

**INCENTIVES AT THE COUNTER:
An empirical analysis of surcharging card payments and payment behaviour
in the Netherlands**

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Abstract

In card payment systems, no-surcharge rules prohibit merchants from charging consumers extra for card payments. However, in contrast to most other countries, Dutch retailers are allowed to surcharge consumers for their debit card use. This allows an empirical analysis of the impact of surcharging on the demand for debit card services, and the effect of abolishing the no-surcharge rule on card acceptance by retailers and consumer payment choice. Based on consumer and retailer survey data, our analysis shows that surcharging steers consumers away from using debit cards towards cash. Half of the difference in the shares of debit card payments in total payments across retailers can be explained by this surcharge effect. Abolishing surcharging debit card payments in the Netherlands may induce considerable social cost savings of some EUR 100 million in the long run.

Keywords: survey data, retail payments, no-surcharge rule, cost efficiency
JEL code: D12, D61, G20

1 INTRODUCTION

The retail cards payments industry is subject to increasing attention by economists and policymakers, not only in the US but also in Europe and Australia. This has led to a surge in the theoretical and empirical literature on the “economics of payments”. At the center of this literature is a debate about the pricing of payments using credit and debit cards. Merchant dissatisfaction with interchange fees and merchant discounts charged for card payments has triggered antitrust scrutiny and resulted in some “spectacular” antitrust cases in the US and Europe and outright regulation of card fees in countries such as Australia.

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According to economic theory, interchange fees act as a balancing tool to reallocate the costs of a payment transaction between the consumer's bank and the merchant's bank. By doing so the prices of payment transactions for end-users are influenced, which in turn affects the payment behaviour of consumers and the acceptance decisions of payment instruments by merchants. Moreover, the price of card payments is hidden from most consumers, because card schemes do often not allow merchants to pass through these charges directly onto the consumer by surcharging card payments. These contractual agreements between card schemes and merchants are commonly known as the "no surcharge rule". This rule has come under pressure by antitrust and competition authorities. Indeed, the Reserve Bank of Australia has eliminated the no-surcharge rule and the European Commission is of the opinion that the no-surcharge rule harms competition at the retailer level.

In the Netherlands, cash and the debit card are the most intensively used payment instruments. In contrast to most other countries, Dutch retailers are allowed to surcharge consumers for card payments. A large minority of retailers—mostly small shop owners--does surcharge consumers for debit card payments. Hence, the Dutch retail payments market allows a useful "economic experiment" to assess the possible impact of the abolition of the no-surcharge rule on acceptance and surcharge behaviour of retailers and on consumer payment choice. Our paper tries to examine empirically the effects of surcharging card payments, whether surcharging leads to possible under- or overprovision of card services and to assess the impact of surcharging on the social costs of the point-of-sale (POS) payment system. Furthermore, we also pay attention to what type of retailers choose to surcharge card payments and what type of consumers react to debit card charges. We use two unique sets of data, especially designed to gain insight in the extent to which Dutch retailers surcharge their customers and its impact on payment behaviour. The first set is the DNB Household survey which was held in the autumn of 2006 among over 2000 households. The second set is a NIPO survey, held in the same period as the consumer survey, among 1000 Dutch retailers. In this sense we are able to confront both sides of the market, identifying possible correlations and feedback mechanisms.

The structure of this article is as follows. Section 2 provides an overview of the theoretical and empirical literature on payment pricing and surcharging card payments. These findings guide us to formulate hypotheses that can be tested using our data sets. Section 3 describes the characteristics of the Dutch POS payment system, its costs structure and the tariffs structure Dutch banks employ to charge consumers, merchants and business clients for payment transactions. Section 4 discusses the set-up of the surveys and the collected data. Section 5 provides some descriptive statistics on payment behaviour of consumers and the payment instrument acceptance and usage of surcharging by retailers. Attention is also paid as to how retailers surcharge and how consumers would react on such charges. Section 6 compares the payment behaviour of consumers in stores with and without surcharges and provides estimation results on the impact of surcharging on debit card usage. In addition it also discusses estimation results on what kind of consumers react on surcharges. Section 7 provides an illustration of the cost savings resulting from an increased substitution of cash by debit cards when retailers lift the debit card surcharge. Finally, section 8 summarises and concludes.

2 SURCHARGING CARD PAYMENTS AND PAYMENT PRICING

2.1 Payment pricing: a theoretic overview

Pricing payment instruments is a complex matter because payment networks give rise to large economies of scale and various types of externalities. These factors have led to significant concentration in the retail payment industry, which in turn triggered a surge in the theoretical literature on the industrial organization of payments. At the core of this literature is a debate about what economic principles should guide payment pricing, in particular the pricing of card payments. The observation that the payment industry is a two-sided market has stressed the fact that in setting payment prices, banks need to get both consumers and retailers “on board” by pricing both sides of the market in an effective way.² Hence, under two-sidedness, payment providers need not only choose a total price for their payment services, but also an optimal price structure between consumers and retailers. The ability (or not) to surcharge card payments by the merchant affects the price structure, and therefore the total demand of card payment services.

While there seems to be a widespread agreement that electronic payment instruments induce greater efficiency, card-based payments in particular have in many cases remained more expensive for merchants than their paper-based equivalents or cash. The price of card payments is effectively hidden from consumers, because contractual agreements between card providers and merchants often prohibit merchants from charging extra for card payments. These contractual agreements are dubbed the so-called “no-surcharge rule”. Instead the cost of card payments is reflected in the merchant service charge (or merchant discount), that is the transaction fee that the merchant pays to the card companies (i.e. the acquiring side). It is often argued that lifting the no-surcharge rule—so that merchants can charge differential prices for card and cash payments—is an alternative mechanism for internalizing (participation) externalities between merchants and cardholders in a two-sided market, like the interchange fee is a mechanism to guarantee the participation of all parties to the card payment system.

Rochet and Tirole (2002, 2003) have shown that the price structure (and therefore also the interchange fee) becomes irrelevant if merchants charge different prices for cash and card payments. In a fully-fledged model of an imperfectly competitive payment card industry, and taking account of two-sidedness, they compare privately optimal and socially optimal payment prices (and corresponding interchange fees). With respect to Baxter’s (1983) initial analysis, two important features of the payment market are added, that is, imperfect competition between issuers and strategic behaviour of sellers.³ For tractability, they assume perfect competition among acquirers, merchants’ homogeneity, and an exogenous total payment volume. Under a no-surcharge rule and homogeneity of merchants, the model is solved by observing that the merchant service discount is as high as possible, but consistent with all merchants (just) accepting. This mechanism in which merchants are kept indifferent between accepting cards and refusing and accepting cash instead, determines the profit maximizing interchange fee. In this way, since the issuer’s

² See Kahn and Roberds (2006) for a broader discussion on payment economics. The reader is referred to seminal papers by Rochet and Tirole (2002, 2003, 2006) and Armstrong (2006) for a general introduction to the theory of two-sided markets.

³ Baxter (1983) was the first to recognize that inefficient card use can be corrected by imposing an appropriate interchange fee.

profits are increasing in the interchange fee, the cardholders fee is kept as low as possible, boosting demand for card services. The socially optimal cardholder fee (and interchange fee) follows from equating the fee to the social value of the payment externality imposed by the cardholder on the rest of the economy, i.e. on the issuers, acquirers, and merchants. In general, the socially optimal cardholder fee is higher than the profit-maximizing fee as long as accepting cards provides a competitive edge for merchants over their competitors (that only accept cash). Hence, there is generally excessive use of card services. The resulting heavily skewed pricing structure is a general finding in two-sided markets.⁴

When the no-surcharge rule is lifted and sellers can costless surcharge, they never benefit from refusing card payments. At the optimum, merchants charge an additional amount equal to their merchant service discount minus (incremental) convenience benefit. This extra amount is effectively added to the cardholder fee, and therefore the total price of card services is entirely borne by consumers. With perfect surcharging (and no transaction costs), total card payment volume only depends on total prices and not on price structure anymore. Similarly, the net margin of issuers only depends on total price and total cost, so that the level of the interchange fee ceases to play any role.⁵ Moreover, because of imperfect competition, issuers have positive margins, implying underprovision of card services.

Rochet and Tirole (2003) conclude that under costless surcharging, lifting the no-surcharge rule may or may not increase welfare, depending on issuers' market power and merchant resistance to accept cards. In particular, when issuers' market power is large than banning the no-surcharge rule is likely to be welfare decreasing due to an aggravation of under-usage of card services. On the other hand, when sellers' resistance is strong so that interchange fees cannot be set too high, banning the no-surcharge rule is likely to be welfare improving because it can act as a countervailing force to initial overprovision. Note that both situations (with or without a no surcharge rule) generally induce inefficient card use. Wright (2003) extends the analysis of Rochet and Tirole (2002) by looking at alternative specifications of sellers' competitive behaviour. He concludes that if sellers are monopolistic, the no-surcharge rule partially corrects the underprovision which occurs under perfect surcharging, and consequently card payment volume and social welfare increase. If sellers are perfect competitors the no-surcharging rule has no impact on card payment volumes or social welfare.

Another approach is provided by Bolt and Chakravorti (2008) who do not assume exogenous (ad hoc) convenience benefits from using a payment card. The premises of their model are "security" (or any opportunity cost attached to carry or use cash) and "income uncertainty" that drive consumers and merchants towards the use and acceptance of cards rather than cash. Given safety and income uncertainty, induced merchant acceptance of cards and (fixed) cardholder fees determine the decision of consumers to have a payment card in their wallets. In turn, merchant acceptance is determined by merchants' cost structures, the ability to pass-through costs, and the level of merchant discounts. Ultimately, in solving the model, both consumer usage and merchant acceptance decisions

⁴ Bolt and Tieman (2008) offer an explanation for extremely skewed pricing in two-sided markets based on the fact that some demand functions that are well-behaved in an ordinary one-sided context yield non-concave profit functions in some two-sided models, thus making corner solutions (e.g., prices of zero) optimal.

⁵ Gans and King (2003) have established that this neutrality of interchange fees is a general property when costless surcharging is feasible.

are a function of only the (endogenous) cardholder and merchant fees that the bank sets. Their model predicts that imposing the no-surcharge rule increases bank profits.

2.2 Payment pricing: an empirical overview

There is limited empirical literature on the influence of payment pricing, and surcharging in particular, on the usage of payment instruments. In the area of retail payment systems, most studies have focused on the issue of consumers' choice of payment method, with a particular emphasis on the shift from paper to electronic payment methods. Due to a lack of precise payment data, most studies of retail payments have tried to infer consumer payments behavior using household surveys. Studies employing such surveys (Boeschoten and Fase 1989, Boeschoten 1992, Kennickell and Kwast 1997, Stavins 2001, Hyytinen and Takalo 2004, Van Hove *et al.*, 2005, Bounie and François 2006, Klee 2006a, Mester 2006, GfK/Currence 2007, Jonker, 2007) have established that demographic factors such as age, income, and education strongly influence consumers' payment choices, and have documented the shift towards electronic means of payment in recent years. Zinman (2006) uses SCF data to infer that debit card use is more common among consumers who are likely to be credit-constrained.

Another approach in the literature has been to infer consumer choice from aggregate data on payment systems and data from industry sources. Among the papers in this literature are Humphrey *et al.* (2000), Humphrey (2004), Bolt *et al.* (2008), Garcia-Swartz *et al.* (2006a,b) and Jonker and Kettenis (2007). In particular Bolt *et al.* (2008) use the experience of Norway (which directly priced its payment services to consumers) and the Netherlands (which did not) over the time period 1990-2004 to try to determine what the incremental effect of transaction pricing may be on the adoption of card payments and electronic bill payments versus ATM withdrawals and paper-based giros. Overall they find that payment pricing induce consumers to shift more rapidly to using more efficient payment instruments. However, non-price attributes and terminal availability may play an even bigger role than payment pricing for point of sale payments.

While these analyses have been informative, their lack of transaction-specific data has limited researchers' abilities to model the microeconomic behaviour of consumer. This shortcoming has been partially addressed in some recent studies that make use of surveys more specifically targeted at consumers' and merchants' perceptions and acceptance of various modes of payment. Hayashi and Klee (2003) use data from a survey by American Bankers Association to link consumers' use of electronic means of payment with their use of other information technologies. Loix *et al.* (2005) find similar results using data from a Belgian survey. Jonker (2007) analyzes data obtained in a survey in the Netherlands, indicating that consumers appreciate the safety, convenience and transaction speed of the debit card whereas they regard cash as a cheap payment instrument. They find the debit card relatively expensive compared to cash because some merchants surcharge debit card payments.. In a specific survey study regarding the effects of banning the no-surcharging rule in Sweden by IMA Market Development (2000), commissioned by the European Commission, the results show that lifting the no-surcharge rule has had only a marginal effect on merchant acceptance of credit cards. The vast majority of merchants connected to Visa and MasterCard would most probably have joined the card payment systems anyway, regardless the abolishment.

Recent papers by Borzekowski and Kiser (2006) and Borzekowski et al. (2007) combine the two prevalent approaches in the empirical literature. They are able to estimate demand functions for various methods of payment, using data from the Michigan Survey (demographic data plus consumers' attitudes toward different types of payment) with data on the "average" characteristics of certain payment types (electronic versus paper, time of use, bank fees, etc.). Borzekowski et al. (2007) examines the reaction of consumers on bank imposed transaction fees for PIN debit card payments. The motivation for banks to do so is that they want to encourage consumers to use signature based debit instead of PIN debit because of the higher interchange fees of signature debit payments. About 15 percent of the US banks charge PIN debit card transactions. The average fee level is 75 dollar cents, or 1.8 percent of the transaction amount. It turns out that bank imposed PIN debit card charges has lead to a 12% reduction in debit card usage. They have also found that the frequency of use is unaffected by the imposition neither of transaction fees nor by the level of the fees. They expect that if merchants would surcharge the magnitude of the effect on debit card usage may be even stronger, since consumers are directly confronted with additional costs when they pay their purchase instead of later on in future.

Only a few empirical studies of retail payments have been able to use actual payments data, some notable examples being Klee (2004, 2006b), Fusaro (2006), and Rysman (2006). Using data provided by a grocery retailer, Klee finds that a major determinant of consumers' payment choice is simply transaction size, with cash being highly favoured for small-value transactions involving just a few items. Analysis of the same dataset indicates a marked transaction-time advantage for debit cards over checks, helping to explain the recent popularity of the former. Fusaro (2006) applies a sample of bank accounts to examine behavioural explanations for consumers' preference for debit over credit card transactions. Rysman (2006) uses data collected by Visa to determine that while consumers may hold multiple payment cards, in practice they tend to concentrate card payments on a single card network.

3 THE DUTCH POINT-OF-SALE PAYMENT SYSTEM

This section discusses relevant features of the Dutch point-of-sale (POS) payment system, focusing on the debit card system. Subsequently, the cost structure of the POS payments system is discussed as well as the tariff structure imposed on consumers and retailers for POS payments.

3.1 Paying in the Netherlands

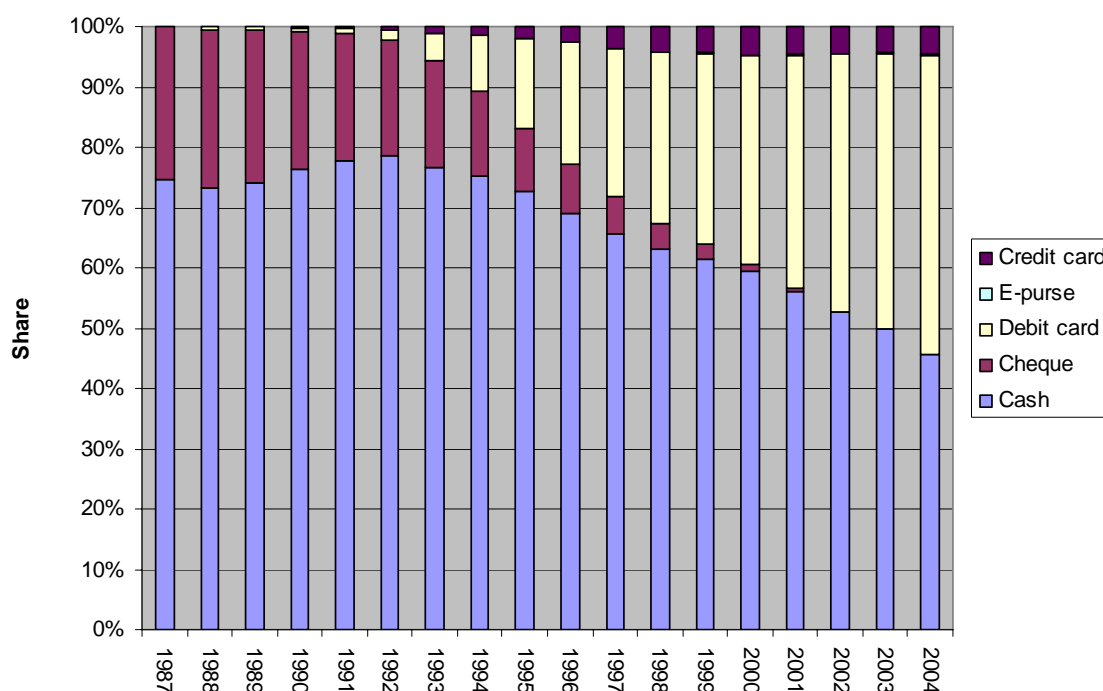
Dutch consumers mainly use cash and the debit card for POS payments. Over the last two decades, the Netherlands has seen a rapid shift from cash and paper based payment instruments to electronic payment instruments. The driving force behind this "electronic revolution" is the debit card. The bulk of point-of-sale retail transactions is still effected in cash, with more than 5 billion cash payments (EIM, 2007) against 1.6 billion debit card payments in 2007 (Currence, 2008). The Dutch e-purse (Chipknip) and the credit card follow at a distance with 175 million and 50 million transactions respectively. However,

looking at the value share of the payment instrument in total POS sales than it turns out that the debit card has surpassed cash from 2004 onwards (see Figure 1).⁶

The Dutch often use cash for small purchases whereas they pay with their debit card when the transaction amount is relatively high, like at gas stations, clothing, builder’s merchant, supermarkets (see table 1). There are several reasons to explain this behaviour. First, in the past there were public campaigns promoting the usage of debit cards for higher transaction amounts. Second, in some branches many retailers only accept cash payments and third surcharging debit card payments when the transaction amounts are low (below EUR 10-15) is quite common (see also section 4).

Figure 1 Value shares of POS payment instruments

(in percentages of total value of POS payments)



Source: Jonker and Kettenis (2007)

3.2 Dutch debit card payment system

The Netherlands has one national debit system (PIN) that was developed by the Dutch banks in the late 1980’s. Consumers can use the debit card to withdraw cash from ATMs and to effect debit card payments at points-of-sale. Dutch banks have co-branded their debit card with the international card scheme Maestro or Mastercard in order to facilitate

Table 1 Estimated shares of cash and debit card by transaction amount (in 2006)

⁶ The value of cash transactions has been approximated by subtracting the value of card payments from total

(in percentages)

Transaction amount	Cash	Debit card	Other
< EUR 5	84	5	11
EUR 5-10	82	16	1
EUR 10-15	69	29	2
EUR 15-20	54	44	2
EUR 20-60	36	62	4
> EUR 60	20	75	5

Source GfK/Currence (2007).

cross-border usage of the debit card. Some banks also issued PIN-only debit cards which could be used in the Netherlands exclusively.

Interpay, the Dutch Automated Clearing House (ACH) was owned by the Dutch banks. Interpay used to be responsible for acquiring, processing payment transactions and scheme management. In the past few years the banks reorganized Interpay. In 2004 banks took over the acquiring activities and Interpay has increasingly focused on processing payments. As part of the restructuring, a new organization, Currence, has been set up. Currence is the scheme owner of Dutch electronic payment products such as PIN. In 2006 the Dutch Interpay and the German ACH Transaktioninstitut für Zahlungsverkehrsdienstleistungen merged, resulting in the establishment of Equens, an international payment processor.

At end-2006, a few Dutch banks made bilateral agreements on interchange fees for debit card payments. Dutch banks attempted to arrange a multilateral interchange fee for debit card payments within the Netherlands but withdrew their request following an informal decision by the Netherlands Competition Authority (NMa). The NMa finds that when there is just a small number of issuers, as is the case in the Netherlands, it is perfectly feasible for banks to reach bilateral agreements on compensation for processing and authorisation costs.

3.3 Cost and tariff structure of Dutch POS payment services

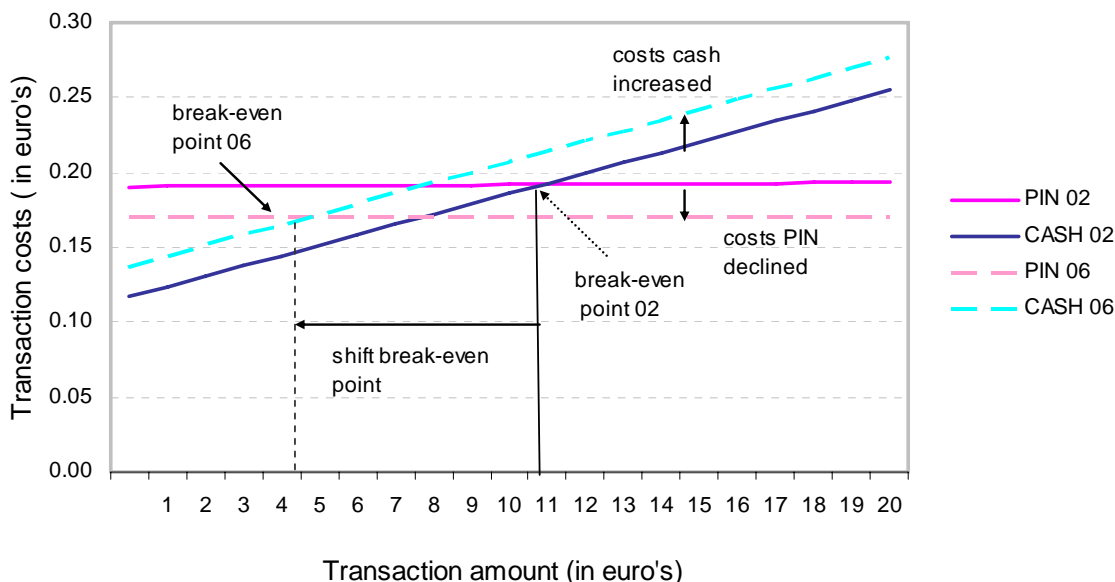
Social costs and benefits

Total costs of payment systems and services to society are considerable and there is much to be gained by designing them efficiently. Brits and Winder (2005) provide an overview of the social costs of retail payments in which they include costs of the banking industry, the retail sector and the central bank. They estimated the social costs in 2002 of all POS payments (cash, debit cards, credit cards and stored value cards) at EUR 2.9 billion, 0.65% of Dutch GDP. The costs of retail payments vary in transaction amount and payment instrument. Focusing on the most used payment instruments, cash and the debit card, paying in cash is socially preferable when the transaction amount is lower than EUR 11.63, otherwise paying by debit card was more efficient. This information is essential in assessing the optimality of payment card usage regarding under- or overprovision of card services.

sales at POS locations..

The used cost data includes the expenditures for producing payment instruments, the construction and maintenance of the payment infrastructure and of processing payments. Brits and Winders made a distinction between fixed and variable costs per additional transaction and per extra euro sales.⁷ By doing so, payment instrument specific cost functions were retrieved (see figure 2), showing the costs for making an additional payment with a particular payment instrument.⁸ The variable costs depend on the costs involved with one extra payment transaction (the intersection of the cost function with the y-axis), like data-communication costs made for the authorization of a card payment, and on the costs related to the transaction amount (the slope of the cost function), like counting banknotes and coins or safety related expenditures. The cost functions were used to determine which payment instrument is most cost-efficient for which transaction amount. A debit card payment turned out to cost about EUR 0.19 and was cheaper than paying in cash if the amount paid is EUR 11.63 or higher.

Figure 2 Impact changes in variable costs of an additional transaction by cash and debit card on break-even point (2002 vs. 2006)



Given the rapid technological developments between 2002 and now, especially in telecommunication and IT, the costs of making electronic payments have declined

⁷ The fixed costs are related to costs that are not affected by carrying out a specific transaction or by the sales amounts thus generated, like investments in the payment infrastructure.

⁸ Note that the cost structure and relative costs of using the two payments instruments is probably not the same for all parties in the payment chain, and can even differ between businesses within the same part of the chain (e.g. merchants). The break-even point between cash and debit card differs between parties and businesses and, consequently, these parties or businesses favour different payment instruments and encourage their customers to pay in accordance with their own preferences.

considerably compared to five years ago. Therefore, we calculated new cost functions for cash and the debit card using new information for 2005 on the costs for banks from the McKinsey study (2006) and cost data for 2006 for the retail and catering industry from a study by EIM (2007). They have been used in section 7 for assessing the impact on the social costs of three scenarios. It turns out that the costs of debit card payments have declined during the past few years whereas the costs of cash have increased, shifting the break-even point of debit card payments versus cash payments to the left. The transaction amount above which debit card payments are less costly than cash payments has more than halved in five years' time. The changes in costs have a large impact on the break-even point because of the modest slope of the cash cost function. This makes the break-even point very sensitive for small changes in costs of either cash or the debit card, as can be seen from figure 2.

Tariff structure POS payments

Consumers and retailers face different tariff structures for using payment instruments (see Bolt 2006). Tariffs for retailers are directly linked to the use of payment instruments through a differentiated system of payment packages, explicit fees and charges depending on the number of payment transactions. Commercial rates for electronic payments do not depend on the value represented by the transactions, whereas the tariffs associated with cash payments do depend on the value. With respect to PIN debit card payments acquiring banks now impose a transaction charge on retailers of around 4-5 euro cents for each incoming debit card payment, although (very) large retailers usually pay less (see NMA, 2005). Dutch consumers are hardly confronted with the costs of their payment behaviour at the counter. For them, the use of payment instruments seems to be "free". Banks usually charge them a fixed periodical fee for the use of a bank account and payment cards. This total fee amounts to EUR 35 on average (Capgemini/ING/EFMA, 2005). However, consumers do pay for their payment instrument use indirectly, and by means of - hidden - direct costs, like receiving no interest revenues on current account balances or value dating.

Dutch retailers recover their payments cost indirectly and sometimes directly from their customers. Indirectly by raising consumer prices and directly by charging consumers a "threshold" transaction fee. In principle, Dutch retailers are free to decide on a surcharge, on the payment instruments they want to surcharge, on the transaction amounts, and on the level of the charge. In practice, retailers who surcharge debit card payments surcharge payments below a certain threshold, e.g. below EUR 10 (see also section 5 for its incidence). The surcharge itself is fixed.

4 SURVEY DATA

4.1 Consumer survey on debit card surcharging

The consumer survey on surcharging debit card payments is part of the DNB Household survey (DHS). The survey on surcharging was distributed to panel members aged 16 or above, for completion during the weekend of 13 October 2006. Of the 2563 panel members qualifying for participation in the present survey, 1,863 respondents answered the questionnaire in full. This questionnaire included questions related to the payment

instrument choice of consumers, the impact of surcharging on it and their opinion about surcharging.

The DNB Household Survey (formerly known as the CentER Savings Survey) is a panel survey that started in 1993. The panel consists of some 2,000 Dutch households, of whom several household members may participate in the panel. Data are collected using internet surveys. This may have introduced some positive selection bias towards electronic payment instruments in our results and may make the results of some analyses in this report not perfectly representative for the entire Dutch population. However, we think that the results at least give a clear and quite accurate indication about what consumers in the Netherlands think about surcharging payments and how it affects their payment behaviour. We expect the pro-electronic bias in this study is rather small, for two reasons. First, new panel members do not need to have access to the Internet to enrol in the panel: the selection of new panel members is done by phone. This selection procedure enhances the representativeness of the panel for the Dutch population. Second, the usage of Internet is nowadays widespread in the Dutch population, with more than 80% of the Dutch having access to internet at home.

Generally, the sample represents the Dutch population fairly well, although there are some differences. There are 1,863 respondents of whom 52% are male and 48% are female. Most respondents use both cash and the debit card to make POS payments (80%). The remainder can be divided between debit card users (12%) and cash payers (8%). The average age of the respondents is 49 years which is somewhat higher than the (conditional) average age of the Dutch population (older than 15 years). Almost 80% of the respondents has a partner (married or living together), whereas this holds for 60% of the Dutch population. The educational level of the respondents seems to be slightly higher than for the whole population. This may have biased some survey results. We will pay attention to this in the discussion of the results and indicate the direction of the bias.

4.2 Retailer survey on debit card surcharging

The retailer survey on surcharging was held in September 2006 among 1000 Dutch retailers by a private company TNS Nipo, based on a questionnaire prepared by DNB. The survey included questions on payment instrument acceptance, payment behaviour of customers, surcharging, reasons to surcharge or not to surcharge, the impact of surcharging on payment behaviour, etc. Furthermore it had questions about firm characteristics. Interviewing was done by phone and respondents were mainly store managers. The sample was drawn from the registers of the Dutch Chamber of Commerce. The sample was stratified into eleven retail sectors and six company sizes (measured by numbers of employees) in order to ensure sufficient variation. Table 2 shows the number of retailers by branch and size in the sample. In this study the estimation results are weighed in order to represent the Dutch population of retailers.

Table 2 Sample retailers by branch and firms size

Branch	Freq	%	Firm size (No. Employees)	Freq	%
Food	118	12	1	92	19
Garden centre, florist, etc	108	11	2-4	278	28
Clothing, shoes	90	9	5-9	210	21
Construction	100	10	10-19	160	16
Hotel/restaurants	104	10	20-49	108	11
Department stores, furniture	111	11	>=50	53	5
Media (books, DVDs, Cds)	69	7			
Drugstores, perfumery	85	8			
Other retail stores	109	11			
Gas stations/travel agencies	41	4			
Other services	66	7			
Total	1,001	100		1,001	100

5 RESULTS ON THE INCIDENCE OF SURCHARGING

Consumers and retailers were asked in the surveys about their experiences with surcharging and their attitude towards payment pricing. This section provides the outcomes of their responses, gives insight in the incidence on surcharging and the conditions under which retailers surcharge debit card payments.

5.1 Acceptance of payment instruments and surcharging debit card payments

Almost every retailer accepts payments in cash (see table 3). Acceptance is not 100% in branches where the transaction amounts tend to be high, like in the hotel & catering industry or where cash is not accepted because of security risks like at gas stations. Two-thirds of the retailers accepts debit card payments and less than three out of ten accepts credit cards. Card acceptance varies by industry. It is relatively common in industries where the transaction amounts tend to be high. For instance, debit card acceptance is around 90% at clothes & shoe shops, drugstores & perfumeries, and florists & garden centres, whereas it is relatively low in the catering industry, specialised food stores and other service-providers. Card acceptance is determined not just by the segment of industry but also by the size of the company: consumers can pay by debit card at only 40% of one-man businesses, whereas nearly all businesses with fifty or more employees accept debit cards.

With respect to surcharging debit card payments we see that one out of five of the debit card accepting retailers surcharges its customers for paying with debit card below a certain threshold amount. Three branches stand out: food, media and gas stations/travel agencies of which almost one out of two debit card accepting stores surcharges. At first sight the high surcharge rate for gas stations seems counterintuitive since the transaction amounts are usually high. However, many people pay separately for fuel, especially if they have a company or lease car, and for other small purchases they make at the gas station (coffee, food, newspaper, etc). Again we see a strong company size effect: retailers with less than ten employees surcharge about ten times as often as the ones with ten or more employees.

Table 3 Acceptance payment instruments and surcharging debit card payments

(in percentages)

Branch	Cash	Debit card	Credit card	Surcharging ^a
Food	100	65	8	48
Garden centre, florists, etc	100	87	19	35
Clothing, shoes	100	88	54	19
Construction	100	76	16	29
Hotel & catering	98	41	27	15
Department stores, furniture	99	78	27	14
Media (books, DVDs, Cds)	100	82	32	47
Drugstores, perfumeries	100	87	16	29
Other stores & market	100	88	47	13
Gas stations/travel agencies	96	84	77	48
Other services	95	54	2	6
<u>Company size</u>				
1 employees	96	41	13	28
2-4	100	76	29	22
5-9	100	89	48	20
10-19	100	93	48	11
19-50	99	98	54	11
>50	100	92	67	2
Total	98	67	28	22

^a percentages refer to the group of debit card accepting retailers

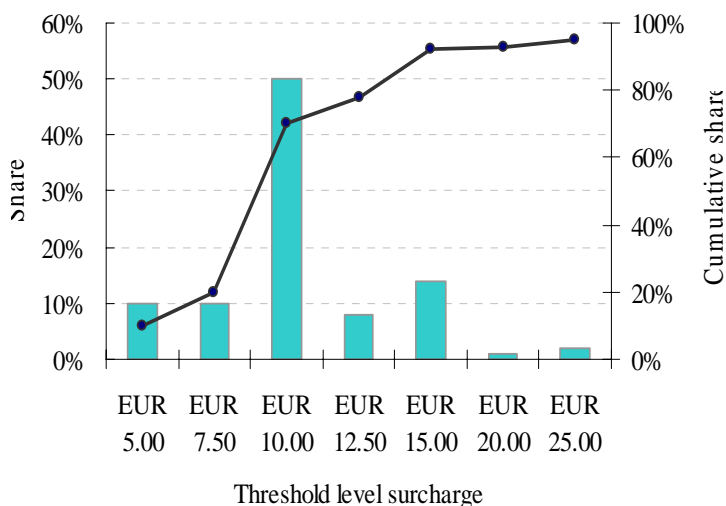
5.2 Some first explorations on the impact of surcharging on efficiency

Recent cost information suggests that the break-even point has more than halved between 2002-2006. However, cash is still the dominant payment instrument for transaction amounts below EUR 20, and the debit card otherwise (see table 1 in section 3). This suggests that the debit card is underused. The empirical question is whether surcharging has contributed to this under-usage.

The way in which retailers surcharge can give a first impression on whether surcharging has led to a under- or overprovision of debit card services. Underprovision due to surcharging may stem from two sources. The first source is the induced incentive structure of the surcharge. If retailers surcharge the debit card above the socially optimal threshold then consumers, acting in accordance with this structure, may use cash more often than desirable from a cost efficiency point of view. The second source is the influence of surcharging on the choice behaviour of consumers. Irrespective of the level of the threshold, surcharging may give rise to the perception by consumers that debit cards are expensive relative to cash which is provided “for free” since ATM fees in the Netherlands are zero (see also Jonker, 2007). The average level of the surcharge may play a role here. The existence of the “cash is for free” thought may influence consumers’

payment behaviour in all payment situations, including the ones where debit card payments are not surcharged. On the other hand, potential overprovision because cardholders do not face transaction fees for using debit cards may be mitigated when retailers surcharge debit card payments. However, this surcharge and threshold must be aligned with the socially optimal break-even point.

Figure 3 Share of surcharging retailers by threshold
(in percentages)



Threshold level

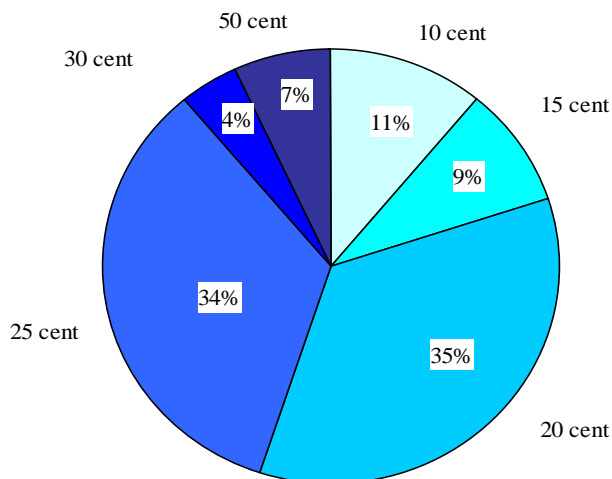
We start by taking a look at the threshold level retailers use for surcharging, in order to examine whether it may cause wrong signals to consumers (see figure 3). One out of five of the surcharging retailers employs a threshold of EUR 7.50 or lower, about three out of five uses a threshold level between EUR 8-12.50, and the remaining 20% utilizes an even higher threshold. On average, the threshold amount is EUR 10. Only a small part of the retailers uses a threshold level which is adequate from a social point of view, whereas 80% applies one that is too high. These results indicate that it is quite likely that the threshold levels used by surcharging retailers leads to current underusage of the debit card. It is rather striking that the current thresholds match very well the break-even point of 2002. When asked whether they have changed the threshold or the level of the surcharge 12% of the retailers states that they have changed the level of the fee, and only 1% adjusted the threshold level. The latter result shows that changes in the break-even point will hardly be translated into adjustments in threshold level, although this could also point to an information problem on the retailer’s side. The present threshold would have been adequate from a social cost perspective for 2002 but nowadays they might contribute to an underusage of the debit card.

Level of the debit card surcharge

In order to influence consumers payment behaviour the level of the surcharge should be "substantial". Graph 2 depicts the share of retailers by the level of the surcharge. The average level lies around 23 eurocents. It is relatively high compared to the surcharged

transaction amounts. On average, this implies a surcharge of 2.3% (= 23 cent of 10 euro) and this might have contributed to the general thought among consumers that the debit card is an expensive payment instrument. Therefore, it is likely that surcharging has affected the payment behaviour of consumers, which is formally tested in the next section.

Figure 4 Share of retailers by level of surcharge (in eurocents)



Consumers’ reaction

We asked the consumers in the DHS survey about their payment choice and whether surcharging influences it. About 25% of the debit card payers indicated that the transaction amount does not affect their payment choice: if possible they will always use the debit card. The larger part however states that the surcharge amount does influence their payment choice (see figure 5). Most of them use cash for purchases below EUR 15. This range matches the thresholds used by surcharging retailers well, indicating that consumers are steered toward the use of cash by the surcharge that Dutch retailers apply.

If explicitly asked how they would pay if confronted with a surcharge of 10-15 euro cents for purchases below EUR 10, three-quarters of the respondents replied that they would be unwilling to pay this surcharge (see figure 6). Around two-thirds indicate that, faced with such a surcharge, they would pay cash, 4% would use their e-purse and 5% would shop elsewhere. In other words, consumers react to fees and adapt their payment behaviour accordingly: they try to avoid the extra surcharge and most do so by paying in cash. An interesting point to note is that surcharging may cost retailers some customers. The retailer’s survey confirms this finding: 6 percent of the retailers who abolished the debit card surcharge attracted more customers. This indicates that not levying a debit card surcharge may result in higher sales, which corroborates Rochet and Tirole’s (2002) assumption that accepting debit cards is a service to consumers that gives a competitive edge and may increase business.

Figure 5 Share of debit card payers using their card by transaction amount (in EUR)

(in percentages)

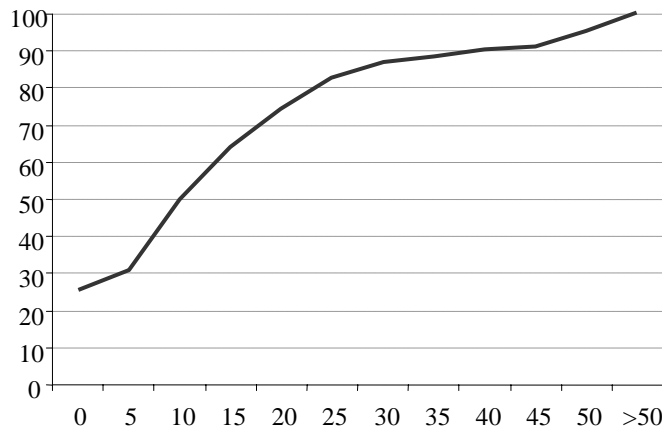
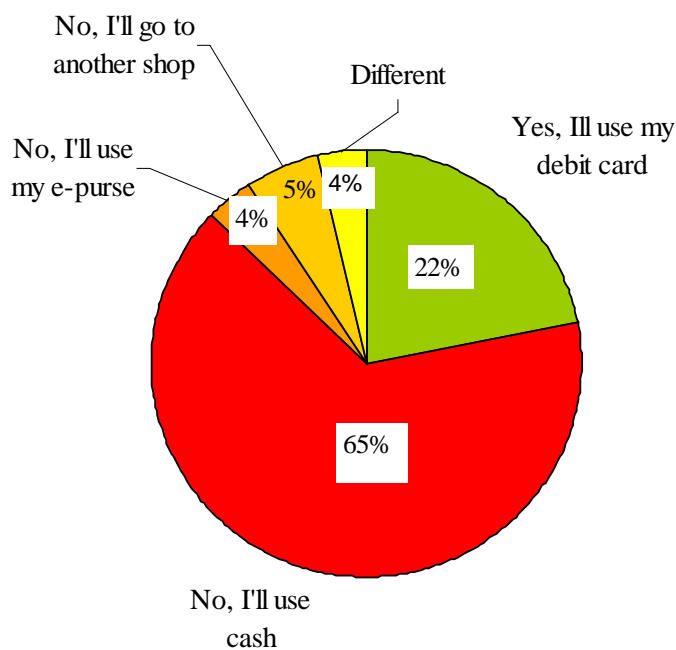


Figure 6 Are you willing to pay a surcharge of 10-15 eurocent for using a debit card to pay an amount lower than EUR 10?

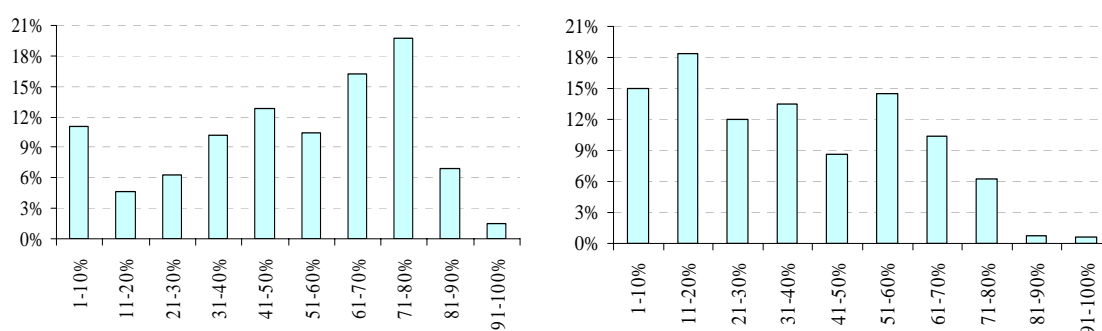


6 THE IMPACT OF SURCHARGING ON PAYMENT BEHAVIOUR

In this section we will examine the impact of surcharging debit card payments on the payment behaviour of consumers at the counter. Retailers who accept debit card payments were asked to indicate the share of debit card payments in the total number of their incoming payments. Figure 7 depicts the results for retailers who do not surcharge (left-hand diagram) and for retailers who do (right-hand diagram). There are ten categories on

the x-axis indicating the share of debit card payments on the total number of payments. The y-axis indicates the share of debit card accepting retailers in these categories. For example, the first bar on the left in the left-hand diagram indicates that 11% of the non-surcharging retailers has 10% or less debit card payments. The frequency distribution functions of the two groups of retailers are clearly different.⁹ Stores with a debit card charge report fewer debit card payments than stores without. On average, one-third of the purchases in stores with a debit card surcharge is paid by debit card, as compared to around half of the purchases in stores without a surcharge.

Figure 7 Frequency distribution of the share of debit card payments in the total number of payments in shops without a debit card surcharge (left panel) and with a debit card surcharge (right panel)



6.1 Estimating the impact of surcharging on payment behaviour

To assess the impact of surcharging on the demand for debit card services, as measured by the share of debit card payments in total (incoming) payments, we applied a linearly ordered probit model.¹⁰ The dependent variable is the reported share of debit card payments on the total number of payments by the retailer (ten categories, see also Figure 7). We chose for this type of probability model because of the discrete and linearly ordered nature of the dependent variable).¹¹ We added various controls to correct for specific firm characteristics and other exogenous influences in our model.

We estimated three separate models. In the first model we used data from all debit card accepting retailers (n=837) and used a dummy variable indicating whether a retailer did or did not surcharge to measure the impact of surcharging, irrespective of the fee level or the threshold level applied by the retailer. In the other two models we examined the impact of the fee level (model 2) and the threshold level of the surcharge (model 3) below

⁹ Various statistical tests reject the null hypothesis of equal distributions at the 5% level.

¹⁰ See Greene (1993) for a clear introduction into the econometrics of ordered probit models.

¹¹ It is possible that some retailers decide to impose a debit card surcharge because they expect few debit card payments and want to recover some of their costs for accepting debit card payments. In these cases the expected share of debit card payments influences the choice to use a surcharge. If the expected share of debit card payments would play a role in the decision to surcharge or not for most retailers than a simultaneous equation model would have been more appropriate. However, we think it is more likely that retailers who expect few debit card payments and find the investment costs too high simply decide not to accept debit card payments at all. Therefore we decided to focus on the influence of surcharging on the payment behaviour of customers and not on the other possible relation.

which debit card transactions are surcharged. For estimating model 2 and 3 we only used data from surcharging retailers. Their number is rather low ($n=174$) and the estimated effects only provide us with some first insights in whether fee level and threshold level influence the payment choice of consumers. The estimated effects are shown in table A.1 in the appendix, together with tables A.2 and A.3 showing the marginal effects for the incidence of surcharging and changes in the fee level.

The results of model 1 show that retailers who surcharge can expect a significantly lower share of debit card payments to the total number of payments than retailers who do not surcharge. This effect still holds when we control for firm size (measured by number of employees or by sales), for industry type, for ownership type (shop is independent or is part of a larger holding) and the type of location as measured by degree of urbanisation and province. The magnitude of the effect seems to be relatively large, indicating that surcharging does affect the payment choice of many customers. The format of the surcharge also seems to be important. The estimated effect of the level of the fee is significant at the 10% level, (see model 2) indicating that the higher the charge the less likely consumers pay with a debit card. However, consumers' payment choice does not seem to be much affected by the cut off point below which debit card transactions are being surcharged. The threshold effect is not significant at the 10% level (see model 3).

We also estimated marginal effects of surcharging on the share of debit card payments on the total number of payments. These estimated effects are significantly different from zero. They show that if a retailer surcharges debit card payments the probability that its debit card share on the total number of payments lies between 1 and 40% increases whereas the probability that it is higher than 50% decreases compared with the debit card share of a non surcharging retailer (see table A.2, 2nd column). Taking the marginal effects of all ten categories together it turns out that surcharging decreases the share of debit card payments on all payments of a surcharging by 8%-points. It is about half of the difference between the average debit card share of surcharging and non surcharging retailers shown in Figure 7. The other half stems from differences in other firm characteristics or region. At the level of the individual retailer the impact of surcharging is quite large. It means that if a retailer stops surcharging the share of debit card payments increases, on average, from 36% to 44%.

The impact of lowering the surcharge fee is shown in table A.3. If we increase the average fee of 23 cents with 9 eurocents (one standard deviation) then the share in debit card payments declines with almost 3 % points. If we decrease the average fee with 23 cents, which more or less boils down to lifting the surcharge, then the debit card share increases with almost 7 % points. This figure is broadly in line with the previously found 8%-points for abolishing the fee. In section 7 we will illustrate the economic impact of abolishing surcharging debit card payments for the entire retail payments.

6.2 Other firm characteristics affecting the share of debit card payments

Apart from surcharging by merchants there are additional firm characteristics as well that influence the demand for debit card services of consumers. A closer look at the estimation results regarding type of industry suggest that the transaction amount influences payment behaviour of consumers. They pay significantly more often in cash when the transaction amount is relatively low (specialised food store, catering, florist, etc.) and use their debit card significantly more often when the transaction amounts are relatively high (clothing or

shoe store, gas station). These findings were found only using data from debit card accepting stores while controlling for surcharging. They support the view that transaction amount is an important factor explaining industry differentials in debit card usage.

Firm size as measured by sales revenues has a positive significant effect on debit card share. Another measure of firm size, the number of employees, does not have a significant effect on payment behaviour. However, if we run the same regression without the sales dummies the number of employees becomes statistically significant. The firm size effect seems intuitively plausible. Dutch consumers are used to pay in cash in small stores since those shops traditionally often only accept cash (see also section 5.1).

The Netherlands is divided into twelve provinces. Eight out of eleven province-dummies are statistically significant. Compared to retailers in Noord-Holland (the reference province in which the capital city Amsterdam is located) retailers in other provinces, except for Zeeland and Limburg, have a larger debit card share. Part of the explanation may lie in differences in age distribution (see also table A.4) between different provinces. For instance, Flevoland is a province with relatively many young people and relatively few elderly.

6.3 Who is sensitive for surcharges and who is not?

The previous analyses show that many but not all consumers are sensitive to surcharges. We already touched upon the influence of age. In this section we will try to shed some more light on the issue which consumers react on debit card surcharges and which consumers are less price sensitive. In the consumer survey we asked respondents to indicate what they would do if they had to pay a surcharge for a debit card payment below EUR 10 (see also Figure 6). We now focus on two answer possibilities, namely “*I’ll use cash instead*” and “*I’ll use my debit card*”. We estimated two probit regressions, one for each of the abovementioned reactions on debit card surcharges. We excluded respondents from the analysis who never used the debit card for making payments. As explanatory variables we included standard demographic characteristics like age, gender, marital status, educational level and income. We also included explanatory variables indicating the degree of urbanisation of the respondent’s residence and province in order to account for regional differences. The results are shown in table A4.

Age is an important factor. People below 35 years of age significantly more often indicated to use the debit card anyway than people aged 65 or higher. This holds to a lesser extent for people between 35 and 44 years of age. The age effects explaining the choice for cash are contrary to the ones we found for the debit card. These findings suggest that age is positively related to price sensitivity for payment services.

Gender also affects the way people react to surcharges. Men are significantly less likely than women to use cash instead of the debit card when confronted with a surcharge. However, they did not indicate significantly more often than women to use the debit card, surcharge or not. This suggests that they are not less price sensitive than women, but that they use other ways to evade the surcharge. The data reveal that they tend to use the e-purse more often than women and that they more often simply go to another shop.

Income and educational level are important factors as well. When facing a surcharge, we observe that low and high income respondents shy away from using their debit cards, and use cash instead. With respect to educational level we find a negative relationship between educational level and the willingness to pay the debit card surcharge. Taken

together, the results on income and educational level reveal that highly educated, well earning respondents are among the most price sensitive payers. This result is somewhat striking since, from a budget perspective, the surcharges affect their purchasing power not as much as people who earn less. Once controlled for personal characteristics there is hardly any evidence of regional differences in price sensitivity. Urbanisation degree does not seem to matter a lot as well.

7 THE IMPACT OF ABOLISHING SURCHARGING ON RETAIL COSTS

Savings in POS payments can be achieved if consumers substitute (“expensive”) cash payments for (“cheap”) debit card payments. Retailers could steer consumers towards debit cards when they would stop charging debit card payments. To gauge just how much banks, retailers, DNB and Equens together could save, three scenarios (see Table 4) were examined. The costs data used in this scenario analysis are from several different sources, namely EIM (2007) for the costs of retailers and the catering industry, McKinsey & Company (2006) for the costs made in the banking community and Brits & Winder (2005) for the costs made by DNB. Following the approach by Brits & Winder (see also section 3.3) we focus on variable costs in our projections for cost savings. We distinguished between costs that vary with the number of transactions and the costs that vary with the value of the transactions.

The direct consequences of the surcharges will presumably show up first in stores which used to surcharge debit card payments of small transaction amounts (scenario 1). In this scenario, these stores’ share of debit card payments will expand by 8%-points if the surcharge is dropped. Assuming substitution for payments in the EUR 10-15 expenditure category, the total number of debit card payments could increase by 67 million annually, and its total value by EUR 840 million. After a while, this will feed through to all POS locations which accept debit cards, and for all purchase amounts. As the debit card surcharge disappears, the idea that debit cards are meant especially for large amounts will gradually fade. Consumers may consequently adjust their payment habits and begin to use debit cards more often for both small and large amounts. After all, they consider debit card payments more convenient than cash. The only aspect they do not like about the debit card is related to prices, like the surcharges for low transaction amounts (Jonker, 2007). Scenarios 2 and 3 present the consequences of the change in payment behaviour in the long term. Scenario 2 shows what happens when the share of debit card payments for purchases of EUR 10-60 in the total number of payments increases by 10%-points. Although the amount continues to co-determine the choice of instrument, the preference shifts to the debit card. In scenario 3, it is assumed that the purchase amount no longer figures in the choice of payment instrument. Purchases of EUR 10-60 are then paid just as often by debit card as in cash, as are purchases in excess of EUR 60. In this scenario, the share of debit cards rises to three-quarters. As a result, 1.2 billion cash payments are replaced by debit card payments, and the total amount involved in debit card payments expands by EUR 16 billion.

The direct costs saved by the abolition of debit card charges in scenario 1 come to EUR 5 million. This is a modest amount, given the total costs of over-the-counter payments. So little is saved because initially only few cash payments are replaced, and because they correspond to purchase amounts for which the costs of a cash payment barely

differ from those of a debit card payment. If consumers were to use their debit cards more often for all purchases of EUR 10-60, savings of around EUR 50 million (scenario 2) to EUR 110 million (scenario 3) might be achieved. This is around 4-8% of the variable costs of cash and debit card payments combined. The bulk of savings is accounted for by retailers and the catering industry.

Table 4 **Payment cost savings for society**

Scenario	Influence on debit card payments		Savings
	Numbers in millions	Value in EUR billion	Value in EUR millions
1: direct effect of abolition debit card surcharge	67	0,8	5
2: 10%-points increase in debit card payments for EUR 10-60 purchases	340	6,7	50
3: share of debit card payments for EUR 10-60 rises to 75%	1180	16,0	110

8 CONCLUSIONS

In the Netherlands retailers are allowed to surcharge consumers for the usage of payment instruments. One in five debit card accepting retailers makes use of this possibility and charges customers for small debit card payments. In such cases, most consumers opt for cash. Retailers charging for debit card payments below a certain amount are thus influencing the way their customers pay for purchases. This means that surcharging payment instruments neutralises to some extent the influence of interchange fees on the payment behaviour of consumers.

The design of the surcharge rule which Dutch retailers use initially enhanced the efficiency of the POS payment system. In 2002 the cheapest way to pay an amount below EUR 11.63 was by paying in cash and surcharging retailers have usually charged an extra fee for debit card payments below EUR 10-15. However due to technological developments and increasing payment volumes the amount below which cash is more cost efficient than the debit card has decreased considerably in a few years time, whereas the threshold level of surcharging retailers has hardly changed. Consequently, surcharging now leads to an underusage of the debit card and abolition of debit card charges will increase efficiency. This result shows that both the way in which retailers surcharge, developments in costs and payment instrument usage should be taken into account when assessing whether surcharging supports the efficient usage of payment cards.

Removing debit card charges will lead to more debit card payments and reduce the use of cash. Estimation results show that the share of debit card payments on the total number of payments in a store will on average increase by 8%-points if the retailer decides not to surcharge anymore. The consequences of abolishing debit card surcharges altogether for the social costs of over-the-counter payments are modest in the short term. Only a limited number of cash payments will be substituted and the cost savings per transaction

will be small. It is only after a while that the general effect will be discernible, when consumers do not think anymore that the debit card is expensive, like many Dutch nowadays do. Scenario analyses show that savings up to EUR 110 million may be possible, which represents about 8% of the variable costs of cash and debit card payments.

The Dutch results are also relevant for Europe. The “no surcharge” rule that some card schemes impose on retailers is currently under pressure by competition authorities. If they do not allow the usage of the no-surcharge rule by card schemes then retailers’ market power will increase. Retailers may start charging their customers additional fees for paying with expensive payment instruments and steer them towards instruments that are relatively less costly for them.

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APPENDIX:**Tabel A.1 Ordered probit results on the impact of surcharging on the share of debit card payments**

	Model 1		Model 2		Model 3	
	Coef.	z	Coef.	z	Coef.	z
Usage of surcharging=1	-0.41**	4.28	-	-	-	-
fee level	-	-	-0.02*	1.70	-	-
cut off point	-	-	-	-	-0.01	0.30
City	0.04	0.27	0.01	0.04	0.06	0.16
Town	-0.04	0.31	-0.44	1.31	-0.38	1.13
Village/countryside	-0.16	1.07	-0.33	0.92	-0.25	0.72
<i>Provinces</i>						
Zuid-Holland	0.27**	2.11	-0.14	0.45	-0.15	0.48
Utrecht	0.54**	3.02	1.52**	3.35	1.53**	3.29
Flevoland	0.72*	1.77	1.34**	1.98	1.36**	1.99
Overijssel	0.68**	3.65	0.94**	2.27	0.94**	2.26
Drenthe	0.44*	1.89	-0.32	0.57	-0.38	0.68
Gelderland	0.27*	1.94	0.14	0.43	0.14	0.44
Friesland	0.30	1.46	0.72*	1.72	0.75*	1.81
Groningen	0.58**	2.78	0.95*	1.71	0.89	1.61
Noord Brabant	0.39**	2.91	0.47	1.50	0.41	1.32
Zeeland	-0.16	0.62	-0.075*	0.09	-0.04	-0.08
Limburg	0.04	0.21	0.67	1.60	0.64	1.51
Independent store	-0.03	0.33	-0.49*	1.70	-0.57**	1.99
Firm size 5-19 employees	-0.02	0.18	0.16	0.81	0.14	0.72
20-49 employees	0.06	0.41	0.20	0.41	0.18	0.36
Over 49 employees	-0.21	1.15	-1.02	1.29	-0.96	1.21
sales < EUR 25K	-0.64**	2.35	1.55	1.28	1.09	0.92
EUR 25K <sales< EUR 49K	-0.46*	1.67	-0.42	0.78	-0.38	0.71
EUR 49k <sales< EUR 100K	-0.47**	2.23	-0.01	0.01	0.00	0.01
EUR 100K <sales< EUR 200K	-0.47**	2.77	-0.19	0.51	-0.20	0.53
EUR 200K <sales< EUR 500K	-0.20	1.53	-0.15	0.45	-0.23	0.68
Sales unknown	-0.05	0.57	0.15	0.74	0.13	0.63
<i>Branch</i>						
Food	-0.80**	5.09	-1.14**	2.69	-1.12**	2.65
Greenery/florist	-0.54**	3.52	-0.57	1.31	-0.55	1.26
Clothing/shoes	0.63**	3.95	1.19**	2.38	1.20**	2.37
Construction	-0.07	0.44	0.60	1.26	0.59	1.25
Catering/hotels	-1.24**	6.86	-0.87	1.56	-0.96*	1.71
Books, Cds, Dvds	-0.42**	2.38	-0.17	0.41	-0.20	0.48
Drugstore	-0.99**	6.08	-0.52	1.12	-0.43	0.93
Other stores	0.42**	2.79	0.85*	1.66	0.78	1.53
Gaz stations	0.37*	1.73	1.08**	2.33	1.02**	2.22
Other services	0.39**	2.00	-0.94	1.27	-0.96	1.29
cut1	-1.89		-2.52		-2.26	
cut2	-1.52		-1.86		-1.60	
cut3	-1.09		-1.29		-1.04	
cut4	-0.60		-0.61		-0.36	

cut5	-0.15	-0.07	0.16
cut6	0.26	0.60	0.82
cut7	0.84	1.18	1.40
cut8	1.74	1.87	2.09
cut9	2.66	2.48	2.72
log likelihood	1,606.74	-304.93	-306.33
pseudo R-squared	0.09	0.14	0.14
no of obs.	812	169	169

** denotes significance at 5%, * denotes significance at 10% level

Table A.2 Marginal effects model 1 Incidence of surcharging on share of debit card payments at store level

Share	Pr(share=j no surcharge)	Marginal effect dPr(Share=j)/d(surcharge= yes)	P+dP= Pr(Share=j surcharge=yes)
1-10%	0.052	0.054**	0.109
11-20%	0.052	0.033**	0.085
21-30%	0.100	0.042**	0.141
31-40%	0.164	0.032**	0.196
41-50%	0.178	-0.001	0.177
51-60%	0.153	-0.026**	0.127
61-70%	0.167	-0.056**	0.111
71-80%	0.111	-0.060**	0.051
81-90%	0.021	-0.016**	0.005
91-100%	0.002	-0.002*	0.000

** denotes significance at 5%, * denotes significance at 10% level

Table A.3 Marginal effects model 2 Impact level of surcharge on share of debit card payments at store level

Share	Pr(Share=j)	Marginal effect dPr(Share=j)/d Tariff up by 1 cent)	Effect for a 9 cent increase In fee level	P+dP(9 cents)
1-10%	0.042	0.002*	0.015	0.057
11-20%	0.101	0.003*	0.023	0.124
21-30%	0.165	0.002*	0.021	0.187
31-40%	0.264	0.001	0.007	0.271
41-50%	0.192	-0.001*	-0.014	0.178
51-60%	0.154	-0.003*	-0.016	0.134
61-70%	0.058	-0.002*	-0.016	0.042
71-100%	0.023	-0.001	-0.009	0.014

* denotes significance at 10% level

Table A.4 Impact of surcharging debit card payments with 10-15 eurocents when the transaction amount is below EUR 10

	Coef.	z	Coef.	z
Male=yes	0.064	0.83	-0.168**	-2.43
Married=yes	-0.008	-0.07	-0.007	-0.08
Children	0.063	0.67	-0.037	-0.44
Wealth	0.000	-0.32	0.000	0.39
Age 15-24	0.516*	1.80	-0.606**	-2.30
25-34	0.478**	2.88	-0.501**	-3.36
35-44	0.163	0.98	-0.225	-1.53
45-54	0.081	0.52	-0.161	-1.18
55-64	0.076	0.55	-0.160	-1.34
Town	0.339**	2.41	-0.170	-1.34
City	0.033	0.29	-0.071	-0.71
Village	0.092	0.81	0.007	0.07
Countryside	0.026	0.21	0.142	1.29
Employed	0.153	1.48	-0.031	-0.34
Studying	0.034	0.13	-0.055	-0.22
Income very low	-0.020	-0.13	0.011	0.08
low	-0.223**	-2.18	0.198**	2.11
high	-0.323**	-3.51	0.202**	2.44
Primary school	0.225	1.30	-0.085	-0.52
Secondary school	0.165*	1.72	-0.155*	-1.77
Higher vocational education	0.000	0.00	-0.065	-0.73
University	-0.276*	-2.01	0.072	0.62
<i>Provinces</i>				
Groningen	-0.040	-0.20	-0.110	-0.62
Friesland	0.295*	1.68	-0.233	-1.43
Drenthe	0.271	1.31	-0.404**	-2.12
Overijssel	0.205	1.26	-0.154	-1.04
Flevoland	0.184	0.66	-0.170	-0.67
Gelderland	0.119	0.84	-0.198	-1.57
Utrecht	-0.120	-0.65	0.004	0.02
Noord Holland	-0.011	-0.09	-0.042	-0.38
Zeeland	-0.120	-0.48	-0.006	-0.03
Noord Brabant	0.066	0.49	-0.045	-0.38
Limburg	0.024	0.14	0.007	0.05
Constant	-1.176**	-5.98	0.842**	4.82
log likelihood	-790.4		-1018.5	
pseudo R-squared	0.05		0.03	
no of obs.	1668		1668	

** denotes significance at 5%, * denotes significance at 10% level