

DNB Working Paper

No 869 / September 2026

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DeNederlandscheBank

EUROSYSTEEM

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

Working Paper No. 869

September 2026

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Are households ready to weather a digital storm in retail payments? Evidence from the Netherlands*

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September 2026

Abstract

In an increasingly digital retail payments landscape, it is essential that households are well prepared for incidents that temporarily disrupt their ability to make digital payments for everyday purchases. This study examines whether Dutch households are prepared for such disruptions and whether official preparedness advice has translated into recommended behaviour. We use survey evidence from 5,672 Dutch respondents collected after the May 2025 official recommendation to hold €70 per adult and €30 per child in cash for a 72-hour outage of electronic payments and to maintain multiple means of payment. Awareness is high, but incomplete: 71% of respondents know the cash recommendation, while 58% hold the recommended amount or more. This implies a preparedness gap, especially among financially constrained households. Awareness is strongly associated with compliance; respondents who know the advice are 21 percentage points more likely to meet it. Non-compliance appears partly behavioural rather than purely informational or financial; the most frequently cited reason is not having got around to following the advice. Our analysis of several events, including communication about the cash advice, suggests that targeted communication may support compliance with the cash advice. Digital fallback capacity is more widespread than cash fallback preparedness, with 70% of respondents having multiple digital payment instruments for point-of-sale purchases. The findings imply that resilience policies should not only safeguard payment infrastructure but also address the informational, behavioural and practical barriers that prevent households from preparing.

Keywords: payment disruptions; consumer preparedness; cash holdings; digital payments; advice compliance; payment resilience.

JEL codes: D12, D14, D91, E42.

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1. Introduction

Retail payment systems have become essential economic infrastructure. Cards, mobile wallets, instant transfers and online banking facilitate everyday consumption, but their functioning depends on electricity, telecommunications, data centres, payment processors and end-user devices. When these infrastructures fail, households may be unable to make essential day-to-day purchases. As retail payments become increasingly digital, resilience therefore depends not only on robust payment infrastructures, but also on whether households have practical fallback options that allow them to continue paying during temporary disruptions. Can households continue to transact when their usual digital payment channels are unavailable? This paper addresses this question by examining whether Dutch households have the cash and digital fallback capacity needed to cope with temporary disruptions. We contribute by shifting the analysis from the resilience of payment infrastructures to the preparedness of end users, using new Dutch survey evidence on households' awareness of, compliance with and barriers to following official cash-buffer advice as published in May 2025.

The early literature studied payment disruptions mainly as wholesale and interbank events. Lacker (2004), Bech and Garratt (2012) and Klee (2010) show that operational failures in interbank systems can affect liquidity, monetary conditions and coordination. More recent work extends this concern to retail payments, where digitalisation, outsourcing, cyber risk, power outages and natural disasters have made resilience a public-policy objective (Khiaonarong et al., 2021). Evidence from large infrastructure failures shows why this matters for the real economy: blackouts in Chile and Spain in 2025 reduced digital retail payment transactions and economic activity, even when core financial infrastructures continued to operate (Gonzales et al., 2026; Cremades et al., 2025). These studies establish that payment disruptions are not merely technical events; they can constrain consumption.

The key household question is therefore whether consumers can continue paying when digital channels fail, and which fallback instruments allow them to do so. Cash-demand models emphasise withdrawal costs, acceptance, transaction size and the stock of cash on hand as drivers of cash use (Alvarez and Lippi, 2009, 2017), while payment-choice studies show that habits, perceived costs, safety, convenience and merchant acceptance shape the use of cash and electronic instruments (Jonker, 2007; Bagnall et al., 2016; van der Cruysen et al., 2017). System-wide shocks can also affect payment choices. For example, the COVID-19 pandemic accelerated the shift from cash to digital payment instruments (Jonker et al., 2022; Wisniewski et al., 2024).

Recent outage evidence adds resilience as a distinct payment attribute. Alvarez et al. (2026) show that natural disasters do not automatically change payment choice; rather, substitution towards cash occurs when outages make electronic payments unreliable or unavailable, when households preserve or increase cash balances for precautionary reasons, and when those balances are subsequently spent. Faella and Zamora-Pérez (2025) characterise cash as a “spare tyre” for retail payments, reflecting its offline functionality, tangibility and status as a direct central bank liability. Mäder et al. (2026) provide direct outage evidence: during a one-day card-payment outage at a large Swiss retailer,

consumers increased ATM withdrawals, showing how accessible cash infrastructure can support fallback behaviour when digital payments fail.

The Dutch case is particularly relevant because everyday payments are already highly digitalised: in 2025, only 17% of POS transactions in the Netherlands were paid in cash, while 83% were paid by debit card, using a physical card or a digitised card via a wallet app on their mobile phone or wearable device (De Nederlandsche Bank (DNB) and Dutch Payments Association (DPA), 2026). In such an environment, routine cash use provides only a partial indication of resilience; what matters is whether households retain sufficient fallback capacity when digital channels fail.

Central banks and payment authorities have therefore begun to frame preparedness as a shared responsibility of infrastructures, merchants and consumers. Based on research by Nibud (2025), the Dutch National Forum on the Payment System (NFPS) – in Dutch: Maatschappelijk Overleg Betalingsverkeer – advised in May 2025 that households prepare for a 72-hour disruption of electronic payments by holding around €70 per adult and €30 per child in cash, while also maintaining multiple means of payment (NFPS, 2025a).¹ If there is a disruption, consumers may not be able to pay by card, withdraw cash from an ATM or transfer money. The advice was also included in the national “Think Ahead” (“Denk vooruit”) campaign (Rijksoverheid, 2025). This campaign was developed and coordinated by the National Coordinator for Counterterrorism and Security (NCTV), in collaboration with national and civil society partners. All Dutch households received a paper information booklet explaining how to prepare for an emergency. The information is also available on the Think Ahead campaign website (Dutch: <https://www.denkvooruit.nl/>, English: <https://english.denkvooruit.nl/>), with the information booklet available in several languages. Similar European guidance stresses diversified payment access and the role of cash infrastructure in contingencies (Danmarks Nationalbank, 2025; Faella and Zamora-Pérez, 2025; Khiaonrong et al., 2021).

Yet preparedness advice does not automatically translate into action. Research on protective action, crisis communication and behavioural economics suggests that people must notice, understand and trust advice, view the recommended action as effective and feasible, and overcome inattention, inertia, present bias and liquidity constraints (Lindell and Perry, 2012; Bubeck et al., 2012; Karlan et al., 2016; Fernandes et al., 2014; Kosse, 2013). This reasoning is consistent with the Theory of Reasoned Action and the Theory of Planned Behavior (Ajzen, 1991), which posit that behavioural intentions and subsequent actions are shaped not only by information, but also by attitudes towards the behaviour, perceived social norms and perceived behavioural control. In the context of emergency cash holdings, households may therefore fail to act not only because they are unaware of the recommendation, but also because they do not view cash as necessary or effective, or because practical and behavioural barriers make compliance difficult.

¹ Prior to its updated calculation, Nibud advised households to keep €50 in cash as an emergency buffer for short-lived disruptions.

This suggests that simple, timely and actionable guidance may matter, but its real-world effects remain an open question. This paper contributes to the emerging literature on payment-system resilience by shifting the focus from whether cash can function as an ex-post fallback during disruptions to whether households are prepared ex ante to use such a fallback. Recent studies show that digital-payment disruptions can reduce expenditure and induce substitution towards cash when electronic payment methods become unreliable or unavailable (Alvarez et al., 2026), that cash provides system-wide redundancy because of its offline functionality, tangibility and status as central bank money (Faella and Zamora-Pérez, 2025), and that accessible cash infrastructure can support consumer adjustment during a card-payment outage (Mäder et al., 2026). Its broad merchant acceptance further strengthens cash's role as a practical backup, since household cash buffers only provide resilience if consumers can actually use cash when digital payments are unavailable. What remains largely unexplored is the household preparedness margin: whether consumers are aware of official contingency advice, whether they comply with it, which households remain least prepared, and which behavioural or practical barriers explain non-compliance. We fill this gap using Dutch household survey evidence collected after the May 2025 NFPS recommendation to hold €70 per adult and €30 per child in cash for a 72-hour disruption of electronic payments and to maintain multiple means of payment. The paper makes three contributions. First, it provides micro-level evidence on awareness, cash-buffer compliance, preparedness heterogeneity, reasons for non-compliance and digital fallback capacity in a highly digitalised retail payment economy. Second, it links a concrete public resilience recommendation to actual household behaviour, thereby connecting the global outage literature with the policy problem of designing preparedness guidance that is noticed, feasible and behaviourally relevant. Third, it examines whether awareness of the cash advice and compliance changed after the following events: a power outage, the escalation of the Iran-US conflict and communication about the cash advice.

Foreshadowing our main results, we find that awareness of the cash recommendation is widespread but incomplete, and that it does not always translate into preparedness. Compliance is lower among financially constrained households, and non-compliance appears to reflect not only information gaps but also behavioural frictions and practical constraints. The event-based evidence points to a potential role for targeted communication. Digital fallback capacity is more common than cash fallback preparedness.

The remainder of the paper is structured as follows. Section 2 presents the data, while Section 3 outlines the survey results. Section 4 examines the factors associated with awareness of the cash recommendation, compliance with this recommendation, and the reasons for non-compliance. Finally, Section 5 concludes and discusses the policy implications.

2. Data

2.1 Survey on Consumers' Payments

To examine household preparedness, we use the DNB/DPA Survey on Consumers' Payments (SCP). The SCP has been conducted since 2010 and aims to provide a representative picture of payment behaviour among the Dutch population aged 12 years and over (Jonker et al., 2018). The SCP consists of two components: a one-day payment diary and an additional questionnaire covering, for example, payment preferences, trust and personal characteristics. In the diary component, respondents register all payments made at physical points of sale (POS) during a single day. The sample is drawn monthly and the respondents are distributed evenly over the days of the month. For this study, we added temporary questions to the questionnaire in the first quarter of 2026 to measure awareness of the cash advice, compliance with that advice and reasons for not following it. These additional questions allow us to make an important contribution to earlier work based on the existing SCP data: whereas Van der Cruijssen and Jonker (2026) used the regular survey questions to study preparedness, our temporary module explicitly measures the total amount of cash held at the household level. Moreover, we measure awareness of the cash advice and reasons for non-compliance.

DNB and DPA commission the data collection, which is carried out in 2026 by the research agency Miles Research. Respondents are recruited from three panels: the online GfK market research panel, the online PanelClix panel and an offline panel established by the research agency Opiniehuis. Members of the offline panel can choose between a telephone interview and a face-to-face interview. This offline panel consists of respondents recruited through street recruitment in areas with many migrants and low-income residents, including at accessible public institutions such as libraries and community centres, as well as through Opiniehuis' online panel, whose members may assist someone from the target group in completing the questionnaire.

The data used in this paper cover the period from 1 January 2026 to 31 March 2026. The sample consists of 5,672 respondents, of whom 5,564 completed the survey online (98%) and 108 offline (2%). This corresponds to an average of 63 respondents per day.

2.2 The Dutch payment landscape

Everyday payments in the Netherlands are highly digitalised. Consumers can choose from several payment instruments, and both electronic payments and cash are widely accepted; in 2025/6 cash was accepted by 96% of the POS locations (DNB, 2026d) and the debit card by 95% (Panteia, 2026). According to the 2025 factsheet on payment behaviour, Dutch consumers made 7.1 billion POS transactions, with a total value of €185 billion (DNB and DPA, 2026). Electronic methods accounted for most of these payments, while cash represented 17% of the number of POS transactions. Contactless payments dominate within electronic POS payments. In 2025, 39% of POS transactions were initiated with a smartphone or wearable device, 40% with a contactless debit card and 4% by inserting a debit card into the payment terminal. Credit cards played only a marginal role, accounting for 0.4% of POS

transactions. Access to the underlying infrastructure is also widespread: debit card and current account ownership is almost universal (ECB, 2022). In addition, 98% of Dutch consumers had internet access at home in 2025, and 91% used the internet for online or mobile banking (Statistics Netherlands, 2025).

3. Survey results

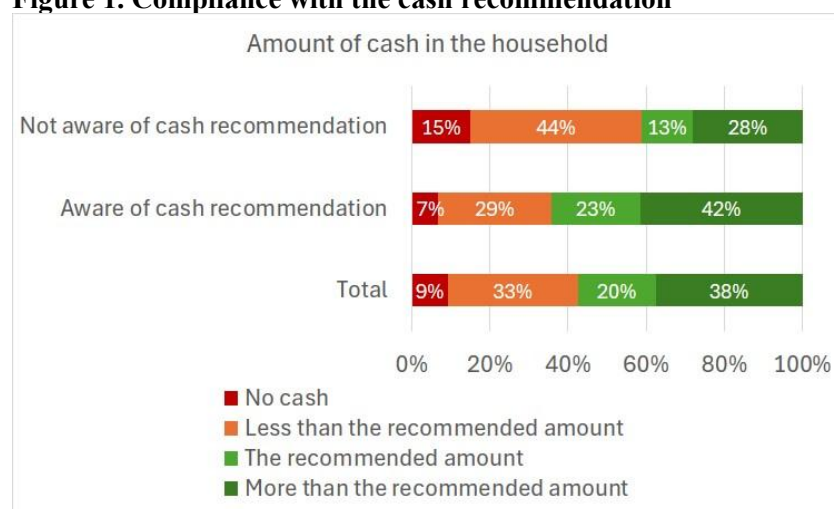
3.1 Awareness of the cash advice

A total of 71% of respondents are aware of the cash holding recommendation. To measure awareness of the cash advice, we asked respondents: *"Even if there is a power outage, or if your bank's IT system or the internet is not working, you should still be able to make payments. That is why it is advisable to keep enough cash on hand for an emergency in which the payment system is unavailable for up to three days (72 hours). Are you aware that the recommendation is for households to hold €70 in cash per adult and €30 per child to be well prepared?"* The answer options were "Yes" and "No".

3.2 Compliance with the cash advice

Most respondents meet the cash recommendation. To measure this, the survey included the following question: *"How well prepared is your household? My household has..."* with answer options: "No cash", "Less cash than the recommended €70 per adult and €30 per child", "€70 per adult and €30 per child in cash", and "More cash than the recommended amount". Figure 1 shows the responses. A total of 58% follow the cash advice by holding the recommended amount or more. Meanwhile, 9% of the respondents indicate that their household has no cash, and 33% report having some cash but less than the advised amount. Compliance is higher among respondents who are aware of the cash recommendation than among those who are not: 64% versus 41%.

Figure 1. Compliance with the cash recommendation



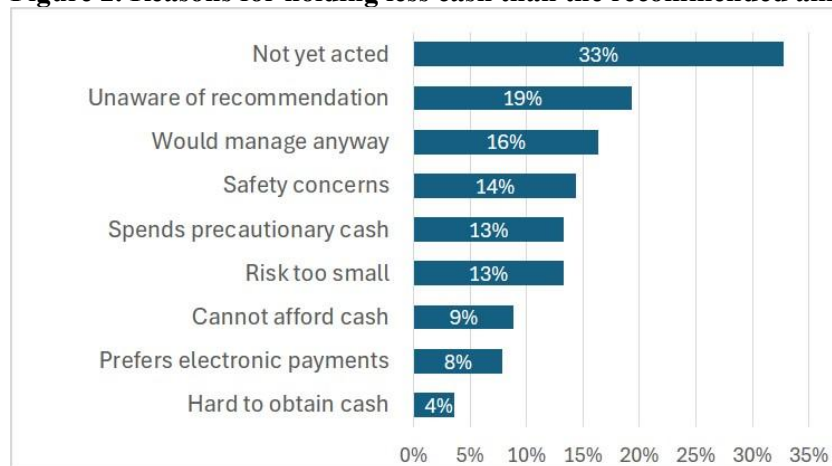
Source: DNB/DPA SCP 2026Q1.

Notes: 5,672 respondents, 4,009 who are aware of the cash recommendation and 1,663 who are not aware of it.

3.3 Reasons for non-compliance

The most frequently mentioned reason for holding less cash than the recommended amount is not having got round to following the recommendation. This applies to 33% of the 2,410 respondents who hold no or less cash than recommended. We asked them the following question: *“Why does your household hold less cash than the recommended amount? Multiple answers possible.”* Respondents could choose from a list of nine possible answers, which were randomised. Figure 2 shows the response shares. A total of 19% of respondents indicated that not being aware of the advice was a reason for not following it. Another 16% reported that they do not consider it necessary, as they believe they would manage anyway in such an emergency. For 14%, the perceived lack of safety of keeping (that much) cash at home discourages them from holding the recommended amount. A further 13% indicated that they tend to spend the cash that is withdrawn as a precaution. An additional 13% mentioned that they consider the risk of such an emergency to be too small. Less frequently mentioned reasons include not having enough money to hold sufficient cash, preferring to pay electronically in emergencies, and finding it difficult to obtain cash.

Figure 2. Reasons for holding less cash than the recommended amount



Source: DNB/DPA SCP 2026Q1.

Notes: 2,410 respondents. The figure uses shortened response labels. The full question wording and response options are reported in Appendix A.

3.4 Other ways to increase preparedness

Holding multiple digital payment methods can also enhance resilience to disruptions in the payment system by providing consumers with alternative ways to make payments. The payment diary includes a question asking which payment methods respondents have. Table 1 shows the results.

A total of 70% of the respondents have more than one digital payment method available for purchases in physical stores and other POS. The payment instrument with the highest adoption rate is the debit card, which is held by 98% of respondents. Slightly more than half own a mobile phone with a wallet app that can be used for in-store payments (57%), while 47% have a credit card and 9% own a smartwatch or another wearable device that can be used to make payments.

Table 1. Digital payment instruments for POS payments

Debit card	98%
Mobile phone with a payment app/wallet (Apple Pay, Google Pay, Klarna, etc.)	57%
Credit card	47%
Smartwatch or other wearable device with a payment app/wallet	9%
More than one digital payment method for POS payments	70%

Source: DNB/DPA SCP 2026Q1.

Notes: 5,672 respondents. The full question wording and response options are reported in Appendix A.

In total, 77% of respondents hold a debit card with only one bank. If payment services at that bank, or the card scheme associated with that debit card (such as Visa or Mastercard), are disrupted, these individuals cannot switch to another bank or card scheme. A further 0.5% hold no debit card. The remaining 23% of the respondents hold debit cards with two or more banks, giving them an alternative option in the event of a disruption at one of their banks (although this may not help if the cards use the same card scheme). In total, 19% hold a debit card with two banks and 3% with three or more banks. At the household level, different household members may hold debit cards issued by different banks. As a result, households are likely to be more resilient than individuals. However, our data do not show with which banks other household members hold current accounts. Nor do they identify the card schemes respondents use for their payments.

4. Regression results

4.1 Awareness of the cash advice

Table 2 reports the average marginal effects from logit models in which *aware of cash recommendation* is the dependent variable. This variable equals 1 for respondents who are aware of the cash recommendation and 0 otherwise. Column 1 presents a model with standard personal characteristics, while column 2 adds a broader set of characteristics indicating whether respondents belong to groups that may be considered potentially vulnerable.

Awareness of the cash advice differs across personal characteristics. It is positively associated with age. For example, people aged 12 to 24 are 8 percentage points (pp) less likely to be aware of the cash advice than those aged 25 to 34, the reference group, whereas people aged 75 and over are 28 pp more likely to be aware of it. Awareness is also higher among respondents with higher levels of education. The positive effect of high income is no longer statistically significant once the broader set of characteristics is included. In this extended model, respondents for whom income is unknown report lower awareness of the cash advice. People with a partner are 5 pp more likely to be aware of the advice than those without a partner, while people with children living at home are 7 pp less likely to be aware of it. Awareness is also lower among respondents who find it difficult to get by on their household income, among first-generation migrants with a non-Western background, and among people with low

digital literacy, by 7, 19 and 15 pp, respectively. By contrast, people with a disability are 5 pp more likely to be aware of the advice.²

Table 2. Models with *aware of cash recommendation* as dependent variable

	(1) Aware of cash recommendation	(2) Aware of cash recommendation
Male	-0.02 (0.01)	-0.02 (0.01)
Gender: other or I prefer not to say	-0.12* (0.06)	-0.09 (0.06)
Between 12 and 24	-0.07*** (0.02)	-0.08*** (0.02)
Between 35 and 44	0.04** (0.02)	0.05** (0.02)
Between 45 and 54	0.09*** (0.02)	0.10*** (0.02)
Between 55 and 64	0.13*** (0.02)	0.14*** (0.02)
Between 65 and 74	0.20*** (0.02)	0.21*** (0.02)
75 and over	0.28*** (0.03)	0.28*** (0.03)
Education: middle	0.08*** (0.01)	0.06*** (0.01)
Education: high	0.09*** (0.02)	0.07*** (0.02)
Income: middle	0.01 (0.02)	-0.02 (0.02)
Income: high	0.05** (0.02)	0.00 (0.02)
Income: unknown	-0.00 (0.02)	-0.04* (0.02)
Partner	0.06*** (0.01)	0.05*** (0.01)
Children	-0.08*** (0.02)	-0.07*** (0.01)
Making ends meet: hard or very hard		-0.07*** (0.02)
Western first generation		-0.07 (0.05)
Western second generation		-0.04 (0.03)
Non-Western first generation		-0.19*** (0.03)
Non-Western second generation		-0.02 (0.03)
Digital literacy: low		-0.15*** (0.02)
Disability		0.04* (0.02)
Number of respondents	5,672	5,672
Pseudo R ²	0.07	0.09
Log pseudolikelihood	-3179.2	-3115.6
Wald χ^2	449.3***	555.7***

Notes: The table reports average marginal effects of logit models with *aware of cash recommendation* as dependent variable. It equals 1 if respondents are aware of the cash recommendation and 0 otherwise. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

² Results are very similar when date controls are included. These are 0–1 indicators for the month, day of the month and day of the week.

4.2 Compliance with the cash advice

Table 3 reports the average marginal effects from logit models in which *meets cash recommendation* is the dependent variable. This variable equals 1 for respondents who meet the cash recommendation and 0 otherwise. Column 1 presents a model with standard personal characteristics, column 2 adds the broader set of characteristics indicating whether respondents belong to groups that may be considered potentially vulnerable, column 3 additionally includes a dummy for being aware of the cash advice, and column 4 includes variables reflecting two other forms of preparedness, i.e. having more than one digital payment method for POS payments and having current accounts at multiple banks.

Compliance with the cash recommendation is associated with several personal characteristics (Table 3, column 2). It is highest among people in the oldest age groups. Those aged 75 and over are 19 pp more likely to meet the recommendation than people aged 25 to 34, the reference group. The corresponding differences for other age groups are 14 pp for people aged 65 to 74 and 10 pp for those aged 55 to 64. People aged 12 to 24 are 7 pp more likely to hold sufficient cash than the reference group. By contrast, people with low incomes are less likely to meet the cash recommendation than those with middle, high or unknown incomes. This may seem counterintuitive, as low-income households tend to use cash more often for everyday purchases (DNB and DPA, 2026); however, it is consistent with the view that they have less financial scope to set aside cash as a precautionary buffer. People with children living at home are also less likely to be prepared than those without children living at home. In addition, respondents who find it hard or very hard to make ends meet are 15 pp less likely to meet the recommendation than those who do not find it hard to make ends meet. Finally, first-generation migrants with a non-Western background and second-generation migrants with a Western background are less likely to follow the advice than people without a migration background.

Compliance is strongly associated with awareness of the cash advice. Respondents who are aware of the advice are 21 pp more likely to hold the recommended amount of cash than those who are not aware of it (Table 3, column 3). In this model, respondents with a partner are 3 pp less likely to meet the cash recommendation, whereas respondents with low digital literacy are 5 pp more likely to do so. Once awareness of the cash advice is included, migration background is no longer statistically significant.

Meeting the cash recommendation is not significantly related to two other forms of preparedness: having more than one digital payment method at the POS and having a current account at more than one bank (Table 3, column 4). When these variables are included, the variable *digital literacy: low* is no longer significant.³

³ The model results are very similar when date controls are included. These are 0–1 indicators for the month, day of the month and day of the week.

Table 3. Models with *meets cash recommendation* as dependent variable

	(1) Meets cash recommendation	(2) Meets cash recommendation	(3) Meets cash recommendation	(4) Meets cash recommendation
Male	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Gender: other or I prefer not to say	0.09 (0.08)	0.10 (0.08)	0.12 (0.08)	0.12 (0.08)
Between 12 and 24	0.08*** (0.03)	0.07*** (0.03)	0.10*** (0.03)	0.10*** (0.03)
Between 35 and 44	0.03 (0.03)	0.03 (0.03)	0.02 (0.02)	0.02 (0.02)
Between 45 and 54	0.02 (0.02)	0.02 (0.02)	-0.00 (0.02)	-0.00 (0.02)
Between 55 and 64	0.10*** (0.02)	0.10*** (0.02)	0.07*** (0.02)	0.07*** (0.02)
Between 65 and 74	0.14*** (0.03)	0.14*** (0.03)	0.09*** (0.03)	0.09*** (0.03)
75 and over	0.20*** (0.03)	0.19*** (0.03)	0.13*** (0.03)	0.13*** (0.03)
Education: middle	-0.00 (0.02)	-0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Education: high	0.02 (0.02)	0.02 (0.02)	0.00 (0.02)	0.01 (0.02)
Income: middle	0.11*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Income: high	0.17*** (0.02)	0.13*** (0.03)	0.13*** (0.03)	0.13*** (0.03)
Income: unknown	0.12*** (0.02)	0.09*** (0.02)	0.10*** (0.02)	0.10*** (0.02)
Partner	-0.01 (0.02)	-0.02 (0.02)	-0.03* (0.02)	-0.03* (0.02)
Children	-0.06*** (0.02)	-0.06*** (0.02)	-0.04** (0.02)	-0.04** (0.02)
Making ends meet: hard or very hard		-0.15*** (0.02)	-0.13*** (0.02)	-0.13*** (0.02)
Western first generation		-0.02 (0.05)	-0.01 (0.05)	-0.01 (0.05)
Western second generation		-0.05* (0.03)	-0.04 (0.03)	-0.04 (0.03)
Non-Western first generation		-0.10** (0.04)	-0.05 (0.04)	-0.05 (0.04)
Non-Western second generation		-0.02 (0.04)	-0.02 (0.04)	-0.02 (0.04)
Digital literacy: low		0.01 (0.03)	0.05* (0.03)	0.04 (0.03)
Disability		-0.00 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Aware of cash advice			0.21*** (0.01)	0.21*** (0.01)
Multiple digital payment methods				-0.02 (0.02)
Current accounts at multiple banks				-0.00 (0.02)
Number of respondents	5,672	5,672	5,672	5,672
Pseudo R ²	0.02	0.03	0.06	0.06
Log pseudolikelihood	-3783.7	-3757.4	-3651.7	-3650.3
Wald χ^2	160.5***	208.3***	398.9***	402.1***

Notes: The table reports average marginal effects of logit models with *meets cash recommendation* as dependent variable. This variable equals 1 for respondents who meet the cash recommendation and 0 otherwise. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

4.3 Reasons for non-compliance

Table 4 reports average marginal effects from logit models for each stated reason for not meeting the cash recommendation. The dependent variable in each column equals 1 if that reason was selected and 0 otherwise. The models include the same standard personal characteristics and vulnerability indicators used before.

The results point to four broad mechanisms: lack of awareness, inertia, risk perceptions and preferences, and practical constraints. Inertia is important but unevenly distributed. Respondents with middle or high education and/or income are more likely than the reference groups to report that they have not yet acted on the recommendation, with effects up to 14 pp for high-income respondents. By contrast, men (-11 pp), respondents with low digital literacy (-11 pp), and those who find it hard or very hard to make ends meet (-16 pp) are less likely to cite inaction. For these groups, non-compliance therefore appears less often to reflect simple postponement.

Awareness gaps as a reason for non-compliance remain concentrated in specific groups. First-generation non-Western migrants (+13 pp) and respondents with low digital literacy (+7 pp) are more likely to cite unawareness of the recommendation as a reason for non-compliance, whereas older respondents and respondents with a disability (-8 pp) are less likely to do so. Households with children are also somewhat more likely to mention unawareness (+4 pp). These patterns suggest that information still matters, but only for part of the non-compliant group.

Motivation and perceived need are also relevant. Men are less likely to report having spent precautionary cash as a reason for non-compliance with the cash recommendation, and more likely to mention the following reasons: a preference for electronic payments, even in emergencies (+4 pp), not necessary because the risk of such an emergency is too small (+7 pp), or not necessary because they believe they would manage anyway (+6 pp). High-income respondents also more often cite a preference for electronic payments, even in emergencies as a reason for non-compliance (+6 pp). By contrast, non-Western migrants are less likely to mention they would manage without the recommended cash buffer as a reason for non-compliance.

Finally, practical constraints are most visible among financially vulnerable and access-constrained groups. Respondents who find it hard or very hard to make ends meet are much more likely to mention they cannot afford the cash buffer as a reason for non-compliance (+15 pp) and somewhat more likely to mention that cash is difficult to obtain as a reason (+3 pp). Safety concerns are mentioned less often as a reason by higher-income respondents (-6 pp), but somewhat more often by respondents between 65 and 74 (+5 pp) and respondents with a disability (+4 pp). Respondents with a disability more frequently report difficulty obtaining cash as a reason for non-compliance (+2 pp). This also holds for respondents with a non-Western first-generation migration background (+3 pp) and respondents who find it hard to get by with their household income (+3 pp), whereas people in the oldest age class are less likely to mention this reason (-8 pp).

Overall, the results indicate that non-compliance reflects not only awareness gaps but also inertia, perceived need, payment preferences, and practical feasibility. This suggests that communication may need to be complemented by reminders, a clearer explanation of why cash is useful in emergencies, and attention to affordability, safety, and access-to-cash constraints.

Table 4. Models with reason variables as dependent variables

	(1) Reason: unaware of recommen- dation	(2) Reason: not yet acted	(3) Reason: safety concerns	(4) Reason: spends precautionary cash	(5) Reason: cannot afford cash
Male	0.02 (0.02)	-0.11*** (0.02)	-0.00 (0.01)	-0.03** (0.01)	-0.00 (0.01)
Gender: other or I prefer not to say	-0.23 (0.16)	-0.42* (0.22)	-0.10 (0.13)	omitted	omitted
Between 12 and 24	0.02 (0.03)	0.00 (0.04)	0.02 (0.03)	0.02 (0.03)	-0.05** (0.02)
Between 35 and 44	-0.00 (0.03)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	-0.02 (0.02)
Between 45 and 54	-0.05* (0.03)	0.02 (0.03)	0.03 (0.03)	0.05* (0.03)	-0.02 (0.02)
Between 55 and 64	-0.10*** (0.03)	0.09*** (0.03)	0.03 (0.03)	0.03 (0.03)	-0.05*** (0.02)
Between 65 and 74	-0.13*** (0.04)	0.07* (0.04)	0.05* (0.03)	0.06** (0.03)	-0.03 (0.02)
75 and over	-0.10** (0.04)	0.05 (0.05)	0.04 (0.04)	0.03 (0.04)	-0.02 (0.03)
Education: middle	-0.01 (0.02)	0.08*** (0.03)	0.01 (0.02)	0.01 (0.02)	-0.02 (0.01)
Education: high	0.03 (0.02)	0.10*** (0.03)	0.01 (0.02)	0.02 (0.02)	-0.04** (0.01)
Income: middle	0.01 (0.03)	0.07** (0.03)	-0.04* (0.02)	-0.02 (0.02)	-0.06*** (0.01)
Income: high	-0.06* (0.03)	0.14*** (0.04)	-0.06** (0.03)	-0.04 (0.03)	-0.10*** (0.02)
Income: unknown	-0.01 (0.03)	0.09** (0.04)	-0.02 (0.02)	-0.05** (0.02)	-0.07*** (0.02)
Partner	-0.00 (0.02)	-0.02 (0.02)	0.03* (0.02)	0.01 (0.02)	-0.01 (0.01)
Children	0.04** (0.02)	0.02 (0.02)	0.00 (0.02)	0.00 (0.02)	0.02 (0.01)
Making ends meet: hard or very hard	-0.04 (0.03)	-0.16*** (0.03)	-0.01 (0.02)	0.02 (0.02)	0.15*** (0.01)
Western first generation	0.06 (0.06)	-0.15* (0.08)	0.06 (0.05)	0.08* (0.05)	0.03 (0.04)
Western second generation	0.01 (0.04)	-0.01 (0.04)	0.00 (0.03)	-0.01 (0.03)	0.02 (0.02)
Non-Western first generation	0.13*** (0.04)	-0.05 (0.06)	0.04 (0.03)	-0.06 (0.05)	-0.02 (0.03)
Non-Western second generation	0.01 (0.04)	0.02 (0.05)	0.01 (0.04)	0.03 (0.04)	0.01 (0.02)
Digital literacy: low	0.07** (0.03)	-0.11** (0.05)	0.03 (0.03)	-0.02 (0.03)	0.01 (0.02)
Disability	-0.08** (0.03)	0.01 (0.03)	0.04* (0.02)	0.01 (0.02)	0.01 (0.01)
Number of respondents	2,410	2,410	2,410	2,395	2,395
Pseudo R ²	0.04	0.05	0.02	0.01	0.27
Log pseudolikelihood	-1136.6	-1453.2	-978.2	-928.0	-527.0
Wald χ^2	89.9***	122.2***	30.7	28.5	355.5***

Notes: The table reports average marginal effects of logit models with 0-1 reason indicator variables as dependent variable (1 = the reason applies, 0 = the reason does not apply). Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 4. Models with reason variables as dependent variables (continued)

	(6) Reason: prefers electronic payments	(7) Reason: hard to obtain cash	(8) Reason: risk too small	(9) Reason: would manage anyway
Male	0.04*** (0.01)	-0.00 (0.01)	0.07*** (0.01)	0.06*** (0.02)
Gender: other or I prefer not to say	omitted	0.02 (0.04)	0.17*** (0.06)	0.32*** (0.07)
Between 12 and 24	-0.02 (0.02)	-0.01 (0.01)	-0.00 (0.03)	0.05* (0.03)
Between 35 and 44	-0.01 (0.02)	-0.02* (0.01)	-0.01 (0.03)	0.04 (0.03)
Between 45 and 54	-0.03 (0.02)	-0.01 (0.01)	-0.04 (0.03)	0.04 (0.03)
Between 55 and 64	-0.04* (0.02)	-0.04** (0.02)	-0.00 (0.02)	0.03 (0.03)
Between 65 and 74	-0.05** (0.02)	-0.02 (0.02)	-0.04 (0.03)	0.04 (0.03)
75 and over	-0.01 (0.03)	-0.08** (0.04)	-0.01 (0.03)	0.06* (0.04)
Education: middle	0.01 (0.02)	-0.01 (0.01)	-0.01 (0.02)	0.01 (0.02)
Education: high	0.02 (0.02)	-0.00 (0.01)	-0.03 (0.02)	0.02 (0.02)
Income: middle	0.03 (0.02)	0.00 (0.01)	0.02 (0.02)	0.02 (0.03)
Income: high	0.06*** (0.02)	0.00 (0.01)	0.02 (0.03)	0.04 (0.03)
Income: unknown	0.03 (0.02)	0.01 (0.01)	0.03 (0.03)	-0.00 (0.03)
Partner	0.01 (0.01)	-0.01 (0.01)	0.02 (0.02)	-0.00 (0.02)
Children	-0.03* (0.01)	-0.01 (0.01)	-0.04** (0.02)	-0.03* (0.02)
Making ends meet: hard or very hard	-0.00 (0.02)	0.03*** (0.01)	-0.02 (0.02)	-0.07** (0.03)
Western first generation	-0.03 (0.05)	-0.01 (0.04)	-0.01 (0.05)	-0.04 (0.07)
Western second generation	-0.03 (0.03)	0.01 (0.02)	-0.06* (0.03)	0.01 (0.03)
Non-Western first generation	-0.05 (0.05)	0.03*** (0.01)	0.01 (0.04)	-0.09* (0.05)
Non-Western second generation	-0.02 (0.03)	0.02 (0.02)	-0.06 (0.05)	-0.11** (0.06)
Digital literacy: low	-0.01 (0.03)	0.02 (0.01)	-0.05 (0.03)	-0.02 (0.04)
Disability	-0.01 (0.02)	0.02** (0.01)	0.01 (0.02)	-0.02 (0.03)
Number of respondents	2,395	2,410	2,410	2,410
Pseudo R ²	0.04	0.07	0.03	0.04
Log pseudolikelihood	-639.0	-352.1	-914.1	-1035.2
Wald χ^2	54.5***	69.2***	52.2***	72.9***

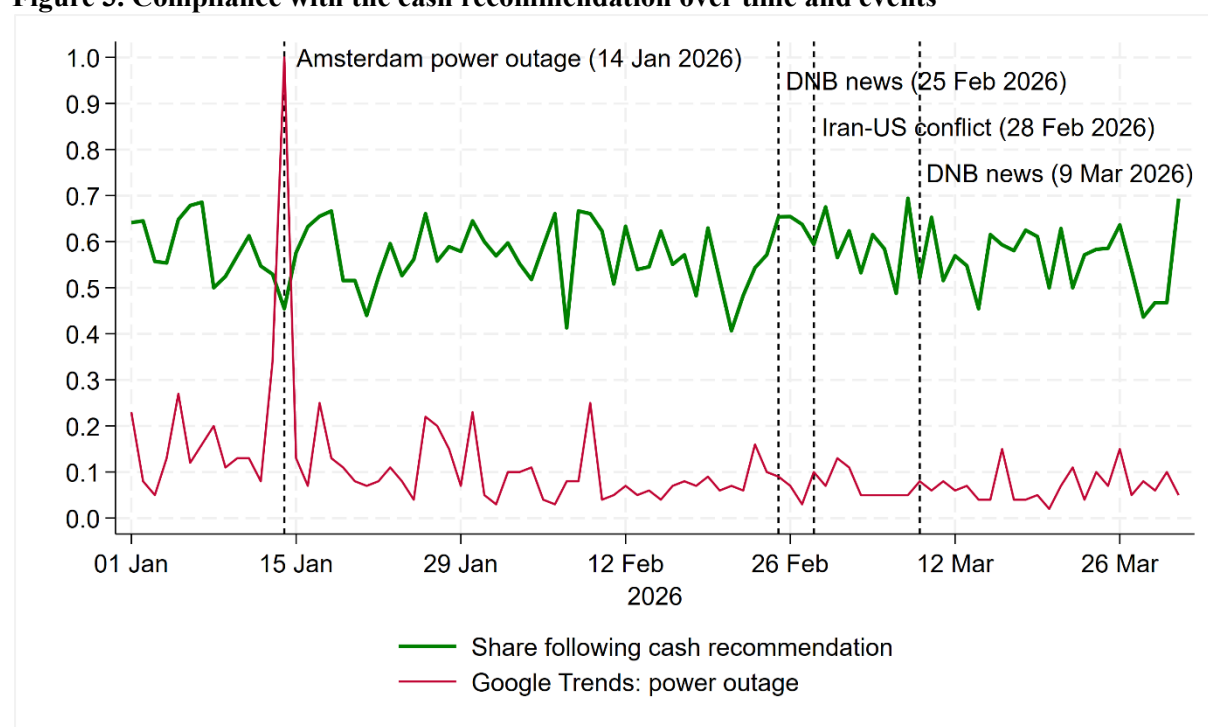
Notes: The table reports average marginal effects of logit models with 0-1 reason indicator variables as dependent variable (1 = the reason applies, 0 = the reason does not apply). Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

4.4 Events and awareness and compliance

Figure 3 shows compliance with the cash advice over time in the first quarter of 2026, alongside several events that may have affected households' awareness of the cash advice and preparedness. The first is the large power outage in Amsterdam on 14 January 2026. The outage started during work at an

electricity substation on the Marnixstraat and left more than 50,000 customers in parts of the city without electricity for about an hour and a half. It also disrupted everyday activities: trams came to a standstill, shops had to close, traffic lights stopped working and an NL-Alert was sent advising people not to use lifts and to check on neighbours. Such a visible disruption may have reminded households of their dependence on electricity and digital infrastructure, including for everyday payments. This is also reflected in Google Trends data: search interest in the Netherlands for the word “stroomstoring” (“power outage”) shows a clear peak on that day. In addition, public communication about the recommended amount of cash may have influenced the share of people holding at least the recommended amount. DNB published a news article on 25 February 2026 on awareness of the cash advice (DNB, 2026a), reporting that households are advised to hold €70 per adult and €30 per child for emergencies. In addition to the news article, DNB promoted the advice through its social media channels as part of its public communication efforts. On 9 March 2026, DNB published its Payments Strategy 2026–2028 together with an accompanying news article. Both reiterated the importance of diversifying payment options and keeping enough cash on hand for the first 72 hours of an emergency (DNB, 2026b; DNB, 2026c). The recommended amounts were mentioned in the news article (DNB, 2026b). Finally, the escalation of the Iran-US conflict in the first quarter of 2026 may have increased awareness of geopolitical risks and the need to be well prepared.

Figure 3. Compliance with the cash recommendation over time and events



Source: SCP and Google Trends data.

Notes: The share following the cash recommendation ranges from 0, when nobody holds at least the recommended amount of cash, to 1, when everyone does so. Google Trends data have been rescaled to range from 0 to 1, where 1 indicates the highest relative search interest in the period studied and 0 indicates no or very low search interest relative to that peak. The search term was “stroomstoring” (“power outage”), for the Netherlands.

To examine whether these events are associated with changes in awareness of the cash recommendation and compliance with this advice, we include 0-1 event dummies that equal 1 from the day of the event onwards and 0 before the event. We add these indicators to both the model for awareness of the cash advice and the model for meeting the cash recommendation. This allows us to assess whether the events are associated with changes in awareness, compliance with the recommendation, or both. Any such association may reflect increased awareness of the advice, a greater likelihood that respondents who were already aware of the advice acted on it, or a combination of the two. We find no evidence that these events went along with higher awareness of the cash advice (Table 5, column 1). The DNB news article of 25 February 2026 is associated with a 9 pp higher share of people following the cash advice, while the other three events are not associated with higher compliance (Table 5, column 2).

These patterns suggest that compliance may respond most strongly to communication that is directly linked to the cash recommendation. The Amsterdam power outage, although relevant to payment resilience, was regional and not accompanied by targeted messaging about the advice. This may explain why it did not coincide with a visible increase in awareness or compliance. Similarly, the Iran-US conflict may have felt too distant from households' everyday payment risks, or may have triggered other forms of preparedness, such as storing food or obtaining other emergency-kit items. The absence of an effect of the 9 March 2026 publications may reflect the fact that these publications addressed several payment strategy topics, so the cash recommendation was less prominent than in the 25 February 2026 communication. The DNB news article published on that day explicitly concerned the cash recommendation and had a broad reach, which may have made the advice more salient and helped translate awareness into action.

Table 5. Models relating preparedness to event indicators

	(1) Aware of cash recommendation	(2) Meets cash recommendation
Amsterdam power outage	-0.03* (0.02)	-0.01 (0.02)
DNB news 1	0.01 (0.03)	0.09** (0.04)
Iran-US conflict	0.04 (0.04)	-0.06 (0.04)
DNB news 2	-0.02 (0.02)	-0.03 (0.02)
Other variables from full model	Yes	Yes
Number of respondents	5,672	5,672
Pseudo R ²	0.09	0.06
Log pseudolikelihood	-3111.5	-3646.8
Wald χ^2	558.3***	407.0***

Notes: The table reports average marginal effects from logit models. The full table with all regression results is in Appendix C (see Table C.1). Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

4.5 Other ways to increase preparedness

Table 6 reports average marginal effects from logit models in which the dependent variable is either *multiple digital payment methods* or *current accounts at multiple banks*. These dummy variables

Table 6. Models with *multiple digital payment methods* or *current accounts at multiple banks* as dependent variable

	(1a) Multiple digital payment methods	(1b) Multiple digital payment methods	(1c) Multiple digital payment methods	(2a) Current accounts at multiple banks	(2b) Current accounts at multiple banks	(2c) Current accounts at multiple banks
Male	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)	0.02 (0.01)	0.01 (0.01)
Gender: other or I prefer not to say	-0.25*** (0.06)	-0.23*** (0.06)	-0.22*** (0.06)	-0.07 (0.08)	-0.06 (0.08)	-0.03 (0.08)
Between 12 and 24	-0.10*** (0.02)	-0.10*** (0.02)	-0.10*** (0.02)	-0.07*** (0.03)	-0.07*** (0.03)	-0.05** (0.02)
Between 35 and 44	0.00 (0.02)	0.01 (0.02)	0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Between 45 and 54	0.05** (0.02)	0.06*** (0.02)	0.06*** (0.02)	-0.00 (0.02)	0.00 (0.02)	-0.00 (0.02)
Between 55 and 64	0.01 (0.02)	0.02 (0.02)	0.02 (0.02)	-0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Between 65 and 74	-0.01 (0.02)	0.00 (0.02)	-0.00 (0.02)	0.03 (0.02)	0.05** (0.02)	0.05** (0.02)
75 and over	-0.05* (0.03)	-0.02 (0.03)	-0.02 (0.03)	0.00 (0.02)	0.02 (0.03)	0.02 (0.03)
Education: middle	0.15*** (0.01)	0.13*** (0.01)	0.12*** (0.01)	0.10*** (0.02)	0.09*** (0.02)	0.07*** (0.02)
Education: high	0.23*** (0.01)	0.21*** (0.01)	0.19*** (0.02)	0.17*** (0.02)	0.16*** (0.02)	0.14*** (0.02)
Income: middle	0.12*** (0.02)	0.10*** (0.02)	0.09*** (0.02)	0.04* (0.02)	0.03 (0.02)	0.02 (0.02)
Income: high	0.23*** (0.02)	0.19*** (0.02)	0.18*** (0.02)	0.06*** (0.02)	0.05** (0.02)	0.02 (0.02)
Income: unknown	0.09*** (0.02)	0.06*** (0.02)	0.06*** (0.02)	0.02 (0.02)	0.01 (0.02)	-0.01 (0.02)
Partner	0.04*** (0.01)	0.04*** (0.01)	0.04*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)
Children	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Making ends meet: hard or very hard		-0.04** (0.02)	-0.05** (0.02)		0.00 (0.02)	0.01 (0.02)
Western first generation		-0.03 (0.04)	-0.04 (0.04)		0.07* (0.04)	0.08** (0.04)
Western second generation		0.09*** (0.03)	0.09*** (0.03)		-0.01 (0.02)	-0.02 (0.02)
Non-Western first generation		-0.06* (0.03)	-0.06* (0.03)		-0.04 (0.04)	-0.04 (0.04)
Non-Western second generation		-0.01 (0.03)	-0.01 (0.03)		0.05 (0.03)	0.05 (0.03)
Digital literacy: low		-0.17*** (0.02)	-0.16*** (0.02)		-0.09*** (0.03)	-0.06** (0.03)
Disability		-0.08*** (0.02)	-0.08*** (0.02)		-0.03* (0.02)	-0.02 (0.02)
Meets cash recommendation			-0.01 (0.01)			0.00 (0.01)
Current accounts at multiple banks			0.12*** (0.02)			
Multiple digital payment methods						0.11*** (0.01)
Number of respondents	5,672	5,672	5,672	5,672	5,672	5,672
Pseudo R ²	0.12	0.13	0.14	0.05	0.06	0.07
Log pseudolikelihood	-3064.4	-3002.2	-2969.0	-2876.5	-2865.0	-2831.5
Wald χ^2	702.4***	781.2***	814.7***	301.0***	321.4***	368.5***

Notes: The table reports average marginal effects from logit models in which the dependent variable is either *multiple digital payment methods* or *current accounts at multiple banks*. The first variable equals 1 for respondents who have multiple payment methods for POS payments and 0 otherwise; the second equals 1 for respondents who have current accounts at multiple banks and 0 otherwise. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

indicate, respectively, whether respondents have multiple digital payment methods for POS payments or hold current accounts at more than one bank. The ‘a’ columns present models with standard personal characteristics, the ‘b’ columns add the broader set of characteristics, and the ‘c’ columns additionally include preparedness variables.

Having multiple digital payment methods for POS payments and holding current accounts at multiple banks are both related to personal characteristics. Again, age matters. For example, young people are less likely to have multiple digital payment methods for POS payments and are also less likely to hold current accounts at multiple banks. Both forms of preparedness are significantly positively related to levels of education and income. Furthermore, people with a partner are more likely to have multiple digital payment methods and to hold current accounts at multiple banks. This may be because many partners have a joint account, which may be held at a different bank from someone’s personal account. People who struggle to get by on their income, first-generation migrants with a non-Western background, people with low digital literacy, and people with a disability are relatively unlikely to have multiple digital payment methods for POS payments. People with a second-generation Western migration background are more likely to possess multiple digital payment methods for POS payments. People with a first-generation Western migration background are more likely to hold current accounts at multiple banks, probably because they hold accounts with both a Dutch bank and a bank in their country or origin. People with low digital literacy or a disability are less likely to hold current accounts at multiple banks. There is a positive and significant association between having multiple digital payment methods for POS payments and having current accounts at multiple banks.

5. Concluding remarks and policy implications

This paper studies household resilience to temporary disruptions in digital retail payments in a highly digitalised payment environment at the POS. Overall, our findings show that while many Dutch households are already prepared for a temporary disruption to the digital retail payment system of up to three days (72 hours), preparedness is incomplete and unevenly distributed. In an increasingly digital payments landscape, the ability to fall back on cash remains an important element of household resilience. We find that 58% of respondents hold at least the advised amount of cash (€70 in cash per adult and €30 per child), and that awareness of the recommendation is strongly associated with doing so. At the same time, the results suggest that non-compliance is often not a matter of unwillingness. Rather, it reflects four distinct mechanisms: lack of awareness, inertia, limited perceived need, and practical constraints. Many respondents indicate that they have simply not yet got round to following the recommendation, while others are not aware of it. A further group does not perceive the risk or usefulness of holding cash as sufficiently important, and some explicitly prefer electronic means of payment or expect to manage without cash. Finally, a non-negligible share faces practical barriers, including financial constraints, safety concerns or difficulties obtaining or retaining cash. These findings highlight that non-compliance is heterogeneous and cannot be addressed by a single policy

instrument. Our event analysis points to a potential role for targeted communication in encouraging households to act on preparedness advice.

The findings should be interpreted with an important qualification. The analysis focuses on one specific dimension of preparedness: awareness of and compliance with the recommendation to hold cash for a temporary disruption of digital retail payments. This is central to payment resilience, but it is not a comprehensive measure of emergency preparedness. The broader “Think Ahead” campaign frames preparedness more widely, including an emergency kit, an emergency plan, and arrangements for mutual assistance.

The policy implications of our findings are threefold. First, strengthening household preparedness requires more than issuing general advice. Communication remains important, especially among groups with relatively low awareness of the recommendation such as younger people, first-generation migrants with a non-Western background, and people with lower levels of education or digital skills. However, the results show that awareness is only one part of the explanation. Consistent with the literature on protective behaviour (Lindell & Perry, 2012) and planned behaviour (Ajzen, 1991), preparedness depends not only on knowing the advice, but also on motivation, perceived effectiveness and the practical ability to act. Communication should therefore not only disseminate the recommendation but also make the rationale for holding cash as a fallback option in emergencies more concrete and salient.

Second, different barriers to compliance call for different policy responses. For people who are aware of the recommendation but have not yet reacted, reminders and simple, actionable guidance may help overcome inertia. By contrast, for individuals who do not perceive the risk or usefulness of cash as sufficiently high, communication should focus on making potential disruptions more tangible and clarifying the role of cash as a reliable fallback option. For financially vulnerable individuals, the main barrier is not inattention but feasibility: affordability constraints are substantially more prevalent among those who struggle to make ends meet. For these people, preparedness may be limited by capacity rather than willingness, implying that communication alone is unlikely to close the gap. A resilience strategy should therefore combine communication with attention to the affordability, accessibility, and perceived safety of maintaining a cash buffer.

Third, policy should recognise that some people consciously rely on digital payment methods and expect to cope without cash. Importantly, these different forms of preparedness do not appear to be perfect substitutes. This suggests that digital diversification does not replace the need for cash as a fallback option during disruptions. Increasing preparedness is not only a matter of awareness or reminders, but also of strengthening confidence in the usefulness of cash as a contingency instrument. Making the benefits of cash more salient in disruption scenarios may therefore be key to changing behaviour among this group.

Taken together, these findings highlight that consumers’ payment resilience is not only multidimensional, but also unevenly distributed. Policies aimed at strengthening resilience should

therefore employ a targeted strategy that distinguishes between consumers who need greater awareness, motivation, behavioural prompts or material support. Such a targeted communication approach can help ensure that more individuals are able to weather a temporary digital storm in retail payments.

This study has several limitations. The analysis relies on self-reported measures of cash holdings and reasons for non-compliance, which may be affected by recall error, rounding, social desirability, or uncertainty about cash held by other household members. Moreover, the data do not fully capture household-level pooling of non-cash payment instruments, nor whether alternative payment options rely on genuinely separate infrastructures, such as different banks or card schemes. Finally, the findings are context-specific. The Netherlands is a low-cash, highly digitalised payment market; results may differ in countries where cash use, cash holdings, cash acceptance, and access to cash infrastructure are higher.

Future research could extend the analysis in several directions. Three particularly relevant avenues are as follows. First, it could examine whether consumers with prior experience of payment, electricity, internet or banking disruptions are more likely to act on preparedness advice. Second, it could analyse how perceived likelihood and perceived impact of digital payment disruptions relate to cash holdings, distinguishing low perceived probability from low perceived severity or doubts about the usefulness of cash. Third, it could investigate whether households that do not comply with the cash recommendation follow other elements of the “Think Ahead” guidance. Such research would clarify whether non-compliance reflects a specific reluctance or inability to hold cash, or a broader lack of emergency preparedness. This would support more targeted policy communication that distinguishes between households needing awareness, motivation, practical guidance, or material support.

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Appendix A. Survey questions

Explanation of the codes used to indicate question type (not shown to the respondent):

- S = Single-choice question – only one answer can be selected.
- M = Multiple-choice question – more than one answer can be selected.
- O = Open-ended question – a free-text field in which respondents can enter their own answer.

All

S11. Which of the following payment methods do you have? Multiple answers possible [M]

- ☐ Debit card (with contactless payment functionality)
- ☐ Credit card
- ☐ Contactless payment using a mobile phone
- ☐ Contactless payment using a smartwatch or other wearable device
- ☐ Apple Pay
- ☐ Google Pay
- ☐ Tikkie/payment request
- ☐ Cryptocurrencies (such as Bitcoin, Ethereum, Ripple, Litecoin, etc.)
- ☐ Stablecoins (cryptocurrencies backed by external assets, such as Tether or USD Coin)
- ☐ PayPal
- ☐ Buy now, pay later services (such as Klarna and Riverty)
- ☐ Other, namely... [O]
- ☐ None of these [S]

All

S12. With which bank(s) do you have a current account with a debit card? This may involve either a physical or a digital debit card. [M]

Multiple answers possible

- ☐ ABN AMRO
- ☐ ASN Bank (including RegioBank and SNS)
- ☐ ING
- ☐ Knab
- ☐ Rabobank
- ☐ Triodos Bank
- ☐ Van Lanschot
- ☐ Bunq
- ☐ Revolut
- ☐ Openbank

- N26
- Other bank, namely... [O]
- I do not have a current account with a debit card. [S]

All

S30. Even if there is a power outage, or if your bank's IT system or the internet is not working, you should still be able to make payments. That is why it is advisable to keep enough cash on hand for an emergency in which the payment system is unavailable for up to three days (72 hours). Are you aware that the recommendation is for households to hold €70 in cash per adult and €30 per child to be well prepared? [S]

- Yes
- No

All

S31. How well prepared is your household? My household has... [S]

- No cash
- Less cash than the recommended €70 per adult and €30 per child
- €70 per adult and €30 per child in cash
- More cash than the recommended amount

S31 = 1 or 2

S32. Why does your household hold less cash than the recommended amount? Multiple answers possible. Because my household... [M]

- Was not aware of the recommendation
- Has not yet got round to following the recommendation
- Does not consider it safe to keep (that much) cash at home
- Spends the cash that is withdrawn as a precaution
- Does not have enough money to hold sufficient cash
- Prefers to pay electronically, even in emergencies
- Finds it difficult to obtain cash
- Does not consider it necessary. The risk of such an emergency is too small
- Does not consider it necessary. We would manage anyway in such an emergency

Appendix B. Summary statistics

Table B.1 Summary statistics

Variable	Mean	SD	Min	Max	N	Description
Aware of cash recommendation	0.71	0.46	0	1	5,672	Binary dummy (1 = aware of the cash recommendation, 0 = not aware).
Meets cash recommendation	0.58	0.49	0	1	5,672	Binary dummy (1 = meets the cash recommendation, 0 = does not meet it).
Reason: unaware of recommendation	0.19	0.39	0	1	2,410	Binary dummy (1 = reason is: unaware of recommendation, 0 = this is not the reason).
Reason: not yet acted	0.33	0.47	0	1	2,410	Binary dummy (1 = reason is: not yet acted, 0 = this is not the reason).
Reason: safety concerns	0.14	0.35	0	1	2,410	Binary dummy (1 = reason is: safety concerns, 0 = this is not the reason).
Reason: spends precautionary cash	0.13	0.34	0	1	2,395	Binary dummy (1 = reason is: spends precautionary cash, 0 = this is not the reason).
Reason: cannot afford cash	0.09	0.29	0	1	2,395	Binary dummy (1 = reason is: cannot afford cash, 0 = this is not the reason).
Reason: prefers electronic payments	0.08	0.27	0	1	2,395	Binary dummy (1 = reason is: prefers electronic payments, 0 = this is not the reason).
Reason: hard to obtain cash	0.04	0.19	0	1	2,410	Binary dummy (1 = reason is: hard to obtain cash, 0 = this is not the reason).
Reason: risk too small	0.13	0.34	0	1	2,410	Binary dummy (1 = reason is: risk too small, 0 = this is not the reason).
Reason: would manage anyway	0.16	0.37	0	1	2,410	Binary dummy (1 = reason is: would manage anyway, 0 = this is not the reason).
Multiple digital payment methods	0.70	0.46	0	1	5,672	Binary dummy (1 = multiple POS digital payment methods, 0 = else).
Current accounts at multiple banks	0.23	0.42	0	1	5,672	Binary dummy (1 = current accounts at multiple banks, 0 = else).
Female	0.52	0.50	0	1	5,672	Binary dummy (1 = female, 0 = else).
Male	0.47	0.50	0	1	5,672	Binary dummy (1 = male, 0 = else).
Gender: other or I prefer not to say	0.01	0.08	0	1	5,672	Binary dummy (1 = other or I do not prefer to say, 0 = else).
Between 12 and 24	0.15	0.36	0	1	5,672	Binary dummy (1 = between 12 and 24, 0 = else).
Between 25 and 34	0.12	0.32	0	1	5,672	Binary dummy (1 = between 25 and 34, 0 = else). Reference category.
Between 35 and 44	0.15	0.36	0	1	5,672	Binary dummy (1 = between 35 and 44, 0 = else).
Between 45 and 54	0.17	0.38	0	1	5,672	Binary dummy (1 = between 45 and 54, 0 = else).
Between 55 and 64	0.18	0.38	0	1	5,672	Binary dummy (1 = between 55 and 64, 0 = else).
Between 65 and 74	0.14	0.35	0	1	5,672	Binary dummy (1 = between 65 and 74, 0 = else).
75 and over	0.09	0.29	0	1	5,672	Binary dummy (1 = 75 and over, 0 = else).
Education: low	0.27	0.44	0	1	5,672	Binary dummy (1 = no education/primary school/courses/LBO/VBO/VMBO/MBO 1/MAVO/HAVO/VWO (first 3 years)/ULO/MULO/VSO, 0 = else). Reference category.
Education: middle	0.38	0.48	0	1	5,672	Binary dummy (1 = MBO 2, 3, 4/MBO old or HAVO/VWO (more than three years)/HBS/MMS/HBO first year or WO first year, 0 = else).
Education: high	0.35	0.48	0	1	5,672	Binary dummy (1 = HBO/WO bachelor, WO/HBO or PhD, 0 = else).
Income: low	0.12	0.32	0	1	5,672	Binary dummy (1 = gross annual household income is less than EUR 23,400, 0 = else or unknown). Reference category.
Income: middle	0.36	0.48	0	1	5,672	Binary dummy (1 = gross annual household income $\geq$ EUR 23,400 and $<$ EUR 65,000, 0 = else or unknown).
Income: high	0.26	0.44	0	1	5,672	Binary dummy (1 = gross annual household income $\geq$ EUR 65,000, 0 = else or unknown).

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

Table B.1 Summary statistics (continued)

Variable	Mean	SD	Min	Max	N	Description
Income: unknown	0.26	0.44	0	1	5,672	Binary dummy (1 = gross annual household income is unknown, 0 = income is known).
Partner	0.59	0.49	0	1	5,672	Binary dummy (1 = living together or married, 0 = else).
Children	0.30	0.46	0	1	5,672	Binary dummy (1 = household with kids living at home, 0 = else).
Making ends meet: hard or very hard	0.09	0.29	0	1	5,672	Binary dummy (1 = making ends meet on income is hard or very hard, 0 = else).
Western first generation	0.02	0.13	0	1	5,672	Binary dummy (1 = Western first generation migration background, 0 = else).
Western second generation	0.06	0.23	0	1	5,672	Binary dummy (1 = Western second generation migration background, 0 = else).
Non-Western first generation	0.03	0.17	0	1	5,672	Binary dummy (1 = non-Western first generation migration background, 0 = else).
Non-Western second generation	0.03	0.17	0	1	5,672	Binary dummy (1 = non-Western second generation migration background, 0 = else).
Digital literacy: low	0.06	0.24	0	1	5,672	Binary dummy (1 = grade is lower than 6, 0 = else).
Disability	0.12	0.32	0	1	5,672	Binary dummy (1 = difficulty walking or wheelchair, deaf or hearing impaired, blind or visually impaired, limited or no hand function or mild intellectual disability, 0 = else).
Amsterdam power outage	0.86	0.35	0	1	5,672	Binary dummy (1 = from 14 January onwards, 0 = else).
DNB news 1	0.43	0.50	0	1	5,672	Binary dummy (1 = from 25 February onwards, 0 = else).
Iran-US conflict	0.40	0.50	0	1	5,672	Binary dummy (1 = from 28 February onwards, 0 = else).
DNB news 2	0.27	0.44	0	1	5,672	Binary dummy (1 = from 9 March onwards, 0 = else).

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

Appendix C. Additional results

Table C.1. Models relating awareness of cash recommendation and compliance to event indicators: full tables

	(1) Aware of cash recommendation	(2) Meets cash recommendation
Male	-0.02 (0.01)	0.01 (0.01)
Gender: other or I prefer not to say	-0.09 (0.06)	0.12 (0.08)
Between 12 and 24	-0.08*** (0.02)	0.10*** (0.03)
Between 35 and 44	0.05** (0.02)	0.02 (0.02)
Between 45 and 54	0.10*** (0.02)	-0.00 (0.02)
Between 55 and 64	0.14*** (0.02)	0.07*** (0.02)
Between 65 and 74	0.21*** (0.02)	0.09*** (0.03)
75 and over	0.28*** (0.03)	0.13*** (0.03)
Education: middle	0.06*** (0.01)	-0.01 (0.02)
Education: high	0.07*** (0.02)	0.01 (0.02)
Income: middle	-0.01 (0.02)	0.09*** (0.02)
Income: high	0.00 (0.02)	0.14*** (0.03)
Income: unknown	-0.04* (0.02)	0.10*** (0.02)
Partner	0.05*** (0.01)	-0.03* (0.02)
Children	-0.07*** (0.01)	-0.04** (0.02)
Making ends meet: hard or very hard	-0.07*** (0.02)	-0.13*** (0.02)
Western first generation	-0.07 (0.05)	-0.01 (0.05)
Western second generation	-0.04 (0.03)	-0.04 (0.03)
Non-Western first generation	-0.20*** (0.03)	-0.06 (0.04)
Non-Western second generation	-0.02 (0.03)	-0.02 (0.04)
Digital literacy: low	-0.16*** (0.02)	0.04 (0.03)
Disability	0.04** (0.02)	-0.01 (0.02)
Aware of cash advice		0.21*** (0.01)
Multiple digital payment methods		-0.03* (0.02)
Current accounts at multiple banks		-0.00 (0.02)
Amsterdam power outage	-0.03* (0.02)	-0.01 (0.02)
DNB news 1	0.01 (0.03)	0.09** (0.04)
Iran-US conflict	0.04 (0.04)	-0.06 (0.04)
DNB news 2	-0.02 (0.02)	-0.03 (0.02)
Number of respondents	5,672	5,672
Pseudo R ²	0.09	0.06
Log pseudolikelihood	-3111.5	-3646.8
Wald χ^2	558.3***	407.0***

Notes: The table reports average marginal effects of logit models. Robust standard errors are in parentheses. ***, ** and * denote statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

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