

CASH VERSUS DEBIT CARD: THE ROLE OF BUDGET CONTROL¹

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Abstract

Due to the financial crisis, an increasing number of households faces 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 to be helpful in this respect. We show that on average consumers who are responsible for the financial decision making within a household consider the debit card to be more useful for monitoring the total value and nature of their expenses than cash. There are however important differences across individuals. In particular, low income people and the liquidity-constrained attach the greatest value to cash as a monitoring and budgeting tool. Finally, we present evidence that these preferences strongly affect consumers' payment behaviour at an aggregated level. We herewith 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 current electronic counterparts have not yet succeeded to provide. This suggests that consumers may be encouraged to use electronic payment instruments more frequently by incorporating enhanced budgeting and monitoring features.

Key words: payment surveys, payment choice, budgeting

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1. INTRODUCTION

Many studies have been conducted to gain an insight into the drivers and barriers underlying consumers' payment choices (see for example Kosse and Jansen (2013) for a synopsis). Overall, consumers' choice between payment instruments is found to depend on various 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 various payment instruments is strongly related to demographic factors, such as age, education and income.

Until now, the literature has paid little attention to the role of budget control in consumers' payment choice. Since the start of the financial crisis in 2008, the financial situation of households in many European countries has worsened. This is also the case for many Dutch households. In 2013, their purchasing power declined for the fourth consecutive year. There are several reasons for this, such as rising unemployment, wages and pensions being under pressure and rising taxes and inflation (e.g. CPB, 2013, DNB, 2013). In order to cope with their lower purchasing power, the need of households to examine their expenses more closely and cut them where necessary seems to have increased. Traditionally, Dutch households that need to cut down expenses are advised by consumer organisations like NIBUD (National Institute for Family Finance Information) to record all of their payments in order to gain insight into how much they spend and into what expenses they could possibly save. Also, households are traditionally advised to withdraw a fixed amount of cash for their daily expenditures, just to make sure that they are not able to spend more than they can afford. However, with the widespread use of payment cards, as well as the almost universal access to internet banking, and the introduction of mobile banking apps, consumers can now also use their payment cards or mobile phones to examine their expenditures and to make sure they do not outspend their budget.

Given the current financial crisis and the new opportunities offered by the various innovations in retail payments, the question arises to what extent these new ways of paying indeed help consumers to gain insight into their budgets and expenditures. Another related question is whether consumers' desire to

control budgets affects their choice of payment instrument.⁵ As far as we know the economic literature has given little attention to these issues. Therefore, this paper aims to fill this gap, by studying consumers' needs for controlling their expenses and budgets in relation to their choices between payment instruments at the point-of-sale (POS). We focus on the role of cash and the debit card, as these instruments are by far the most frequently used means of payment in the Netherlands (see Hernandez and Kosse, 2013).⁶ In this paper, we try to answer the following questions:

- 1) What value do consumers attach to having insight into their budgets and spending?
- 2) To what extent are cash and debit cards perceived to be helpful in this respect?
- 3) To what degree do consumers' views on the benefits of cash and debit cards in terms of budget and expense control affect their payment choices?

In 2012 we drew up and distributed a questionnaire among more than 1,700 Dutch consumers to collect unique and detailed information about their needs for and views on monitoring and controlling budgets and expenses. This rich dataset allows us to assess differences across individuals. In particular, this paper aims at answering the main research questions while focusing on differences based on consumers' financial situation and their degree of self-control in financial matters.

Earlier work on self-control and spending (e.g. Fusaro, 2008; Von Kalckreuth et al. 2011) focuses on consumers' need for controlling remaining budgets and the level of past expenses, without accounting for the potential desire for tracking individual expenses. One of the novelties of our study is that we distinguish between three types of consumer needs: (i) the need to have an insight into the total value of expenses, (ii) the desire to keep track of the nature of expenses, and (iii) the need for budget control.

⁵ It turns out that in the UK cash usage slightly rose in 2012, which might be 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 mainly use cash, followed by the debit card which is widely accepted. This is not the case for the prepaid card and the credit card. In 2012, cash was used almost 3.8 billion times representing a value of EUR 47 billion, the debit card was used almost 2.5 billion times and represented EUR 84 billion on sales, the prepaid card 148 million times, representing EUR 0.3 billion and the credit card 38 million times, representing EUR 4.5 billion on sales. For estimates on cash usage, see Hernández and Kosse (2013), for card usage see National Forum on the Payment System (2013).

By doing so, we allow for a better understanding of the role of budget and expense control in consumers' payment choices at the POS.

This paper is structured as follows. Section 2 provides an overview of the literature on budget control with a special emphasis on its relation with consumers' choice between different payment instruments at the POS. In section 3, we formulate the main research questions. Section 4 then discusses the set-up of the survey used for collecting 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 for payment of purchases made at various points of sale, such as shops, petrol stations and restaurants. Most common 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.⁷ Overall, consumers' 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 points out an important role of consumers' characteristics, as well as of their perceptions. Finally, a vast amount of papers demonstrates that consumers react strongly to transaction charges and discounts imposed by retailers, banks or card companies.

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 more broader literature on self-control (e.g. Fisher, 1930; Thaler and Shefrin, 1981), which departs from the concept that consumers have a simultaneous desire for both "immediate spending of income" and "long-term planning and

⁷ 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 (2010), Kosse and Jansen (2013), Mantel (2000), Rysman (2007), Schuh and Stavins (2010), Von Kalckreuth et al. (2009).

investment”, and therefore need some sort of self-control to prevent overspending. Overall, two distinct self-control mechanisms are proposed: (i) monitoring behaviour, such as tracking expenses, and (ii) setting clear constraints, such as periodical 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 be easy (Srivastava and Raghurir, 2002; Jonker and Kosse, 2013). Especially, consumers tend to forget small value payments and payments that have occurred less recently. However, technological enhancements have greatly increased the ability to keep up-to-date records of transactions. In particular, the rapid developments in the area of internet and mobile phones have enabled consumers to access their bank account and to check their balances at any time and 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, using these special techniques requires investment costs, for instance, for internet access or appropriate mobile phones, as well as learning costs of getting acquainted to the new technology and facilities (Von Kalckreuth et al., 2009).

In light of this, payment instruments may be used as a spending and tracking control measure.⁸ In case of cash, a quick scan in the wallet, memorising the initial content and calculating the difference with the remaining content would provide an immediate picture of the total value of expenses made. A similar memorisation and calculation needs to be made when paying by a payment card. However, before doing so, consumers need to consult their bank statements. The time within which this information is available depends on the technology used (immediate via mobile, when being at home via the computer, or after a few days/weeks when receiving paper statements). Cash and payment cards also differ in their capability of providing information on the nature of expenses made. When paying in cash, no traces are left of the type of purchases made, while card transactions are individually reported in account statements. Third, cash and payment cards considerably differ in the way they allow for setting pre-defined budgets and monitoring the amount left to spend. Cash allows

⁸ 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). They do, however, not take into account that money can be transferred through different payment instruments, each of which having its own characteristics in terms of transparency provided about past expenses and available funds.

for physically setting a predetermined budget by withdrawing the amount of money allowed to spend during a particular period and by only paying in cash. In this way, there is no opportunity to (unintentionally) over-spend. In addition, the remaining budget can relatively easily be assessed by checking the wallet. By contrast, when paying by payment card, spending constraints will need to be set mentally. This implies that there is relatively high freedom to spend more than the pre-set limit in case the balances on the account exceed the pre-defined budgets. In addition, in order to assess how much money is still left to spend, consumers need to consult their bank statements, memorise their pre-set budget and make their own calculations.

There are a number of studies that indeed present evidence that consumers feel a need for restraining overspending and tracking expenses and that this influences their choice of payment instruments. In general, both the theoretical (e.g. Feinberg, 1986; Thaler and Shefrin, 1981; Ameriks et al. 2004; Raghurir 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 usage, the literature, however, provides 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 for restraining overspending and for keeping insight into their volume of spending. By contrast, Borzekowski et al. (2008) find that consumers who want to limit overspending rather pay by debit card, and that debit cards are also preferred by those who like to track and monitor their expenses. At the same time, Schuh and Stavins (2010) show an important role of cheques on the aspect of record keeping.

In accordance with the traditional self-control literature (e.g. Fisher, 1930), there are various pieces of evidence showing that the need for monitoring total spending and budgets differs across consumers. Overall, the desire for monitoring and control is found to be stronger among (i) consumers who have the highest financial need to do so, such as people with lower levels of income or education, people having children, or those having liquidity constraints, and (ii) consumers who have more difficulty

with monitoring their liquidity, such as people with low commitment power, or those being less capable of remembering expenses and 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 the retired being more likely to track their expenses well as opposed to people in the middle years of their life (Ameriks et al., 2004). This is mainly explained by the wealth effect, with the latter group having the lowest 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 their spending and setting pre-defined budgets. Moreover, it suggests that cash and debit cards – given their own characteristics – may each serve a valuable tool here. The most important differences between cash and debit cards relate to the efforts, time, and technologies needed to gain insight into the total value of expenses made, their ability to provide insight into the type of expenses made, the way in which pre-set budgets can be set and exceeded, and the efforts, time and technologies needed to check the remaining budget that was set (see Table 1 for an overview of the main distinctive features). Finally, the literature suggests that consumers' perceptions of which payment instrument provides the highest value may vary across individuals. In particular, perceptions may differ across two dimensions: (i) the degree to which consumers have a financial need to control their spending, and (ii) the degree to which consumers are facing difficulties 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 controlling their budgets and spending?
- (II) To what extent do cash and debit cards fulfil these demands?
- (III) How does this affect consumers' choice between cash and debit cards?

Table 1 Overview of cash and debit cards by self-control mechanism

Self control mechanism		Cash	Debit cards
Monitoring behaviour	<i>Total value of expenses</i>	Immediate (wallet) Needs calculation/memory	Immediate (mobile) or delay (paper, computer) Needs calculation/memory
	<i>Nature of expenses</i>	Not possible	Immediate (mobile) or delay (paper, computer) No need for calculation/ memory
Setting clear constraints	<i>Setting pre-defined budgets</i>	Physically set Low degree of freedom to exceed	Mentally set High degree of freedom to exceed
	<i>Monitoring pre-defined budget</i>	Immediate (wallet) No need for calculation/ memory	Immediate (mobile) or delay (paper, computer) Needs calculation/memory

We aim at answering 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 self-control. In doing so, we assume that consumers may have three different needs: having insight into (i) the total value of their expenditures (*TOTAL VALUE*), (ii) the nature of their expenditures (*NATURE*), and (iii) the amount left to spent (*BUDGET*). Based on this, we will address the following sub-questions:

Q 1-a: What value do consumers attach to having insight into TOTAL VALUE, 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 degree to which consumers attach value to having insight into the total value of their expenses, the nature of their expenses and their remaining budgets vary according to individual characteristics. In particular, we expect to find an important role for consumers' financial situation and their level of self-control. Therefore, the following sub-questions have been defined:

Q I-b: Does the financial situation of a consumer influence the importance attached to having insight into TOTAL VALUE, NATURE and BUDGET?

In answering this question, we use two measures for the financial situation, i.e. consumers' gross monthly household income,⁹ and the extent to which the consumers' monthly household income is sufficient to cover their expenses. 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 having 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 *TOTAL VALUE, NATURE* and *BUDGET* on the other.

Q I-c: Does the degree of consumers' self-control influence the importance attached to having insight into TOTAL VALUE, NATURE and BUDGET?

According to the literature people with a low degree of self-control have a higher need to monitor and control budget and expenses. We test this theory by using two measures of self-control in financial matters. The first one, called 'planning', indicates the consumer's self-reported ability to plan his expenditures, whereas the second one, '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 the same value to cash as to debit cards for helping them to gain insight into TOTAL VALUE, 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 the account statements provide detailed transaction information on each individual debit card purchase. By contrast, this information is not available for cash payments. Concerning *TOTAL VALUE*, both cash and debit card payments may serve a valuable

⁹ 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 incomes of the respondents. Therefore, we use gross income levels.

tool. However, as summarised in Table 1 each of them has its own characteristics in terms of efforts, time and technologies needed. This also holds for BUDGET, where cash and debit cards considerably differ in terms of the way in which pre-defined budgets can be set, exceeded and checked. Again, following the literature, we expect that consumers vary according to their individual characteristics, and in particular to their financial situation and their level of self-control. This leads us to formulating the following sub-questions:

Q II-b: Does the consumer's financial situation influence the value attached to cash and debit cards for helping them gaining insight into TOTAL VALUE, NATURE and BUDGET?

Based on the conclusions drawn in the literature, we expect the low income people and the liquidity-constrained – i.e. the people who have the highest need to control their spending and budgets - to give a higher rating to cash than to the debit card for providing insight into *TOTAL VALUE* and *BUDGET* compared to their counterparts. As summarized in Table 1, using cash allows for an immediate check of the total value of expenses made and the latest status of the pre-set budget, without using a particular technology, such as a mobile phone or computer. We expect this distinctive characteristic to be particularly valued by the low income and liquidity-constrained, as they have a higher likelihood to be bound to a certain budget. As a result, they are more likely to have a higher need to immediately check their past expenditures and the remaining spending possibilities before making a transaction. Also, they may be expected to be less likely to have the latest (i.e. costly) technologies that enable for an immediate electronic update of their bank balances. Second, we expect the low income and liquidity-constrained to have the highest need for physically setting their pre-determined budgets, so that there is limited room for exceeding it.

With respect to *NATURE*, we expect an opposite outcome. Based on the literature, we expect the lower income and the liquidity-constrained to have a stronger desire to have insight into how exactly they spend their money so to assess on what type of expenses they could potentially save. Therefore, we expect that the debit card is perceived to be more helpful for them here, since, as opposed to cash, each

individual debit card transaction is reported in the account statement of the card holder, allowing for a detailed overview of all individual transactions made.

Q II-c: Does the consumer's degree of self-control influence the value attached to cash and debit cards for helping them gaining insight into TOTAL VALUE, 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 when physically setting a pre-defined cash budget, and given the ease with which the remaining budget can be assessed by simply opening the wallet and examining the content, without the need for any memorisation and calculation, we expect that, out of self-protection, people with lower degrees of self-control attach a higher value to cash than to the debit card for providing insight into *TOTAL VALUE* and *BUDGET*. By contrast, as the 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 more useful than cash with respect to gaining insight into *NATURE* as each individual debit card transaction is reported in the account statement, which enables the consumer to have insight into how they spend their money and into how they could potentially save. Due to its anonymous nature, this is not possible with cash.

Q III: Do consumers' views on the helpfulness of cash and debit cards for gaining insight into TOTAL VALUE, NATURE and BUDGET affect consumers' debit card usage?

This question is intended to examine whether consumers' perceptions regarding the helpfulness of the debit card over cash with respect to the three different budget needs influence their choice of payment instrument at the POS. Given the evidence found in the literature that consumers' choice of what payment instrument to use is influenced by the need to control spending and budget, we expect to find a positive relationship between the relative helpfulness of debit cards compared to cash with respect to the three different budget needs and debit card usage. Also, as the existing literature is silent on this, we hope to see which of the three needs has the largest impact on consumers' payment choice.

Table 2 Overview of sub-questions and expected outcomes

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

4. DATA

4.1 Data collection

In order to get a first insight into the degree to which and the reasons why the people monitor their budget and expenses, we used some general information on consumers' budgeting habits using the results of a DNB survey on consumers' daily payment transactions at the point-of-sale held in September 2011, see also Jonker and Kosse (2012).

In order to answer the research questions as presented in Section 3 with sufficient depth, we set up a unique survey denoted as DHS survey budget control among more than 1,700 Dutch consumers in March 2012. The respondents were selected from the CentERpanel. This internet panel is managed by research institute CentERdata and provides a good reflection of the Dutch-speaking population. However, our survey questions were included in another survey which was only directed at the panel

members of 18 years and older who were responsible for the financial decisions made in their household. As a result, the respondents to our survey may differ from the average consumer, both in terms of socio-demographics, behaviour and in attitudes. Therefore, in the econometric analyses presented in section 5 we use various control variables to correct for any potential biases of this kind. This questionnaire was answered in full by 1,429 individuals, corresponding to a 81% response rate.

Every year, CentERdata also collects household information on the financial situation of the household, income, various subjective measures such as general payment behavior, financial knowledge and investment and savings motives. Furthermore, it also collects information on psychological characteristics such as respondent's self-assessed level of self-control. In light of the literature as discussed above, this part of the dataset is particular valuable for our analysis.

4.2 Variables

Regarding consumers' reasons for desiring insight into expenses and budgets, the results of the DNB survey on payment transactions clearly point at different needs of which: (i) the need to have an insight into total expenses (40%), (ii) the need for budget control (35%), and (iii) the desire to keep track of the type of expenses (33%), are mentioned most often, see Table 3. These results confirm our assumptions that these three needs are important as laid out in Section 3 and justifies our approach in further 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	22%
To keep track of the nature of my expenses	33%	Because my revenues exceed 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%
For transferring money from current to savings account	12%	Because my partner monitors the expenses	6%
To check for incorrect debit card payments	11%	That's too complicated for me to do	6%
To avoid overdraft	7%	Other	13%
Other	2%		
Number of respondents	7122		665

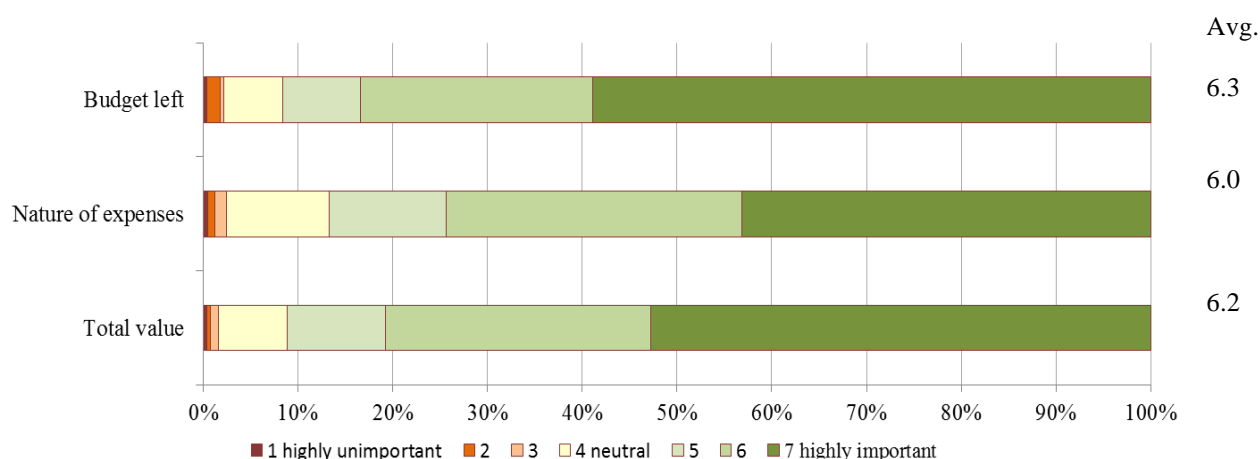
Source: DNB survey Payment transactions, September 2011

4.2.1 Dependent variables

The DHS Survey on budget control did not only include questions related to the respondents' personal characteristics, but also as on their views on the importance of the three above-mentioned needs, about the role that the various payment instruments may play therein and their usage 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 question 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 thinks having an insight into the three needs is important to highly important, whereas less than 3% considers it to be not important. On average, they find it most important to know the size of the budget left to spend (average score 6.3), followed by the total value 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. The results indeed point at significant differences between the three needs (Table 1A in the annex).

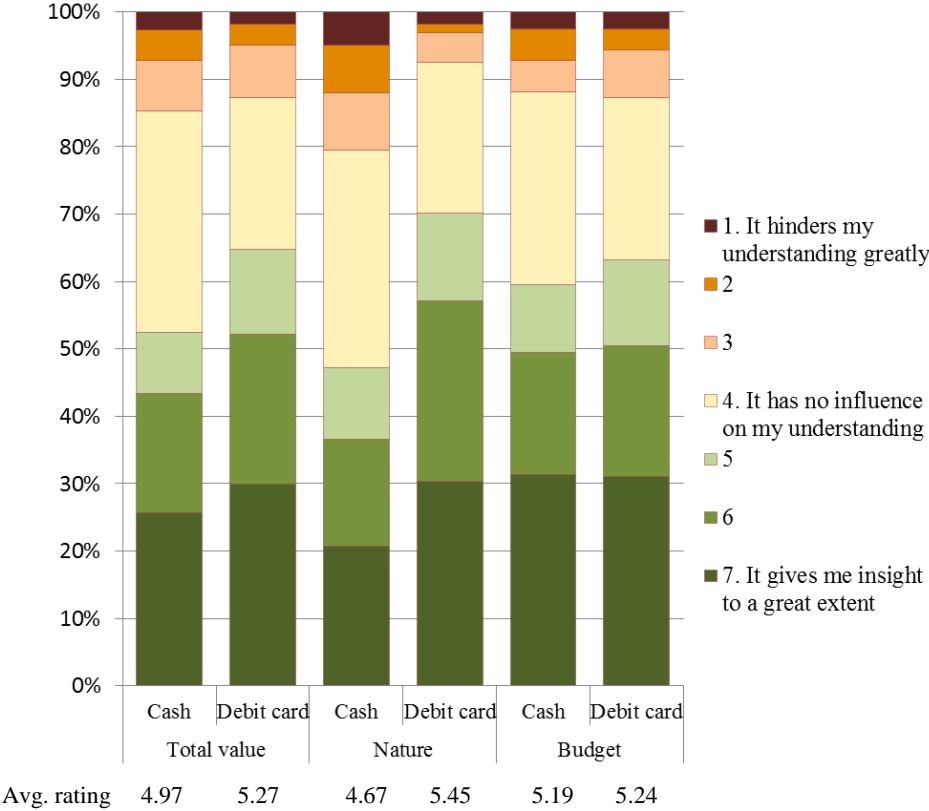
Figure 1. Importance attached by respondents to each of the three budgeting needs (1 – 7 scale)



Source: DHS Survey budget control

Subsequently, we asked them to indicate on a scale from 1 (highly unimportant) to 7 (highly important) to what extent cash and the debit card allow them to fulfill each of these three needs. Note that in the remainder of this study we focus on the ratings given by respondents to cash and the debit card.¹⁰ Figure 2 presents the perceived payment methods' contribution to fulfilling the three budgeting needs. The results show that debit cards get the highest ratings for tracking the total value of expenses (64%), having insight on their nature (68%) and in tracking the amount left to spend (61%). 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 value 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 fulfill consumers' budgeting needs



Source: DHS Survey budget control

¹⁰ Average ratings attached to 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. It can vary between 1 and 3.¹¹ It takes the value of 1 if the consumer perceives cash as less helpful than debit cards, 2 if he perceives cash as equally helpful as the debit card and 3 if he thinks that cash is more helpful than the debit card.

The DHS Survey on budget control also includes questions on general payment habits, for instance by asking respondents about the degree to which they pay using the debit card. Respondents can provide a score from 1 (never, very rarely) to 4 (very often). It turns out that 1.5% of the respondents never or very rarely use the debit card for making 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 particularly focus 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 the expenses. For the latter measure, we distinguished between five levels, ranging from 1 (very hard to come by) to 5 (very easy to come by). The descriptive statistics show that about 13% of the respondents had difficulties coming by, whereas 47% indicated to face no problems. The remaining 40% indicated to find it neither hard nor easy.

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

¹¹ In an earlier version we used the difference between *CASHHELP_n* and *DEBITHELP_n* as a measure of the relative helpfulness of cash compared to the debit card. This variable takes on 13 values. However, we decided to simplify the dependent variable and distinguish just three categories as some of the thirteen categories included no or only a few respondents. 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 the money left immediately) to 7 (I want 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 to spend all their budget surpluses.

4.3 Empirical methodology

In order to answer the research questions laid out in Section 3, we use the ordered probit approach. We estimate several models, in each one the dependent variables may take on a limited number of positive, natural values in which there clearly exists a natural ordering of the answers. Multivariate modeling is especially informative as it allows the joint estimation of the effects of different explanatory variables on the dependent variable under consideration. Also, ordered probit models capture qualitative differences between the levels of the dependent variable.

The analysis is split up in 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).

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 dependent variable. It takes the value of 1 if the consumer perceives cash as less helpful than debit cards, 2 if he perceives cash as equally helpful as the debit card and 3 if he thinks that cash is more helpful than the debit card.

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 urbanization

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 extent to which consumers are able to come 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. Consumers' attached value 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 18 years and more. Therefore, in order to correct for the personal specificities of this group, we estimated various 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 indeed tend to attach a higher value to all the three budgeting needs under study than their counterparts. Those for whom it is more difficult to come by every month are significantly more likely

Table 4. Importance attached by consumers to each budgeting need

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

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

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

to attach a higher value to tracking the total value of their expenses, the nature of their expenses, and their budget left to spend.¹² The results also show that household income has a significant negative effect on the importance attached to monitoring the total value of expenditures.

5.1.2. **Effect of self-control**

The results also show a significant effect of our two measures of self-control on consumers' attached value to the three budgeting needs. However, these effects are often not as expected. Consumers reporting to find it easy to plan their expenditures are more likely to attach a higher value to each need –total value 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 having insight into 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 rather spend it (i.e. “spenders”). The former are significantly more likely to attach a higher value to monitoring the value and nature of their expenses, while the latter are less likely to do so. Summarizing, the results indicate that people with a high and not a low degree of self-control in spending attach a relatively high value to having insight into their budget and spending.

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 a relatively high value to each of the three budgeting needs under analysis. Also, persons aged over 65 and those who are married turn out to find it more important to monitor their spending than their counterparts. Finally, although the effect of education is only significant for those with vocational training, the direction of the results show that the perceived

¹² We are aware of possible endogeneity problems between consumers' ability to come-by every month and their views about the importance of controlling expenses and budgets. That is, the people attaching a higher importance to budget- and expenditure control might – as a result – be more able to come 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 his/her expense. The results do not show substantial changes to our conclusion on consumers' ability to self-control.

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' opinion 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 consumer perceives cash as less helpful than debit cards, 2 if he perceives cash as equally helpful as the debit card and 3 if he thinks that cash is more helpful than the debit card. We estimated for each budgeting need an ordered probit model. The results are presented in Table 5 and discussed in the following subsections.

5.2.1 Effect of financial situation

The estimation results show various pieces of evidence that consumers' financial situation affects their views on the perceived usefulness of cash versus debit cards in terms of budgeting purposes. First, we find a significant effect of consumers' income. Consumers with a relatively low income are more likely than their counterparts to perceive cash to be more useful than debit cards when it comes to monitoring remaining budgets. Second, our findings show that consumers reporting to have difficulties to come by every month rather perceive cash than debit cards to be useful for budgeting needs. This effect is significantly different from zero at a five percent level for two out of the three budgeting needs, i.e. monitoring the total value and the nature of the expenses.

5.2.2 Effect of self-control

The findings for the influence of self-control in spending are not line with our expectations as presented and discussed in section 3. Most of the estimated coefficients for the self-control indicators have the wrong sign. We do not find any evidence that people who have little self-control attach a relatively high value to cash compared to the debit card for monitoring the total value spent and the budget left to spend, nor do we find any evidence supporting our expectation that they attach a

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

Standard errors in parentheses, *, ** and *** denote significance levels 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 come by.

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 which type of payment instrument they find most useful; people with a tendency to save (i.e. “savers”) indicate that they perceive cash to be more useful than debit cards in order to fulfill their budgeting needs. The results for ‘savers’ are 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 the degree to which cash and debit cards are perceived to be a useful budgeting tool significantly differs across consumers. Overall, men are significantly less likely than women to perceive cash to be more useful than the debit card, irrespective of the budgeting need in question. Also, higher educated people are more likely to value the debit card. Respondents with university and college education prefer debit cards for having insight into the total value and nature of their expenses, while those with vocational education perceive debit cards to be more useful for tracking their budget left to spend. By contrast, cash turns out to be appreciated most by people aged 35 and older. There appears to be no clear difference between the results among consumers living in highly urban areas or those living in less urban areas.

5.3 Perception vs. usage: consumers’ payment choice

Table 6 presents the results to our final question regarding debit card usage, i.e. the question whether consumers’ views on the usefulness of cash and the debit card for budgeting and monitoring purposes affect the degree to which they pay by debit card. 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. The first three columns include 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.

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

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

Variables	Total value	Nature	Budget	All perceptions
Male	-0.142* (0.076)	-0.115 (0.075)	-0.097 (0.074)	-0.166** (0.077)
Married	-0.016 (0.088)	-0.032 (0.090)	-0.02 (0.089)	-0.026 (0.091)
Age: 35-44	0.203 (0.162)	0.166 (0.167)	0.159 (0.167)	0.22 (0.166)
Age: 45-54	-0.006 (0.159)	-0.007 (0.164)	-0.005 (0.165)	0.06 (0.163)
Age: 55-64	-0.006 (0.156)	0.012 (0.162)	-0.011 (0.162)	0.057 (0.160)
Age: 65+	-0.243 (0.150)	-0.197 (0.156)	-0.271* (0.156)	-0.201 (0.154)
Income low	0.125 (0.143)	0.145 (0.142)	0.214 (0.142)	0.212 (0.144)
Income medium	0.433*** (0.147)	0.434*** (0.147)	0.486*** (0.148)	0.485*** (0.149)
Income high	0.497*** (0.151)	0.532*** (0.152)	0.576*** (0.151)	0.561*** (0.152)
Primary education	-0.390** (0.195)	-0.355* (0.196)	-0.468** (0.203)	-0.480** (0.198)
Vocational education	-0.173* (0.093)	-0.143 (0.093)	-0.193** (0.094)	-0.186* (0.095)
College	-0.056 (0.093)	-0.058 (0.093)	-0.06 (0.093)	-0.082 (0.094)
University	0.109 (0.119)	0.172 (0.119)	0.209* (0.121)	0.148 (0.123)
Urbanization degree: (very) urban	-0.006 (0.117)	-0.039 (0.117)	-0.055 (0.115)	0.007 (0.118)
Urbanization degree: high	0.077 (0.101)	0.033 (0.101)	0.049 (0.102)	0.059 (0.103)
Urbanization degree: slightly urban	0.065 (0.106)	0.041 (0.105)	0.043 (0.106)	0.078 (0.108)
Urbanization degree: Rural	0.04 (0.112)	-0.005 (0.111)	-0.006 (0.112)	0.036 (0.114)
Perception dummy: cash (Amount)	-0.550*** (0.086)			-0.317*** (0.108)
Perception dummy: debit (Amount)	0.359*** (0.083)			0.306*** (0.110)
Perception dummy: cash (Nature)		-0.533*** (0.097)		-0.263** (0.121)
Perception dummy: debit (Nature)		0.243*** (0.077)		-0.031 (0.102)
Perception dummy: cash (Budget)			-0.416*** (0.084)	-0.127 (0.099)
Perception dummy: debit (Budget)			0.343*** (0.085)	0.182* (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

*, ** 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.

The two indicators reflecting the contribution of cash or the debit card in obtaining insight into the total value of expenses are both significant and have the largest impact on debit card usage compared to the two other sets of preference indicators. This suggests that, of all three budgeting needs, debit card usage is mainly driven by the desire to track the total value of expenses. However, two of the four preference indicators for the other needs are also significantly different from zero, pointing out that the other budgeting and monitoring motives also influence debit card usage. These results also confirm our findings in Table 1 that consumers regards these needs as non-identical.

In accordance, with the payments literature (see Kosse and Jansen, 2013, for a synopsis), the results also point to a significant effect of various demographic characteristics such as gender, education and income on the use of debit cards. In general, men tend to pay relatively often with cash. In contrast, debit card usage increases with a person's income and education level.

6. SUMMARY AND CONCLUDING REMARKS

Given the current financial crisis, an increasing number of households faces financial problems. Consequently, understanding the financial situation of consumers and its effect on their (financial) behaviour has increasingly gained importance since the very start of the crisis. In this study we examine the value attached by consumers to having insight into their budget and spending, the extent to which cash and the debit card are perceived to be useful in this respect, and whether this influences their payment behaviour. In doing so, we pay special attention to consumers' financial situation and their degree of self-control in financial matters. As far as we know, 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 value of expenses, (ii) monitoring the nature of expenses, and (iii) tracking the amount left to spend. For our empirical analysis, we use information from a unique consumer survey, which was in held in March 2012 among 1,700 respondents.

Our results indicate that the demand for budget control among the Dutch is very high. More than 90% of our respondents indicate to find it important to have insight into their budget and spending. They

consider it most important to be aware of the amount left to spend, followed by the total value and nature of expenses made. The results also indicate that they do regard these needs as being 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 little self-control attach a higher value to having insight into their spending and budget. We only find that people who can be characterised as being 'spenders' instead of 'savers' are found to attach a higher value to having insight into their spending on different products. 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 find the debit card more helpful than cash for obtaining insight into the total value and the nature of their expenses. Yet, the two payment instruments do not differ in the extent to which they are perceived to be of use for checking the amount left to spend. Although in general the debit card is perceived to be a better expense monitoring tool, we do show that the most vulnerable consumer segments rather consider cash to be most useful. This holds e.g. for low income people and people having financial problems.

Finally, we show proof of a significant important role of budget control in consumers' choices between payment instruments at the POS. Our results demonstrate that consumers have a tendency to pay using the payment instrument that they perceive to be most effective in tracking their budget and monitoring their expenses. This effect is strongest for the device that helps them best gaining insight into the total value of their spending.

In sum, our results suggest that the on-going substitution of cash by cards may potentially slow down during a financial crisis, as the number of households with financial problems is rising. Such a change in behaviour has already been signalled 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 (2012) indicates that households facing financial problems have started using cash more often while their total spending has 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 cash is found to be a useful tool.

Similarly, our findings show that cash brings benefits for particular consumer groups 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., 2012 and references therein), potential cost savings could be realized if the use of electronic payment instruments would further increase. 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 further be encouraged if they would also incorporate enhanced budgeting and monitoring features.

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ANNEX

Table 1A. Paired t-test: Consumers' perceived value attached to each budgeting need

Variable	Mean	P-value
Total value	6.238	Ha: mean(diff) != 0
Nature	6.016	Pr(T > t) = 0.0000
diff	0.222	
Total value	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' perceived value attached to each instrument

Variable	Mean	P-value
Total value (cash)	4.966	Ha: mean(diff) != 0
Total value (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	