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Cash, Check or Bank Card?
The Effects of Transaction Characteristics on the Use of Payment Instruments

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Cash, Check or Bank Card?

The effects of transaction characteristics on the use of payment instruments*

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Exploiting a unique and original dataset of 11,945 payments made from March to May 2005, the paper estimates the determinants of the probability of a transaction being paid by cash, check or bank card at the point of sale. Controlling for individual characteristics, the main results of the paper are: 1) a differentiated effect of the transaction size regarding payment instruments; 2) a specialization effect between payment instruments according to the type of good and spending place; 3) a double supply-side effect due to a restriction of the payment choice and to the organization of the payment process. For the first time ever, detailed data on consumption and payment patterns make it possible to assess the role of transaction characteristics in the use of payment instruments.

JEL Codes: G2, E4

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1 Introduction

Recent empirical investigations support the view that the substitution of electronic for paper-based systems can reduce the social cost of a country's payment system. Humphrey et *al*., (2003), for instance, note that "*if a country moves from a wholly paper-based payment system to close to an all electronic system, it may save 1% or more of its GDP annually once the transaction costs are absorbed*". However, people are not necessarily prepared to adopt and use electronic payment systems. The failures of several electronic purses in Europe, for instance, are well documented (Hove, 2004) even if these payment instruments can be theoretically less costly (Shy and *al*. 2002). Understanding the reasons why people adopt and use electronic payment instruments can thus become a primary concern for banking and monetary authorities. Why do people still prefer to use cash? Why are checks sometimes preferred to bank cards to settle transactions? What are the factors that influence the use of a payment instrument?

Even if payment is an everyday experience for all consumers, the understanding of the use of alternative payment instruments has not, paradoxically, received much attention in the literature (Boeschoten, 1998; Hancock and Humphrey, 2001). Theoretical works such as Santomero (1974), Whitesell (1989), and Santomero and Seater (1996) provide some fruitful analytical results on the choice of payment instruments but the lack or the poorness of data (Hancock and Humphrey, 2001) have limited empirical verifications.

The purpose of this paper is precisely to explain the determinants of the use of payment instruments at point of sale. Following a survey undertaken from February to April 2005 on a representative sample of the French population, we use a unique and original dataset to explain the probability of a transaction being paid by cash, bank card or check, in terms of two sets of explanatory variables: transaction and individual characteristics. We use 11,945 self-reported transactions by individuals over an 8-day period in our econometric estimation based on a multinomial logit model. Globally, we find: 1) strong evidence of a differentiated effect of the size of transactions compared to payment instruments; 2) a specialization effect between payment instruments according to the type of good and spending place; and 3) a double supply-side effect due to a restriction of the payment choice and to the organization of the payment process. For the first time ever, detailed data on consumption and payment

patterns enable us to assess the role of transaction characteristics in the use of payment instruments.

The rest of the paper is organized as follows. First, we present the related literature. We then describe the methodology and comment on payment patterns. Thirdly, we present the econometric analysis and fourthly, we discuss the estimation results. Finally, we conclude the paper.

2 Related literature

Empirical investigations on the choice of payment instruments are relatively recent. Two main groups of empirical studies may be commented on.

A first group of contributions attempts to analyse the influence of particular effects on the use of payment instruments or the specific use of payment instruments such as electronic payment systems.

For example, the works of Mantel (2000), Stavins (2001) and Hayashi and Klee (2003) highlight the role of socio-demographic and technological factors on the propensity to use electronic payment systems or the probability of them being used. Mantel (2000) proposes a framework to describe why consumers pay bills electronically. Using US national survey data, the author shows that wealth, personal preferences and certain demographic factors are significant to explain the use of electronic bill payments. Stavins (2001) uses survey data from US households in order to evaluate the effects of consumer characteristics on the probability of using different electronic payment systems. The results show a strong effect of demographic characteristics on consumers' use of payment instruments. Lastly, Hayashi and Klee (2003) use data on a sample of US consumers and primarily from users on the Internet in order to test consumers' propensity to adopt new technologies (debit cards, electronic bill payment). The results indicate that consumers who use new technology or computers are more likely to use electronic forms of payment and that payment choice depends on the characteristics of the transaction such as the transaction value and the physical characteristics of the points of sale (such as the absence of a cashier or the availability of self-service).

Other works such as Humphrey, Kim and Vale (2001) try to estimate a model of payment choice (cash, debit card and check) from which own price, cross price and payment substitution elasticities are derived. Using semi-annual panel data from Norway over the period 1989-1995, the authors show that consumers are sensitive to prices.

Lastly, some works such as Rysman (2004) deal with problems related to network effects in payment networks. Exploiting a unique dataset on the payment card industry, the author shows the existence of single homing effects (concentration of spending on a single payment network) and a positive feedback loop between consumer usage and merchant acceptance.

A second group of contributions attempts to determine the influence of a whole group of factors on the use of alternative payment instruments. From payment aggregate data collected on fourteen developed countries over the period 1987-1993, Humphrey, Pulley and Vesala (1996) analyze for instance the effects of economic and institutional determinants on the use of five types of paper and electronic payment instruments. Several types of variable are studied: price and income, equipment (cash holding), payment availability (Point of Sale (POS), Automated Teller Machine (ATM)) and, finally, institutional variables (crime, concentration of the banking system). The econometric results show in particular a limited impact of own prices and a positive effect of the POS and ATM on the use of payment cards. Carow and Staten (1999) attempt to explain consumers' payment option to use cash, debit cards, general purpose credit cards or gasoline credit cards. Using a survey of US gasoline credit cardholders in 1992, the authors estimate the probability of using a payment instrument in relation to mainly demographic and credit characteristics. The results show that consumers are more likely to use cash when they have less education, lower incomes, are middle-aged and hold more credit cards. Debit and credit card holders are less likely to use their gasoline credit cards. Finally, Boeschoten (1998) seeks to explain payment behaviours of households. The author uses the results of an *ad hoc* design panel survey over the 1990-1994 period, on Dutch households. This study is the most complete concerning the covered population and the explanatory variables used. In particular, the importance of transaction size is demonstrated: indeed "*the probability that an amount which is 100 per cent higher is paid cash is about 20 to 30 percentage points lower* (...)" (Boeschoten 1998: 133).

A brief survey of the main contributions allows us to point out that individual, technological or financial variables are mostly preferred as explanatory variables in explaining the choice of payment instruments. However, several authors report that the choice of payment instruments is derived from their use in transactions and, hence, that transaction characteristics are predominant (Humphrey et *al*., 2001, Boeschoten 1998, Hayashi and *al*. 2003). Boeschoten (1998), for example, concludes that the transaction size is one of the most

important explanatory variables in choosing a payment instrument. However, apart from size, transaction characteristics have not received more attention in the literature mainly because of the difficulty of collecting data on consumption and payment behaviours at multiple points of sale. But there are numerous other variables that could be used to describe a transaction and that could influence the use of a payment instrument such as the type of good purchased, the type of spending place where the purchase occurred, the type of contact used for the transaction (post mail, face-to-face, etc.) and supply-side constraints (limited choice of the payment instrument). Because the role of transaction characteristics has not generally been taken into account in previous empirical works, we seek to assess whether transaction characteristics have a predominant role in explaining the use of payment instruments.

3 Data description

3.1 Survey design: a two-stage method

To study payment patterns, we undertook a survey using a two-stage method.

First, we administrated a survey from March to May 2005 on a representative sample of 1,447 French individuals of 18 years and older. The questionnaire aimed to collect information related to banking and payment instrument equipment, and to obtain socio-economic data on individuals (*e.g.* income, profession, etc).

Second, we asked each respondent to keep a diary in which they reported all information related to purchases on a daily basis, for eight days. A purchase is characterized by six pieces of information: the amount to be paid (size of transaction), the type of good or service purchased, the type of spending place in which the good has been purchased, the type of contact (face-to-face, Internet, telephone, etc.), the supply-side constraints and, finally, the payment instrument used. Of the 1,447 respondents, 1,392 individuals completed the diary. Overall, we have 16,692 transactions containing all information on transaction characteristics.

3.2 Payment patterns

Payment patterns are obviously dependent on the possession of payment instruments. Globally, we note that 85% of individuals say they have a check-book and 83% a payment card related to their main account. Among the range of available cards issued by banks, the

debit card is the most popular (85%). Only 5% of the French population says that it owns a banking credit card. A very large majority of individuals (85%) has only one debit card.

Transactions are frequently made on Fridays and Saturdays; these two days are also the most significant in value (the most frequent days without purchases are Sundays and Mondays). The total amount of the transactions is 541,583 euros. On average, an individual makes 12 purchases over eight days, *i.e.* just over one transaction per day.

The majority of transactions are under 15 euros (56% of all transactions). Purchases for under 5 and 1 euro, respectively, account for 34% and 9% of all transactions. Interestingly, purchases for over 15 euros account for only 4% of the total. This particular distribution of transactions directly affects the choice of the payment instruments. Thus, we note that 97% of the 16,692 transactions made by individuals were paid using cash (62%), bank card (21%) or check (14%). Whereas cash is ahead of bank cards and checks in terms of the volume of payments, the latter two payment instruments take the lead in terms of transaction value; they respectively account for 36% and 33% of the total amount of purchases. Given the importance of the use of these three payment instruments, we decided to focus us on them.

A more detailed analysis of the number of payments according to transaction size enables us to identify the market shares of the three payment instruments (Figure 1).

[Insert Figure 1 around here]

We observe that cash payments decrease as the transaction size increases. Thus, cash is more frequently used for low value transactions. For example, the cash market share for transactions of under 5 euros is about 90%; this market share amounts to approximately 8% and 2% for bank cards and checks. But the cash market share quickly decreases: when the transaction size is around 23 euros, cash and bank card market shares are equal (35%). Beyond that, bank card use increases up to values located around 60 euros, and significantly decreases for values higher than 150 euros. Beyond 150 euros, payments by check are more significant.

We also note in Figure 2 that the use of the payment instruments is not equally distributed according to the different types of good.

[Insert Figure 2 around here]

Cash is mainly used to purchase goods or services such as "newspapers, tobacco and lotteries", "food and beverages", "restaurant and hotel" and "culture and leisure"; checks are preferably used in "health services" and bank cards in "transport" and "equipment and personal care". This *specialization effect* can be due to several factors. First, the size of the transaction in each class of goods can differ and influence the use of specific payment instruments; for instance, newspapers (low values payments) will preferably be settled by cash; "health services" by check, etc. Second, the type of spending place in which the purchases occurred may impact on the use of payment instruments. We observe a similar effect in the distribution of payments by spending place (Figure 3).

[Insert Figure 3 around here]

Thus, we note that cash is mainly used in "small stores" whereas checks are more present in "home services" and "public administration". By contrast, the bank card is the payment instrument preferably used in "department stores" and "supermarkets". This particular distribution of the use of the payment instruments that we call "specialization effect" is probably due to supply-side constraints since "public administrations" and "home services" do not generally accept bank cards. Furthermore, some spending places such as department stores and supermarkets may facilitate or encourage the use of bank cards in order to reduce the overall processing costs of payments.

Besides the role of the type of spending place on the use of payment instruments, the type of contact may also have an effect (Figure 4).

[Insert Figure 4 around here]

In this figure we note that cash is used more in "face-to-face" transactions, checks in "post mail" transactions and bank cards in "electronic transactions" (the Internet, automat and telephone).

A further interesting observation relates to the number of payments where the choice of the payment instrument was limited[1] at the point of sale: approximately one transaction on ten was settled in the framework of a limited choice. These payments are usually made during face-to-face interactions (62%) or on automats (24%)[2]. On the whole, when the choice of the payment instrument is limited at the point of sale, cash and bank cards are the most frequently used instruments (58% and 23%).

4 Econometric estimations

In this part we assess the main determinants of the use of cash, checks and bank cards during transactions.

4.1 Method

Initially, we have 16,692 transactions made by 1,392 individuals who completed the diary. Three elements reduce the sample we use in the econometric analysis. First, transaction and individual characteristics must be declared. Second, we exclude twenty-six transactions of over 1,000 euros[3]. Finally, we are exclusively interested in transactions paid by cash, check or bank card (debit and credit)[4]. Consequently, we exclude people who do not hold bank cards or check accounts. We finally have a total of 11,945 observations available, for 1,035 individuals.

Table 1 below illustrates a high number of cash payments in volume (59.5% of all transactions are paid in cash) whereas bank card payments dominate in value (44.4% of all the payments).

[Insert Table 1 around here]

1 The choice of the payment instrument may be limited at the point of sale when for instance merchants do not accept bank cards or when automats accept only coins, etc.

2 Despite the low number of transactions on the Internet (0.4% of all transactions), 57% of these transactions were settled in the frame of a limited choice.

3 We note that these transactions are not very frequent over the observed period and therefore not representative of consumer purchases. We then exclude these outlier purchases from our analysis.

4 Only 3% of all transactions were settled using other payment instruments (electronic purse, etc.).

We wish to estimate the choice of a payment instrument *j* made by an individual *i* during a transaction *t*. The model rests on the utility associated with each choice. More precisely, the utility can be explained by observable characteristics (V_{it}^{j}) and by unobservable characteristics (ε_{it}^{j}):

$$U_{it}^{j} = V_{it}^{j} + \varepsilon_{it}^{j} = \alpha^{j} X_{t} + \beta^{j} Z_{i} + \varepsilon_{it}^{j}$$

The observable characteristics consist of transaction characteristics (X_t) and individual characteristics (Z_i). We do not directly observe the utility of an individual *i*; we observe the choice of a payment instrument I_{it}^{j} (with *j* = cash, check or bank card) for a transaction *t*. We can then estimate the probability that a consumer *i* chooses a payment instrument *j* during a transaction *t*, *i.e.*:

$$\Pr(I_{it}^{j}) = \Pr(U_{it}^{j} > U_{it}^{k} \forall k \neq j) .$$

To estimate the choice of a payment instrument we use a multinomial *logit* model. Given the method of observation and the fact that the surveyed consumers do not make the same number of transactions during the week, we have to control the impact of individual variables. Traditionally with survey data, consumer characteristics are similar for all transactions made by each individual. Consequently, we have to check whether the error term is not correlated with unobservable effects for each consumer (defined as clustering). To do so, we use the cluster-robust variance matrix which allows for adjustment of the standard errors of the estimators (Cameron and Trivedi, 2005).

4.2 Explanatory variables

Two sets of explanatory variables related to transactions and individuals are used in the regression.

Transactions are described by six characteristics.

The first is the size of the transaction which is indicated by its price and its square value. Following our previous statistic descriptions, the impact of the transaction size on the probability is assumed to be non-linear. More accurately, we anticipate that the marginal effect is decreasing with the amount: the negative variation of the probability of using cash

and the positive variation of the probability of using a check or bank card should be decreasing with transaction size.

The second and third variables are the type of good and the type of spending place where the good is purchased. We capture these characteristics by dummy variables, each of which describes a category of good or spending place (see Figure 2 and Figure 3). The expected effects of these variables are unknown even if we anticipate a specialization of the use of payment instruments according to the spending places (*specialization effect*). Indeed, as we previously noted, some spending places encourage (or discourage) consumers to use certain payment instruments. For instance, department stores and supermarkets in France have equipped their point of sale with devices that facilitate payment by bank card. In small stores there is often a single cash register where people queue to be served; consequently, even if a small store accepts bank cards, people do not necessarily use them as they prefer to avoid complaints from people waiting in the queue. This organization of the payment process within the spending place obviously modifies the different costs of using alternative payment instruments. In line with the theoretical argument of Whitesell (1989) who claimed that a fixed transaction cost could consist of "extra time spent in a credit or check payment queue versus a currency-only queue", we can anticipate a specialization effect due to an (in)decrease of the fixed costs per transaction.

The fourth variable is the type of contact measured by six dummies: face-to-face, telephone, post mail, the Internet, automats and other types (see Figure 4). Since face–to-face is excluded, we expect negative signs of the dummy coefficients concerning the probability of using cash. The impacts on the other payment instruments are *a priori* indeterminate.

The fifth variable is the day of the week. This variable tries to take a temporal dimension into account.

The sixth and last transaction characteristic focuses on supply-side constraints that limit the choice of payment instruments. For instance, people cannot choose their favourite payment instrument on the Internet, on automats or in retailers that do not accept all the payment instruments. In order to capture supply-side constraints, we set up a dummy variable that takes either the value one, if the choice is not limited, otherwise zero.

Finally, we use individual characteristics as control variables such as age, gender, level of education, personal income and cash profession (Profcash). The cash profession is a dummy variable which takes either the value 1, if individuals have an occupation in which

wages are directly paid in cash (merchants, doctors, craftsmen, etc.), otherwise zero. We expect to find that people who are paid in cash are more likely to pay cash.

5 Estimation results

Overall, we observe that the probabilities of using cash, checks or bank cards are explained relatively well by our model (since pseudo R^2 is close to 0.4). Moreover, the Hausman-McFadden test indicates that the assumption of the independence of irrelevant alternatives is conclusive (at the 0.1% level). We can conclude that the odds ratio between alternative outcomes depends exclusively on characteristics pertaining to the outcomes and are therefore independent of the number and the nature of other outcomes that are considered.

In general the coefficients of transaction characteristics have a significant effect on the probabilities of using payment instruments.

First, the transaction size has a very strong impact. The higher it is, the lower the probability of using cash. More precisely, the probability of a 10% higher amount being paid in cash is 7% lower. This result is in line with Boeschoten (1998). However, we note that our effect is about twice as high as that of Boeschoten (1998) who assessed a decrease of about 2 to 3%. The main reason is that bank cards are now well accepted for small amounts and are therefore a strongly competitive payment instrument compared to cash. We observe that the probability that an amount which is 10% higher is paid by bank card or check is respectively 9% and 10% higher[5]. However, the effect of transaction size on the probability of using a check or bank card is less relevant and is to the benefit of checks (the higher the transaction the more the check will be used compared to bank cards). As expected, the estimation results confirm the non-linearity assumption of the effect of transaction size on the probability of paying by cash, bank card or check.

Second, the type of good has a significant effect on the probability of using a payment instrument but this effect varies across payment instruments. It is independent of transaction size that we already controlled. Globally, we find that the probability of using cash for purchases related to "Food and beverages" is higher than that of bank cards or checks. Conversely, the probability of using bank cards or checks for all other types of good is higher.

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[5] Elasticities are computed from mean values of other explanatory variables.

More precisely, we observe that the probability of using checks in purchases related to "Health" (and marginally to "Equipment & personal care") is higher than that of bank cards. This is mainly due to the fact that health goods and services in France are marketed by retailers which are under-equipped. In our regression we do not specifically isolate the influence of such particular spending places (health professions). The positive influence of such goods and services on the probability of using a check could indirectly measure such a relationship.

[Insert Table 2 around here]

Third, as expected we find a specialization effect of the payment instruments according to the spending place. Whereas the probability of using cash in "small stores" is higher than that of checks and bank cards, the probability of using checks is always higher than that of cash in all other spending places. This finding captures the universal acceptance of checks. Finally, the effect of the spending place on the probability of using bank cards is not as clear. The probability of using the bank card is higher than that of cash and checks in "Department stores" and "Supermarkets", lower than that of cash in "Public services" and "Home services" and also lower than that of checks in all other spending places. These effects confirm the low penetration of bank cards in French public services and the technical constraints related to the use of bank cards in "home services". But these findings also confirm the existence of the incidence of fixed transaction costs related to the payment environment. The organization of the payment process within department stores and supermarkets, which allows a decrease of the fixed cost of payments by bank card, obviously acts in favour of the use of this payment instrument. This finding confirms the theoretical argument of Whitesell (1989). We note furthermore that the simultaneous introduction of goods and spending place characteristics could induce multicollinearity between the two independent variables. These suspicions are in fact not verified. The exclusion of one set of categories does not alter the results. Moreover, the matrix of correlations reveals low levels of correlation. It suggests a fairly robust effect of the types of good and spending places on the probability of using payment instruments (Appendix 1).

Fourth, the effect of the type of contact on the probability of using payment instruments is also significant. The probability of using checks compared to cash is higher in remote

transactions ("the Internet" and "Post mail") and is lower on "Automats". Conversely, the probability of using bank cards is higher than that of cash on the "Telephone", "Internet" and "Automats". Finally, we note that the bank card is the preferred payment instrument in electronic transactions since the probability of using it on the Internet and automats is higher than that of checks. It is important to note that this specialization effect of the payment instrument according to the type of contact is independent of the type of spending place and the type of good that we controlled. Once again, the analysis of the matrix of correlations reveals low levels of correlation between the type of contact, the type of good and the type of spending place (Appendix 1).

Fifth, we observe that the probability of using one of the three payment instruments is not influenced by the day of the week. It suggests the lack of intra-weekly seasonality in the use of payment instruments.

Finally, supply-side constraints influence the use of payment instruments. They induce an increase in the probability of using cash compared to checks and bank cards, and suggest that each time the choice of the payment instrument is limited, the probability of using cash is higher (0.14).

Socio-demographic characteristics also influence the probability of a transaction being paid by one of the three payment instruments. First, being a woman induces a differentiated use of payment instruments: the probabilities of using a check rather than cash or a bank card are higher when women make the transactions. Two explanations may be advanced. The first is presumably due to security concerns (Boeschoten, 1998). The second could be trivially related to the cost of holding a checkbook (which necessarily necessitates a "bag"). Second, we do not find, as in previous studies (Boeschoten 1998), a statistically significant effect of age on the probability of using a payment instrument. Third, levels of education have the same expected signs usually established in the literature (Boeschoten, 1998; Carow and Staten, 1999; Stavins, 2001). These confirm the result according to which highly-skilled people have a higher probability of making electronic payments. Conversely, we do not find a clear effect of the level of income mentioned in the literature on the probability of using a payment instrument. Paradoxically, income has an ambiguous effect: the lower-income groups have a high probability of paying by check rather than cash, and people for whom time is valuable – opportunity cost (high level of income) – do not have a higher probability of using a payment instrument whose costs per transaction are weak (the bank card). This result may be due to the fact that we already control the level of education. Finally, we do not verify

our intuition on cash occupations; people who are paid in cash do not have a higher propensity to pay in cash.

6 Conclusion

This paper shows for the first time that transaction characteristics have a strong impact on the probability of a transaction being paid by cash, check or bank card.

We find that the transaction size influences the probability of it being paid by one of the three payment instruments. The larger a transaction, the lower the probability of it being paid cash and the higher the probability of it being paid by check or bank card. As expected, the estimation results confirm the non-linearity assumption of the effect of transaction size on the probability of paying by cash, bank card or check.

Besides the well-known effect of transaction size, our estimation sheds new light on the effects of further transaction characteristics on payments. Our results show that these characteristics influence payment patterns. We find strong evidence that there is a specialization effect of the use of payment instruments according to the type of good, spending place and contact. These findings indirectly confirm the influence of the organization of the payment process, within the spending place, on the choice of a payment instrument (Whitesell 1989). We also find a statistically significant effect of supply-side constraints to the benefit of cash.

Overall, the estimation results outline the crucial importance of transaction characteristics when studies attempt to explain payment patterns. This remark is all the more critical when econometric analyses try to explain the probability of using a payment instrument for transactions (Boechoten 1998, Carow and Staten 1995). Indeed, omitting transaction characteristics or integrating partial information on transaction characteristics may limit the explanatory power of the studies.

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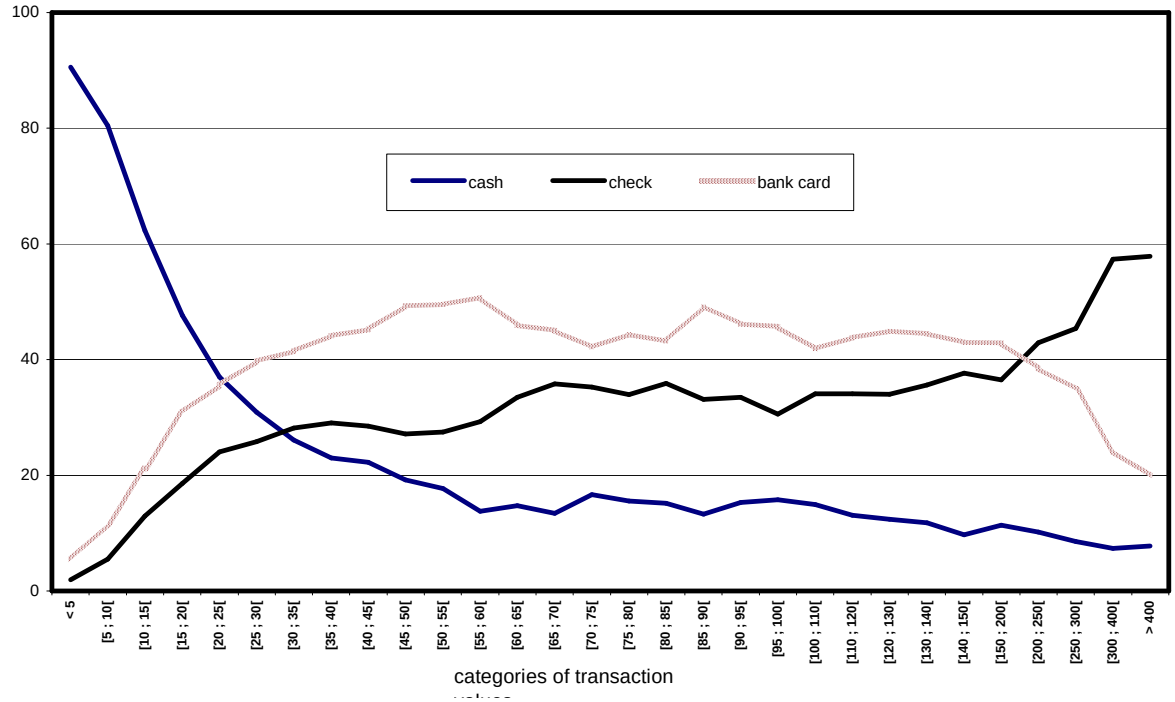
Appendix 1: Correlation matrix between transaction characteristic variables

		value	day of the week							type of goods									type of commerce							type of contact				
			1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	1	2	3	4	
day of the week	1	-0.01																												
	2	-0.01	-0.15																											
	3	0.01	-0.16	-0.18																										
	4	-0.01	-0.15	-0.17	-0.18																									
	5	0.03	-0.16	-0.19	-0.2	-0.19																								
	6	0.03	-0.17	-0.19	-0.2	-0.19	-0.21																							
	7	-0.06	-0.11	-0.13	-0.13	-0.13	-0.14	-0.14																						
type of goods	1	-0.13	0	0.01	-0.01	0.02	-0.01	-0.01	0.02																					
	2	0.07	-0.04	0	0.01	0	0	0.05	-0.05	-0.27																				
	3	-0.13	0.02	0	0	0	-0.02	-0.02	0.03	-0.39	-0.11																			
	4	0.13	0	0	0.02	-0.01	0	0.01	-0.04	-0.24	-0.06	-0.09																		
	5	0.03	0.02	0.03	0.01	0	0.01	-0.03	-0.06	-0.2	-0.05	-0.08	-0.05																	
	6	0.07	0.01	0	0	0	0.01	0	0	-0.3	-0.08	-0.12	-0.07	-0.06																
	7	0.02	-0.01	-0.02	-0.01	-0.02	0	0.03	0.04	-0.2	-0.05	-0.08	-0.05	-0.04	-0.06															
	8	-0.01	0	-0.02	-0.02	-0.02	0.02	0.01	0.03	-0.22	-0.06	-0.08	-0.05	-0.04	-0.07	-0.04														
	9	0.17	0.01	0.01	-0.01	0.01	0	-0.02	-0.01	-0.2	-0.06	-0.08	-0.05	-0.04	-0.06	-0.04	-0.04													
type of commerce	1	-0.32	-0.01	0	0	0.01	-0.03	-0.04	0.1	0.14	-0.06	0.31	-0.17	-0.09	-0.27	-0.14	0.13	-0.17												
	2	0.13	-0.01	-0.02	0.02	0.01	0	0.05	-0.05	-0.14	0.3	-0.11	0.24	-0.06	-0.04	0.1	-0.05	-0.04	-0.34											
	3	0.09	0.02	0.01	0.01	-0.01	0.01	-0.02	-0.03	-0.17	-0.04	-0.08	0	0.37	0.19	-0.01	-0.02	0.03	-0.27	-0.07										
	4	0.15	-0.01	0.01	0	-0.01	0.02	0.05	-0.09	0.19	-0.08	-0.19	0.03	-0.1	0.18	-0.06	-0.11	-0.09	-0.57	-0.15	-0.12									
	5	0.11	0	0	0.01	0.01	0	-0.01	-0.02	-0.05	0.01	-0.03	0.07	0.09	0	-0.01	-0.01	0.02	-0.09	-0.02	-0.02	-0.04								
	6	0.08	0.04	0.03	-0.01	0	0.01	-0.04	-0.03	-0.15	-0.03	-0.05	-0.01	0.05	0.03	0.01	0	0.43	-0.18	-0.05	-0.04	-0.08	-0.01							
	7	0.09	0	-0.02	-0.02	-0.01	0.01	0.01	0.04	-0.17	-0.02	-0.09	0	0.01	0.11	0.26	-0.02	0.22	-0.31	-0.08	-0.06	-0.14	-0.02	-0.04						
type of contact	1	-0.15	-0.03	0.02	-0.01	-0.02	0	0.02	0.01	0.17	0	0.1	0.01	0.04	-0.3	-0.02	0.05	-0.27	0.3	-0.02	-0.18	-0.05	0	-0.17	-0.22					
	2	0.04	0.01	0.01	-0.01	0.01	0	-0.01	-0.01	-0.04	0.07	-0.02	0.02	-0.01	0	0.01	0	0.03	-0.05	0.06	0.01	-0.03	0.03	0.05	0.03	-0.22				
	3	0.17	0.03	0	0	0.02	-0.01	-0.01	-0.01	-0.09	0.05	-0.04	0.01	0	-0.01	0.05	-0.02	0.21	-0.12	0.03	0	-0.05	0.04	0.2	0.13	-0.39	-0.01			
	4	0.06	0.01	0.01	-0.01	0.01	-0.01	-0.01	0	-0.05	0.04	-0.02	0.02	0	0.03	0.05	-0.01	0	-0.06	0.04	0.12	-0.03	-0.01	0	0.01	-0.22	0	-0.01		
	5	0	0.01	-0.02	0.01	0.01	0.01	-0.02	0	-0.14	-0.05	-0.08	-0.04	-0.04	0.4	-0.03	-0.04	0.14	-0.22	-0.03	0.21	0.08	-0.02	0.03	0.13	-0.71	-0.01	-0.02	-0.01	
	6	0.12	0.02	-0.01	0.01	0	-0.01	0	-0.01	-0.04	-0.02	-0.04	0.01	-0.02	0.02	0.03	-0.02	0.16	-0.13	0	-0.01	0.04	-0.01	0.11	0.13	-0.45	-0.01	-0.01	-0.01	-0

Figure 1: Distribution of the use of payment instruments by class of value



NB: the intervals of the transaction size classes are not constant. In order to smooth the curve due to class cutting, we used mobile averages; we compute for each class the simple average of the six frequencies around the class (three before and three after).

Figure 2: Distribution of the use of payment instruments by type of good

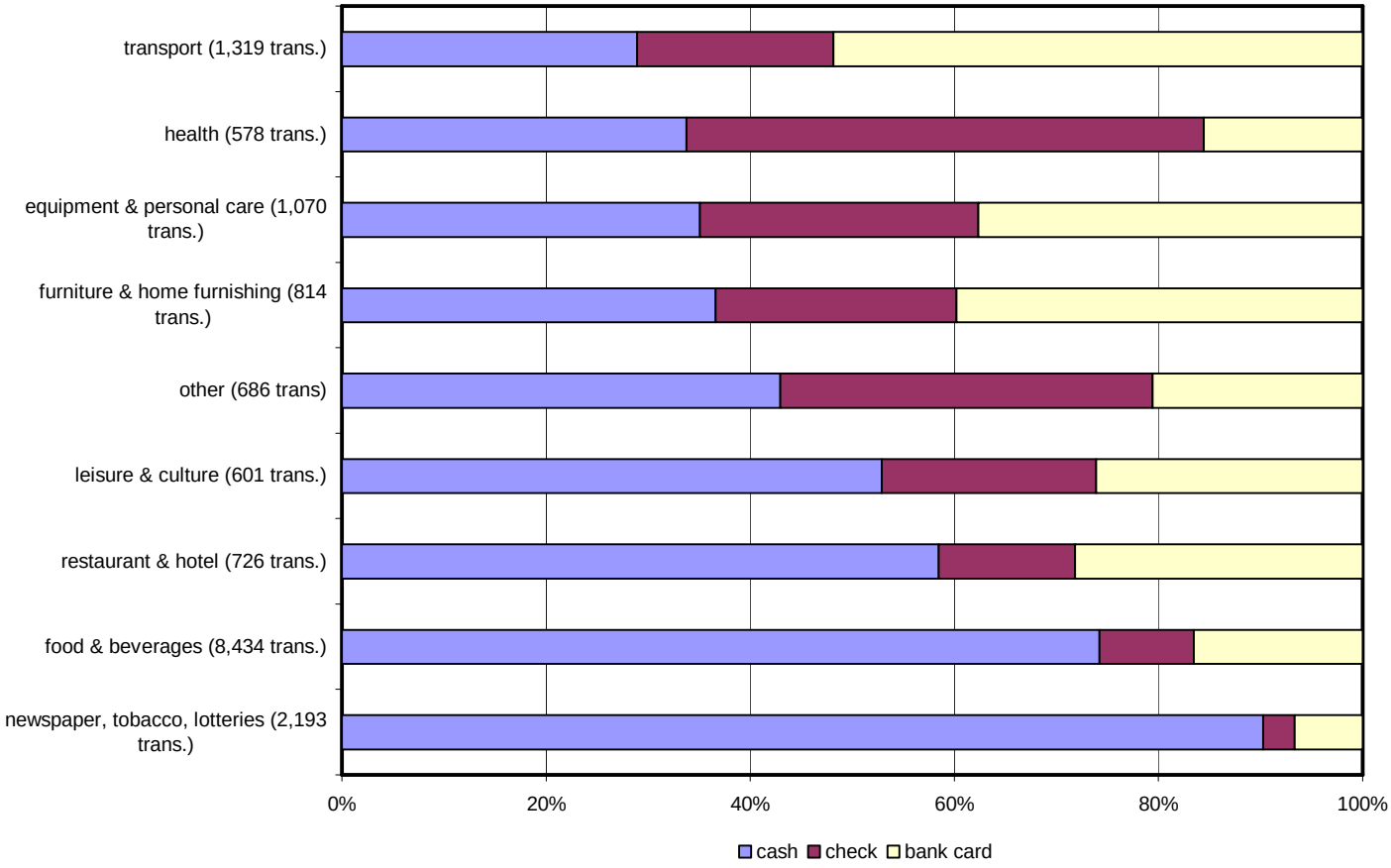


Figure 3: Distribution of the use of payment instruments by spending place

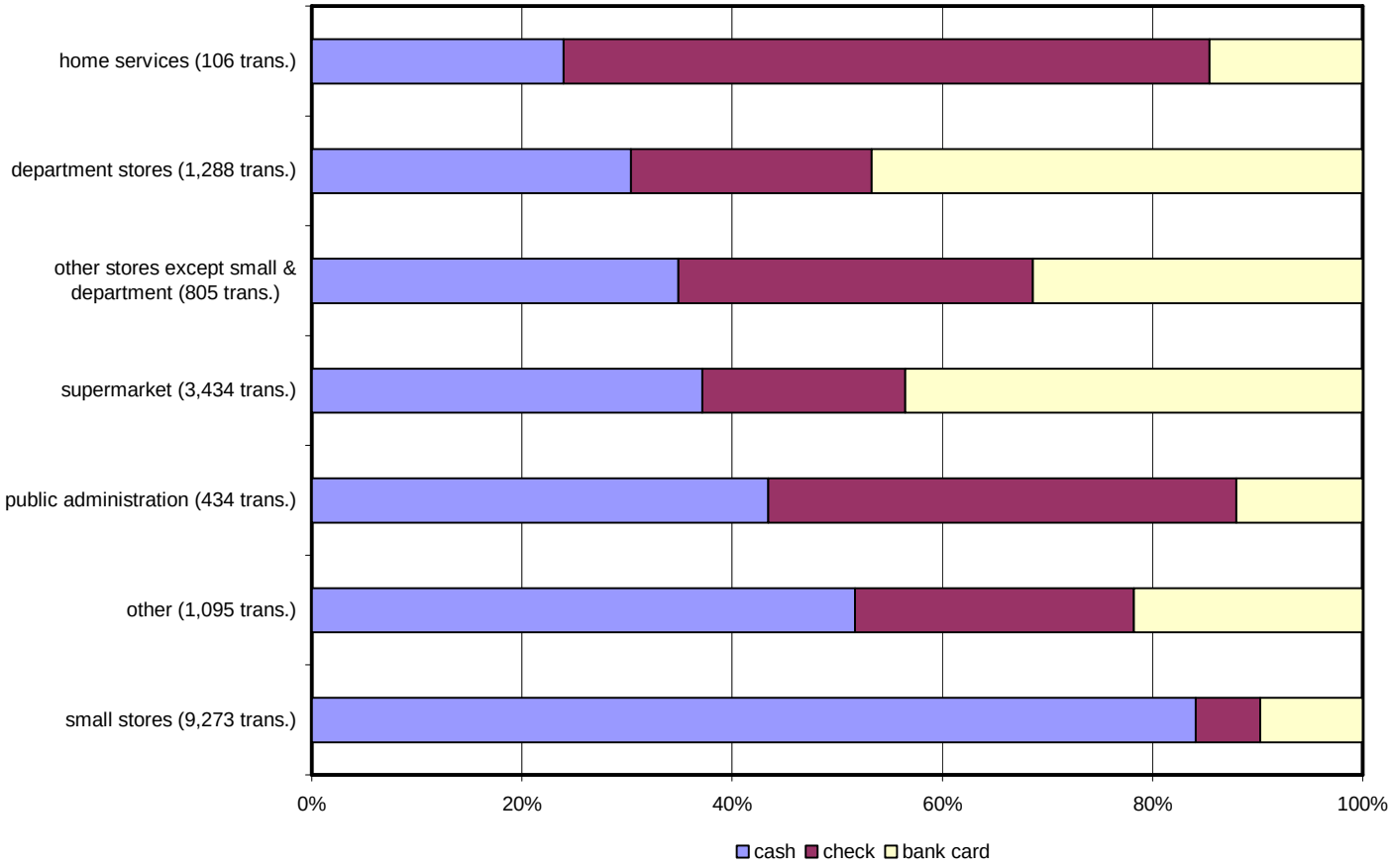


Figure 4: Distribution of the use of payment instruments by type of contact

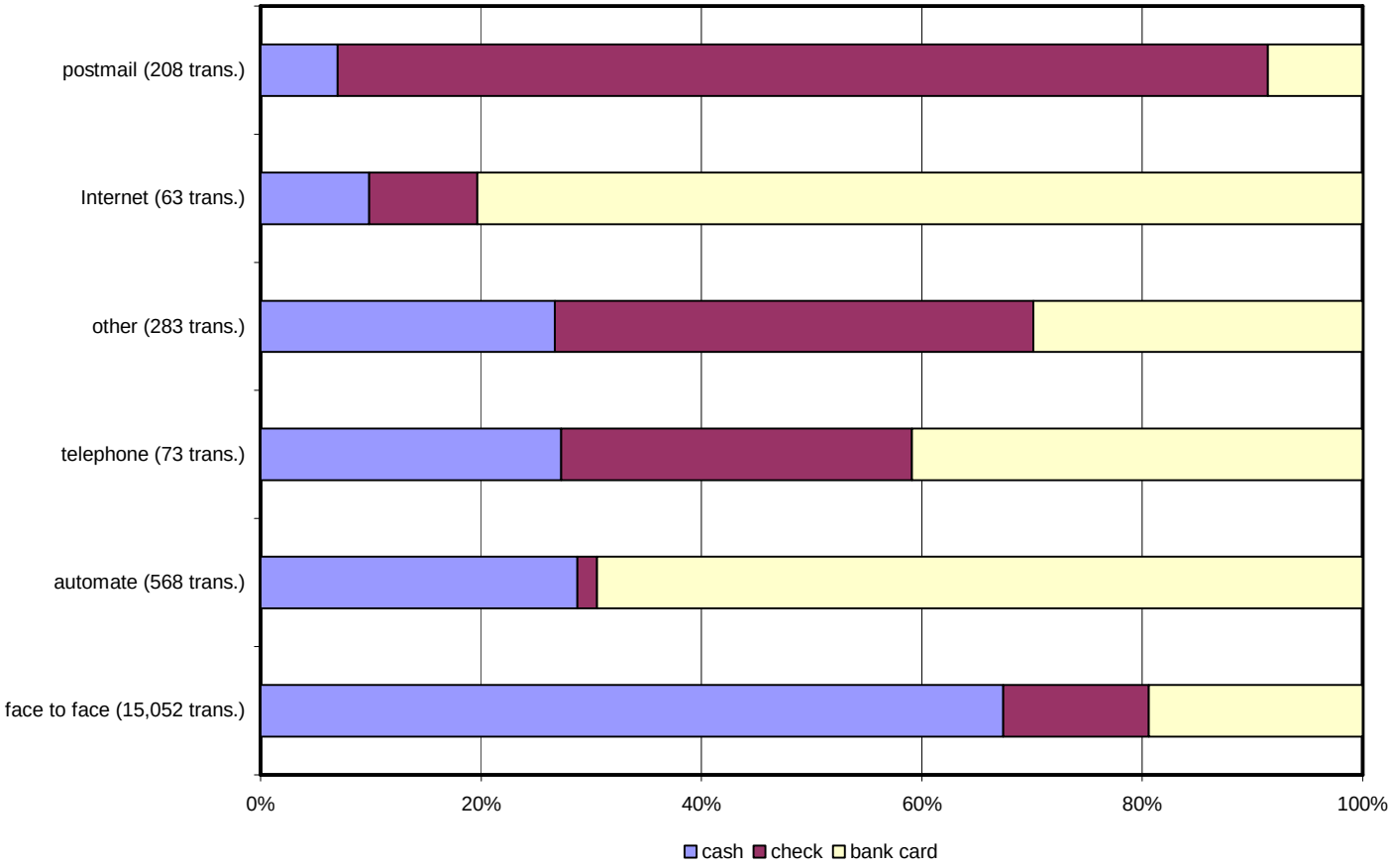


Table 1: Distribution of the transactions by payment instrument

Means of payment	Cash	Check	Bank card	Overall
Number *Volume of transaction*	7,088 *59.5%*	1,790 *14.9%*	3,068 *25.6%*	11,945 *100%*
Average value (euros)	8.94	66.83	47.47	27.44
Standard deviation	20.3	98.49	50.91	53.79

Table 2: Estimation results

Cash is the base outcome	**Check**	**Bank card**
Amount	0.072*** (13.32)	0.070*** (13.43)
Amount²	-0.0001*** (-11.58)	-0.0001*** (-9.54)
Day (category "Monday" excluded):		
Tuesday	0.152 (1.1)	0.107 (0.84)
Wednesday	0.026 (0.19)	0.054 (0.44)
Thursday	0.027 (0.19)	-0.065 (-0.53)
Friday	0.247* (1.88)	0.15 (1.32)
Saturday	-0.05 (-0.36)	0.186 (1.53)
Sunday	-0.077 (-0.44)	-0.067 (-0.44)
Good (category "Food and beverages" excluded):		
Equipment and personal care	1.413*** (9.29)	1.18*** (9.17)
Newspaper, tobacco, lotteries	-0.265 (-1.48)	-0.008 (-0.06)
Furniture and home furnishing	0.818*** (4.81)	0.846*** (5.84)
Health	2.508*** (15.38)	1.135*** (6.06)
Transport	1.44*** (8.73)	1.528*** (10.68)
Culture and leisure	0.774*** (4.29)	0.505*** (2.95)
Restaurant, hotel	1.21*** (7.24)	1.285*** (8.33)
Others	1.189*** (6.26)	0.599*** (3.03)
Spending place (category « small stores » excluded):		
Department stores	1.019*** (6.03)	1.403*** (10.23)
Other stores (except small and department)	1.047*** (6.39)	0.384** (2.24)
Supermarket	1.31*** (11.01)	1.645*** (15.31)
Home services	1.938*** (4.24)	0.112 (0.21)
Public services	0.807*** (3.68)	-0.598** (-1.99)
Others	0.947*** (6.04)	0.215 (1.34)
Contact ("face to face" excluded):		
Telephone	0.859 (1.07)	1.402* (1.86)
Post mail	2.942*** (5.92)	0.867 (1.42)
Internet	1.315* (1.84)	3.408*** (5.37)
Automat	-1.691*** (-3.74)	2.021*** (9.02)
Others	0.651** (2.44)	0.316 (1.24)
Limited choice	0.372** (2.06)	0.663*** (3.51)
Gender	0.477*** (3.87)	0.114 (1.05)
Age	-0.004 (-1.01)	-0.001 (-0.31)
Income (category "less than 500 €" excluded):		
From 500 € to 1,000 €	0.439** (2.06)	0.181 (0.95)

From 1,000 € to 1,500 €	0.396* (1.89)	0.319* (1.76)
From 1,500 € to 2,000 €	0.492** (2.19)	0.261 (1.32)
From 2,000 € to 2,500 €	0.717** (2.49)	0.826*** (3.27)
From 2,500 € to 3,000 €	0.056 (0.15)	0.097 (0.32)
More than 3,000 €	-0.492 (-1.35)	0.475 (1.59)
Do not know	-0.274 (-0.53)	0.118 (0.19)
No answer	-0.006 (-0.02)	0.137 (0.54)
Profcash	-0.322 (-0.73)	-0.306 (-0.92)
Education (no diploma is excluded) :		
Pre-high school certificate	-0.036 (-0.13)	0.199 (0.72)
Pre-high school professional certificate	-0.034 (-0.15)	0.239 (1.06)
Former pre-high school certificate	0.077 (0.26)	0.226 (0.79)
High school certificate	0.187 (0.82)	0.754*** (3.35)
Professional certificate	0.008 (0.03)	0.929*** (3.78)
BA, MA and PhD	-0.247 (-0.92)	0.859*** (3.39)
Intercept	-5.693*** (-11)	-5.526*** (-10.53)
frequencies effective frequencies predicted (cutoff of 0.5 / 0.6 / 0.7)	0.15 0.06 / 0.05 / 0.03	0.26 0.21 / 0.14 / 0.08
N= 11,945 Pseudo R^2=0.39 / Wald Chi^2= 2,437 / Log PseudoLH = -6869 1056 clusters / obs. per cluster: min=1; average=11.3; max=39		
Hausman test of iia assumption: Ho "odds are independent of other alternatives" Outcome omitted: Check, $Chi^2(45)$=4.65, Prob>0.99 Outcome omitted: Bank card, $Chi^2(45)$= -83.98, Prob>0.99		