

Card acceptance and surcharging: the role of costs and competition^{*}

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Abstract:

The payment cards market is a two-sided market. Price sensitivity of consumers and retailers for card services influences total demand. Retailer survey data shows that costs and cost perception influence both acceptance and surcharging decisions of retailers. Retailers who find payment cards expensive are less likely to accept them and more likely to surcharge their customers for using them. Retailers who face no or weak competition decline debit card payments relatively often and are especially more likely to surcharge their customers for using them. Strong competition leads to higher credit card acceptance among debit card accepting retailers. (97 words)

Key words: retail payments, retailers, costs, competition, pricing

JEL code: D23, D40, E41, G20

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1. INTRODUCTION

The pricing of payment card services, the usage of multilateral interchange fees and contractual agreements set by card networks such as the ‘no surcharge’ rule that limit retailers in their acceptance decisions and their possibilities to pass through costs have been the subject in several countries of some recent antitrust cases (Bradford and Hayashi, 2008). A recent case which attracted attention worldwide concerns the multilateral interchange fees set by card association MasterCard for cross-border debit and credit card transactions in the Europe. In 2007 the European Commission decided that MasterCard had set multilateral interchange fees for cross-border debit and credit card transactions in the Europe that violated EC Treaty rules on restrictive business practices. In 2009 the Commission has reached an agreement with MasterCard that allows MasterCard to temporarily use multilateral interchange fees based on the Tourist Test (Rochet and Tirole, 2008) and which are considerably lower than the fees it set until 2007. In 2009 Commission has also started an investigation on the multilateral interchange fees of card association Visa.

One of the reasons why pricing of card payments is of interest is because of the impact of prices on the usage of cards by consumers and the acceptance and surcharging decisions by retailers. Several cost studies have revealed that for society as a whole the costs of a debit card payment are often lower than the cost of a cash payment (see e.g. Brits and Winder, 2005, Bergman, Guibourg and Segendorf, 2007, Gresvik and Haare, 2009) and that the costs of card payments are still decreasing whereas the costs for cash payments are rising (EIM, 2007, Gresvik and Haare, 2009). Therefore a further continuation of the replacement of cash by debit card payments at the point-of-sale may confer large economic benefits for society as a whole. In the Netherlands, but probably also elsewhere, the substitution of cash by cards seems to be hindered by limitations in card acceptance among retailers. Dutch consumers have stated repeatedly that they would use cards more often if acceptance among retailers would rise. They also stated that they would use payment cards more often if fewer retailers would surcharge them for card usage (Jonker, 2007, Jonker and Kosse, 2008).³

Theoretical literature on card acceptance focussing on factors influencing retailers’ decisions is scarce and empirical work covering this topic is even scarcer. This study is one of the first attempts to shed light into which factors influence card acceptance and card surcharging decisions by retailers by using survey data collected among Dutch retailers. The focus is on the impact of costs and competition, but factors such as firm size, branch and location have also been taken into account. For the empirical analyses a unique dataset has been used including information of over 1,000 retailers in

³ Acquiring banks in the Netherlands charge retailers tariffs that 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 transaction. Card associations and acquiring banks are not allowed to impose a ‘no-surcharge rule’ on retailers who accept their payment instruments. Issuing banks hardly confront consumers with the costs of their payment behaviour. Banks usually charge them a fixed, periodical fee for the use of a bank account and payment cards. However, consumers do pay indirectly for their payment instruments, for instance by not receiving interest revenues on current account balances. For a more detailed discussion of tariff structures for payments in the Netherlands, see e.g. Bolt (2006).

the Netherlands. Data was collected in the autumn of 2007 by market research institute TNS NIPO, using a questionnaire especially designed for this study.

Most retailers in the Netherlands accept cash payments and around 70% accept debit card payments at the point-of-sale (Bolt et al., 2008a).⁴ Consumers use these payment instruments intensively. Recent estimates for cash usage (EIM, 2007, Jonker and Kosse, 2009) indicate that cash was used about 5 billion times at the point of sale in 2007 and the debit card 1.6 billion times (Currence, 2008). The number of debit card payments is increasing steadily with growth rates of about 9% annually. Acceptance and usage of other types of payment cards, such as prepaid cards and credit cards is less common. In contrast to many countries, Dutch retailers are allowed to surcharge consumers for (card) payments and about 20% of them did so in the year of the interview⁵. Therefore the Netherlands provides a good opportunity to examine the influence of costs, cost perception and competitive forces on both acceptance and surcharging decisions by retailers.

In general, the research outcomes support the predictions from the theoretical literature. Regression analyses show that perception on the fairness of cost level influences the acceptance of both debit and credit cards by Dutch retailers, indicating that Dutch retailers are sensitive for costs of payment. Perceptions on fixed cost significantly influence both retailers' decisions to accept a means of payment or not and to surcharge it, variable costs seem to be less important. The relative cost of accepting payment cards scaled by annual sales is positively related with the decision to surcharge or not: a cost increase of 0.1% of total sales leads to a 1.5 pp higher probability to surcharge debit card payments. A rather striking result is that a substantial share of the retailers does not have an opinion about the fairness of the costs associated with accepting payment cards. A small part does not even have an opinion about the fairness of costs of payment instruments that he accepts himself. These results suggest that raising cost awareness among retailers may also be an important tool to increase card acceptance as the introduction of payment cards the costs associated with accepting card payments has lowered for retailers whereas costs for accepting cash has increased (EIM, 2007).

The research results also confirm results from theoretical literature regarding the influence of competition on acceptance and the possibility to pass through payment costs to customers. Retailers who are (local) monopolists are 10 pp less likely to accept debit cards than retailers that face some degree of competition and those who accept the card but experience no or little competition are more likely to surcharge their customers for using the card than other retailers. Other factors that influence card acceptance or surcharging are firm size, branch and degree of urbanisation of the retailers' location.

⁴ In the Netherlands, there was one domestic debit card scheme called PIN active in 2007 and several international three party and four party credit card schemes, such as VISA, MasterCard, American Express and DINERS.

⁵ In principle, Dutch retailers may also surcharge cash payments. Since cash payments are often more costly to businesses than debit card payments (Brits and Winder, 2005) surcharging them and not debit card payments may provide consumers incentives to pay cost efficiently.

The results of this study are relevant for both researchers in the field of payment economics as well as for policymakers and practitioners in the payments market. It provides some first insights in the cost sensitivity and cost awareness of retailers, which may be useful in antitrust issues on interchange fees and the pricing of card services. The study also shows other factors that affect retailers' decisions which may also be useful for practitioners in the payments market who want to stimulate card acceptance among retailers.

This paper is structured as follows. Section 2 provides an overview of the theoretical and empirical literature on payment pricing, surcharging card payments and the role of costs and competition. Section 3 discusses the set-up of the survey and the collected data. Section 4 describes the econometric model used to analyse card acceptance and surcharging and provides the outcomes of the survey. It presents some descriptive statistics on cost, cost perception card acceptance and surcharging by retailers and it discusses the estimation results on the impact of cost, cost perception and competitive forces on the acceptance of debit and credit cards as well as the decision to surcharge or not. It also provides an illustration of potential effects of cost reductions for retailers on card acceptance and surcharging. Finally, section 5 summarises and concludes.

2 RELATED LITERATURE

This section provides a brief overview of theoretical and empirical literature on factors that drive the decisions to adopt a payment instrument by retailers or to surcharge its usage by customers, with a special emphasis on the impact of the costs for the merchant associated with accepting specific payment instruments and the competitiveness of the market (s)he is active in.

2.1 Theoretical literature

Economic theory (Baxter, 1983, Rochet & Tirole, 2002 or Bolt and Chakravorti for a literature overview, 2008a) provides a rationale for the usage of interchange fees in two-sided markets, of which the card payments market with consumers and retailers as two distinct groups of end-users is an example. Banks co-operating in a card network set payment prices for both consumers and retailers to stimulate card usage among consumers and card acceptance among retailers and to maximise the card network's profits overall.⁶ The bank of one of the end-users may pay a so called interchange fee to the bank of the other end-user in case a card payment.⁷ Banks pass through this reallocation of costs to their customers. A key issue in determining the optimal price structure and the level of the interchange concerns differences in price sensitivity of consumers and retailers for payment card services. The assumption that retailers are relatively less price elastic compared to consumers is commonly used as a rationale to justify that acquiring banks pay interchange fees to issuing banks, thereby raising retailer

⁶ In this article the focus is on four party card networks with banks offering card payment services.

⁷ Banks may agree on a common fee, the multilateral interchange fee or make bilateral agreements.

fees for card services and lowering consumer fees. In the early models consumers and retailers were assumed to be homogeneous. Depending on the net transactional benefits being the difference between transactional benefits of card acceptance for retailers and the merchant transaction fee all retailers accepted the payment card or not. Another feature of the early models was the focus on variable costs and transaction fees for retailers and consumers. Investment costs or fixed costs were not taken into account.

Rochet & Tirole (2002) are the first who introduce strategic behaviour of retailers in their theoretical two-sided cards market model. They find among others that merchants who face competition may accept cards even when the acceptance fees exceed the net merchant benefits from transactions. They may do so in order to attract customers from competitors who do not accept cards (yet) or they may feel obliged to accept cards in order to prevent their customers from going to competitors who do. Wright (2004) builds on Rochet and Tirole (2002), but allows retailers in different branches to receive different benefits from card acceptance. In his model the outcome of trade off between the benefits and costs of card acceptance for retailers may differ by branch. As a result in some branches cards will be accepted, whereas in other branches the benefits do not outweigh the costs for acceptance. Wright focuses on variable acceptance costs, but excludes fixed costs. McAndrews and Wang (2008) consider both fixed and variable costs in their analysis. They employ a theoretical two-sided card payment market model in which they analyse the adoption of payment cards among consumers who differ in wealth and retailers who differ in size or average transaction price. They assume that different payment methods impose different costs on purchases for consumers, by taking high fixed adoption costs and low variable usage costs for both consumers and retailers into account. They find that large retailers or retailers who sell high value products adopt the payment card earlier than other merchants. As adoption costs fall other retailers will start accepting cards as well. In equilibrium large retailers accept both cash and payment cards, medium sized firms may only accept cash, or just cards and charge higher prices than their cash only competitors whereas small retailers only accept cash. Hayashi (2006) presents a model based on one card network that determines both the transaction fees for retailers and for consumers. She assumes that the network sets a retailer fee so that all retailers in a specific branch accept cards. Retailers decide whether they accept the card or not and determine the consumer prices for the products they sell. Retailers are allowed to set the consumer price they want, however they may not price discriminate between customers who pay in cash and customers who use payment cards. She finds that in such a market set-up only monopoly retailers who face an inelastic consumer demand may decide not to accept card payments if the retailer transaction fee exceeds their transactional benefits. However retailers with monopoly power may decide to accept cards if it shifts their customers' demand curve upward and leads to additional sales.

Other studies relax the assumption that retailers may not price discriminate between cash payers and card payers. They allow retailers to pass through the retailer fees for card payments by surcharging their customers for card usage or by incorporating the retailer fees in their prices. In reality some card

networks (used to) forbid retailers to surcharge payments with their payment cards, the so called ‘no surcharge rule’. Gans and King (2003) provide an explanation for why card networks are not in favour of surcharging: it neutralises the impact of interchange fees on end-users’ tariffs and it provides retailers a tool to influence their customers’ payment choice. Rochet and Tirole (2002, 2003) show that if retailers are able to fully pass through their payment costs to their customers by differentiating prices by payment instrument the structure of the payment fees charged by banks to consumers and retailers becomes irrelevant and consumers will bear all the costs for card payments. Bolt and Chakravorti (2008) examine the possibilities of banks and retailers to influence payment behaviour of consumers. They find that the acceptance of payment cards by retailers decreases with the level of the per-transaction merchant fee and increases with the extent in which retailers are able to pass through their costs for acceptance to their customers. If retailers are able to fully pass on their costs to their customers all retailers will accept the payment card, regardless of the level of the per-transaction fee.

2.2 Empirical literature

As far as I know only Carbó Valverde et al. (2009) analyse the impact of costs on card acceptance by retailers. They use unique Spanish network level panel data to analyse the impact of interchange fee regulation by the Spanish government on card acceptance by merchants, card adoption by consumers and card usage. They show that the reduction in interchange fees for debit and credit cards had a positive impact on card acceptance by merchants and consumers, leading to higher card usage by consumers. Their study suggests that the regulation of interchange fees has improved the social welfare. Arango and Taylor (2008) examine a related issue, ie. merchant preferences for cash, debit and credit cards and their perceptions regarding reliability, risk and costs using survey data. They find debit and credit card acceptance rates of well above 90% for Canada. Regarding costs, retailers in high transaction value sectors view card payments less costly than cash compared to retailers active in sectors where transaction amounts tend to be low.

There are few studies which examine the price sensitivity of consumers for payment services. A brief summary of the findings will be provided, as the outcomes of these studies may be used to compare the results on the price sensitivity among retailers with. Borzekowski et al. (2008) examine the reaction of cardholders on bank imposed transaction fees for PIN debit card payments. It turns out that bank imposed PIN debit card charges leads to a 12% reduction in debit card usage. Bolt et al. (2008b) use the experience of Norway (where banks directly price their payment services to consumers) and the Netherlands (where banks hardly charge consumers direct tariffs for payment services) over the time period 1990-2004 to try to determine what the incremental effect of transaction pricing by banks may be on the usage of card payments and electronic bill payments versus ATM withdrawals and paper-based giros. Overall they find that payment pricing by banks influences consumers payment choices. However, non-price attributes and terminal availability may play an even bigger role than payment pricing for point of sale payments. Bolt et al. (2008a) focus on the impact of

surcharging debit card transactions by retailers on consumers' payment choices using survey information from both retailers and consumers. As Borzekowski et al (2008) they find that imposing transaction fees for card payments on consumers alters their payment behaviour considerably. Once confronted with a debit card fee, most consumers state they would opt for cash. Only 25% of the consumers would still pay in cash. If a retailer would stop surcharging debit card payments the share of card payments on the total number of payments would raise by 8 pp, which would imply, apart from any second round effects, an increase of almost 70 million debit card payments .

3 SURVEY SET-UP

The retailer survey on POS payments was held in the period September 16 – October 12 2007 among 1008 Dutch retailers. The sample was drawn from the registers of the Dutch Chamber of Commerce. It was stratified into eleven retail sectors and six company sizes (measured by numbers of employees) in order to ensure sufficient variation. Table 1 shows the stratification of the firms in the sample.

Interviewing was done by phone by interviewers from private market research company TNS Nipo. The interviewed people were mainly store managers. The questionnaire was based on one used in an earlier DNB-survey that was held in September 2006.⁸ The questionnaire included questions on payment instrument acceptance, surcharging of debit card and credit card payments and reasons to surcharge or not to surcharge and several firm characteristics. It also contained questions on the retailer's opinion about the level of the fixed and variable costs associated with accepting payments with cash, the debit card or the credit card. Retailers have to invest in equipment, hardware and software in order to be able to accept payments with different payment instruments. These costs have a fixed nature. Retailers also incur variable costs; costs that vary with the number or the value of the payments made such as handling costs, transport costs of cash, data communication fees, merchant

Table 1 Sample retailers by branch and firms size (unweighed data)

Branch	Freq %		Firm size	Freq %	
					(No. employees)
Food	101	10	1	228	23
Garden centre, florist, etc	105	10	2-4	278	27
Clothing, shoes	100	10	5-9	220	22
Builder's merchant	100	10	10-19	143	14
Hotels/restaurants/pubs etc	93	9	20-49	99	10
Department stores, furniture	101	10	>=50	40	4
Media (books, DVDs, Cds)	107	11			
Drugstores, perfumeries	100	10			
Other retail stores	99	10			
Gas stations/travel agencies	41	4			
Other services	61	6			
Total	1,008	100		1,008	100

⁸ The results of 2006 survey are reported in Bolt et al. (2008). Compared to 2007 the debit card acceptance in 2006 was 3 pp lower, whereas the share of debit card accepting retailers that surcharges was 2 pp higher.

service fees charged by bank, etc. Questions about the fairness of costs associated with the three payment instruments were asked to all retailers, also the ones who did not accept debit or credit cards. That way the influence of perceived costs or perceived costs differentials between different payment instruments on retailers' acceptance and surcharging decisions could be examined. Retailers could rate their opinion on a 1-10 scale with 1 indicating that they find the costs very low, 6 indicating that they find the costs reasonable and with 10 indicating that they find the costs extremely high. Retailers who accepted a specific payment instrument were also asked to provide information about total costs (fixed and variable) on an annual base for each payment instrument they accepted. Relative costs measures have been constructed by dividing these total costs with information on annual sales in 2006.

The 2007 questionnaire also contained a question on the competitiveness of the market the retailers were active in. Interviewees were asked to rate the extent in which they face competition in their line of business on a 1-5 scale with 1 no competition and 5 denoting fierce competition. Almost 1 out of 2 retailers indicated that they met strong to fierce competition, 3 out of 10 experienced mild competition and the remaining retailers faced no (6%) or weak competition (15%). A measure based on self-reported experienced competition have been used, instead of a more objective measures like the number of retailers active in the same branch in the same area because we think that these objective measures may be too crude, because they may refer to a larger area than the geographic market of a retailer. This may especially hold for small retailers.

4. ECONOMETRIC MODEL [UNDER CONSTRUCTION]

4.1 Heckman's probit model with sample selection

In this study the retailers' decision to accept debit and credit cards or not as well as the decision to surcharge them or not is examined. Heckman's probit model with sample selection seems to be a suitable candidate to analyse the determinants of these two choices jointly as the surcharging decision is censored in the sense that it will only be observed for retailers who have made the decision to accept payment cards. The latent decision to accept a payment instrument or not is denoted by the variable y_{1i}^* . It represents the difference experienced by the retailer between the benefits and costs of accepting a debit card. The latent decision to levy customers an additional fee for a card payment is denoted by y_{2i}^* . This variable represents the outcome of balancing the pros and cons by the retailer of surcharging. It is assumed that y_{1i}^* and y_{2i}^* depend linearly on sets of explanatory variables respectively stored in x_{1i} and in x_{2i} and that the error terms ε_{1i} and ε_{2i} both come from a standard normal distribution with $\text{corr}(\varepsilon_{1i}, \varepsilon_{2i}) = \rho$. Error terms corresponding with different retailers are independently distributed.

$$y_{1i}^* = x_{1i}\beta_1 + \varepsilon_{1i}$$

$$y_{2i}^* = x_{2i}\beta_2 + \varepsilon_{2i}$$

In reality the latent variables y_{1i}^* and y_{2i}^* are not observed, only the outcomes of the retailer's decisions:

$$\begin{aligned} y_{1i} &= 0 && \text{if } y_{1i}^* \leq 0 && \text{(retailer does not accept the payment card)} \\ y_{1i} &= 1 \text{ and } y_{2i} = 0 && \text{if } y_{1i}^* > 0 \text{ and } y_{2i}^* \leq 0 && \text{(retailer accepts the payment card and does not surcharge)} \\ y_{1i} &= 1 \text{ and } y_{2i} = 1 && \text{if } y_{1i}^* > 0 \text{ and } y_{2i}^* > 0 && \text{(retailer accepts the payment card and surcharges it)} \end{aligned}$$

The corresponding probabilities of the three aforementioned possibilities are

$$\begin{aligned} P(y_{1i} = 0) &= \Phi(-x_{1i}\beta_1) \\ P(y_{1i} = 1, y_{2i} = 0) &= \Phi(x_{1i}\beta_1, -x_{2i}\beta_2, -\rho) \\ P(y_{1i} = 1, y_{2i} = 1) &= \Phi(x_{1i}\beta_1, x_{2i}\beta_2, \rho) \end{aligned}$$

These three probabilities constitute the log likelihood function of Heckman's probit model with sample selection. If ρ does not differ significantly from zero than the acceptance and surcharging decisions can be estimated independently using univariate probit models. The statistical software programme Stata has been used to estimate this model for debit cards. The number of retailers accepting and surcharging credit cards was too low to employ the model for credit cards as well. Instead the credit card acceptance decision has been analysed.

4.2 Explanatory variables

In both the acceptance equations and the surcharge equations dummy variables were included indicating branch, firm size measured by the number of employees, urbanisation degree, a dummy indicating whether the retailer is independent or is part of a chain of retailers and dummy variables indicating the competitiveness of the market the retailer operates in as reported by the retailer. The logarithm of the average income of citizens in 2005 in a COROP region has been included in order to examine whether differences in economic conditions influence the acceptance of payment cards. This variable is retrieved from Statistics Netherlands.⁹ Empirical research among consumers shows that income has a positive impact on card usage (see e.g. Stavins, 2001 or Jonker, 2007) and also in theoretical literature income is getting more and more attention (see e.g. McAndrews and Wang, 2008 or Bolt and Chakravorti, 2008).

The cost level indicating the total costs for the retailer associated with accepting debit (credit) card payments were included as an explanatory variable in the surcharging equation as well as a relative cost measure: the cost-sales ratio. It is expected that retailers who have a relatively high cost/income ratio are more likely to surcharge a particular payment instrument than retailers who have a relatively low cost/income ratio. Both the absolute and the relative costs measures were not included in the acceptance equation, although ideally, one would like to have them included as explanatory

⁹ The COROP classification divides the Netherlands in 40 regions.

variables in the acceptance equation for both retailers who accept debit and/or credit cards and for retailers who do not accept them. However, the latter group will not be able to provide indications about costs. Instead dummies were also included which express whether a retailer perceives the fixed or variable costs associated with accepting debit (credit) cards as too high. All retailers in the sample were asked to rate the fairness of the fixed and variable costs of accepting different payment instruments on a 1-10 scale. The value 1 refers to 'very low costs', 6 to 'neutral' and '10' to 'costs too high'. Values of 7 or higher indicate that retailers perceive costs as too high. Since many retailers indicated that they did not have an opinion about the level of the costs dummies indicating 'no opinion' were also included. These cost perception dummies have also been included in the acceptance equation.

In order to ensure identification in the probit selection models province dummies were included in the acceptance equation but not in the surcharging equation. Some of the province dummies had a significant impact on acceptance whereas they had little explanatory power in the surcharging equation. Therefore they were a natural candidate to be selected exclusively for the acceptance equation.

5. SURVEY OUTCOMES

5.1 Descriptive statistics

5.1.1 *Acceptance and surcharging debit and credit cards*

Cash is accepted by almost any retailer in the Netherlands, the debit card by 70% and the credit card by 28% (see table 2). Branches in which transaction sizes are relatively high tend to have a relatively high card acceptance. This holds especially for the credit card, which has the highest acceptance rates at gas stations/travel agencies followed by clothes and shoe shops. Furthermore, it turns out that the size of the retailer, measured by the number of employees, correlates positively with both debit and credit card acceptance. Almost all large retailers accept the debit card and the majority of them accept credit cards, but most small retailers accept debit card payments, but not credit card payments.

Retailers in the Netherlands are allowed to surcharge card payments by law. In 2007 a large minority of about 20% of the debit card accepting stores surcharged debit card transactions below a threshold amount of about EUR 10-15. The surcharge is a fixed amount of on average 24 eurocents. Surcharging credit card payments is done by 13% of the retailers who accept credit cards. One out two of them surcharges every credit card transaction. The surcharge is usually a percentage of the transaction size; however fixed amounts also occur regularly. Surcharging debit or credit card transactions occurs relatively often in branches in which relatively small amounts are settled, like in food. Just as with not accepting debit cards surcharging debit card payments is relatively common in small shops.

Table 2 Acceptance and surcharging debit and credit cards in 2007 (reweighed data)

In percentages

<u>Branch</u>	Acceptance debit card	Surcharging debit card	Acceptance credit card	Surcharging credit card
Food	76	44	14	40
Garden centre, florist, etc	73	36	22	15
Clothing, shoes	89	10	54	6
Builder's merchant	80	19	15	5
Hotels/restaurants/pubs etc	56	19	26	21
Department stores, furniture,	73	11	29	10
Media (books, DVDs, Cds)	84	32	33	4
Drugstores, perfumeries	85	29	25	17
Other retail stores	75	19	37	3
Gas stations/travel agencies	81	34	72	21
Other services	44	6	16	10
<u>Firm size (no. of employees)</u>				
1	50	23	13	19
2-4	75	22	29	15
5-9	89	19	46	7
10-19	93	9	59	9
20-49	92	4	54	24
50 and more	97	2	74	10
<u>Competitiveness market</u>				
Fierce	67	26	29	14
Strong	74	15	32	10
Mild	72	15	24	16
Weak	69	28	33	11
<u>No</u>	<u>44</u>	<u>52</u>	<u>16</u>	<u>30</u>
Total	70	20	28	13

Following Hoerberichts and Stokman (2006) self-reported competitiveness was employed as a competition measure. The relation between competitiveness of the market a retailer is active in and decisions with respect to the acceptance of payment cards or surcharging is not clear-cut. Retailers who do not meet any competition are less inclined to accept debit cards or credit cards than retailers who face hardly any to fierce competition. And those local monopolists who do are more likely to surcharge card payments. However, at first sight, there does not seem to be relationships between acceptance or surcharging decisions and the intensity of competition for those retailers who face weak to fierce competition.

5.1.2 *Cost and cost perception cash, debit card and credit card*

Retailers perceptions on the fixed and variable costs associated with different payment instruments may influence their decisions to accept them or not or to surcharge them or not. All retailers in the sample were asked to rate the fairness of the fixed and variable costs of accepting different payment instruments on a 1-10 scale. Table 3 shows the average scores. On average, irrespective of firm size, retailers find the costs of accepting credit card payments too high. This holds more for the variable costs than for the fixed costs and may be related to the level of the merchant service charges for credit card payments. Regarding the costs perception for cash and debit card payments Dutch retailers perceive the costs for cash payments relatively low compared to the costs for debit card payments. The

Table 3 Firm size and cost perception, 2007

(reweighed data, 1=very cheap, 6=sufficient/just right and 10= too expensive)

Firm size (no. of employees)	Fixed costs			Variable costs		
	cash	debit card	credit card	cash	debit card	credit card
1	5.2	6.3	8.2	4.9	6.0	8.2
2-4	6.1	6.7	7.3	6.2	6.7	7.2
5-9	5.9	6.5	7.2	6.3	6.6	7.7
10-19	6.2	6.6	7.2	6.0	6.6	7.7
20-49	5.5	6.5	6.2	5.6	6.2	7.1
>=50	6.6	6.3	6.7	6.2	6.5	7.6
Total	5.8	6.5	7.3	5.7	6.5	7.5
Don't know (in %)	14	27	67	18	33	68
Number of respondents	1008	1008	1008	1008	1008	1008

average scores for cash are actually below 6 indicating that the majority of the retailers perceive cash payments as cheap, whereas the average scores for debit card payments lie above 6 indicating that the majority of the retailers think debit card payments are rather high.

Cost perception seems to be related with firm size. Small and medium sized firms tend to value the costs of cash lower than the costs of accepting debit card payments, whereas large firms perceive the costs for cash and debit card payments as more or less equal. These results corroborate with the results on the cost-sales ratio in Table 4. Note that a large share of the retailers does not have an opinion about the fairness of costs. Although almost any retail accepts cash 14% have no opinion about the fairness of the fixed costs for cash payments and two third of the retailers have an opinion about the costs for credit card payments.

Retailers were also asked to provide a rough indication for their total annual costs for cash payments, debit card payments and credit card payments.¹⁰ The costs included both fixed costs (e.g. depreciation terminals, terminal hire, security, telecom subscriptions, etc), and costs varying with the number of payments made (e.g cash deposit fees, merchant service charges, telecom fees). They

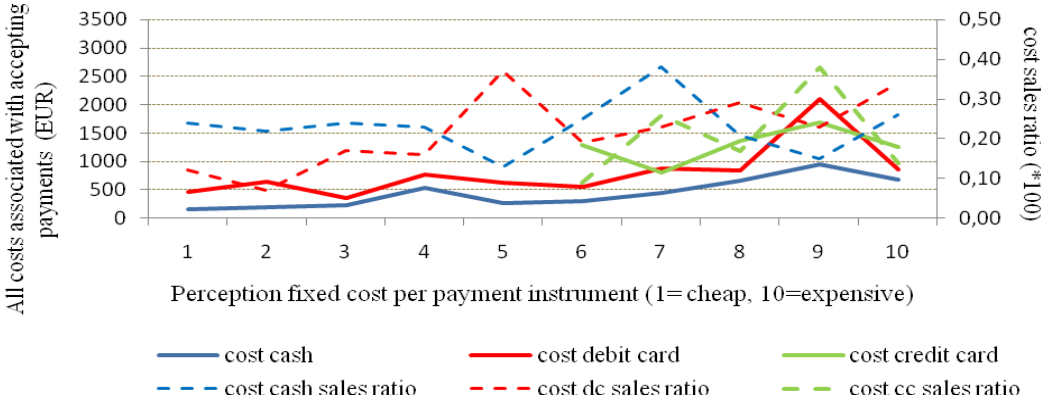
Table 4 Firm size, costs and relative costs, 2007

(reweighed data)

Firm size (no. of employees)	Annual costs in euro			Annual cost-sales ratio (*100)		
	Cash	debit card	credit card	cash	debit card	credit card
1	187	372	269	0.40	0.32	0.19
2-4	350	662	833	0.18	0.24	0.20
5-9	559	915	1467	0.13	0.18	0.18
10-19	640	939	1795	0.12	0.13	0.13
20-49	1774	1917	4471	0.09	0.06	0.17
>=50	<u>1995</u>	<u>2792</u>	<u>4383</u>	<u>0.03</u>	<u>0.05</u>	<u>0.08</u>
Total	372	701	1249	0.25	0.24	0.18

¹⁰ This question was intended to get a rough indication of how much money retailers think they spend on cash, debit card and credit card payments, it was not intended to get a reliable estimate for the merchants costs for cash and card payments. Brits & Winder (2005) and EIM (2007) provide information on the costs of POS payments for retailers.

Graph 1 Relation Costs, cost-sales ratio and perception fairness fixed and variable costs for accepting cash, debit card and credit card payments



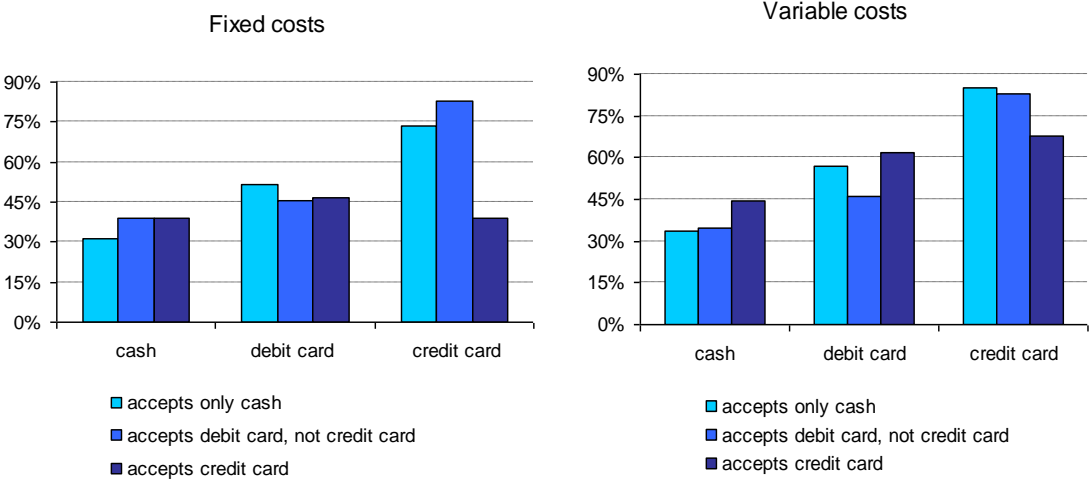
could choose between ten cost categories from EUR 250 or less to EUR 4000 or more. Table 4 presents results on annual costs on cash, debit card and credit card payments for retailers differing in firm size, as well as the annual costs scaled by the annual sales in 2006. The results indicate that the annual costs associated with cash payments are lowest and the costs associated with credit card payments are highest. For each payment instrument costs increase with firm size. Once scaled with annual sales the costs of payments actually rapidly decline with firm size. Economies of scale/scope reduce the average costs as fixed costs can be spread over higher sales. In addition, bank and telecom fees may decline with increasing value (cash) or numbers of payments number (payment cards).

Graph 1 combines the information from Tables 3 and 4. It depicts the relationship between costs, cost scales by sales and cost perception for cash, debit card and credit card payments. Retailers perceive accepting payments as more costly as the costs associated with accepting increases. In general, the relationship between the absolute cost level and cost perception seems to be stronger than the relationship between the relative cost level and cost perception. For both cash and debit card payments the cost-level steadily increases with increasing cost perception, except from rating 9 to 10. The relationship between relative costs and cost perception seems to be more volatile and the general trend between the two factors seems to be less steep. Graph 2 also suggests that the same perception level is associated with higher absolute costs for debit cards than for cash. A explanation may be that retailers who accept debit cards are less sensitive for costs than retailers who only accept cash. For relative costs there does not seem to be such an ordering as the lines of relative costs for cash and debit cards intersect each other several times.

Graph 2 depicts the percentage of retailers who perceive fixed or variable costs associated with the acceptance of cash, debit cards and credit cards as too high, distinguishing between retailers who accept different payment instruments. The graph shows that retailers who differ in acceptance also perceive the fairness of the costs associated with the acceptance of cash, debit cards and credit cards differently. The share of retailers that finds payment costs too high ranges between 30% for cash

Graph 2 Cost perceived as too high by retailers accepting different means of payment

In percentages of retailers with an opinion about the fairness of costs



up to 88% for credit card payments. In addition, the share of retailers that perceives cash as expensive is lower than for debit cards payment, which in turn has a lower share of dissatisfied retailers than credit cards. Graph 2 also illustrates that dissatisfaction about the costs for accepting a specific payment instrument is relatively high among retailers who do not accept it: relatively many retailers who only accept cash find the fixed and variable costs of debit cards too high and relatively many retailers who accept debit cards, but not credit cards think credit cards are too expensive. On the other hand retailers who accept cash and debit cards perceive cash slightly more often as too expensive as retailers who just accept cash. A similar story seems to hold for retailers who accept credit cards versus retailers who accept debit cards but not credit cards. In a nutshell, it seems that retailers who accept a specific payment instrument are relatively more content with its costs than retailers who do not accept it or who accept a close substitute as well.

5.1.3 Reasons for non acceptance and surcharging of payment cards

Retailers were asked explicitly for the reasons why they do not accept cards (Table 5) or why they surcharge card payments or not (Table 6). The results clearly reveal that costs are a major behind

Table 5 Reasons to accept cash only
(Reweighed data, multiple answers possible, in percentages)

Investment costs too high	53
Merchant service fees too high	39
Card payments cause too much stuff	26
Transaction speed too low	19
Safety concerns	10
Low transaction amounts	5
Number of respondents	94

acceptance and surcharging decisions by retailers. Retailers who only accept cash could indicate the main reasons for not accepting card payments. The results reveal that costs are the main barrier for retailers to accept card payments. More than half of them mentioned the investment costs needed to make acceptance of card payments possible as a barrier, followed by a third who find the merchant service charges charged by acquiring banks for each card payment too high. The third reason, mentioned by 26%, related to the fuss and time investments to be made by the retailer associated with making card payments possible as an important reason to accept cash only. Other barriers concerned the transaction speed of card payments, fraud issues and the average transaction size.

As with non-acceptance, the costs of debit card payments are also mentioned as the primary motive to surcharge debit card payments.¹¹ 11% of the retailers that surcharge stated that they do so because it is common in their business to surcharge card payments. It might reflect weak competition in the market they are active in. The primary motivation of retailers not to surcharge card payments is because they consider it as an additional service towards their customers. Other motives include encouraging customers to use their debit card (16%), because they find the costs of debit card payments low (9%) or because they want to attract extra customers (7%). The latter motive is clearly related to the competitive advantage of accepting cards without additional charges.

Table 6 Reasons to surcharge debit card payments or not
(Reweighed data, multiple answers possible, in percentages)

Reasons to surcharge debit card payments		Reasons not to surcharge debit card payments	
Cost coverage debit card payments	61	Additional service to my customers	75
To stimulate cash usage for low amounts	37	To encourage debit card usage	16
Debit cards payments are relatively costly	24	Costs of debit card payment are low	9
Common in my business	11	To attract customers	7
Advised by bank/retail association	4	Pass through costs in consumer prices	6
		Too much stuff	6
Number of respondents	118	Number of respondents	425

5.2 Estimating the impact of costs, cost perception and competition on acceptance and surcharging

A Heckman probit model has been estimated in order to examine jointly the impact of cost perception and competition on the acceptance of debit cards as well as their influence together with actual cost on the decision to surcharge or not. The estimated value of ρ , which measures the correlation between the error terms of the acceptance and surcharging equation amounts -0.3 and turns out not to differ

¹¹ The answers are only reported for debit card payments. The acceptance of the credit card is fairly low in the Netherlands and only a small part of them surcharges credit card payments. The number of observations mentioning why they surcharge credit cards is insufficient to give reliable results.

significantly from zero. Therefore also separate probit models for the acceptance and surcharging decisions have been estimated (see tables A.2 and A.3 for the estimation results). The results from a Heckman probit model for debit card payments using information from small and medium sized retailers only yields an estimated value for ρ of -0.6 that differs significantly from zero at the 5% level. The estimated values for other explanatory variables hardly altered, indicating robustness of the estimation results. The negative value for ρ may be interpreted as follows: retailers who are not likely to accept a debit (credit) card payments, are more likely to surcharge debit (credit) card payments in case of acceptance. The number of retailers that surcharges credit card payments is too low to analyse. Therefore only results for credit card acceptance are discussed. Table A.2 in the appendix shows the results of a probit model explaining credit card acceptance.

5.2.1 *Cost perception*

Cost perception significantly influences acceptance and surcharging decisions of retailers. Retailers who perceive fixed costs of debit cards payments as too expensive are less likely to accept debit cards. The effect is significant at the 10% level in the Heckman probit model and at the 5% level in the probit model. The estimated marginal effect in the probit model indicates that if a retailer thinks the fixed costs are too high the probability that he accepts the card drops by 3.8 pp.

Fixed costs also influence the decision to surcharge debit card payments. Retailers who find fixed costs too high have an around 10-12 pp higher probability to surcharge than retailers who perceive fixed costs as low or reasonable. The perception for variable costs seems to be less important, but may be blurred because of a high degree of multicollinearity between the perception of fixed and variable costs. It is not significant when included as explanatory variable together with the perception on fixed costs, but if included alone it becomes significant at the 10% level of significance. The estimated marginal effect is 5.2 pp: half the size of the perception of fixed costs.

For credit cards the impact of the retailers' perception of the fixed costs significantly influences the acceptance decision. Retailers who find fixed costs too high are 21 pp less likely to accept them than retailers who find fixed costs low or reasonable. As with debit cards, multicollinearity between the perception of fixed and variable costs leads to insignificant results for variable cost perception. If the perception of fixed costs is excluded from the analysis the perception of variable costs becomes significant at the 1% level. The estimated marginal effect equals 17 pp.

5.2.2 *Relative costs*

The absolute costs for accepting debit card payments scaled by annual sales significantly influence the surcharging decision. The estimated marginal effect equals 0.16 indicating that if the costs would rise with 1% of sales the chance that (s)he would surcharge would increase with 16 pp. However such an increase in debit card costs is not realistic, as on average debit card costs amount about 0.24% of sales

revenue. A cost increase of 0.1 % of total sales leading to a 1.5 pp higher probability to surcharge seems more in line with reality.

5.2.3 *Competition*

Competition influences both the acceptance and surcharging decisions significantly. If retailers sell their products in a market in which they face no competition they have a 10 pp higher probability to decline debit card payments than retailers who experience some competition. The retailers who accept debit cards, despite the fact that they operate in a non competitive market, have a 24 pp higher probability to surcharge debit card payments than retailers who face competition. Retailers who face a mild degree of competition are also significantly more likely to surcharge, but the estimated marginal effect is about 3 times as low as for retailers who do not face any competition at all. The strong impact of being a local monopolist on debit card acceptance and surcharging decisions supports the special position given to monopolists in the theoretical payments literature.

At first sight credit card acceptance in the Netherlands does not seem to be influenced by the degree of competition in the market. However, when focussing on card accepting retailers only the degree of competition does seem to matter. Retailers who accept debit card payments are more likely to accept credit cards as well if they operate in a market with fierce competition. The probability that they accept credit cards increases with 12 pp.

5.2.4 *Other firm characteristics*

In addition to cost, cost perception and competitiveness of the market other firm characteristics also influence acceptance and surcharging decisions of retailers. The estimation results of the stand alone probit model for debit card acceptance show some mild evidence that differences in economic conditions, measured by average income level of consumers in a region, influences debit card acceptance by retailers. The indicator used is a rather crude measure, but the estimated coefficient is positive and its p-value is close to significance at the 10%-level. Firm size measured by number of employees has a positive and significant impact on card acceptance, but significantly lowers the probability that retailers surcharge card payments. The effects are most pronounced with debit cards, but also hold for credit cards, albeit at a lower significance level (10%- level instead of 1%-level). The estimation results regarding type of industry (reference group supermarkets) suggest that the average transaction size influences card acceptance and surcharging.

Credit cards are significantly often accepted by retailers in the clothes and shoes sector and by petrol station owners, both sectors in which transaction sizes tend to be high, but these cards are significantly often declined by retailers in low transaction size sectors such as specialised food and drugstores. Results for card acceptance seem less strong for debit cards than for credit cards, with only two significant sectors at the 5%-level, but here the sector results for surcharging reveal the importance of transaction sizes in retailers' payment decisions. Retailers in branches with relatively

many low transaction sizes (specialised food stores, florists, drugstores and media stores) surcharge debit cards payments significantly often.

Summarising, the empirical results largely confirm the predictions from economic theory. Both costs and competition influence acceptance and surcharging decisions by retailers. In addition some evidence has been found on the influence of firm size and the affluence of potential customers.

5.3 Scenario analyses: impact of costs reductions on card acceptance

In the previous section it was shown that acceptance and surcharging decisions of retailers depend on costs and cost perception. To gauge just to what extent lowering costs associated with debit card payments for retailers leads to less dissatisfaction about debit card payments, higher card acceptance and less surcharging by retailers, two ad hoc scenarios were briefly examined (see table 7). Both scenarios aim at lowering costs for debit card payments to the level of cash payments for retailers. In order to quantify the relation between true costs associated with accepting debit cards by retailers and cost perception several econometric models were estimated. The research outcomes reveal that what matters for retailers' perception is the absolute level of these costs and not relative costs. An increase of EUR 1,000 in total debit card costs would lead to 5 pp more retailers who perceive the fixed costs of debit card payments as too high and 7 pp more retailers who are dissatisfied with the variable costs. Again Heckman's probit selection model was used as a starting point as debit card costs for retailers are only observed by retailers who accept debit cards and these retailers may differ from the average retailer in the population. However the correlation term between the acceptance equation and the cost perception equation turned out not to differ significantly from zero and estimating a probit model explaining cost perception only was sufficient. A discussion of the estimation results can be found in the appendix.

The first scenario refers to lowering annual external costs for debit cards payments to the level of cash payments. In the second scenario annual total costs for debit card payments are brought down to the level for cash payments. Cost data on external and internal costs for cash and debit card payments are taken from EIM (2007). External costs refers to payments made by retailers to third parties for debit and cash payments, such as fees paid to banks, telecom companies or terminal suppliers for retailers or for armoured cash transport. External costs for debit card payment amounts 9.1 eurocent against 2.3 eurocents for each cash payment. A lowering of external costs for debit card payments to the level of cash payments boils down to a decrease in cost per debit card payment of 6.8 eurocent or EUR 1,600 per year for all debit card payments together (scenario 1). It results in a lowering of discontent among retailers about the costs for debit card payments by 10 pp. Card acceptance would rise by 0.4 pp, whereas the share of surcharging retailers would decline by 1.3 pp.

The second scenario focuses on equalising total costs for debit card and cash payments. Total costs also include costs made by the retailer himself for each payment, the so called internal costs. For

Table 7 Impact of cost reduction acceptance debit card payments on acceptance and surcharging of debit card payments by Dutch retailers, 2007

	Change in costs per retailer	Change in perception: debit card too expensive	Impact on acceptance	Impact on surcharging	Impact on number of debit card payments
<i>Scenario 1</i>	External costs debit card payments equal to external costs cash payments EUR 1600	-10.0 pp	+0.4 pp	-1.3 pp	13 mio
<i>Scenario 2</i>	Total costs debit card payment equal to total costs cash payment EUR 350	-2.2 pp	+0.1 pp	-0.3 pp	3 mio

cash payments internal costs include labour costs for the preparation, emptying and balancing cash registers, the processing of payments at the counter and preparing the day's receipts to be deposited, etc. which add up to 15.5 eurocent for each cash payment. For debit card payments internal costs mainly consists of labour costs involved with processing payments at the counter which amounts to 10.2 eurocent per debit card payment. Taking internal and external costs together gives an average total cost of 17.9 eurocent for each cash payment and 19.3 eurocent for each debit card payment. A lowering of total costs for debit card payments to the level of cash payments would imply a cost decrease per debit card payment of 1.4 eurocent or EUR 350 per year for all debit card payments together (scenario 2). According to this scenario discontent among retailers about the costs for debit card payments would decline by 2.2 pp. Card acceptance would rise by 0.1 pp, whereas the share of surcharging retailers would decline by 0.3 pp. Rough calculations suggest that the direct impact of cost lowering on the number of debit card payments are fairly modest.¹² Scenario 1 leads to 13 million and scenario 2 to 3 million additional debit card payments.

The scenario results suggest that a lowering of retailers' costs for debit card payments influences cost perception to a great extent. However, the impact on acceptance and surcharging decisions seems to be rather modest, especially with respect to card acceptance. This indicates that retailers' demand for debit card services was fairly inelastic. The estimation results imply that a lowering of costs is expected to have a greater impact on surcharging decisions of retailers who already accept debit card payments, than on the acceptance decisions of retailers who do not accept debit cards yet.

Bolt et al (2008a) examine price sensitivity of consumers with respect to debit card services by examining the impact of surcharging debit card payments on consumers' choice of payment instrument. They found that the immediate impact of a stop in surcharging would lead to a rise in the

¹² The impact of cost lowering for retailers on changes in the number of debit card payments as reported in table X have been calculated using an ad-hoc assumption implying that retailers starting to accept or stop surcharging debit card payments do not differ from the ones who already accept them and don't surcharge them with respect to the number of payments made in their shop.

number of debit card payments by almost million, or 5% on the total number of debit card payments and 1% in the total number of POS payments. Such a stop would lower consumer costs of debit card usage by around 23 eurocent for small value payments that are typically surcharged by a large minority of the Dutch retailers. Although the results for consumers and retailers are not directly comparable they seem to hint that in 2007, about 20 years after the introduction of the debit card in the Netherlands, price sensitivity for debit card services among consumers was indeed higher than among retailers, although the differences were small. A eurocent decline in consumer prices seems to lead to 3 million extra debit card payments (67 million payments /23 eurocents) against almost 2 million extra debit card payments resulting from a cost lowering for retailers (13 million payments/7 eurocent).

6 CONCLUDING REMARKS

Several cost studies reveal that the debit card is very often the most cost efficient payment instrument compared to cash or the credit card. So from a social cost perspective increasing debit card usage would be desirable. A higher acceptance rate among retailers will stimulate consumers to use their debit card more frequently just as less surcharging of the debit card. The aim of this study is to gain insight in the factors influencing acceptance and surcharging decisions of retailers using survey data collected among 1,008 retailers in the Netherlands in 2007, with a special emphasis on the impact of costs, cost sensitivity and competition among retailers.

The research outcomes reveal that in the Netherlands 70% of the retailers accepted debit cards in 2007, of which 20% surcharged customers for using the card for low transaction sizes. Credit cards were accepted by 28% of the retailers, with 13% of them employing credit card surcharges. Retailers state that they are sensitive to the costs for accepting card payments. It is the most important reason for them to decline card payments or to surcharge them. Retailers are especially sensitive to fixed costs, but many of them also find variable costs high. According to estimation results retailers who find costs for debit card payments too high opt significantly often for cash only as the only accepted means of payment compared to retailers who find costs fair or low. However, even more of them choose to accept debit card payments and surcharge their customers for debit card usage. The impact of cost perception on credit card acceptance is stronger than on debit card acceptance. The estimation results also reveal that costs are not the most important factor explaining retailers' decisions. Many retailers are not even aware of the costs associated with payment instruments they do not accept themselves. The influence of competition among retailers, branch and firm size on acceptance and surcharging decisions are at least as important as costs. As economic theory predicts, competition stimulates retailers to accept payment cards, while limiting their possibility to pass through payment costs to customers by means of card surcharging. In fact, retailers who are local monopolists surcharge debit card payments significantly more often than retailers who face at least some mild competition. A rather interesting finding is that factors affecting debit card acceptance also turn out to be important

drivers behind the surcharging decision. Retailers who are less likely to accept debit cards, such as SMEs and retailers in branches where transaction sizes tend to be small are more likely to surcharge debit card payments if they accept the card. It seems that the possibility to surcharge may stimulate card acceptance among retailers who would otherwise not accept them. In that sense surcharging might lower the barriers for retailers who think investment costs and merchant service tariffs associated with card acceptance do not outweigh their benefits.

If the banking community and card associations want to stimulate debit card usage in the Netherlands they should focus on small- and medium sized retailers who work in a low competitive environment. There card acceptance is lowest and surcharging most common. The research outcomes also suggest that they should focus on how fixed costs of accepting payment cards for retailers may be reduced and on raising cost awareness among retailers. The introduction of so called ‘slimme pinpakketten’ for SMEs (‘Smart debit card packages’) in the Netherlands intended to increase debit card acceptance by offering low cost all-in one debit card packages seems to respond very well to the needs of SMEs.

The Dutch results are not only relevant for the Netherlands but also for other countries. The ‘no surcharge’ rule which some card associations impose on retailers is currently under pressure by competition authorities. Our results suggest that if the rule is abolished it might stimulate specific retailers to start accepting payment cards and lead to more card payments. However, surcharging also influences consumers’ perception on costs and consequently also their payment behaviour. In that respect surcharging card types which are relatively costly to society as a whole enhances cost efficient payment behaviour by consumers, but surcharging cost efficient means of payment may deter them from paying efficiently. Therefore card associations and banks should carefully price their payment services. Payment fees for retailers and consumers should reflect true costs. Cost savings in the payment chain should also be passed on to retailers in order to encourage them to accept efficient payment instruments and steer their customers towards cost efficient payment behaviour.

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Appendix A1: Impact of costs on cost perception

The costs associated by the retailers with accepting debit card payments significantly influence their perception of the fairness of the costs¹³. The research outcomes reveal that what matters for retailers' perception is the absolute level of these costs. An increase of EUR 1,000 in total debit card costs would lead to 5 pp more retailers who perceive the fixed costs of debit card payments as too high and 7 pp more retailers who are dissatisfied with the variable costs. Next to costs, the competitiveness of the market environment, urbanisation degree, firm size and whether the retailer is an independent shopkeeper or not influence cost perception significantly. Retailers active in markets with no (- 7 pp) or weak competition (-16 pp) significantly less often that fixed costs are too high than retailers who face moderate competition. There also seems to be a positive relation between the degree of competition and the probability that a retailer finds variable costs too high, but the estimated effects are not statistically significant.

Table A. 1 Opinion: Costs debit card too expensive

<u>Variable</u>	Fixed costs			Variable costs		
	<u>coef.</u>	<u>stdv.</u>	<u>dF/dx</u>	<u>coef.</u>	<u>stdv.</u>	<u>dF/dx</u>
Cost/1000	0.1325**	0.0474	0.0528	0.176**	0.049	0.069
Cost/sales	19.624	29.354	7.824	18.902	29.800	7.449
City	-0.418**	0.193	-0.163	-0.144	0.195	-0.056
Town	-0.159	0.169	-0.063	0.191	0.170	0.076
Village, countryside	0.046	0.151	0.018	0.162	0.152	0.064
Fierce competition	-0.143	0.178	-0.057	0.171	0.178	0.068
Strong competition	0.052	0.149	0.021	0.208	0.151	0.082
Weak competition	-0.401	0.206	-0.156	-0.083	0.206	-0.033
No competition	-0.171	0.332	-0.068	-0.195	0.346	-0.075
Independent store	0.561**	0.205	0.214	0.071	0.200	0.028
Firm size < 5 employees	0.210	0.213	0.083	0.503**	0.220	0.197
5-19 employees	0.038	0.198	0.015	0.348*	0.206	0.137
<i>Branches</i>						
Food	0.267	0.266	0.106	0.476*	0.268	0.188
Greenery/florist	0.101	0.259	0.040	0.072	0.261	0.028
Fashion	0.090	0.266	0.036	0.164	0.267	0.065
Home improvement	0.353	0.258	0.139	0.269	0.259	0.107
Catering, hotels	0.113	0.282	0.045	0.159	0.284	0.063
Media (books, Cds, Dvds)	0.263	0.257	0.104	0.196	0.257	0.078
Drugstore,perfumery	0.386	0.261	0.152	0.335	0.263	0.133
Other stores	0.239	0.273	0.095	0.076	0.275	0.030
Gas station,travel agency, etc	-0.246	0.347	-0.097	-0.259	0.343	-0.099
Other services	-0.220	0.305	-0.087	-0.328	0.317	-0.125
Constant	-0.834**	0.350		-1.125**	0.355	
Log likelihood	-1939.80			-316.67		
Pseudo R ²	0.05			0.06		
No. obs	490			490		

Robust standard errors; * (**) denotes significance at the 10%-level (5%-level)

¹³ No estimation results are presented for the impact of costs on cost perception for credit card payments due to the low number of observation on costs associated with accepting credit card payments.

Table A.2: Acceptance of debit cards and credit cards

<u>Variable</u>	Debit card			Credit card		
	<u>coef.</u>	<u>stdv.</u>	<u>dF/dx</u>	<u>coef.</u>	<u>stdv</u>	<u>dF/dx</u>
lnincome	3.630	2.224	0.382	1.495	1.892	0.588
Fixed costs too high	-0.333**	0.159	-0.038	-0.778**	0.181	-0.287
No opinion fixed costs	-2.243**	0.174	-0.525	-2.237**	0.172	-0.735
Fierce competition	-0.147	0.188	-0.017	0.311*	0.162	0.123
Strong competition	0.020	0.164	0.002	0.171	0.144	0.067
Weak competition	-0.190	0.202	-0.022	0.206	0.175	0.082
No competition	-0.608**	0.271	-0.098	0.264	0.259	0.105
Independent store	-1.543**	0.358	-0.072	-0.523**	0.163	-0.206
Firm size < 5 employees				-0.548**	0.184	-0.211
5-19 employees	1.362**	0.178	0.121	-0.162	0.178	-0.064
20-49 employees	1.120**	0.272	0.060			
>= 50 employees	1.970**	0.499	0.060			
<i>Branches</i>						
Food	-0.083	0.255	-0.009	-1.079**	0.267	-0.348
Greenery/florist	-0.075	0.245	-0.008	-0.254	0.252	-0.097
Fashion	0.640	0.288	0.045	0.473*	0.218	0.187
Home improvement	0.388	0.269	0.032	-0.450*	0.238	-0.168
Catering, hotels	-0.536**	0.246	-0.080	-0.149	0.237	-0.058
Media (books, Cds, Dvds)	0.498*	0.277	0.038	-0.403*	0.224	-0.152
Drugstore,perfumery	0.457*	0.255	0.036	-0.924**	0.236	-0.312
Other stores	0.075	0.286	0.008	-0.009	0.232	-0.003
Gas station,travel agency, etc	0.435	0.365	0.033	0.769*	0.376	0.295
Other services	-0.708**	0.297	-0.120	-0.262	0.284	-0.100
City	0.014	0.221	0.001	0.005	0.197	0.002
Town	-0.395**	0.184	-0.050	-0.218	0.162	-0.084
Village, countryside	-0.387**	0.190	-0.045	-0.561**	0.150	-0.214
<i>Provinces</i>						
Zuid Holland	0.004	0.247	0.000	0.059	0.225	0.023
Utrecht	-0.236	0.294	-0.029	0.191	0.252	0.076
Flevoland	0.369	0.459	0.029	0.216	0.520	0.086
Overijssel	1.134**	0.473	0.056	0.633	0.366	0.247
Drenthe	0.307	0.528	0.025	0.678	0.466	0.263
Gelderland	0.762**	0.364	0.053	0.011	0.296	0.004
Friesland	0.607	0.548	0.040	0.461	0.455	0.182
Groningen	0.757	0.498	0.046	0.303	0.458	0.120
Noord Brabant	0.332	0.309	0.029	0.103	0.267	0.041
Zeeland	0.765	0.478	0.045	0.288	0.362	0.114
Limburg	0.433	0.419	0.034	0.302	0.395	0.120
Constant	-7.737	6.634		-2.113	5.614	
Log likelihood	-240.59			-338.33		
Pseudo R ²	0.48			0.41		
No. obs	1008			837		

Robust standard errors; * (**) denotes significance at the 10%-level (5%-level)

Table A.3: Surcharging debit cards

<u>Variable</u>	<u>coef.</u>	<u>stdv.</u>	<u>dF/dx</u>
Cost/sales	72.826**	33.635	15.485
Cost/ sales unknown	0.320**	0.121	0.066
Fixed costs too high	0.454**	0.122	0.100
No opinion fixed costs	-0.127	0.205	-0.026
Fierce competition	0.021	0.163	0.005
Strong competition	-0.066	0.143	-0.014
Weak competition	0.359	0.188	0.088
No competition	0.860**	0.312	0.261
Independent store	0.274	0.174	0.052
Firm size 5-19 employees	-0.246**	0.118	-0.051
20-49 employees	-0.999**	0.279	-0.134
>= 50 employees	-1.402**	0.473	-0.138
<i>Branches</i>			
Food	1.243**	0.270	0.392
Greenery/florist	0.815**	0.256	0.234
Fashion	-0.234	0.298	-0.045
Home improvement	0.279	0.278	0.067
Catering, hotels	0.356	0.307	0.088
Media (books, Cds, Dvds)	0.923**	0.253	0.271
Drugstore, perfumery	0.498	0.269	0.129
Other stores	0.351	0.288	0.087
Gas station, travel agency, etc	0.880**	0.313	0.267
Other services	-0.209	0.412	-0.040
City	0.108	0.196	0.024
Town	0.005	0.170	0.001
Village, countryside	0.153	0.151	0.033
<i>Provinces</i>			
Zuid Holland	-0.188	0.200	-0.037
Utrecht	-0.178	0.263	-0.035
Flevoland	0.459	0.368	0.122
Overijssel	-0.146	0.254	-0.029
Drenthe	-0.178	0.368	-0.034
Gelderland	-0.254	0.219	-0.049
Friesland	-0.432	0.327	-0.072
Groningen	-0.024	0.274	-0.005
Noord Brabant	-0.162	0.207	-0.032
Zeeland	-0.133	0.349	-0.026
Limburg	-0.065	0.261	-0.013
Constant	-2.015**	0.336	-
Log likelihood	- 325.91		
Pseudo R ²	0.19		
No. obs	837		

Robust standard errors; * (**) denotes significance at the 10%-level (5%-level)