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Carin van der Cruijssen and Jakob de Haan

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

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De Nederlandsche Bank NV
P.O. Box 98
1000 AB AMSTERDAM
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Payment literacy pays off: higher trust and financial inclusion^{*}

Carin van der Cruijssen^a and Jakob de Haan^{b, c}

^a *De Nederlandsche Bank, Amsterdam, the Netherlands*

^b *University of Groningen, Groningen, the Netherlands*

^c *CESifo, Munich, Germany*

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Abstract

This paper proposes a payment literacy index, developed using a comprehensive consumer survey in the Netherlands to assess knowledge of both traditional and new payment methods, as well as fraud in the payment system. The index suggests that there is considerable room for improvement in payment literacy. Payment literacy is influenced by a number of personal characteristics, the information sources used, experiences with fraud, and the desire to be well informed about payments. Our findings suggest a positive relationship between payment literacy and trust in the payment system and banks, as well as the likelihood of individuals adopting new payment methods and making payments independently.

Key words: payment literacy; payments; financial inclusion; financial literacy; trust

JEL-codes: D12; D83; G50; J16; J33

^{*} Carin van der Cruijssen is cluster lead research at the Retail, Payments and Research department of De Nederlandsche Bank (DNB) (corresponding author, email: c.a.b.van.der.cruijssen@dnb.nl). Jakob de Haan is Professor of Political Economy at the University of Groningen and research fellow of CESifo (Munich, Germany) (email: jakob.de.haan@rug.nl). We thank Edward van Dooren, Jorgen Eijlander, and Esther van den Kommer for their insightful comments on our survey and Maurice Bun for his helpful comments on a previous version of the paper. We are grateful to Miquelle Marchand of Centerdata for arranging the survey. The views expressed in this paper are our own and do not necessarily reflect those of DNB or the Eurosystem.

1. Introduction

Payment systems are becoming increasingly digital. Whereas cash has long been king, electronic payments are now the most commonly used payment method in a growing number of countries. For example, cash accounts for less than half of the point-of-sale (POS) payments in nine of the twenty euro area countries (ECB, 2024). While many people benefit from the digitalization of the payment system, this digital shift is a challenge for others (Koskelainen et al., 2023). To illustrate, more than one in six Dutch adults struggle to get to grips with digital payments (Broekhoff et al., 2023). One of the recommendations of Broekhoff et al. (2023) is to use technology in a smarter way to make digital payments simpler and more tailored to the users. In addition, people could be helped more effectively to learn how to use the digital payment system. Payment literacy is important for independent and responsible participation in the payment system and for the correct and safe use of all available payment methods.

Our research provides insight into payment literacy, the factors that influence it, and its impact. We aim to answer the following research questions: 1) How payment literate are consumers? 2) What factors explain differences in payment literacy levels? and 3) How is payment literacy related to trust in the payment system and banks, payment behaviour, and independence in making payments? The answers to these questions will be valuable for policy makers and bankers seeking to improve financial inclusion and trust across the socio-demographic spectrum.

We add to the extensive literature on financial literacy (see Zaimovic et al. (2023) for an overview). While previous research on financial literacy was mostly developed in a traditional analog world, it may no longer be compatible with the new and more complex financial landscape created by digital technologies (Koskelainen et al., 2023). Lusardi and Mitchell (2023) point to several reasons why financial decisions have become more complex, including new payment options such as ‘buy now, pay later’. These authors emphasize that financial literacy is more important than ever. Despite extensive research, there is still no consensus on how to define and implement the concept of financial literacy in general, let alone for different sub-domains (Goyal and Kumar, 2020). Lusardi and Mitchell (2023: 137) define financial literacy as “...people’s knowledge of and ability to use fundamental financial concepts in their economic decision-making...”. Financial literacy is important because it helps people to make sound financial decisions and reduces their financial fragility (Lusardi et al., 2020), which is also beneficial for financial resilience (Demertzis et al., 2020; Clark et al, 2021). For example, financial literacy is associated with less costly credit card behaviour (Allgood and Walstad, 2013; Mottola, 2013). Research measuring financial literacy covers: money basics, borrowing, investing, and protecting resources (Huston, 2010). There are also measures that focus on a specific aspect, such as pension finance literacy (Landerretche and Martínez, 2013) or insurance literacy (Tennyson, 2011).

However, there is limited research on payment literacy. Similar to Lusardi and Mitchell's (2023) definition of financial literacy, we can define payment literacy as people's knowledge of and ability to use payment systems and instruments. Marcotty-Dehm and Trütsch (2021) have begun research in this area. Their payment literacy index is based on six questions and captures consumers' understanding of the functionality, pricing and mechanisms of debit and credit cards in Switzerland. Based on data from the 2018 payment survey they find that around 30% of the Swiss respondents answered all questions correctly. Marcotty-Dehm and Trütsch (2021) find a positive association of payment literacy with the adoption of traditional and contactless debit and credit cards and a negative association with the adoption of prepaid credit cards. In contrast to financial literacy, payment literacy is related to the likelihood of adoption of payment instruments. However, their payment literacy index does not cover several important topics, including cash payments, contactless payments via payment cards, smartphones, or smartwatches, and knowledge of fraud in the payment system. We expect knowledge of these topics to be relevant to payment behaviour, trust in the payment system, and consumer empowerment in the realm of payments. Cwynar et al. (2022) have suggested a more extensive approach to measure payment literacy than Marcotty-Dehm and Trütsch (2021). Their survey among Polish consumers includes 23 true/false test items with the option I don't know (5 are false, 18 are true). The questions cover card payments (debit, credit, charge, prepaid, virtual), mobile payments and online payments. The questions refer not only to the characteristics of the payment instruments but also to the related infrastructure. Some questions are specific to the Polish market. The proposed Cashless Payments Knowledge (CPK) measure is positively related to safe cashless behaviour. The CPK is also positively associated with respondents' educational attainment and is higher for respondents living in a city or metropolitan area. Finally, it is highest among the youngest generation. The index does not include knowledge of fraud. In their study on gender gaps in the world of payments, van der Cruysen, Broekhoff and Knoben (2025) include respondents' self-assessed knowledge of nine types of fraud. In eight out of nine cases, men's self-declared knowledge of fraud was higher than that for women. This may reflect that men are more confident than women. In our study, we measure knowledge more objectively using true-false statements.

We contribute to the literature by developing a new payment literacy index that captures knowledge of both new and traditional payment instruments (including cash) and fraud within the payment system. In addition, we link our literacy index not only to socio-demographic factors but also to the sources of information consumers use to learn about payments, their desire to stay well informed about payments, and their experiences with fraud. Another key contribution of our research is that it explores the importance of payment literacy from multiple perspectives. We relate it not only to payment behaviour, but also examine its connection to trust in the payment system, trust in banks, and consumer empowerment in the realm of payments.

We have designed a consumer survey to explore payment literacy. This survey covers various aspects and includes questions that measure knowledge about payments and fraud in the payment

system. The survey was completed by members of the Centerpanel, a representative Dutch consumer panel that is widely used by both researchers and policy makers, in 2024. The Netherlands offers an excellent environment for the study of payment literacy. The payment system is well developed. Both electronic payments and cash are widely accepted at the POS (DNB, 2020; DNB, 2024) and it is easy to pay online with just a few clicks. In addition, the ownership of debit cards and bank accounts is almost universal (ECB, 2022), and there is a high level of internet connectivity in households (Statistics Netherlands, 2024). This allows us to focus on measuring consumer knowledge within this diverse payment landscape.

By developing a measure of payment literacy, we also contribute to the large literature on payment choice. Central banks, commercial banks, and retailers want to understand what drives payment behaviour. For example, this knowledge can help to guide payment behaviour towards the most cost-effective, secure, and convenient payment methods. The literature on payments has identified a wide range of factors that influence payment behaviour. Payment choice depends on personal characteristics, price incentives, perceived attributes of the instrument, psychological factors including habits and social norms, the transaction size and location, and external shocks. See Shy (2023) for details and references.

Our research also contributes to studies on the relationship between financial literacy and trust. While research on trust in the payment system is growing (Bijlsma et al., 2022; Broekhoff et al. 2024), the association between knowledge about payments and trust remains unexplored. It is important to understand how knowledge about payments influences trust. Trust is essential for the smooth functioning of the payment system. Previous studies on the relationship between financial literacy and trust have focused on trust in financial institutions. This research shows mixed results (van der Crujsen et al., 2023). For example, while several papers report a positive association (see, for example, van der Crujsen et al., 2021), Lachance and Tang (2012) find an inverted U-shaped relationship. At low levels of financial literacy, increasing knowledge leads to trust, but at higher levels, people become more critical as their knowledge increases. van der Crujsen, Doll and de Haan (2025) find a positive relationship between knowledge of banking supervision and trust in the banking supervisor based on data collected from Dutch consumers.

Finally, we add to the financial inclusion literature by exploring the relationship between payment literacy and payment independence. Broekhoff et al. (2023) report that the group of people who struggle with digital payments is not only large but also very diverse. It includes many people with low levels of education and older people, but also people with disabilities and people with low digital skills. They face a variety of barriers, including difficulty using devices such as POS terminals and smartphones, meeting time limits for certain actions, understanding instructions, remembering codes, and fear of the digital world. Reliance on the help of others leads to feelings of frustration, stress, shame, and vulnerability. Policy makers and banks are looking for ways to make people more independent in

the world of payments. One approach is to enhance payment literacy. We are the first to examine the relationship between payment literacy and payment empowerment.

Our findings suggest that payment literacy varies across demographic groups and is influenced by sources of information, experience with fraud, and the desire to be well informed. In addition, payment literacy is crucial. The higher the level of payment literacy, the higher the level of trust in the payment system and banks, and the higher the likelihood that individuals will navigate the digital payment landscape independently and use new digital payment methods. There is considerable room for improvement in payment literacy.

The remainder of the paper is structured as follows. Section 2 provides an overview of the Dutch payment landscape and presents our conceptual framework. Section 3 discusses our payment literacy survey. Section 4 explains the construction of our payment literacy measures and presents findings on payment literacy among Dutch consumers. Section 5 examines the drivers of variation in payment literacy, while section 6 explores the implications of payment literacy. Finally, section 7 draws conclusions and discusses policy implications.

2. The Dutch payment system and research framework

2.1 The Dutch payment landscape

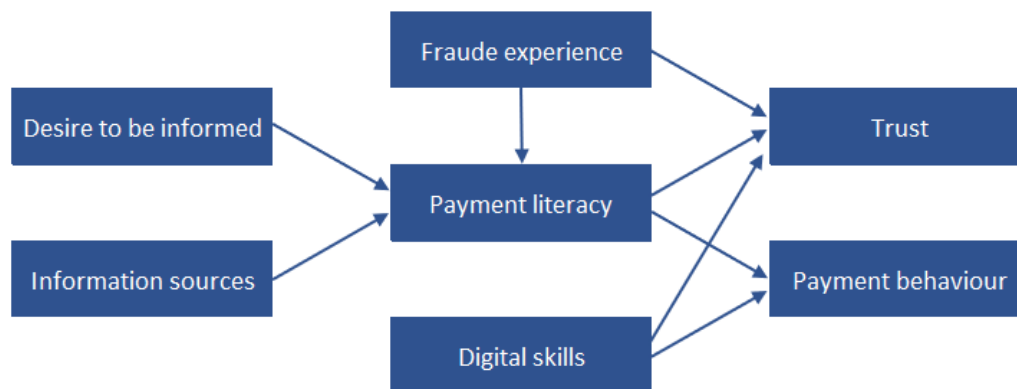
The Dutch payment landscape offers a wide range of payment methods with high acceptance rates for both electronic payments and cash (DNB, 2020; DNB, 2024). The factsheet on payment behaviour in 2023 of De Nederlandsche Bank and the Dutch Payments Association shows that Dutch consumers made around 7 billion POS transactions, with a total value of €171 billion (DNB and DPA, 2024). Most of these transactions were settled using electronic payment methods. Cash is used in 20% of the cases. Contactless payment methods via smartphones or wearables have become increasingly popular. In 2023, 29% of transactions were completed this way, 43% of transactions were conducted through contactless payments with debit cards, and 8% of transactions were completed with debit cards in the traditional way by inserting the card into the payment terminal. Credit cards are used for less than 1% of POS transactions. In the Netherlands, 98% of consumers have access to a payment account, and 95% have a payment card (ECB, 2022). In 2024, 98.5% of the Dutch population aged 12 and over had internet access and 92.2% used it for internet banking or mobile banking (Statistics Netherlands, 2024).

2.2 Framework

Figure 1 shows our conceptual framework. After constructing our payment literacy measures (section 4), we estimate models to explain variation in payment literacy across individuals (section 5). These models include the desire to be informed about payments, the sources of information used to acquire knowledge about payments, fraud experiences, and personal characteristics as right-hand-side variables. We then focus on the consequences of payment literacy (section 6). First, we analyse the importance of payment literacy for trust in the payment system and trust in banks. These models also include fraud

experiences, digital skills, and personal characteristics as explanatory variables. Finally, we focus on payment behaviour and how it depends on payment literacy. These models include digital skills and personal characteristics as explanatory variables. We examine experiences with different payment methods, the most frequently used payment instrument, and the ability to pay without the help of others.

Figure 1. Conceptual framework for the study of payment literacy, its drivers and consequences



Notes: Each model also encompasses personal characteristics. For the sake of clarity, these are not shown in the figure.

3. Payment literacy survey

We have designed a survey to measure payment literacy.¹ This survey includes questions on knowledge, questions to measure factors that influence knowledge, and questions on the impact of payment literacy. The survey was distributed to the online Centerpanel. This panel is fairly representative for the Dutch population. It is managed by Centerdata, a research institute affiliated with Tilburg University.² Participants without the facilities to take part in online surveys are provided with a basic computer, a broadband internet connection, and technical support. Both researchers and policy makers have used the Centerpanel extensively to collect consumer survey data on a wide range of topics, for example to study financial literacy and wealth accumulation (van Rooij et al., 2012) or gender gaps in the world of payments (van der Crujisen, Broekhoff and Knoben, 2025). For detailed information on the Centerpanel, we refer to Teppa and Vis (2012).

The survey was distributed to 3229 members of the Centerpanel aged 16 and over, between 22 November and 17 December 2024. The survey was fully completed by 2327 respondents (72.1%) and partially completed by 9 panel members (0.3%). We use the responses of the group of respondents who completed the survey in full. The descriptive results in this paper are based on weighted Centerpanel data to correct for (minor) differences between the sample and the Dutch population in terms of gender, age, net household income, and educational attainment.

¹ See online Appendix A for the questions in the payment survey.

² See <https://en.centerdata.nl/> for more information.

4. Payment literacy measures

4.1 Statements to measure payment literacy

To measure payment literacy, we asked respondents to indicate whether ten statements about payments and ten statements about fraud in the payment system were true or false. To avoid guessing, we included the option “I don’t know”. The question was introduced with the following text: “Finally, we would like to measure your knowledge about payments with the following questions. It is okay if you do not know the answers. To get an accurate picture of your knowledge, it is important that you do not look anything up.” This introduction prevents guesswork and looking up the correct answers. Table 1 shows the results of the ten statements about payments, while Table 2 shows the results of the statements to test knowledge of fraud. The statements cover both digital payments and cash payments and both the offline and online worlds. The tables show the statements in order of least to most correct.

Table 1. Statements to measure knowledge about payments

Do you think the following statements about payments in the Netherlands are true or false?

		True	False	I don't know
S1	The PIN chip in a smartphone or smartwatch enables contactless payments and securely exchanges information with a payment terminal.	48%	15% ✓	38%
S2	An amount of 500 euros cannot be paid contactless with a physical debit card. The debit card must be inserted into the payment terminal.	56%	21% ✓	23%
S3	Post-payment is only possible with webshops and never in physical stores.	48%	37% ✓	15%
S4	Euro banknotes newly put into circulation come in 6 different denominations.	38% ✓	24%	39%
S5	Payments with iDEAL can also be made using an iDEAL QR code. This QR code can be recognized by the iDEAL logo in the middle of the QR code.	58% ✓	9%	33%
S6	Banknotes of 5 euros cannot be withdrawn from all ATMs.	60% ✓	16%	24%
S7	If a customer pays for a bag of apples costing 2.98 euros in cash, the shopkeeper may round the amount to 3.00 euros if it is clearly indicated that rounding is applied (for example, via a window sticker).	63% ✓	24%	13%
S8	The edges of all euro coins are smooth.	10%	74% ✓	16%
S9	When paying with a credit card, the amount is not immediately debited from the payment account.	75% ✓	9%	16%
S10	For contactless payments with the physical debit card, a PIN code never needs to be entered.	11%	83% ✓	6%

Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. The statements are ordered by the proportion of correct responses. The order of the statements in the question was randomised for respondents. The symbol ✓ indicates the correct answers.

For four out of ten payment-related statements, a minority knows the correct answer (Table 1). We can illustrate this with the two statements that were least correctly answered. Only 15% of people know that the chip in a smartphone or smartwatch that enables contactless payments is not called a PIN chip. It is called a Near Field Communication (NFC) chip. In addition, only 21% of people know that

€500 can be paid contactless. For six out of ten payment-related statements, a majority of people know the correct answer. We can illustrate this with the statements with the highest share of correct answers. There are situations where a PIN code has to be entered when paying contactless with a physical debit card. This is known by 83% of people. Three out of four people know that when paying with a credit card, the amount is not debited from the payment account immediately.

In eight out of ten cases, the majority of respondents answered correctly to questions measuring their knowledge about payment fraud (Table 2). Many people (93%) know that banks never ask their customers to send in their debit cards. In addition, many people (89%) know what bank helpdesk fraud is. However, only 26% of people know that a web shop with a URL starting with https:// and a padlock in the address bar is not necessarily trustworthy.

Table 2. Statements to measure knowledge about fraud in the payment system

And do you think the following statements about secure payments in the Netherlands are true or false?

		True	False	I don't know
S11	A web shop is reliable if the internet address (URL) starts with https:// and you see a padlock in the address bar.	51%	26% ✓	23%
S12	When criminals pretend to be family members and ask for money via a text message, this is called phishing.	28%	42% ✓	30%
S13	The authenticity of a euro banknote can be checked by feeling, looking, and tilting it.	60% ✓	22%	18%
S14	Malware is harmful or deceptive software that can get onto a computer, for example, by inserting an infected USB stick.	67% ✓	8%	25%
S15	A web shop is reliable if you can pay with iDEAL and credit card.	13%	71% ✓	16%
S16	Banks have introduced the IBAN-Name Check to make the payment system safer.	74% ✓	6%	21%
S17	A genuine euro banknote has a watermark and security thread (a dark stripe across the banknote), which are visible when you hold the banknote up to the light.	78% ✓	4%	18%
S18	The PIN code of a debit card should only be shared with bank employees.	5%	88% ✓	7%
S19	An example of bank helpdesk fraud is when criminals pose as bank employees, call you, and ask you to transfer money to a "safe account".	89% ✓	4%	8%
S20	Banks never ask their customers to send in their debit cards.	93% ✓	3%	5%

Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. The statements are ordered by the proportion of correct responses. The order of the statements in the question was randomised for respondents. The symbol ✓ indicates the correct answers.

4.2 Construction of payment literacy measures

We measure payment literacy (PL) as follows. For each statement, we construct a dummy variable PL_n , which equals 1 for respondents who gave the correct answer to statement number n and 0 for respondents who gave the wrong answer or answered "I don't know". For example, the dummy PL_1 refers to statement S1. PL_{total} is the average score on all twenty statements, $PL_{payments\ total}$ captures the average score on the ten statements about payments, while $PL_{fraud\ total}$ captures the average score on the ten statements about fraud. Additionally, PL_{cash} shows the average score on all statements about

cash payments and fraud with cash payments, while *PL digital* captures the average score on all statements about digital payments and fraud with digital payments. *PL payments cash* and *PL payments digital* are based on statements about cash payments and digital payments, respectively. *PL fraud cash* and *PL fraud digital* are based on responses to the statements about fraud in the world of cash and the world of digital payments, respectively. All PL variables range between 0 and 1. See Table 3 for more details. The average of *PL total* is 0.60, which means that, on average, people answer 60% of the twenty statements correctly. Knowledge of fraud is higher than knowledge of payments (0.69 versus 0.52). The lowest score is found for *PL payments digital*. On average, 48% of the statements about digital payments are answered correctly. Figure 2 shows the distribution of *PL total*.

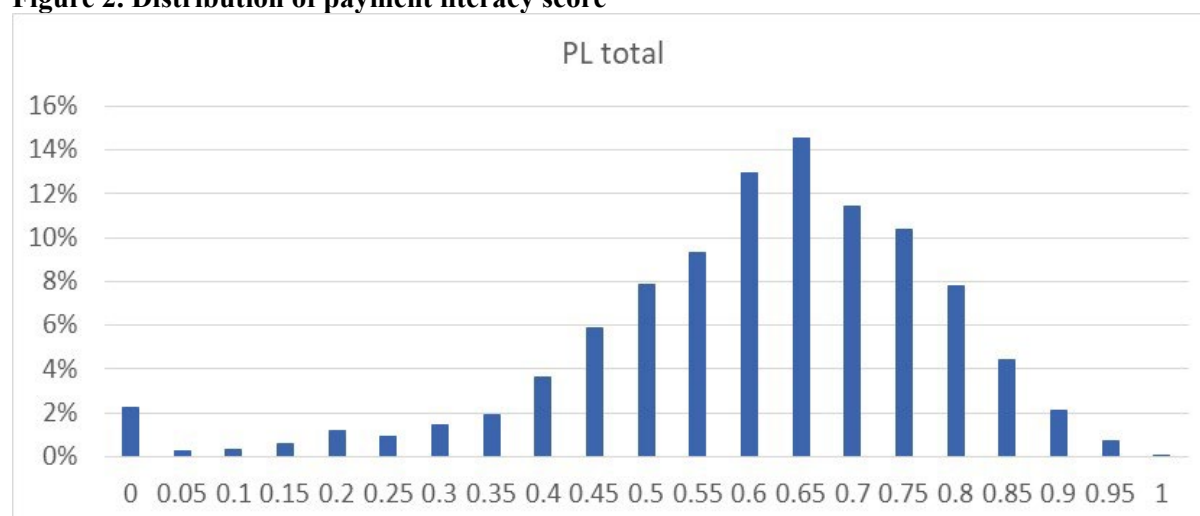
Table 3. Payment literacy measures

Payment literacy measure	Definition	Mean
PL total	$= \frac{\sum_{n=1}^{20} PL_n}{20}$	0.60
PL cash	$= (PL_4 + PL_6 + PL_7 + PL_8 + PL_{13} + PL_{17}) / 6$	0.62
PL digital	$= (PL_1 + PL_2 + PL_3 + PL_5 + PL_9 + PL_{10} + PL_{11} + PL_{12} + PL_{14} + PL_{15} + PL_{16} + PL_{18} + PL_{19} + PL_{20}) / 14$	0.60
PL payments total	$= \frac{\sum_{n=1}^{10} PL_n}{10}$	0.52
PL payments cash	$= (PL_4 + PL_6 + PL_7 + PL_8) / 4$	0.59
PL payments digital	$= (PL_1 + PL_2 + PL_3 + PL_5 + PL_9 + PL_{10}) / 6$	0.48
PL fraud total	$= \frac{\sum_{n=11}^{20} PL_n}{10}$	0.69
PL fraud cash	$= (PL_{13} + PL_{17}) / 2$	0.69
PL fraud digital	$= (PL_{11} + PL_{12} + PL_{14} + PL_{15} + PL_{16} + PL_{18} + PL_{19} + PL_{20}) / 8$	0.69

Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. The mean payment literacy scores are reported in this table. For all measures, the observed minimum score is 0 and the maximum score is 1.

Figure 2. Distribution of payment literacy score



Source: Centerpanel, 22 November - 17 December 2024.

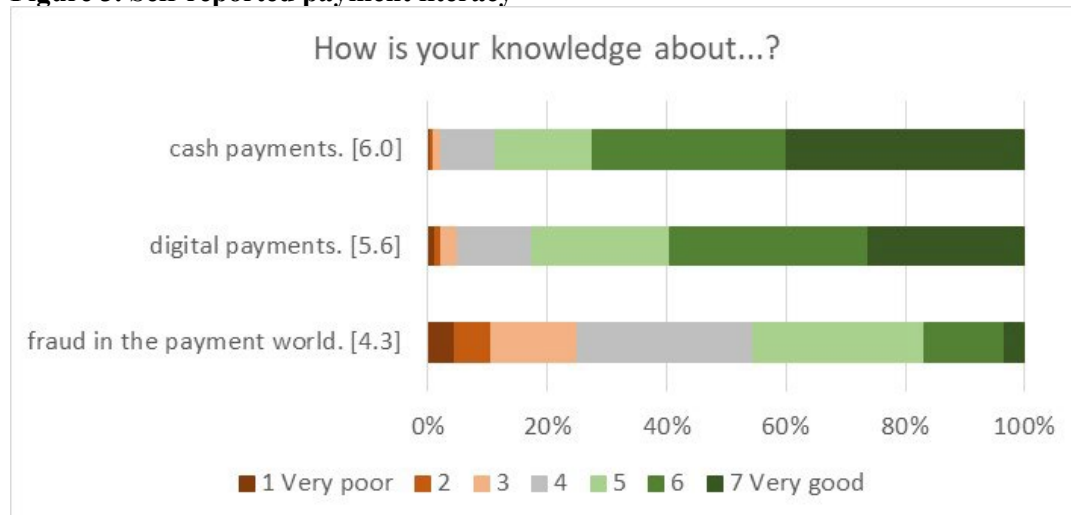
Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and the educational attainment.

4.3 Self-perceived payment literacy

Self-perceived payment literacy is measured on a scale from 1 (“very poor”) to 7 (“very good”) for three aspects: cash payments, digital payments, and fraud in the world of payments (see Figure 3). On average, people rate their knowledge of cash and digital payments as good, with average scores of 6.0 and 5.6, respectively. Knowledge of fraud is perceived to be poorer, with an average score of 4.3 and 25% of people reporting poor knowledge of fraud.

Pearson correlation coefficients indicate positive and significant relationships between self-reported and actual payment literacy, with moderate strength. For self-reported knowledge of cash payments, the correlation is 0.15 with *PL payments cash* and 0.18 with *PL cash*. For self-reported knowledge of digital payments, the correlation is 0.23 with *PL payment digital* and 0.30 with *PL digital*. For self-reported knowledge of payment fraud, the correlation is 0.26 with *PL fraud total*. In all cases, the p-value is less than 0.001, indicating statistical significance.

Figure 3. Self-reported payment literacy



Source: Centerpanel, 22 November - 17 December 2024.

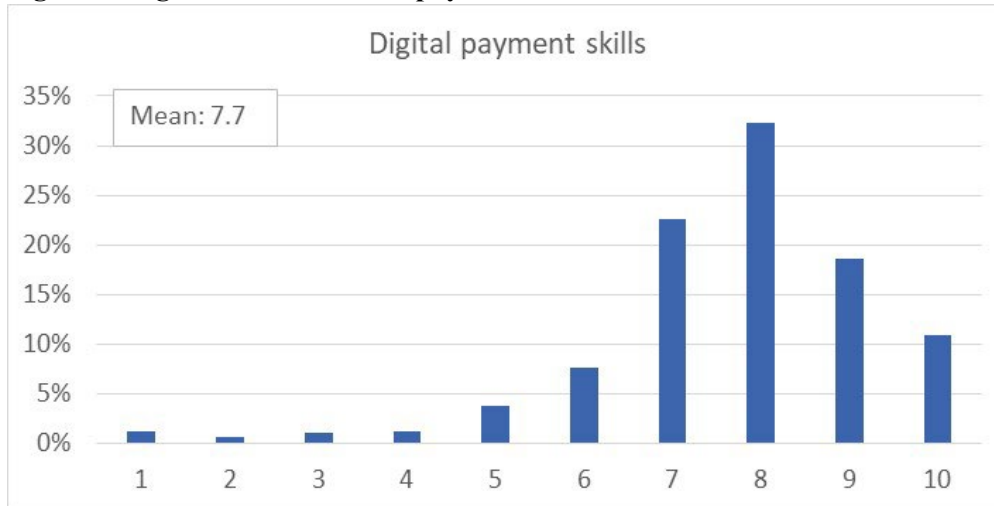
Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. The average response is shown between brackets.

4.4 Digital payment skills

In addition to having a solid understanding of payments and fraud, having the right digital skills is essential to effectively navigate the diverse world of payments. The variable *digital skills* ranges from 1 “not digitally skilled at all” to 10 “very digitally skilled” and captures digital skills in the field of payments (see Figure 4). On average, people rate their digital skills related to payments at 7.7. While *PL total* is significantly correlated with *digital skills* (0.37, p-value < 0.001), the moderate strength of this correlation coefficient suggests that the two constructs capture distinct aspects.³

³ See Table B.2 in Appendix B for the correlations between all payment literacy measures and *digital skills*.

Figure 4. Digital skills related to payments



Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. Question: “You are digitally skilled if you possess all the skills necessary to navigate in the digital society. This includes, for example, the ability to use a computer or mobile phone proficiently and navigate the internet effectively. On a scale from 1 (not digitally skilled at all) to 10 (very digitally skilled), what score would you give yourself for your digital skills in the field of payments?”

5. Explaining variation in payment literacy

To explore potential explanations for variation in payment literacy, we estimate linear models using different payment literacy measures as dependent variable. The results are presented in Table 4.^{4, 5}

5.1 Payment literacy and the desire to be informed

The models in Table 4 include respondents’ desire to be informed. The variables *desire to be informed: cash payments*, *desire to be informed: digital payments*, and *desire to be informed: fraud* capture the answer to the question “How important is it to be well informed about [cash payments / digital payments / fraud in the payments world]?”. These three variables range from 1 “very unimportant” to 7 “very important”. Figure 5 shows the weighted proportions of responses. On average, the desire to be informed is 5.9 for fraud and digital payments and 5.5 for cash payments. Only a small proportion of people consider it unimportant to be well informed.

The more people want to be well informed about digital payments and the stronger their desire to be well informed about payment fraud, the higher their payment literacy is (Table 4). To illustrate: someone who thinks it is very important to be well informed about digital payments scores 0.12 higher on the *PL total* than someone who thinks it is very unimportant to be well informed about digital payments. The effect size is the same for the desire to be well informed about fraud. An opposite effect

⁴ Multicollinearity is not a concern. The mean Variance Inflation Factor (VIF) ranges from 1.46 to 1.53. Across all analyses conducted in this research, the highest observed mean VIF is 1.82.

⁵ See Table B.1 in Appendix B for summary statistics of the variables included in the empirical analysis.

Table 4. Payment literacy: the role of desire to be informed, sources of information, experience with fraud, and personal characteristics (1/2)

	(1) PL total	(2) PL cash	(3) PL digital	(4) PL payments total	(5) PL payments cash	(6) PL payments digital	(7) PL fraud total	(8) PL fraud cash	(9) PL fraud digital
Desire to be informed: cash payments	-0.01*** (0.00)	0.00 (0.00)		-0.01** (0.00)	0.01 (0.00)		-0.01** (0.00)	0.01 (0.01)	
Desire to be informed: digital payments	0.02*** (0.00)		0.01*** (0.00)	0.02*** (0.00)		0.02*** (0.00)	0.02*** (0.01)		0.01*** (0.01)
Desire to be informed: fraud	0.02*** (0.00)	0.02*** (0.01)	0.02*** (0.00)				0.02*** (0.01)	0.03*** (0.01)	0.02*** (0.01)
Source: television	0.03*** (0.01)	0.05*** (0.01)	0.02*** (0.01)	0.02*** (0.01)	0.04*** (0.01)	0.01 (0.01)	0.04*** (0.01)	0.06*** (0.02)	0.03*** (0.01)
Source: radio	0.02 (0.01)	0.02 (0.02)	0.02 (0.01)	0.01 (0.02)	0.02 (0.02)	0.01 (0.02)	0.02 (0.02)	0.02 (0.03)	0.02 (0.02)
Source: newspapers	0.03*** (0.01)	0.03** (0.01)	0.04*** (0.01)	0.03*** (0.01)	0.03** (0.01)	0.03*** (0.01)	0.04*** (0.01)	0.02 (0.02)	0.04*** (0.01)
Source: magazines	0.02 (0.02)	0.03 (0.03)	0.01 (0.02)	0.01 (0.02)	0.01 (0.03)	0.02 (0.02)	0.02 (0.03)	0.07* (0.04)	0.01 (0.03)
Source: internet	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.04*** (0.01)	0.04*** (0.01)	0.06*** (0.01)	0.07*** (0.02)	0.06*** (0.01)
Source: social media	-0.02** (0.01)	-0.01 (0.02)	-0.03** (0.01)	-0.02 (0.01)	-0.02 (0.02)	-0.02 (0.01)	-0.03** (0.01)	-0.00 (0.02)	-0.03** (0.01)
Source: partner	0.01 (0.01)	0.02 (0.02)	0.00 (0.01)	-0.00 (0.01)	0.01 (0.02)	-0.01 (0.01)	0.02 (0.01)	0.05** (0.02)	0.01 (0.01)
Source: friends	0.01 (0.01)	0.00 (0.02)	0.01 (0.01)	0.00 (0.01)	-0.00 (0.02)	0.00 (0.01)	0.02* (0.01)	0.02 (0.02)	0.02* (0.01)
Source: family	0.00 (0.01)	0.01 (0.01)	0.00 (0.01)	0.00 (0.01)	0.01 (0.02)	-0.00 (0.01)	0.01 (0.01)	0.02 (0.02)	0.00 (0.01)
Source: colleagues	0.05*** (0.01)	0.04* (0.02)	0.05*** (0.01)	0.06*** (0.02)	0.06** (0.02)	0.07*** (0.02)	0.03* (0.02)	0.02 (0.03)	0.04** (0.02)
Source: shopkeepers	0.02 (0.02)	0.02 (0.03)	0.01 (0.02)	0.02 (0.02)	0.01 (0.03)	0.02 (0.02)	0.02 (0.02)	0.03 (0.04)	0.01 (0.02)
Source: banks	0.04*** (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.04*** (0.01)	0.06*** (0.01)	0.04*** (0.01)	0.04*** (0.01)	0.05*** (0.02)	0.04*** (0.01)
Source: Dutch Payments Association	0.03 (0.05)	0.06 (0.05)	0.02 (0.05)	0.05 (0.05)	0.05 (0.06)	0.05 (0.05)	0.01 (0.05)	0.07 (0.08)	-0.00 (0.06)
Source: Dutch Banking Association	0.05** (0.02)	0.10*** (0.04)	0.03 (0.02)	0.06** (0.02)	0.12*** (0.04)	0.02 (0.03)	0.05* (0.03)	0.07 (0.07)	0.04 (0.03)
Source: De Nederlandsche Bank	0.03 (0.02)	0.01 (0.03)	0.03* (0.02)	0.01 (0.02)	-0.01 (0.03)	0.02 (0.02)	0.04** (0.02)	0.06 (0.04)	0.04* (0.02)
Source: other	0.04* (0.02)	0.05* (0.03)	0.03 (0.02)	0.05** (0.02)	0.06** (0.03)	0.05** (0.02)	0.03 (0.02)	0.05 (0.04)	0.02 (0.03)
Fraud experience: self	0.00 (0.01)	-0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	-0.02 (0.02)	0.01 (0.01)
Fraud experience: other people	0.03*** (0.01)	0.04*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.04*** (0.01)	0.02*** (0.01)	0.03*** (0.01)	0.03** (0.02)	0.03*** (0.01)
Female	-0.03*** (0.01)	-0.01 (0.01)	-0.04*** (0.01)	-0.02** (0.01)	-0.00 (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.02 (0.02)	-0.04*** (0.01)
Age: between 35 and 49	0.01 (0.01)	0.03 (0.02)	-0.00 (0.01)	-0.00 (0.01)	0.03 (0.02)	-0.03* (0.02)	0.02 (0.02)	0.03 (0.03)	0.02 (0.02)
Age: between 50 and 64	-0.02* (0.01)	-0.00 (0.02)	-0.03** (0.01)	-0.04*** (0.01)	0.01 (0.02)	-0.07*** (0.02)	-0.00 (0.01)	-0.02 (0.03)	0.00 (0.02)
Age: 65 and over	-0.10*** (0.01)	-0.09*** (0.02)	-0.11*** (0.01)	-0.12*** (0.01)	-0.06*** (0.02)	-0.16*** (0.01)	-0.09*** (0.01)	-0.14*** (0.03)	-0.08*** (0.02)
Education: high	0.03*** (0.01)	0.01 (0.01)	0.04*** (0.01)	0.03*** (0.01)	0.02* (0.01)	0.04*** (0.01)	0.02*** (0.01)	-0.01 (0.02)	0.03*** (0.01)
Income: quintile 2	0.03*** (0.01)	0.03* (0.02)	0.03*** (0.01)	0.03** (0.01)	0.03* (0.02)	0.03** (0.01)	0.03*** (0.01)	0.03 (0.02)	0.04*** (0.01)
Income: quintile 3	0.01 (0.01)	-0.01 (0.02)	0.02** (0.01)	0.01 (0.01)	-0.00 (0.02)	0.02 (0.01)	0.02 (0.01)	-0.00 (0.03)	0.03** (0.01)
Income: quintile 4	0.04*** (0.01)	0.01 (0.02)	0.06*** (0.01)	0.04*** (0.01)	0.02 (0.02)	0.06*** (0.01)	0.05*** (0.01)	0.01 (0.03)	0.07*** (0.01)

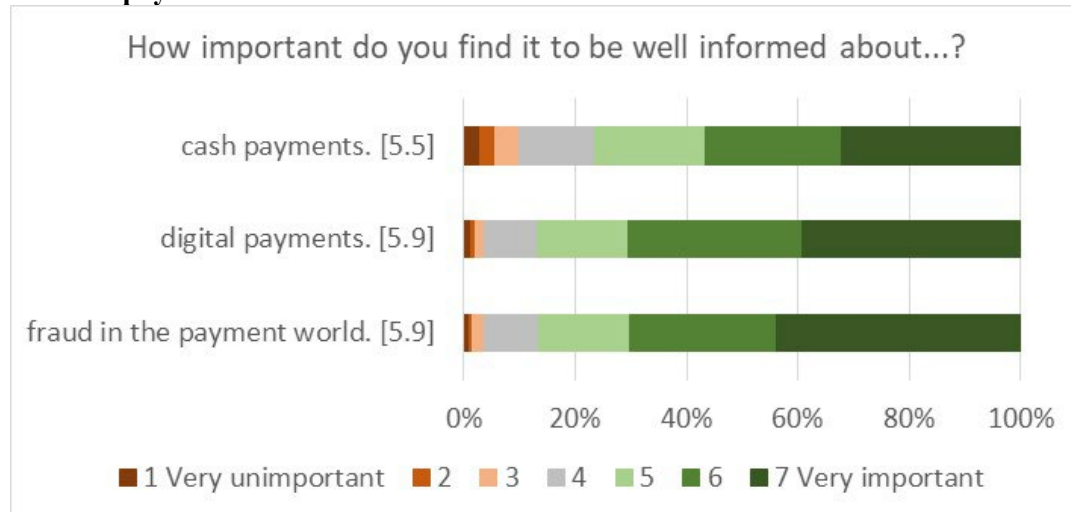
Notes: The table reports coefficients of linear models with knowledge measures as dependent variable. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 4. Payment literacy: the role of desire to be informed, sources of information, experience with fraud, and personal characteristics (2/2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PL total	PL cash	PL digital	PL payments total	PL payments cash	PL payments digital	PL fraud total	PL fraud cash	PL fraud digital
Income: quintile 5	0.04*** (0.01)	0.01 (0.02)	0.06*** (0.01)	0.02 (0.01)	0.02 (0.02)	0.03* (0.02)	0.06*** (0.02)	0.01 (0.03)	0.08*** (0.02)
Partner	0.00 (0.01)	0.01 (0.01)	-0.00 (0.01)	0.02** (0.01)	0.01 (0.01)	0.02** (0.01)	-0.02 (0.01)	0.01 (0.02)	-0.02** (0.01)
Homeowner	0.04*** (0.01)	0.02 (0.01)	0.04*** (0.01)	0.04*** (0.01)	0.02 (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.01 (0.02)	0.04*** (0.01)
Works in a financial institution	0.04*** (0.01)	0.04 (0.03)	0.05*** (0.01)	0.04** (0.02)	0.04 (0.03)	0.04* (0.02)	0.04*** (0.02)	0.03 (0.04)	0.05*** (0.02)
Constant	0.34*** (0.03)	0.38*** (0.04)	0.32*** (0.03)	0.33*** (0.03)	0.43*** (0.04)	0.30*** (0.03)	0.36*** (0.04)	0.40*** (0.06)	0.35*** (0.04)
Number of observations	2327	2327	2327	2327	2327	2327	2327	2327	2327
R ²	0.24	0.08	0.26	0.18	0.06	0.20	0.21	0.06	0.22
F-statistic	22.9***	6.6***	26.6***	16.7***	4.6***	18.9***	17.8***	4.8***	19.5***

Notes: The table reports coefficients of linear models with knowledge measures as dependent variable. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Figure 5. The desire to be well informed about cash payments, digital payments and fraud in the world of payments



Source: Centerpanel, 22 November - 17 December 2024.

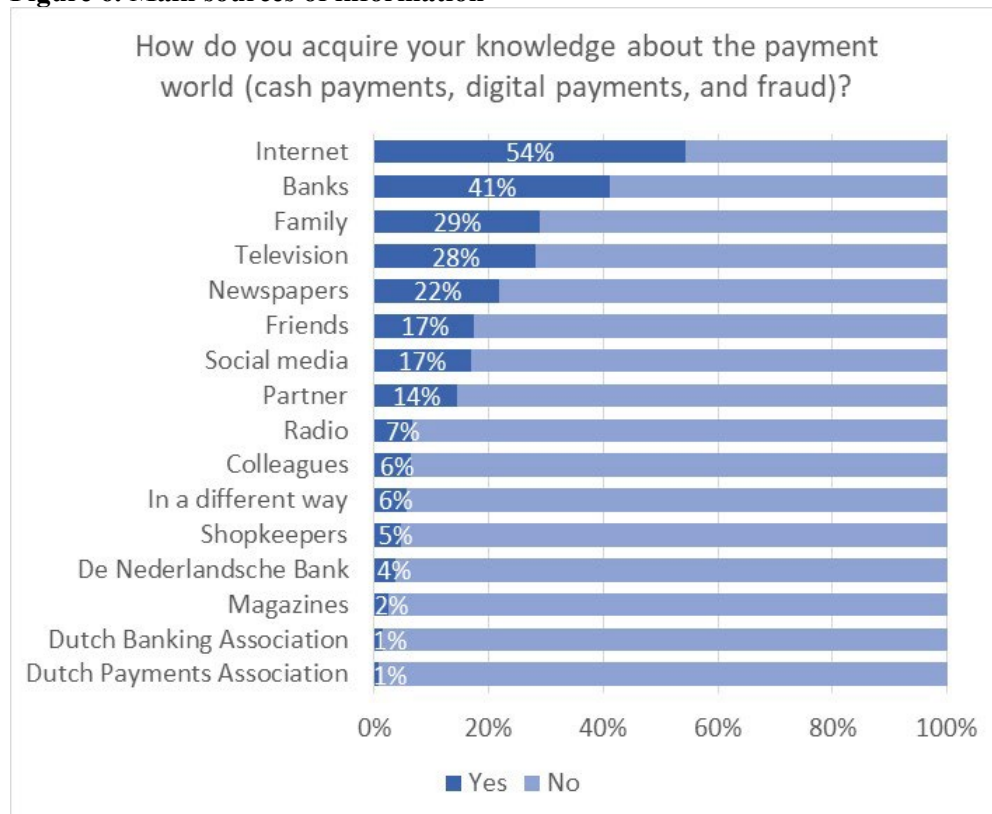
Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. The average answer is shown between brackets.

is found for the desire to be well informed about cash payments. It is not significantly related to the cash payment literacy measures and is negatively related to *PL total*, *PL payments total*, and *PL fraud total*. For example, someone who thinks it is very important to be well informed about cash payments scores 0.06 lower on the *PL total* than someone who thinks it is very unimportant to be well informed about cash payments. The desire to be well informed is related to personal characteristics (see Table C.1 in Appendix C for our estimation results). For example, for all three measures of the desire to be well informed, the values are the highest for people aged 65 and over. The desire to be well informed about digital payments and fraud is lowest among people in the lowest income category.

5.2 Payment literacy and information sources

The models in Table 4 also include dummy variables measuring whether a particular source of information is one of the respondent's maximum top three main sources of information for acquiring knowledge about cash payments, digital payments, and fraud. For example, *source: television* is 1 for respondents who have television in their top three sources and 0 for those who do not. Figure 6 shows the different types of information sources and their popularity for gaining knowledge about payments. The internet is the most popular source of information, with 54% of the people having internet in their top three. Banks come second (41%), followed by family (29%), television (28%), and newspapers (22%). The main sources of information vary by demographic groups (see Table C.2 in Appendix C for the results). For example, the internet is less likely to be in the top three for women, the less educated, and those aged 65 and over, than for men, the highly educated, and younger people.

Figure 6. Main sources of information



Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. Respondents choose their main sources (maximum 3). The order of the sources in the question was randomised for respondents.

Seven out of sixteen information sources are positively associated with *PL total*, while one information source has a negative effect on *PL total*. The seven sources with a positive effect are television, newspapers, the internet, colleagues, banks, the Dutch Banking Association, and other. The

effects range between 0.03 and 0.05. On the other hand, people who have social media in their top three of sources of information have a lower total payment literacy score, but the effect is small: -0.02.

5.3 Payment literacy and experience of fraud

Third, fraud experiences are captured by the models in Table 4. We distinguish between direct and indirect experience of payment fraud. The majority of people have never experienced fraud themselves (Figure 7a). Of those who have experienced fraud, most have not been victims. Unsurprisingly, there are more indirect experiences of fraud (Figure 7b). The majority of people know someone who has experienced fraud, and in most of these cases, the person they know has been a victim. We construct two dummy variables to capture fraud experience: *fraud experience: self* (0 = no, 1 = yes) and *fraud experience: other people* (0 = no, 1 = yes).

Figure 7. Direct and indirect experience of fraud in the payment system

What is your experience with payment fraud?



Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment.

Only in the case of indirect fraud experience do we find a significant positive association with all measures for payment literacy. The effects range from 0.02 to 0.04. Focussing on *PL total*, people who know someone who has experienced payment fraud score 0.03 higher than people who do not know someone who has.

5.4 Payment literacy across demographic groups

Finally, the models in Table 4 include variables that capture the personal situation and characteristics of the respondents. Binary variables capture the gender (*female*), the age of the respondent (*age: between 35 and 49*, *age: between 50 and 64*, *age: 65 and over*), whether the respondent has completed higher vocational and/or university education (*education: high*), the net monthly household income (five equal-sized groups of respondents), whether the head of the household has a partner, whether the

respondent owns a house (*homeowner*, our proxy for wealth), and works in a financial institution (*works in a financial institution*).

Even though we include variables such as the desire to be informed and sources of information in the model, which we found to be related to demographic variables (see Tables C.1 and C.2 in Appendix C), payment literacy varies between demographic groups. Older persons generally have lower levels of payment literacy. For example, *PL total* is 0.10 lower for people aged 65 and over than those aged under 35. Women score lower on payment literacy than men, with an effect of -0.03 on *PL total*. This is due to their lower knowledge of digital payments and fraud. Payment literacy increases with income and is higher for those with higher vocational and/or university education than for those without. Payment literacy is relatively high among homeowners and people working in a financial institution. Our results are comparable with those of Cwynar et al. (2022), who find that four socio-demographic variables are significantly associated with their payment literacy index, namely age (negatively associated), level of education, place of residence (which captures the degree of urbanization), and household size (all three positively related with payment literacy).

6. Why payment literacy matters

Next, we examine the importance of payment literacy. First, we explore its relationship with trust in the payment system and banks. Second, we analyse its impact on payment behaviour.

6.1 Payment literacy and trust in the payment system and banks

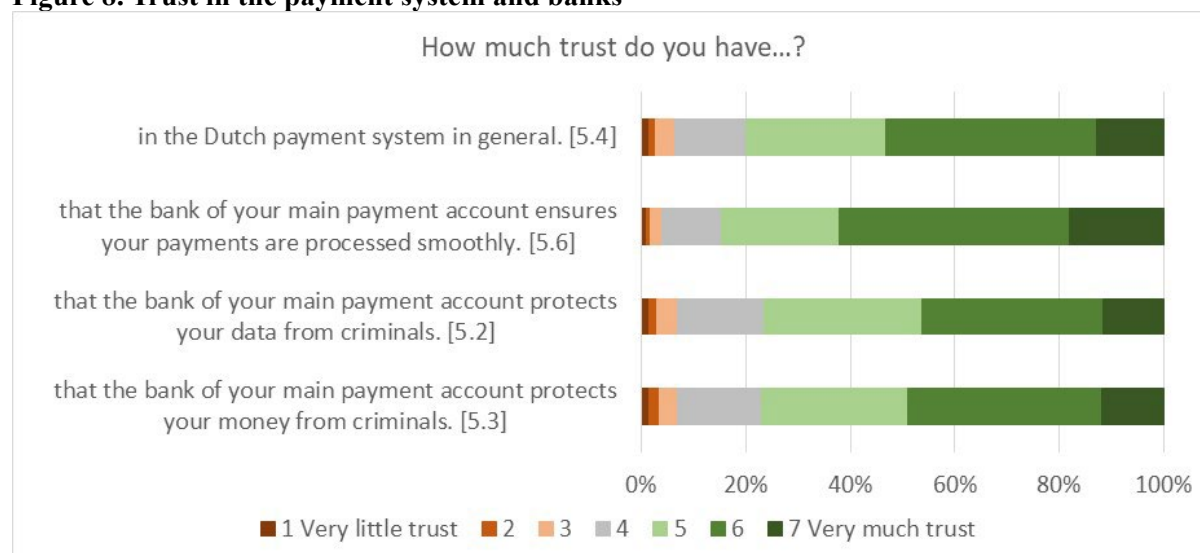
Our survey includes a question measuring trust in the payment system and banks. The weighted response proportions are shown in Figure 8. We constructed four different measures of trust: *trust in the payment system*, *trust own bank: payments*, *trust own bank: data protection*, and *trust own bank: money protection*. These ordered variables range from 1 “very little trust” to 7 “very much trust”. Trust in the payment system and banks is high. On average, *trust own bank: payments* is the highest, with a score of 5.6. This variable captures the respondents’ confidence that their bank will ensure that payments are processed smoothly. Trust in the Dutch payment system comes second (5.4), followed by trust that the bank of the main payment account will protect one’s money from criminals (5.3), and trust that this bank will protect one’s data from criminals (5.2).

The higher the level of payment literacy, the higher the level of trust in the payment system and in banks. Table 5 shows the results of linear models with *PL total* as main explanatory variable.⁶ The effect of *PL total* on trust ranges from 0.71 to 1.01. For example, someone with the highest *PL total* score (1) reports 1.01 more trust in their own bank’s ability to ensure that payments are processed smoothly than someone with the lowest *PL total* score (0). Table C.3 in Appendix C shows the results

⁶ Estimates of these models are easier to interpret than estimates of ordered logit models. As a robustness analysis, we estimated ordered logit models, which yield very similar results.

of models that include four PL sub-measures: *PL payments cash*, *PL payments digital*, *PL fraud cash*, and *PL fraud digital*. These capture the various dimensions of payment literacy. The four different trust measures are positively related to *PL payments: cash* and *PL fraud: digital*. In particular, knowledge about digital fraud seems an important channel for promoting trust.

Figure 8. Trust in the payment system and banks



Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment. The average answer is shown between brackets.

Trust is also significantly related to digital skills, fraud experience, and personal characteristics. Firstly, the better the digital skills, the higher all four types of trust. To illustrate, someone who rates their own digital skills in the field of payments as a 10 has 1.53 higher trust in the payment system than someone who rates their digital skills as a 1. Secondly, there is a negative association between direct fraud experience and trust in the ability of one's own bank to protect data and trust in its ability to protect money. Thirdly, trust varies across demographic groups. All types of trust are relatively high among older people, those with a high level of education, and those with a job in the financial sector. In addition, in all cases, people with the highest household income have the highest levels of trust. Gender plays a role only in the case of trust in the payment system, with women reporting 0.15 less trust. The effect of *partner* is also negative and significant for trust in the payment system. Homeowners report relatively high levels of trust in the payment system and in their bank's ability to protect their money.

Table 5. Trust in the payment system and banks: the role of payment literacy, digital skills, experience of fraud, and personal characteristics

	(1) Trust in the payment system	(2) Trust own bank: payments	(3) Trust own bank: data protection	(4) Trust own bank: money protection
PL total	0.94*** (0.15)	1.01*** (0.14)	0.71*** (0.16)	0.84*** (0.16)
Digital skills	0.17*** (0.02)	0.17*** (0.02)	0.15*** (0.02)	0.15*** (0.02)
Fraud experience: self	-0.06 (0.05)	-0.01 (0.04)	-0.10* (0.05)	-0.09* (0.05)
Fraud experience: other people	0.06 (0.05)	0.05 (0.04)	0.01 (0.05)	0.02 (0.05)
Female	-0.15*** (0.04)	-0.04 (0.04)	-0.02 (0.05)	-0.06 (0.05)
Age: between 35 and 49	0.04 (0.08)	0.03 (0.08)	0.06 (0.08)	0.10 (0.08)
Age: between 50 and 64	0.14* (0.08)	0.18** (0.07)	0.13 (0.08)	0.19** (0.08)
Age: 65 and over	0.52*** (0.08)	0.58*** (0.07)	0.56*** (0.08)	0.57*** (0.08)
Education: high	0.21*** (0.05)	0.18*** (0.04)	0.02 (0.05)	0.07 (0.05)
Income: quintile 2	0.22*** (0.07)	0.15** (0.07)	0.18** (0.08)	0.18** (0.08)
Income: quintile 3	0.22*** (0.08)	0.10 (0.07)	0.09 (0.08)	0.07 (0.08)
Income: quintile 4	0.24*** (0.08)	0.11 (0.07)	0.16** (0.08)	0.15* (0.08)
Income: quintile 5	0.44*** (0.09)	0.37*** (0.08)	0.38*** (0.09)	0.35*** (0.09)
Partner	-0.15*** (0.06)	-0.08 (0.05)	-0.01 (0.06)	-0.06 (0.06)
Homeowner	0.13** (0.06)	0.01 (0.06)	0.06 (0.06)	0.10* (0.06)
Works in a financial institution	0.20** (0.10)	0.17* (0.10)	0.25** (0.11)	0.18* (0.10)
Constant	3.08*** (0.18)	3.34*** (0.17)	3.33*** (0.19)	3.25*** (0.19)
Number of observations	2327	2327	2327	2327
R ²	0.18	0.18	0.11	0.12
F-statistic	28.2***	26.6***	15.2***	16.7***

Notes: The table reports coefficients of linear models with trust measures as dependent variable. These variables range between 1 (very little trust) and 7 (very much trust). Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

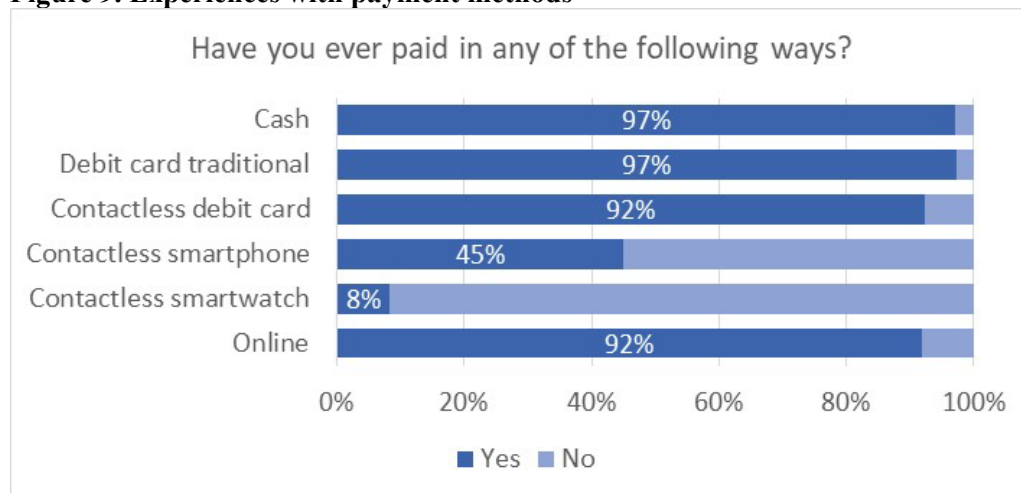
6.2 Payment literacy and payment behaviour

Better knowledge about payments may lower the barrier for people to use various payment methods. We examine the relationship between payment literacy and payment experience (Section 6.2.1), the most commonly used payment method (Section 6.2.2) and independence in the world of payments (Section 6.2.3). In all cases, dummy variables are used as dependent variables, making the logit model a suitable choice for accurate and reliable estimation.

6.2.1 Payment experience

Figure 9 shows people's experience with different payment methods. Very large proportions of people have experience with cash payments, traditional debit card payments, and contactless debit card payments. Slightly less than half of the people have experience with contactless payments using a smartphone, and 8% have ever paid using a smartwatch. Regarding online payments, 92% of people have used online payment methods such as a credit card, iDEAL, or PayPal. iDEAL is a popular online payment method in the Netherlands. We construct dummy variables that capture experience with different payment methods: *experience: cash*, *experience: debit card traditional*, *experience: debit card contactless*, *experience: smartphone*, *experience: smartwatch*, and *experience: online* (0 = no, 1 = yes).

Figure 9. Experiences with payment methods



Source: Centerpanel, 22 November - 17 December 2024. Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment.

We find a positive association between *PL total* and all experience variables (Table 6). The effect is significant in four out of six cases. The strongest effects are found for contactless debit card payments and online payments. For example, people with the highest payment literacy score are 18 percentage points (pp) more likely to have ever made a contactless debit card payment and 19 pp more likely to have ever made an online payment than people with the lowest payment literacy score. The effect is driven by digital payment literacy (see Table C.4 in Appendix C). Digital skills also matter except for cash. To illustrate the magnitude of the effect: someone who rates their digital skills as a 10 is 63 pp more likely to have ever paid contactless with a smartphone and 18 pp more likely to have ever paid contactless with a smartwatch than someone who rates their digital skills as a 1. Payment experience also depends on demographics. For example, older people are less likely to have ever tried online payments and all types of contactless payments, and are more likely to have experience with cash. In addition, people in the highest income groups are most likely to have experience with the different types of contactless payments. Education also matters. People who have completed higher

vocational and/or university education are more likely to have experience of paying online than those who have not.

Table 6. Payment experience: the role of payment literacy, digital skills, and personal characteristics

	(1) Experience: cash	(2) Experience: debit card traditional	(3) Experience: debit card contactless	(4) Experience: smartphone	(5) Experience: smartwatch	(6) Experience: online
PL total	0.06*** (0.01)	0.03* (0.02)	0.18*** (0.03)	0.08 (0.06)	0.02 (0.04)	0.19*** (0.03)
Digital skills	-0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.07*** (0.01)	0.02*** (0.01)	0.03*** (0.00)
Female	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	-0.04** (0.02)	-0.03*** (0.01)	-0.01 (0.01)
Age: between 35 and 49	0.02*** (0.01)	0.03** (0.01)	0.02 (0.03)	-0.04 (0.03)	-0.00 (0.01)	0.04 (0.03)
Age: between 50 and 64	0.03*** (0.01)	0.02** (0.01)	-0.02 (0.02)	-0.17*** (0.03)	-0.06*** (0.02)	-0.02 (0.02)
Age: 65 and over	0.04*** (0.01)	0.02* (0.01)	-0.05** (0.02)	-0.27*** (0.03)	-0.11*** (0.02)	-0.05** (0.02)
Education: high	0.01 (0.01)	0.00 (0.01)	0.02* (0.01)	0.01 (0.02)	-0.03** (0.01)	0.05*** (0.01)
Income: quintile 2	-0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	0.07** (0.03)	0.02 (0.02)	0.02 (0.01)
Income: quintile 3	-0.01 (0.01)	0.01 (0.01)	0.01 (0.02)	0.13*** (0.03)	0.05*** (0.02)	0.02 (0.02)
Income: quintile 4	-0.00 (0.01)	0.00 (0.01)	0.04* (0.02)	0.18*** (0.03)	0.07*** (0.02)	0.00 (0.02)
Income: quintile 5	0.02 (0.01)	0.03* (0.02)	0.04* (0.02)	0.17*** (0.04)	0.05** (0.02)	0.03 (0.02)
Partner	0.01 (0.01)	-0.01 (0.01)	-0.00 (0.01)	-0.04* (0.02)	-0.00 (0.01)	-0.03*** (0.01)
Homeowner	-0.01 (0.01)	0.01 (0.01)	0.02** (0.01)	-0.01 (0.02)	-0.02 (0.01)	0.02 (0.01)
Works in a financial institution	-0.01 (0.01)	-0.00 (0.02)	0.07 (0.07)	0.11** (0.05)	0.01 (0.02)	0.01 (0.05)
Number of observations	2327	2327	2327	2327	2327	2327
Pseudo R-squared	0.18	0.09	0.16	0.14	0.12	0.28
Log pseudolikelihood	-176.7	-236.1	-544.4	-1349.7	-511.1	-486.9
Wald χ^2	96.9***	55.6***	163.6***	357.7***	138.1***	259.7***

Notes: The table reports average marginal effects of logit models with the payment experience dummies as dependent variables. These variables are 1 for respondents who have experience with the payment method and 0 for respondents who have never used it. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

6.2.2 Most often used payment method

Figure 10 shows how people pay most frequently. In the Netherlands, contactless debit card payments are the most popular. Table 7 shows our estimates for payment behaviour, where the most commonly used payment instruments are captured by dummy variables. For example, *behaviour: cash* is 1 for respondents who use cash most often and 0 for those who do not. The higher the level of payment literacy, the more likely it is that the most frequently used payment instrument is contactless by debit card. Conversely, there is a negative association between payment literacy and traditional debit card

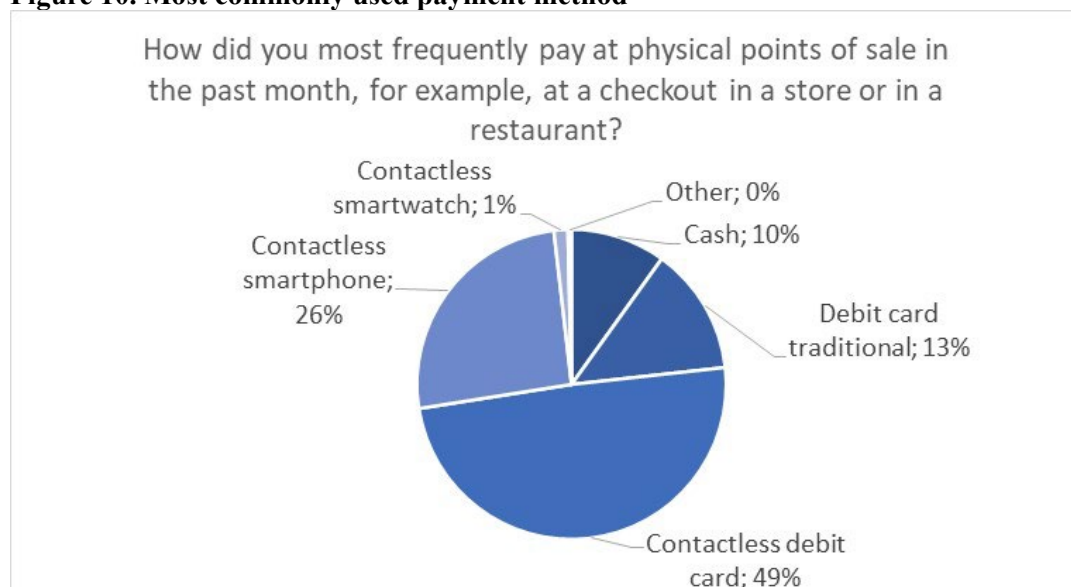
payments. Comparing someone with the lowest payment literacy score to someone with the highest literacy score, the effects are a 25 pp lower likelihood of most often using traditional debit card payments and a 27 pp higher likelihood of most often using contactless debit card payments. As with experience, this effect is driven by knowledge of digital payments (see Table C.5 in Appendix C). In addition, the higher the self-reported digital skills, the lower the likelihood of cash being the most frequently used payment instrument and the higher the likelihood of contactless payments by smartphone or smartwatch being the most frequently used payment instrument. Personal characteristics also play a role. For example, people aged 65 and over are less likely to most frequently use contactless payments by smartphone and more likely to most frequently use contactless debit card payments, traditional debit card payments, or use cash.

Table 7. Payment behaviour: the role of payment literacy, digital skills, and personal characteristics

	(1) Behaviour: cash	(2) Behaviour: debit card traditional	(3) Behaviour: debit card contactless	(4) Behaviour: smartphone	(5) Behaviour: smartwatch
PL total	-0.03 (0.03)	-0.25*** (0.04)	0.27*** (0.07)	0.06 (0.06)	0.01 (0.02)
Digital skills	-0.02*** (0.00)	-0.00 (0.00)	-0.01 (0.01)	0.05*** (0.01)	0.01*** (0.00)
Female	-0.00 (0.01)	-0.02 (0.01)	0.03 (0.02)	-0.01 (0.02)	0.00 (0.01)
Age: between 35 and 49	0.04 (0.03)	0.01 (0.04)	0.05 (0.04)	-0.06** (0.02)	0.01 (0.01)
Age: between 50 and 64	0.07*** (0.03)	0.10*** (0.03)	0.07* (0.04)	-0.13*** (0.02)	-0.00 (0.01)
Age: 65 and over	0.06** (0.03)	0.15*** (0.03)	0.09*** (0.04)	-0.22*** (0.03)	-0.01 (0.01)
Education: high	-0.02 (0.01)	-0.04** (0.02)	0.05** (0.02)	0.01 (0.02)	-0.01 (0.00)
Income: quintile 2	-0.01 (0.02)	-0.01 (0.02)	0.02 (0.03)	0.00 (0.03)	-0.01 (0.01)
Income: quintile 3	-0.02 (0.02)	-0.04* (0.02)	0.03 (0.03)	0.05* (0.03)	0.01 (0.01)
Income: quintile 4	-0.04* (0.02)	-0.05* (0.03)	0.04 (0.04)	0.06** (0.03)	0.01 (0.01)
Income: quintile 5	-0.10*** (0.03)	0.01 (0.03)	-0.05 (0.04)	0.11*** (0.03)	0.01 (0.01)
Partner	0.00 (0.01)	0.01 (0.02)	0.02 (0.03)	-0.04** (0.02)	0.00 (0.01)
Homeowner	-0.03* (0.01)	-0.00 (0.02)	0.02 (0.03)	0.02 (0.02)	0.00 (0.01)
Works in a financial institution	-0.05 (0.05)	-0.03 (0.05)	-0.08 (0.06)	0.08** (0.04)	-0.01 (0.01)
Number of observations	2327	2327	2327	2327	2327
Pseudo R ²	0.10	0.08	0.01	0.13	0.08
Log pseudolikelihood	-680.6	-889.2	-1589.5	-1073.9	-155.3
Wald χ^2	137.8***	152.7***	43.4***	264.3***	52.0***

Notes: The table reports average marginal effects of logit models with the payment behaviour dummies as dependent variables. These variables are 1 for respondents who use the payment method most often and 0 for other respondents. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Figure 10. Most commonly used payment method



Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment.

6.2.3 Independence

The higher the level of payment literacy, the more likely people are able to make payments without help of others. Figure 11 shows that 1% need help with cash payments in physical shops, 3% need help with digital payments at the POS, and 5% need help with online payments. We construct dummy variables that capture independence: *independent: POS cash payments*, *independent: POS digital payments*, and *independent: online payments* (0 = no, 1 = yes).

Figure 11. Independence in the world of payments



Source: Centerpanel, 22 November - 17 December 2024.

Notes: The answers of the 2327 respondents have been weighted to correct for differences between the sample and the population with respect to gender, age, net household income, and educational attainment.

Table 8 shows the regression results for models with *PL total* as main explanatory variable. The results with sub-measures are shown in Table C.6 in Appendix C. People with the maximum *PL total* score are 6 pp less likely to need help with cash payments than people with the minimum *PL total* score. The effect is 8 pp for digital point-of-sale payments and online payments. We also find that the higher the digital skills score, the more likely someone is able to navigate the digital offline and, especially, online world of payments without help. Personal characteristics also matter. For example, people in the oldest age group are less likely to be able to make online payments independently than younger people.

Table 8. Independence: the role of payment literacy, digital skills, experience of fraud, and personal characteristics

	(1) Independent: POS cash payments	(2) Independent: POS digital payments	(3) Independent: online payments
PL total	0.06*** (0.02)	0.08*** (0.02)	0.08*** (0.02)
Digital skills	0.00 (0.00)	0.01*** (0.00)	0.03*** (0.00)
Female	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)
Age: between 35 and 49	0.00 (0.01)	-0.01 (0.01)	0.02 (0.02)
Age: between 50 and 64	0.02 (0.01)	0.01 (0.01)	-0.01 (0.02)
Age: 65 and over	0.00 (0.01)	-0.00 (0.01)	-0.04*** (0.02)
Education: high	0.01 (0.01)	0.01 (0.01)	0.03** (0.01)
Income: quintile 2	-0.00 (0.01)	0.01 (0.01)	-0.01 (0.01)
Income: quintile 3	0.02 (0.02)	0.02* (0.01)	0.00 (0.01)
Income: quintile 4	-0.02** (0.01)	-0.02* (0.01)	-0.02* (0.01)
Income: quintile 5	omitted	omitted	0.03 (0.02)
Partner	0.01 (0.01)	0.01 (0.01)	-0.02** (0.01)
Homeowner	-0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
Works in a financial institution	omitted	omitted	omitted
Number of observations	1812	1812	2250
Pseudo R ²	0.16	0.27	0.36
Log pseudolikelihood	-113.7	-175.3	-311.2
Wald χ^2	86.2***	130.3***	257.8***

Notes: The table reports average marginal effects of logit models with the independence dummies as dependent variables. These variables are 1 for independent respondents and 0 for dependent respondents. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

7. Concluding remarks and policy implications

We constructed a payment literacy index, using a comprehensive survey of Dutch households to assess knowledge of both traditional and new payment methods, as well as fraud in the payment system. Our

results suggest that payment literacy is influenced by a range of personal characteristics, such as age and educational attainment, the information sources used, experiences of fraud, and the desire to be well informed about payments. The index suggests that there is room for improvement, notably of digital payment literacy, by targeting specific groups. For example, older persons and women generally have lower levels of payment literacy. Our findings suggest a positive association between payment literacy and trust in the payment system and banks. Trust is also significantly related to digital skills and experience of fraud. As pointed out by van der Cruijssen, Doll and de Haan (2025), trust in financial institutions is key to the functioning of the financial sector. For example, trust in financial institutions is widely believed to be important for financial stability. Furthermore, when customers trust financial institutions, they are more likely to allocate their savings to financial intermediaries.

Finally, payment literacy increases financial inclusion. It is important for being able to use payment instruments without the help of others. We also find a positive association between payment literacy and the likelihood that individuals adopt new payment methods.

Our research highlights the importance of policies aimed at improving payment literacy and provides pathways to achieving this. A crucial first step is raising awareness of the benefits of payment literacy. For example, how it enables people to benefit from the advantages new payment instruments offer, and how payment literacy helps them better identify fraudsters. Building on this, our findings can be used to refine efforts to enhance knowledge – such as through campaigns and training – by identifying which aspects of payment literacy are lacking, which groups require special attention, and which sources of information people rely on to learn about payments.

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Appendix A. Payment survey 2024

{Intro}

The purpose of this questionnaire is to learn more about your payment behaviour, your trust in the payment world, and your knowledge about payments.

v1_1 – v1_6

Have you ever paid in any of the following ways?

Question type: Table

Answer type: Radio buttons

Sub-questions:

v1_1 Cash (coins and/or banknotes)

v1_2 By inserting a debit card into the payment terminal

v1_3 Contactless with a debit card

v1_4 Contactless with a mobile phone

v1_5 Contactless with a smartwatch

v1_6 Online with, for example, a credit card, iDEAL, or PayPal.

Categories:

1. Yes
2. No

v2

How did you most frequently pay at physical points of sale in the past month, for example, at a checkout in a store or in a restaurant?

Answer type: Radio buttons

Categories:

1. Cash (coins and/or banknotes)
2. By inserting a debit card into the payment terminal
3. Contactless with a debit card
4. Contactless with a mobile phone
5. Contactless with a smartwatch
6. Other

v3t1- v3t4

How much trust do you have...?

Question type: Table

Answer type: Radio buttons

Sub-questions:

v3t1 in the Dutch payment system in general.

v3t2 that the bank of your main payment account ensures your payments are processed smoothly.

v3t3 that the bank of your main payment account protects your data from criminals.

v3t4 that the bank of your main payment account protects your money from criminals.

Categories:

1. 1 Very little trust
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7 Very much trust

v4t1- v4t3

How is your knowledge about...?

Question type: Table

Answer type: Radio buttons

Sub-questions:

v4t1 Cash payments

v4t2 Digital payments (for example, with a debit card or mobile phone in a store, or with iDEAL or a credit card online)

v4t3 Fraud in the payment world

Categories:

1. 1 Very poor
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7 Very good

v5**{Intro}**

You are digitally skilled if you possess all the skills necessary to navigate in the digital society. This includes, for example, the ability to use a computer or mobile phone proficiently and navigate the internet effectively.

On a scale from 1 (not digitally skilled at all) to 10 (very digitally skilled), what score would you give yourself for your digital skills in the field of payments?

Answer type: Integer

Min: 1

Max: 10

v6t1-v6t3

How independently can you make payments?

Question type: Table

Answer type: Radio buttons

Sub-questions:

v6t1 Cash payments in physical shops.

v6t2 Digital payments in physical shops.

v6t3 Online payments

Categories:

1. I can do that independently. I don't need help from others.
2. I can't do that independently. I need help from others.

v7t1- v7t3

How important do you find it to be well informed about...?

Question type: Table

Answer type: Radio buttons

Sub-questions:

v7t1 Cash payments

v7t2 Digital payments

v7t3 Fraud in the payment world

Categories:

1. 1 Very unimportant
2. 2
3. 3

4. 4
5. 5
6. 6
7. 7 Very important

v8

How do you acquire your knowledge about the payment world (cash payments, digital payments, and fraud)?
Choose your main sources (maximum 3).

[The order of the answers is randomized. The exception is “In another way”, which is always listed last.]

Answer type: Radio buttons

1. Television
2. Radio
3. Newspapers
4. Magazines
5. Internet
6. Social media
7. Partner
8. Friends
9. Family
10. Colleagues
11. Shopkeepers
12. Banks
13. Dutch Payments Association
14. Dutch Banking Association
15. De Nederlandsche Bank
16. In a different way

v9a

What is your experience with payment fraud?

Answer type: Radio buttons

Self

1. I have never experienced this.
2. I have experienced this but did not fall for it.
3. I have experienced this and fell for it.

v9b

Answer type: Radio buttons

Other people

4. I don't know anyone who has experienced this.
5. I know someone who has experienced this but did not fall for it.
6. I know someone who has experienced this and fell for it.

[The respondents can't go back in the survey.]

{Intro}

Finally, we would like to measure your knowledge about payments with the following questions. It is okay if you do not know the answers. To get an accurate picture of your knowledge, it is important that you don't look anything up.

v10t1-v10t10

Do you think the following statements about payments in the Netherlands are **true** or **false**? [The order of the answers is randomized.]

Question type: Table

Answer type: Radio buttons

Sub-questions:

- v10t1** Banknotes of 5 euros cannot be withdrawn from all ATMs.
- v10t2** The edges of all euro coins are smooth.
- v10t3** Euro banknotes newly put into circulation come in 6 different denominations.
- v10t4** If a customer pays for a bag of apples costing 2.98 euros in cash, the shopkeeper may round the amount to 3.00 euros if it is clearly indicated that rounding is applied (for example, via a window sticker).
- v10t5** For contactless payments with the physical debit card, a PIN code never needs to be entered.
- v10t6** An amount of 500 euros cannot be paid contactless with a physical debit card. The debit card must be inserted into the payment terminal.
- v10t7** The PIN chip in a smartphone or smartwatch enables contactless payments and securely exchanges information with a payment terminal.
- v10t8** Payments with iDEAL can also be made using an iDEAL QR code. This QR code can be recognized by the iDEAL logo in the middle of the QR code.
- v10t9** When paying with a credit card, the amount is not immediately debited from the payment account.
- v10t10** Post-payment is only possible with web shops and never in physical stores.

Categories:

- 1. True
- 2. False
- 3. I don't know

v11t1-v11t10

And do you think the following statements about secure payments in the Netherlands are true or false? [The order of the answers is randomized.]

Question type: Table

Answer type: Radio buttons

Sub-questions:

- v11t1** A genuine euro banknote has a watermark and security thread (a dark stripe across the banknote), which are visible when you hold the banknote up to the light.
- v11t2** The authenticity of a euro banknote can be checked by feeling, looking, and tilting it.
- v11t3** The PIN code of a debit card should only be shared with bank employees.
- v11t4** Banks never ask their customers to send in their debit cards.
- v11t5** Malware is harmful or deceptive software that can get onto a computer, for example, by inserting an infected USB stick.
- v11t6** When criminals pretend to be family members and ask for money via a text message, this is called qishing.
- v11t7** An example of bank helpdesk fraud is when criminals pose as bank employees, call you, and ask you to transfer money to a 'safe account'.
- v11t8** Banks have introduced the IBAN-Name Check to make the payment system safer.
- v11t9** A web shop is reliable if you can pay with iDEAL and credit card.
- v11t10** A web shop is reliable if the internet address (URL) starts with https:// and you see a padlock in the address bar.

Categories:

- 1. True
- 2. False
- 3. I don't know

Appendix B. Summary statistics

Table B.1. Summary statistics of variables (1/2)

Variable	N	Mean	Sd	Min	Max
PL total	2327	0.61	0.18	0	1
PL cash	2327	0.62	0.25	0	1
PL digital	2327	0.60	0.18	0	1
PL payments total	2327	0.52	0.19	0	1
PL payments cash	2327	0.59	0.27	0	1
PL payments digital	2327	0.47	0.21	0	1
PL fraud total	2327	0.69	0.21	0	1
PL fraud cash	2327	0.69	0.36	0	1
PL fraud digital	2327	0.69	0.21	0	1
Desire to be informed: cash payments	2327	5.51	1.54	1	7
Desire to be informed: digital payments	2327	5.98	1.20	1	7
Desire to be informed: fraud	2327	6.06	1.17	1	7
Source: television	2327	0.32	0.47	0	1
Source: radio	2327	0.07	0.25	0	1
Source: newspapers	2327	0.29	0.45	0	1
Source: magazines	2327	0.03	0.18	0	1
Source: internet	2327	0.54	0.50	0	1
Source: social media	2327	0.13	0.34	0	1
Source: partner	2327	0.16	0.37	0	1
Source: friends	2327	0.14	0.35	0	1
Source: family	2327	0.24	0.42	0	1
Source: colleagues	2327	0.05	0.23	0	1
Source: shopkeepers	2327	0.04	0.20	0	1
Source: banks	2327	0.45	0.50	0	1
Source: Dutch Payments Association	2327	0.01	0.08	0	1
Source: Dutch Banking Association	2327	0.01	0.12	0	1
Source: De Nederlandsche Bank	2327	0.04	0.19	0	1
Source: other	2327	0.05	0.22	0	1
Fraud experience: self	2327	0.41	0.49	0	1
Fraud experience: other people	2327	0.54	0.50	0	1
Digital skills	2327	7.65	1.61	1	10
Trust in the payment system	2327	5.47	1.14	1	7
Trust own bank: payments	2327	5.69	1.05	1	7
Trust own bank: data protection	2327	5.33	1.16	1	7
Trust own bank: money protection	2327	5.37	1.17	1	7
Experience: cash	2327	0.98	0.13	0	1
Experience: debit card traditional	2327	0.98	0.15	0	1
Experience: debit card contactless	2327	0.92	0.27	0	1
Experience: smartphone	2327	0.41	0.49	0	1
Experience: smartwatch	2327	0.07	0.25	0	1
Experience: online	2327	0.92	0.28	0	1
Behaviour: cash	2327	0.10	0.30	0	1
Behaviour: debit card traditional	2327	0.15	0.35	0	1
Behaviour: debit card contactless	2327	0.52	0.50	0	1
Behaviour: smartphone	2327	0.22	0.41	0	1
Behaviour: smartwatch	2327	0.01	0.12	0	1
Independence: cash payments	1812	0.99	0.12	0	1
Independence: digital payments	1812	0.97	0.17	0	1
Independence: online payments	2250	0.94	0.23	0	1
Female	2327	0.48	0.50	0	1

Note: This table summarizes the variables used in the regressions. The number of observations (N), mean, standard deviation (sd), minimum (min) and maximum (max) are reported the sample included in these regressions.

Table B.1. Summary statistics of variables (2/2)

Variable	N	Mean	Sd	Min	Max
Age: 34 or younger	2327	0.12	0.32	0	1
Age: between 35 and 49	2327	0.22	0.41	0	1
Age: between 50 and 64	2327	0.27	0.44	0	1
Age: 65 and over	2327	0.39	0.49	0	1
Education: high	2327	0.43	0.50	0	1
Income: quintile 1	2327	0.20	0.40	0	1
Income: quintile 2	2327	0.20	0.40	0	1
Income: quintile 3	2327	0.20	0.40	0	1
Income: quintile 4	2327	0.20	0.40	0	1
Income: quintile 5	2327	0.20	0.40	0	1
Partner	2327	0.68	0.47	0	1
Homeowner	2327	0.73	0.44	0	1
Works in a financial institution	2327	0.03	0.18	0	1

Note: This table summarizes the variables used in the regressions. The number of observations (N), mean, standard deviation (sd), minimum (min) and maximum (max) are reported the sample included in these regressions.

Table B.2. Correlation analysis

	PL total	PL cash	PL digital	PL payments total	PL payments cash	PL payments digital	PL fraud total	PL fraud cash	PL fraud digital	Digital skills
PL total	1.00									
PL cash	0.76	1.00								
PL digital	0.93	0.46	1.00							
PL payments total	0.88	0.74	0.77	1.00						
PL payments cash	0.65	0.89	0.38	0.77	1.00					
PL payments digital	0.76	0.36	0.83	0.84	0.30	1.00				
PL fraud total	0.90	0.61	0.87	0.57	0.40	0.51	1.00			
PL fraud cash	0.58	0.73	0.38	0.38	0.33	0.28	0.65	1.00		
PL fraud digital	0.84	0.43	0.90	0.53	0.35	0.50	0.94	0.36	1.00	
Digital skills	0.37	0.21	0.39	0.31	0.17	0.32	0.34	0.17	0.35	1.00

Note: Pearson correlation coefficients. Two-sided t-tests. In all cases, the p-value is smaller than 0.001. The number of observations is 2327.

Appendix C. Additional regression results

Table C.1. Desire to be informed: the role of personal characteristics

	(1) Desire to be informed: cash payments	(2) Desire to be informed: digital payments	(3) Desire to be informed: fraud
Female	0.21*** (0.06)	0.08 (0.05)	0.05 (0.05)
Age: between 35 and 49	0.12 (0.11)	-0.00 (0.09)	0.06 (0.09)
Age: between 50 and 64	0.21* (0.11)	0.17* (0.09)	0.44*** (0.09)
Age: 65 and over	0.53*** (0.11)	0.45*** (0.08)	0.67*** (0.09)
Education: high	-0.12* (0.07)	0.04 (0.05)	-0.11** (0.05)
Income: quintile 2	0.06 (0.10)	0.23*** (0.09)	0.28*** (0.08)
Income: quintile 3	-0.04 (0.11)	0.27*** (0.09)	0.26*** (0.09)
Income: quintile 4	-0.08 (0.11)	0.33*** (0.09)	0.36*** (0.09)
Income: quintile 5	-0.09 (0.12)	0.38*** (0.10)	0.36*** (0.10)
Partner	0.06 (0.08)	-0.13** (0.07)	-0.10 (0.06)
Homeowner	0.02 (0.08)	0.14** (0.07)	0.13** (0.06)
Works in a financial institution	-0.31 (0.20)	0.08 (0.14)	0.02 (0.13)
Constant	5.17*** (0.13)	5.44*** (0.11)	5.41*** (0.11)
Number of observations	2327	2327	2327
R ²	0.03	0.04	0.07
F-statistic	5.7***	7.4***	13.4***

Notes: The table reports coefficients of linear models with desire to be informed measures as dependent variable. These variables range between 1 (very unimportant to be well informed) and 7 (very important to be well informed). Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table C.2. Main information sources: the role of personal characteristics (1/2)

	(1) Source: tele- vision	(2) Source: radio	(3) Source: news- papers	(4) Source: maga- zines	(5) Source: internet	(6) Source: social media	(7) Source: partner	(8) Source: friends
Female	0.02 (0.02)	0.00 (0.01)	-0.02 (0.02)	-0.02*** (0.01)	-0.09*** (0.02)	0.01 (0.01)	0.13*** (0.01)	0.02 (0.01)
Age: between 35 and 49	0.07* (0.04)	0.05** (0.02)	0.09** (0.04)	0.04 (0.03)	0.04 (0.04)	-0.08*** (0.02)	0.07** (0.03)	-0.08*** (0.02)
Age: between 50 and 64	0.17*** (0.04)	0.04* (0.02)	0.28*** (0.04)	0.06* (0.03)	-0.04 (0.04)	-0.11*** (0.02)	0.05* (0.03)	-0.10*** (0.02)
Age: 65 and over	0.21*** (0.04)	0.04* (0.02)	0.36*** (0.04)	0.09*** (0.03)	-0.09*** (0.03)	-0.12*** (0.02)	0.07*** (0.03)	-0.12*** (0.02)
Education: high	-0.02 (0.02)	0.02** (0.01)	0.12*** (0.02)	0.01 (0.01)	0.07*** (0.02)	-0.05*** (0.02)	-0.01 (0.02)	-0.01 (0.02)
Income: quintile 2	-0.01 (0.03)	0.02 (0.02)	0.05* (0.03)	0.01 (0.01)	-0.02 (0.03)	-0.00 (0.02)	0.00 (0.03)	0.00 (0.02)
Income: quintile 3	-0.03 (0.03)	-0.02 (0.02)	0.04 (0.03)	0.02 (0.01)	0.01 (0.03)	-0.01 (0.02)	0.04 (0.03)	-0.02 (0.02)
Income: quintile 4	-0.03 (0.03)	-0.00 (0.02)	0.07** (0.03)	0.02* (0.01)	0.05 (0.04)	-0.01 (0.03)	0.00 (0.03)	0.01 (0.02)
Income: quintile 5	0.01 (0.04)	-0.00 (0.02)	0.09*** (0.03)	0.02 (0.02)	0.03 (0.04)	0.02 (0.03)	0.01 (0.03)	-0.01 (0.03)
Partner	-0.03 (0.02)	0.01 (0.01)	-0.05** (0.02)	-0.02*** (0.01)	-0.04 (0.03)	-0.03 (0.02)	0.25*** (0.03)	-0.04** (0.02)
Homeowner	0.06** (0.02)	-0.00 (0.01)	0.06** (0.02)	0.00 (0.01)	-0.04 (0.03)	-0.02 (0.02)	-0.00 (0.02)	-0.02 (0.02)
Works in a financial institution	0.01 (0.06)	-0.07 (0.05)	-0.09 (0.06)	0.01 (0.02)	0.05 (0.06)	-0.13** (0.06)	-0.12** (0.06)	-0.02 (0.04)
Number of observations	2327	2327	2327	2327	2327	2327	2327	2327
Pseudo R ²	0.02	0.02	0.09	0.09	0.02	0.04	0.12	0.03
Log pseudolikelihood	-1420.7	-568.8	-1267.2	-314.2	-1569.8	-887.9	-909.6	-927.5
Wald χ^2	63.8***	18.1	206.3***	59.1***	70.4***	66.6***	188.0***	60.2***

Notes: The table reports average marginal effects of logit models with the information source dummies as dependent variables. These variables are 1 for respondents with the information source belonging to their three main information sources when it comes to acquiring knowledge about the payment world and 0 for other respondents. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table C.2. Main information sources: the role of personal characteristics (2/2)

	(1) Source: family	(2) Source: collea- gues	(3) Source: shop- keepers	(4) Source: banks	(5) Source: Dutch Payments Asso- ciation	(6) Source: Dutch Banking Asso- ciation	(7) Source: De Neder- landsche Bank	(8) Source: other
Female	0.10*** (0.02)	-0.02* (0.01)	-0.01 (0.01)	-0.08*** (0.02)	-0.01** (0.01)	-0.00 (0.00)	-0.02*** (0.01)	-0.02* (0.01)
Age: between 35 and 49	-0.15*** (0.03)	-0.00 (0.01)	0.01 (0.01)	0.10*** (0.04)	0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.02 (0.02)
Age: between 50 and 64	-0.23*** (0.03)	-0.02 (0.01)	-0.01 (0.01)	0.19*** (0.04)	0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	0.00 (0.02)
Age: 65 and over	-0.18*** (0.03)	-0.11*** (0.02)	-0.01 (0.01)	0.20*** (0.04)	0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)	-0.03** (0.02)
Education: high	-0.09*** (0.02)	0.02* (0.01)	-0.04*** (0.01)	0.08*** (0.02)	-0.01** (0.01)	-0.01 (0.00)	0.00 (0.01)	-0.00 (0.01)
Income: quintile 2	-0.03 (0.03)	0.02 (0.02)	0.01 (0.01)	0.01 (0.03)	-0.00 (0.01)	-0.01 (0.01)	0.02 (0.01)	-0.01 (0.01)
Income: quintile 3	-0.03 (0.03)	0.02 (0.02)	0.02 (0.01)	0.02 (0.03)	omitted (0.01)	-0.00 (0.01)	0.02 (0.01)	-0.02 (0.01)
Income: quintile 4	-0.03 (0.03)	0.01 (0.02)	-0.00 (0.02)	0.02 (0.04)	-0.00 (0.01)	0.00 (0.01)	0.02 (0.02)	-0.05*** (0.02)
Income: quintile 5	-0.06** (0.03)	0.02 (0.02)	0.01 (0.02)	0.05 (0.04)	0.01 (0.01)	0.00 (0.01)	0.01 (0.02)	-0.05*** (0.02)
Partner	-0.00 (0.02)	0.02 (0.01)	0.01 (0.01)	-0.08*** (0.03)	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)	0.02 (0.01)
Homeowner	0.01 (0.02)	-0.01 (0.01)	-0.02** (0.01)	0.07*** (0.03)	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)	0.00 (0.01)
Works in a financial institution	-0.11** (0.06)	0.04** (0.02)	-0.02 (0.03)	0.13** (0.06)	omitted	0.01 (0.01)	0.01 (0.02)	0.01 (0.02)
Number of observations	2327	2327	2327	2327	1793	2327	2327	2327
Pseudo R ²	0.06	0.09	0.04	0.03	0.09	0.03	0.02	0.03
Log pseudolikelihood	-1193.5	-449.1	-385.7	-1552.8	-83.2	-167.6	-374.5	-462.6
Wald χ^2	138.4***	56.5***	32.3***	92.1***	35.7***	18.6*	11.9	33.9***

Notes: The table reports average marginal effects of logit models with the information source dummies as dependent variables. These variables are 1 for respondents with the information source belonging to their three main information sources when it comes to acquiring knowledge about the payment world and 0 for other respondents. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table C.3. Trust in the payment system and banks: the role of payment literacy, digital skills, experiences of fraud, and personal characteristics (models with payment literacy sub-measures)

	(1) Trust in the payment system	(2) Trust own bank: payments	(3) Trust own bank: data protection	(4) Trust own bank: money protection
PL payments cash	0.19** (0.09)	0.14* (0.08)	0.20** (0.09)	0.26*** (0.09)
PL payments digital	0.10 (0.13)	-0.02 (0.12)	0.07 (0.14)	0.03 (0.14)
PL fraud cash	0.05 (0.07)	0.08 (0.06)	0.07 (0.07)	0.08 (0.07)
PL fraud digital	0.58*** (0.13)	0.77*** (0.12)	0.35*** (0.14)	0.43*** (0.14)
Digital skills	0.17*** (0.02)	0.17*** (0.02)	0.15*** (0.02)	0.15*** (0.02)
Fraud experience: self	-0.06 (0.05)	-0.01 (0.04)	-0.10* (0.05)	-0.09* (0.05)
Fraud experience: other people	0.06 (0.05)	0.05 (0.04)	0.00 (0.05)	0.02 (0.05)
Female	-0.15*** (0.04)	-0.04 (0.04)	-0.02 (0.05)	-0.06 (0.05)
Age: between 35 and 49	0.04 (0.08)	0.01 (0.07)	0.05 (0.08)	0.09 (0.08)
Age: between 50 and 64	0.12 (0.08)	0.15** (0.07)	0.11 (0.08)	0.17** (0.08)
Age: 65 and over	0.50*** (0.08)	0.55*** (0.07)	0.54*** (0.08)	0.55*** (0.08)
Education: high	0.21*** (0.05)	0.18*** (0.04)	0.02 (0.05)	0.08 (0.05)
Income: quintile 2	0.22*** (0.07)	0.15** (0.07)	0.18** (0.08)	0.18** (0.08)
Income: quintile 3	0.22*** (0.08)	0.09 (0.07)	0.09 (0.08)	0.07 (0.08)
Income: quintile 4	0.24*** (0.08)	0.11 (0.07)	0.17** (0.08)	0.15* (0.08)
Income: quintile 5	0.43*** (0.09)	0.35*** (0.08)	0.38*** (0.09)	0.34*** (0.09)
Partner	-0.14** (0.06)	-0.06 (0.05)	-0.01 (0.06)	-0.05 (0.06)
Homeowner	0.13** (0.06)	0.01 (0.06)	0.06 (0.06)	0.11* (0.06)
Works in a financial institution	0.20** (0.10)	0.17* (0.10)	0.25** (0.11)	0.18* (0.10)
Constant	3.06*** (0.18)	3.31*** (0.17)	3.32*** (0.19)	3.23*** (0.19)
Number of observations	2327	2327	2327	2327
R ²	0.19	0.19	0.11	0.12
F-statistic	24.2***	23.3***	12.8***	14.2***

Notes: The table reports coefficients of linear models with trust measures as dependent variables. These variables range between 1 (very little trust) and 7 (very much trust). Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table C.4. Payment experience: the role of payment literacy, digital skills, and personal characteristics (models with payment literacy sub-measures)

	(1) Experience: cash	(2) Experience: debit card traditional	(3) Experience: debit card contactless	(4) Experience: smartphone	(5) Experience: smartwatch	(6) Experience: online
PL payments cash	0.01 (0.01)	0.00 (0.01)	0.04 (0.02)	-0.06 (0.04)	-0.03 (0.02)	-0.02 (0.02)
PL payments digital	-0.00 (0.02)	0.00 (0.02)	0.17*** (0.03)	0.26*** (0.05)	0.08** (0.03)	0.12*** (0.03)
PL fraud cash	0.01 (0.01)	0.01 (0.01)	-0.02 (0.02)	-0.02 (0.03)	0.01 (0.02)	-0.02 (0.01)
PL fraud digital	0.05*** (0.02)	0.02 (0.02)	0.03 (0.03)	-0.05 (0.06)	-0.03 (0.04)	0.14*** (0.03)
Digital skills	-0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.07*** (0.01)	0.02*** (0.01)	0.03*** (0.00)
Female	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	-0.03* (0.02)	-0.03*** (0.01)	-0.00 (0.01)
Age: between 35 and 49	0.02*** (0.01)	0.03** (0.01)	0.03 (0.03)	-0.03 (0.03)	0.00 (0.01)	0.05 (0.03)
Age: between 50 and 64	0.03*** (0.01)	0.02** (0.01)	-0.01 (0.02)	-0.16*** (0.03)	-0.05*** (0.02)	-0.02 (0.02)
Age: 65 and over	0.04*** (0.01)	0.01 (0.01)	-0.04* (0.02)	-0.25*** (0.03)	-0.10*** (0.02)	-0.04** (0.02)
Education: high	0.01 (0.01)	0.00 (0.01)	0.02 (0.01)	0.01 (0.02)	-0.03** (0.01)	0.04*** (0.01)
Income: quintile 2	-0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	0.07** (0.03)	0.02 (0.02)	0.02* (0.01)
Income: quintile 3	-0.01 (0.01)	0.01 (0.01)	0.01 (0.02)	0.13*** (0.03)	0.05*** (0.02)	0.02 (0.02)
Income: quintile 4	-0.00 (0.01)	0.00 (0.01)	0.04* (0.02)	0.17*** (0.03)	0.07*** (0.02)	-0.00 (0.02)
Income: quintile 5	0.02 (0.01)	0.03* (0.02)	0.04* (0.02)	0.18*** (0.04)	0.05** (0.02)	0.02 (0.02)
Partner	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.05** (0.02)	-0.01 (0.01)	-0.03** (0.01)
Homeowner	-0.01 (0.01)	0.01 (0.01)	0.02* (0.01)	-0.01 (0.02)	-0.02 (0.01)	0.01 (0.01)
Works in a financial institution	-0.02 (0.01)	-0.00 (0.02)	0.08 (0.07)	0.10* (0.05)	0.01 (0.02)	0.01 (0.04)
Number of observations	2327	2327	2327	2327	2327	2327
Pseudo R ²	0.18	0.09	0.17	0.15	0.13	0.29
Log pseudolikelihood	-175.2	-235.8	-535.2	-1337.6	-506.8	-474.4
Wald χ^2	99.1***	57.9***	176.8***	370.8***	145.7***	281.8***

Notes: The table reports average marginal effects of logit models with the payment experience dummies as dependent variables. These variables are 1 for respondents who have experience with the payment method and 0 for respondents who have never used it. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table C.5. Payment behaviour: the role of payment literacy, digital skills, and personal characteristics (models with payment literacy sub-measures)

	(1) Behaviour: cash	(2) Behaviour: debit card traditional	(3) Behaviour: debit card contactless	(4) Behaviour: smartphone	(5) Behaviour: smartwatch
PL payments cash	-0.00 (0.02)	-0.02 (0.03)	0.07 (0.04)	-0.03 (0.03)	-0.01 (0.01)
PL payments digital	-0.09*** (0.04)	-0.22*** (0.04)	0.19*** (0.06)	0.13** (0.05)	0.00 (0.01)
PL fraud cash	0.04** (0.02)	0.01 (0.02)	-0.02 (0.03)	-0.02 (0.02)	-0.00 (0.01)
PL fraud digital	0.00 (0.04)	-0.06 (0.04)	0.07 (0.06)	0.00 (0.05)	0.02 (0.02)
Digital skills	-0.02*** (0.00)	0.00 (0.00)	-0.01 (0.01)	0.05*** (0.01)	0.01*** (0.00)
Female	-0.01 (0.01)	-0.02* (0.01)	0.04* (0.02)	-0.01 (0.02)	0.00 (0.01)
Age: between 35 and 49	0.03 (0.03)	0.00 (0.04)	0.05 (0.04)	-0.06** (0.02)	0.01 (0.01)
Age: between 50 and 64	0.06** (0.03)	0.09*** (0.03)	0.08** (0.04)	-0.13*** (0.02)	-0.00 (0.01)
Age: 65 and over	0.05* (0.03)	0.14*** (0.03)	0.10*** (0.04)	-0.21*** (0.03)	-0.01 (0.01)
Education: high	-0.02 (0.01)	-0.03** (0.02)	0.04** (0.02)	0.00 (0.02)	-0.01 (0.00)
Income: quintile 2	-0.01 (0.02)	-0.01 (0.02)	0.02 (0.03)	0.00 (0.03)	-0.01 (0.01)
Income: quintile 3	-0.01 (0.02)	-0.04 (0.02)	0.03 (0.03)	0.05* (0.03)	0.01 (0.01)
Income: quintile 4	-0.04* (0.02)	-0.04* (0.03)	0.04 (0.04)	0.06* (0.03)	0.00 (0.01)
Income: quintile 5	-0.10*** (0.03)	0.01 (0.03)	-0.05 (0.04)	0.11*** (0.03)	0.00 (0.01)
Partner	0.00 (0.01)	0.01 (0.02)	0.02 (0.03)	-0.04** (0.02)	0.00 (0.01)
Homeowner	-0.02 (0.01)	0.00 (0.02)	0.01 (0.03)	0.02 (0.02)	0.00 (0.01)
Works in a financial institution	-0.05 (0.05)	-0.03 (0.05)	-0.08 (0.06)	0.08** (0.04)	-0.01 (0.01)
Number of observations	2327	2327	2327	2327	2327
Pseudo R ²	0.11	0.09	0.02	0.13	0.09
Log pseudolikelihood	-674.9	-882.0	-1586.9	-1070.1	-154.3
Wald χ^2	148.0***	168.8***	49.0***	270.2***	54.9***

Notes: The table reports average marginal effects of logit models with the payment behaviour dummies as dependent variables. These variables are 1 for respondents who use the payment method most often and 0 for other respondents. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table C.6. Independence: the role of payment literacy, digital skills, experience of fraud, and personal characteristics (models with payment literacy sub-measures)

	(1) Independent: POS cash payments	(2) Independent: POS digital payments	(3) Independent: online payments
PL payments cash	0.04*** (0.01)	0.06*** (0.02)	-0.01 (0.02)
PL payments digital	-0.04*** (0.02)	-0.02 (0.02)	0.02 (0.03)
PL fraud cash	0.01 (0.01)	-0.00 (0.01)	-0.02 (0.01)
PL fraud digital	0.04*** (0.02)	0.03 (0.02)	0.09*** (0.03)
Digital skills	0.00 (0.00)	0.01*** (0.00)	0.02*** (0.00)
Female	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)
Age: between 35 and 49	-0.00 (0.01)	-0.01 (0.01)	0.02 (0.02)
Age: between 50 and 64	0.01 (0.01)	0.00 (0.01)	-0.01 (0.02)
Age: 65 and over	-0.01 (0.01)	-0.01 (0.01)	-0.04*** (0.02)
Education: high	0.01 (0.01)	0.01 (0.01)	0.02** (0.01)
Income: quintile 2	-0.00 (0.01)	0.01 (0.01)	-0.01 (0.01)
Income: quintile 3	0.02 (0.02)	0.02* (0.01)	-0.00 (0.01)
Income: quintile 4	-0.02** (0.01)	-0.01 (0.01)	-0.03** (0.01)
Income: quintile 5	omitted	omitted	0.02 (0.02)
Partner	0.01* (0.01)	0.01 (0.01)	-0.02* (0.01)
Homeowner	-0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
Works in a financial institution	omitted	omitted	omitted
Number of observations	1812	1812	2250
Pseudo R ²	0.24	0.29	0.37
Log pseudolikelihood	-103.7	-169.3	-305.6
Wald χ^2	104.3***	118.5***	257.8***

Notes: The table reports average marginal effects of logit models with the independence dummies as dependent variables. These variables are 1 for independent respondents and 0 for dependent respondents. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

DeNederlandscheBank

EUROSYSTEEM

De Nederlandsche Bank N.V.
Postbus 98, 1000 AB Amsterdam
020 524 91 11
dnb.nl