups, notably consumers, would likely gain from the shift. In contrast, some merchants might lose. Nevertheless, in general, the shift toward a cashless society appears to improve the economic welfare.

The main findings of the study of group III are briefly summarised below. For banks paper payment instruments (including cheques and cash) have considerably high social/resource costs. Credit cards are characterised by high resource costs, but these cards also generate high profits for banks. This is the reason why they are promoted by credit institutions. Direct debits, (electronically initiated) credit transfers and debit cards have the lowest social costs. The ABC analysis is particularly well-suited to the cost distribution where support functions generate a large share of the total costs and where there is a considerable variation in products, services, customers and production processes.

### **Calculating costs and benefits in practice**

The study of the costs of payment instruments proves that using a single methodology of cost estimation is extremely difficult. The central bank, commercial banks and non-bank payment service providers do not run a cost accounting system separating costs on payment instruments, but they compare their costs in the format required by the law. Therefore, only at the research stage, an appropriate division of costs can be made, often distinguishing the costs of payment instruments from other more general costs, e.g. from the cost of wages, third party services, depreciation, etc.

In some studies (e.g. in the Dutch, Belgium and Swedish studies), a conventional division of costs into variable and fixed is used and in other studies the Activity Based Costing (ABC) is used (in the Norwegian and Portuguese studies).

The division of the total costs into fixed and variable is connected with defining how in a given period (e.g. over a year) the different costs change. There are two types of variable costs: transaction-linked and sales-linked. A fixed cost is any cost that is not affected by changes in transaction numbers or sales, generated in a given period (Brits and Winder 2005, Quaden 2005). Therefore, depreciation, overhead costs, rents and annual fees are fixed costs in a one year period, whereas variable costs include all the transaction fees (merchant service charges, credit and money transfer fees, etc.), the time required to execute a transaction with a given payment instrument, the time spent travelling to ATMs, etc. Variable sales-linked costs are insurance costs, the costs of robberies, theft and fraud. Some cost items may contain all types of costs (fixed and variable dependent on the transaction number and on sales) – e.g. cash production costs, transportation costs with armoured car services. Defining the proportion of the costs is only possible at the stage of data compilation. The respondent (e.g. a bank) itself defines the proportions, using the directions of the author of the study (Górk 2011a: 48-49).

The problem of the division of costs into variable and fixed can be eliminated when the Activity Based Costing is used. In this method, the division into direct and indirect costs is



of paramount importance. In commercial banks many costs are of indirect character. For example, the following departments are involved in the creation of a particular payment service: the IT Department, Sales Department, Marketing Department, Customer Service Department, Security Department, etc. The problem arises of which costs (and in what proportions) incurred by the above departments should be allocated to particular services/payment instruments. In the ABC method, the functional organisational structure can in a way be cut across, basing the analysis on the sequences of the business process. Activities performed by people and machines which are important for producing the payment service are distinguished. Then, cost drivers (measurement units which are the basis for assigning activities to particular payment services) are identified<sup>2</sup>. After that, cost pool of the activities is established, which contains the cost of resources taken from the costs of company departments. Finally, the costs of activities are allocated to payment services on the basis of their requirement for a particular type of activity. The ABC method is different from the conventional one in the approach to indirect costs. Direct costs are allocated in a similar way in both methods, namely in relation to the number (possibly value) of transactions. In the case of indirect costs, in the ABC method, the allocation key is the activities which are required for creating a particular payment service, and not the cost centres, that is organisational structure departments, as in the conventional method (Górk 2008: 46).

The period adopted for the analysis and the approach to initial or replacement investments may have influence on the cost measurement of payment instruments. When the costs of the infrastructure set-up are treated as sunk costs, they are not revealed in the costs of payment instruments. However, if we consider the initial or replacement investments in terms of depreciation, it may turn out that in the costs of payment instruments there will be more or less costs, depending on the year of the analysis. For example, if machines used for the physical processing of banknotes and coins or servers switching card transactions and card acceptance terminals become totally depreciated in a particular year of the analysis, their cost will be lower than in the period of depreciation. It may turn out that adopting a particular year for the analysis will result in increasing the costs of one and reducing the costs of another payment instrument.

Limiting the scope of analysis to social costs of four groups from the payment chain and including payment services providers in the group of commercial banks (Brits and Winder 2005, Quaden 2005), the relations shaping the payment system in a particular country may not be fully exposed. In Poland the role of acquirers facilitating Points-Of-Sale in the acceptance of card payments and the role of independent ATM operators, developing the ATM network, is very important. The increase or decrease in the interchange fee or other fees may heavily impact the economic situation of these institutions (Górk 2010a, 2010b and 2011b).

Trying to use the proper method of measurement of non-pecuniary costs and benefits some problems are encountered. First of all, the time spent on payment transactions with different instruments must be quantified in money terms (Polasik, Górk *et al.* 2011), as well as the time devoted to cash withdrawals (Górk 2011b) and possibly other time costs. Secondly, accepting a particular quantifier may significantly change the level of cost consumption of a particular payment instrument. This was the case in the American study (Garcia-Swartz *et al.* 2006), the Australian study (Simes *et al.* 2006), the Swedish study (Bergman *et al.* 2007) and the Bank of Australia study (2007). In these analyses, to calculate time costs different kinds of wage rates were used, such as the average full national wage rate, the net wage rate, the half of the average wage rate, etc. Moreover, in all the studies

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<sup>2</sup> Cost drivers link incurred costs with activities. The cost drivers can be generally divided into three groups: the quantity drivers (e.g. the number of transactions, clearing accounts and products), the time drivers (e.g. the employees' work time, the duration of training) and the intensity drivers (used resources).

enumerated above, different duration times of the same activities were defined (e.g. the time of travelling to an ATM and withdrawing money). As a consequence, after the conversion to pecuniary units, different time costs of the same activities were obtained (compare Górk 2009b: 165 and 168). Thirdly, a method of assigning money value to some benefits connected with the perception of a particular payment instrument (safety, convenience, anonymity) is on the one hand difficult on account of using a particular pecuniary quantifier, and on the other hand the benefit connected with perception changes with time, can be manipulated by promotion and articulated in a poll may not be true.

As it was aforementioned, costs, revenues and benefits of every payment participant can be split into private and social. Then, one attributes these costs to a given payment instrument. A cost can be social or private, revenue is always private and a benefit may be either private or social. Revenue can be treated as a private benefit and it is treated as such in the American study of Garcia-Swartz *et al.* (2006) and the Australian study of Simes *et al.* (2006). A benefit is social when it causes externalities. A social benefit is not explicitly included when calculating the pecuniary costs of payment instruments. It exists not only for individuals but for a group. Therefore, we can talk about social benefits mostly as far as consumers are concerned. The broadness of merchant acceptance of a particular payment instrument (positive externality, network effect) is a typical social benefit of consumers. Other benefits of consumers are for example: the anonymity of payment, the ease of use of a particular payment instrument, the immediate settlement, the credibility of the issuer, etc. It is a moot question as to which of these benefits can be classified as social, but they certainly are of private and non-pecuniary character.

### **The author's method for the cost analysis of payment instruments**

The author has already made attempts to undertake an extensive study of payment instruments in Poland but has so far failed to convince the Polish central bank and representative groups of Polish banks and merchants. All institutions felt apprehensive about disclosing sensitive data. Moreover the costs of undertaking such a study seemed considerable. Especially commercial banks would have to put much effort into reporting the costs of payment instruments in a required configuration. An alternative way of conducting the research would be to use secondary data and certain approximations but this way would not guarantee the same degree of precision as in the studies based on primary data. The author successfully completed research on a more narrow scale in which he estimated unit costs of cash withdrawals at ATMs and at bank branches as well as cost savings for the Polish economy, banks and consumers arising from the use of ATMs instead of bank branches (Górk 2011b).

A purely social cost analysis is quite neutral, because it does not affect any stakeholder, especially commercial banks which earn profits on payment instruments. However, market reality involves balancing reciprocal costs and revenues/benefits. Therefore the cost-benefit approach seems more justified in analysing the choice and profitability of payment instruments.

The efficiency of payment instruments is a complex issue. The lack of convergence between private and social costs resulting from the subsidisation of cash and paper-based payments instruments, bundling and tying payment instruments with other bank products, hiding the true costs of payment instruments and lack of transparent cost-based pricing in banks make the issue even more complex (compare Bergman *et al.* 2007, Van Hove 2008, Leinonen 2008).

The approach to the extensive measurement of costs put forward by the author takes into account four stakeholders – the central bank, commercial banks, merchants and consumers (Górk 2011c). The author's concept is summarised below.

### **The central bank**

Under article 227 of the Constitution of the Republic of Poland, the National Bank of Poland shall have the exclusive right to issue money as well as to formulate and implement monetary policy. The major social benefit of money circulation participants (consumers, companies) ensured by the central bank is the certainty of cash acceptance and its appropriate quantity.

The National Bank of Poland, like most other central banks, makes profits on cash, not on other retail payments instruments.

By issuing cash the central bank earns revenues called seigniorage. Cash is the direct source of finance and non-interest bearing liability of the central bank. At the end of November 2011 the cash item accounted for more than 31% of NBP's total liabilities. The central bank can invest and make a return on the cash value in circulation, which in fact is an interest-free loan. The National Bank of Poland holds a long position in foreign exchange reserves. At the of November 2011 they accounted for 99% of NBP's total assets. Therefore, a significant share of earnings on forex reserves is strictly linked to cash. From the perspective of all entities other than the central bank, seigniorage can be perceived as a quasi tax. Cash loses its value due to inflation and does not produce any interest income to its holders. They bear the alternative cost of cash.

The NBP must reduce seigniorage revenues by deducting own private costs of cash issuance, including: currency production, delivering currency to banks, exchanging worn and damaged notes and coins, conducting authenticity and quality controls of currency, carrying out periodic analyses and evaluations of currency stocks, forecasting the circulation of notes and coins of particular denominations, bearing storage and security (vault) costs, etc.

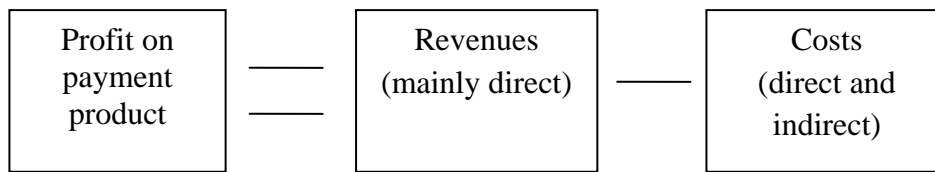
In order to measure the central bank's costs of cash, alternative methods can be used: the conventional method based on the division of costs into fixed and variable, the ABC method or the mixed method. So as to be consistent with the analysis of commercial bank costs, the same method of cash measurement should be adopted.

### **Commercial banks**

For commercial banks and other payment service providers payment instruments are products or business lines, which generate both costs and revenues and may be profitable or not. Payment instruments are often tied to other banking products (like accounts) and used to cross-sell more profitable banking products (like credits). According to McKinsey (2005: 1-2) and Capgemini (2007: 50) payments account for *circa* 1/4 of revenues and 1/3 of costs in banks.

Payment cost surveys conducted in the world showed that undertaking payment cost study requires from banks financial input and a lot of effort to report costs in a demanded manner. The author has built a framework which is based on tables of bank rates and charges, so that banks would have ready data to report without the need to reconfigure them (Górk 2011c). However, the framework also contains elements of the ABC analysis in order to include properly direct and indirect costs (all overheads) pertaining to payment activities. Financial statements made public by commercial banks do not suffice. The collaboration of banks is necessary to extract these data from cost centers and departments to allocate costs to payment instruments.

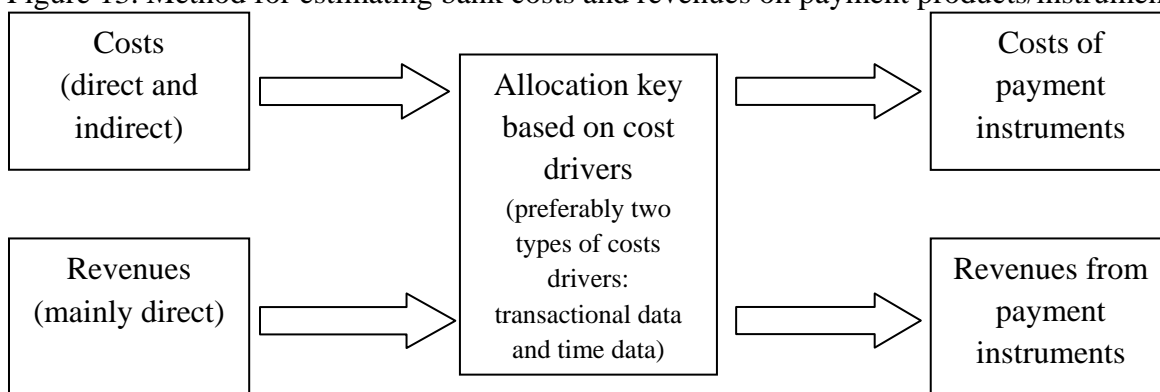
Figure 12. Profitability of payment products/instruments in banks.



Source: Author's concept.

In banks payment products generate mainly direct income from fees and charges received, whereas the costs of payment are not only direct (e.g. fees and charges paid for processing transactions to clearing houses) but also indirect (e.g. IT, staff, marketing, security costs, foregone interest on cash stocks, etc.).

Figure 13. Method for estimating bank costs and revenues on payment products/instruments.



Source: Author's concept.

Direct costs and revenues are allocated using transactional cost drivers (the number and value of payment transactions and data about overnight deposits). It is more difficult to distribute indirect costs between particular payment instruments, first identifying bank activities and services performed in producing payment products and then allocating them to each payment instrument with the help of cost drivers (transactional, time and if necessary intensity drivers).

Originally, the author distinguished quite many direct and indirect costs split into general categories and specifically into particular payment products (Górká 2011c). In the case of cash, for example, the costs comprise such items as: cash counter services, back-office counting and other cash handling activities, foregone interest on cash holdings, logistics (transport, CIT costs), ATM maintenance and interbank fees paid, security, frauds and robberies, book-account keeping costs and IT costs. Cash revenues include: client charges (corporations, small companies, individuals) for withdrawing and depositing cash at cash counters (in an open and closed form), ATM fees received (for withdrawals and deposits, interchange fees, other fees), transaction banking revenues and part of revenues from clients' current account charges.

### Merchants

The costs of merchants, acceptors of payment instruments, constitute a significant fraction of the total payment costs. Merchants' costs can be divided into:

1. Pecuniary costs;
2. Time costs.

The first group of costs is clearly visible in the merchants' income statements. While the second group is harder to identify and requires a separate measurement. The merchants' costs differ depending on where the transactions occur. Remote Internet transactions are characterised by different costs than transactions at physical Points-Of-Sale (distinguished below). Polish consumers pay either in cash or with cards at shops.

Table 2. Pecuniary costs of cash and cards for merchants (physical Points-Of-Sale).

| Payment cards   | Cash   |
|---|--|
| <ul style="list-style-type: none"> <li>i. Costs of merchant service charge including interchange fee transferred by acquirers to banks issuing payment cards</li> <li>ii. Payment terminal rental costs</li> <li>iii. Telecommunication costs (depending on type of connection used – dial-up, ISDN, LAN, GPRS, etc.)</li> <li>iv. Payment terminal service costs</li> <li>v. Float costs</li> <li>vi. Disputes and chargebacks</li> <li>vii. Costs of frauds</li> <li>viii. Costs of adjustment to Payment Card Industry Data Security Standards (PCI-DSS)</li> <li>ix. Other costs (for additional software, logo on slips, enhanced payment terminal interface, etc.)</li> </ul> | <ul style="list-style-type: none"> <li>i. Costs of cash open withdrawals/deposits</li> <li>ii. Costs of cash closed withdrawals/deposits</li> <li>iii. Costs of safe envelopes and wallets</li> <li>iv. Costs of cash register (part of it)</li> <li>v. Costs of insurance against cash thefts and robberies</li> <li>vi. Costs of counterfeited notes and coins</li> <li>vii. Costs of thefts, frauds and robberies</li> <li>viii. Costs of armoured car services (Cash-In-Transit, CIT costs)</li> <li>ix. Costs of foregone interest on cash holdings.</li> <li>x. Other costs</li> </ul> |

Source: Author's concept.

Table 3. Time costs of cash and cards for merchants (physical Points-Of-Sale).

| Payment cards   | Cash   |
|---|--|
| <ul style="list-style-type: none"> <li>i. Payment tender time (card payments).</li> <li>ii. Time of payment terminal operations, (preparing, switching on and off, changing terminal paper rolls, etc.)</li> <li>iii. Time of contacts with the acquirer service, telephones due to malfunctioning of terminals (e.g. problems with authorisations)</li> <li>iv. Time of sending payment orders packages to an acquirer at the end of a day, possibly at other times of a day</li> <li>v. Time of disputes with clients who want to execute chargeback</li> <li>vi. Other time</li> </ul> | <ul style="list-style-type: none"> <li>i. Payment tender time (cash payments)</li> <li>ii. Time of preparing cash registers</li> <li>iii. Time of changing cash in other stores when there is lack of particular denominations of notes and coins at cash registers, possibly time of supplying needed denominations to cash registers in other ways</li> <li>iv. Time of travelling to banks</li> <li>v. Time of reconciling payments at the end of a day (or possibly at other times of a day) and preparing for cash (open or closed) deposits</li> <li>vi. Other time</li> </ul> |

Source: Author's concept.

In order to calculate the total and unit costs of payment instruments the following transactional data is needed:

1. The number and value of cash transactions.
2. The number and value of card transactions (division into types of cards).
3. Possibly other transactional data (e.g. the number of cash open and closed deposits).

Tables 2 and 3 include merchants' cost items which, depending on the payment instrument acceptor, can be more or less important. Smaller merchants have their employees deliver cash to their banks, whereas bigger merchants pay for the services of CIT companies which deliver cash to banks on behalf of merchants. In Poland small merchants often do not necessarily deposit cash in banks or withdraw it every day. They may use earned cash to pay

back their current obligations. Some time costs of cash, like preparing for cash deposits at bigger merchants (e.g. supermarkets), may involve work of more than one employee. The time costs of payment cards can also be considerable, especially in the cases when terminals do not respond to authorisation orders, which additionally may cause negative externalities for clients, who willing to pay with a card, cannot execute a payment and do not have cash at hand.

The major benefit for merchants resulting from card payments is bigger sales. Consumers may spend more with a card. They may prefer card payments and be additionally induced to spend more by loyalty programmes. Often however in such programmes at Polish Points-Of-Sale customers get reward points whatever payment instrument they use. Possibly another benefit for merchants resulting from the use of credit cards issued by banks is that they can avoid investing in in-house credit departments.

### Consumers

Consumers are payers who decide what payment instrument to choose in a given payment situation. They, just like merchants, do not earn on payment instruments but bear specific costs. Consumers can also benefit from using a particular payment instrument. The benefits and costs of two basic payment instruments are shown in tables below.

Table 4. Consumers' costs and benefits of cash.

| Type of cash cost or benefit  | Benefit / cost |
|---|----------------|
| Anonymity, privacy  | benefit        |
| Popularity of cash and certainty of acceptance  | benefit        |
| Means of storing wealth (financial asset)   | benefit        |
| Ease of controlling expenditures  | benefit        |
| Convenience and ease of use   | benefit        |
| Immediate settlement  | benefit        |
| Possibility to settle debts without additional infrastructure necessary to execute an electronic transaction  | benefit        |
| Credibility of the issuer   | benefit        |
| Possibility to execute consumer-to-consumer transfers   | benefit        |
| Time spent on a cash payment transaction at a Point-Of-Sale   | cost           |
| Time spent for a trip to an ATM or a bank and the time spent on a cash transaction alone (withdrawal/deposit) | cost           |
| Theft/robbery   | cost           |
| Seigniorage   | cost           |
| Fees paid for cash deposits/withdrawals at a bank counter   | cost           |
| Fees paid for cash deposits/withdrawals at an ATM   | cost           |
| Fees paid for cash withdrawals at a Point-Of-Sale (cash back)   | cost           |
| Part of fees paid for current accounts, bundled services (e.g. free of charge ATM withdrawals)                | cost           |

Source: Author's concept.

Table 5. Consumers' costs and benefits of payment cards.

| Type of card cost or benefit   | Benefit / cost |
|--|----------------|
| Float (delay between purchase and settlement of accounts)  | benefit        |
| Credit option (credit card)  | benefit        |
| Card rewards (credit card), possibly <i>money back</i> (the bank shares the interchange fee with the card user)  | benefit        |
| Record keeping (possibility to track purchases executed with a card)   | benefit        |
| Possibility to withdraw cash at a Point-Of-Sale (cash back)  | benefit        |
| Time spent executing a card payment transaction at a Point-Of-Sale   | cost           |
| Time spent checking card statements and reconciling credit card and debit card account statements and the time spent paying credit card bills and speaking with bank employees about card issues   | cost           |
| Fees paid for cards (annual/monthly fees, charges for issuing cards, for a change of PIN, for altering card payment limits, for bank statements, for transfers of money from cards, for card insurance, for late repayment of a credit on cards, for exceeding credit limits on cards, etc.) | cost           |

Source: Author's concept.

After careful consideration of consumers' costs and benefits, the conclusion can be drawn that some items may be relative or not equally important for all consumers. The cash benefit – the ease of controlling expenditures means that a consumer pays more attention to the amounts spent using cash than when making purchases with a card. However, in the case of cash transactions he deprives himself of the record keeping benefit accompanying card payments, by which all transactions are automatically saved and can be later verified and controlled via the bank statement. On the other hand, the record keeping benefit on a card is a disadvantage in some situations for consumers who value anonymity. In effect consumers face a trade-off. Moreover, the record keeping benefit may entail bearing time costs (compare table 5).

The float as a benefit attributed to cards may in fact be negligible in the case of debit cards. Its importance grows with credit cards, when a consumer pays off the balance by the end of a grace period. When he does not pay the balance off, the loan is not interest free. Conversely, the loan may be quite expensive in terms of interest and a consumer may have to pay additional costly charges to his bank. It should be remembered that according to various cost studies (compare above) credit cards are a very profitable product for banks in all countries. Therefore, what may be a benefit for a single consumer who uses his credit card responsibly, brings losses to all credit card users and produces significant gains to banks. These gains may be of such magnitude that banks are willing to diminish them by offering credit card reward programmes, which however induce consumers to pay with their credit cards more often.

Recently in Poland several banks offered consumers additional card benefits. Consumers who pay with their cards frequently may benefit from a money back programme. A bank shares an interchange fee with them. By each payment a consumer gets a percentage of the amount credited back to his account at the end of a month. Obviously, the bank limits money back sums, so that they could not exceed some thresholds. This phenomenon clearly shows that interchange fees pertaining to card payments are too high in Poland.

### **The discussion of cost-benefit studies of payment instruments**

Undoubtedly in conceptual terms the cost-benefit approach to payment instruments is advantageous compared to the purely social cost analysis or social and private cost analysis that include only pecuniary items. The cost-benefit approach seems closer to the real economic situations in which parties take decisions.

However, objective quantifying non-pecuniary costs and benefits of payment instruments pose difficulties. The problem is shortly discussed on the example of two studies: the American study of Garcia-Swartz *et al.* (2006) and the Australian study of Simes *et al.* (2006). The Simes *et al.* study replicated the Garcia-Swartz *et al.* methodology, hence both studies are almost directly comparable.

Table 6. List of costs and benefits calculated in Garcia-Swartz *et al.* and Simes *et al.* studies.

| <b>Demand side of the payments market</b>   |  |   |  |
|---|--|---|--|
| <b>Merchants</b>  |  | <b>Consumers</b>  |  |
| <i>Costs</i>  | <i>Benefits</i>  | <i>Costs</i>  | <i>Benefits</i>  |
| <ul style="list-style-type: none"> <li>• Tender time (cash, cards)</li> <li>• Deposit preparation (cash)</li> <li>• Bank charges (cash, cards)</li> <li>• Float (cards)</li> <li>• Other direct costs* (cash, cards)</li> </ul> | <ul style="list-style-type: none"> <li>• No benefits calculated</li> </ul>                                   | <ul style="list-style-type: none"> <li>• Processing time (cash, cards)</li> <li>• Queue time (cash, cards)</li> <li>• Explicit price/bank charges (cash, cards)</li> <li>• Implicit price (cash)</li> <li>• Seigniorage (cash)</li> </ul> | <ul style="list-style-type: none"> <li>• Float (cards)</li> <li>• Credit option (cards)</li> <li>• Record keeping (cards)</li> <li>• Cash back option (cards)</li> <li>• Reward cards (cards)</li> <li>• Privacy (cash)</li> </ul> |
| <b>Supply side of the payments market</b>   |  |   |  |
| <b>The central bank</b>   |  | <b>Commercial banks</b>   |  |
| <i>Costs</i>  | <i>Benefits</i>  | <i>Costs</i>  | <i>Benefits</i>  |
| <ul style="list-style-type: none"> <li>• Processing cost (cash)</li> <li>• Production (cash)</li> </ul>   | <ul style="list-style-type: none"> <li>• Seigniorage (cash)</li> <li>• Processing revenue (cash).</li> </ul> | <ul style="list-style-type: none"> <li>• ATM maintenance (cash)</li> <li>• Production (cards)</li> <li>• Processing (cash, cards.)</li> <li>• Reward cards (cards)</li> </ul>   | <ul style="list-style-type: none"> <li>• Processing revenue (cash, cards)</li> <li>• Float (cards)</li> </ul>  |

\* This includes the cost of fraudulent use of payment instruments incurred by the merchant (e.g., dishonoured cheques, collection fees, credit card chargebacks where the merchant cannot verify transaction authorisation, value of cash theft and counterfeiting and associated loss prevention measures) and the cost of armoured car transport for cash (Simes *et al.* 2006: 14).

Source: Garcia-Swartz *et al.* (2006) and Simes *et al.* (2006).

Comparing the list of costs and benefits in the studies of Garcia-Swartz *et al.* and Simes *et al.* with the author’s list of costs and benefits it is clearly visible that the discussed studies did not include all items. Especially the list of consumers’ cash benefits was short, only privacy (anonymity) was taken into account by Americans and Australians, whereas the list of consumers’ cash benefits is much longer (e.g. broad acceptance base, immediate settlement, no infrastructure required, possibility to perform easy consumer-to-consumer transfers).

Moreover, analysing Garcia-Swartz *et al.* and Simes *et al.* estimates, one has to admit that costs of cash were overstated. The author agrees with the Shampine’s critique (2007: 496) who wrote: “For example, ATM maintenance costs and ATM fees are included in Garcia-Swartz *et al.* analysis (costs incurred prior to the customer arriving at the cash register) but credit card reader and electronic network maintenance costs and credit card annual fees are not. If one were to include ATM maintenance, then one should also include the maintenance of electronic card readers, including data line costs and servicing costs”.

In Garcia-Swartz *et al.* and Simes *et al.* studies privacy was also rated too low as a benefit equal to the discount provided by loyalty cards (compare Poles’ attitude to anonymity at physical Points-Of-Sale – survey results and Shampine 2007: 503).

On the other hand, the implicit price of cash (the value of time spent travelling to an ATM and conducting an ATM withdrawal) was calculated too high. In both studies it was



assumed that on average, 5 minutes were required to travel to the nearest ATM (4 minutes) and complete a transaction (1 minute). In other studies – e.g. Bergman *et al.* (2007) and Reserve Bank of Australia (RBA 2007) – shoe leather costs of obtaining cash were estimated much lower (simplifying, travelling to an ATM should take on average 1 minute and withdrawing cash – 50 seconds). Also multiplying the time of obtaining cash by the average U.S. (or Australian) full wage seemed to be too high. In the study of RBA (2007) this time was calculated on the basis of a half of the average wage rate in Australia.

Garcia-Swartz *et al.* and Simes *et al.* did not consider any time costs of cards, which certainly exist. The RBA enumerated these costs and partly included them in its calculations. Time costs of cards comprise such items as: the time associated with checking credit card statements for fraudulent or mistaken activity, the time involved in reconciling credit card and debit card account statements and the time spent paying credit card bills and speaking with customer service representatives about account-related queries (RBA 2007: 19).

There are many consumers' costs associated with cards (different fees and charges) which were disregarded by Garcia-Swartz *et al.* and Simes *et al.* (compare the author's list in the previous chapter and Górk 2011c). Although card fees paid to banks have nothing to do with the choice of a payment method at the Point-Of-Sale, they are important from the perspective of consumers' private costs. ATM charges and the time spent travelling to cash dispensers and withdrawing money also have nothing to do with the choice of a payment method at the Point-Of-Sale but they were included by Garcia-Swartz *et al.* and Simes *et al.* in cost calculations.

Seigniorage is another cost which a consumer bears before payment transactions occur at the cash register. Even ignoring the fact that Garcia-Swartz *et al.* and Simes *et al.* estimated costs of seigniorage for cash and did not take into account similar costs of foregone interest on banking current accounts (which gave no interest or negligible interest) attributable to cards and other non-cash payment instruments, the way of calculating seigniorage in analysed studies was disputable. Garcia-Swartz *et al.* and Simes *et al.* obtained the seigniorage cost figure by counting the difference between what it cost the government to produce currency and the face value of the currency which was then at the government's disposal (Garcia-Swartz *et al.* 2006: 190, Simes *et al.* 2006: 34). The author believes that the method of calculating seigniorage proposed by him (the section "the central bank") is more adequate. The government does not spend the currency on goods consumption, in fact the central bank issuing cash invests these funds in different types of assets, in Poland – in foreign highly-rated assets (forex reserves). Therefore, the return upon these assets, multiplied by the share of cash in the central bank's liabilities, minus the costs of cash for the central bank, produces an outcome which can be treated as the central bank's seigniorage income. However, in any case one should claim that the obtained figure is the seigniorage cost for consumers or other entities holding banknotes and coins. From their perspective the foregone interest on cash holdings should be counted as an opportunity cost of, let say, risk free Treasury securities (or other risk-free financial instruments). Unfortunately, when one calculates seigniorage differently for the central bank and consumers (possibly other cash holders) this cost item will not net out in the social cost calculations consolidated for all payment stakeholders.

Finally, Garcia-Swartz *et al.* and Simes *et al.* did not find a way to include merchants' card benefits, such as increased sales as an effect of using cards and savings resulting from avoiding running in-house credit departments in the case of sales produced by credit cards.

Garcia-Swartz *et al.* and Simes *et al.* underline that their calculations ought to be interpreted as suggestive and illustrative but not definite, and further refinements may be possible. The author is of the opinion that both studies deserve a good appraisal although in his view their outcomes must be treated with great caution since many underlying assumptions and methods of calculation were arguable (compare above).

The survey results presented in the chapter “Payment habits of Polish consumers”, show that currently Poles still perceive cash as far more convenient, cheaper, quicker in use and safer than cards. Merchants are of a similar opinion. Polish consumers consciously and unconsciously weigh their pecuniary and non-pecuniary costs and benefits when deciding about the choice of a payment instrument. It turns out that Polish consumers still think that cash is less costly and more beneficial for them, since they use it more often than cards at physical Points-Of-Sale. On the Internet, the benefits of cash are of smaller magnitude, in effect on the Internet cash in Poland is more quickly driven out by other payment instruments (mainly electronic credit transfers).

The overall trend is the decreasing share of cash payment in the total number of payments in Poland, but probably changes will occur faster in remote transactions and slower at Points-Of-Sale transactions. The intense promotion of payment cards may accelerate the change and the Polish society’s perception can become similar to the perception of the societies from Western Europe. Perhaps also some benefits of cash will erode, e.g. the unique cash feature that allows for consumer-to-consumer payments. At present, payment cards may migrate to the mobile form of an electronic wallet, which will make initiating P2P/C2C payments from mobile devices far more easy.

Moreover, the acceptance base of cards is also growing, although in Poland the process is seriously impeded by high merchant discount fees and other merchant charges.

On the other hand, Poles still value anonymity a lot and cards warrant it less than cash. Perhaps an introduction of new payment solutions (e.g. based on electronic money) ensuring more privacy would prompt customers to stop using cash and start using the new payment method. Truthfully, however, current anti-money laundering laws in Europe hamper business initiatives that would launch payment solutions characterised by high level of anonymity. Perhaps Polish consumers may with time start holding anonymity in lower esteem or may agree to sacrifice this benefit in exchange for other benefits, e.g. convenience. This is a deeper sociological issue not only concerning payments. People worldwide begin to share publicly very private things, for example through social networks. They are ready to sell their personal data for a discount in a shop or for a possibility to use a computer application or an operational system “for free”. In exchange for a benefit of using some products, like for example maps and GPS on their mobile phone, they are ready to allow tracking their location and activities, so the companies may build their behaviour profile and use it later. People are often not aware what terms of contract they accept and what threats are associated with their decisions. Sometimes they accept terms of contract feeling that they must do it and depreciating possible negative consequences of their decisions. Sometimes consumers are not even asked for permission, but their personal data are processed and used anyway. In payments new technologies are breaking their way. When The RFID and NFC (Near-Field-Communication) technology expands, it will bring many convenient benefits. Individuals will not only pay over-the-air in an instant, but will also benefit from a constant flow of information about products, promotions, etc. It will only suffice to have a mobile device with a digital wallet activated. The obvious trade off will, however, be less privacy and anonymity.

Research shows that Poles treat cash as an important means of storing wealth. They trust the issuer of currency (the National Bank of Poland). This is another important cash feature which tempers the pace of superseding cash from money circulation.

## Conclusions

The best evidence for how consumers (payers) value costs and benefits of payment instruments is to look at the statistics of usage. Cash is still held in high esteem by Poles. Partly, the popularity of cash results from the price policies of commercial banks which do not charge consumers for cash operations. In effect, consumers perceive cash free. On the other hand, costs of cards are also hidden from consumers and Poland suffers from the highest in Europe merchant card fees. Together with cardholder fees they make the Polish card industry very costly for consumers and merchants and in parallel very profitable for banks and payment card organisations.

The author is under the impression that two biggest card organisations and several commercial banks operating in Poland treat the domestic payment market as a lucrative testing ground. This thesis is supported by interchange fee tiers on card payments in Poland, which have been extremely high for years, recent reductions of interchange fee tiers on ATM withdrawals and significant licence, marketing and processing fees of payment card organisations (the latter not publicly available). The author believes that Poland (and Europe) lacks the competitive, cost-efficient non-cash payment scheme that would successfully challenge existing card payment schemes.

In the article the author promotes the idea that the cost-benefit approach towards payment instruments embracing all the parties in the payment chain is the most advantageous because it best describes the parties' interests and reciprocal relations. In his view in order to appropriately measure the costs and revenues of institutions of the supply side of the market (the central bank, commercial banks and payment subcontractors) the method containing elements of the Activity Based Costing would be most suitable. On the other hand, quantifying non pecuniary benefits and costs of payment instrument poses serious difficulties and may be disputable.

Facing problems with undertaking extensive studies of the profitability of payment instruments for the central bank and commercial banks the author seeks to find proxy measures.

The list of merchants' and consumers' costs and benefits related to cash and cards contains numerous items which may be unequally internalised by different merchants and consumers. Typically, entities are more sensitive to pecuniary costs and benefits. Therefore, merchants in Poland strongly oppose cards due to their high fees, indicating that cash is cheaper and consumers receiving little signals about the price of banknotes and coins from banks regard cards as more costly than cash. Judging by the perception of cash and cards and by the usage of payment instruments in Poland it seems that benefits of cash still dominate their costs and the benefits of cards.

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