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DNB Working Paper

De Nederlandsche Bank
Eurosysteem

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CASH VERSUS DEBIT CARD:

THE ROLE OF BUDGET CONTROL[1]

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Abstract

Due to the financial crisis, an increasing number of households face financial problems. This may lead to an increasing need for monitoring spending and budgets. We demonstrate that both cash and the debit card are perceived as helpful in this respect. We show that, on average, consumers responsible for the financial decision making within a household find the debit card more useful for monitoring their household finances than cash. Individuals differ in major respects, however. In particular, low earners and the liquidity-constrained prefer cash as a monitoring and budgeting tool. Finally, we present evidence that at an aggregated level, such preferences strongly affect consumer payment behaviour. We suggest that the substitution of cash by cards may slow down because of the financial crisis. Also, we show that cash still brings benefits that electronic alternatives have been unable to match. This suggests that inclusion of enhanced budgeting and monitoring features in electronic payment instruments may encourage consumers to use them more frequently.

Key words: payment surveys, cash, debit card, consumer choice, budgeting, financial distress, self-control

JEL codes: C81, D12, D14, E41, G21

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1.   INTRODUCTION

Many studies have sought to gain insight into the drivers and barriers underlying consumers' payment choices at the point of sale – see for example Kosse (2014) for a summary. Overall, consumers' choice between alternative payment instruments has been found to depend on factors such as the amount of the transaction, the availability of payment terminals and financial incentives. In addition, the payments literature suggests that the use of different payment instruments is strongly related to demographic factors, such as age, education and income.

So far, the literature has largely ignored the impact of budget control on consumers' payment choices. Since the start of the financial crisis in 2008, households' financial situation has deteriorated in many European countries, including the Netherlands. In 2013, the purchasing power of the Dutch declined for the fourth consecutive year. The reasons include rising unemployment, downward pressures on wages and pensions and rising taxes and inflation (e.g. CPB, 2013; DNB, 2013). In order to cope with declining purchasing power, households have had to examine their expenses more closely and make cuts where necessary. Traditionally, Dutch households that need to cut down expenses have been advised by consumer organisations like NIBUD (National Institute for Family Finance Information) to record all their payments in order to realise how much they spend and on what expenses they might save. Also, households are traditionally advised to withdraw a fixed amount of cash for their daily expenditures, to prevent spending more than one could afford. However, with the widespread use of payment cards, almost universal access to internet banking and the introduction of mobile banking apps, Dutch consumers can now use their payment cards or mobile phones to monitor their expenditures.

Given the current financial crisis and the many new options offered by the various innovations in retail payment systems, the question arises to what extent modern technology actually helps consumers to balance their budgets. Another, related question is whether consumers' desire to control their budget

affects their choice of payment instrument.[5] As far as we know, the economic literature has paid little attention to these issues. This paper aims to fill that gap by studying consumers' need to control their expenses and budgets in relation to their choice of payment instrument at the point-of-sale (POS). We focus on behaviour at the point of sale and the budgeting role of cash and the debit card, as being by far the most frequently used means of payment in the Netherlands (see Hernandez and Kosse, 2013).[6,7] In this paper, we try to answer the following questions:

1) How highly do consumers value (instant) insight into their daily finances?

2) To what extent are cash and debit cards perceived to be helpful in this respect?

3) To what degree are consumers' payment choices affected by their views on the use of cash and debit cards in exercising budget and expense control?

In 2012 we polled more than 1,700 Dutch consumers about their budget control needs and perceptions. The resulting rich dataset allows us to assess differences across individuals. In particular, this paper aims to answer our main research questions through focusing on differences based on consumers' financial situation and their degree of financial self-control.

Earlier work on self-control and spending (e.g. Fusaro, 2008; Von Kalckreuth et al. 2011) focuses on consumers' need to control remaining budgets and to have insight into the level of earlier expenses made, without accounting for the possible desire to track individual expenses. One of the novelties of

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[5] It turns out that in the UK cash usage rose slightly in 2012, perhaps due to the financial crisis (Payments Council, 2013).

[6] We decided to exclude credit cards from our analysis given that in the Netherlands their use is limited. At the point-of-sale, the Dutch use cash most often, with the widely accepted debit card coming in second place. The prepaid card and credit card follow far behind. In 2012, cash was used almost 3.8 billion times representing a value of EUR 47 billion, debit cards were used almost 2.5 billion times (EUR 84 billion), the prepaid card 148 million times, (EUR 0.3 billion) and the credit card 38 million times, representing EUR 4.5 billion in sales. For estimates on cash usage, see Hernández and Kosse (2013), for card usage see National Forum on the Payment System (2013).

[7] Consumer expenditures include remote and POS expenditures. In the Netherlands, POS payments account for about half of consumers' total consumption. In this paper we focus on POS payments, which are relatively volatile but are also relatively easy to influence by consumers. This may be important for people with financial problems who need to cut down expenses. Remote payments on the other hand consist to a great extent of recurrent fixed expenditures like housing, utilities or taxes, whose total value is less easy to influence in the short run.

our study is that we distinguish between three types of consumer need: (i) the need to gain insight into total expenses, (ii) the desire to keep track of the nature of expenses, and (iii) the need for budget control. This makes for a better understanding of the role of budget and expense control in consumers' payment choices at the point-of-sale.

This paper is structured as follows. Section 2 provides an overview of the literature on budget control with special emphasis on its relation with consumers' choice between different payment instruments at the point-of-sale. In section 3, we formulate the main research questions. Section 4 discusses the set-up of the survey used to collect our data, presents descriptive statistics and briefly describes the econometric models used for the in-depth analyses. Section 5 discusses the estimation results and Section 6 summarises and concludes.

2.   RELATED LITERATURE

There is a wide variety of payment instruments available that consumers and merchants can use to pay for purchases made at various points of sale, such as shops, filling stations or restaurants. Most commonly used are cash, debit cards and credit cards. There is a considerable stream of literature examining the drivers and barriers underlying consumers' choice of what instrument to use.[8] Overall, the choice is found to depend on various factors, such as the size of the transaction, the type of merchant and the acceptance of payment instruments by retailers. In addition, the payments literature reveals an important role for consumers' personal traits and perceptions. Finally, a vast number of papers demonstrate that consumers react strongly to transaction charges and discounts set by retailers, banks or card companies.

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[8] The many relevant references include Arango et al. (2011), Bolt et al. (2010), Borzekowski et al. (2008), Bounie and François (2006), Carbó-Valverde and Liñares Zegarra (2011), Ching and Hayashi (2010), Humphrey et al. (2001), Jonker (2007), Jonker et al. (2012), Kennickell and Kwast (1997), Klee (2008), Kosse (2013), Kosse and Jansen (2013), Mantel (2000), Rysman (2007), Schuh and Stavins (2010), Von Kalckreuth et al. (2009).

Several studies have paid attention to the role of budget and spending control in consumers' use of payment instruments. Overall, these papers touch upon the broader literature on self-control (e.g. Fisher, 1930; Thaler and Shefrin, 1981), which departs from the concept that consumers have simultaneous desires for "immediate spending of income" and for "long-term planning and investment", and therefore need some sort of self-control to prevent overspending. Overall, two distinct self-control mechanisms are proposed: monitoring one's behaviour, such as expense tracking, and setting clear constraints, such as periodic budgets (e.g. Heath and Soll, 1996; Ameriks et al., 2004). Monitoring expenses and managing budgets requires consumers to somehow recall their expenses, which may not always be easy (Srivastava and Raghubir, 2002; Jonker and Kosse, 2013). In particular, consumers tend to forget low-value payments and payments that have occurred less recently. However, technological enhancements have greatly improved the ability to keep up-to-date records of transactions. In particular, the rapid developments in Internet and mobile technology have enabled consumers to access their bank accounts and to check their balances any time any place. Even more advanced tools are conceivable for the future, such as wallets that grow and shrink to reflect the user's account balance (Kestner et al., 2009). Yet to use such technological innovations consumers need to invest money, as in Internet access or smartphones, and time, as in learning to use the new technology (Von Kalckreuth et al., 2009).

Thus payment instruments may be used as spending control and tracking devices.[9] In the case of cash, a quick scan inside the wallet, recalling the initial content and calculating the difference from the remaining content provides an immediate picture of total expenses made. Payment cards provide for a similar memorisation and calculation mechanism, the difference lying in the need to consult a bank statement. The time frame within which this information is made available varies with the technology used, from almost immediate (mobile phone), to a few days/weeks (paper statements). Cash and

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[9] In the standard theory of money and trade, a few papers suggest that, apart from being a store of value, medium of exchange and unit of account, money also serves as a form of memory that helps to keep track of past expenses (e.g. Ostroy, 1973; Lucas, 1980; Kocherlakota and Wallace, 1998; Kocherlakota, 1998; Temzelides and Yu, 2000). These authors fail to take into account, however, that money can be transferred through several different channels, each of which has its own characteristics in terms of providing transparency about past expenses and available funds.

payment cards also differ in their capability of providing information on the nature of expenses made. Cash leaves no trace of the type of purchase made, while card transactions are reported individually in account statements. Third, cash and payment cards differ considerably in the way they allow the user to set pre-defined budgets and to monitor the amount left to spend. With cash one may stick to a predetermined budget by withdrawing the amount of money allowed to be spent during a particular period and paying only in cash. This makes overspending impossible. In addition, the remaining budget can be assessed relatively easily by checking the wallet. The use of a payment card, by contrast, requires spending constraints to be set mentally. The card leaves relatively much freedom to spend more than the pre-set limit if the balance in the account exceeds the pre-defined budget. In addition, in order to assess how much money they have left to spend, consumers need to consult their bank statements, memorise their pre-set budget and make their own calculations.

In fact, some studies present evidence that consumers feel a need to restrain overspending and to track expenses and that this influences their choice of payment instrument. In general, both the theoretical (e.g. Feinberg, 1986; Thaler and Shefrin, 1981; Ameriks et al. 2004; Raghubir and Srivastava, 2008; Prelec and Loewenstein, 1998), and the empirical literature (e.g. Bertaut et al., 2008; Fusaro, 2008; Borzekowski et al., 2008) argue that the desire for budget and spending control drives consumers away from credit cards. With respect to cash and debit card use, however, the literature draws mixed conclusions. Some papers (e.g. Ameriks et al., 2004; Jonker, 2007; Von Kalckreuth et al. 2011; Arango et al., 2011) suggest that consumers prefer cash as a means to restrain overspending and to keep track of expenses. By contrast, Borzekowski et al. (2008) find that that debit cards are also preferred by consumers who want to curb overspending and by those who like to track and monitor their expenses. At the same time, Schuh and Stavins (2010) show an important role of cheques as a book-keeping tool.

In accordance with the traditional self-control literature (e.g. Fisher, 1930), there are various pieces of evidence showing that the need to monitor total spending and budgets differs across consumers. Overall, the desire for monitoring and control is found to be stronger among (i) consumers with a

special financial need to do so, such as people of low income and/or low education, people with

children, or people facing liquidity constraints, and (ii) consumers who have difficulty monitoring

their liquidity, such as people with low commitment power, or those having difficulty remembering

expenses or using enhanced tracking tools (e.g. Thaler, 1985; Bertaut et al., 2008; Borzekowski et al.,

2008; Arango et al., 2011, Von Kalckreuth et al., 2011). Moreover, there is evidence of a U-shaped

relation with age, with the young as well as seniors being more likely to track their expenses well than

middle-aged people (Ameriks et al., 2004). This is mainly explained by the wealth effect, with the

latter group having the weakest financial incentives to keep track of their expenses.

3 RESEARCH QUESTIONS

To sum up, the available literature suggests that consumers may use two distinct mechanisms to

control their spending, i.e. monitoring and budget-setting. Also, it suggests that cash and debit cards –

given their specific characteristics – may each serve as a valuable tool here. The most important

differences between cash and debit cards relate to the effort, time, and technology needed to gain

insight into total past expenses, their ability to provide insight into the type of expenses made, the way

in which a budget can be set and exceeded, and the efforts, time and technologies needed to check

what remains of a set budget (see Table 1 for an overview of the main distinctive features). Finally, the

literature suggests that individual consumers think differently about the usefulness of each payment

instrument as a budgeting tool. In particular, perceptions may differ across two dimensions: (i) the

financial need to control spending, and (ii) the individual effort required to do so, in terms of

commitment power or mental ability.

Given this background, the aim of this paper is to answer the following key research questions:

(I) What value do consumers attach to budget and spending control?

(II) How well do cash and debit cards perform in this respect?

(III) How does this affect consumers' choice between cash and the debit card?

Table 1. Overview of distinctive budgeting features of cash and debit card by self-control mechanism

Self-control mechanism		Cash	Debit card
Behaviour monitoring	*Total amount of expenses*	Immediate (wallet) Needs calculation/memory	Immediate (mobile) or delayed (paper, computer) Needs calculation/memory
	Nature of expenses	Not possible	Immediate (mobile) or delayed (paper, computer) No need for calculation/ memory
Setting clear constraints	*Setting pre-defined budgets*	Physically set Low freedom to exceed	Mentally set High freedom to exceed
	Monitoring pre-defined budget	Immediate (wallet) No need for calculation/ memory	Immediate (mobile) or delayed (paper, computer) Needs calculation/memory

Note: 'Immediate' and 'delayed' refer to the time it takes consumers to gain insight into each budgeting need.

We aim to answer the three key questions while assessing potential differences across individuals. In particular, we focus on the role of consumers' financial situation and their ability to exercise self-control. In doing so, we assume that consumers may have three different needs, i.e. the need to know (i) the total amount of their expenditures (*TOTAL AMOUNT*), (ii) the nature of their expenditures (*NATURE*), and (iii) the amount left to spend (*BUDGET*). Based on this, we will address the following sub-questions:

Q I-a: What value do consumers attach to having insight into TOTAL AMOUNT, NATURE and BUDGET?

We start our analysis by examining consumers' views on the importance of each of the three budgeting needs described above. Following the literature, we expect that the relative value consumers attach to knowing the total amount of their expenses, the nature of their expenses and their remaining budgets for POS payments will vary according to individual characteristics. In particular, we expect to

find an important role for consumers' financial situation and their level of self-control. Hence the next set of questions:

Q I-b: Does individual consumers' financial situation affect the importance they attach to knowing the TOTAL AMOUNT, NATURE and BUDGET?

In answering this question, we use two measures for the financial situation of consumers: gross monthly household income[10] and the perceived sufficiency of that income. According to the literature, the desire for monitoring and control is found to be stronger among consumers who have the highest financial need to do so, such as people with lower levels of income or those facing liquidity constraints. Therefore, we expect to find a negative relationship between consumers' household income and the extent it covers expenditures on the one hand, and the importance attached to have insight into the *TOTAL AMOUNT, NATURE* and *BUDGET* on the other.

Q I-c: Does consumers' degree of self-control affect the importance they attach to knowing the TOTAL AMOUNT, NATURE and BUDGET?

According to the literature, people with low self-control have a stronger need to monitor and control their budget and expenses. We test this theory by using two measures of self-control in financial matters. The first, 'planning', indicates the consumer's self-reported ability to plan his/her expenditures, whereas the second, 'spending', indicates the consumer's self-reported behaviour regarding the way they spend their money after having paid for food, rent and other necessities (i.e. spending versus saving).

Q II-a: In general, do consumers attach equal value to cash and debit cards as tools providing insight into the TOTAL AMOUNT, NATURE and BUDGET?

With respect to *NATURE*, we follow Borzekowski et al. (2008) and expect to find a clear perceived advantage of the debit card over cash, as account statements provide detailed transaction information

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[10] We acknowledge that for the purpose of analysing consumers' views on budgeting and spending issues, it would have been better to consider consumers' net income. Unfortunately, the surveys did not provide insight into the net income of the respondents. Therefore, we use gross income levels.

on every individual debit card purchase. Concerning *TOTAL AMOUNT*, both cash and the debit card are valuable tools, although each has its own characteristics in terms of efforts, delay time and technologies needed (see Table 1). This also holds for BUDGET, where cash and debit cards differ considerably in terms of the way pre-defined budgets for POS payments can be set, exceeded and checked. Again, following the literature, we expect consumers to vary according to their individual traits, and especially according to their financial situation and level of self-control. This leads us to formulate the following sub-questions:

Q II-b: Does consumers' financial situation influence their rating of cash and debit cards as tools providing insight into TOTAL AMOUNT, NATURE and BUDGET?

Based on the conclusions drawn in the literature, we expect low income people and the liquidity-constrained – i.e. the people who have the greatest need to control their spending and budgets – to rate cash above the debit card for providing insight into *TOTAL AMOUNT* and *BUDGET* compared to their counterparts. As summarized in Table 1, using cash allows for an immediate check of the total amount of expenses made at points-of-sale and the current status of the pre-set budget, without the use of additional technology, such as a mobile phone or computer. We expect this feature to be valued particularly highly by low income earners and the liquidity-constrained, as they are more likely to be bound to a fixed budget. As a result, they are more likely to have a strong need to quickly check their past expenditures and the remaining spending possibilities before making a transaction. Also, they are less likely to have the latest (i.e. costly) technologies permitting a current view of their bank balances. Second, we expect low earners and the liquidity-constrained to have the most pressing need to set immutable budgets.[11]

With respect to *NATURE*, we expect an opposite outcome. Based on the literature, we expect low earners and the liquidity-constrained to have a stronger desire to know exactly how they spend their money and hence on what type of expenses they could potentially save. Therefore, we expect them to

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[11] Physically setting a predetermined budget is a mechanism employed by consumers to prevent over-spending. It refers to withdrawing the amount of cash to be spent during a particular period and paying all expenses in cash.

perceive the debit card as more helpful here, since, unlike cash payments, each individual debit card transaction is reported in the account statement of the card holder, allowing for a detailed overview of all individual transactions.

Q II-c: Does consumers' degree of self-control affect their rating of cash and debit cards as tools providing insight into TOTAL AMOUNT, NATURE and BUDGET?

Following the literature as summarised in Section 2, consumers with little self-control in spending may be expected to benefit more from setting clear spending limits than people who are in control. Given the limited opportunity to over-spend on POS payments when on a physical cash budget, and given the ease with which the remaining budget can be assessed by checking one's wallet, people with low self-control rate cash above the debit card as a tool for providing insight into *TOTAL AMOUNT* and *BUDGET*. By contrast, as people with little self-control are found to have a higher need for budget and expense control, we expect them to perceive the debit card as more useful than cash with respect to gaining insight into *NATURE*, on account of the available detailed payment history and budgeting possibilities. Due to its anonymous nature, this is not possible with cash.

Q III: Do consumers' views on the budgeting characteristics of cash and debit cards affect consumers' debit card usage?

This question is intended to examine whether consumers' perceptions regarding the ability of the debit card and cash to meet the three budgeting needs affect their choice of payment instrument at the point of sale. Given the evidence found in the literature that consumers' choice of payment instrument is influenced by the need to budget and control spending, we expect to find a positive relationship between the relative helpfulness of the debit card compared to cash. Also, as the existing literature is silent on this topic, we hope to find out which of the three needs has the greatest impact on consumers' payment choice.

Table 2. Overview of sub-questions and expected outcomes

Sub-question	Personal characteristic	*TOTAL AMOUNT*	*NATURE*	*BUDGET*
Q I-a: How do consumers rate insight into ...?				
Q I-b: Does a consumer's financial situation influence the importance attached to insight into ...?	Household income	-	-	-
	Income suffices to cover expenses	-	-	-
Q I-c: Does the degree of consumers' self-control influence the importance attached to insight into ...?	Ability to plan expenditures	-	-	-
	Spender vs. saver	+	+	+
Q II-a: Do consumers attach the same value to cash as to debit cards for helping them to gain insight into ...?				
Q II-b: Does the consumer's financial situation influence the value attached to cash compared to debit cards for helping them gaining insight into ...?	Household income	-	+	-
	Income suffices to cover expenses	-	+	-
Q II-c: Does the consumer's degree of self-control influence the value attached to cash compared to debit cards for helping them gaining insight into ...?	Ability to plan expenditures	-	+	-
	Spender vs. saver	+	-	+
Q III: Do consumers' views on the helpfulness of cash and debit cards for gaining insight into ..., ... and ... affect consumers' debit card usage?		+	+	+

Note: Signs in the last three columns denote the expected direction of each outcome

4. DATA

4.1 Data collection

In order to obtain a first impression of the degree to which and the reasons why people monitor their budget and expenses, we used some general information on consumers' budgeting habits from the DNB survey on consumers' daily payments at points of sale held in September 2011, see also Jonker and Kosse (2012).

In order to answer the research questions as presented in Section 3 in sufficient depth, we distributed a unique survey among more than 1,700 Dutch consumers in March 2012, the so-called DHS Survey on Budget Control. The respondents were selected from the CentERpanel. This Internet panel, managed by research institute CentERdata, provides an accurate reflection of the Dutch-speaking population.[12] Our survey questions were directed at the panel members aged over 18 who were responsible for the

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[12] For more information about the CentERpanel, see Teppa and Vis (2012).

financial decisions made in their household. As a result, the respondents to the survey may differ from the average consumer in terms of socio-demographics, behaviour and attitudes. In the econometric analyses presented in section 5 we therefore use various control variables to correct for any potential biases of this kind. The questionnaire was answered in full by 1,429 individuals, corresponding to an 81% response rate. In addition, we employ data collected by CentERdata on the financial situation of the household, their income and payment behaviour at the point of sale as well as various psychological characteristics such as the respondent's self-assessed level of self-control.

4.2   **Variables**

Regarding consumers' reasons for wanting to keep abreast of expenses and budgets, the results of the DNB survey on consumers' payments clearly point at different needs. Mentioned most often are: (i) the need to have insight into total expenses (40%), (ii) the need for budget control (35%), and (iii) the need to keep track of the type of expenses (33%), see Table 3. These results confirm our assumptions that these three needs are important, as set out in Section 3, and justify our approach in subsequent analyses.

Table 3. Reasons mentioned for monitoring or not monitoring expenses and budgets

| Reasons to monitor		Reasons not to monitor	
Insight into my total expenses	40%	I won't be able to stick to it	23%
Need for budget control	35%	Too dull to do/Can't be bothered	22%
To keep track of the nature of my expenses	33%	Because my income exceeds my expenses	19%
Insight into total expenses of my household	14%	It takes too much of my time	17%
To ensure that I'm not short of money at the counter	13%	I don't want to know how much I'm spending	11%
To cut down expenses	12%	I don't want to know the nature of my expenses	6%
Optimising interest revenues by transferring excess balance from current account to savings account and vice versa if the balance on the current account is lower than a certain threshold level	12%	Because my partner monitors the expenses	6%
To check for incorrect debit card payments	11%	Too complicated for me	6%
To avoid overdraft	7%	Other	13%
Other	2%		
Number of respondents	7,122		665

Source: DNB survey on daily payments, September 2011

4.2.1   **Dependent variables**

The DHS Survey on budget control included questions about respondents' personal characteristics, their views on the importance of the three above-mentioned needs, about the roles of the various payment instruments in filling those needs and about their use of different POS payment instruments. These latter three sets of questions form the base of the dependent variables that we use in this paper to answer research questions Q1 a to Q III in section 5.

More specifically, we asked the respondents to indicate on a scale from 1 (very minor) to 7 (very high) how much importance they attach to each of the three needs (see Figure 1). Overall, about 90% of the respondents perceive insight into the three needs as important to highly important, whereas less than 3% consider it to be unimportant. On average, the amount left to spend is considered most important (average score 6.3), followed by the total amount of their expenses (average score 6.2) and the nature of their expenditures (average score 6.0). Before modeling our data, we conducted paired mean comparison t-tests to check for the equality of the importance attached by the respondents to each of the three budgeting needs. As expected, the results point to significant differences between the three needs, see Table 1A in the Annex.

Figure 1. Importance attached by respondents to each of the three budgeting needs (1 – 7 scale)
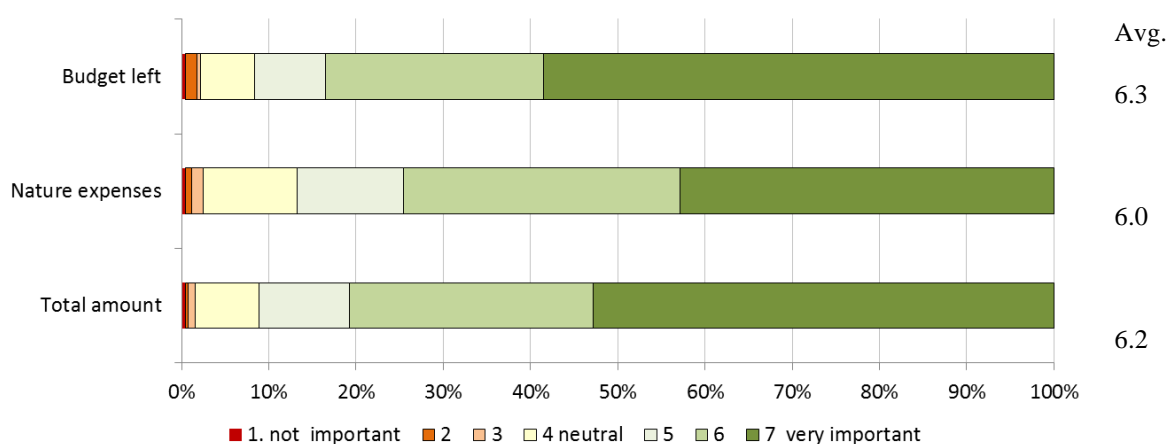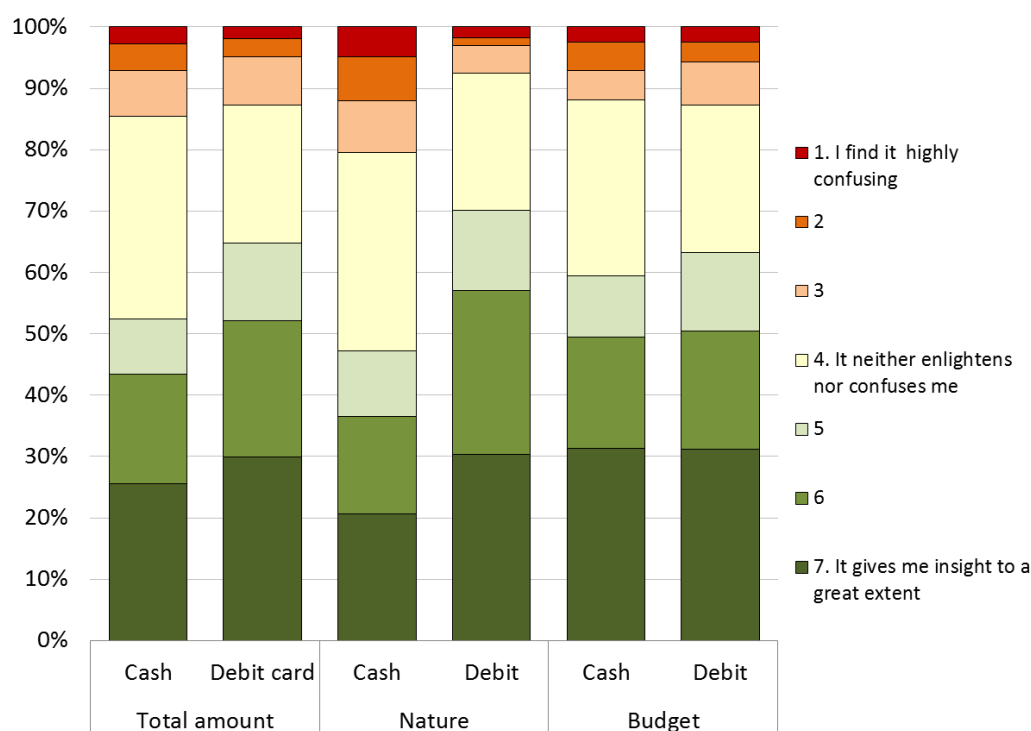

Source: DHS Survey on budget control, March 2012

Subsequently, we asked the respondents to indicate on a scale from 1 (of no importance) to 7 (highly important) to what extent cash and the debit card allow them to fulfill each of these three needs.[13] Figure 2 presents the perceived use of payment methods in fulfilling the three budgeting needs. The results show that debit cards get the highest ratings for all three needs. However, we used paired mean comparison t-tests to test for the equality of the provided ratings, see Table 2A in the Annex. They show that on average, the respondents attach a higher value to debit cards than to cash when it comes to obtaining insight into the total amount of their expenses and into their nature. However, we, do not find any difference in the value attached to cash and debit cards regarding their use for tracking remaining budgets.

Figure 2 Extent to which cash and debit card contribute to fulfil consumers' budgeting needs

Source: DHS Survey on Budget Control, March 2012

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[13] Although in the remainder of this paper we focus on the ratings given by respondents to cash and the debit card, information about credit cards was collected as well. Average ratings for credit cards were 4.66 (Amount), 4.96 (Nature) and 4.45 (Budget).

We constructed the dependent variable *CASHMINUSDEBIT* which measures the relative helpfulness of cash compared to debit card for each of the three needs. This variable can take on any of three values, from 1 to 3.[14] It takes the value of 1 if the consumer perceives cash as less helpful than the debit card, 2 if he/she perceives cash as equally helpful as the debit card and 3 if he/she thinks that cash is more helpful than the debit card.

The DHS Survey on budget control also included questions on general payment habits, for instance about relative debit card use. Respondents could provide a score from 1 (never, very rarely) to 4 (very often). It turns out that 1.5% of the respondents use the debit card never or very rarely to make payments, 13% use it every now and then, 32% use it often and 54% use it very often.

4.2.2 Key explanatory variables

In assessing consumers' attitudes towards monitoring and controlling budgets and expenses, we focus in particular on the influence of individual differences in terms of financial situation and degree of self-control, while controlling for other demographic characteristics.

We use two measures for financial situation, i.e. consumers' gross monthly household income (4 categories) and the extent to which a consumer's monthly household income is sufficient to cover their expenses. For the latter measure, we distinguished five levels, ranging from 1 (very hard to get by) to 5 (very easy to get by). The descriptive statistics show that about 13% of the respondents had difficulties getting by, whereas 47% indicated no problems. The remaining 40% found it neither hard nor easy to make ends meet.

With respect to consumers' degree of self-control in financial matters, we also employ two different measures. The first one, called 'planning', indicates the consumers' self-reported ability to control

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[14] In an earlier version we used the difference between consumers' rating for cash and the debit card as a measure for the relative helpfulness of cash compared to the debit card. However, this variable could take on 13 values, some of which had zero or only a few observations. Therefore, we decided to simplify the dependent variable and to distinguish between three categories only. The regression results as presented in section 5.2 were robust to this change in specification.

their expenditures, ranging from 1 (very easy to control) to 7 (very hard to control). The average score equalled 2.7, implying that on average the respondents felt fairly in control. The second measure, 'spending', is derived from the question asking about what consumers normally do with the money they have left after having paid for food, rent and other necessities. Here we distinguish between seven levels, ranging from 1 (I like to spend any remaining budget immediately after covering basic expenses) to 7 (I try to save as much as possible). The average answer score turned out to be 5.1, indicating that on average there is a tendency to save. Less than 10% of respondents reported spending all their budget surpluses.

4.3   **Empirical methodology**

In order to answer the research questions set out in Section 3, we use the ordered probit approach. We estimate several models, where the dependent variables can take on a limited number of positive integer values according to a clear, natural ordering. Multivariate modeling is especially informative as it allows the joint estimation of the effects of different explanatory variables on the dependent variable under consideration. In addition, ordered probit models capture qualitative differences between the levels of the dependent variable. We estimated both the coefficients and marginal effects of the explanatory variables. However, for the reasons of simplicity and clarity, we only present the coefficients in Tables 4–6. The marginal effects are available upon request [15]

The analysis is split up into three parts, each one focusing on one of the paper's key questions (see Section 3). In the first step, we assess the importance attached by consumers to each of the three budgeting needs (*n*), with $IMPORTANCE_n$ being the dependent variable having a value of 1 (very minor) to 7 (very high).

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[15] The marginal effects of the independent variables have been calculated in terms of the average marginal effect for the respondents in the sample (not as the mean value of the explanatory variables). They are evaluated relative to the corresponding explanatory variable that acted as reference variable.

In the second step, we examine which of the two means of payment are perceived to be most helpful in fulfilling the three needs. We use the variable CASHMINUSDEBIT as described in Section 4.2.1. as the dependent variable.

In both steps, we follow the literature and use a rich set of explanatory variables. We use various consumer characteristics, such as the person's gender, age, marital status, education and urbanisation degree. In addition, we use indicators reflecting the respondent's financial situation and level of self-control. As described above, we use gross monthly household income and the ease with which consumers are able to get by as a measure of consumers' financial situation, and 'spending' and 'planning' as indicators of consumers' degree of self-control.

As a third and final step, we assess the impact of consumers' desire for budget- and expenditure control on the use of debit cards. The dependent variable is $DEBITUSE_n$ taking on a value of 1 (never, rarely) to 4 (very often). In addition to the standard demographic variables, we use the respondents' relative assessment of the usefulness of the debit card compared to cash with respect to providing insight in each of three budgeting needs (n). For each budgeting need we constructed two dummy variables. The first is equal to one if the respondent perceives cash as more helpful than the debit card for that particular need and the second dummy is equal to one if the respondent thinks the opposite, i.e. the debit card is more helpful than cash. So in total, there are six dummies related to the relative helpfulness of cash compared to the debit card.

5.   RESULTS

5.1.   **Value attached by consumers' to monitoring their budget and expenses**

Note that the estimation results refer to a specific group of respondents, i.e. the financial decision makers within households aged over 18 years. Therefore, in order to correct for the personal characteristics of this group, we estimated several ordered probit models to further assess consumers' views on the importance of each of these three needs. The estimated coefficients are presented in Table 4–6 and discussed in the following subsections.

5.1.1. **Effect of financial situation**

Table 4 shows that both indicators of consumers' financial situation have a significant impact on their budgeting needs. As expected and in line with the economic literature, consumers with liquidity constraints tend to attach a higher value to all three budgeting needs under study than their counterparts. Those who find it harder to get by every month are significantly more likely to attach a higher value to tracking the total amount and the nature of their expenses, and their budget left to spend.[16] The average marginal effects indicate that this probability increases by 8, 7.5 and 12.3 percentage points for the respective budgeting needs. The results also show that household income has a significant negative effect on the importance attached to total expenditure monitoring. In terms of magnitude, the likelihood of attaching high importance to total expenditure monitoring decreases by 10 percentage points when household income is high (relative to the 'very low income' reference category).

5.1.2. **Effect of self-control**

The results also show a significant effect of our two measures of self-control on the value consumers attach to the three budgeting needs. However, not in all cases are these effects as expected. Consumers finding it easy to plan their expenditures are more likely to attach higher value to each need – total amount of expenses, nature of expenses and budget left to spend – while those reporting difficulties in planning their expenses appear to attach higher value only to knowing the nature of their expenses. Also, we find a contrary effect between those reporting to save their budget surpluses (i.e. "savers") and those who prefer to spend them (i.e. "spenders"). The former are significantly more likely to attach higher value to monitoring the amount and nature of their expenses than the latter. Summarizing, the results indicate that people with high rather than low self-control in spending attach relatively high value to tracking their budget and expenses.

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[16] We are aware of possible causality problems between consumers' ability to get by every month and their views about the importance of controlling expenses and budgets. That is, those attaching higher importance to budget and expenditure control might – as a result – find it less difficult to get by. In order to check for the presence of any endogeneity biases, we have re-run all regressions related to the first and second research question excluding dummy variables indicating whether the consumer's monthly household income is sufficient to cover expenses. The results do not show substantial changes to our conclusion on consumers' level of self-control.

Table 4. Importance attached by consumers to each budgeting need

Estimated coefficients of consumers' characteristics. Standard errors are in parentheses

Variables	Total amount of expenses	Nature of expenses	Budget left to spend
Male	-0.144**	-0.335***	-0.319***
	(0.072)	(0.072)	(0.076)
Married	0.212**	0.156*	0.067
	(0.086)	(0.086)	(0.091)
Age: 35-44	-0.239	-0.127	-0.497***
	(0.157)	(0.149)	(0.166)
Age: 45-54	-0.186	0.112	-0.378**
	(0.154)	(0.149)	(0.165)
Age: 55-64	-0.060	0.176	-0.280*
	(0.153)	(0.149)	(0.165)
Age: 65+	0.215	0.536***	-0.045
	(0.153)	(0.148)	(0.165)
Income low	-0.079	-0.013	0.096
	(0.150)	(0.147)	(0.168)
Income medium	-0.088	-0.015	-0.008
	(0.142)	(0.142)	(0.165)
Income high	-0.264*	-0.134	-0.12
	(0.147)	(0.147)	(0.167)
Primary education	0.19	0.286	0.358
	(0.232)	(0.237)	(0.250)
Vocational education	0.041	0.012	0.193*
	(0.098)	(0.093)	(0.102)
College	-0.001	-0.073	-0.002
	(0.088)	(0.086)	(0.090)
University	-0.081	-0.162	-0.066
	(0.104)	(0.103)	(0.108)
Urbanization degree: (very) urban	0.078	0.052	0.231*
	(0.121)	(0.117)	(0.126)
Urbanization degree: high	-0.019	0.03	-0.014
	(0.099)	(0.096)	(0.100)
Urbanization degree: slightly urban	-0.099	-0.065	-0.056
	(0.101)	(0.095)	(0.103)
Urbanization degree: Rural	0.052	0.075	-0.052
	(0.103)	(0.106)	(0.104)
Ability to plan expenditures: very high	0.268***	0.190**	0.200**
	(0.078)	(0.076)	(0.081)
Ability to plan expenditures: very low	0.203	0.477***	0.235
	(0.155)	(0.181)	(0.203)
Spending behaviour: Spender	-0.169	-0.408***	-0.051
	(0.152)	(0.158)	(0.158)
Spending behaviour: Saver	0.211***	0.284***	0.111
	(0.075)	(0.073)	(0.076)
(Very) Difficult to get by	0.222*	0.204*	0.349***
	(0.118)	(0.109)	(0.125)
Easy to get by	0.121	0.101	-0.031
	(0.082)	(0.082)	(0.086)
Very easy to get by	-0.115	-0.023	-0.287**
	(0.135)	(0.131)	(0.139)
No. of observations	1220	1216	1215
Log likelihood	-1408	-1545	-1328
Pseudo R-squared	0.033	0.047	0.039

* p<0.1, ** p<0.05, *** p<0.01

*, ** and *** denote significance levels of 10, 5 and 1 per cent, respectively.

Reference characteristics are: female, unmarried, age below 34, income very low, secondary education, urbanization degree: intermediate, neither saver nor spender, intermediate ability to plan spending, neither hard nor easy to get by. The direction and statistical significance of the marginal effects are in line with the results presented in table 4, and are available upon request.

5.1.3.   **Demographic characteristics**

The findings presented above prove to be robust to the inclusion of various demographic characteristics, such as gender, marital status, age and, to a lower extent, education. Overall, females are significantly more likely than men to attach relatively high value to each of the three budgeting needs under analysis. This holds especially for the need to know the nature of expenses and the budget left to spend, where the likelihood of attaching greater importance is 12 percentage points higher for women than for men. Also, persons aged over 65 and those who are married turn out to find it more important than the rest to monitor their spending. The marginal effects indicate that the probability of attaching greater importance increases by up to 20 percentage points for those in the higher age group compared to people below 34 (reference group) when seeking insight into the nature of their expenses, while married people are more likely to attach higher importance to having insight into the amount (+ 8 percentage points) and nature of their expenses (+ 6 percentage points) than singles. Finally, although the effect of education is only significant for those with vocational training, the direction of the results show that the perceived importance of controlling budgets decreases with a person's level of education. This may be related to the negative effect of income which was mentioned before, but may also hint at a potential role of mental ability as discussed by Von Kalckreuth et al. (2009).

5.2.   **Role of cash and debit cards in fulfilling budgeting needs**

In order to compare consumers' opinions on the relative usefulness of cash compared to the debit card in fulfilling their budgeting needs, we constructed the dependent variable CASHMINUSDEBIT which takes the value of 1 if the respondent perceives cash as less helpful than debit cards, 2 if he/she perceives cash as equally helpful as the debit card and 3 if he/she thinks that cash is more helpful than the debit card. We estimated an ordered probit model for each budgeting need. The results are presented in Table 5 and discussed in the following subsections.

Table 5. Degree to which cash is perceived to be more useful than the debit card for each budgeting need

Estimated coefficients of consumers' characteristics. Standard errors are between parentheses

Variables	Total amount of expenses	Nature of expenses	Budget left to spend
Male	-0.280***	-0.276***	-0.204***
	(0.070)	(0.072)	(0.070)
Married	0.023	0.046	0.125
	(0.086)	(0.088)	(0.082)
Age: 35-44	0.370**	0.16	0.233
	(0.187)	(0.178)	(0.179)
Age: 45-54	0.480***	0.316*	0.422**
	(0.177)	(0.174)	(0.174)
Age: 55-64	0.446**	0.322*	0.265
	(0.174)	(0.169)	(0.170)
Age: 65+	0.281	0.233	0.000
	(0.173)	(0.170)	(0.169)
Income low	0.126	0.122	0.423***
	(0.131)	(0.135)	(0.138)
Income medium	0.102	-0.029	0.352***
	(0.135)	(0.137)	(0.136)
Income high	-0.11	-0.17	0.106
	(0.142)	(0.145)	(0.145)
Primary education	0.016	-0.067	-0.285
	(0.178)	(0.184)	(0.182)
Vocational education	-0.086	0.02	-0.208**
	(0.088)	(0.089)	(0.089)
College	-0.143	-0.193**	-0.153*
	(0.093)	(0.094)	(0.092)
University	-0.349***	-0.370***	-0.162
	(0.114)	(0.117)	(0.111)
Urbanization degree: (very) urban	0.248**	0.185	0.182
	(0.116)	(0.118)	(0.112)
Urbanization degree: high	0.063	-0.014	0.013
	(0.096)	(0.094)	(0.096)
Urbanization degree: slightly urban	0.167	0.198*	0.196*
	(0.104)	(0.105)	(0.104)
Urbanization degree: Rural	0.207*	0.161	0.134
	(0.108)	(0.110)	(0.106)
Ability to plan expenditures: very high	-0.066	0.003	-0.074
	(0.083)	(0.084)	(0.083)
Ability to plan expenditures: very low	-0.035	0.193	-0.086
	(0.206)	(0.194)	(0.168)
Spending behaviour: Spender	-0.107	-0.002	-0.072
	(0.171)	(0.171)	(0.156)
Spending behaviour: Saver	0.007	0.098	0.144*
	(0.072)	(0.075)	(0.074)
(Very) Difficult to get by	0.235**	0.240**	0.209*
	(0.116)	(0.113)	(0.110)
Easy to get by	-0.071	-0.037	-0.054
	(0.081)	(0.083)	(0.082)
Very easy to get by	-0.084	-0.005	-0.038
	(0.125)	(0.130)	(0.115)
No. of observations	1178	1178	1189
Log likelihood	-1220	-1149	-1215
Pseudo R-squared	0.039	0.040	0.033

* p<0.1, ** p<0.05, *** p<0.01

Standard errors in parentheses, *, ** and *** denote significance at 10, 5 and 1 per cent respectively.
Reference characteristics are: female, unmarried, age below 34, income very low, secondary education, urbanization degree: intermediate, neither saver nor spender, intermediate ability to control spending, neither hard nor easy to get by.
The direction and statistical significance of the marginal effects are in line with the results presented in Table 5 and are available upon request.

5.2.1   Effect of financial situation

The estimation results show ample evidence that consumers' financial situation affects their perceptions on the usefulness of cash and the debit card as budgeting tools. First, we find a significant effect for income. Consumers with relatively low incomes are more likely than others to perceive cash as more useful than debit cards. Second, our findings show that consumers reporting difficulty in getting by every month tend to find cash more useful than debit cards for budgeting purposes. Compared to the reference group, the probability that budget-constrained people find cash more helpful is 7 percentage points higher where insight into amount expenses and budget is concerned and 6 percentage points higher for monitoring the nature of expenses. This effect is significantly different from zero at the five percent level for two of the three budgeting needs, i.e. monitoring the total amount and the nature of expenses.

5.2.2   Effect of self-control

The findings for the influence of self-control in spending are not in line with our expectations as presented and discussed in section 3. We do not find any evidence that people with low self-control attach relatively high value to cash compared to the debit card as a tool for monitoring the total amount spent and the budget left to spend, nor do we find any evidence supporting our expectation that they attach relatively high value to the debit card for monitoring the nature of their expenses. We find some mild evidence that people who differ in spending behaviour also differ in perception as to which payment instrument is most useful; people with a tendency to save ('savers') indicate that they perceive cash as more useful than debit cards in meeting their budgeting needs. The marginal effects show that they are 4.4 percentage points more likely than people in the reference group (neither 'saver' nor 'spender') to perceive cash as more useful for providing insight into the budget left to spend. This result is significant at the 10 percent level of significance. In line with the literature (e.g. Heath and Soll, 1996; Ameriks et al., 2004), these findings show that people who decide to set clear budget limits prefer to use cash as a mechanism to control and monitor their expenses.

5.2.3 Demographic characteristics

The estimation results show that consumers differ significantly as to how useful cash and debit cards are as budgeting tools. Overall, men are significantly less likely than women to perceive cash as more useful than the debit card, irrespective of the budgeting need. Also, the higher educated are more likely to prefer the debit card. Respondents with university and college education prefer the debit card for the insight it provides into the total value and nature of their expenses, while those with vocational education perceive debit cards to be the more useful when tracking their budget left to spend. By contrast, cash turns out to be appreciated most by people from age 35. There appears to be no big difference between consumers living in highly urbanised areas and those living in less urban areas (reference group).

5.3 Perception vs. usage: consumers' payment choice

Table 6 presents the results to our final question regarding debit card use, i.e. whether the relative use of the debit card by consumers reflects their views on the usefulness of cash and the debit card for budgeting and monitoring purposes. The results clearly indicate that it does. The first three columns show the results for each pair of preference indicators for a specific budgeting need. All the indicators have the expected sign and are significantly different from zero at the 1 percent level. The last column shows the estimation results when we include all six preference indicators together as explanatory variables.

The results clearly indicate that consumers do have a stronger preference for using the payment instrument they believe is providing them the best tool for monitoring their expenses and budget. In every model specification, the two indicators reflecting consumers' preference for either cash or the debit card have a significant corresponding effect on debit card usage.[17] Of all three budgeting needs,

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[17] Marginal effects show that consumers who prefer cash to the debit card as a monitoring tool are significantly less likely to use their debit card. The results indicate that these consumers are 20 percentage points less likely to be frequent debit card users than those who find cash as helpful as the debit card. This estimated effect holds for both reasons to need insight into the total amount and nature of expenses. Those who prefer cash as a budget

Table 6. Impact of perceived usefulness on the use of debit cards

Estimated coefficients of consumers' characteristics. Standard errors are between parentheses

Variables	(1)	(2)	(3)	(4)
Male	-0.142*	-0.115	-0.097	-0.166**
	(0.076)	(0.075)	(0.074)	(0.077)
Married	-0.016	-0.032	-0.02	-0.026
	(0.088)	(0.090)	(0.089)	(0.091)
Age: 35-44	0.203	0.166	0.159	0.22
	(0.162)	(0.167)	(0.167)	(0.166)
Age: 45-54	-0.006	-0.007	-0.005	0.06
	(0.159)	(0.164)	(0.165)	(0.163)
Age: 55-64	-0.006	0.012	-0.011	0.057
	(0.156)	(0.162)	(0.162)	(0.160)
Age: 65+	-0.243	-0.197	-0.271*	-0.201
	(0.150)	(0.156)	(0.156)	(0.154)
Income low	0.125	0.145	0.214	0.212
	(0.143)	(0.142)	(0.142)	(0.144)
Income medium	0.433***	0.434***	0.486***	0.485***
	(0.147)	(0.147)	(0.148)	(0.149)
Income high	0.497***	0.532***	0.576***	0.561***
	(0.151)	(0.152)	(0.151)	(0.152)
Primary education	-0.390**	-0.355*	-0.468**	-0.480**
	(0.195)	(0.196)	(0.203)	(0.198)
Vocational education	-0.173*	-0.143	-0.193**	-0.186*
	(0.093)	(0.093)	(0.094)	(0.095)
College	-0.056	-0.058	-0.06	-0.082
	(0.093)	(0.093)	(0.093)	(0.094)
University	0.109	0.172	0.209*	0.148
	(0.119)	(0.119)	(0.121)	(0.123)
Urbanization degree: (very) urban	-0.006	-0.039	-0.055	0.007
	(0.117)	(0.117)	(0.115)	(0.118)
Urbanization degree: high	0.077	0.033	0.049	0.059
	(0.101)	(0.101)	(0.102)	(0.103)
Urbanization degree: slightly urban	0.065	0.041	0.043	0.078
	(0.106)	(0.105)	(0.106)	(0.108)
Urbanization degree: Rural	0.04	-0.005	-0.006	0.036
	(0.112)	(0.111)	(0.112)	(0.114)
Perception dummy: cash (Amount)	-0.550***			-0.317***
	(0.086)			(0.108)
Perception dummy: debit (Amount)	0.359***			0.306***
	(0.083)			(0.110)
Perception dummy: cash (Nature)		-0.533***		-0.263**
		(0.097)		(0.121)
Perception dummy: debit (Nature)		0.243***		-0.031
		(0.077)		(0.102)
Perception dummy: cash (Budget)			-0.416***	-0.127
			(0.084)	(0.099)
Perception dummy: debit (Budget)			0.343***	0.182*
			(0.085)	(0.107)
No. of observations	1193	1183	1182	1165
Log likelihood	-1131	-1141	-1135	-1096
Pseudo R-squared	0.068	0.053	0.055	0.073

* p<0.1, ** p<0.05, *** p<0.01

*, ** and *** denote significance levels at 10, 5 and 1 percent respectively.

Reference characteristics are: male, unmarried, age below 34, income very low, secondary education, urbanization degree: intermediate. Columns 1 to 3 present the results including dummy variables capturing consumers' perceived usefulness to having insight into each budgeting need: Total amount, Nature and Budget respectively. The last column includes results with all three perception dummies. The direction and statistical significance of the marginal effects are in line with the results presented in Table 6 and are available upon request.

tracking tool are 15 percentage points less likely to be frequent card users. The estimated effects are statistically significant at the 1 percent level.

debit card usage turns out to be mainly driven by the need to track the total amount of expenses. The results also confirm our findings in Table 1 that consumers regard these needs as non-identical. In accordance with the payments literature, the results also point to a significant effect of various demographic characteristics such as gender, education and income on debit card use. In general, men tend to pay cash relatively often. In contrast, debit card usage increases with income and level of education.

6. SUMMARY AND CONCLUDING REMARKS

The current financial crisis has faced increasing numbers of households with financial problems. Understanding how consumers are coping and the effect this has had on their financial behaviour has therefore become increasingly important since the outbreak of the crisis. This study examines how consumers value keeping track of their budget and spending, to what extent they find cash or the debit card more useful as budgeting instruments, and whether this preference affects their payment behaviour. We pay special attention to consumers' financial situation and their degree of self-control in financial matters. To the extent of our knowledge, we are the first to do so. We also add to the literature in that we distinguish between three different forms of budget monitoring: (i) obtaining insight into the total amount spent, (ii) monitoring the nature of expenses, and (iii) tracking the amount left to spend. In our analyses we focus on consumers' budgeting behaviour at the POS including the respective roles of cash and debit cards. For our empirical analysis, we use information from a one-off consumer survey held in March 2012 among 1,700 respondents.

Our results indicate that the need for budget control among the Dutch is high. More than 90% of our respondents indicate a need to keep abreast of their budget and spending. They consider it most important to be aware of the amount left to spend, followed by the total amount and the nature of past expenses. The results also indicate that they regard these needs as different, which supports our choice to assess them separately.

Regarding the influence of consumers' financial situation, we present evidence that people who are struggling to make ends meet indeed have a higher need for keeping track of their expenses as well as their budget. We also find that respondents in the highest income class attach significantly less value to having insight into the level of their spending than others. However, we find little evidence that people with low self-control attach higher than average value to keeping track of their spending and budget. We only find that typical 'spenders' tend to value insight into the nature of their expenses more than do 'savers'. On the contrary, the results mainly show that people with a high degree of self-control attach a relatively high value to having insight into their spending and budget. These results are robust to the inclusion of other personal characteristics such as gender, age and education.

Second, our results reveal that, on average, our respondents rate the debit card above cash for providing insight into total spending and the nature of their expenses. Yet, both payment instruments are perceived as equally useful for checking the amount left to spend. Although overall, the debit card is regarded as the better expense monitoring tool, we find that the most vulnerable consumer segments (e.g. those with low incomes or financial difficulties) consider cash to be more useful.

Finally, we show evidence that budget control plays a significant role in consumers' choice between payment instruments at the point-of-sale. Our results demonstrate that consumers are inclined to pay with the instrument they perceive to be most effective in tracking their budget and monitoring their expenses. This effect is strongest for the device people find most useful in tracking total spending.

In sum, our results suggest that the ongoing substitution of cash by cards may potentially slow down during a financial crisis, as the number of households with financial problems rises. Such a change in behaviour has already been detected in the United Kingdom. The latest findings by the British Retail Consortium (2012) and the UK Payments Council (2013) show an increase in cash usage in the UK between 2011 and 2012. In particular, the British Retail Consortium found that households facing financial problems began to use cash more often whereas their total spending declined. Our results show that due to the deterioration of consumers' financial situation, the need for monitoring the

amount of money left to spend on a day-to-day basis has grown, for which purpose cash is considered to be most useful.

Similarly, our findings show that for particular groups of consumers, cash brings benefits that the current electronic payment instruments have not yet succeeded to provide. As electronic payment instruments are generally found to be less costly for society than cash (see e.g. Jonker 2013, or Schmiedel et al., 2013 and references therein), potential cost savings could be realised if the use of electronic payment instruments were to increase further. Here, our results suggest an important role for product innovation. The fact that cash is still preferred by certain consumer segments for its ability to provide immediate and accurate information on, in particular, the remaining budget left to spend, the use of electronic payment instruments may potentially be encouraged further if they included enhanced budgeting and monitoring features.

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Table 1A. Paired t-test: Consumers' rating of budgeting needs

Variable	Mean	P-value
Total amount	6.238	Ha: mean(diff) != 0
Nature	6.016	Pr(T > t) = 0.0000
diff	0.222	
Total amount	6.236	Ha: mean(diff) != 0
Budget	6.296	Pr(T > t) = 0.0499
diff	-0.060	
Nature	6.014	Ha: mean(diff) != 0
Budget	6.296	Pr(T > t) = 0.0000
diff	-0.282	

Table 2A. Paired t-test: Consumers' rating per instrument

Variable	Mean	P-value
Total amount (cash)	4.966	Ha: mean(diff) != 0
Total amount (debit)	5.270	Pr(T > t) = 0.0000
diff	-0.305	
Nature (cash)	4.665	Ha: mean(diff) != 0
Nature (debit)	5.451	Pr(T > t) = 0.0000
diff	-0.785	
Budget (cash)	5.181	Ha: mean(diff) != 0
Budget (debit)	5.239	Pr(T > t) = 0.3194
diff	-0.058	

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