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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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De Nederlandsche Bank NV
P.O. Box 98
1000 AB AMSTERDAM
The Netherlands

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Michiel Bijlsma[a, b], Carin van der Cruijsen[a] and Nicole Jonker[a]

[a] *De Nederlandsche Bank (DNB), The Netherlands*
[b] *Tilburg University, The Netherlands*

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Abstract
We study consumers' attitudes towards sharing payments data with incumbent and new providers of payment and account information services, and using their services. This is important, in order to understand the possible impact of the revised Payment Services Directive (PSD2) on the functioning of the retail payments market. We do so using a representative panel of Dutch consumers. We obtain a number of results. First, consumers' propensity to give consent for payments data usage is highest if the data user is their own bank. Only a minority would give consent to the usage of payments data to make a financial overview with personalised offers. Second, an explicit financial reward can tempt more people to use this service and to demand the service from a BigTech instead of one's own bank. Third, support for the usage of payments data by other banks and BigTechs to decide on loans is also positively related to financial incentives. Finally, the propensity to use the two new PSD2 services is driven by consumers' trust in the providers of these services. Consumers have more trust in their own bank than in BigTechs.

Keywords: consumers, discrete choice models, PSD2, retail payments, trust, pricing
JEL classification: C25, D12, E42, G21, G24, G28

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1. Introduction

For central banks and other public authorities it is key to understand how consumers respond to new legislation offering them new possibilities. In January 2018 the revised Payment Services Directive (PSD2) entered into force within the European Union (EU). Countries were required to transpose the directive into national law by 13 January 2018 at the latest. PSD2 updates and improves upon the original PSD from 2007, and aims to enhance innovation, competition and efficiency in the European retail payments market. PSD2 allows payment service providers (PSPs) to offer account holders of banks two new kinds of payment services on the retail payments market: account information services (AIS) and payment initiation services (PIS). An example of an AIS is a financial overview of all your income and expenses with personalised budgeting advice. An example of a PIS is a new quick payment method for person-to-person payments (P2P) offered by a company that can issue a payment order to your bank on your behalf. With the account holders' consent, PSPs can obtain access to their payment accounts and payments data to deliver these services.[1] Providers of these new payments services must have a license issued by a supervisory authority in the EU.

We study to what degree consumers in the Netherlands are interested in the adoption of the two new payment services and to what extent consumers differentiate between their own bank, another bank or newcomers like BigTechs. We focus on trust and financial incentives. We expect trust to be a crucial factor behind the possible success of AIS and PIS, and the degree to which the newcomers in the Dutch retail payments market will be able to compete with incumbent parties. Only if consumers have trust in a PSP – be it their own bank, another bank, or a BigTech – will they give permission to use the information on their payment account and to initiate payments on behalf of them. In addition, we expect that people's adoption intention also depends on financial incentives. PSPs may try to persuade consumers to grant them permission to use (the data on) their payment account by providing them financial incentives. We examine for how much money consumers are willing to give up their privacy.

In particular, we address the following research questions:

1) *Are consumers willing to give consent to banks and licensed PSPs to use their payment account and payments data?*
2) *Are consumers willing to adopt the new PSD2 payments related services, and to what extent does the adoption intention depend on the type of PSP?*
3) *Does consumers' willingness to give banks and licensed PSPs access to their payment account and payments data depend on financial incentives?*
4) *Does consumers' willingness to give banks and licensed PSPs access to their payment account and payments data depend on trust in the PSP?*

[1] PSPs can offer the PSD2 services to both consumers and businesses. We focus on the impact of PSD2 on the consumer retail payments market.

We focus on the Netherlands, a country in which the impact of PSD2 on the retail payments market is potentially large. First, Dutch consumers pay most of their point-of-sale (POS) transactions electronically and shop a lot online, so their payments data are very informative and valuable. Second, it is a country with a highly concentrated banking sector. So the entry of newcomers has the potential to increase competition and thereby improve the services offered to consumers.

In August 2019 we held a survey among 2,678 members of the CentERpanel to answer these research questions.[2] We assess their adoption intention of AIS and PIS offered by incumbents and non-bank newcomers in the retail payments market. We polled the respondents about their trust in banks and in these new PSPs, and about their willingness to give them access to their payment account with payments data in exchange for a variety of AIS and PIS. We use vignette techniques[3] to elicit consumers' preferences and discrete regression analysis to answer our research questions. In the vignettes we vary between the PSPs that offer the service, and the financial incentives. By introducing and varying financial conditions, we test whether the likelihood of using an AIS and of using other PSPs than one's own bank depends on financial incentives.

Our work makes several contributions to the literature. First, we contribute to research on the impact of PSD2 on the functioning of the retail payments market, which will start to evolve now that PSD2 has been implemented. We examine in detail to what extent consumers in the Netherlands are willing to give consent to the usage of their payments data and their adoption intention of new payment-related services that are introduced as part of PSD2. Thereby, we provide insight into the extent PSD2 may influence competition by examining the willingness of consumers to make use of banks other than their own bank and of newcomers. In that respect, we pay special attention to BigTechs, the role of trust and financial incentives. So, we also contribute to studies that examine to what extent BigTechs will impact the future of banks (e.g. Stulz 2019). Second, we add to the privacy literature (for an overview, see Acquisti et al. 2015). More specifically, we contribute to research on consumers' atttitudes towards payments data usage (Van der Cruijsen 2020), which remains an understudied topic. By examining the role of financial incentives, we also link to the studies on the relationship between financial rewards and privacy attitudes, which show that it is difficult to put a price on privacy (e.g. Acquisti et al. 2013; Athey et al. 2017). Third, our study adds to research on the link between financial incentives and the use of payment methods (e.g. Bolt et al. 2010; Borzekowski et al. 2008).

[2] The CentERpanel is an Internet-based survey among a representative sample of the Dutch-speaking population in the Netherlands. The CentERpanel was created in 1993 and has been widely used by both policymakers and researchers to study a broad range of topics. See https://www.centerdata.nl/en/publications.

[3] Vignette analysis is a survey method, in which respondents are randomly treated with hypothetical situations consisting of several core characteristics (types of services offered, type of PSPs and financial incdentives). As these characteristics are controlled within and between respondents, vignette analysis offers possibilities for the analysis of causal effects. Furthermore, it can be argued that vignettes allow for a more valid measurement of consumers' preferences or adoption intentions as compared to direct questioning, as they rely on more realistic scenarios, where respondents have to trade off different features of the vignettes simultaneously. Furthermore, the complexity of the evaluation process makes it harder to answer in socially desirable ways.

This paper is structured as follows: Section 2 describes the related literature, our contribution, research questions and hypotheses. Section 3 describes the set-up of the survey and discusses the vignettes, while Section 4 presents the data. Section 5 describes our empirical approach and Section 6 discusses the results of the empirical analyses. We end with a discussion and conclusion in Section 7.

2. Related literature and our hypotheses

2.1 Literature review

We contribute to various strands of literature. First, we add to the literature on the changing payments landscape and the future of banks. As PSD2 has just been implemented, there are no studies yet on its impact. However, several studies discuss the potential impact of regulation, technological developments, FinTechs and BigTechs on the future of banks. For example, Stulz (2019) highlights that BigTechs have unique advantages that are difficult for banks to replicate, and argues that banks are losing their comparative advantage as they have less access to unique information on parties seeking a loan. We focus on consumer attitude and assess how successful new firms like BigTechs may be in competing for with banks for consumers in payments markets.

Second, we connect to a literature that studies consumers' willingness to pay for their privacy, in particular concerning payments data. In general, studies on the relationship between financial incentives and privacy have shown that it is hard to put a price on privacy (Acquisti et al. 2015). Research shows that people tend to say they value privacy a lot, but are not very willing to pay for privacy (Acquisti et al., 2013). Regarding consumer behaviour in sharing information in a payments context, a particularly interesting study is the paper by Athey et al. (2017), who use data from a digital currency field experiment. They find that small changes in incentives, costs and information can have a significant influence on data sharing. The work of Van der Cruijsen and Van der Horst (2019) is also relevant in this respect: they report that consumers find privacy an important payment instrument attribute. There are relatively few studies that focus specifically on financial data. Closest to our work is a study by Van der Cruijsen (2020) that examines consumers' attitudes towards payments data usage by presenting them with different situations and asking them for each situation to what extent the use of payments data is acceptable. She finds that attitudes depend on the purpose of the data use. For example, most people support payments data usage to enhance safety. In contrast, support for commercial usage of payments data is very low, especially when the user is a company other than the consumers' own bank. Also relevant is a study by Bansal et al. (2016), who show that the extent to which an individual is prepared to disclose financial information to a finance website is positively related to the degree of trust in that website.

Last, our paper relates to a literature studying how consumers react to financial incentives intended to steer them away from or towards specific payment methods. Stavins (2018), using diary

data for US consumers, shows that consumers are rather insensitive to financial incentives. According to Stavins, this explains the limited uptake of pricing tools by merchants. Ching and Hayashi (2010) also find that removing payment card rewards has limited effects on consumer choice of payment methods. Other papers find that financial incentives have a more pronounced influence on the choice of payment method. Using retailer data on the Netherlands, Bolt et al. (2010) show that surcharging consumers for debit card usage steers them away from debit cards towards cash. They find that surcharging explains half of the observed difference in debit card payment shares across retailers. Using transaction data on Australia, Simon et al. (2010) find that a loyality program and an interest-free period increases credit card usage and decreases the use of other payment instruments at the POS. The substitution effect depends on the price incentive. Magnac (2017) shows that the introduction of foreign fees triggers strong behavioural responses from customers. Borzekowski et al. (2008) study how increases in bank-imposed transaction fees affect debit card use at the POS. They find a 12% decline in overall use in reaction to a mean 1.8% fee charged on certain debit card transactions. Using payment diary data from Austria, Canada, France, Germany, the Netherlands, and the United States Arango-Arango et al. (2018) show that cash usage depends on the perceived relative costs of cards and cash.

2.2. Research questions and hypotheses

Our first research question is*: 'Are consumers willing to give consent to banks and licensed PSPs to use their payment account and payments data?*' (Q1). According to Van der Cruijsen (2020) many people feel uncomfortable with the use of their payments data, especially when the data is used commercially by a company other than one's own bank. In line with these findings, we foresee that people will be more willing to give consent to their own bank than to other banks or to new PSPs because their payments data are already used by their own bank and because of the strong bank-customer relationship (Van der Cruijsen and Diepstraten 2017). Moreover, in general Dutch account holders are happy with the payment services of their bank (MOB 2016). If consumers' own bank offers PSD2 services, it may be most convenient for them to turn to their own bank than to other companies, the more so because consumers trust their own bank more than banks in general (Van Esterik-Plasmeijer and Van Raaij 2014, Van der Cruijsen et al. 2020). In addition, non-banks are less experienced with the careful handling of payments data. As a result, people may be more hesitant to share their data with these companies. Last, non-banks may also more easily combine the payments data with other types of information so that people give up more privacy. Thus, the first three hypotheses are:

H1a: The likelihood of giving consent to use payments data is higher for one's own bank than for other banks.

H1b: The likelihood of giving consent to use payments data is higher for one's own bank than for non-banks.

H1c: The likelihood of giving consent to use payments data is higher for banks than for non-banks.

In this respect, it is also relevant whether consumers intend to adopt the PSD2 related services, and if so, which type of PSP they would prefer. The second research question is '*Are consumers willing to adopt the new PSD2 payments related services, and to what extent does the adoption intention depend on the type of PSP?*' (Q2). According to the literature, the propensity to adopt new payment related services may depend on several factors. First of all, demographic features, such as gender, age, educational level, or income, affect the likelihood of payment innovation adoption (e.g. Kosse 2014). Furthermore, the benefits associated with the service may be of importance. Currently, little is known about the precise features of the PSD2 services. It is therefore not possible to formulate expectations about their attractiveness based on existing evidence. Nevertheless, it seems likely that context and the combination with other services matter. We proxy this context by presenting different payment situations for PIS. Regarding the combination with other services, we present AIS with different use cases: getting a financial overview or in combination with lending (a mortgage or a personal loan).

Also, the costs for consumers of getting used to using a new service is expected to influence their adoption decision. The easier a PSP's new service is to adopt, the lower the consumer's learning costs and the more likely it is she adopts it from that particular PSP. Both consumer's own bank as well as some of the BigTechs may be in a relatively good position to achieve that. The own bank, because the consumer already makes use of its services and is used to the bank's digital environment. For BigTechs, the same may hold if consumers already make use of these BigTechs' other platform services.

As discussed for Q1, the own bank may be in a relatively good position to offer these services, because they are experienced in treating confidential payments data and people already trust them to use this data. Remember that people have more trust in their own bank than in other banks. As other banks are also experienced in carefully handling payments data, we expect people to be more likely to adopt services from these other banks than from non-banks. Therefore, we expect to find support for the following hypotheses on the adoption intentions of PIS:

H2a: The adoption intention of PIS is higher for one's own bank than for other banks.
H2b: The adoption intention of PIS is higher for one's own bank than for non-banks.
H2c: The adoption intention of PIS is higher for other banks than for non-banks.

In a similar fashion, we expect the following to hold for AIS.

H3a: The adoption intention of AIS is higher for one's own bank than for other banks.
H3b: The adoption intention of AIS is higher for one's own bank than for non-banks.

H3c: The adoption intention of AIS is higher for other banks than for non-banks.

Third, we examine to what extent financial incentives influence the choice of consumers to use AIS and switch from banks to non-banks. Our third research question (Q3) is *'Does consumers' willingness to give banks and licensed PSPs access to their payment account and payments data depend on financial incentives?'*.

PSPs that offer PSD2 services to consumers may try to attract customers by providing financial incentives. According to the literature, financial incentives make a service more attractive for consumers, and may lead to higher adoption rates (see Section 2.1). A financial incentive for consumers to use a particular PSD2-related service can have two effects. First, consumers who initially did not yet use the service, may start using the PSP service that provides the incentive. Second, consumers who already make use of the service provided by another PSP, may decide to switch PSP because of the incentive. As Dutch consumers are not used to paying at the POS, we incorporate the financial incentives in the AIS. In line with the prior rationale, we expect the following hypotheses to hold:

H4a: The intention to adopt AIS depends positively on the size of the financial incentive.
H4b: The intention to adopt AIS offered by a bank other than one's own bank depends positively on the size of the financial incentive given by that other bank.
H4c: The adoption intention of AIS offered by non-banks depends positively on the size of the financial incentive.

Our last research question is: '*Does consumers' willingness to give banks and licensed PSPs access to their payment account and payments data depend on trust in the PSP?' (Q4).* The level of trust that people have in banks and licensed PSPs is likely to influence the likelihood that consumers give consent to access their payment account and use payments data. If people trust a PSP they are probably more likely to agree to sharing their payments data and to adopt AIS and PIS. Based on this rationale we posit the following hypotheses:
H5a: The likelihood to give a PSP consent to use payments data positively relates to trust in the PSP.
H5b: The intention to adopt a PIS positively relates to trust in the PSP offering the PIS.
H5c: The intention to adopt an AIS positively relates to trust in the PSP offering the AIS.

3. Data

We designed a consumer survey to collect detailed data on consumers' attitudes towards the usage of their payments data and their willingness to adopt AIS and PIS. The survey was held in August 2019 among 3,330 members of the CentERpanel of 16 years of age and older. It was completed by 2,678 panel members, which implies a response rate of 80.4%. The CentERpanel is a representative

internet panel of the Dutch-speaking population in the Netherlands, and is managed by research institute CentERdata.[4] We have also used data on the panel members' demographics as captured by the annual DNB Household Survey (DHS). The DHS covers a wide range of topics and has been extensively used by researchers.[5]

The survey includes questions to measure trust in the different types of PSPs. Furthermore, it includes questions on respondents' willingness to give consent to the use of their payments data by different types of PSPs. We also include questions that reflect consumers' adoption intentions of the new PIS. We sketch three different sets of situations to test a consumer attitude towards allowing access to her payments account in order to pay more quickly and easily (1) for groceries at a supermarket, (2) among family and friends (person-to-person, P2P), and (3) at a webshop. In all three cases the sample is split into four random groups. People in each group are presented with a situation and a question in the context of that situation. Situations vary with respect to the supplier of the payment service. In the supermarket case, the supplier of the PIS is either one's own bank, another bank, a Bigtech, or the supermarket. In the case of P2P payments it is one's own bank, another bank, a BigTech or a social media company. In the online shopping scenario it is one's own bank, another bank, a BigTech or a webshop. For each situation, respondents are asked whether they would use these new PIS. Potential answers range on a 1-5 scale from "definitely not"(1) to "definitely" (5). See Appendix A, A.1 for the exact wording of the questions.

We also collect data on consumers' attitudes towards the usage of AIS by including vignettes. These vignettes help us to measure consumers' attitudes towards the usage of their payments data and to learn how these attitudes depend on (1) the provider of the services and (2) financial incentives. First, we sketch the situation in which banks and large technology companies like Amazon, Apple, Facebook and Google (BigTechs) offer helpful financial overviews that provide insight in income and spending behaviour (Box 1). In return, these companies use this information to send personal offers. The respondents are presented with three different vignettes on the offering of a financial overview. Firstly, everybody is presented with a vignette without any financial incentives and needs to choose between (1) a financial overview via one's own bank, (2) an overview via a BigTech, and (3) no financial overview. The goal is to measure attitudes in the absence of financial incentives. Next, the sample is divided in four random groups to test how people's willingness to share payments data depends on the magnitude of financial incentives. Each group is presented with a different vignette. These differ in the financial reward offered by both one's own bank and the BigTech: EUR 5, EUR 10, EUR 25 or EUR 50 per month. Finally, the sample is again divided into four random groups to measure if a financial incentive can tempt someone into choosing a Bigtech instead of one's own bank. Now the vignettes only vary with respect to the financial reward

[4] For more information on the methodology see Teppa and Vis (2012).
[5] See https://www.centerdata.nl/en/publications for an overview of the publications. URL last accessed on December 24, 2019.

offered by the BigTech (same amounts as before). In each of these last set of vignettes the own bank does not provide a financial reward.

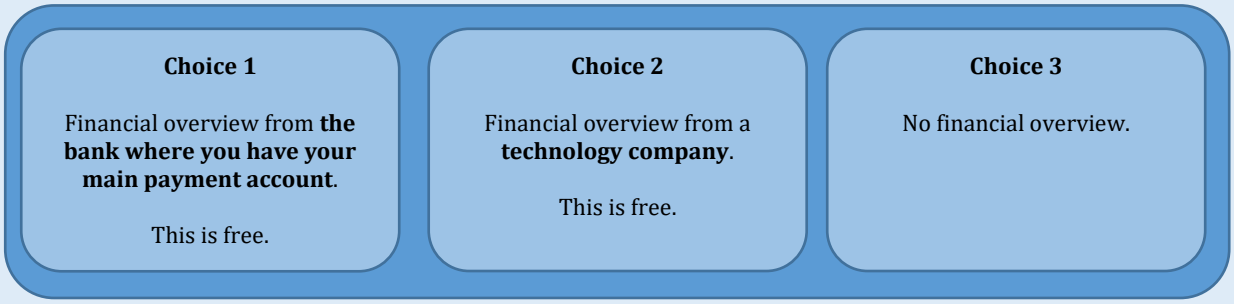
Box 1. Financial overview

Imagine banks and technology companies like Amazon, Apple, Facebook and Google offer a product that provides you with an overview of all your income and expenses. All the providers are licensed and supervised, and there is no difference in the quality of the products they offer.

The financial overview gives you an insight into the balance of all your accounts and your income and expenses. You can see exactly what you are spending your money on and get tips on how you can save money and increase your income. You can see this overview via an app or your computer.

If you want to receive this overview, you must first give permission to the provider of this product to analyse your payment account data. Your income and expenditure patterns will then be mapped out for you. In addition, the provider will send you personal offers based on this information.

What is your choice?



[4 random groups]
What is your choice now?

Choice 1 Financial overview from **the bank where you have your main payment account**. [*If arandom=1:* You receive € 5 per month. *If arandom=2:* You receive € 10 per month. *If arandom=3:* You receive € 25 per month. *If arandom=4:* You receive € 50 per month.]
Choice 2 Financial overview from **a technology company**. [*If arandom=1:* You receive € 5 per month. *If arandom=2:* You receive € 10 per month. *If arandom=3:* You receive € 25 per month. *If arandom=4:* You receive € 50 per month.]
Choice 3 No financial overview.

[4 random groups]
Lastly, what do you choose?

Choice 1 Financial overview from **the bank where you have your main payment account**. This is free. You do not receive any money.
Choice 2 Financial overview from **a technology company**. [*If brandom=1:* You receive € 5 per month. *If brandom=2:* You receive € 10 per month. *If brandom=3:* You receive € 25 per month. *If brandom=4:* You receive € 50 per month.]
Choice 3 No financial overview.

We also test people's choices towards the usage of their payments data by their own bank, another bank or a BigTech to decide on a mortgage loan of EUR 300,000 that has to be repaid within 30 years (Appendix A, A.2) or a personal loan of EUR 5,000 that has to be repaid within 5 years (Appendix A, A.3). Again, we examine the sensitivity of choices to financial incentives. With the consumer's permission, these providers can access and view the customer's payment account data to determine whether she qualifies for the loan and the rate of interest on the loan. The structure of these two sets of vignettes is the same. First, we measure the choices of the complete sample in the absence of financial incentives by sketching a situation in which all providers charge the same interest rate.

Second, we make the other bank more attractive by lowering its interest rate, and the monthly amount to be paid. The sample is then split into four different groups to test if the size of the financial incentive matters. Third, again using four random groups, we make the BigTech more attractive. To measure fundamental attitudes we use an interest rate of 2.8% in case of the mortgage loan and a rate of 10% in case of the personal loan. In the prior case, the monthly mortgage repayment and interest payment amounts to EUR 1,232. In case of the personal loan the monthly payment is EUR 104.17 (repayment and interest). To measure the sensitivity to lower interest rates, and accompanying lower monthly payments, we use interest rates of 2.6%, 2.4%, 2.2% and 2.0% in case of the mortgage loan. The monthly payments in these cases are: EUR 1,200, EUR 1,168, EUR 1,136, and EUR 1,104. In case of the personal loan we use interest rates of 8.5%, 7%, 5.5% and 4% and the accompanying monthly amounts of EUR 101.04, EUR 97.92, EUR 94.79 and EUR 91.67.

4. Atitudes towards payments data usage: descriptive results

In this section we discuss our main descriptive results. The reported likelihood of giving permission to a PSP to use payments data is highest if the PSP is the bank at which the respondent has their main payment account (Table 1), and there is an average likelihood of 29% of doing this within the next twelve months. 46% of the respondents would definitely not give permission, whereas 13% would definitely give their permission. The average likelihood for giving permission is roughly halved if the data user is a bank where the respondent does not have their main account. The average likelihood is much lower if the user is a bank of which the respondent is not a customer, a technology company, a webshop, a credit provider (not a bank), a mortgage lender (not a bank), a financial adviser, or a supermarket. It is noteworthy that a high share of respondents indicated they would certainly not agree to data usage by a company other than their own bank. These shares range between 81% (the provider is another bank) and 89% (the provider is a non-bank credit provider). In these cases, the share of respondents that would definitely share their payments data is only 1% or lower.

In case of PIS, we find that consent to giving access to one's payment account is always highest when the user is the repondent's own bank. In case a supermarket requests access, almost 1 out of 5 respondents would probably or definitely agree with the initiation of the payment by the own bank (Figure 1a). This is 28% in the case of the P2P payments (Figure 1b) and 17% in the case of payments at a webshop (Figure 1c). Attitudes with respect to the other service providers do not differ much.

Most respondents (55%) would not give their consent for payments data usage to facilitate a financial overview and personal offers, although financial incentives can induce a small but significant share of the respondents to give consent (Figure 2a). In the absence of financial incentives 44% would give consent to their own bank, but only 1% would agree with the data usage by a BigTech. If both suppliers of the service offer a financial reward, the share of respondents who give

Table 1. Likelihood of giving permission to use payments data

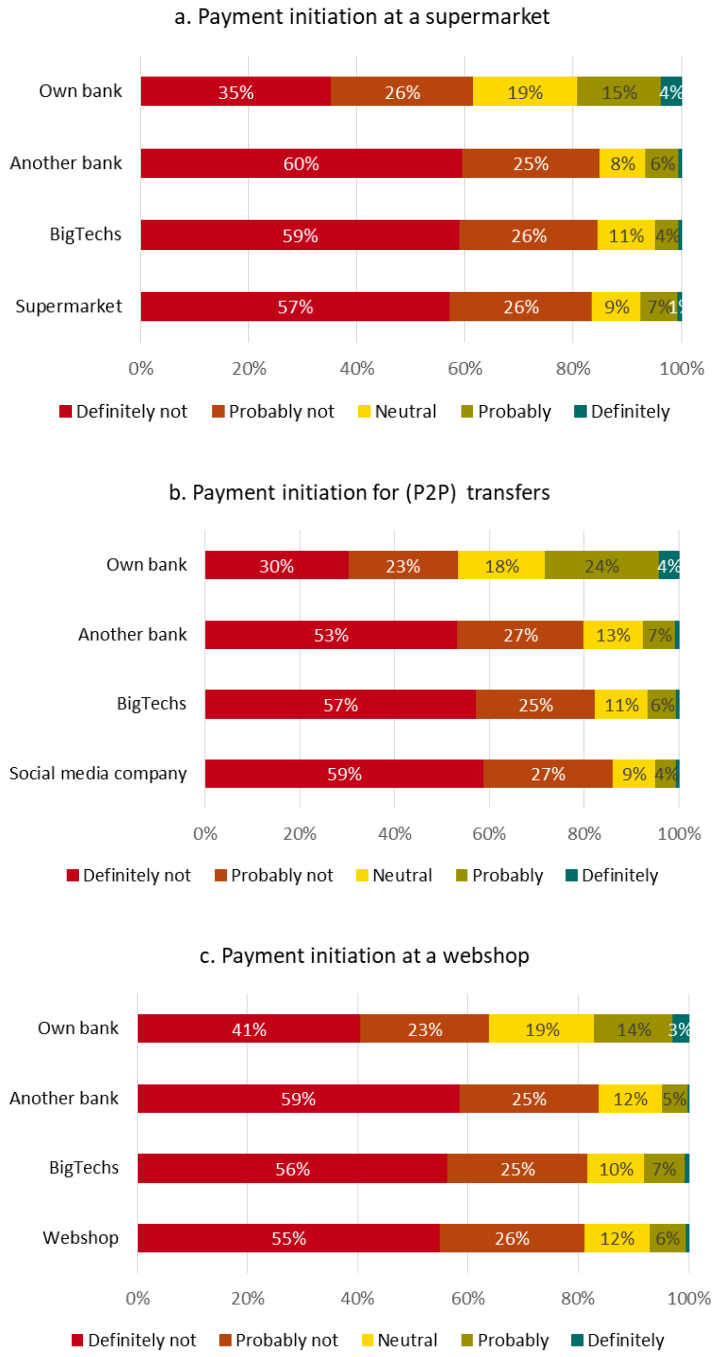
	Average likelihood	Share of respondents answering 0%	Share of respondents answering 100%	Number of observations
The bank where I have my main payment account	29%	46%	13%	2,683
My own other banks	14%	60%	4%	1,242
Banks of which I am not a customer	4%	81%	0%	2,683
A BigTtech such as Amazon, Apple, Facebook and Google	2%	86%	0%	2,683
A webshop	3%	85%	0%	2,682
A credit provider (not a bank)	2%	89%	1%	2,682
A mortgage lender (not a bank)	4%	84%	1%	2,682
A supermarket	3%	86%	1%	2,683

Source: CentERpanel, August 2019.
Note: The question was: "In the next 12 months, what is the likelihood that you will give permission to the parties listed below to use the details of your main payment account for the provision of services? Enter a percentage between 0 (0% = 'I will definitely not give permission') and 100 (100% = 'I will definitely give permission')."

their consent is higher. If the reward is EUR 50, then 51% would give consent to their own bank and 2% to a BigTech. If only the BigTech offers a financial incentive, the share of respondents who would agree with data usage is higher than in the absence of financial incentives. The share of people who opt for the BigTech instead of their own bank increases with the financial incentive. It is 14% if the financial incentive is EUR 50. It is also noteworthy that in the case of large financial rewards (EUR 25 or EUR 50 a month), the share of people who would give their consent is lower than in case both type of suppliers offer a financial reward.

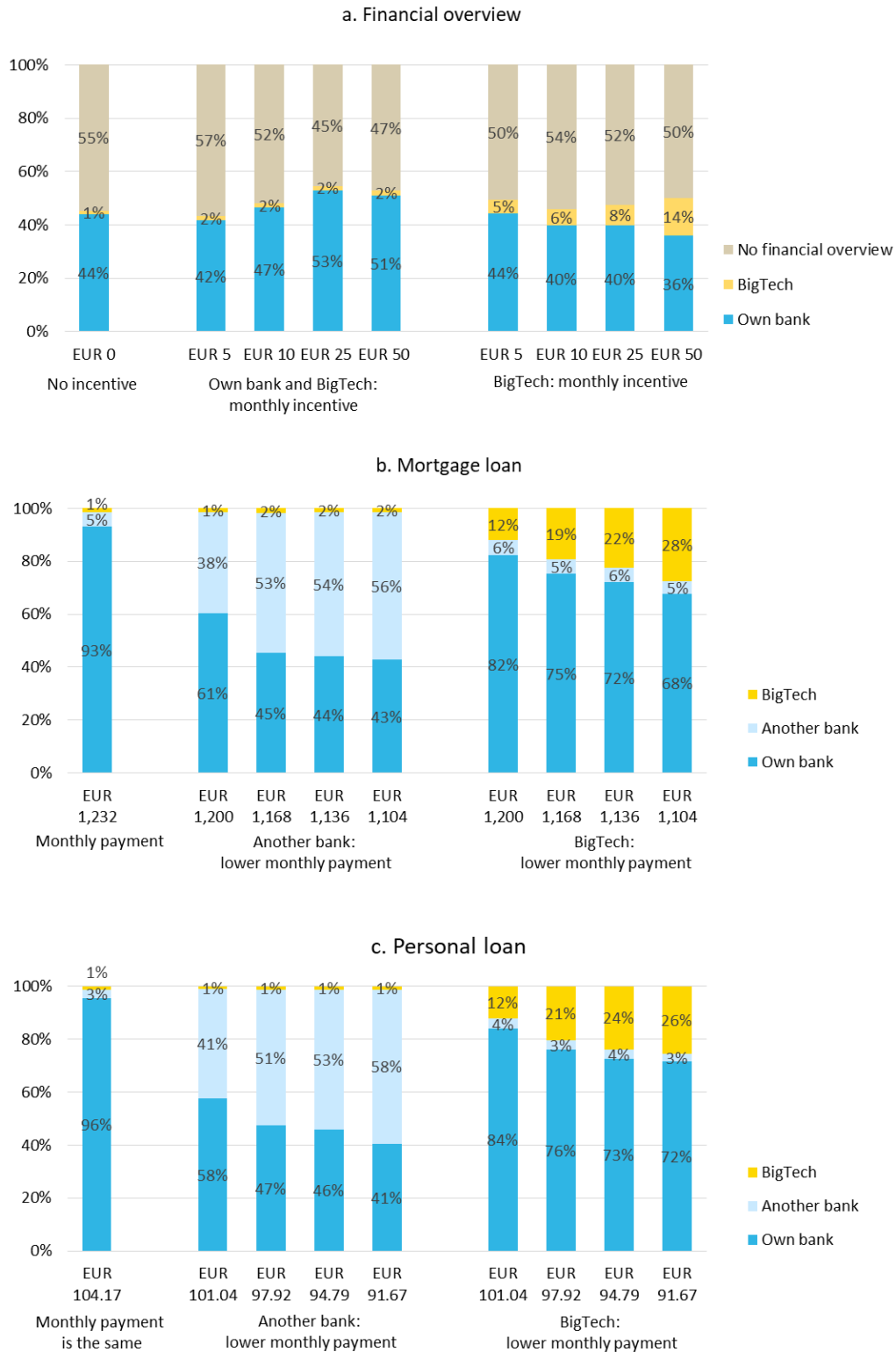
The own bank is the most popular provider of a mortgage loan (Figure 2b). If interest rates and monthly payments are the same, 93% would take out a mortgage from the own bank, 5% would select another bank and only 1% would choose a BigTech. We observe a large shift in preferences in case the other bank offers lower interest rates than the own bank and BigTechs (middle part of Figure 2b). If the interest rate is 2% instead of 2.8% and the monthly payment is EUR 1,104 instead of EUR 1,232, more than half of the respondent would take out a mortgage from a bank other than their own bank. For a Bigtech it is much harder to attract people by offering lower interest rates (right part of Figure 2b). If the strongest financial incentive is offered (a monthly payment of EUR 1,104) 28% would choose a BigTech. We see a similar pattern in case of the personal loan (Figure 2c).

Figure 1. Consumers' consent for payment initiation such that one can use a new quick and easy payment method



Source: CentERpanel, August 2019.
Note: The figures show response shares. The number of respondents per vignette ranges between 644 and 710.

Figure 2. Consumers' consent for payments data usage and financial incentives



Source: CentERpanel, August 2019.
Note: The figures show response shares. The number of respondents per vignette ranges between 622 and 2,717.

5. Empirical methodology

We use several econometric choice models to answer the research questions and test the hypotheses as set out in Section 2.2.

5.1 Analysing willingness to give consent to use payments data using tobit regression analysis

In the first step, we assess the likelihood that consumers give permission to use their payments data for the next 12 months. Because this question is asked for different types of PSP separately, we can assess to what extent people's preferences differ per PSP, allowing for variation in the estimated coefficients per type of PSP.

The dependent variables Y_{ik} are the reported probabilities of agreeing with payments data usage by PSP type k, expressed as percentages ranging between 0 ('I will definitely not give permission') and 100 ('I will definitely give permission'). As discussed in Section 4, many respondents are absolutely certain they would not give permission to use their payments data. In case of the own bank, the share of responses answering 100% is also relatively high. Due to the large share of answers at the lower bound and, in case of the own bank, also the upper bound, we use two limit Tobit regression models instead of OLS regression for our estimations. The econometric model is as follows:

$$y_{ik}^{*} = \beta_k' x_{ik} + \varepsilon_{ik} \quad (1)$$

where y_{ik}^{*} is the unobserved willingness of respondent i to share their payments data during the upcoming 12 months with PSP k (k = 1…6), x_{ik} is a vector with explanatory variables for respondent i and her willingness to share payments data with PSP k and ε_{ik} is an error with a normal distribution with mean zero and variance σ_k^2 . The observed willingness Y_{ik} is related to latent willingness y_{ik}^{*} :

$$\begin{aligned} Y_{ik} &= 0 \text{ if } y_{ik}^{*} \leq 0 \quad (2) \\ &= y_{ik}^{*} \text{ if } 0 < y_{ik}^{*} < 100 \\ &= 100 \text{ if } y_{ik}^{*} \geq 100 \end{aligned}$$

The corresponding likelihood function of the two-limit Tobit model that is used to estimate β_k and σ_k is as follows:

$$L = \prod_{Y_{ik}=0} \Phi\left(-\frac{\beta_k' x_{ik}}{\sigma_k}\right) \prod_{Y_{ik}=y_{ik}^{*}} \frac{1}{\sigma_k} \varphi\left(\frac{(y_{ik}-\beta_k' x_{ik})}{\sigma_k}\right) \prod_{Y_{ik}=100} 1 - \Phi\left(-\frac{(100-\beta_k' x_{ik})}{\sigma_k}\right) \quad (3)$$

Tobit regression models take censoring of the dependent variable into account, while OLS regression does not. Consequently, the marginal effects are smaller than the estimated coefficients. More detailed information about two-limit Tobit models can be found in Maddala (1983) and Cameron and Trivedi (2010).

Two trust variables are included as key explanatory variables. First, we include a measure of generalized trust. It is a dummy called *trust in other people*, which equals 1 if the respondent thinks that in general other people can be trusted, and zero otherwise. Second, we include a variable *trust*

in <name PSP j> which reflects how much trust a respondent has in PSP j. These trust variables range from 1 (very little trust) to 5 (very much trust).[6]

We also include a broad range of variables to control for differences in personal characteristics as they may influence respondent's willigness to give consent to payments data usage. To control for differences in how much people know about PSD2 we include a dummy *good knowledge PSD2* that is 1 for respondents who say they are (very) familiar with PSD2 and and 0 for respondents who have never heard of PSD2 or who do not know what it concerns. To control for gender we include the dummy *male* that is 1 for males and 0 for females. We capture the age of the respondents by including four age dummies: *between 35 and 44*, *between 45 and 54*, *between 55 and 64*, *65 and over*. For example, *65 and over* is 1 for respondents aged 65 or above and 0 for younger respondents. The reference category includes respondents of 34 years and younger. The level of education is controlled for by including the variable *education: bachelor or higher*. This dummy variable is 1 for respondents who successfully completed higher vocational or university education and 0 for lower-educated respondents. We control for differences in the household net monthly income by including three variables: *income: EUR 1151-1800*, *income: EUR 1801-2600*, *income: > EUR 2600*. These dummies are 1 for respondents within the particular income bracket and 0 for other respondents. Respondents with the lowest net household income (EUR 1150 or below) are in the reference category. *Homeowner* is 1 for homeowners and 0 else and is included as a proxy for wealth. In addition, *degree of urbanisation* captures the address density of the respondent's residence and ranges from 1 (500 adresses per km^2 or less) to 5 (more than 2,500 adresses per km^2). Last, we control for the region people live in by including the dummies *region: north*, *region: east* and *region: south*. The reference group consists of respondents who live in the west of the country. For more details on the descriptives of all model variables, see Table B.1 of Appendix B.

5.2 *Analysing adoption intention PIS using ordered probit analysis*

The second step of our analysis concerns assessing the intention of respondents to adopt PIS from different PSPs. We examine three different payment situations, i.e. paying in a supermarket, making

[6] Annex C.1 includes ordered probit estimates on how much trust respondents have in their own most important bank, their other banks, other banks than their own banks, BigTechs, online stores and supermarkets. Note that we use the variable that measures trust in BigTechs as a proxy for trust in social media companies. We have done so, as both BigTechs and social media companies are technological companies that operate on a global scale and BigTechs often have their roots in social media (e.g. Facebook, Google). It turns out that people who believe that in general most people can be trusted, also have a relatively high trust in all mentioned PSPs. The estimated coefficients are all positive and significant. Regarding marginal effects, having high trust in others concurs with a 4.7 percentage point (pp) higher probability that one trusts one's own bank very much, and with a 0.6 pp lower probability that one has very little trust in it. Having high trust in others goes together with a 14.4 pp lower probability that one has very little trust in BigTechs and a 0.2 pp higher probability that one trust BigTechs very much. We also find that age correlates negatively with trust in other banks, BigTechs, online stores and supermarkets. For instance, people aged 65 and older have a 16.9 pp higher probability to have very little trust in BigTechs than people aged 34 and younger. They also have a 4.8 pp higher probability to have very little trust in other banks than their own and a 1.1 pp lower probability to trust them very much. Furthermore, income correlates positively with one's trust in other banks than their own. Other factors that correlate significantly with trust with one or two types of PSPs are the degree of urbanisation of one's residence, living in the south or north of the Netherlands, gender and being a homeowner.

P2P payments and paying in online stores. For each payment situation, respondents were asked to indicate their adoption intention for PIS. The PSP offering the service differs per respondent, as for each of the three payment situations, respondents were randomly assigned to one of four groups, which only differ in the type of PSP offering PIS. The random assignment of the PSPs allows us to assess to what extent respondents' adoption intention of the new PIS differs per PSP offering the service.

For each of the three payment situations k (k=1, 2 or 3), we use ordered probit regression analysis to examine which explanatory variables influence adoption intention of PIS. In an ordered probit model the dependent variable can take on a limited number of values which have a natural ordering. In our situation, there is a latent adoption intention I_{ik}^* and an observed choice I_{ik}, which acts as the dependent variable. I_{ik} can take on five values, i.e, 1 if respondent i would definitely not make use of PIS in payment situation k, 2 if they are likely not to make use of it, 3 if they take a neutral standpoint, 4 if they are likely to make use of it and 5 if they will definitely make use of it. The variables explaining individual *i*'s adoption intention in payment situation k are reflected in vector x_{ik}. It is assumed that the unobserved evaluation I_{ik}^* is defined by the following relationship:

$$I_{ik}^* = \beta_k' x_{ik} - \epsilon_{ik} \quad (4)$$

We assume that the error terms ε_{ik}'s are independently distributed across individuals *i*=1…N, and payment situations k and follow a standard normal distribution, with mean 0 and variance 1. Although we do not observe I_{ik}^* we do observe I_{ik}:

$$I_{ik} = 1 \text{ if } \quad I_{ik}^* \leq \alpha_{1k} \quad (5)$$

$$I_{ik} = j \text{ if } \quad \alpha_{jk-1} < I_{ik}^* \leq \alpha_{jk} \text{ for j=2, 3 or 4}$$

$$I_{ik} = 5 \text{ if } \quad I_{ik}^* > \alpha_{4k}$$

The parameters α_{ik} are unknown and need to be estimated together with β_k. The probability that individual *i* has adoption intention j (j=1, 2, 3, 4 or 5) in payment situation k is given by:

$$Prob(I_{ik} = 1) = \Phi(\alpha_{1k} - \beta_k' x_{ik}) \quad (6)$$

$$Prob(I_{ik} = j) = \Phi\left(\alpha_{jk} - \beta_k'' x_{ik}\right) - \Phi\left(\alpha_{jk-1} - \beta_k'' x_{ik}\right) \text{ for j =2, 3 or 4}$$

$$Prob(I_{ik} = 5) = 1 - \Phi\left(\alpha_{4k} - \beta_k'' x_{ik}\right)$$

This model is called the ordered probit model, with Φ denoting the standard normal distribution. The parameters are estimated using the maximum likelihood (ML) method. The log likelihood function for payment situation k which we maximise is:

$$lnL = \sum_{i=1}^{n} \sum_{j=1}^{5} \left[I(I_{ik} = j) ln \left(Prob\left((I_{ik} = j)\right) \right) \right] \quad (7)$$

For each of the three payment situations, we estimate a separate ordered probit model. For more information about ordered probit models, see e.g. Greene (2010).

We include the same set of demographic control varables as discussed in Section 5.1. Two sets of explanatory variables are of special importance. The first set concerns dummies which identify which PSPs were randomly assigned to the respondents (omitted dummy: *one's most important bank*): *another bank*, *a BigTech*, *a supermarket*, *a social media company*, and *an online store*. The estimated coefficients for the PSP dummies reflect to what extent people are more or less willing to adopt the PIS from a particular PSP relative to adopting it from one's most important bank. The second set of variables concern trust. The variable *trust in other people* is included as a measure of generalized trust. In addition, we include a measure *difference in trust: <name PSP j>* which reflects the absolute difference between the respondent's degree of trust in the randomly assigned PSP and the trust in the respondent's most important bank. Theoretically, these variables range between -4 (trust in the randomly assigned PSP is very low (1) and trust in one's most important bank is very high (5)) and 4 (trust in the randomly assigned PSP is very high (5) and trust in one's most important bank is very low (1)). In practice, they range between -4 and +2.

5.3 Analysing adoption intention of AIS using alternative specific conditional logit analysis

In the third step, we use alternative specific conditional (ASC) logit models to assess which factors influence respondents' choice W_i for different PSPs that want to have permission to access one's payments data to offer them an AIS.[7] We analyse preferences for three AIS products, i.e. 1) a financial overview of one's income and expenses, 2) a mortgage loan of EUR 300,000 that has to be repaid within 30 years against a fixed interest rate, and 3) a personal loan of EUR 5,000 that has to be repaid within 5 years against a fixed interest rate. In this step, for each of the three products, we also measure the price sensitivity of respondents by varying financial conditions in three rounds. By doing so, we try to answer the question whether respondents become more willing to adopt an AIS if a PSP provides a financial incentive.

We use ASC logit models, which belong to the group of discrete choice models in which the dependent variable, say W_i, can be one of several mutually exclusive alternatives (or vignettes in our case). The ordering of these alternatives does not have any meaning. Respondent i (i=1…N) chooses the vignette m that provides her the highest utility U_{im}, (m=1…3) among the available three vignettes. The utility U_{im} is assumed to be the sum of a deterministic part V_{im} and an unobserved random component ε_{im}. We observe that respondent i chooses vignette m, W_i=m if vignette m provides them with the highest utility of the available vignettes:

$$Pr(W_i = m) = Pr(U_{im} \geq U_{ik}) = Pr(\varepsilon_{ik} - \varepsilon_{im} \leq V_{im} - V_{ik}) \text{ for all available vignettes k.} \quad (8)$$

We assume that the random components ε_{i1}, ε_{i2} and ε_{i3} follow the logistic distribution, and we specify the deterministic part V_{im} as follows:

[7] For readability reasons, we only use a subscript denoting the respondent, but not for the three different products or three different rounds.

$$V_{im} = \beta' x_{im} + \gamma'_m z_i \quad (9)$$

where x_{im} is the vector with vignette-specific explanatory variables, in our study the vignette specific financial incentives, and z_i is the vector with the respondent specific explanatory variables, including trust in the different PSPs. Since the outcome variables are assumed to depend on the difference between the random components, two of these random components can vary, and also only two of the estimated vectors γ_l are free to vary. For one of the alternatives (the base alternative), the estimated coefficients are set to zero in order to ensure identification. According to the ASC logit model the probability p_{im} that respondent i chooses vignette m is as follows:

$$p_{im} = \frac{e^{\beta' x_{im} + \gamma'_m z_i}}{\sum_{l=1}^{3} e^{\beta' x_{il} + \gamma'_l z_i}} \quad (10)$$

The density function f for respondent i is as follows $f(W_i) = \prod_{k=1}^{3} p_{ik}{}^{w_{ik}}$ where w_{ik} denotes a dummy equal to 1 if respondent i chooses vignette k, and zero otherwise. The log likelihood to be maximised to estimate the coefficients β and γ_k is:

$$Ln\ L(\beta, \gamma_k) = \sum_{i=1}^{N} \sum_{k=1}^{3} w_{ik}\ ln(p_{ik}) \quad (11)$$

The interpretation of the coefficients differs per type of explanatory variable. The coefficients stored in γ_k are interpreted in the same way as coefficients in multinomial logit models, i.e. against the base category. The impact of a change in vignette specific covariate x_{im} on the probability p_{im} that respondent i chooses vignette m is fairly straightforward:

$$\frac{\partial p_{ij}}{\partial x_{im}} = p_{im}(1 - p_{im})\beta \text{ if j=m} \quad (12)$$

$$= -p_{ij}(1 - p_{im})\beta \text{ if j≠ m}$$

If the estimated coefficient β is positive then the impact of an increase in x_{im} on the probability that respondent i chooses vignette m is positive (positive own-effect), and on the probability that they choose another vignette j is negative (negative cross-effect). For more detailed information on ASC logit models, see e.g. Cameron and Trivedi (2010).

We treat the variables reflecting financial incentives as alternative specific covariates x_{im} in our model, while we include respondents' trust in the different PSPs and demographic controls in the set of respondent specific covariates z_i. For the financial overview, the incentive is given in the form of a monthly reward paid by the PSP, ranging between EUR 5 and EUR 50. In case of the mortgage loan and personal loan, the incentive is reflected in a lower monthly repayment to the PSP, see Section 3 for a detailed description of the vignettes. Next to the standard demographic explanatory variables we include *trust in other people* as an explanatory variable to control for generalized trust and one or two trust variables which reflect the *difference in trust* between the other PSPs and one's most important bank to assess the impact of difference in trust on respondents' preferences.

6. Estimation results

6.1 Willingness to give consent to use payments data

The estimation results show that consumers' willingness to share their payments data with banks and non-banks in exchange for a banking service depends on trust (see Table 2). For all types of PSPs the stronger the consumer's trust in the specific PSP, the higher the willingness to share payments data with it. So we find support for H5a. The impact of trust differs between PSPs. It is lowest for other banks where consumers do not have an account and highest for the banks where they do have an account (both their most important bank as well as their other banks). A one-point increase in trust in other banks increases the propensity to agree with payments data usage by them by 2.1 percentage points (pp), while it rises by 3.6 pp for their own banks.[8] The marginal effect of a one-point increase in trust for online stores is 2.6 pp, for supermarkets it is 2.8 pp and for BigTechs it is 2.9 pp. Furthermore, we find that people who in general trust other people are 1.3 pp more likely to share their payments data with other banks than their own and 0.8 pp more likely to agree with the usage by BigTechs than people who distrust others.

We also find that people who are knowledgeable about PSD2 tend to be less likely to give their consent than others. They are 2.5 pp less likely to agree with payments data usage by their own most important bank, 1.9 pp less likely to give consent to other banks, and 1.3 pp less likely to give it to supermarkets.

Regarding demographic factors, we find that both gender and age matter. In all cases, men are more willing to agree with the usage of their payments data than women. The marginal effects range between +0.9 pp in case of payments data usage by online stores and +3.6 pp when the data is used by one of their other banks. Furthermore, we find that the older people are, the lower their willingness to agree with payments data usage by any of the PSPs. The age effects are especially large in case of payments data usage by the own bank. People below the age of 34 (our baseline age category) are the most open to share payments data with other banks than their own and with new comers like BigTechs and online stores. People below the age of 45 are relatively willing to agree with payments data usage by their own banks compared to elderly. We find no or mixed results for education, income, being a homeowner, degree of urbanisation and region. These variables are statistically significant for two or less of the six PSPs.

[8] Marginal effects are available upon request.

Table 2. Tobit coefficients for willingness to share payments data with PSPs

	Own most important bank	Other own bank	Other banks	BigTechs	Online stores	Super-markets
Trust in other people	0.475	5.112	6.679*	4.655*	3.859	4.789
	(3.634)	(4.001)	(2.602)	(2.288)	(2.583)	(3.120)
Trust in one's most important bank	26.29***					
	(2.559)					
Trust in another own bank		17.15***				
		(3.054)				
Trust in other banks			11.18***			
			(1.914)			
Trust in BigTechs				17.26***		
				(1.897)		
Trust in online stores					14.93***	
					(1.912)	
Trust in supermarkets						17.27***
						(2.428)
Good knowledge of PSD2	-18.00***	-9.230*	-1.629	-0.766	-4.433	-7.878*
	(4.065)	(4.286)	(2.999)	(2.580)	(3.069)	(3.699)
Male	8.039*	16.88***	6.790**	8.385***	5.029*	10.00***
	(3.137)	(3.661)	(2.319)	(2.152)	(2.376)	(2.945)
Between 35 and 44	-10.10	-14.06	-13.12**	-9.732**	-8.145*	-7.196
	(5.991)	(7.392)	(3.985)	(3.224)	(3.836)	(4.896)
Between 45 and 54	-25.45***	-32.55***	-14.83***	-13.19***	-15.82***	-12.17**
	(5.652)	(7.449)	(3.787)	(3.299)	(3.866)	(4.478)
Between 55 and 64	-34.20***	-34.92***	-25.58***	-23.45***	-26.80***	-22.46***
	(5.625)	(7.337)	(3.946)	(3.586)	(4.136)	(4.880)
65 and over	-41.86***	-50.65***	-31.91***	-29.10***	-30.55***	-27.96***
	(5.384)	(7.087)	(3.793)	(3.429)	(3.875)	(4.471)
Education: bachelor or higher	-8.127*	-1.577	0.773	2. 153	-2.985	0.823
	(3.695)	(3.841)	(2.577)	(2.188)	(2.580)	(3.022)
Income: EUR 1151-1800	11.67	11.32	5.562	10.31*	4.557	8.740
	(7.606)	(9.610)	(5.042)	(4.353)	(5.036)	(6.134)
Income: EUR 1801-2600	10.43	3.873	-3.549	0.934	-3.606	-3.782
	(6.941)	(8.871)	(4.712)	(4.144)	(4.599)	(5.452)
Income: more than EUR 2600	13.35*	2.312	0.431	3.150	-0.236	3.277
	(6.719)	(8.591)	(4.378)	(4.007)	(4.456)	(5.336)
Homeowner	-5.830	2.225	-1.735	-0.768	-4.073	-7. 323
	(4.484)	(5.535)	(3.307)	(2.914)	(3.297)	(3.992)
Degree of urbanisation	2.846	-0.134	1.931	2.885**	1.992	3.009*
	(1.534)	(1.593)	(1.035)	(0.905)	(1.048)	(1.246)
Region north	1.740	-11.67	4.398	3.726	0.130	3.330
	(6.129)	(6.725)	(4.225)	(3.798)	(4.194)	(5.143)
Region east	-1.757	-5.902	-0.740	-2.279	0.430	-1.544
	(4.858)	(5.341)	(3.361)	(2.922)	(3.381)	(3.895)
Region south	-3.247	-7.530	-4.136	-5.983*	-4.981	-9.089*
	(4.716)	(4.722)	(3.342)	(2.890)	(3.342)	(4.172)
Constant	-69.31***	-47.81**	-61.94***	-73.34***	-64.63***	-92.14***
	(13.22)	(15.24)	(9.119)	(8.524)	(8.614)	(11.59)
Observations	2,627	1,221	2,627	2,627	2,627	2,627
Uncensored	1,071	443	482	360	384	361
Left-censored	1,221	731	2135	2,258	2,232	2,249
Right-censored	335	47	10	9	11	17
Pseudo R^2	0.02	0.03	0.03	0.07	0.05	0.04
Log Likelihood	-7345.3	-2844.8	-3174.6	-2303.4	-2548.5	-2502.4

Note: The table reports parameter estimates for Tobit regressions. The dependent variable is respondents' willingness to agree with payments data usage by six different PSPs. The outcomes differ per PSP and range between 0% and 100%. Clustered standard errors at household level are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

6.2 Adoption PIS

Table 3 presents the PIS ordered probit estimation results. For each payment situation, respondents who are assigned to one of the PSPs other than their own most important bank (the omitted variable which serves as benchmark), report a significantly lower intention to adopt PIS than respondents who are assigned to their most important bank. So, we find support for H2a and H2b. Furthermore, the adoption intention seems higher among people to whom the PIS would be offered by a BigTech than among those to whom it would be offered by a bank other than their own or by the company that runs the payment location. However, according to a Wald test the hypothesis of equal coefficients for the different PSPs, is only rejected for PIS in supermarkets (see Table 4 with the test results under the 'dummy' columns). For P2P payments, neither of the tests rejects the null hypothesis of equal coefficents, indicating no difference in adoption intention between respondents who would be offered PIS by either a bank other than their own, a BigTech or a social media company. For PIS in online stores, the adoption intention is significantly higher when offered by a BigTech firm or the online store than when offered by a bank other than their own, but there is no difference between the BigTech and the social media company. Thus, we reject H2c (the adoption intention of PIS is higher for other banks than for non-banks).

To illustrate the difference in adoption intention between PSPs, we discuss the estimated marginal effects for adoption intention in supermarkets. When PIS would be offered by a bank other than one's own bank, the propensity that someone would certainly not adopt PIS would rise by 22.4 pp and that they would certainly adopt it would drop by 1.9 pp. If the service would be offered by a BigTech instead of one's own bank, the propensity that it would certainly not be adopted would increase by 10.9 pp and that they would certainly adopt it would decline with 0.9 pp. Lastly, when the supermarket itself would offer PIS instead of one's own bank, the propensity that it would certainly not be adopted would rise by 18.6 pp, while the propensity that it would certainly be adopted would drop with 1.6 pp.

Differences in trust between a PSP and one's own bank also matter for consumers' expressed adoption intention, except when the other PSP is a bank other than their own bank. In that case, a difference in trust does not influence the adoption intention. For the other PSPs, we find that the higher trust in a particular PSP compared to trust in one's own bank, the higher the adoption intention. This result suggests that if non-bank PSPs were able to gain consumers' trust (or if consumers would lose trust in their own bank) the probability that consumers would make use of their PIS instead of those offered by their own bank, would rise. The estimation results indicate that this effect is relatively larger for BigTech companies in the supermarket case than for the other PSPs, and for BigTechs compared to other banks for PIS in online stores case (see Table 4, columns "Supermarket – Difference in trust" and "Online stores – Difference in trust").

Table 3. Ordered probt results adoption intention payment initation services

	1: Supermarket	2: P2P payments	3: Online store
(Benchmark: the respondent's own most important bank)			
Another bank	-0.626***	-0.667***	-0.538***
	(0.070)	(0.077)	(0.077)
A BigTech	-0.304**	-0.567***	-0.216*
	(0.097)	(0.102)	(0.100)
A supermarket	-0.521***		
	(0.075)		
A social media company		-0.647***	
		(0.098)	
An online store			-0.344***
			(0.081)
Trust in other people	0.260***	0.249***	0.226***
	(0.048)	(0.048)	(0.047)
Difference in trust: other banks	0.107	0.067	-0.008
	(0.056)	(0.065)	(0.057)
Difference in trust: BigTechs	0.281***	0.209***	0.192***
	(0.052)	(0.055)	(0.052)
Difference in trust: supermarkets	0.113*		
	(0.050)		
Difference in trust: social media companies[9]		0.186***	
		(0.051)	
Difference in trust: online stores			0.111*
			(0.050)
Good knowledge of PSD2	-0.141*	-0.201***	-0.169**
	(0.060)	(0.060)	(0.063)
Male	0.229***	0.160***	0.178***
	(0.046)	(0.045)	(0.046)
Between 35 and 44	-0.232**	-0.289***	-0.110
	(0.080)	(0.082)	(0.080)
Between 45 and 54	-0.505***	-0.621***	-0.429***
	(0.079)	(0.079)	(0.079)
Between 55 and 64	-0.645***	-0.777***	-0.666***
	(0.077)	(0.080)	(0.079)
65 and over	-0.750***	-1.030***	-0.955***
	(0.072)	(0.075)	(0.074)
Education: bachelor or higher	-0.025	-0.023	0.034
	(0.051)	(0.050)	(0.050)
Homeowner	-0.016	0.035	-0.047
	(0.061)	(0.060)	(0.060)
Degree of urbanisation	0.021	0.041*	0.050*
	(0.020)	(0.020)	(0.020)
Income: EUR 1151-1800	0.139	0.079	0.121
	(0.104)	(0.102)	(0.104)
Income: EUR 1801-2600	0.022	0.060	0.128
	(0.095)	(0.093)	(0.044)
Income: more than EUR 2600	0.163	0.098	0.176
	(0.093)	(0.090)	(0.092)
Region north	0.024	0.015	0.114
	(0.081)	(0.081)	(0.083)
Region east	-0.113	-0.105	-0.101
	(0.065)	(0.064)	(0.063)
Region south	-0.064	-0.055	-0.099
	(0.062)	(0.061)	(0.062)
Observations	2,627	2,627	2,627
Pseudo R^2	0.07	0.10	0.07
F	0.00	0.00	0.00
Log likelihood	-2930.4	-2970.7	-2916.2

Note: The table reports parameter estimates for ordered probit regressions. The dependent variable is respondent's intention to adopt PIS in three different payment situations: (1) for paying in supermarkets, (2)for P2P payments among family and friends, and (3) in online stores. The dependent variable ranges from 1 (definitely not adopting the PIS) to 5 (definitely adopting the PIS). Clustered standard errors at household level are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

[9] Proxied by trust in BigTechs

Table 4. Wald tests equality of coefficients for PSPs

Type of PSP	Type of PSP	Supermarket Dummy	Supermarket Difference in trust	P2P Dummy	P2P Difference in trust	Online store Dummy	Online store Difference in trust
Other bank	BigTech	p=0.002**	p=0.022*	p=0.373	p=0.092	p=0.002**	p=0.009**
Other bank	Supermarket	p=0.200	p=0.933				
Other bank	Social media company	n.a.	n.a.	p=0.852	p=0.151		
Other bank	Online store	n.a.	n.a.			p=0.031*	p=0.112
BigTech	Supermarket	p=0.036*	p=0.019*				
BigTech	Social media company	n.a.	n.a.	p=0.530	p=0.752		
BigTech	Online store	n.a.	n.a.			p=0.249	p=0.263

Note: * p<0.05, ** p<0.01.

We also find that people who in general trust other people most, have a higher propensity to adopt PIS than people who distrust others. Having a good knowledge of PSD2 decreases people's adoption intention of PIS in all three payment situations. Consumers with high PSD2 knowledge are 5.0 pp (supermarkets) to 6.9 pp (online stores) more likely to be certain that they do not want to adopt PIS than other people. In addition, we find that adoption intention is relatively high among men and strongly decreases with age. For instance, men are 5.5 pp (P2P payments) to 8.2 pp (supermarkets) less likely than women to be certain that they will not use PIS, while they are 0.5 pp (P2P payments) to 2.1 pp (online stores) more likely to be certain that they will adopt it than women.

Regarding age, we find that people aged 65 and older are 26.8 pp (supermarkets) to 35.4 pp (P2P payments) more likely than people who are 34 or younger to be certain that they will not use PIS. It is not just the elderly who express a relatively low propensity to adopt PIS. Also, people aged between 35 and 44 years are less likely to adopt PIS for paying in supermarkets or for P2P payments than people below the age of 35. Such gender and age patterns are fairly common for the adoption of innovative payment related services (Kosse, 2014). However, contrary to what is often found in the literature, education and income do not correlate positively with adoption intention. These findings hold for all three payment situations. Furthermore, the degree of urbanisation of the respondent's residence is significant for P2P payments and for payments in online stores. People who live in urbanised areas are more open to adopting PIS than people who live in less urbanised areas.

6.3 Adoption intention AIS and the influence of financial incentives

6.3.1 Financial overview

Table 5 presents the ASC-logit results for each of the three rounds for the financial oveview. There are three options: 1) a financial overview provided by one's own bank, 2) a financial overview provided by a BigTech and 3) no financial overview. The benchmark is getting no financial overview, which was chosen by 55% of the respondents in the first round.

The results for the first round show that trust influences consumers' preferences. People who trust most people in general, are more likely than distrusting people to choose a financial overview

provided by their own bank instead of receiving no financial overview. They are less likely to prefer a financial overview from a BigTech. We find support for H5c: the intention to adopt an AIS relates positively to trust in the PSP offering it. The higher the trust in BigTechs, relative to trust in the own bank, the lower the likelihood of respondents' preference for receiving an overview from their own bank, and the higher the likelihood that they would prefer to receive this overview from a BigTech. However, the latter effect is significant at the 10% level, but not at the 5% level.

People who are knowledgeable about PSD2 are less likely to prefer a financial overview from their own bank than others who know nothing or little about PSD2. Regarding the other demographic controls, gender, age, income and region matter. Men choose significantly more often for a financial overview from their own bank than women, but they do not opt significantly more often for an overview provided by a BigTech. Age has a negative impact on both the choice for a financial overview provided by one's own bank and by a BigTech. The effect is stronger for BigTechs than for one's own bank. Furthermore, we find a negative impact of education on both the preference for the provision of an overview by one's own bank and by a BigTech. People in the highest income category are less likely to prefer an overview by a BigTech than people with a low income, but they do not differ with respect to their preference for an overview by their own bank. Last, people living in the eastern part of the Netherlands are less likely to choose for an overview from their own bank than people in the western part of the Netherlands (the benchmark), while people living in the Northern part are more likely to prefer an overview from a BigTech.

Although most results for trust and demographic characteristics on consumers' preferences remain unchanged when financial rewards are introduced in round 2 and round 3, there are some noteworthy differences in round 3 regarding preferences for receiving an overview from a BigTech. The difference in trust between a BigTech and one's own bank, knowledge of PSD2 and the age effect for people between 45 -54 years of age have become statistically significant at the 5% level. So the support for H5c has become more convincing. Furthermore, the sign of the gender effect has switched and has become significant at the 5% level in both rounds 2 and 3, implying that men are more likely to prefer receiving a financial overview from a BigTech than women once financial incentives are introduced. Something similar happens for the degree of urbanisation.

The size of the financial reward given by consumers' own bank and the BigTech in round 2 has a significant, positive impact on consumers' preferences. Table 6 shows an indication of the estimated impact of financial rewards on consumers' preferences.[10] Rewards shift preferences from not receiving a financial overview to receiving it from one's own bank, but there is hardly any shift in preference towards receiving it from a BigTech firm. When the monthly reward would amount EUR 5, consumers' preference for a financial overview from their own bank would increase by 0.9 pp, and

[10] Note that the presented effects of the level of financial rewards on preferences as presented here, are merely indicative. They are based on the estimated marginal effects, which refer to the impact of a small change in a variable on the dependent variable. We extrapolated the estimated marginal effects of financial rewards on consumers' preferences linearly.

Table 5. Alternative specific conditional (ASC) logit estimates financial overview

	Round 1		Round 2		Round 3	
Financial incentive by:						
own bank and BigTech			0.007***			
			(0.002)			
BigTech					0.024***	
					(0.004)	
Base: no financial overview	financial overview by own bank	financial overview by a BigTech	financial overview by own bank	financial overview by a BigTech	financial overview by own bank	financial overview by a BigTech
Trust in other people	0.208*	-0.875*	0.198*	-0.306	0.169	0.120
	(0.087)	(0.373)	(0.085)	(0.345)	(0.0877)	(0.166)
Difference in trust: BigTechs	-0.119*	0.511	-0.086	0.297	-0.146**	0.394***
	(0.047)	(0.280)	(0.046)	(0.201)	(0.049)	(0.101)
Good knowledge of PSD2	-0.505***	-0.247	-0.376***	-0.800	-0.539***	-0.423*
	(0.112)	(0.415)	(0.107)	(0.416)	(0.114)	(0.197)
Male	0.192*	-0.127	0.232**	0.607*	0.238**	0.626***
	(0.079)	(0.333)	(0.079)	(0.310)	(0.082)	(0.142)
Between 35 and 44	-0.267	0.126	-0.311*	0.517	-0.206	-0.361
	(0.160)	(0.470)	(0.158)	(0.490)	(0.170)	(0.242)
Between 45 and 54	-0.537***	-0.660	-0.698***	-0.384	-0.500**	-0.965***
	(0.149)	(0.549)	(0.152)	(0.542)	(0.158)	(0.256)
Between 55 and 64	-0.717***	-1.243*	-0.728***	-0.482	-0.588***	-1.186***
	(0.145)	(0.527)	(0.146)	(0.520)	(0.153)	(0.250)
65 and over	-1.003***	-1.605**	-1.040***	-2.088**	-0.764***	-1.876***
	(0.137)	(0.528)	(0.136)	(0.664)	(0.143)	(0.253)
Education: bachelor or higher	-0.220*	-1.396**	-0.084	-1.049*	-0.216*	-0.369*
	(0.092)	(0.473)	(0.092)	(0.415)	(0.095)	(0.173)
Income: EUR 1151-1800	-0.065	0.069	-0.001	0.942	-0.088	0.138
	(0.185)	(0.672)	(0.182)	(0.700)	(0.192)	(0.336)
Income: EUR 1801-2600	0.104	-0.684	0.071	-0.274	0.130	0.165
	(0.166)	(0.754)	(0.164)	(0.789)	(0.176)	(0.315)
Income: more than EUR 2600	-0.077	-0.799*	-0.058	-0.017	-0.059	-0.033
	(0.107)	(0.402)	(0.107)	(0.367)	(0.110)	(0.203)
Homeowner	-0.059	-0.767	-0.043	0.027	-0.042	-0.013
	(0.107)	(0.400)	(0.108)	(0.365)	(0.110)	(0.205)
Degree of urbanisation	-0.039	0.255	-0.015	0.228	-0.064	0.261***
	(0.036)	(0.152)	(0.056)	(0.141)	(0.037)	(0.069)
Region north	0.105	0.954*	-0.0281	0.831	-0.0124	0.518
	(0.149)	(0.475)	(0.150)	(0.462)	(0.153)	(0.267)
Region east	-0.306**	-0.078	-0.234*	-0.415	-0.198	-0.269
	(0.117)	(0.504)	(0.115)	(0.482)	(0.120)	(0.241)
Region south	-0.091	-0.702	-0.107	-0.598	-0.135	0.124
	(0.114)	(0.610)	(0.111)	(0.519)	(0.118)	(0.218)
Constant	0.343	-2.281*	0.295	-3.725***	0.179	-2.254***
	(0.248)	(0.986)	(0.249)	-1.019	(0.258)	(0.480)
Number of observations		7,881		7,881		7,881
Number of individuals		2,627		2,627		2,627
Log Likelihood		-1883.5		-1927.02		-2274.4

Note: The table reports parameter estimates for ASC-logit regressions. The dependent variable is respondents' choice for either receiving a financial overview from the own bank, receiving it from a BigTech, or not receiving a financial overview. Separate regressions have been estimated for three rounds. In round 1 there are no financial incentives, round 2 introduces financial incentives given by the own bank and the BigTech, and in round 3 only the BigTech gives financial incentives. Clustered standard errors at household level are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

when the reward would be EUR 50, the increase would be 8.6 pp. So the share of consumers that wants to have the financial overview from their own bank would rise from 44% in the benchmark

situation without rewards to 53%, but the share of consumers that prefer an overview from a BigTech would remain almost unaltered. In round 3 only BigTechs offer rewards. In this situation there are two shifts in consumer preferences: from receiving a financial overview from their own bank to receiving it from a BigTech and from not receiving a financial overview to receiving it from a BigTech. The overall impact is smaller than in the second round. The likelihood that someone would prefer a financial overview from a BigTech would rise by 0.7 pp if the monthly reward would be EUR 5, and by 6.9 pp if the monthly reward would be EUR 50. About 4/7 of the increased preference for the BigTech stems from the reduced preference of consumers for not getting a financial overview and 3/7 from the reduced preference for receiving it from their own bank.

To summarize, we find support for H3b (the adoption intention of AIS is higher for one's own bank than for non-banks), H4a (The intention to adopt AIS depends positively on the size of the financial incentive) and H4c (the adoption intention of AIS offered by non-banks depends positively on the size of the financial incentive). Furthermore, the outcomes suggest that consumers who initially did not want to receive an overview are more sensitive to financial incentives from their own bank than from a BigTech.

Table 6. Impact of financial incentives on consumers' preferences for a financial overview
Effects in percentage points

	Financial overview by own bank	Financial overview by BigTech	No financial overview
Both the own bank and the BigTech give a financial incentive			
EUR 5	0.9	0.0	-0.9
EUR 10	1.7	0.0	-1.7
EUR 25	4.3	0.1	-4.4
EUR 50	8.6	0.1	-8.7
Only the BigTech gives a financial incentive			
EUR 5	-0.3	0.7	-0.4
EUR 10	-0.6	1.4	-0.8
EUR 25	-1.5	3.5	-2.0
EUR 50	-3.0	6.9	-3.9

6.3.2 Mortgages and personal loans

Tables 7 and 8 present the ASC-logit results for respectively mortgage and personal loans. There are three options: a mortgage (personal loan) 1) from one's own bank, 2) from another bank where one does not have an account, and 3) from a BigTech. In both sets of estimations, the benchmark PSP is the bank where the respondent already holds the main payment account.

Most respondents prefer their own bank, anything else equal including financial conditions. In round 1 for mortgages, 93% of the respondents expressed their preference for their own bank, 5% for another bank and 1% for a BigTech. The results are fairly similar for personal loans; 96% indicate

in round 1 a preference for a personal loan from their own bank, 3% from another bank and 1% from a BigTech.

The estimation results in round 1 for mortgages and personal loans are similar and are therefore discussed together. For both mortgages and personal loans, the estimated constant terms for banks other than own bank are negative and significant, which indicates that all else equal, consumers prefer their own bank over other banks for AIS. The estimated constant term for Bigtechs is negative and significantly different from zero in the case of AIS for personal loans, but not in the case of mortgages. So we find support for H3a (the adoption intention of AIS is higher for one's own bank than for other banks) and partial support for H3b (the adoption intention of AIS is higher for one's own bank than for non-banks). According to Wald tests on the equality of the constant terms for other banks and BigTechs, the hypothesis that these constant terms do not differ significantly from each other cannot be rejected. This holds for both consumers' preferences for PSPs in case of mortgages (p-value=0.51) and for personal loans (p-value=0.88). So, we do not find support for hypothesis H3c (the adoption intention of AIS is higher for other banks than for non-banks).

Unlike the outcomes for adoption intention for PIS and the financial overview trust in other people, having a good understanding of PSD2 and gender do not significantly influence people's preferences. On the other hand, education and income have a significant effect. People with at least a bachelor degree are significantly less likely to prefer a mortgage or personal loan from a BigTech than from their own bank than people with a lower educational level. However, the preference for another bank is unrelated to educational level. We find a negative income effect for preferring a BigTech over one's own bank for mortgage loans, but there is no income effect for personal loans. Trust in the different PSPs play a significant role, we find support for H5c. The higher the trust in BigTechs relative to the trust in one's own bank, the more likely it is that people have a preference for taking out a mortgage or personal loan from a BigTech instead of from their own bank. Furthermore, the higher trust in other banks relative to trust in the own bank, the lower the likelihood is that someone prefers a mortgage loan from a BigTech, but the preference for a mortgage from another bank itself remains unaltered. Age effects are less pronounced than for PIS or the financial overview. The preferences of people aged between 35 and 54 are not significantly different from those of people who are 34 or younger (the benchmark group). People between 55 and 64 are less likely to prefer a BigTech for both types of loans. They are also, together with people who are 65 or older, less likely to prefer another bank than their own bank for taking out a personal loan than the benchmark group.

When financial incentives are introduced in rounds 2 and 3, some variables that are not significant in round 1 do become significant. This holds for trust in other people, male, aged between 45 and 54, being a homeowner and having a net household income between EUR 1150–2600. For

instance, when either other banks or BigTechs offer mortgages and personal loans against lower interest rates and lower monthly repayments than the other PSPs, men become more likely than

Table 7. Alternative specific conditional (ASC) logit estimates for mortgages

	Round 1		Round 2		Round 3	
Lower monthly payment to:						
another bank			-0.008***			
			(0.001)			
BigTech					-0.010***	
					(0.001)	
Base: mortgage by own bank	Another bank	A BigTech	Another bank	A BigTech	Another bank	A BigTech
Trust in other people	-0.032	-0.651	0.262**	-0.362	-0.041	0.174
	(0.184)	(0.385)	(0.088)	(0.335)	(0.183)	(0.111)
Difference in trust: other banks	0.109	-0.803**	0.360***	-0.424	0.155	-0.059
	(0.162)	(0.292)	(0.067)	(0.278)	(0.155)	(0.082)
Difference in trust: BigTechs	0.275*	1.087***	-0.139*	0.707***	0.189	0.410***
	(0.119)	(0.275)	(0.059)	(0.210)	(0.131)	(0.072)
Good knowledge of PSD2	-0.331	-0.290	-0.019	-0.905	-0.534	-0.135
	(0.251)	(0.509)	(0.106)	(0.561)	(0.294)	(0.126)
Male	0.175	-0.189	0.319***	-0.030	0.161	0.687***
	(0.176)	(0.338)	(0.0823)	(0.329)	(0.183)	(0.099)
Between 35 and 44	0.356	-0.829	-0.199	-1.091	0.024	0.016
	(0.305)	(0.637)	(0.163)	(0.696)	(0.316)	(0.193)
Between 45 and 54	0.181	-0.673	-0.294*	-0.348	-0.056	-0.071
	(0.294)	(0.671)	(0.150)	(0.525)	(0.300)	(0.183)
Between 55 and 64	-0.317	-1.420*	-0.661***	-1.312*	-0.496	-0.402*
	(0.321)	(0.675)	(0.146)	(0.583)	(0.305)	(0.183)
65 and over	-0.229	-0.057	-1.009***	-0.915*	-0.627*	-0.622***
	(0.281)	(0.425)	(0.137)	(0.428)	(0.289)	(0.171)
Education: bachelor or higher	-0.331	-1.511**	0.143	-0.413	-0.324	-0.021
	(0.214)	(0.537)	(0.093)	(0.384)	(0.209)	(0.114)
Income: EUR 1151-1800	-0.068	-1.583*	0.178	-1.051	0.130	0.286
	(0.322)	(0.620)	(0.180)	(0.557)	(0.344)	(0.223)
Income: EUR 1801-2600	-0.854*	-1.308**	-0.039	-1.467**	-0.597	-0.032
	(0.336)	(0.507)	(0.170)	(0.527)	(0.337)	(0.211)
Income: more than EUR 2600	-0.222	-0.783	0.122	-0.516	-0.014	0.012
	(0.297)	(0.506)	(0.164)	(0.452)	(0.304)	(0.202)
Homeowner	-0.228	0.142	0.335**	0.0929	0.0727	0.329*
	(0.221)	(0.393)	(0.108)	(0.386)	(0.219)	(0.145)
Degree of urbanisation	-0.036	-0.066	-0.001	0.170	0.077	0.065
	(0.075)	(0.160)	(0.035)	(0.129)	(0.073)	(0.044)
Region north	-0.317	-0.773	-0.202	-0.027	-0.795*	-0.169
	(0.312)	(0.698)	(0.148)	(0.588)	(0.365)	(0.184)
Region east	-0.083	-0.185	-0.444***	0.259	-0.393	-0.146
	(0.237)	(0.526)	(0.119)	(0.452)	(0.255)	(0.144)
Region south	-0.098	-0.874	-0.118	0.234	-0.111	-0.188
	(0.231)	(0.545)	(0.114)	(0.442)	(0.222)	(0.145)
Constant	-1.619**	-0.952	-0.515	-1.700*	-1.812***	-2.132***
	(0.496)	(0.904)	(0.264)	(0.824)	(0.523)	(0.319)
Observations		7,881		7,881		7,881
Individuals		2,627		2,627		2,627
Log likelihood		-692.1		-1853.4		-1728.5

Note: The table reports parameter estimates for ASC-logit regressions. The dependent variable is consumers' choice for either a mortgage from their own bank, from another bank or from a BigTech. Separate regressions have been estimated for three rounds. In round 1 the monthly mortgage payment is the same for the three PSPs, in round 2 the monthly mortgage payment to another bank is lower than for the own bank or the BigTech, and in round 3 the BigTech charges lower monthly mortgage payment than the own or other banks. Clustered standard errors at household level are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

Table 8. Alternative specific conditional (ASC) logit estimates for personal loans

	Round 1		Round 2		Round 3	
Lower monthly payment to:						
another bank			-0.066***			
			(0.012)			
BigTech					-0.089***	
					(0.014)	
Base: personal loan from my own bank	Another bank	A BigTech	Another bank	A BigTech	Another bank	A BigTech
Trust in other people	-0.537	-0.757	0.326***	-0.139	-0.403	0.245*
	(0.277)	(0.410)	(0.087)	(0.401)	(0.237)	(0.112)
Difference in trust: other banks	-0.092	-0.633	0.346***	-0.410	-0.175	-0.230**
	(0.225)	(0.329)	(0.066)	(0.315)	(0.197)	(0.087)
Difference in trust: BigTechs	0.457*	1.067***	-0.087	0.468	0.626***	0.528***
	(0.178)	(0.235)	(0.059)	(0.261)	(0.168)	(0.078)
Good knowledge of PSD2	-0.006	-1.161	-0.036	-0.628	-0.561	-0.200
	(0.357)	(0.658)	(0.108)	(0.561)	(0.370)	(0.128)
Male	0.0678	-0.063	0.218**	-0.145	0.213	0.456***
	(0.248)	(0.331)	(0.081)	(0.359)	(0.226)	(0.098)
Between 35 and 44	-0.641	-0.364	-0.228	-0.680	-0.455	-0.279
	(0.445)	(0.555)	(0.164)	(0.646)	(0.423)	(0.189)
Between 45 and 54	-0.283	-0.823	-0.318*	-0.705	-0.228	-0.180
	(0.386)	(0.656)	(0.154)	(0.611)	(0.377)	(0.183)
Between 55 and 64	-0.906*	-1.431*	-0.788***	-1.298*	-0.264	-0.683***
	(0.433)	(0.682)	(0.151)	(0.595)	(0.362)	(0.181)
65 and over	-0.810*	-0.607	-0.964***	-1.638**	-0.571	-0.799***
	(0.355)	(0.430)	(0.141)	(0.505)	(0.332)	(0.170)
Education: bachelor or higher	-0.401	-1.322*	0.222*	-0.459	-0.266	-0.007
	(0.324)	(0.557)	(0.091)	(0.485)	(0.272)	(0.116)
Income: EUR 1151-1800	-0.130	-0.775	0.372*	-0.900	0.965*	0.284
	(0.468)	(0.621)	(0.184)	(0.635)	(0.453)	(0.213)
Income: EUR 1801-2600	-0.192	-0.353	0.192	-1.411*	0.062	-0.009
	(0.421)	(0.563)	(0.176)	(0.614)	(0.466)	(0.201)
Income: more than EUR 2600	-0.147	-0.314	0.248	-0.817	0.534	0.040
	(0.438)	(0.609)	(0.172)	(0.575)	(0.439)	(0.189)
Homeowner	-0.185	-0.189	0.254*	0.485	0.249	0.119
	(0.296)	(0.457)	(0.111)	(0.525)	(0.274)	(0.138)
Degree of urbanisation	0.063	0.042	-0.007	0.097	0.077	0.0154
	(0.099)	(0.149)	(0.036)	(0.153)	(0.089)	(0.043)
Region north	-1.069*	0.393	-0.201	0.731	-1.076*	-0.205
	(0.515)	(0.576)	(0.152)	(0.573)	(0.463)	(0.188)
Region east	-0.246	0.689	-0.389**	0.943	-0.396	-0.269
	(0.312)	(0.495)	(0.119)	(0.512)	(0.286)	(0.147)
Region south	-0.671	-0.318	-0.221	-0.209	-0.884**	-0.208
	(0.349)	(0.575)	(0.114)	(0.585)	(0.328)	(0.142)
Constant	-1.679**	-1.835*	-0.365	-2.258*	-2.271***	-1.359***
	(0.615)	(0.820)	(0.271)	(0.938)	(0.621)	(0.313)
Observations		7,881		7,881		7,881
Individuals		2,627		2,627		2,627
Log likelihood		-479.6		-1828.1		-1582.3

Notes: The table reports parameter estimates for ASC-logit regressions. The dependent variable is respondents' choice for either a personal loan from their own bank, another bank or from a BigTech. Separate regressions have been estimated for three rounds. In round 1 the monthly payments is the same for the three PSPs, in round 2, the monthly payments to another bank is lower than for the own bank or the BigTech, and in round 3 the BigTech charges a lower monthly payment than the own bank or other banks. Clustered standard errors at household level are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

women to prefer PSPs that offer more favourable financial conditions than their own bank. This holds for both their preferences for other banks (round 2) and for BigTechs (round 3). This is in line with the prior findings for PIS. Homeowners show a significantly higher preference for other banks (round 2) and BigTechs (round 3) than people who rent a house, if these PSPs offer them lower monthly mortgage payments than the other PSPs, including their own bank. Homeowners are also more likely to have a higher preference for a personal loan offered by another bank, against more favourable financial conditions, than people who rent.

The level of the monthly mortgage payment and personal loan have a negative and significant effect on consumers' preferences for PSPs (Table 7 and 8). Negative coefficients imply that the demand for a mortgage or personal loan provided by a particular PSP rises when the level of the monthly repayments decreases, while the demand from other PSPs falls. These results confirm our hypotheses that financial incentives matter more for the adoption intention of AIS from another bank than one's own bank (H4b) and from non-banks (H4c).

Table 9 presents indicative results of the impact of financial incentives provided by another bank and the BigTech on consumers' preferences for the three different PSPs in case of the mortgage loan and Table 10 presents the outcomes for personal loans. [11] The results for mortgages in round 2 show that in the case of a mortgage payment of EUR 1200 while the own bank and the BigTech offer both EUR 1232 (the default), the likelihood that a consumer prefers the other bank rises by 6.2 pp, while it drops by 6.1 pp for the own bank and by 0.1 pp for the BigTech. If the other bank lowers the monthly mortgage payment to EUR 1104, the likelihood that consumers prefer the other bank's offer increases to 24.7 pp. These outcomes indicate that many consumers are price sensitive, but most of them are not, and will stick to their own bank. This seems to hold less for the 1% that initially preferred a BigTech in round 1. They seem more price conscious than the ones that prefer their own

Table 9. Impact of financial incentives on consumers' preferences for a mortgage
Effects in percentage points

	Impact of financial incentives on consumers' preferences for a mortgage by…		
	…one's own bank	…another bank	…a BigTech
The other bank charges a lower monthly mortgage payment of…			
EUR 1200	-6.1	6.2	-0.1
EUR 1168	-12.1	12.4	-0.2
EUR 1136	-18.2	18.5	-0.4
EUR 1104	-24.3	24.7	-0.5
The BigTech charges a lower monthly mortgage payment of…			
EUR 1200	-4.6	-0.3	4.9
EUR 1168	-9.2	-0.6	9.8
EUR 1136	-13.9	-0.9	14.7
EUR 1104	-18.5	-1.2	19.7

Note: The default monthly mortgage payment is EUR 1232.

[11] The outcomes in Tables 9 and 10 are indicative, see explanation in footnote 8.

bank. About half of them switched preferences from BigTech to the other bank when the latter charges EUR 1104 instead of EUR 1232.

The outcomes for round 3 are in line with those found for round 2, although price sensitivity is slightly lower. If a BigTech offers a monthly mortgage payment of EUR 1200 instead of EUR 1232, the likelihood that consumers prefer the BigTech increases by 4.9 pp, while the likelihood that they continue to prefer their own bank or another bank drops by respectively 4.6 pp and 0.3 pp. If the BigTech lowers the monthly mortgage payment to EUR 1104, the propensity to prefer the BigTech rises by 19.7 pp, while it drops by 18.5 pp for the own bank and 1.2 pp for another bank.

Table 10 shows the impact of financial incentives on consumers' preferences in case of a personal loan. Also here we find that the level of the monthly payment has a negative and significant effect on consumers' preferences for PSPs. If a bank other than the own bank or the BigTech offers a personal loan against a monthly payment of EUR 101.04 instead of EUR 104.17 then the likelihood that someone prefers another bank rises by 5.2 pp, while the likelihood that she prefers the own bank drops by 5.1 pp, and that she prefers the BigTech by 0.1 pp. If the BigTech gives a similar incentive then the likelihood that someone prefers the BigTech increases by 4.2 pp, while the likelihood that someone prefers their own bank or another bank falls by 4.1 pp and 0.1 pp respectively.

Table 10. Impact financial incentive on consumers' preferences for a personal loan by one's own bank, another bank or a BigTech

Marginal effects in percentage points

	Impact of financial incentives on consumers' preferences for a loan by…		
	…one's own bank	…another bank	…a BigTech
The other bank charges a lower monthly repayment			
EUR 101.04	-5.1	5.2	-0.1
EUR 97.92	-10.2	10.3	-0.1
EUR 94.79	-15.3	15.5	-0.2
EUR 91.67	-20.4	20.7	-0.3
The BigTech charges a lower monthly repayment			
EUR 101.04	-4.1	-0.1	4.2
EUR 97.92	-8.2	-0.3	8.5
EUR 94.79	-12.3	-0.4	12.7
EUR 91.67	-16.4	-0.6	17.0

Note: The default monthly repayment is EUR 104.17.

So, as with the financial monthly reward for the financial overview and the reduced monthly mortgage repayments, the impact of the incentive given by a BigTech for a personal loan on consumers' preferences is smaller, but of the same order of magnitude as the impact of a similar incentive given by a bank. Again, even if we look at the most attractive incentive given, most consumers still prefer their own bank; if another bank offers the loan for EUR 91.67 instead of EUR 104.17 a month, the likelihood that someone prefers the other bank would increase by 20.7 pp, while the preference for the own bank would drop by 20.4 pp, indicating that ¾ of the consumers would still prefer their own bank. If the BigTech would offer EUR 91.67, then the likelihood that someone

would prefer the BigTech would rise by 17 pp, while the preference for the own bank would drop by 16.4 pp, implying that about 8/10 of consumers would still prefer their own bank for a personal loan.

6.3.3 Trade off trust and financial incentives

Consumers are reluctant to share their payments data, especially with PSPs other than their own bank. To some extent, this is due to differences in consumers' trust in their own bank and in other parties (Section 6.2 and 6.3). However, if these PSPs give financial incentives, consumers' propensity to share payments data may rise rapidly (Section 6.3). Table 11 presents estimations of how large monthly financial incentives should be to "compensate" for differences in trust. We use the estimated "marginal" effects of trust and financial incentives on consumers' preferences for the different providers that offer AIS services, to estimate how large such financial incentives should be.

It turns out that the monthly financial incentive that compensates for 1 unit lower trust varies between EUR 5.30 (personal loan by another bank) to EUR 47.48 (mortgage by a BigTech). The magnitude of the financial incentive differs by product and by type of PSP. The financial incentive given by a BigTech should be about 2-3 times higher than the one given by another bank to bridge the trust gap. This is mainly due to the smaller trust gap between other banks and the own bank than between BigTechs and the own bank. The results for personal loans show that the monthly financial incentive that compensates for the trust gap might be modest. It ranges between EUR 3.44 a month for another bank to EUR 8.78 for a BigTech. The small size of the incentive is in line with the findings by Athey et al. (2017).

Table 11. Estimated monthly financial incentives which equal the impact of trust

	Financial overview by		Mortgage by		Personal loan by	
	another bank	a BigTech	another bank	a BigTech	another bank	a BigTech
Marginal effect on preferences for another bank respectively a BigTech						
1 point less trust difference with one's own bank	n.a.	2.6 pp	9.2 pp	6.0 pp	8.8 pp	7.7 pp
Monthly financial incentive of EUR 5 by ….	n.a.	0.7 pp	1.0 pp	0.8 pp	8.3 pp	6.7 pp
Monthly incentive with the impact of 1 point less trust difference with one's own bank	n.a	EUR 18.57	EUR 47.48	EUR 39.18	EUR 5.30	EUR 5.74
Monthly incentive equalizing trust difference with one's own bank	n.a	EUR 28.41	EUR 30.86	EUR 59.85	EUR 3.44	EUR 8.78

Note: Marginal effects are derived from Tables 5 and 6 (financial overview), Tables 7 and 9 (mortgages) and Tables 8 and 10 (personal loans). The average trust level is 3.41 for the most important bank, 2.76 for other banks and 1.88 for BigTechs (Table B.1).

7. Discussion and conclusion

We study consumers' propensity to adopt PSD2 services offered by incumbent banks and licensed newcomers to assess to what extent PSD2 may enhance competition in the consumer retail payments market in the Netherlands. We find that most people are unwilling to agree with the usage of their

payments data by any bank or any of the newcomers. Support for payments data usage is highest if the data user is one's own bank. Only a minority of the consumers would give consent to other banks they are not customers of or to newcomers in the payments market. Men, people under 35, and people living in urbanised areas show the highest inclination to adopt PSD2-related services. Interestingly, people with higher self-reported knowledge of PSD2 are more hesitant to use new services than people with less PSD2 knowledge.

When focusing specifically on PIS, we find that the likelihood of adopting PIS is low. This holds for various situations in which a PSP can initiate payments on behalf of the account holder, i.e., for simplifying payments in supermarkets, for improving P2P payments and for making it easier to pay in online stores. The adoption intention is highest when the service is offered by consumers' own bank, followed at some distance by a BigTech company (for paying in supermarkets or in online stores). The adoption intention is even lower if the service is offered by a non-financial merchant or by another bank. However, if BigTechs are able to gain the public's trust, consumers' intention to adopt PIS from them may rise, as adoption intentions significantly relate to how much trust people have in a PSP relative to their own bank.

Furthermore, pricing matters for the adoption of AIS. If people need to select a service provider and there are no financial incentives, most people prefer their own bank. However, if other banks or BigTechs offer AIS against more favourable financial conditions than their own bank, part of the consumers that initially prefer their own bank switch towards the PSP with the more favourable financial conditions. The magnitude of the financial incentive needed to 'compensate' for the trust gap with consumers' own bank varies between type of product and PSP. BigTechs should give a 2 to 3 times higher incentive than banks, mainly due to the relatively larger gap in trust. For personal loans the monthly financial incentive that compensates for the trust gap might be modest in absolute terms, but for other services, like the financial overview or a mortgage, the incentive needed to bridge the trust gap is sizable. However, even if incentives are large, most people would still prefer their own bank. Interestingly, price sensitivity also depends on background characteristics. For example, we find that men are more sensitive to financial incentives than women.

Overall, we conclude that PSD2 might indeed enhance competition in the consumer retail payments market, but the position of incumbent banks with a large customer base is strong. Newcomers need to work on gaining people's trust, and show that their payments data is safe with them. Furthermore, they may attract customers by offering them financially attractive products, as consumers' demand for PSD2 services turns out to be sensitive to prices. They might be able to do so, in product markets where the margins are high and by making intelligent use of people's payments data so that they can make tailor made offers, which adequately price credit risks.

References

Agarwal, S., Chakravorti, S., & Lunn, A. (2010). Why do banks reward their customers to use their credit cards? Federal Reserve Bank of Chicago Working Paper 2010-19.

Acquisti, A., Brandimarte, L., & Loewenstein, G. (2015). Privacy and human behavior in the age of information, *Science* 347(6221), 509–514.

Acquisti, A., John, L.K., & Loewenstein, G. (2013). What is privacy worth? *Journal of Legal Studies* 42, 249–274.

Arango-Arango, C., Bouhdaoui, Y., Bounie, D., Eschelbach, M. & Hernandez, L. (2018). Cash remains top-of-wallet! International evidence from payment diaries. *Economic Modelling* 62, 38–48.

Arango, C., Hyun, & K., Sabetti, L. (2015). Consumer payment choice: merchant card acceptance versus pricing incentives. *Journal of Banking & Finance* 55 (c), 130–141.

Athey, S., Catalini, C., & Tucker, C. (2017). The digital privacy paradox: small money, small costs, small talk, NBER Working Paper 23488.

Bansal, G., Zahedi, F.M., & Gefen, D. (2016). Do context and personality matter? Trust and privacy concerns in disclosing private information online. *Information & Management* 53, 1–21.

Bolt, W., Jonker, N., & Van Renselaar, C. (2010). Incentives at the counter: an empirical analysis of surcharging card payments and payment behaviour in the Netherlands*. Journal of Banking & Finance* 34 (8), 1738–1744.

Borzekowski, R., Kiser, E., & Ahmed, S. (2008). Consumers' use of debit cards: patterns, preferences, and price response*. Journal of Money, Credit & Banking* 40 (1), 149–172.

Cameron, A.C., & Trivedi, P.K. (2010). Micoeconometrics using Stata, Revised edition, Texas: Stata Press.

Ching, A., & Hayashi, F. (2010). Payment cards reward programs and consumer payment choice. *Journal of Banking & Finance* 34 (8), 1773–1787.

Greene, W.H. (2010). Econometric Analysis, New Jersey: Prentice-Hall International, inc.

Humphrey, D. , Kim, M., & Vale, B. (2001). Realizing the gains from electronic payments: costs, pricing, and payment choice. *Journal of Money, Credit & Banking* 33 (2), 216–234.

Kosse, J.C.M. (2014). Consumer payment choices: room for further digitization?, PhD thesis, Tilburg: Tilburg University.

Maddala, G.S. (1983). Limited-Dependent and Qualitative Variables in Econometrics, Cambridge: University Press, Cambridge.

MOB (2016). Bereikbaarheidsmonitor 2016 (Accessibility monitor 2016), Amsterdam: MOB.

Simon, J., Smith, K., & West, T. (2010). Price incentives and consumer payment behavior. *Journal of Banking & Finance* 34 (8), 1759–1772.

Stulz, R.M. (2019). FinTech, BigTech and the future of banks. NBER Working Paper 26312.

Teppa, F., & Vis, C. (2012). The CentERpanel and the DNB Household Survey: methodological aspects. DNB Occasional Study 10 (4).

Van der Cruijsen, C., De Haan, J. & Roerink, R. (2019). Financial knowledge and trust in financial institutions. DNB Working Paper 662.

Van der Cruijsen, C., & Diepstraten, M. (2017). Banking products: you can take them with you, so why don't you?, *Journal of Financial Services Research* 52(1), 123–154.

Van der Cruijsen, C., & Van der Horst, F. (2019). Cash or card? Unravelling the role of socio-psychological factors. *De Economist* 167(2), 145–175.

Van der Cruijsen, C. (2020). Payments data: do consumers want banks to keep them in a safe or turn them into gold? *Applied Economics* 52(6), 609–622.

Van Esterik-Plasmeijer, P.W.J. & van Raaij, W.F. (2017). Banking system trust, bank trust, and bank loyalty. *International Journal of Bank Marketing* 35(1), 97–111.

Appendix A. Description of key questions

A.1. Payment Initiation Services

Under PSD2, you can also permit a company to make a payment from your payment account. For example, if you buy a product at a webshop this company can issue a payment order to your bank to pay the webshop on your behalf. The bank then processes the payment order. This new electronic payments method, which can be regarded as an alternative for e.g. iDEAL, credit card and PayPal payments, is referred to as a payment initiation service. It involves a transfer of money from your account.

[4 random groups]
Paying for your groceries at the supermarket

Say [*if grandom=1*: your own bank / *if grandom=2*: a bank of which you are not a customer / *if grandom=3*: a technology company / *if grandom=4*: a supermarket offers you the option of [*if grandom= 2, 3 of 4*: ordering your bank on your behalf] to pay for your groceries at [*if grandom=1, 2 of 3*: a supermarket / *if grandom=4*: this supermarket] quickly and easily. The money is then transferred directly to the supermarket from your payment account.

[*if grandom=1*: Would you use this new payment option? / *if grandom=2, 3 of 4*: Would you give your permission to this company to issue a payment order to your bank on your behalf?

1 Definitely not
2 Probably not
3 Neutral
4 Probably
5 Definitely

[4 random groups]
Making person-to-person (P2P) payments

Say [*if hrandom=1*: your own bank / *if hrandom=2*: a bank of which you are not a customer / *if hrandom=3*: a technology company / *if hrandom=4*: a social media company] offers you a way of making P2P payments to e.g. friends and family more quickly and easily. [*if hrandom=2, 3 of 4:* This company issues a payment order to your bank on your behalf and the money is then transferred directly to your friend or family member from your payment account.

[*if hrandom=1*: Would you use this new payment option? / *if hrandom=2, 3 of 4*:
Would you give your permission to this company to issue a payment order to your bank on your behalf?

1 Definitely not
2 Probably not
3 Neutral
4 Probably
5 Definitely

[4 random groups]
Making payments to a webshop

Say [*if irandom=1*: your own bank / *if irandom=2*: a bank of which you are not a customer / *if irandom=3*: a technology company / *if irandom=4*: a webshop] offers you the option of [*if irandom=2, 3 of 4*: ordering your bank on your behalf] to pay for your shopping at [*if grandom=1, 2 of 3*: a webshop / *if grandom=4*: this webshop] quickly and easily. The money is then transferred directly to the webshop from your payment account.

[*if irandom=1*: Would you use this new payment option? / *if irandom=2, 3 of 4*: Would you give your permission to this company to issue a payment order to your bank on your behalf?

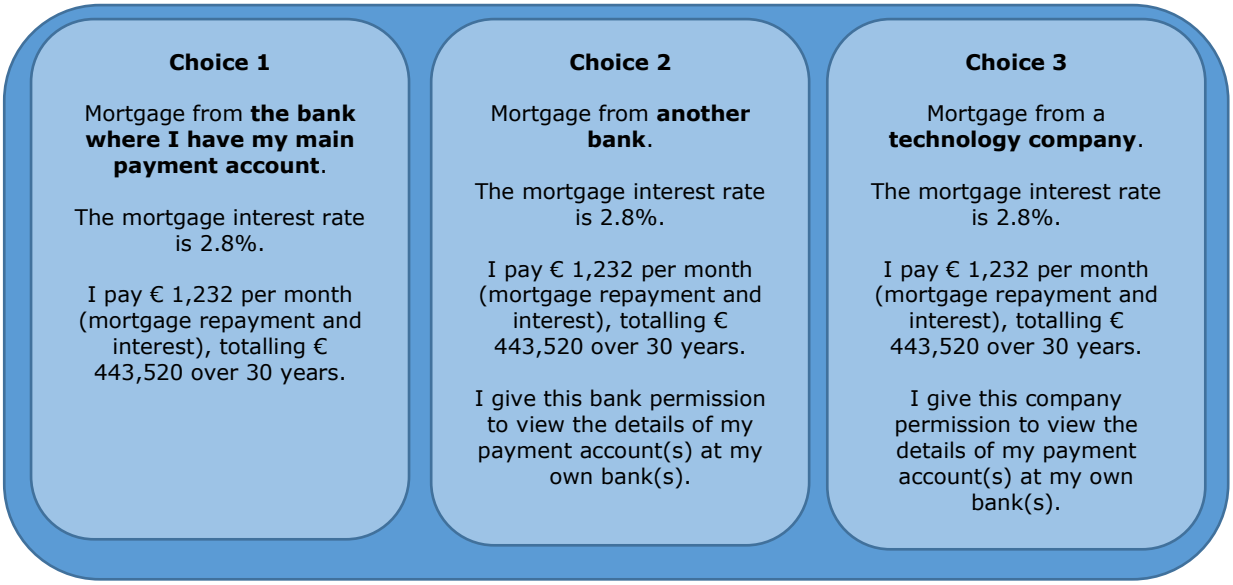
1 Definitely not
2 Probably not
3 Neutral
4 Probably
5 Definitely

A.2 Account information services for a mortgage loan

Say you want to take out a mortgage loan of € 300,000 so you can buy a house. You repay the amount within 30 years and borrow at a fixed rate of interest.

As well as the bank where you have your main payment account, you can also choose to take out a mortgage loan from another bank or a technology company such as Amazon, Apple, Facebook and Google. With your permission, they can access and view your bank's payment information to determine if you qualify for the mortgage loan and the rate of interest on the loan. The providers are licensed and supervised.

What is your choice?



[4 random groups]
What is your choice now?

Choice 1 Mortgage from **the bank where I have my main payment account**. The mortgage interest rate is 2.8%. I pay € 1,232 per month (mortgage repayment and interest), totalling € 443,520 over 30 years.
Choice 2 Mortgage from **another bank**. [*if crandom=1:* The mortgage interest rate is 2.6%. I pay € 1,200 per month (mortgage repayment and interest), totalling € 432,000 over 30 years. */if crandom=2:* The mortgage interest rate is 2.4%. I pay € 1,168 per month (mortgage repayment and interest), totalling € 420,480 over 30 years. */if crandom=3:* The mortgage interest rate is 2.2%. I pay € 1,136 per month (mortgage repayment and interest), totalling € 408,960 over 30 years. */if crandom=4:* The mortgage interest rate is 2.0%. I pay € 1,104 per month (mortgage repayment and interest), totalling € 397,440 over 30 years.] I give this bank permission to view the details of my payment account(s) at my own bank(s).
Choice 3 Mortgage from **a technology company**. The mortgage interest rate is 2.8%. I pay € 1,232 per month (mortgage repayment and interest), totalling € 443,520 over 30 years. I give this company permission to view the details of my payment account(s) at my own bank(s).

[4 random groups]
Lastly, what do you choose?

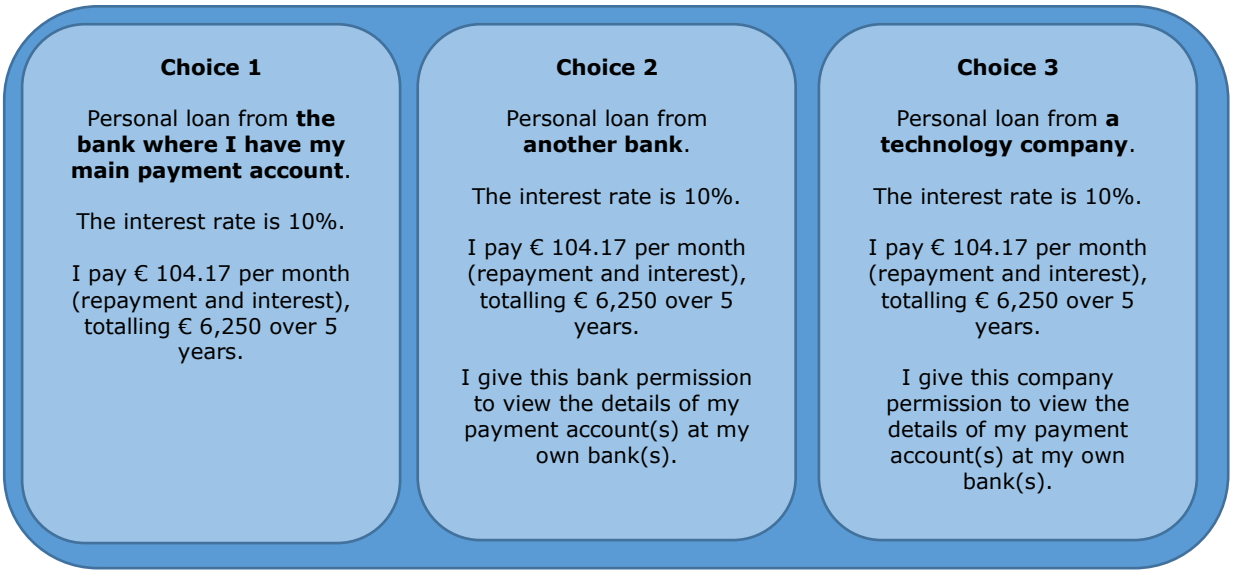
Choice 1 Mortgage from **the bank where I have my main payment account**. The mortgage interest rate is 2.8%. I pay € 1,232 per month (mortgage repayment and interest), totalling € 443,520 over 30 years.
Choice 2 Mortgage from **another bank**. The mortgage interest rate is 2.8%. I pay € 1,232 per month (mortgage repayment and interest), totalling € 443,520 over 30 years. I give this bank permission to view the details of my payment account(s) at my own bank(s).
Choice 3 Mortgage from **a technology company**. [*if drandom=1:* The mortgage interest rate is 2.6%. I pay € 1,200 per month (mortgage repayment and interest), totalling € 432,000 over 30 years. */if drandom=2:* The mortgage interest rate is 2.4%. I pay € 1,168 per month (mortgage repayment and interest), totalling € 420,480 over 30 years. */if drandom=3:* The mortgage interest rate is 2.2%. I pay € 1,136 per month (mortgage repayment and interest), totalling € 408,960 over 30 years. */if drandom=4:* The mortgage interest rate is 2.0%. I pay € 1,104 per month (mortgage repayment and interest), totalling € 397,440 over 30 years.] I give this company permission to view the details of my payment account(s) at my bank(s).

A.3. Account information services for a personal loan

Say you want to take out a personal loan of € 5,000. You repay the amount within 5 years and borrow at a fixed rate of interest.

You can choose from different providers. As well as the bank where you have your main payment account, you can also choose to take out a personal loan from another bank or a technology company such as Amazon, Apple, Facebook and Google. With your permission, they can view the details of your payment account(s) at your bank(s). The providers are licensed and supervised.

What is your choice?



[4 random groups]
v5b What is your choice now?

Choice 1 Personal loan from **the bank where I have my main payment account**. The interest rate is 10%. I pay € 104.17 per month (repayment and interest), totalling € 6,250 over 5 years.
Choice 2 Personal loan from **another bank**. [*if erandom=1:* The interest rate is 8.5%. I pay € 101.04 per month (repayment and interest), totalling € 6,062 over 5 years. */if erandom=2:* The interest rate is 7%. I pay € 97.92 per month (repayment and interest), totalling € 5,875 over 5 years. */if erandom=3:* The interest rate is 5.5%. I pay € 94.79 per month (repayment and interest), totalling € 5,687 over 5 years. */if erandom=4:* The interest rate is 4%. I pay € 91.67 per month (repayment and interest), totalling € 5,500 over 5 years.] I give this bank permission to view the details of my payment account(s) at my own bank(s).
Choice 3 Personal loan from **a technology company**. The interest rate is 10%. I pay € 104.17 per month (repayment and interest), totalling € 6,250 over 5 years. I give this company permission to view the details of my payment account(s) at my bank(s).

[4 random groups]
v5c Lastly, what do you choose?

Choice 1 Personal loan from **the bank where I have my main payment account**. The interest rate is 10%. I pay € 104.17 per month (repayment and interest), totalling € 6,250 over 5 years.
Choice 2 Personal loan from **another bank**. The interest rate is 10%. I pay € 104.17 per month (repayment and interest), totalling € 6,250 over 5 years. I give this bank permission to view the details of my payment account(s) at my own bank(s).
Choice 3 Personal loan from **a technology company**. [*if frandom=1:* The interest rate is 8.5%. I pay € 101.04 per month (repayment and interest), totalling € 6,062 over 5 years. */if frandom=2:* The interest rate is 7%. I pay € 97.92 per month (repayment and interest), totalling € 5,875 over 5 years. */if frandom=3:* The interest rate is 5.5%. I pay € 94.79 per month (repayment and interest), totalling € 5,687 over 5 years. */if frandom=4:* The interest rate is 4%. I pay € 91.67 per month(repayment and interest), totalling € 5,500 over 5 years.] I give this company permission to view the details of my payment account(s) at my own bank(s).

Appendix B. Summary statistics

Table B.1. Summary statistics demographic and trustvariables

Variable	Obs	Mean	Std. Dev.	Min	Max
Trust in other people	2,627	0.54	0.50	0	1
Trust in one's most important bank	2,627	3.41	0.72	1	5
Trust in another own bank	1,221	3.27	0.68	1	5
Trust in other banks	2,627	2.76	0.72	1	5
Trust in BigTechs/social media companies	2,627	1.88	0.72	1	5
Trust in supermarkets	2,627	2.53	0.81	1	5
Trust in online stores	2,627	2.29	0.77	1	5
Difference in trust: other banks	2,627	-0.65	0.81	-4	1
Difference in trust: BigTechs/social media companies	2,627	-1.53	0.90	-4	2
Difference in trust: supermarkets	2,627	-0.89	0.99	-4	2
Difference in trust: online stores	2,627	-1.12	0.95	-4	2
Male	2,627	0.51	0.50	0	1
34 and younger	2,627	0.14	0.35	0	1
Between 35 and44	2,627	0.13	0.34	0	1
Between 45 and 54	2,627	0.17	0.37	0	1
Between 55 and 64	2,627	0.20	0.40	0	1
65 and above	2,627	0.36	0.48	0	1
Education: bachelor or higher	2,627	0.37	0.48	0	1
Good knowledge of PSD2	2,627	0.20	0.40	0	1
Income: EUR 1150 or less	2,627	0.09	0.29	0	1
Income: EUR 1151-1800	2,627	0.15	0.36	0	1
Income: EUR 1801-2600	2,627	0.25	0.43	0	1
Income: more than EUR 2600	2,627	0.51	0.50	0	1
Homeowner	2,627	0.72	0.45	0	1
Degree of urbanisation	2,627	3.03	1.32	1	5
Region north	2,627	0.11	0.32	0	1
Region east	2,627	0.22	0.42	0	1
Region south	2,627	0.24	0.43	0	1
Region west	2,627	0.42	0.49	0	1

Source: CentERpanel, August 2019.

Note: Descriptive statistics of the demographic and trust variables used as explanatory variables in the regression analyses, based on the information from 2,627 respondents from whom we have information on all explanatory variables. Information on trust in another own bank is only available for respondents with more than one bank. Trust in social media companies is proxied by trust in BigTechs, which often have their roots in social media.

Appendix C. Trust in payment service providers

Table C.1. Ordered probit estimates explaining respondents' trust in PSPs

	Own most important bank	Other own bank	Other banks	BigTechs	Online stores	Supermarkets
Victim financial crime	-0.131	-0.088	-0.021	-0.119	-0.129	-0.090
	(0.074)	(0.109)	(0.074)	(0.074)	(0.073)	(0.072)
Trust in other people	0.342***	0.505***	0.597***	0.424***	0.551***	0.510***
	(0.046)	(0.0708)	(0.047)	(0.046)	(0.045)	(0.045)
Good knowledge of PSD2	-0.013	-0.082	0.108	-0.077	0.085	-0.087
	(0.056)	(0.079)	(0.057)	(0.056)	(0.0552)	(0.055)
Male	0.069	0.134*	0.058	-0.026	-0.013	-0.017
	(0.045)	(0.068)	(0.045)	(0.045)	(0.044)	(0.044)
Between 35 and 44	-0.0305	-0.101	-0.029	-0.054	0.012	0.015
	(0.084)	(0.140)	(0.086)	(0.083)	(0.084)	(0.083)
Between 45 and 54	-0.248**	-0.163	-0.155	-0.237**	-0.246**	-0.165*
	(0.080)	(0.136)	(0.082)	(0.079)	(0.079)	(0.079)
Between 55 and 64	-0.125	-0.174	-0.263***	-0.352***	-0.392***	-0.247**
	(0.077)	(0.130)	(0.078)	(0.076)	(0.076)	(0.076)
65 and above	-0.019	-0.073	-0.471***	-0.498***	-0.623***	-0.379***
	(0.070)	(0.120)	(0.026)	(0.070)	(0.070)	(0.069)
Education: bachelor or higher	-0.068	-0.097	-0.018	-0.151**	0.033	0.040
	(0.048)	(0.071)	(0.049)	(0.048)	(0.048)	(0.047)
Income: EUR 1151-1800	0.179	0.135	0.042	0.025	0.042	-0.051
	(0.092)	(0.159)	(0.092)	(0.092)	(0.091)	(0.090)
Income: EUR 1801-2600	0.162	0.112	0.235**	-0.020	0.040	-0.076
	(0.086)	(0.143)	(0.0861)	(0.086)	(0.085)	(0.084)
Income: more than EUR 2600	0.139	0.176	0.206*	0.036	0.085	-0.018
	(0.083)	(0.138)	(0.083)	(0.082)	(0.082)	(0.081)
Homeowner	-0.043	-0.012	0.088	-0.008	-0.096	-0.123*
	(0.055)	(0.090)	(0.055)	(0.055)	(0.054)	(0.054)
Degree of urbanisation	-0.021	-0.044	-0.037*	-0.002	-0.013	-0.040*
	(0.018)	(0.028)	(0.018)	(0.018)	(0.018)	(0.018)
Region north	-0.053	-0.049	-0.083	0.0290	0.003	-0.051
	(0.077)	(0.118)	(0.078)	(0.076)	(0.076)	(0.075)
Region east	0.001	-0.021	-0.134*	-0.044	-0.085	-0.053
	(0.059)	(0.091)	(0.060)	(0.059)	(0.059)	(0.058)
Region south	-0.024	-0.129	-0.119*	-0.028	-0.029	-0.075
	(0.058)	(0.086)	(0.058)	(0.058)	(0.057)	(0.056)
Observations	2,627	1,221	2,627	2,627	2,627	2,627
Pseudo R^2	0.02	0.03	0.06	0.03	0.06	0.03
Log Likelihood	-2711.1	-1175.3	-2606.0	-2693.4	-2818.5	-2968.8

Note: The number of observations ranges between 1221 for other bansk and 2627 for the other PSPs. The table reports parameter estimates for ordered probit regressions in all columns with *Trust in PSP j* as dependent variable. This variable ranges from 1(very little trust) to 5 (very much trust). Robust clustered standard errors on household level are between parentheses. * p<0.05, ** p<0.01, *** p<0.001. Marginal effects are available on request.

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