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

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# Determinants of trust in banks' payment services during COVID: an exploration using daily data\*

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## Abstract

Trust in banks is key, especially in turbulent times. Using unique daily payment diary data for a representative panel of Dutch consumers, which has been enriched with questions on trust in banks' payment services, we examine the determinants of trust as well as to what extent the COVID-crisis has affected trust. We have the following main findings. First, narrow-scope trust (trust in consumers' own bank payment services) is in general higher than broad-scope trust (trust in banks' payment services in general). Second, COVID-19 measures have affected trust in banks' payment services. The first lockdown and measures taken by banks – such as increasing contactless payment limits – increased narrow-scope trust and broad-scope trust. The second lockdown decreased both notions of trust. The crisis measures impacted the trust of the elderly the strongest. Third, personal characteristics are significantly related to trust in banks' payment services. We find that both types of trust are increasing with digital literacy and the ease of getting by with income. Also, people who hold an account with a large bank have higher broad-scope trust, while customers of small banks have higher narrow-scope trust. Men have lower broad-scope trust, while there is no difference between men and women for narrow-scope trust. People with high income have higher broad-scope trust, while there is no effect on narrow-scope trust.

**Keywords:** trust in banks, COVID-19, crises measures, payments, payment diary data

**JEL classifications:** D12, E42, G21

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\*The views expressed in this paper are our own and do not necessarily reflect those of De Nederlandsche Bank, the Eurosystem or SEO Amsterdam Economics.

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# 1. Introduction

Bank payment services are a crucial aspect of the role banks play in society. Trust in these services, and in banks in general, is vital for financial stability, financial inclusion and financial activity. Low trust may result in financial instability (Guiso, 2010). Low trust also hinders financial inclusion because households who distrust the banking sector are less likely to hold a bank account (Ampudia & Palligkinis, 2018). Finally, low trust makes households more reluctant to deposit their money with banks, forcing them to rely more on wholesale funding, a less stable source of funding (Park, 2020; van Esterik-Plasmeijer & van Raaij, 2017).

The goal of this paper is twofold. First, we research an understudied question: what are the determinants of trust in banks' payment services? Most studies look at trust in banks or the financial system in general. Second, the current pandemic offers an opportunity to study how the health crisis affects trust.

By using a unique dataset of daily payment diary data for Dutch consumers, we research the effect of the COVID-crisis on trust in banks' payment services in general (broad-scope trust) and more narrowly for consumers' main bank (narrow-scope trust), as well the relationship of the impact with individual background characteristics. A key advantage compared to prior studies is the frequency of our data. Most prior studies use annual data or data from a single, one-time only survey (see van der Crujssen et al. (2020) for an overview of the literature on trust in financial institutions).

Throughout the first quarter of 2020, the Dutch government enacted various regional and national pre-emptive measures. On March 16, a single dominant measure was enforced by the Dutch government: the first nationwide lockdown. Dutch banks implemented measures making contactless payments easier. The cumulative limit above which an identification code is required for contactless payments was raised from 50 to 100 euros and the transaction limit was increased from 25 to 50 euros. This decreased the need for cash payments. On October 14 the second lockdown kicked in to curb resurging COVID-infections.

Our main findings are as follows. First, the trust level is relatively high and lies between predominantly and completely trusting banks' payment services, with broad-scope trust somewhat lower than narrow-scope. Second, the lockdown in March and the measures taken by banks significantly increased Dutch consumers' trust in banks' payment services, especially with respect to broad-scope trust. However, the second lockdown had a detrimental effect on both types of trust. Trust of the elderly responds most to the crisis measures. We see no effect of income in the impact of crisis measures, however. Third, various personal characteristics significantly affect the trust an individual has in banks' payment services. Broad- and narrow-scope trust are increasing with digital literacy and the ease of getting by with income. Broad-scope trust is positively related to income and education, decreases with age and is higher for women than men. Narrow-scope trust is highest among young people and lowest among high-educated people, while there is no effect of income. Respondents who refuse to state their income level have lower broad-scope and narrow-scope trust. People who hold an account with a big bank have higher broad-scope trust than people who hold an account with small banks. For narrow-scope trust, the relationship is the other way around.

Our study contributes to the literature in several ways. First, we contribute to the literature on crises and trust. We look at the effect of the COVID-crisis and research the effect of the national lockdowns on trust in banks' payment services by using the time-series character of our data. Most other research papers use trust data with a low frequency. We are aware of one study that uses online reviews of Russian commercial banks to construct a monthly confidence grade (Chernykh et al., 2019).

Studies show contrasting results when estimating the relationship between crises and trust in (financial) institutions. The financial crisis of 2007 reduced consumers' trust in banks and financial institutions in the United States and Europe; this effect is greater for the countries influenced the

most by the consequences of the financial crisis (Foster & Frieden, 2017; Roth et al., 2014). Stevenson and Wolfers (2011) find that the financial crisis decreased trust, especially for the countries where unemployment rose the largest. Sapienza and Zingales (2012) also find that, as a consequence of the Global Financial Crisis in 2007-2008, trust in the financial sector declined. The decline was correlated to a decline in people's willingness to invest and willingness to withdraw deposits.

Recent studies examining the effect of the COVID-crisis on trust in institutions suggest that the effect depends on public sentiment about the performance of the institution. Bol et al. (2020) find a positive effect of national lockdowns to combat the COVID-crisis on political trust, presumably due to agreement with the measures taken. This result is underlined by Kye and Hwang (2020), who study a broader range of institutions in South-Korea. The authors conclude that increased trust in an institution is associated with proactive responses to the COVID-crisis, while a decrease in trust is related to a lack of appropriate action taken. Thus, the impact of a crisis on trust in institutions could depend on how the public viewed the specific institution's performance.

In addition, the COVID-crisis potentially affects individuals heterogeneously, as the psychological effects are more severe for vulnerable subgroups, and economic inequalities are potentially enhanced. Qiu et al. (2020) find that in China the elderly population, young adults and low-income individuals experienced higher distress than other subgroups. Blundell et al. (2020) study UK data and conclude that the current COVID-crisis is increasing existing (economic) inequalities, an example is a higher likelihood of losing your job for low-income individuals. Afandi and Habibov (2017) find that in transitional countries, which includes most Eastern European countries, younger, rural, educated, banked and generally trusting people tend to have higher confidence towards banks during the 2007-2008 financial crisis. Knell and Stix (2015) use Austrian survey data and find that a trust decline depends on respondents' personal crisis experiences. van der Crujisen et al. (2016) also show that trust in banks depends on personal crisis experiences.

Second, we contribute to the literature on trust. We study the drivers of narrow- and broad-scope trust in banks' payment services. This type of trust is relatively understudied and likely to be important for the adoption and usage of payment instruments and a well-functioning payment system. Prior studies on trust in banks focus on different notions of trust, such as trust in the financial health of banks, general trust in banks or trust in their personnel (see van der Crujisen et al. (2020) for a review of the literature on trust).

We also add to the literature on trust by not only including personal characteristics that are commonly used in prior studies on trust, but by also including variables that are understudied in this literature: digital literacy, the ease of getting by with one's income and the type of bank one is customer of (large versus small). Regarding digital literacy, payment services currently often have a digital component, for instance, through a mobile application or internet. Therefore digital literacy is presumed to be of importance when understanding trust in payment services. On the one hand, we expect that people with better digital skills are more likely to understand the payment system and payment instruments and as a result have trust in banks that they adequately take care of payments. On the other hand, consumers with better digital literacy may be more aware of the things that may go wrong, resulting in a lower degree of trust.

Various studies examine the relationship between personal characteristics and trust in banks, mostly presenting mixed results (van der Crujisen et al., 2020). Several studies find that income is positively related to trust in banks (Ampudia & Palligkinis, 2018; Fungáčová et al., 2019; Moin et al., 2017). However, there are also studies that find no significant income effect (Fungáčová & Weill, 2018). The literature on the relationship between age and trust in banks also presents mixed results. Ennew and Sekhon (2007) find higher trust for the oldest subgroup when studying the UK population. However, Afandi and Habibov (2017) show that trust in banks is higher for young people. The effect of education on trust is also not clear-cut. Fungáčová and Weill (2018) conclude that having a higher education level negatively relates to trust in banks, whereas Afandi and Habibov (2017) show that higher educated individuals have higher trust in banks. The specific region in which an individual lives affects trust differently throughout various studies. In China,

living in a rural region positively relates to trust (Fungáčová & Weill, 2018), whereas other studies find no regional differences. Gender has a mixed effect on trust, as this seems to depend on the type of trust. The literature shows that self-assessment of an individual’s financial well-being is likely to be positively related to trust in banks. Shim et al. (2013) study the trust of young adults in banks and conclude that self-reported financial well-being positively and significantly affects trust in banks. A higher degree of financial literacy goes along with higher trust in banks (van der Cruijssen et al., 2021).

Prior studies find a positive relationship between broad- and narrow-scope trust and that narrow-scope trust is higher than broad-scope trust. We expect this also holds for trust in banks’ ability to adequately process payments. Hansen (2012, p. 282) defines broad-scope trust as: “the expectation held by the consumer that companies within a certain business type are generally dependable and can be relied on to deliver on their promises.”. Narrow-scope trust can be defined as “the expectation held by the consumer that the service provider (for instance a bank) is dependable and can be relied on to deliver on its promises” (Sirdeshmukh et al., 2002, p. 17). For a sample of the Dutch population, van der Cruijssen et al. (2021) find that narrow-scope trust in the financial health of banks is higher than broad-scope trust and that there is a positive relationship between the two (see also van Esterik-Plasmeijer and van Raaij (2017)).

The outline of this study is as follows. First, the data sources are described in combination with the specifics of the main methods in Section 2. Second, the results are discussed in Section 3. Last, we conclude and discuss our findings in Section 4.

## 2. Empirical method

### 2.1 Data used

This study’s primary dataset is payment diary data collected for the De Nederlandsche Bank (DNB) and the Dutch Payment Association. This survey is filled in by on average 68 respondents each day, randomly sampled by the research bureau from their panel, which is representative of the Dutch population. Our study uses 23,562 observations from the 1st of January 2020 until the 31st of December 2020. Once a respondent has filled in the survey, the individual can participate again after at least three months. Most respondents answered only once, however a substantial fraction (roughly 1/3) of the diary entries result from a consumer who has participated twice or more. For inflation and unemployment we use the monthly economic measures by Statistics Netherlands (CBS) (CBS, 2020a, 2020b). As covariates, we use trust variables, personal characteristic measures, lockdown variables, and control variables, which we describe briefly below. A complete overview of variables used can be found in Appendix A, Table A.1.

### 2.2 Dependent variables

We use two trust variables as dependent variables which both measure trust in payment services facilitated by banks. The first we refer to as *narrow-scope trust* and it measures trust in payments services offered by a respondent’s own bank. The second we refer to as *broad-scope trust*, and it measures trust in payment services offered by the banking sector as a whole. The question concerning narrow-scope trust is: “Do you have trust in [bank name]’s ability to process your payments adequately?”. If the respondent is a customer of multiple banks (5563 diary entries report 2 or more banks), the person can select up to three banks for which the respondent can answer the narrow-scope trust question. Using only the first observation would potentially result in a biased selection due to the alphabetical order of answers. Therefore, if a respondent answered the narrow-scope question multiple times, only one randomly chosen answer is used. Otherwise, there is high correlation between these answers, and the individuals with multiple banks would be overrepresented in the sample. The question regarding broad-scope trust is: “Do you have trust that Dutch banks’ in general are able to process your payments adequately?”. Both questions are answered on a 1-5 Likert scale: 1 = “No, not at all”, 2 = “No, predominantly not”, 3 = “Neutral”,

4 = “Yes, predominantly”, 5 = “Yes, completely”. Narrow-scope and broad-scope trust range from 1 to 5.

## 2.3 Explanatory variables

We include a set of variables to capture the following personal characteristics: income, age, education, region, gender, ease of getting by with income, digital literacy, and whether the respondent is a customer of a large bank. Income is captured by three dummies: *income medium*, *income high*, *income unknown*. Income medium is 1 for respondents with an annual total gross household income between EUR 23,400 and EUR 65,000, and 0 for other respondents. Similarly, income high is 1 for respondents with an income of at least EUR 65,000 and 0 else. The dummy income unknown is 1 for those respondents who did not report their income. The reference group is *income low*, which consists of people with an income less than EUR 23,400. We include the following four age dummies: *age 31-45*, *age 46-55*, *age 56-65*, and *age >65*. These are 1 for respondents with the particular age and 0 else. The reference group is *age <31*, which consists of respondents who are 30 or younger. The level of education is captured by *education medium* and *education high*. Education medium is 1 for respondents with post-secondary vocational education and 0 for other respondents. Similarly, education high is 1 for respondents with higher education. People with the lowest level of education are in the reference group *education low*. Five dummies are created corresponding to five regions in the Netherlands, namely *region north*, *region south*, *region west*, *region east*, and *region three largest cities* (the three largest cities’ agglomerates of the Netherlands in the west of the Netherlands, reference category). *Male* is a dummy, which is equal to 1 if the respondent is male and 0 for females. The payment diary also provides information on how well people can manage on the total income of their household. *Getting by neither hard, nor easy* and *getting by easy/very easy* reflect the ease of getting by with income. People who find this hard or very hard are in the reference group (*getting by hard/very hard*). *Digital literacy* is a dummy variable that captures digital literacy. The underlying question is “To what extent do the following statements apply to you? (a) When using the Internet I need help of others (partner, friends, family, acquaintances) (b) I can handle a computer, tablet and smartphone well”. Respondents answered on a scale from 1 “Not applicable at all” to 5 “Totally applicable”. The digital literacy dummy is equal to 1 for respondents who answered 1 or 2 to the first statement and 4 or 5 to the second statement, otherwise the dummy is equal to 0. Lastly, *large bank* is 1 for customers of one of the three largest banks in the Netherlands and 0 else. These banks are substantially larger than other banks in the Netherlands.

To estimate the effect of COVID-19 measures we include three dummies. First, we create an indicator variable *start first lockdown* that takes the value of 1 once the first lockdown has started, which was on March 16 2020. This dummy variable captures a change in trust levels due to the lockdown. Second, we include an indicator variable *end first lockdown* that equals 1 after the lockdown ended on the first of July and 0 before that date. On the first of July the pandemic seemed under control, as infections and hospitalization of patients decreased substantially. Therefore, the government relaxed the lockdown constraints, as pubs opened up for 100 people, sport competitions could be organized and individuals were allowed to go to the offices again. Third, we create an indicator variable *start second lockdown* that takes the value of 1 once the second lockdown started – October 14 2020 – and is 0 before that date.

Moreover, we control for the economic situation. Prior studies have shown that the economic situation affects consumers’ trust in banks (van der Cruisjen et al., 2020). For example, Knell and Stix (2015) show that unstable inflation perceptions decrease trust in banks and Roth et al. (2014) find that the unemployment has a detrimental effect on trust. To control for the economic situation monthly measures for unemployment and inflation are used. We include the unemployment rate and inflation rate of the previous month. For example, each daily trust observations in July 2020 is related to the monthly unemployment rate and inflation rate of June 2020.

Lastly, in the robustness analyses we use two COVID-related variables: *daily confirmed deaths* and *stringency index*. The daily confirmed deaths are the daily COVID-related deaths in the Netherlands (Hale et al., 2021). The stringency index is an aggregation of 20 daily indicators formulated to assess the stringency in a country, specifically the Netherlands in this case, which ranges from 1 to 100 (Hale et al., 2021). This increased substantially due to the governmental restrictions to oppress COVID-19. Table A.1 in Appendix A shows summary statistics for the main variables adopted in this study.

## 2.2 Methodology

The pooled cross-sectional model is described by estimation equation 1. We use an ordered logit model because the dependent variable is ordinal.

$$Y_i^* = \alpha + \beta' \cdot X_i + \gamma' \cdot Lockdown + \delta' \cdot Controls + \epsilon_i \quad (1)$$

Here, the dependent variable  $Y_i^*$  is the unobserved: (1) trust of individual  $i$  in payment services by his/her bank (narrow-scope trust) or (2) trust of individual  $i$  in payment services by banks in general (broad-scope trust). In the ordered logit framework, instead of  $Y_i^*$  we observe the (ordered) categories of response. Together with the assumption of a logistic distribution for the error term, this gives the standard ordered logit regressions. Next, the term  $X_i$  consists of the  $K$  personal characteristics of person  $i$ , as earlier described with coefficients  $\beta' = \{\beta_1, \dots, \beta_K\}$ . These variables estimate the relationship between the personal characteristics and trust. *Lockdown*, with coefficients  $\gamma' = \{\gamma_1, \gamma_2, \gamma_3\}$ , consists of the three lockdown dummies: start first lockdown, end first lockdown and start second lockdown. The term *Controls* is a vector of control variables: the inflation rate in the previous month and the unemployment rate in the previous month. The coefficients of these two variables are  $\delta' = \{\delta_1, \delta_2\}$ . Moreover, as some respondents are sampled more than once, standard errors  $\epsilon_i$  are clustered per respondent.

In addition, we run these models with interaction terms between start first lockdown and start second lockdown and a subset of individual characteristics: age, income and satisfaction with income variables. By including these interaction terms we are able to test whether the effects of the lockdowns on trust vary across specific groups. We include interactions with age and income variables because shifts in payment behaviour of Dutch consumers during the current pandemic are related to these variables (see Jonker et al. (2021)). The shift from cash to cards was most pronounced among the elderly and people with a low income. Changes in payment patterns may affect people's trust in banks' payment services. Moreover, the effects of the lockdowns on trust may also depend on people's own financial situation. Prior research has shown that the own financial situation is key in explaining trust in banks (Knell and Stix (2015)). People with a low income were hit hardest by the pandemic.

## 3. Results

Table 1 indicates the outcomes of the ordered logistic regressions. The dependent variable is broad-scope trust for regressions (1) to (3) and narrow-scope trust for regressions (4) to (7). First, only variables capturing personal characteristics are used in the regressions, including variables that capture digital literacy, the ease of getting by and being a customer of a large bank (column 1 and 4). Second, the three dummies that capture the government measures are added (start first lockdown, end first lockdown, and start second lockdown) as well as the variables that control for the economic situation (column 2 and 5). Third, we include interaction terms between the variables of interest and the lockdown start dummies to test whether the impact of the crises measures on trust depends on the consumers' age, income or the ease of getting by (column 3 and 6). Last, we add broad-scope trust to test its relationship with narrow-scope trust (column 7).

Trust in banks' payment services is related to standard personal characteristics: income, age, education and gender (Table 1, column 1 and 4). Broad-scope trust increases with the level of



income. This does not hold for narrow-scope trust, where income has no significant effect. For example, people with a high income are 6 percentage points more likely to have full trust in banks than people with low income. People whose income is unknown have significantly lower broad-scope and narrow-scope trust. Broad-scope trust decreases with age. For example, people aged 65 or above are 12 percentage points less likely to have full trust than people aged 30 or younger (the reference group). Although the age pattern is less clear in case of narrow-scope trust, we do find that all people above 30 have less trust than younger people. The highest educated people have higher broad-scope trust but lower narrow-scope trust than people with a low level of education. Men have significantly lower broad-scope trust than women. For example, women are 6 percentage points more likely to fully trust banks. There is no gender difference with respect to narrow-scope trust. There are regional differences in trust. Broad-scope trust is higher for people living in the west and north of the Netherlands than for inhabitants of the three largest cities. Narrow-scope trust is lower for people living in the three largest cities than for people who live elsewhere.

Trust in payment services is also related to digital literacy, the ease of getting by and being a customer of a large bank (Table 1, column 1 and 4). A significant and positive relationship between digital literacy and trust is found for both types of trust. To illustrate the effect size, people with high digital literacy are 9 percentage points more likely to have full trust in banks in general than people with low digital literacy. The effect is 8 percentage points in case of narrow-scope trust. People who find it easy or very easy to get by with their household income report higher trust in banks in general and in their own bank than people who find it hard or very hard to get by. For example, people who find it easy to get by are 18 percentage points more likely to fully trust banks in general and 14 percentage points more likely to trust their own bank, compared to people who find it hard to get by. In case of broad-scope trust, people who find it neither hard nor easy to get by with their income also report higher trust than people who find this hard. The effect is smaller: 4 percentage points. Compared to customers of small banks, customers of large banks report higher trust in banks in general but lower trust in their own bank. In other words, the gap between narrow-scope and broad-scope trust is highest for customers of small banks. Customers of small banks are 7 percentage points less likely to have full trust in banks in general and 3 percentage points more likely to have full trust in their own bank, compared to customers of large banks. Figure B.1 (Appendix B) shows that narrow-scope trust is higher than broad-scope trust. Narrow-scope trust is on average 4.6 and broad-scope trust 4.3. A paired t-test shows that this 0.27 gap is significant (t-value=71.1, p-value=0.000). For people of small banks this gap is 0.38 and for people of large banks 0.26.

The crisis measures have affected trust in the banks' ability to process payments adequately (Table 1, column 2 and 5). First, the lockdown on March 16 2020 significantly increased broad-scope and narrow-scope trust. For example, the likelihood that someone completely trusted banks in general increased by 5 percentage points. Whereas the effect is 2 percentage points for narrow-scope trust. The relaxation of the government measures as of July 1 2020 had no significant effect on trust. Third, the start of the second lockdown went along with lower broad-scope and narrow scope trust. The likelihood that someone fully trusted banks decreased by respectively 3 percentage points and 2 percentage points.

There is a negative relationship between the unemployment rate of the previous month and broad-scope trust, but there is no significant relationship with narrow-scope trust. The inflation rate of the previous month is not significantly related to both notions of trust. Findings on relationships with personal characteristics are robust to the inclusion of the lockdown dummies and macroeconomic variables.

The impact of crises measures on trust depends on consumers' age but is unrelated to consumers' income and the ease of getting by with household income (Table 1, column 3 and 6). The positive effect of the first lockdown on broad-scope trust and the negative effect effect of the second lockdown are highest for people aged between 56 and 65. Regarding narrow-scope trust, the positive effect of the first lockdown is highest for people older than 65. The negative effect of the second lockdown on narrow-scope trust is highest for people older than 55.

Table 1: Results ordered logistic regressions

	Broad-scope trust			Narrow-scope trust			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Income medium	0.151*** (0.041)	0.151*** (0.041)	0.093 (0.091)	-0.006 (0.046)	-0.008 (0.046)	-0.036 (0.102)	-0.174*** (0.056)
Income high	0.220*** (0.046)	0.223*** (0.046)	0.217** (0.099)	-0.021 (0.051)	-0.020 (0.051)	-0.020 (0.112)	-0.251*** (0.061)
Income unknown	-0.285*** (0.044)	-0.285*** (0.044)	-0.388*** (0.097)	-0.374*** (0.047)	-0.375*** (0.047)	-0.402*** (0.106)	-0.257*** (0.058)
Age 31-45	-0.155*** (0.045)	-0.157*** (0.045)	-0.199** (0.094)	-0.129*** (0.049)	-0.129*** (0.049)	-0.267*** (0.104)	-0.049 (0.056)
Age 46-55	-0.220*** (0.043)	-0.223*** (0.043)	-0.240** (0.094)	-0.206*** (0.047)	-0.207*** (0.047)	-0.278*** (0.103)	-0.083 (0.054)
Age 56-65	-0.319*** (0.043)	-0.322*** (0.043)	-0.462*** (0.093)	-0.137*** (0.047)	-0.136*** (0.047)	-0.229** (0.103)	0.098* (0.056)
Age >65	-0.492*** (0.044)	-0.496*** (0.044)	-0.567*** (0.093)	-0.120** (0.048)	-0.120** (0.048)	-0.233** (0.105)	0.262*** (0.059)
Education medium	-0.003 (0.034)	-0.003 (0.034)	-0.004 (0.034)	-0.022 (0.038)	-0.023 (0.038)	-0.022 (0.038)	-0.052 (0.046)
Education high	0.097*** (0.034)	0.098*** (0.034)	0.098*** (0.034)	-0.092** (0.037)	-0.093** (0.037)	-0.093** (0.038)	-0.244*** (0.044)
Male	-0.251*** (0.026)	-0.252*** (0.026)	-0.253*** (0.026)	0.025 (0.029)	0.024 (0.029)	0.025 (0.029)	0.237*** (0.033)
Region west	0.080* (0.041)	0.082* (0.041)	0.084* (0.041)	0.169*** (0.045)	0.171*** (0.045)	0.174*** (0.045)	0.184*** (0.051)
Region north	0.148*** (0.054)	0.149*** (0.054)	0.151*** (0.054)	0.288*** (0.058)	0.288*** (0.058)	0.291*** (0.058)	0.325*** (0.068)
Region east	0.033 (0.044)	0.036 (0.044)	0.037 (0.044)	0.146*** (0.048)	0.148*** (0.048)	0.151*** (0.048)	0.195*** (0.054)
Region south	0.033 (0.042)	0.034 (0.042)	0.034 (0.042)	0.215*** (0.046)	0.216*** (0.046)	0.218*** (0.046)	0.264*** (0.053)
Digital literacy	0.349*** (0.031)	0.351*** (0.031)	0.352*** (0.031)	0.362*** (0.031)	0.363*** (0.033)	0.365*** (0.033)	0.170*** (0.038)
Getting by neither hard, nor easy	0.150*** (0.053)	0.151*** (0.053)	0.214** (0.109)	0.079 (0.053)	0.083 (0.053)	0.196* (0.112)	-0.078 (0.066)
Getting by easy/very easy	0.729*** (0.054)	0.728*** (0.054)	0.714*** (0.110)	0.650*** (0.055)	0.653*** (0.055)	0.617*** (0.115)	0.187*** (0.067)
Large bank	0.296*** (0.039)	0.296*** (0.039)	0.295*** (0.039)	-0.163*** (0.045)	-0.164*** (0.045)	-0.164*** (0.045)	-0.543*** (0.059)
Start first lockdown	0.211*** (0.055)	0.211*** (0.055)	0.141 (0.155)		0.103* (0.061)	-0.007 (0.160)	-0.049 (0.072)
End first lockdown	0.031 (0.055)	0.031 (0.055)	0.031 (0.055)		-0.037 (0.060)	-0.037 (0.060)	-0.073 (0.071)
Start second lockdown	-0.123*** (0.042)	-0.123*** (0.042)	-0.251 (0.154)		-0.104** (0.046)	-0.040 (0.158)	-0.031 (0.053)
Unemployment	-0.116** (0.048)	-0.116** (0.048)	-0.117** (0.048)		-0.068 (0.053)	-0.068 (0.053)	0.017 (0.063)
Inflation	-0.074 (0.053)	-0.074 (0.053)	-0.076 (0.053)		-0.056 (0.058)	-0.057 (0.058)	0.006 (0.068)
Age 31-45 * Start first lockdown	0.027 (0.110)	0.027 (0.110)	0.053 (0.109)			0.191 (0.121)	
Age 46-55 * Start first lockdown	0.053 (0.109)	0.053 (0.109)	0.053 (0.109)			0.132 (0.119)	
Age 56-65 * Start first lockdown	0.228** (0.109)	0.228** (0.109)	0.124 (0.108)			0.184 (0.120)	
Age >65 * Start first lockdown	0.124 (0.108)	0.124 (0.108)	0.038 (0.106)			0.230* (0.122)	
Income medium * Start first lockdown	0.038 (0.106)	0.038 (0.106)	-0.040 (0.114)			0.042 (0.119)	
Income high * Start first lockdown	-0.040 (0.114)	-0.040 (0.114)	0.090 (0.113)			-0.012 (0.129)	
Income unknown * Start first lockdown	0.090 (0.113)	0.090 (0.113)	-0.115 (0.130)			0.025 (0.123)	
Getting by neither hard, nor easy * Start first lockdown	-0.115 (0.130)	-0.115 (0.130)	0.008 (0.131)			-0.170 (0.133)	
Getting by easy/very easy * Start first lockdown	0.008 (0.131)	0.008 (0.131)	0.094 (0.109)			0.029 (0.136)	
Age 31-45 * Start second lockdown	0.094 (0.109)	0.094 (0.109)	-0.097 (0.107)			-0.058 (0.119)	
Age 46-55 * Start second lockdown	-0.097 (0.107)	-0.097 (0.107)	-0.192* (0.106)			-0.135 (0.115)	
Age 56-65 * Start second lockdown	-0.192* (0.106)	-0.192* (0.106)	-0.128 (0.107)			-0.230** (0.116)	
Age >65 * Start second lockdown	-0.128 (0.107)	-0.128 (0.107)	0.127 (0.104)			-0.310*** (0.118)	
Income medium * Start second lockdown	0.127 (0.104)	0.127 (0.104)	0.170 (0.114)			-0.020 (0.113)	
Income high * Start second lockdown	0.170 (0.114)	0.170 (0.114)	0.145 (0.112)			0.045 (0.123)	
Income unknown * Start second lockdown	0.145 (0.112)	0.145 (0.112)	0.136 (0.138)			0.039 (0.117)	
Getting by neither hard, nor easy * Start second lockdown	0.136 (0.138)	0.136 (0.138)	0.037 (0.140)			0.104 (0.137)	
Getting by easy/very easy * Start second lockdown	0.037 (0.140)	0.037 (0.140)				0.057 (0.140)	
Broad-scope trust							2.634*** (0.041)
Akaike Information Criterion (AIC)	46018.35	45998.13	46010.77	37490.89	37483.5	37498.16	27045.68

Note: The table reports parameter estimates of ordered logit regressions. All regressions use 23,562 observations.

Standard errors are clustered by individual and shown in parentheses. The dependent variables range from 1 (no trust at all) to 5 (complete trust).

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

In line with prior studies on other types of trust in banks, we find that narrow-scope trust positively depends on broad-scope trust (Table 1, column 7). For example, the likelihood that someone completely trusts the own bank to process payments adequately is 50 percentage points higher for people who also completely trust banks in general to do so, than for people who predominantly trust bank in general.

Table 2 depicts the results of various robustness tests. First, we include a variable that captures the daily confirmed deaths (column 1 and 4). This variable is insignificant. In case of broad-scope trust, prior results are not altered much. In contrast, in case of narrow-scope trust the positive effect of first lockdown start is no longer significant.

Second, we include the stringency index instead of the lockdown dummies (Table 2, column 2 and 5). The coefficient of the stringency index is positive and significant in the broad-scope trust regression but insignificant in the narrow-scope trust model. To illustrate the effect of the stringency index on broad-scope trust, when the stringency index increases by 26 (1 standard deviation) the likelihood that someone fully trusts banks in general increases by 2.6 percentage points. There is a negative unemployment rate effect in case of narrow-scope trust but not for broad-scope trust. Last, we include both the stringency index and the lockdown dummies in the model with interaction terms (column 3 and 6). We find no significant effect of the stringency index and of the first lockdown on trust. As before, we find a positive effect of the end of the first lockdown and a negative effect of the start of the second lockdown on broad-scope trust. These variables are not significantly related to narrow-scope trust.

Table 2: Results robustness tests

	Broad-scope trust			Narrow-scope trust		
	(1)	(2)	(3)	(4)	(5)	(6)
Income medium	0.163*** (0.043)	0.151*** (0.041)	0.094 (0.091)	-0.004 (0.047)	-0.007 (0.046)	-0.037 (0.102)
Income high	0.226*** (0.048)	0.222*** (0.046)	0.217*** (0.099)	-0.027 (0.053)	-0.021 (0.051)	-0.021 (0.112)
Income unknown	-0.270*** (0.046)	-0.284*** (0.044)	-0.387*** (0.097)	-0.361*** (0.049)	-0.374*** (0.047)	-0.404*** (0.106)
Age 31-45	-0.170*** (0.046)	-0.156*** (0.045)	-0.199** (0.094)	-0.148*** (0.051)	-0.129*** (0.049)	-0.268*** (0.104)
Age 46-55	-0.239*** (0.045)	-0.222*** (0.043)	-0.240*** (0.094)	-0.235*** (0.049)	-0.206*** (0.047)	-0.278*** (0.103)
Age 56-65	-0.332*** (0.045)	-0.322*** (0.043)	-0.461*** (0.093)	-0.164*** (0.049)	-0.136*** (0.047)	-0.229** (0.103)
Age >65	-0.507*** (0.045)	-0.494*** (0.044)	-0.567*** (0.093)	-0.152*** (0.050)	-0.119** (0.049)	-0.234** (0.105)
Education medium	0.002 (0.036)	-0.003 (0.034)	-0.004 (0.034)	-0.019 (0.039)	-0.023 (0.038)	-0.022 (0.038)
Education high	0.105*** (0.035)	0.098*** (0.034)	0.098*** (0.034)	-0.074* (0.039)	-0.093** (0.037)	-0.093** (0.038)
Male	-0.253*** (0.027)	-0.251*** (0.026)	-0.253*** (0.026)	0.020 (0.030)	0.025 (0.029)	0.025 (0.029)
Region west	0.085** (0.042)	0.081** (0.041)	0.084** (0.041)	0.184*** (0.046)	0.170*** (0.045)	0.174*** (0.045)
Region north	0.139** (0.056)	0.150*** (0.054)	0.151*** (0.054)	0.302*** (0.060)	0.288*** (0.058)	0.291*** (0.058)
Region east	0.024 (0.045)	0.035 (0.044)	0.037 (0.044)	0.148*** (0.049)	0.146*** (0.048)	0.151*** (0.048)
Region south	0.032 (0.043)	0.033 (0.042)	0.034 (0.042)	0.212*** (0.048)	0.214*** (0.046)	0.218*** (0.046)
Digital literacy	0.337*** (0.032)	0.351*** (0.031)	0.352*** (0.031)	0.352*** (0.034)	0.363*** (0.033)	0.365*** (0.033)
Getting by neither hard, nor easy	0.135** (0.055)	0.148*** (0.053)	0.213* (0.109)	0.064 (0.055)	0.080 (0.053)	0.197* (0.112)
Getting by easy/very easy	0.716*** (0.056)	0.725*** (0.054)	0.713*** (0.110)	0.649*** (0.057)	0.651*** (0.055)	0.618*** (0.114)
Large bank	0.300*** (0.040)	0.296*** (0.039)	0.295*** (0.039)	-0.168*** (0.046)	-0.163*** (0.045)	-0.164*** (0.045)
Start first lockdown	0.173** (0.071)		0.060 (0.196)	0.082 (0.080)		0.135 (0.210)
End first lockdown	0.032 (0.055)		0.049 (0.061)	-0.036 (0.061)		-0.067 (0.068)
Start second lockdown	-0.122*** (0.043)		-0.263* (0.156)	-0.098** (0.048)		-0.018 (0.160)
Unemployment	-0.108* (0.055)	-0.033 (0.024)	-0.105** (0.052)	-0.070 (0.061)	-0.052** (0.026)	-0.090 (0.057)
Inflation	-0.057 (0.055)	-0.021 (0.046)	-0.067 (0.055)	-0.041 (0.060)	0.017 (0.050)	-0.073 (0.061)
Daily confirmed deaths	0.0001 (0.0005)			-0.0001 (0.001)		
Stringency index		0.002*** (0.001)	0.001 (0.002)		0.001 (0.001)	-0.002 (0.002)
Age 31-45 * Start first lockdown			0.026 (0.110)			0.192 (0.121)
Age 46-55 * Start first lockdown			0.053 (0.109)			0.131 (0.119)
Age 56-65 * Start first lockdown			0.228** (0.109)			0.184 (0.120)
Age >65 * Start first lockdown			0.125 (0.108)			0.230* (0.122)
Income medium * Start first lockdown			0.037 (0.106)			0.043 (0.119)
Income high * Start first lockdown			-0.041 (0.115)			-0.011 (0.129)
Income unknown * Start first lockdown			0.089 (0.113)			0.027 (0.123)
Getting by neither hard, nor easy * Start first lockdown			-0.114 (0.130)			-0.170 (0.133)
Getting by easy/very easy * Start first lockdown			0.009 (0.131)			0.028 (0.136)
Age 31-45 * Start second lockdown			0.094 (0.109)			-0.058 (0.119)
Age 46-55 * Start second lockdown			-0.097 (0.107)			-0.134 (0.115)
Age 56-65 * Start second lockdown			-0.192* (0.106)			-0.230** (0.116)
Age >65 * Start second lockdown			-0.127 (0.107)			-0.309*** (0.118)
Income medium * Start second lockdown			0.128 (0.104)			-0.021 (0.113)
Income high * Start second lockdown			0.171 (0.114)			0.043 (0.123)
Income unknown * Start second lockdown			0.145 (0.112)			0.039 (0.117)
Getting by neither hard, nor easy * Start second lockdown			0.135 (0.138)			0.104 (0.137)
Getting by easy/very easy * Start second lockdown			0.037 (0.140)			0.057 (0.140)
Akaike Information Criterion (AIC)	46007.53	43217.94	46012.35	35155.12	37491.8	37499.1

Note: The table reports parameter estimates of ordered logit regressions. All regressions use 23,562 observations.

Standard errors are clustered by individual and shown in parentheses. The dependent variables range from 1 (no trust at all) to 5 (complete trust).

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 4. Conclusion & discussion

We use unique daily payment diary data to explore the effects of various demographics and COVID-19 measures on trust in banks' ability to process payments. Trust in banks is vital for financial stability, financial inclusion and financial activity. Prior studies on trust in banks focus on different notions of trust, use less frequent data and do not touch upon the impact of COVID-19 measures.

First, measures by governments, banks and retailers have impacted trust in banks' ability to process payments adequately. After the first lockdown trust in banks in general and trust in the own bank increased. This suggests that people agreed with the measures taken to combat the COVID-19 crisis and that simplified paying contactless. Both broad-scope and narrow-scope trust declined after the start of the second lockdown. A possible explanation is that people realized that it would still take a while before lives would return to normal and the economy would recover. It also shows that the effect of crisis measures on trust depends on the circumstances. The impact of the crises measures on trust depends on people's age – it is strongest among the elderly – but is unrelated to their income or the ease of getting by. In our analyses, we control for the economic situation and find that broad-scope trust is negatively related to the unemployment rate of the previous month.

Second, we find that trust in banks depends on personal characteristics. Trust depends on income, age, education and gender. Broad-scope trust is positively related to income and education, decreases with age and is higher for women than men. Narrow-scope trust is highest among young people and lowest among high-educated people. Moreover, trust is also related to non-standard personal characteristics: digital literacy, being customer of a large bank, and the ease of getting by with household income. Both notions of trust depend positively on digital literacy. The ease of getting by with household income is positively related with trust: people who find it easy to get by with income have higher levels of trust.

Third, we find that narrow-scope trust is higher than broad-scope trust. This holds especially for customers of small banks. Moreover, broad-scope trust and narrow-scope trust are positively related. Customers of small banks have relatively a lot of trust in their own bank and low trust in banks in general. Customers of small banks may be more likely to have made an active choice for the particular bank, for instance if the individual cares about sustainability or prefers digital services. A relatively high trust in the small bank and/or distrust in the large bank may have caused this switch. Moreover, these customers are probably more likely to rationalize their choice because the decision to switch to another bank is a more active choice than the decision to stay at the current bank.

There are several policy implications of our research. First, when designing crisis measures it is important to be aware of the possible impact of these measures on trust in banks. However, the effect will depend on circumstances. Second, digital literacy is a key trust building factor. Supervisors could underscore the importance of digital literacy and support educational programs that try to increase it. Third, banks and supervisors could benefit from tailoring their communication towards groups of people with low trust levels, such as elderly and people with low income.

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# Appendix A. Description of variables

Table A.1: Summary statistics

Variable	Mean	SD	Min	Max	Description
Broad-scope trust	4.34	0.71	1	5	Answer to 'Do you have trust that Dutch banks in general are able to process your payments adequately?' (1 = no, not at all, 2 = no, predominantly not, 3 = neutral, 4 = yes, predominantly, 5 = yes, completely).
Narrow-scope trust	4.61	0.64	1	5	Answer to 'Do you have trust in [bank name]'s ability to process your payments adequately?' (1 = no, not at all, 2 = no, predominantly not, 3 = neutral, 4 = yes, predominantly, 5 = yes, completely).
Income low	0.16	0.36	0	1	1 = household income < EUR 23,400, 0 = else. Reference category.
Income middle	0.31	0.46	0	1	1 = household income between EUR 23,400 and EUR 51,300, 0 = else.
Income high	0.28	0.45	0	1	1 = household income ≥ EUR 51,300, 0 = else.
Income unknown	0.25	0.43	0	1	1 = household income unknown, 0 = else
Age <31	0.19	0.39	0	1	1 = <31, 0 = else. Reference category.
Age 31-45	0.20	0.40	0	1	1 = >30 and <46, 0 = else.
Age 46-55	0.21	0.41	0	1	1 = >45 and <56, 0 = else.
Age 56-65	0.19	0.40	0	1	1 = >55 and <66, 0 = else.
Age >65	0.20	0.40	0	1	1 = >65, 0 = else.
Education low	0.33	0.47	0	1	1 = MAVO or lower, 0 = else. Reference category.
Education middle	0.29	0.45	0	1	1 = MBO or HAVO/VWO, 0 = else.
Education high	0.38	0.49	0	1	1 = HBO or WO, 0 = else.
Male	0.52	0.50	0	1	1 = male, 0 = female.
Region three largest cities	0.14	0.35	0	1	1 = 3 largest cities and agglomerates, 0 = else. Reference category.
Region west	0.30	0.46	0	1	1 = west minus 3 largest cities, 0 = else.
Region north	0.10	0.30	0	1	1 = north, 0 = else.
Region east	0.21	0.40	0	1	1 = east, 0 = else.
Region south	0.25	0.43	0	1	1 = south, 0 = else.
Digital literacy	0.71	0.46	0	1	1 = respondents who need no help of others (partner, family, friends, acquaintances) when using the internet and get along well with computers, tablets and smartphones, 0 = else.
Getting by hard/very hard	0.09	0.28	0	1	1 = very hard or hard, 0 = else.
Getting by neither hard, nor easy	0.37	0.48	0	1	1 = neither hard nor easy, 0 = else. Reference category.
Getting by easy/very easy	0.55	0.50	0	1	1 = very easy or easy, 0 = else.
Large bank	0.87	0.34	0	1	1 = individual is customer of one of the three largest banks, 0 otherwise.
Start first lockdown	0.80	0.40	0	1	1 = date ≥ March 16th, 0 otherwise.
End first lockdown	0.52	0.50	0	1	1 = date ≥ July 1st, 0 otherwise.
Start second lockdown	0.22	0.42	0	1	1 = date ≥ October 14th, 0 otherwise.
Daily confirmed deaths	31.04	43.10	-18	234	Confirmed COVID-related deaths per day.
Stringency index	49.29	25.97	0	80	Composite measure (stringency index), ranging from 0-100, on how severe the restrictions in the Netherlands are.
Unemployment	3.83	0.61	3.00	5.00	Seasonally adjusted unemployment rate of the previous month.
Inflation	1.26	0.34	0.70	1.80	Inflation rate of the previous month.

Note: This table describes the variables used in the regressions of which the results are reported in Table 1 and Table 2. The mean, standard deviation (SD), minimum (min), and the maximum (max) are reported for the sample included in these regressions. The number of observations is 23,562.



## Appendix B. Trust over time

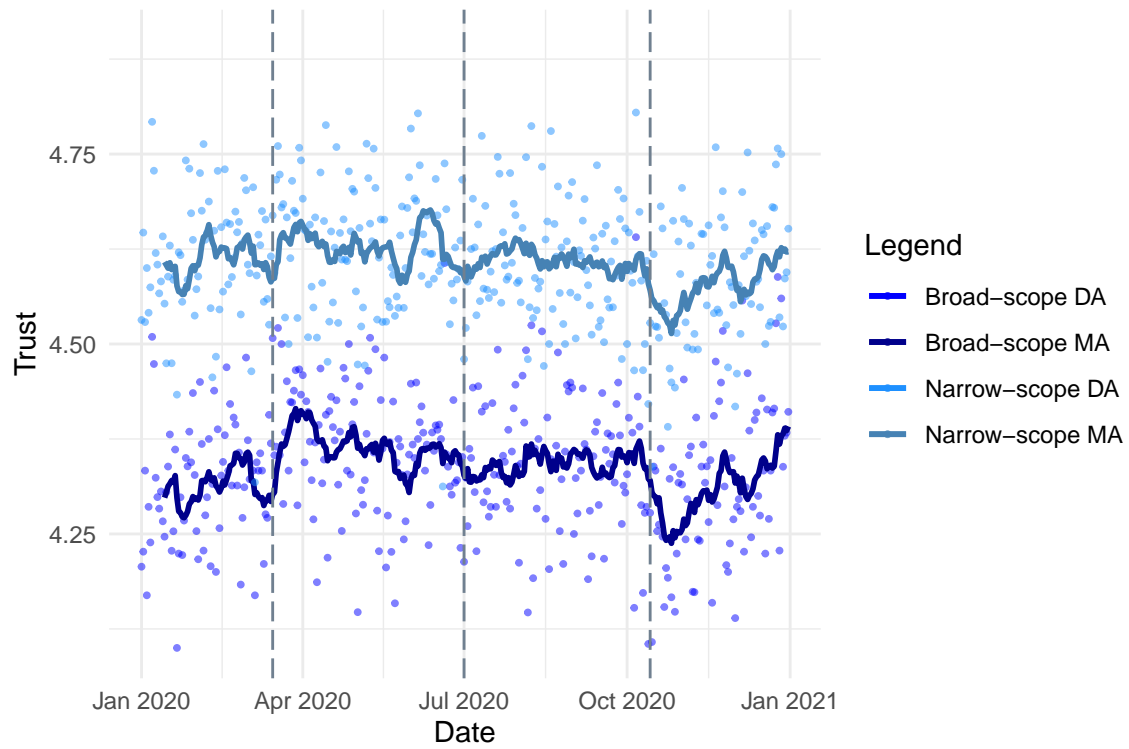


Figure B.1: Trust over time

*Note: The dots present Daily Averages (DA) and the lines are 14-day Moving Averages (MA). Broad-scope trust and narrow-scope trust range from 1 (no trust at all) to 5 (complete trust).*

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