

The background of the cover is a photograph of the De Nederlandsche Bank (DNB) building in Amsterdam. The building is a modern structure with a curved glass facade on the left and a more traditional brick and glass facade on the right. A flag is visible on the roof. The sky is clear and blue. The water in the foreground is dark and reflects the building.

DNB Working Paper

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No. 461 / February 2015

DeNederlandscheBank

EUROSYSTEEM

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* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

In love with the debit card but still married to cash ^{*}

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12 February 2015

Abstract

Using shopping diary survey data we show that changing payment patterns is a challenging task; even when consumers have fallen in love with the debit card, they find it hard to divorce from cash. While seven out of ten Dutch consumers report to prefer using the debit card, only seven out of twenty actually mostly pay by debit card. The likelihood that reported preferences and actual behaviour do not match increases with income, education and age. Consumers with payments in cash-intensive sectors, where the wide acceptance of the debit card is a relatively recent phenomenon, are more likely to overestimate debit card usage than other consumers. The likelihood of a gap also increases with the amount of cash that consumers carry with them and decreases with the average transaction size. Our findings indicate that persistent habits are an important explanation why the substitution of cash by debit cards took place at a slower pace than was expected.

Keywords: payment patterns, cash, debit card, households, survey data, diary data, economic psychology.

JEL classifications: C25, D12.

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1. Introduction

Every day consumers use different means of payment to pay for their daily needs in for example shops and restaurants. Traditionally, they used paper-based payment instruments such as cash and cheques, but nowadays they also have a variety of electronic payment instruments at their disposal. Their payments are supported by so called retail payment systems that facilitate the exchange of money, goods and services with different means of payments between consumers and businesses. Retail payment systems that are safe, efficient and reliable form the basis of any modern well-functioning economy.

The costs for society of such retail payment systems are substantial (e.g. Schmiedel, Kostova and Ruttenberg 2012).¹ Payment instruments differ in the costs they incur on society. Increased usage of electronic means of payment at the expense of paper-based means of payment could result in major cost savings for society (e.g. Danmarks Nationalbank 2012, Jonker 2013 or Segendorf and Jansson 2012). In addition, payment instruments differ in other characteristics that are relevant for society, such as safety. Consequently, changes in people's payment habits influence the safety and cost efficiency of an economy as a whole. It is therefore important to understand how consumers pay, which factors determine their behaviour and how it may be steered towards safe and cost efficient means of payment.

A complicating factor is that the price mechanism for payment instruments differs from the pricing of products in most other markets. The payments market is a so-called two-sided market with two groups of end-users: merchants and consumers (e.g. Baxter 1983 or Verdier 2011). In contrast to merchants, consumers hardly face any transaction fees for card usage or cash withdrawals nor do they receive tangible rewards. Banks find it therefore hard to have consumers pay for making payments, and consequently can't steer consumers' payment behaviour by making card payments financially more attractive than cash.

This study sheds light on the puzzling reasons why the pace of the substitution of cash by debit cards was slower than expected by banks and merchant organisations in the Netherlands, who agreed in a covenant to actively stimulate debit card usage among consumers to enhance cost efficiency and safety of point-of-sale payments in the Netherlands (Foundation for the Promotion of Efficient Payments 2009). Despite the continuing substitution of cash by debit card payments, the share of cash payments at the point-of-sale (POS) is still higher than that of debit

¹ Social costs refer to the costs of society. It reflects the use of resources in the production of payment services by the central bank, banks, automatic clearing houses that process payments, cash-in-transit companies and retailers.

card payments according to a monitoring study by the Nederlandsche Bank and the Dutch Payment Association (DNB/DPA 2014). However, consumers themselves value debit card usage higher than cash usage and state that they mainly use the debit card (Van der Crujsen and Plooi 2015). So, there is a gap between stated payment behaviour and realized payment behaviour. In this paper we study the gap between preferences, stated payment behaviour and reported payment behaviour. We address the following research questions.

1. Is there a difference between stated general payment preferences, stated behaviour per type of store and actual behaviour, and if so, to what extent?
2. Which factors influence the existence of a gap between stated and realized payment behaviour? Is it related to individual-specific and/or payment-specific characteristics?

To answer these questions we use a unique dataset on the payment patterns of Dutch consumers. This dataset includes both one-day diary information on payment behaviour and survey answers on questions about payment preferences and behaviour. Many central banks monitor payment instrument usage using diary research (e.g. Boeschoten 1992 or Bagnall et al. 2014).

Our key findings are as follows. First, a substantial share of consumers uses the debit card far less than intended or thought. There is a huge discrepancy between people's preferences or stated behaviour from surveys and what they actually report in payment diaries. Second, the habit of paying cash plays a crucial role explaining consumers' overestimation of debit card usage and therefore why payment behaviour changes slower than expected. This conclusion is based on our finding of several significant effects of individual-specific characteristics and payment-characteristics on the likelihood of a gap. Our finding that habits moderate the effect of intentions on actual behaviour is in line with the model of interpersonal behaviour (Triandis 1980) and other studies such as Gardner et al. (2011).

These are important issues for policymakers that want to influence payment behaviour. The results of this study contribute to the understanding of the substitution of cash by card payments as a whole and more specifically why this substitution process takes place at a slower pace than we would expect from the positive attitude of consumers towards debit cards. It makes an important contribution to the existing literature as it is the first study that addresses the gap between preferred, stated and realized payment behaviour. The study also provides information about the drivers underneath consumers' actual payment behaviour which may be of interest to stakeholders when trying to steer payment behaviour. Even if consumers prefer to use the debit card, this does not mean that their behaviour necessarily matches their

preferences. Falling in love with the debit card is only the first step to change payment behaviour. Additional steps need to be taken to break habits and increase the pace by which consumers divorce from cash.

The paper proceeds as follows. In Section 2 we describe the payment habits of the Dutch consumers at the POS. In Section 3 we provide a brief summary of the related literature. We discuss the data and research approach in Section 4. Our findings on stated general preferences, stated behaviour, and actual behaviour are in Section 5. We show in Section 6 how the overestimation of debit card usage depends on individual-specific and payment-specific characteristics. We conclude in Section 7.

2. Payment behaviour at the point-of-sale in the Netherlands

All Dutch consumers have access to a current account and can use a debit card to withdraw cash from automated teller machines (ATMs) or make card payments at the POS. Consumers with a credit card pay an extra periodical fee to the issuing bank or use a credit card issued by a business or a three-party card scheme, like American Express. About half of the Dutch have at least one credit card. Dutch consumers don't have to pay their issuing bank any transaction fees for debit card usage in the euro area, nor do they have to pay withdrawal fees for withdrawing cash from the ATM.

In 1987 Dutch banks introduced debit cards as a means for their customers to withdraw cash from ATMs. In 1990, the first payment terminals in shops were installed and consumers could pay by debit card in these shops. Initially, consumers mainly used the debit card to pay for large amounts in petrol stations and supermarkets. Gradually, the number of payment locations increased and consumers also started to use the debit card for paying intermediate and small amounts. In 2007 a long term public campaign "Small amount? Debit card allowed!" was launched by the Foundation for the Promotion of Efficient Payments. This encouraged consumers to use their debit card also for small amounts (Panteia 2011, 2013).

DNB/DPA (2014) shows that in 2013 Dutch consumers mostly used cash at the POS, with the debit card coming in second place. Cash was used 3.8 billion times, representing a value of EUR 47 billion, debit cards were used 2.7 billion times (EUR 85 billion), the prepaid card 121 million times (EUR 0.3 billion) and the credit card 38 million times (EUR 4 billion). Consumers are very satisfied with the acceptance, safety, transaction speed, and ease of use of debit card payments, also in comparison with cash payments. This was already the case in 2004 (Jonker 2007) and is still the case in 2014 (Van der Crujsen and Plooi 2015). The only feature of the

debit card that consumers did not like in 2004 were the costs associated with it. These costs included the annual bank fees for the debit card that were just introduced by banks at that time and surcharges of merchants for using the debit card in case of small amounts. Nowadays, there are hardly any merchants left who surcharge debit card payments.² Overall, consumers hardly experience any constraints when making POS payments. We find that in 2013 only 1% of the payments could not be made with consumers' preferred means of payment.

Nowadays, debit card acceptance among merchants is high. According to Panteia (2013) debit card acceptance in 2012 was 100% among petrol stations and large retail chains, 95% among small and medium sized shops, 71% in the catering industry and 54% among market vendors. Credit card acceptance is almost universal among petrol stations (100%) and large retail chains (94%), but fairly moderate in the catering industry and among smaller shops (less than 40%).

3. Related literature

During the past 15 years a considerable stream of studies on consumers' payment behaviour and the factors influencing it has been published worldwide.³⁴ Most of these are on consumers' choices between different means of payment at the POS, see Kosse (2014) for an up-to-date overview. In general, consumers' choice between alternative means of payment depend both on demographic characteristics as well as on transaction related factors. Regarding demographic characteristics, card usage increases with the educational and income level and is higher for consumers who can easily get by than for consumer who cannot. In addition, card usage tends to be fairly low among the elderly. With respect to transaction related characteristics ample evidence has been found that consumers often use cash when the transaction amount is low, when cash is the only accepted means of payment, when they want to avoid to pay a surcharge

² Between 2006 and 2011 the share of card accepting merchants that surcharged customers for using it dropped from 22% to 2% (HBD 2012).

³ For studies on payment behaviour see e.g. Bounie, D. and A. Francois (2006), Deutsche Bundesbank (2012), Federal Reserve System (2013), Jonker et al. (2012), Ossolinksi et al. (2014), UK Payments Council (2013) and Wakamori and Welte (2012).

⁴ Empirical studies on the drivers include Arango et al. (2011), Arango et al. (2014), Bolt et al. (2010), Borzekowski et al. (2008), Carbó-Valverde and Liñares Zegarra (2011), Ching and Hayashi (2010), Hernandez, Jonker and Kosse (2014), Humphrey et al. (1996), Jonker (2007), Klee (2008), Kosse (2013), Kosse and Jansen (2013), Rysman (2007), Schuh and Stavins (2010), Stavins (2001) and Von Kalckreuth et al. (2014).

related to card usage, or in case they pay for a purchase in a sector where transaction amounts tend to be low.

As far as we know, no studies have been conducted yet on the discrepancy between preferred or stated payment behaviour on the one hand and realized payment behaviour on the other hand. However, in other fields of consumer research the gap between preferred and realized behaviour has already been examined. Previous research shows that people find it hard to change their behaviour. For example, DellaVigna and Malmendier (2006) demonstrate that people overestimate the number of future visits to the gym. Previous studies also find that people can have a blurred picture of their actual behaviour. Wansink (2006) shows that they eat more than they think they do and Cook (1987) finds that consumers overstate their actual purchases as verified by scanner data. The literature also suggests that behavioural frequency questions may often be biased upward (Loftus et al. 1990; Sudman et al. 1984) due to respondents' tendency to give too much information rather than too little which might answer to their wish to provide useful information. Morwitz (1997) made an empirical examination of the extent of telescoping errors in marketing research. In her study "It seems like only yesterday" she shows that people have a systemic tendency to recall recent events occurred farther back in time (backward telescoping) and distant events occurred more recently (forward telescoping) than is actually the case. She also finds significant variations across demographic segments.

Many psychological studies point at the difference between intentions and actual behaviour. There are several attitude-behaviour models. These models try to explain why general attitudes (e.g. *paying cash is bad*) don't predict behaviour well. According to the theory of reasoned action (TRA; Fishbein and Ajzen 1975) both attitudes and subjective norms (e.g. *most people who are important to me think that I should use the debit card*) promote the formation of behavioural intention. The latter is the proximal determinant of behaviour. Behavioural intention mediates the effects of attitude, subjective norm and external variables such as demographics on behaviour. The TRA has been extended to reflect the idea that persons only intend to perform behaviour if they have control over their behaviour or perceive to have control. The theory of planned behaviour (TPB; Ajzen 1985, 1991) includes perceived behavioural control (e.g. *for me to pay debit card would be easy*) as an extra predictor of behaviour. McEachan et al. (2011) show that perceived behavioural control and intention are rather consistent psychological predictors of actual behaviour. Webb and Sheeran (2006) perform a meta-analysis and find that a medium-to-large change in intentions only results in a small-to-medium change in behaviour. Glasman and Albarracín (2006) perform a meta-analysis

and conclude that for attitudes to correlate more strongly with future behaviour it is important that attitudes are accessible - easy to remember - and do not change over time.

Although the TPB is a dominant theoretical approach it has been criticized a lot. Sniehotta et al. (2014) summarize the critique. They show that the TPB has for example been criticized for excluding unconscious effects on behaviour (Sheeran et al. 2013), the role of emotions (Conner et al 2013) and the limited predictive validity. Sniehotta et al. (2014) add concerns about the validity and utility of the TPB and call for the retirement of the TPB and the construction of a new theoretical model.

Also according to the model of interpersonal behaviour (MIP; Triandis 1980) behaviour depends on intentions. This theory states that there are two potential moderators of intention realization: (1) lack of control over the behaviour and (2) habits. According to Triandis (1980) habits are likely to be present when behaviour is performed frequently. The predictive power of intentions for actual behaviour depends both on the frequency of the behaviour and on the context (e.g. Wood and Quinn 2005). Gardner et al. (2011) show that habit strength can predict behaviour better than TPB measures. Danner et al. (2011) perform an experiment⁵ and find that accessing past behaviour differs among habitual and non-habitual behaviours on which intentions were formed. They find that: 1) habitual behaviours are more accessible⁶ than non-habitual behaviours when no intentions were formed around a daily-life activity and 2) non-habitual behaviours are easier to remember when an intention has been formed (e.g. *eat a salad instead of a sandwich for lunch*) than when no intention has been formed. The latter suggests that intentions may have an inhibition effect when trying to remember past behaviours and might help explain mismatches between actual and stated behaviour in consumer surveys. Wood et al. (2002) explore the correspondence between thoughts and behaviours. In their diary study⁷ they find that greater conscious processing is required to guide non-habits than habits. As a result, during the performance of habits thoughts are less likely to correspond with behaviour while this is more likely to happen during the performance of non-habits.

Summing up, the available literature supports the existence of a difference between preferences and actual behaviour. The literature also suggests that some behaviours might be

⁵ Danner et al (2011) performed an experiment among undergraduate students to investigate personal existing habits and non-habitual behaviour for various daily-life activities (e.g., having lunch, playing sports).

⁶ Recalling habits and non-habitual behaviours was measured in terms of time.

⁷ Wood et. al (2002) conducted two diary studies in which participants provided hourly reports on their ongoing experiences on habitual or non-habitual behaviours.

environmentally triggered and thus supports our approach to explore POS specific gap measures.

For our study it is interesting to be aware of the findings from different behavioural models that both habit strength and intentions can matter for behaviour and that even without affecting intentions or the perceived behavioural control nudging can change behaviour (Marteau et al. 2011). These findings support our approach to analyse the effect of individual and payment specific characteristics on the gap between preferences and actual payment behaviour. It could be that the gap is determined by the potential ‘reward’ that consumers perceive to obtain from their change of payment habit, which might vary among different individuals. Perhaps the reward for changing payment habits is not clear to some individuals, or for some payment situations. In such cases, as long as consumers can keep on carrying out their expenses, they might stick to their old habits (e.g. *paying with cash*). However, it could be that other consumers might perceive they have much to gain (e.g. *in case of the fear of being robbed*) and thus their intention to change could have a stronger influence on their non-habitual behaviour (e.g. *paying with the debit card instead of cash*).

4. Data and research set-up

We use the outcomes of a detailed survey commissioned by DNB and DPA among 8707 Dutch consumers by GfK during September 2013.⁸ The consumers are representative for the Dutch population of 12 years and older. Consumers either filled in the DNB/DPA payment survey online or were interviewed by phone. The latter was done to prevent that consumers who prefer to use cash are underrepresented. The DNB/DPA payment survey consists of two parts. The first part is a one-day payment diary.⁹ Consumers registered all their payments and the payment instrument used during the day. In case this differed from their preferred payment method they also reported their preferred payment method. In total there were 13,278 registered payments registered. Of these payments 6,922 were cash transactions, 5,273 were debit card transactions, and 138 were credit card payments. The survey covers September. All days of the week are well-covered. Regarding the POS, most payments, one out of three, took place at the supermarket, whereas least payments were made in non-food retail trade stores with on average high prices.

⁸ See www.gfk.com for more information about GfK. URL last accessed on 10 February 2015.

⁹ Jonker and Kosse (2013) show that the registration period affects how well payments are registered. Survey participant give more reliable information on their payment behaviour when they need to fill in their behaviour for one day than for a longer time span. A one-week survey misses around 40% of the transactions that are reported in a one-day survey.

The second part of the DNB/DPA payment survey is an additional questionnaire which measures stated preferences, stated behaviour at different stores and background characteristics. This unique dataset enables us to contrast stated preferences to reported behaviour at an individual level. For detailed information on the survey questions we refer to Appendix A.

5. Preferences versus actual behaviour

To analyse how well payment preferences match actual behaviour we take a step-wise approach. First, we study stated general payment preferences obtained from survey data (Section 5.1). Then, we analyse stated behaviour per type of store that is also obtained from survey data (Section 5.2). Next, we look at actual behaviour based on diary data (Section 5.3). We contrast store-specific information (Section 5.4) and general preferences to actual behaviour at the consumer level (Section 5.5).

5.1 Stated general preferences

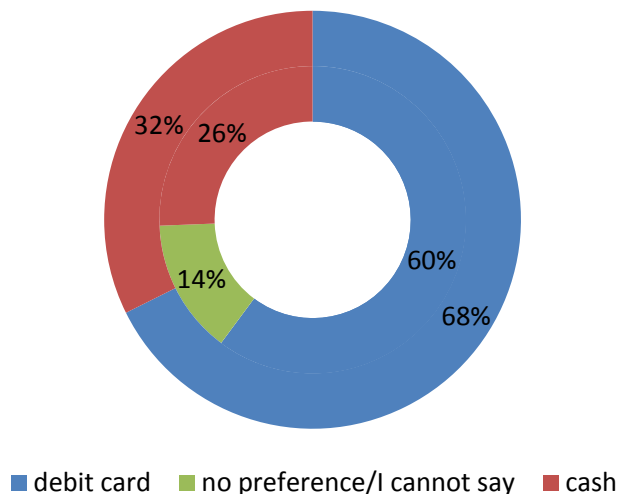
Figure 1 displays the stated general payment preferences of Dutch consumers. The figure summarized the outcomes of two questions. The outcomes of the first question *“Under normal circumstances do you prefer paying by debit card or paying cash?”* [Q50] are shown in the inner circle. It clearly shows that most people prefer to use the debit card. The respondents that replied *“No preference/I cannot say”* answered the follow-up question *“And if you had to choose between paying by debit card and cash, what would you prefer?”* [Q51]. The outer circle in Figure 1 combines the answers to Q50 and Q51.

When consumers are required to choose between the debit card and cash, 68% say they prefer the debit card. Respondents that prefer to pay by debit card were asked whether this preference also holds when they pay amounts less than EUR 5 [Q54]. 66% of the consumers who prefer the debit card in general also prefer it for low amount purchases. So 45% of the total group of consumers prefers the debit card to pay small amounts, whereas 55% prefers cash.¹⁰ Survey participants that prefer cash, henceforth cash-likers, were given a list of possible reasons and asked *“Below you see possible considerations to prefer paying cash. Which of these apply to you?”* [Q52]. Respondents answered “no” or “yes”. Debit-card likers were given a question about

¹⁰ We assume that consumers who like cash in general also like it when paying small amounts.

reasons to prefer paying by debit card.¹¹ Table 1 shows the five most important reasons for consumers including the “yes”-response share.

Figure 1. Stated general preferences



Source: DNB/DPA payment survey, September 2013.

Note: The figure shows weighted response shares. The inner circle shows unforced preferences (answers to Q50), whereas the outer circle shows forced preferences (based on answers to Q50 and Q51).

The most often mentioned reason for preferring cash is that one wants to keep track of how much one spends. This finding is in line with Hernandez, Jonker and Kosse (2014) who show that consumers’ desire to control budgets affects their payment choice. Habit is also mentioned by a majority of cash-likers. This is consistent with Van der Horst and Matthijsen (2013) whose virtual-reality study shows that consumers mostly choose their payment instrument at the checkout on the basis of habit.

That one always has enough money in one’s pocket, that it is faster, that it is a habit and that it is possible to check expenses afterwards via Internet banking or bank statements are important reasons to prefer the debit card. A majority of the debit card-likers also finds not having to think about withdrawing money a relevant reason for preferring the debit card.

The bottom part of Table 1 summarizes why 34% of the debit card-likers prefer to pay amounts less than EUR 5 cash. The most important reasons are that they spend cash in their pocket and habit. The speed of payment, the effort that it costs to pay by debit card and the costs

¹¹ “Below you see possible considerations to prefer paying by debit card. Which of these apply to you?” [Q53].

of paying by debit card are also mentioned by a substantial share of consumers in this group as relevant reasons to prefer cash for small amounts.

Table 1. Explaining preferences

	Yes
<i>Reasons for preferring cash</i>	
Keep track of how much I spend	82%
Habit	69%
I spend less money	63%
Paying cash feels "realer" than paying by debit card	60%
Faster	43%
<i>Reasons for preferring debit card</i>	
Always enough money in my pocket	69%
Faster	69%
Habit	69%
Possible to check expenses afterwards via Internet banking/bank statements	69%
Not thinking about withdrawing money	63%
<i>Reasons for preferring cash for amounts <5 euro</i>	
Spending cash in my pocket	65%
Habit	55%
Faster	44%
Never pay (10 or 20 ct.) extra	39%
Too much effort to pay small amounts by debit card	35%

Source: DNB/DPA payment survey, September 2013.

Note: The table shows weighted response shares. Reasons are ranked by importance. The five most important reasons are included in this table.

5.2 Stated behaviour

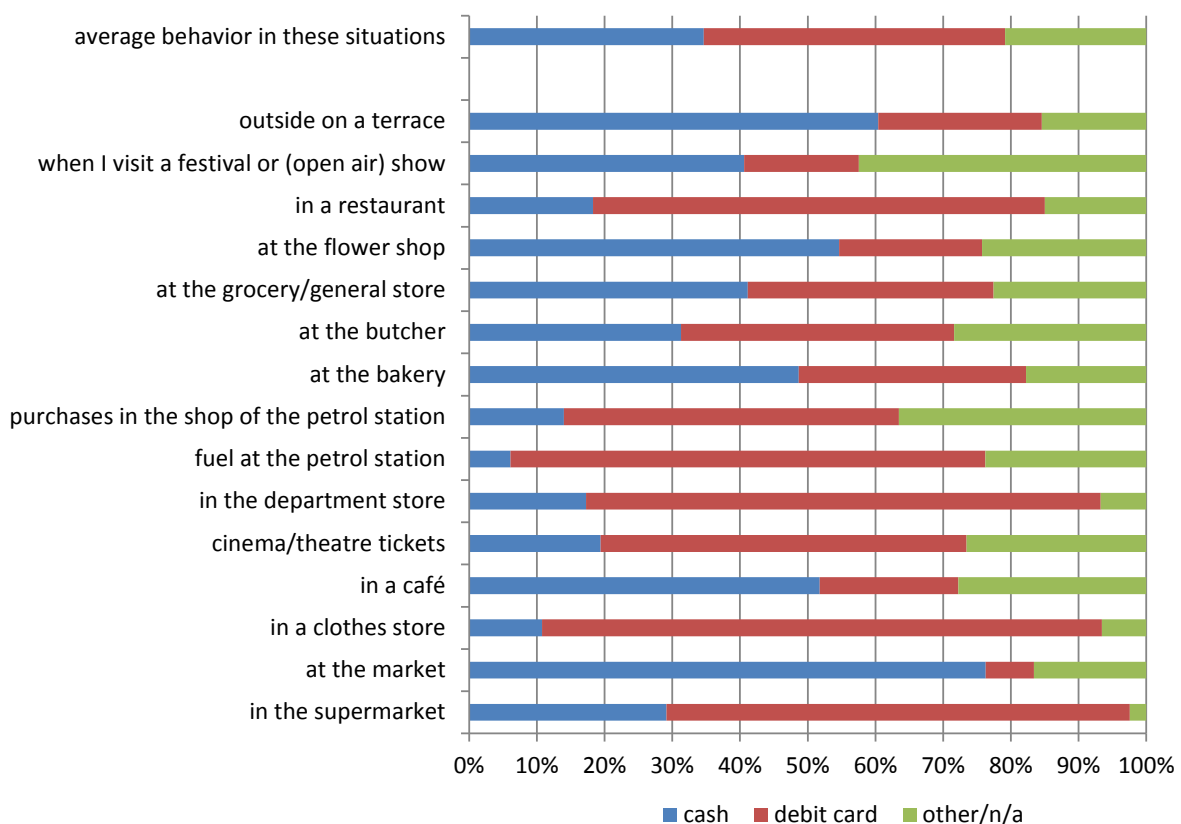
Figure 2 shows how stated behaviour depends on the type of store. Participants of the DNB/DPA payment survey answered the question *"The way you pay may depend on the circumstances. Could you please indicate how you mostly pay in below situations? If the situation is not applicable to you, you can also indicate that."* [Q56].

Cash is especially popular when transaction amounts are low and the acceptance of the debit card is relatively poor. 76% of the consumers state that they mostly pay by cash at the market. Cash usage is also high in several other situations: outside on a terrace, at the flower shop and in a café. In these situations a majority of the consumers mostly use cash. The debit

card is popular at clothes and department stores and when buying fuel at the petrol station, at the supermarket and in restaurants.

According to stated behaviour the debit card is more often used than cash. The average stated behaviour over the store types is that 35% of the consumers mostly use cash, 44% mostly use their debit card and 21% choose either another payment method or the situation is not applicable.

Figure 2. Stated behaviour



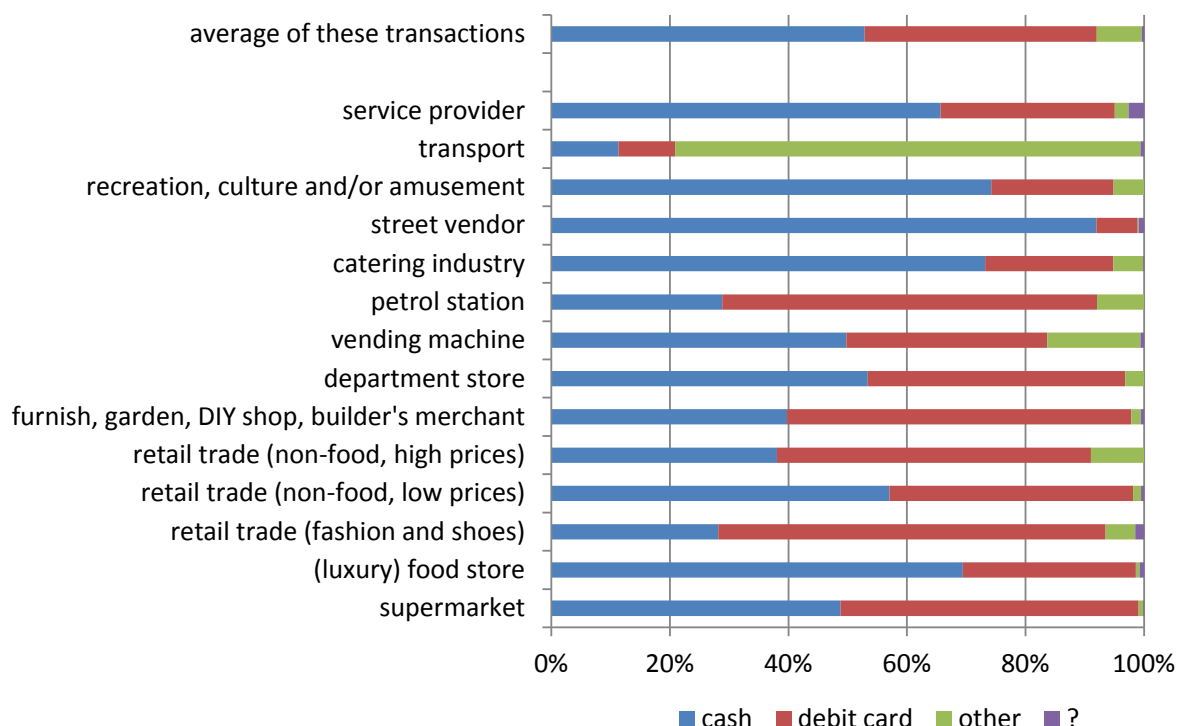
Source: DNB/DPA payment survey, September 2013.

Note: The figure shows weighted response shares. Consumers first filled-in a diary before they answered this survey question.

5.3 Actual behaviour

Based on diary information we get a measure of actual payment behaviour. We have information on payment behaviour in general as well as information on how consumers pay in different type of stores, see Figure 3.

Figure 3. Actual behaviour



Source: DNB/DPA payment survey, September 2013.

Note: The figure shows weighted response shares based on one-day diary information.

Only 39% of the transactions is paid by debit card, while 53% is paid in cash. Other payment instruments are used in the remainder 8% of the transactions. The credit card is not used frequently in the Netherlands and there are a lot of niche products, e.g. the prepaid card, customer cards, the fuel cards and the public transport prepaid card. From the set of other payment methods the public transport prepaid card is used most. 5% of all payments are made this way, followed by the prepaid card and the credit card, which are used for 1% of payments.

At the furnishing store, garden centre, do-it-yourself (DIY) shop and/or builder's merchant a high share of payments is made by debit card. Consumers are also likely to opt for the debit card at the petrol station, when buying fashion or shoes and in non-food retail trade high price shops. Half of the supermarket transactions are paid by debit card. At several other occasions it is still more common to use cash. This holds especially when consumers pay a street vendor. 92% of these transactions are paid by debit card. Cash is also popular in the recreation, culture and amusement sector, in the catering industry, at (luxury) food stores and when paying service providers. The latter may be due to moonlighters that are active in the services sector

(e.g. housekeepers and handymen) but also because of the absence of a payment terminal at home.

5.4 Stated versus actual behaviour per type of store

We find that a substantial share of consumers has a blurred picture of their payment patterns (see Table 2). These consumers overestimate their debit card usage. For example, 34% of the consumers who state to mostly use the debit card at the supermarket actually don't use it for more than half of their payments at the supermarket. Also many consumers overestimate debit card usage at clothes stores and department stores.

Table 2. Stated versus actual behaviour per type of store

	Stated behaviour <i>Mostly debit card?</i>	Actual behaviour <i>more than 50% of payments by debit card</i>	
		no	yes
a. supermarket	no	88%	12%
	yes	34%	66%
b. bakery & butcher & grocery/general store	all 3 situations no	89%	11%
	all 3 situations yes	39%	61%
c. clothes store	no	86%	14%
	yes	33%	67%
d. department store	no	86%	14%
	yes	47%	53%
e. Petrol station: fuel & purchases in the shop	both situations no	88%	12%
	both situations yes	25%	75%
f. café & restaurant & outside, on a terrace	all 3 situations no	94%	6%
	all 3 situations yes	57%	43%
g. market & flower shop	both situations no	97%	3%
	both situations yes	52%	48%
h. cinema/theatre tickets & festival or (open air) show	both situations no	95%	5%
	both situations yes	55%	45%

Source: DNB/DPA payment survey, September 2013.

Note: The table shows weighted response shares. Stated behaviour is based on Q56. Actual behaviour is based on diary information. The share of respondents that overestimates debit card usage is highlighted. Preferences with respect to category a are matched with actual behaviour at store type 1, similarly category b is matched with store type 2, category c with store type 3, category d with store type 7, category e with store type 9, category f with store type 10, category g with store type 11, and category h with store type 12, see Appendix A for more detailed information about the division into store types.

In the rest of the paper, we focus on the difference between stated preferences in general and actual payment behaviour.¹² First of all, given that there is only one day of payment information it is easier to get a reliable picture of consumers' payment behaviour in general than per sector. Second, the classification of the POS in the transaction dataset does not perfectly match the type of stores in the survey question on payment behaviour, which complicates the construction of gap measures. Therefore we only do this for the supermarket, clothes store and department store, where the same definition is used to measure stated and actual behaviour.

5.5 Stated preferences versus actual behaviour

To measure to what extent debit card usage is overestimated we proceed as follows. First we construct payment dummies in the transaction dataset.¹³ We only keep the debit card and cash transactions because we know consumers' preferences for either the debit card or cash. We construct a *debit card dummy* that is 1 if a payment was made by debit card and 0 for cash payments. We make two versions. Version one is based on actual behaviour whereas version two corrects for the fact that 1% of the payments could not be made with consumers' preferred payment method. In these cases actual payment behaviour is replaced by the reported preferred payment behaviour. Next, we calculate the mean debit card dummy variable for each respondent. We have two versions for mean debit card usage, i.e., one based on the uncorrected and one based on the corrected dummies.

We include this information on actual payment behaviour based on diary data in the dataset with payment preferences, stated behaviour and background characteristics. We create variables that measure preferences, based on Q50 and Q51, and contrast these to actual payment behaviour variables (as described in Section 5.3). Table 3 summarizes how well preferences match actual behaviour.

We find that 34% of the selected group of respondents 'overestimate' their debit card usage; they report a preference for the debit card while they actually do not pay a majority of their payments by debit card.¹⁴ For only 4% of these respondents it is the other way around,

¹² Note that only in 1% of the transactions consumers could not pay the way they preferred. Therefore, the presence of a gap between stated payment preferences and actual behaviour is mainly caused by consumers' blurred picture of their payment behaviour.

¹³ We exclude donations, deposits of money at banks, putting money in a money box and borrowing from, lending to or paying back friends.

¹⁴ It is 23% if we only consider it a preference for the debit card when at least 25% of payments are made by debit card.

they mostly use the debit card but report a preference for cash. In 62% of the cases actual preferences are in line with stated preferences. The percentage of respondents that overestimate debit card usage drops to 29% if we define that respondents without a clear preference do not overestimate debit card usage.

Table 3. Overestimation of debit card usage
Stated preference versus actual behaviour

		Actual behaviour <i>more than 50% of payments by debit card</i>		
		no	yes	total
<i>Stated preferences</i>				
<i>forced</i>	cash	27%	4%	30%
	debit card	34%	35%	70%
	total	61%	39%	100%
<i>unforced</i>	cash	22%	3%	24%
	debit card	29%	33%	62%
	no preference/I cannot say	10%	3%	14%
	total	61%	39%	100%

Source: DNB/DPA payment survey, September 2013.

Note: The table shows response shares. Stated preferences are based on Q50 and Q51. Actual behaviour is based on diary information. For this purpose the database only includes debit card and cash payments. The share of respondents that overestimates debit card usage is highlighted.

Next, we determine the actual payment behaviour based on two different transaction datasets, one with transactions below EUR 5 and one with transactions of at EUR 5 euros. We contrast the outcomes on actual behaviour to preferences (see Table B1 in Appendix B for the results). When actual preferences are determined based on high value transactions the share of consumers that overestimates the usage of their debit card is still substantial, namely 28%. When we compare stated preferences for paying amounts smaller than EUR 5, by combining the answers to Q50, Q51 and Q54, with actual behaviour the share of consumers with a gap is also considerable, namely 26%.

6. Regression analysis

6.1 Method

We estimate probit regressions to examine whether the likelihood of overestimating debit card

usage depends on individual-specific and/or payment-specific characteristics.

Dependent variables: gap dummies

We construct four gap debit card measures which act as dependent variables. The first one is *gap debit card*. This variable is 1 for respondents that state to prefer the debit card but actually do not use it in the majority of payments they make. For the other respondents *gap debit card* is 0.¹⁵ In addition, we examine to what extent it matters that some respondents reported only a preference for the debit card when they were forced to choose between cash and the debit card (Q51). *Gap debit card unforced* is similar to *gap debit card* except that respondents that answered “No preference/I cannot say” to Q50 are put in the zero category. *Gap debit card small* and *gap debit card unforced small* are constructed to test the likelihood of a gap when paying small amounts. *Gap debit card small* and *gap debit card unforced small* are 1 for respondents that report to prefer the debit card for small transactions but actually don’t pay a majority of their low value transactions this way. The unforced gap variable puts the respondents that answers “No preference/I cannot say” to Q50 in the zero category.

Furthermore, we construct store-specific gap measures: *gap debit card supermarket*, *gap debit card clothes store* and *gap debit card department store*. This enables us to model the likelihood of a gap at the supermarket, clothes store and department store. These gap variables are 1 for respondents that report to mostly use the debit card at the particular store but in practice don’t pay a majority of their transactions by debit card. Here we keep transactions with all payment instruments in the database.¹⁶ We do this because respondents could indicate that they mostly paid cash, with the debit card *or* using other payment instruments. Note that this is in contrast to how general preferences are measured.

Explanatory variables

Our primary focus in the regressions is on testing to what extent overestimation of debit card usage depends on individual-specific and payment-specific factors. We include the following set

¹⁵ There are several possible reasons why behaviour of respondents on the particular registration day may not match their average behaviour. However, the sample size is large so these individual cases will not affect the general picture.

¹⁶ For payments for which it is unknown how they are paid, the dummies are set at missing such that these observations are not taken into account. Respondents with at least one payment for which it is unclear how it was paid are not included in the further analysis. Note that there are only a few observations of respondents for which we do not know reported preferences.

of individual-specific binary dummy variables as explanatory variables: *male*, *age: 12-25*, *age: 25-35*, *age: 45-55*, *age: 55-65*, *age: 65 plus*, *income: low*, *income: high*, *education: low*, *education: high* and *region: west*, *region: north*, *region: east*, and *region: south*. *Male* is a 1 for male respondents and 0 for female respondents. *Age: 12-25* is 1 for respondents younger than 25 and 0 for other respondents. In a similar way we construct *age: 25-35*, *age: 45-55*, *age: 55-65* and *age: 65+*. The region variables are 1 for respondents that live in the particular region and 0 for other respondents. The reference person is a woman, aged between 35-45, has an income between EUR 1000 and EUR 2000, an intermediate educational level and lives in one of the three largest cities of the Netherlands - Amsterdam, Rotterdam or The Hague - or their metropolitan areas.

We also include information on the type of payments that consumers made as explanatory variables. *Average amount* is the average transaction amount in EUR 100. *Average amount²* is the squared value of *average amount*. Furthermore we include fourteen dummies, one for each POS-sector as described by Q5-1 (see Appendix A.1). These dummies are 1 for respondents that registered transactions in the particular sector and 0 for other respondents. We also include *cash on hand*. This variable measures the amount of cash in the consumer's wallet in the morning in EUR 100. On average respondents had EUR 42,90 cash at the beginning of the day. Last, we include *cash on hand²*, the squared value of cash on hand, as well.

6.2 Results

Baseline regressions

The first two column in Table 4 show the results of the regressions with the gap debit card dummies as dependent variables and using both low and high value transactions. The outcomes on the region and sector variables are in Appendix B, Table B.2.¹⁷ Compared to consumers aged between 35 and 45, the reference group, consumers aged 55 and older are 7 percentage points more likely to overestimate debit card usage (column 1). This age effect indicates that the habit of paying cash is an important explanation for the presence of a discrepancy between preferences and actual behaviour. This is in line with the outcomes presented in Table 1, that habit is a very important factor in payment behaviour. The age effect is however insignificant when we put consumers with a less clear preference for the debit card in the 0 category (column

¹⁷ Note that multicollinearity is not a problem in our regressions. The mean Variance Inflation Factor (VIF) is 1.50. The minimum VIF found is 1.02 and the maximum is 2.75. As a rule of thumb a VIF smaller than 10 is fine.

2). We do not find a significant gender effect.

Overestimation of debit card usage is more common by consumers with a high income than by consumers with a low income. Consumers who earn 2,000 euros or more per month are 5 to 6 percentage points more likely to overestimate debit card usage than consumers who earn between 1,000 and 2,000 euros (column 1 and 2). We also find an education effect; consumers with a low degree of education are 4 percentage points less likely to overestimate debit card usage than consumers with a medium degree of education (column 1 and 2). High-educated and high-income consumers are more likely to follow trends and use new payment instruments than other consumers. We find that the former group of consumers is more likely to report a preference for the debit card than the latter group of consumers. However, if well-educated and high-income consumers still have both cash and a debit card in their wallet it is probably difficult for them to have a good picture of their actual payment behaviour. It is then also possible that they stick to the (unconscious) habit of paying cash.

In addition, the likelihood of a gap depends on the place of residence. Consumers who live in the West of the Netherlands are less likely to overestimate debit card usage than inhabitants of the three largest cities or their metropolitan areas (column 1). This effect is not significant in the regressions with *gap debit card unforced* as dependent variable.

The likelihood of overestimating debit card usage not only depends on individual-specific characteristics but also on the type of payments that were made. First of all, consumers who pay on average large amounts are less likely to overestimate debit card usage than consumers who pay on average small amounts. Out of habit consumers are probably more likely to use cash when they have to pay small amounts than when they have to pay large amounts.

Second, the likelihood of a gap depends on the type of sectors at which payments took place. The likelihood of a gap tends to be higher when consumers shop in sectors with a high proportion of cash payments. These are the catering industry, street vendors, recreation and culture and service providers. In 2012 the cash market share of these sectors was 75, 95, 80 and 63 percent, respectively (Hernandez and Kosse 2013). The acceptance of the debit card in these sectors is relatively low or used to be relatively low.¹⁸ The habit of paying cash is probably stronger in these sectors than in other sectors, which makes the presence of a gap more likely. We also find that the likelihood of a gap is relatively low for consumers with payments in sectors where card acceptance is almost universal and which were the first to be targeted by a public

¹⁸ For example, street vendors (54%) and catering industry (71%) (Panteia 2013).

Table 4. Overestimation of debit card usage

	(1) <i>gap debit card</i>	(2) <i>gap debit card unforced</i>	(3) <i>gap debit card small</i>	(4) <i>gap debit card unforced small</i>
male	-0.00 (0.02)	-0.00 (0.01)	0.03 (0.02)	0.02 (0.02)
age: 12-25	-0.02 (0.03)	-0.01 (0.03)	-0.04 (0.03)	-0.04 (0.03)
age: 25-35	-0.00 (0.03)	0.00 (0.02)	0.04 (0.04)	0.04 (0.04)
age: 45-55	0.01 (0.02)	-0.00 (0.02)	-0.01 (0.03)	-0.01 (0.03)
age: 55-65	0.07*** (0.03)	0.03 (0.02)	-0.06* (0.03)	-0.05 (0.03)
age: 65+	0.07*** (0.03)	0.04 (0.02)	-0.08*** (0.03)	-0.08** (0.03)
income: low	-0.02 (0.02)	-0.01 (0.02)	-0.02 (0.03)	-0.02 (0.03)
income: high	0.05*** (0.02)	0.06*** (0.02)	0.08*** (0.03)	0.08*** (0.03)
education: low	-0.04** (0.02)	-0.04** (0.02)	-0.06** (0.02)	-0.06*** (0.02)
education: high	-0.02 (0.02)	-0.01 (0.02)	-0.03 (0.02)	-0.03 (0.02)
average amount	-0.47*** (0.06)	-0.39*** (0.05)		
average amount ²	0.05*** (0.01)	0.04*** (0.01)		
cash on hand	0.04*** (0.01)	0.05*** (0.02)	-0.08*** (0.03)	-0.07*** (0.03)
cash on hand ²	-0.00 (0.00)	-0.00 (0.00)	0.01 (0.00)	0.01 (0.00)
...
N	4630	4630	2080	2080
McKelvey & Zavoina's pseudo R ²	0.10	0.08	0.07	0.07
Chi-squared	362.9	315.2	148.1	147.1
p-value	0.00	0.00	0.00	0.00

Note: The table shows average marginal effects based on probit regressions with robust standard errors in parentheses. Dependent variables are binary dummies indicating whether the respondent overestimates debit card usage. Results in column 1 and 2 are based on regressions that include all transactions whereas the results in column 3 and 4 are based on regressions that include transactions with a value below 5 euro. The reference individual is a female aged between 35 and 45, who earns a middle income, has a medium degree of education and lives in one of the three largest cities of the Netherlands or their metropolitan areas. Coefficients of region and sector variables are in Table B.3 of Appendix B. * p < 0.1, ** p < 0.05, *** p < 0.01.

campaign promoting debit card usage among consumers. This campaign was targeted at supermarkets, different retail stores and department stores. We find that consumers with purchases in the supermarket are 9 percentage points less likely to have a gap than consumers who do not visit the supermarket (column 1 and 2).

Last, the likelihood of the gap is also related to the amount of cash that consumers have in their wallet. Compared to consumers without cash, consumers with EUR 100 in their wallet are 4 to 5 percentage points more likely to overestimate their debit card usage (column 1 and 2). For consumers with much money in their wallet it is easier to stick to their habits.

Low value transactions

Column 3 and 4 show the results for low value transactions. As before, we do not find a significant gender effect but we do find support for the income and education effect. However, we find an opposite age effect. Consumers older than 55 years are less likely than consumers between 35 and 45 years to overestimate debit card usage when paying small amounts (column 3). Inhabitants of the West, East and South of the Netherlands are more likely to overestimate debit card usage than inhabitants of the three largest cities or their metropolitan areas. We also find an opposite cash on hand effect. Compared to consumers with little cash in their wallet, consumers with a lot of cash seem to know better that they prefer cash when paying small amounts. They are therefore less likely to overestimate debit card usage. The sector dummies tell a similar story as before. Consumers who make payments at the catering industry, to a street vendor or paid service providers are more likely to overestimate debit card usage than consumers without these type of payments. Instead consumers who visit the supermarket, (luxury) food store, or retail trade (non-food, low prices) are less likely to have a gap than other consumers.

The supermarket, clothes store and department store

Our store-specific findings confirm our earlier findings that habits play an important role in explaining payment behaviour (Table 5). We find further evidence that the likelihood of a gap increases with the age and income of consumers. For department stores we also find that consumers in the youngest age class are more likely than consumers in the reference group to have a gap. The relationship between the number of transactions and age is an inverse u-curve; young and old consumers pay less frequently than middle-aged consumers. This may result in a

Table 5. Overestimation of debit card usage at three POS

	(1) <i>gap debit card supermarket</i>	(2) <i>gap debit card clothes store</i>	(3) <i>gap debit card department store</i>
male	-0.01 (0.02)	0.07 (0.08)	-0.01 (0.06)
age: 12-25	0.00 (0.03)	-0.09 (0.09)	0.17* (0.10)
age: 25-35	-0.04 (0.03)	-0.27*** (0.06)	0.02 (0.10)
age: 45-55	0.02 (0.03)	-0.10 (0.10)	0.03 (0.09)
age: 55-65	0.01 (0.03)	-0.02 (0.10)	0.21** (0.09)
age: 65+	0.01 (0.03)	-0.00 (0.11)	0.17** (0.09)
income: low	-0.01 (0.02)	-0.10 (0.08)	0.09 (0.07)
income: high	0.06*** (0.02)	-0.01 (0.09)	0.11 (0.07)
education: low	-0.03 (0.02)	0.05 (0.08)	-0.07 (0.06)
education: high	-0.03* (0.02)	0.09 (0.08)	-0.12* (0.06)
region: west	-0.06** (0.02)	0.13 (0.11)	-0.07 (0.08)
region: north	-0.01 (0.03)	-0.11 (0.10)	-0.14 (0.09)
region: east	-0.03 (0.03)	0.06 (0.12)	-0.01 (0.08)
region: south	0.01 (0.03)	0.10 (0.11)	-0.04 (0.08)
average amount	-0.85*** (0.09)	-0.43*** (0.14)	-0.84*** (0.25)
average amount ²	0.40*** (0.09)	0.12*** (0.04)	0.30** (0.12)
cash on hand	0.09*** (0.02)	0.22*** (0.07)	0.14** (0.06)
cash on hand ²	-0.01** (0.01)	-0.03*** (0.01)	-0.01 (0.01)
N	2866	231	388
McKelvey & Zavoina's pseudo R ²	0.06	0.17	0.14
Chi-squared	162.2	46.8	37.5
p-value	0.00	0.00	0.00

Note: The table shows average marginal effects based on probit regressions with robust standard errors in parentheses. Dependent variables are binary dummies indicating whether the respondent overestimates debit card usage. The reference individual is a female aged between 35 and 45, who earns a middle income, has a medium degree of education and lives in one of the three largest cities of the Netherlands or their metropolitan areas. * p < 0.1, ** p < 0.05, *** p < 0.01.

less clear picture of actual payment behaviour. In contrast to before, we now find that consumers with a high degree of education are less likely to overestimate debit card usage. This holds both for payments at supermarkets and payments at department stores. Again consumers in the West of the Netherlands are less likely to have a gap than inhabitants of the three largest cities or their metropolitan areas (column 1). Consumers who have on average high value payments are again less likely to have a gap. The results provide also further evidence for the presence of a cash-on-hand effect. This holds for all three type of stores.

Robustness tests

We perform several additional regressions to check the robustness of our results. First of all, we run regressions with less strict gap measures: *Gap debit card less strict* and *Gap debit card unforced less strict*. Only consumers who prefer the debit card but use it for less than 1 out of 4 payments are defined to have a gap. The share of respondents that overestimates debit card usage is now somewhat lower, respectively 23% and 19%. Second, we perform the regressions with gap measures that are corrected for the fact that 1% of the payments could not be made in the preferred manner: *gap debit card corrected* and *gap debit card unforced corrected*. In these cases the actual payments are replaced by the preferred payments. It does not matter much whether we use the uncorrected or corrected dataset. Based on the corrected dataset the share of respondents that overestimates debit card usage is 34% in case of the forced definition and 29% based on the unforced definition. Third, we check whether it matters if a payment was a private transaction or a business transaction. Perhaps respondents have especially their private payments in mind when answering the survey questions about their preference for either the debit card or cash. Note however that only 3% of all payments in our dataset are business transactions so we expect that excluding these payments will not have a major effect. Fourth, we include only transactions of at least EUR 5. The way we measure stated preferences does not change but now actual preferences are based on the transactions of at least EUR 5. In this case the share of respondents that overestimates debit card usage is 28% based on the forced gap definition (*gap debit card large*) and 23% based on the unforced gap definition (*gap debit card unforced large*). Furthermore, we test what the results look like if we include only those consumers with at least three transactions on the transactions day.¹⁹ The results of these

¹⁹ One may argue that the data on their behaviour is more reliable than that of others. However, one may

exercises only marginally differ from the ones presented in Table 4. The general picture is robust and the key insights remain unchanged. The outcomes of these exercises are available upon request.²⁰

7. Conclusion

This study sheds light on the puzzling reasons why the pace of the substitution of cash by debit cards was slower than expected. Using shopping diary survey data we have found a discrepancy between consumers' preferences and stated payment behaviour on the one hand and their actual payment behaviour on the other. This implies that changing payment patterns is a challenging task; even when consumers have fallen in love with the debit card they find it hard to divorce from cash. An important share of the Dutch consumers overestimates their use of the debit card. They report to prefer the debit card but don't pay a majority of their payments by debit card.

Our regression results reveal that the habit of paying cash plays a crucial role explaining consumers' overestimation of debit card usage and therefore why payment behaviour changes slower than expected. First of all, the likelihood that reported preferences and actual behaviour do not match increases with age. Old people are more likely to have strong cash habits than young people. Second, consumers with payments in cash-intensive sectors, where the wide acceptance of the debit card is a relatively recent phenomenon, are more likely to overestimate their debit card usage than other consumers. It is important to note that the likelihood of a gap is the smallest for consumers with payments in sectors which traditionally had high debit card acceptance rates and were the first to be targeted by publicity campaigns promoting debit card usage among consumers. This finding suggests that certainty about debit card acceptance and desirability of debit card usage may help changing habits. Our finding that perceived control over behaviour affects behaviour is in line with the theory of planned behaviour (Ajzen 1985, 1991) and the model of interpersonal behaviour (Triandis 1980). Third, the likelihood of a gap also increases with the amount of cash that consumers carry with them. When the amount is larger consumers tend to stick to cash habits. Fourth, consumers who pay on average low value transactions are more likely to overestimate debit card usage than consumers who pay on

also argue that the picture of actual payment behaviour is more reliable when respondents only had to register a couple of payments instead of a longer list.

²⁰ Note that we also performed regressions with day of the month dummies and regressions with day of the week dummies. Our findings are robust to the inclusion of these dummies. Results are available upon request.

average high value transactions. The habit of paying cash is probably higher for low value transactions than for high value transactions because of the initial surcharges of merchants for using the debit card in case of small amount transactions. Our finding that habits moderate the effect of intentions on actual behaviour is in line with the model of interpersonal behaviour (Triandis 1980).

Our research shows that falling in love with the debit card is only the first step to change payment behaviour. A lot of consumers have persistent payment habits. Therefore additional steps are needed if one wants to increase the pace by which consumers divorce from cash. An approach could be to make consumers more aware of persistent habits, create incentives to change their behaviour and make it more difficult for them to stick to their habit of paying cash. This could be done in several ways, for instance by rewarding debit card payments and by making debit card usage the default by introducing debit card only counters in shops. The cash-on-hand effect may for example be weakened by discouraging consumers to withdraw large amounts of cash from ATMs and by stimulating *retourpinnen*. In the latter case consumers who return their purchases get repaid on their checking account instead of getting cash.

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Appendix A. The 2013 DNB/DPA payment survey

A.1 Actual behaviour

Q5-1: Did you on <REGISTRATIONDAY> spend money in one or more of the following stores and/or in one or more of the following ways? Did you... [S]

Grid, answers in columns:

1. Yes
2. No

Rows:

(BA: Show the items in lowercase. Is it possible to show the items one by one on the screen?)

1. **pay in a supermarket** (Albert Heijn, C1000, Jumbo, Aldi, etc.)
2. **pay in a (luxury) food store** (butcher, baker, dairyman, liquor store, cheese store, tobacconist's shop, general store, etc.)
3. **pay fashion and footwear in a retail trade store** (Steps, Livera, Prenatal, M&S, C&A, H&M, Zara, etc.)
4. **pay in a non-food retail trade store with on average low prices** (toy shop, sports shop, Bruna, AKO, stationer, flower and plant shop, pet shop, pharmacy, drugstore, perfumery, video shop, etc.)
5. **pay in a non-food retail trade store with on average high prices** (cars, motorcycles and bicycles (including accessories, spare parts, etc.), photographs, jewels and opticians, BCC, Mediamarkt, computer store, electronics store, shop for large household appliances (e.g. washing machine, oven, etc.)
6. **pay in a home furnishing store, garden centre, do-it-yourself (DIY) shop and/or builder's merchant** (Praxis, Gamma, Hornbach, Ikea, Intratuin, kitchen and bathroom business, furniture store, bedrooms, bedroom furniture, lamp shop, curtain, carpet, parquet shop, etc.)
7. **pay in a department store** (Hema, V&D, Bijenkorf, Blokker, Markramer, etc.)
8. **pay at a vending machine** (candy and drink vending machine, parking machine, charge or buy a public transport ticket from a vending machine, slot machines, cigarette vending machines, etc.)
9. **pay in a petrol station**
10. **pay at the catering industry** (restaurant, café, coffee shop, hotel, camping, snack bar, club house, dancing, night club, canteen, takeaway, pizza delivery, disco, etc.)
11. **pay to a street vendor** (seller's market, flower stall, fish stall, ice cream man, busker, street vendor, chip shop, etc.)
12. **pay for recreation, culture and/or amusement** (theatre, museum, cinema, penny arcade, fair, amusement park, library, swimming pool, gym, sporting canteen, etc.)
13. **pay for transport** (taxi, check with smart card for public transport (train, metro, tram, bus), buy a ticket on the tram, bus or at the ticket office, car or motorbike hire, etc.)
14. **pay to a service provider** (travel agency, dentist, hairdresser, tailor, dry cleaner's, tanning studio, beauty parlour, town hall, handyman, cleaning, etc.)

BA: for each BRANCHE (Q5-1=1/Q5-2=1)

Q6-1: How many times did you <REGISTRATIONDAY> <INCLUDE BRANCHE>? [S]

1. Once
2. Twice
3. Three times
4. Four times
5. Five times
6. Six times
7. Seven times
8. Eight times

9. Nine times
10. Ten times
11. More than ten times

BA:

IF (Q6-1=1) LISTQ6-1= (empty)

IF (Q6-1>1) LISTQ6-1=

Q6-1=1: the first time

Q6-1=2: the second time

Q6-1=3: the third time

Q6-1=4: the fourth time

Q6-1=5: the fifth time

Q6-1=6: the sixth time

Q6-1=7: the seventh time

Q6-1=8: the eighth time

Q6-1=9: the ninth time

Q6-1=10 or 11: the tenth time

For each branche, except 17 and 18

Q7: How did you on <REGISTRATIONDAY> <LISTQ6-1> <INCLUDE BRANCHE>? Was that with ... [S]

1. cash
2. Pin/debit card
3. Prepaid card
4. Customer card
5. Credit card
6. Fuel card
7. Public transport prepaid card
8. Mobile phone
98. Other, namely... [O]
98. I don't know

For each branche

Q8: Which amount did you on <REGISTRATIONDAY> <LISTQ6-1> <INCLUDE BRANCHE>? [Q]

When you don't recall it exactly, could you estimate it?

... Euro's and ... Eurocents (BA: min. 0.01 and max. 99999.99)

For each branche, except 17 and 18

Q9: Did you pay the way you wanted? [S]

1. Yes
2. No

If Q9=2

Q10: You did not pay the way you wanted. How did you wanted to pay? Was that by...? [S]

1 answer possible

1. cash
2. Pin/debit card
3. Prepaid card
4. Customer card
5. Credit card
6. Fuel card
7. Public transport e-purse
8. Mobile phone

- 98. Other, namely... [0]
- 99. I don't know

If Q9=2

Q11-1: What is the reason that you used another payment instrument than you wanted to use? [S]

- 1. <Q10> was not accepted
- 2. breakdown / <Q10> did not work / point-of-sale terminal was out of order (BA: if Q10≠1)
- 3. I forgot <Q10> / did not have <Q10> with me
- 4. I had to pay extra to use <Q10>
- 5. I did not have enough cash (BA: only show if Q10=1)
- 6. I did not have enough funds on my prepaid card (BA: only show if Q10=3)
- 7. There was not enough change in the till (BA: only show if Q10=1)
- 8. Other, namely... [0]
- 98. I don't know [S]

For each branche

Q11-2: Was the payment of <Q8> euro that you did on <REGISTRATIONDAY> a private or business transaction? [S]

- 1. Private transaction
- 2. Business transaction

A.2 General preferences

Q50: Under normal circumstances do you prefer paying by debit card or paying cash? [S]

- 1. Preference for debit card
- 2. Preference for cash
- 3. No preference/ I cannot say

If Q50=3

Q51: And if you had to choose between paying by debit card and cash, what would you prefer?

- 1. Preference for debit card
- 2. Preference for cash

If Q50=1 or Q51=1

Q54: You prefer to pay by debit card. Does this also hold for small amounts? Suppose you have to pay a small amount less than EUR 5,-- such as bread, an ice-cream, a newspaper or magazine. Do you prefer to pay by debit card or cash? [S]

- 1. Preference for debit card
- 2. Preference for cash

A.3 Stated behaviour

Q56: The way you pay may depend on the circumstances. Could you please indicate how you mostly pay in below situations? If the situation is not applicable to you, you can also indicate that. [S]

Grid, answers in columns:

- 1. Mostly cash
- 2. Mostly debit card
- 3. Different/n/a

Rows Q56.1 (first show Q56.1 random on a screen)

- 1. In the supermarket
- 2. At the market
- 3. In a clothes store
- 4. In a café

5. Cinema/theatre tickets
6. In a department store
7. Fuel at the petrol station
8. Purchases in the shop of the petrol station

Rows Q56.2 (than show Q56.2 random on a screen)

1. At the bakery
2. At the butcher
3. At the grocery/general store
4. At the flower shop
5. In a restaurant
6. When I visit a festival or (open air) show
7. Outside, on a terrace

Appendix B. Additional outcomes

Table B.1. Overestimation of debit card usage

Stated preference versus actual behaviour

		Actual behaviour <i>more than 50% of payments by debit card</i>		
		no	yes	total
Stated preferences				
(< 5 euro)				
<i>forced</i>	cash	54%	5%	59%
	debit card	26%	15%	41%
	total	81%	19%	100%
<i>unforced</i>	cash	42%	3%	46%
	debit card	25%	14%	39%
	no preference/I cannot say	13%	2%	15%
	total	81%	19%	100%
(>= 5 euro)				
<i>forced</i>	cash	24%	5%	29%
	debit card	28%	43%	71%
	total	52%	48%	100%
<i>unforced</i>	cash	19%	3%	23%
	debit card	23%	40%	64%
	no preference/I cannot say	9%	5%	13%
	total	52%	48%	100%

Note: The table shows response shares. Stated preferences are based on Q50, Q51 and Q54. Actual behaviour is based on diary information. For this purpose the database only includes debit card and cash payments. The shares of respondents that overestimate debit card usage are highlighted.

Table B.2. Overestimation of debit card usage: region and sector variables

	(1) <i>gap debit card</i>	(2) <i>gap debit card unforced</i>	(3) <i>gap debit card small</i>	(4) <i>gap debit card unforced small</i>
region: west	-0.04* (0.02)	-0.03 (0.02)	0.06* (0.03)	0.07** (0.03)
region: north	-0.01 (0.03)	-0.00 (0.03)	0.02 (0.04)	0.02 (0.04)
region: east	-0.01 (0.02)	-0.01 (0.02)	0.10*** (0.04)	0.10*** (0.04)
region: south	0.02 (0.02)	0.02 (0.02)	0.07** (0.04)	0.07* (0.04)
supermarket	-0.09*** (0.02)	-0.09*** (0.02)	-0.09*** (0.02)	-0.09*** (0.02)
(luxury) food store	0.01 (0.02)	-0.00 (0.02)	-0.06** (0.03)	-0.07** (0.03)
retail trade (fashion and shoes)	-0.00 (0.04)	-0.00 (0.03)	-0.07 (0.10)	-0.06 (0.10)
retail trade (non-food, low prices)	-0.02 (0.02)	-0.02 (0.02)	-0.07** (0.03)	-0.07** (0.03)
retail trade (non-food, high prices)	-0.05 (0.05)	-0.04 (0.05)	-0.11 (0.09)	-0.10 (0.09)
furnish, garden, DIY, builder's merchant	0.00 (0.03)	0.01 (0.03)	-0.00 (0.06)	0.00 (0.06)
department store	-0.04 (0.03)	-0.05** (0.02)	-0.04 (0.04)	-0.04 (0.04)
vending machine	-0.01 (0.03)	0.01 (0.02)	0.03 (0.03)	0.02 (0.03)
petrol station	-0.07*** (0.02)	-0.06*** (0.02)	-0.03 (0.06)	-0.04 (0.06)
catering industry	0.12*** (0.02)	0.09*** (0.02)	0.05* (0.03)	0.04 (0.03)
street vendor	0.16*** (0.03)	0.15*** (0.03)	0.08** (0.04)	0.08** (0.04)
recreation, culture and/or amusement	0.14*** (0.04)	0.15*** (0.03)	0.05 (0.05)	0.04 (0.05)
transport	0.04 (0.05)	0.02 (0.04)	0.00 (0.06)	-0.00 (0.06)
service provider	0.16*** (0.03)	0.15*** (0.03)	0.33*** (0.09)	0.31*** (0.09)

Note: The table shows average marginal effects based on probit regressions with robust standard errors in parentheses. Dependent variables are binary dummies indicating whether the respondent overestimates debit card usage. Results in column 1 and 2 are based on regressions that include all transactions whereas the results in column 3 and 4 are based on regressions that include transactions with a value below 5 euro. The reference individual is a female aged between 35 and 45, who earns a middle income, has a medium degree of education and lives in one of the three largest cities of the Netherlands or their metropolitan areas. Coefficients of other explanatory variables are in Table 3. * p < 0.1, ** p < 0.05, *** p < 0.01.

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