

DO CONSUMERS PAY MORE USING DEBIT CARDS THAN CASH?

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Would you pay more for a product simply because you were paying with card instead of cash? Earlier research suggests that this seems to be the case for some forms of payment methods, including credit cards, pre-paid cards, and gift cards (Feinberg, 1986, Hirschman, 1979, Prelec and Simester, 2001, Raghuram and Srivastava, 2008, Soman, 2003). A commonly advanced explanation for why this bias occurs is that payment methods differ in the transparency of parting with money (Prelec and Loewenstein, 1998). When paying with cash, a payer can see how much money that is deducted from the lot but when paying with card she cannot see how the money disappears. In this sense, paying with card may feel less real and thus less painful which gives an explanation for the bias. Apart from the form that money comes in, the vividness of payment can be numbed by the fact that some payments are delayed in time such as for credit cards. However, because consumption and payment are separated over time, other factors may account for higher spending with credit cards, such as how consumers value future consumption (see for instance Hafalir and Loewenstein, 2009).

We conduct an experiment in Denmark using debit cards and cash to investigate whether the form of payment affect spending. Debit cards, typically the national Dankort, is the most common payment method in terms of transaction value in Denmark and 82 percent of the population between 15-79 years old own a Dankort (Nationalbanken, 2011). Cash and debit cards are equivalent in the sense that payment is immediate and neither debit nor cash are restricted in their purpose and location, which is typically the case for pre-paid cards and gift cards. Our experiment is also incentivized which means that participants make payments based on real money. Compared to the few existing incentivized experiments (e.g. Prelec and Simester, 2001), we control for the possibility that participants might not carry enough cash on them at the time of the experiment and would have to incur the extra cost of going to the ATM if they wanted to spend more, one reason why spending might be lower with cash.

An Experiment with Debit Cards and Cash

82 master level students (37 female, 45 male, average age is 27) at the IT University in Copenhagen participated in the experiment and everyone received 100 DKK for participating. We used three groups to test whether there is a spending bias between cash and card.

In the first group (the *cash* group), each student was handed 100 DKK in cash and asked to make bids for three consumer products: a 10 beer clip card (worth 170 DKK), a 6 coffee clip card (the full selection of coffee, worth 100 DKK) and a 10 coffee clip card (only black coffee, worth 40 DKK). To elicit the highest bids that participants were willing to pay, we used the Becker-DeGroot-Marschak mechanism which is a commonly used method to elicit reservation prices. Before the participants made their bids, we instructed them that after they had made their bids we would randomly select three participants with bids that matched a randomly drawn sale price for each item. These participants would then each buy one product using cash. We also instructed them that they could not bid more than 100 DKK.

In the second group (the *card/cash* group), we performed the same procedure but we instructed the participants that they would be paying with debit card (Dankort or Visa Electron). To make sure that these participants did have a debit card and to expose them to the card we asked them to put the cash we handed them in their pocket and to put their card in front of them on the desk. To ensure that they were using a debit card we checked all the cards before continuing. The card payments for the items were made using iZettle.

In the third group (the *card/account* group), we performed the same procedure as in *card/cash* but

instead of handing out cash we transferred the 100 DKK to the participants' accounts using PayPal. To ensure that the participants felt as if they had the money to spend, a research assistant, located in the room, performed the actual transfers as soon as we had collected their email addresses.

What Can We Expect in Terms of Outcomes?

Consider first the *cash* and *card/cash* groups. In these two groups, the only thing that differs is the payment method. Thus, if payers are willing to pay more for a product using debit card instead of cash then we should observe that bids are higher in the *card/cash* group than in the *cash* group.

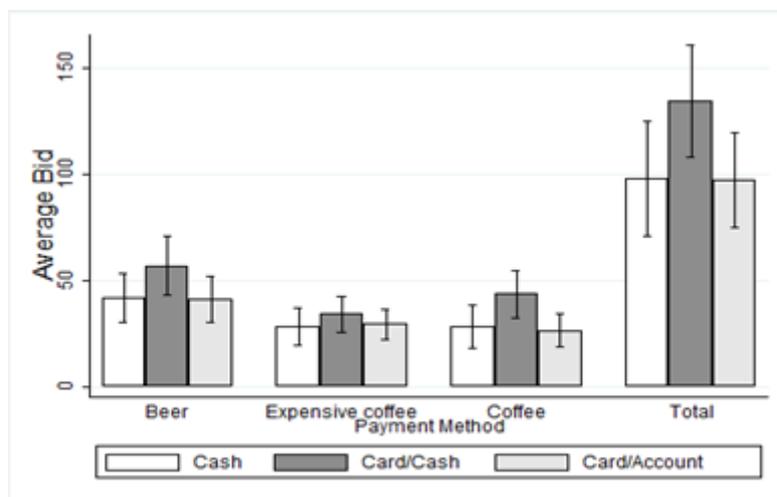
Now consider the *card/account* group. This group is included for exploratory purposes since the expected outcome is ambiguous. First, if spending is higher in *card/account* than in *card/cash* then simply showing cash can depress bids for card payers. For example, showing a credit card logo has previously proven to increase willingness to pay and donations to charity (Feinberg, 1986). Second, if spending is lower in *card/account* than in *card/cash* then we suggest that there is an earmarking effect present. Studies have shown that, for example, contributions to taxes increase when these taxes are earmarked for specific purposes (e.g. Sclen and Kallbekken, 2011). In the *cash* and *card/cash* group, all the participants see the money that they receive and have available to spend in the experiment. In the *card/account* group the money never materializes but goes directly into participants' accounts which therefore may reduce the feeling of the money being earmarked for the experiment.

Is There a Spending Difference between Cash and Debit Cards?

First, it is worth noting that among our participants 23 percent carried no cash on them at the time of the experiment and 65 percent carried less than 100 DKK. This suggests that cash constraints could indeed have played a role in bids if we would not have controlled for this. In addition, our participants are highly familiar with using debit cards: the median of participants' share of transactions with debit cards is 90 percent, for cash it is only 5 percent. Thus, if we do find a bias it is unlikely that it depends on inexperience with card payments.

Figure 1 shows the average of participants' bids for each of the three items (beer, expensive coffee and coffee) as well as the average of bids when added together, the total. The figure shows clearly that average bids are higher in the *card/cash* group than the *cash* group. Univariate statistical tests show that beer, coffee and the total are indeed higher in the *card/cash* group than in the *cash* group.¹ Specifically, participants' bids are 15 DKK higher for beer and coffee each in *card/cash* than in *cash* and 36 DKK higher in total. These findings indicate that payment form does matter for consumer valuations of products.

Figure 1: Average bids in the Cash, Card/Cash and Card/Account group



¹ Wilcoxon-Mann-Whitney tests, two-sided, n=53, beer: p=0.086, coffee: p=0.023, total: p=0.035.

Figure 1 further shows that there is no difference between *cash* and *card/account* which is confirmed by statistical tests. We further find that bids are significantly lower in *card/account* than in *card/cash* which points to an earmark effect.²

We also wish to control for other factors that might affect bids and this is done using regression analysis. The factors include consumption habits for beer and coffee since a higher consumption of a good in question may increase the willingness to pay for it. A measure of how much participants believe that the items they bid for cost since believing that an item is more expensive may lead to higher bids. We also include a measure of pain of paying which captures whether participants feel as if they have difficulty controlling spending (in this case they experience to little pain when paying) or whether they tend to underspend (anticipate to much pain of paying) (Rick et al., 2008). In addition, we control for the order in which the participants bid for the items since this may affect their bids (see e.g. Kahneman and Knetsch, 1992). In total, we have four orderings of the items since we always keep the coffee items together.

To estimate the regressions, we use Seemingly Unrelated Regressions since it takes into account that the dependent variables are not independent across observations (i.e. each participant bids for all three items) and that we have factors that are unique to a certain dependent variable (for example how much a participant believe that beer cost and her beer consumption should only matter for her beer bid). The estimation strategy is to sequentially remove those variables that are both statistically insignificant in each separate regression and jointly insignificant tested across all three regressions. The only variable that is not removed despite insignificance is the order. As a baseline group we use the *cash* group.

Table 1 shows the final regression results. First, the fundamental result remains: bids are higher in the *cash/card* group than in the *cash* group and there is no difference between the *card/account* group and *cash* group. On average, *card/cash* bid 17.5 DKK more than *cash* for beer and 14.5 DKK more for coffee. Second, it is also clear that the order seems to matter but only to a limited extent, there is only a difference between Order 1 and Order 2. Third, and contrary to our expectations, there is also a small and negative effect of spending personality, captured by the variable Pain. It suggests that a participant who perceives she has difficulty controlling spending bids slightly lower for beer. Finally, there is also a negligible but positively significant effect of how participants' beliefs about the cost of the items cost captured by the variable Value. This means that a participant who believes that coffee costs more also bids slightly more for coffee.

² Wilcoxon-Mann-Whitney tests, two-sided, n=54, beer: p=0.083, coffee: p=0.019, total: p=0.056.

Table 1: Regression Results

	Beer	Expensive Coffee	Coffee
Card/Cash	17.541** (7.980)	1.670 (6.156)	14.460** (6.676)
Card/Account	1.527 (7.340)	-0.566 (5.312)	-0.195 (5.846)
Order 2	-20.653** (8.380)	-8.667 (6.375)	-22.146*** (6.921)
Order 3	2.793 (7.853)	-3.718 (5.604)	-6.535 (6.716)
Order 4	-1.345 (9.491)	-0.399 (7.099)	-6.535 (6.716)
Pain	-1.888** (0.865)	0.144 (0.653)	-0.937 (0.746)
Value	-0.081 (0.075)	0.164** (0.687)	0.102*** (0.040)
Constant	85.956*** (19.523)	19.697* (10.808)	40.690*** (13.172)
<i>No of obs.</i>	82	82	82
<i>Robust standard errors in parenthesis. *, **, *** denotes significance on 10, 5 and 1 percent level respectively.</i>			

Conclusions

This study finds that the form in which payments are made affects consumer valuations of products. In particular, after controlling for a number of factors that might influence bids we can still find a substantive difference between debit card payments and cash payments. This finding suggests one rationale for why cash is still widely used despite the attempts to reduce the costly use of cash (see for instance Bergman et al. 2008). Cash makes it simpler to control spending since payments tend to be more transparent.

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