

Can a nudge make debtors budge? Four Field Experiments on Payment Reminders

Andris Saulītis

Thesis submitted for assessment with a view to obtaining the degree of Doctor of Political and Social Sciences of the European University Institute

Florence, 3 February 2020

European University Institute Department of Political and Social Sciences

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Examining Board

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Abstract

Can a nudge make debtors budge? Four Field Experiments on Payment Reminders

This dissertation tests various messaging strategies to improve debt repayment among overindebted individuals. In order to do so, I carry out four field experiments in cooperation with a credit management company in Riga, Latvia. I examine the effects of personalizing a message, social norm, reputational concerns, public goods, framing, sequencing, salience, as well as the effect of communication on payment rates. The field experiments explore how debtors respond to these messages at different stages of the debt-recovery process (those who have already defaulted; those on a debt-repayment plan), on various types of debts (consumer debts; hospital debts) and through various communication channels (email; mobile text messages; regular mail).

Chapter 2 provides insights on debt repayment from the perspectives of rational choice theory, behavioural economics and the field of cognitive psychology. The chapter provides the theoretical framework for the experiments and sets out several hypotheses. Chapter 3 explains the methodology behind the experiments. It includes a description of the setting, design, treatments and other common properties of the experiments presented in the thesis.

The remaining four chapters are devoted to analysis from each of the experiments. The sample for the experiment presented in Chapter 4 consists of 24,950 defaulted individuals with consumer debts. The intervention was delivered via mobile text messages and emails. Chapter 5 reports on an adaptive–randomized trial with 4,821 defaulted consumer debtors. The intervention was delivered via regular mail. The 9,196 debtors for the experiment reported in Chapter 6 differ from the previous two experiments with the type of debts. All of the debtors in the sample have unpaid bill to a public hospital. It gives the possibility to compare the effect of nudges on debts with private and public institutions. The intervention was delivered via mobile text messages and emails. Chapter 7 focus is on 2,497 consumer debtors who have already started to pay back the debt instead of being in a status of default. The intervention was delivered via mobile text and email.

The experimental results reveal that a simple act of communication reminding a debtor of a debt is effective only among defaulted consumer debtors. Also, there is no effect for a reminder referring to a social norm, public good or reputational concerns. At the same time, personalization of a message improves the payment rate among defaulted individuals with hospital debts. The same is true for consumer debts if the loan value is less than \in 150. Overall, the four field experiments present evidence that defaulters are acting in accordance with the rational model. On the other hand, individuals are punishing the lender if they consider the debt-collection as too aggressive or unjust. For this reason, some of the nudges have a negative effect. Particularly, sending a message to a defaulted individual in a red envelope significantly decreases the payment rate. The data also suggests that, among individuals on a repayment plan, sending a reminder has a negative effect because of the costs of annoyance, evoking psychological reactance.

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Abbreviations and Acronyms

ATE	Average Treatment Effect
CACE	Complier Average Causal Effect
CMS	Credit Management Services
ІТТ	Intention-to-Treat Effect

The glossary of control variables for the regressions used in the experiments can be found in Appendix 3.2.

1. Introduction

Until not so long ago – the middle of 20th century – having an unpaid debt was a criminal offence in many countries. Back then, defaulters had just two choices: flee or be imprisoned (Peebles 2012; B. H. Mann 2009).¹ Today, European defaulters do not face criminal charges for unpaid debts. For debtors without any property to claim against, the only way to make people pay is to convince them that it is the right thing to do.

The focus of this thesis is on defaulters – particularly, resilient defaulters – and their behaviour. In order to carry out the research, I collaborated with a credit management services (CMS) firm—that is, a debt collection agency—in Riga, Latvia.² We designed several field experiments on defaulted individuals with debts from private and public institutions. At no point did I have to convince the representatives of the CMS firm that any of the treatment texts, i.e., the subtle nudges, had the potential to change the behaviour of the defaulted. Indeed, I noticed that debt collectors share a strong belief that the primary logic underpinning the behaviour of most defaulters is not *capacity*, captured in the famous title of Dario Fo's play—*Can't Pay, Won't Pay.* From the perspective of a debt collector, it is not liquidity constraints that cause most people to remain in financial default. Instead, the unwillingness to pay is driven by self-interest.

¹ The former option has a notable place in the history of Riga. Latvians are very proud of the fact that the famous German composer Richard Wagner lived in Riga at the end of 19th century. Unfortunately, his residence was short after several years, Wagner was forced to flee to London to escape debt collectors, never to return to Riga. To this day, this story of Wagner and his solution to the problem of over-indebtedness remains very popular among Latvians. ² The colloquial term "debt collector" is nowadays seldom used in the industry; firms now prefer to refer to their business activities as "credit management services", while debt collectors are known as "credit servicers".

CMS firms address unwillingness to pay mainly with various ways that increase the 'annoyance costs' related to the unpaid debt. In other words, credit servicers rely on a repeated communication with a defaulter, regularly reminding him or her about an unpaid debt in the hope that this the payment will be forthcoming. As such, communication is the primary tool of debt collection. Defaulters and credit servicers are radically opposed to the nature of this communication. The former often express deep dissatisfaction in their interactions with credit servicers. They feel threatened and treated impersonally or aggressively (Mind 2008, 16; Nettleton and Burrows 2001; Papamichai and Mizamidis 2015, 111; Walker et al. 2013). In many cases, debtors choose to abstain from communicating with credit servicers rather than cooperating (see, for instance, R. J. Mann and Porter 2009; Thorne and Anderson 2006). CMS companies, on the other hand, resent that their practices are demonized by the media, as threats are rarely used (Deville 2015; Pal 2017).

The research on CMS practices reveals that the narrative employed by credit servicers in communication with defaulters is distinctive. Credit servicers address debtors in emotional and psychological terms, rather than engaging the physical person, who is no longer at risk of being imprisoned. Paul Rock — the author of the first thorough study on CMS companies —emphasizes that defaulters, from the perspective of CMS companies, are redeemable and conditional deviants (Rock 2013 [1973]). The credit servicers perceive their role as protecting defaulters from falling into the irreversible degradation that comes from complete insolvency. Credit servicers thus cast themselves as providers of assistance and guidance on how to return "to the normal, moral community" (Rock 2013 [1973], 7). They emphasize cooperation, choice and belonging to a community "founded on shared conceptions of honour, trust and reciprocity" (Rock 2013

[1973], 101). At the same time, as Rock notes, "this idea of a moral community is intimately connected with the reluctance of the enforcement machine to confer stigma on debtors" (2013 [1973], 101).

A study by the sociologist Joe Deville (2015) demonstrates that the practices of credit servicers have remained the same over recent decades. Deville notes that the collection letter is an attempt to "successfully 'resonate' with the reader" (Deville 2015, 152). The content ranges from "the explicitly to the implicitly threatening, from attempts to elicit self-governance, to attempts to impose a worldview on the debtor, to raising and lowering the affective intensity of the letter" (Deville 2015, 152).

What is the real reason behind an individual's changes of heart and decision to start to making payments on a debt she has defaulted on, often a long time ago? A self-interested individual would avoid paying a debt as long as possible. Given this, strong and effective deterrence mechanisms are necessary to induce people to pay. However, although the legal enforcement mechanisms are highly inefficient even in the most advanced economies (Djankov et al. 2008), the majority of people do pay their debts. From a rational choice perspective, we would expect an individual to pay a debt when he or she has available funds to do so, and nonpayment would curtail future wealth maximization.

A different, but not wholly incompatible explanation is given by the social anthropologist David Graeber. In the opening pages of his book *Debt: The First 5,000 Years*, Graeber notes that almost everywhere, the majority of human beings consider paying back borrowed money as a simple matter of morality (Graeber 2011). In other words, next to self-interested-behaviour and

wealth maximization, pro-social motives can be the underlying mechanism by triggering the socalled warm-glow feeling. This is the added utility – ranging from the enjoyment of gratitude and recognition to the avoidance of shame and guilt – that comes from giving (Andreoni 1990; 2006). While Andreoni's model of warm-glow giving originates from studies of philanthropy and public goods, it also prevails in credit markets (see Chemin and de Laat 2013).

To my knowledge, there is no robust empirical data (i.e., causal evidence) on which of the three behaviours – self-interested, rational, pro-social, or some combination thereof – prevails in the collection of debt. In order to study the underlying motives for paying a debt, I use a series of field experiments. I send various randomly assigned and differently worded text messages from a real-world CMS firm to actual defaulters. Overall, I examine the behaviour of more than 40,000 defaulters with consumer (banks, payday loans, etc.) or public debts (state hospitals). The goal of the study is to identify the most effective ways of addressing defaulted individuals with non-performing loans with various types of debt to trigger behavioural change.

In the remaining part of this introduction, I first describe the context of my research and explain why Latvia is a good case for the study, and detail the rationale of the sample for the experiments. Second, I define the meaning of the term *nudge*, which is my instrument, and the experimental methodology with which my hypotheses are tested. Third, I describe the overall structure of the thesis.

1.1. The focus: defaulted debtors and credit servicers

The question of how to decrease the number of defaulters is highly relevant, as nearly one in ten European households is in arrears on mortgage or rent, utility bills or a hire-purchase (Eurostat 2019). Although the rates of defaulters differ significantly between countries, ranging from 3% to over 45%, on average, defaulting among European households is relatively common. In Latvia, the rate is 14%, the highest among the Baltic countries, and well above the European average of 9% (see Figure 1.1).



Figure 1.1 Share of households in arrears, EU-28, 2016

Note: Arrears in terms of mortgage or rent, utility bills, or hire-purchase. Source: Eurostat, 2019 Another reason that studying defaulters is relevant in the current economic situation is that European households – especially Latvian ones – are highly exposed to the risk of default. Saving rates have been in a constant decline among Europeans for at least two decades (see OECD n.d.). Since 2011, Americans have saved more than their European peers (see Figure 1.2), although the United States has long been thought of as a nation that does not save (Garon 2011). The saving rate among Latvian households has been continuously negative, except in 2008 and 2009 when it reached the European Union average (see Figure 1.2). In other words, Latvians eschew saving, tending to live on credit. When faced with the problem of making ends meet, the most popular choice among Latvians is to take another loan (FKTK 2014, 34).



Figure 1.2 Household saving rates in the United States, the EU and Latvia, 1999–2016

Source: OECD, 2018

The debtors covered by my field experiments defaulted during the crisis of 2008 and in its aftermath. The escalating decline in household savings and the widespread over-indebtedness are the result of the Latvian government's fiscal policy in the 15 years since the country joined the European Union in 2004. From this time, credit growth and capital inflows in the Baltics (i.e., Latvia, Lithuania and Estonia) has exceeded that of other Central and Eastern European economies (Purfield and Rosenberg 2010, 4–5). Over this period, economic growth was driven mainly by massive foreign investment in non-exporting industries and on debt-driven consumption of foreign goods (see Blyth 2013, 204–12; Toporowski 2011, 238–40). As a result, once the global financial crisis hit in 2008, Latvia's GDP growth fell from positive double digits in 2008 to minus 18% points in 2009 (Erbenova, Liu, and Saxegaard 2011).

In such circumstances, the most widespread practice among governments is to devalue the national currency. Latvian politicians, however, opted for a more radical approach. They embarked on an experiment, implementing so-called "internal devaluation". Instead of devaluing the currency, the government dramatically decreased public sector spending and drastically drove down wage levels (Purfield and Rosenberg 2010; Sommers 2018). The severity of the economic crisis was staggering. The burden of the crisis was thus placed on households, instead of banks who would forfeit the value of their loans under a policy of currency devaluation. The share of non-performing Latvian household loans peaked soon after (Erbenova, Liu, and Saxegaard 2011). In 2008, around 20% of loans were not paid on time, well above the European Union average of around 10% (see Figure 1.3).



Figure 1.3 Households in arrears (mortgage or rent, utility bills or hire-purchase) 2010–2017

Nearly a decade after the crisis, the share of Latvian households in arrears has decreased. Balance sheets of Latvian banks in terms of non-performing loans have improved as well (FKTK 2017). However, rather than being an indicator of the improved ability of households to pay their debts, it has been driven by the expansion of the CMS industry and an increased current role for the same within credit markets. Under constant pressure from regulators to get non-performing loans off balance sheets (Pal 2017), banks have been all-too-willing to sell them at a discount to CMS firms, who then take sole ownership of that debt. Credit servicers then take responsibility for chasing defaulters, relieving banks of toxic debts.

In sum, defaulting has become a part of Latvian households' standard economic behaviour. It is the consequence of over-indebtedness, which—through easy access to loans and

Source: Eurostat, 2019

the internal devaluation of the currency in the last 15 years—has come to affect more and more households. Today, most defaulters are pursued by CMS companies rather than the institutions from which the debt originated. Rather than enacting legal enforcement mechanisms, credit servicers rely on the assumption that defaulted individuals can be convinced to pay back the debt, mostly by persuasion.

In Latvia, it is estimated that CMS firms are able to retrieve only 14% of the debt value they are managing (Dzedulis 2015). The sample given to me by the CMS company I cooperated with is very particular. These debtors have been on the CMS company's books for quite a while and have received at least one generic reminder on a debt. The first three experiments of this thesis deal with individuals, who have not changed their behaviour after receiving a generic reminder and remained in a status of default. The fourth experiment of this thesis deals with individuals, who have changed their behaviour after receiving a generic reminder and have agreed to a monthly debt-repayment plan.

1.2. The approach: nudges and randomized trials

The term 'nudge' was coined by Richard H. Thaler and Cass R. Sunstein in their famous book *Nudge: Improving Decisions about Health, Wealth, and Happiness* (Thaler and Sunstein 2008). Nudges are involved in designing behaviourally-informed 'choice architecture': "the context in which people make decisions" (Thaler and Sunstein 2008, 3). The function of a nudge is to draw attention to a particular piece of information or social cues in order to trigger a behavioural change (John et al. 2011, 9–20). The idea is not new, as from cognitive psychology we have long

known of the potential to enact behavioural changes by changing the social context in which the action is taking place (Dolan et al. 2012).

According to Wendel (2016), not all reminders qualify as nudges. Only when the design of the choice architecture is grounded in theory, as well as being empirically tested with an intention to change behaviour, can we argue that individuals were nudged. The explicit goal for behavioural change of nudging makes it ethically questionable: can individuals be nudged? Indeed, nudges can activate automatic behaviour – for instance, by offering a default choice, which is preferred by the designer of the choice architecture. In this case, nudging pushes individuals in a particular direction. Although individuals can still opt-out (i.e., they still have a choice under the choice architecture design), only a few will do so due to the behavioural biases (Abdukadirov 2016a). An alternative – and more ethical – strategy is to nudge individuals with the aim of opening a space for individuals to rethink their options and consider what is best for them (Soman 2015, 108–10).

The interventions deployed in the research are the nudges of the latter sense. I remind individuals of the choice they have before them (either to pay or remain in a status of default), focusing their attention to one or the other aspect of the context in which the decision between those choices is to be taken. As such, my texts are nudges designed to budge. At the same time, once the messages in my field experiments are sent, I allow the debtors to make a deliberate decision on their own. If the debtor agrees to pay the debt, the decision has to be reapproved by him or her at least twice. First, the payment must be set up. Second, it has to be confirmed. Of course, I intervene in none of these steps. I do not push individuals in one direction or the other. I simply nudge.

1.3. The thesis: plan and structure

The reminders examined in this thesis follow "best practice" for the design of potentially effective nudges in the field of finance and consumer behaviour, as laid out by behavioural studies (see Abdukadirov 2016b; Floyd and List 2016). First, I review the relevant literature to develop the hypotheses to be tested. This is done in Chapter 2, which is devoted to the theory of my study. I identify self-interest, rational and pro-social behaviour as underlying motives for repaying debt. In order to do so, I discuss the seminal works in the field of economy, taxation, cognitive and behavioural sciences. At the end of the chapter, I also consider the effect of a reminder and how it can influence payment on a debt.

In Chapter 3, I lay out the design for the experiments to examine the developed hypotheses in a natural setting. I implement an experimental methodology as the most effective way of examining the causal effects of behavioural change (Angrist and Pischke 2014; Gerber and Green 2012; John et al. 2011, 27–42; Soman 2015, 113–31). That is, I randomize individuals among the control and treatment groups in order to identify the causal effect of a nudge. Nevertheless, I am aware of the pitfalls of the randomized controlled trials. Any study, including experimental one, should focus on *why* something works instead of *simply reporting* what works (Deaton and Cartwright 2018). Although this thesis places considerable weight on the significance testing of the trial results and treatment effects, I also try to understand a broader question: what

is the behaviour of defaulted individuals and under what circumstances will they change their behaviour and pay?

Chapters 4 to 7 report on each of the field experiments. In Chapter 4, I send reminders via both mobile text messages and emails to defaulted individuals with consumer loans. In Chapter 5, I also examine the behaviour of individuals with consumer loans, but only among those, who were unreachable via SMS and emails in the experiment of the previous chapter. The experiment presented in Chapter 5 is the only one in which interventions are delivered via regular mail. In all other experiments, I deploy digital channels, i.e., SMS and emails.

In Chapter 6, I examine my hypotheses in a gradually different setting, as individuals in the sample have debts with public hospitals. Chapter 7 focuses again on individuals with consumer loans, the same as in the experiments presented in Chapters 4 & 5. However, in this case, the debtors are on a repayment plan, which they have consented to with the CMS firm. Payment reminders are sent to remind not of a general obligation to repay but of an impending scheduled debt payment.

The structure of each report on the experiment (Chapters 4 to 7) is similar. At first, I lay out the particular setting in which the experiment took place. Then, I explain the specific design and treatments examined, as well as the experimental procedure. I present the results and exploratory analysis at the end of each chapter. The thesis concludes with a general discussion of the results from all four experiments.

2. On Reasons People (Do Not) Repay Their Debts

Under what circumstances and for what reasons do debtors repay or choose to default on debts they have taken out? In this chapter, I review the underlying motives for repaying debt. I show that paying a debt might be a rational thing to do, but, at the same time, it can also be grounded in pro-social behaviour. In other words, rationality and pro-social motives can be complementary. At the same time, the motive of paying—or, alternatively, defaulting—can be driven by raw selfinterest. It is still a rational decision: self-interest behaviour occurs when defaulting is less costly than paying the debt. However, the decision to default in this case is never a pro-social one. In other words, self-interest and pro-sociality can never be complementary.

There are also the non-informative dimensions, which can affect payment behaviour. I focus on the effects of sequencing, framing and salience, based on the scholarship in social cognition and work on the dual system theory. Lastly, I discuss the effect of a reminder. I show that a reminder has the potential to effectively solve the limited attention problem as the cause for default.

The literature review in this chapter is complemented with empirical studies. They range from qualitative inquiries to experimental research, from studies in finance and tax collection to cognitive psychology. Taken together, these literatures provide me with broad insights on customer behaviour in financial markets. More importantly, they offer the possibility to develop several hypotheses, as well as define the control group for the experiments: a generic reminder.

2.1. Rational choice theory

In his seminal work *Crime and Punishment: An Economic Approach* (1968), Gary S. Becker notes that the reasons for delinquency are based on the expected probability of being punished for wrongdoing, as well as on the severity of the punishment. The smaller the likelihood of being caught, the higher the willingness to commit an illegal act. In the same manner, the higher the expected fine, the lower the likelihood an individual will commit a wrongdoing.

Becker's model has been applied in a related field to debt repayment: tax collection. The standard model of tax evasion (Allingham and Sandmo 1972; Srinivasan 1973) predicts that tax compliance is increased by, first, income, second, audit probability and, third, the penalty rate. In financial markets, the probability of defaulting on a debt is linked to related aspects. The willingness to default on debt depends on income, debt amount and collateral requirements, as well as on the price of non-compliance (see Jaffee and Russell 1976; Stiglitz and Weiss 1981). It includes all the fees and fines for delinquency, as well as the expected costs of borrowing in the future.

Based on these works, researchers have distinguished between two different selfexclusive reasons why individuals do not keep up with their payments. One is called 'economic default', which stems from liquidity constraints. The other is called 'strategic default', when an individual has sufficient funds to cover the payment on the debt, but still defaults. It is driven by self-interest and occurs when paying the debt is more costly than defaulting. Both kinds of default have different determinants, which I describe in the following sections.

Economic default

Severe economic crisis, job loss, and sudden illness are examples of reasons debtors face economic default. For instance, in the United States, a large share of personal bankruptcy filers cites medical causes as the reason for default (Sullivan, Warren, and Westbrook 2001). Medical expenses are not a common reason to file for bankruptcy in Europe, however. Here, the most common reason for default is unemployment (Frade and Lopes 2009, 252). Also, divorced individuals are overrepresented among bankruptcy filers both in the United States and Germany (Backert et al. 2009; Warren and Tyagi 2004).

Besides external shocks — such as those already mentioned — economic default can occur because of limited financial resources. A lack of savings and a high amount of debt leads to a high risk of economic default. In a cross-cultural study on credit card use by Ronald J. Mann (2006), a strong and significant relation was found between the rate of credit card debt per capita and the number of bankruptcy filings. The higher the credit card use, the greater the number of bankruptcies, even controlling for unemployment and other economic variables. On the other hand, limited access to credit services can cause economic default (Bucks 2012). It might be one of the reasons why poor households—which typically lack access to credit—are more exposed to the risk of default, as they do not have ready access to extended credit.

To sum up, the reasons for economic default vary from external shocks (such as economic crisis and sudden illness) to the mismanagement of household finances, resulting in a lack of savings and extensive borrowing. The individual simply does not have sufficient funds to cover the current expenses, and economic default occurs despite an underlying willingness to pay.

The assumption that debtors do not fulfil their obligations because of liquidity constraints is taken into account in the field experiments of this thesis. These are identified by creating an experimental condition, in which individuals do not receive any kind of reminder. As these debtors are not receiving any stimulus from the CMS firm on debt repayment, it can be effectively argued that the payment, if any, is made because the liquidity constraints have been solved.

Strategic default and self-interest

Under the strategic default assumption, the reason debtors fulfil their duties towards the borrowers is desire to maximize wealth. Paying back the debt is more profitable than defaulting. When the opposite is true, the debtor does not pay. Michael J. Seiler considers that strategic default represents as much as 26% of all the defaults in the United States (Seiler 2015, 49). Another observational study found that more than 38% of American households in default would have been able to make their payments without reducing their consumption (Gerardi et al. 2018).

When a debtor does not pay, there is, as it were, a price to pay. It includes both the fine for missing payment and (possibly) additional collection fees. As noted before, an effective punishment should prevent a debtor from defaulting. The mere existence of punishment is sufficient enough to be effective. The fear of being punished for free-riding behaviour has been proved to be an effective mechanism for increasing cooperation among individuals in general welfare/public good games (Fehr and Gächter 2000). The fear of punishment as a preventive mechanism for delinquency *can* work as a mere threat and does not have to be executed to have an effect (Gächter, Renner, and Sefton 2008). It is like the sword of Damocles hanging above the head of a borrower.

Many field experiments in tax collection have found that priming individuals with messages of audit probabilities has a positive effect on self-reported income (Dwenger et al. 2016; Fellner, Sausgruber, and Traxler 2013; Hasseldine et al. 2007; Kleven et al. 2011). However, other field experiments on tax compliance have provided more ambiguous evidence. For instance, a letter saying that the filer's tax submission will be 'closely examined' had mixed effects on Minnesota taxpayers (Slemrod, Blumenthal, and Christian 2001). While such a message increased the reported income among low and middle-income groups, it fell sharply among the high-income treatment group. Heterogeneous effects of audit on tax compliance have been found in a study by Bergman and Nevarez (2006). In their study, audits had a negative effect on deviants, at the same time fostering fulfilment among those prone to compliance. As suggested by the authors, the reason for increased non-compliance among the cheaters is the necessity to compensate for the incurred costs because of the audit in the past.

Another interesting case is the field experiment by Harju et al (2013) in which two different audit probabilities were examined. While low audit probability (5%) did not significantly improve the reported turnover to tax authority among the small businesses, among the high audit probability (33%) treatment the reported turnover was significantly higher. Like the study above by Bergman and Nevarez (2006), it suggests that individuals are taking into account the probabilities of being caught and make calculations according to the rational choice model. In addition to an immediate increase in borrowing costs for the defaulted debt, noncompliance increases the borrowing costs in terms of higher interest rate on future loans. The level of interest rate on a loan has long been one of the most important aspects in credit markets. It is not driven purely by credit demand (the more borrowers there are, the higher the interest rate). First, it acts as a screening device. Excessive interest rates increase the relative attractiveness of riskier projects among the pool of borrowers, thus increasing the aggregate risk of default (Stiglitz and Weiss 1981). An optimal interest rate helps the lender distinguish between bad and good borrowers. As such, it addresses the adverse selection problem of information asymmetry in credit markets between the lender and the borrower (Jaffee and Russell 1976).

Second, interest rates have been found to be a significant factor influencing debt repayment. A field experiment by Karlan and Zinman (2009) examined the effect of strategic default among high-risk borrowers from one of the largest microlenders in South Africa. The experimental design randomized the offered interest rate for the loan and the interest rate on future loans for those individuals paying the debt on time. Additionally, half of the borrowers who accepted the offer were given an interest rate lower than the one initially offered. As such, the design allowed the researchers to capture whether the default was based on *adverse selection* (i.e., borrowers with a higher risk of default will accept a higher interest rate) or *moral hazard* (i.e., the higher cost of the loan makes default more appealing). The results of the experiment found no strong evidence of adverse selection as a reason for default. Moral hazard, instead, explains 13–21% of defaults.

One of the most popular ways of setting the optimal interest rate is by using historical data on the debtor's behaviour. Credit scoring systems measure an individual's ability to repay a debt in the future, setting the optimal interest rate and borrowing conditions (McNab and Taylor 2008; Thomas 2009). Credit scores signal the level of trustworthiness of the borrower. The drop in credit score that can be expected in case of default is a strong incentive to keep up with the payments and deters individuals for applying for bankruptcy (Daglish 2009, 691). Its existence decreases the delinquency rate in debt repayment, mitigating the risk of default (Brown and Zehnder 2007; Cornée, Masclet, and Thenet 2012).

A credit scoring system quantifies the individual's reputation. As such, it fosters both savings and debt repayment. In a laboratory experiment by Fehr and Zehnder (2009), participants were more likely to fulfil their debt obligations when information on their past behaviour on repayment was shared among the lenders than under strict legal enforcement conditions. Exposure to reputational costs promoted the fulfilment of financial commitments in a field experiment with savings in India (Breza and Chandrasekhar 2019). Currently, there is little field experimental evidence for the effect of reputational concerns on debt repayment, but the overall effect seems to be positive (see Table 2.1).³ In a field experiment with student loan holders in the United States (Homonoff, OBrien, and Sussman 2018), access to the individual credit score triggered lower delinquency rates. In another field experiment with credit cardholders in arrears in Indonesia, payment reminders including reputational prompts were found to be around 10 percentage points more effective compared to a generic reminder (Bursztyn et al. 2019).

³ Table 2.1. includes only studies and treatments that explicitly points to the economic consequences of reputational concerns, leaving out the studies referring to the social consequences of reputational concerns.
However, there are also counterexamples. In a field experiment by Bracha and Meier (2014), a reminder with information on credit score level had a positive effect on increasing the credit score among individuals with a low credit score. At the same time, there was no effect of a reminder on the credit score among mid-score individuals and even negative effect (albeit statistically significant at a marginal level) among high-score individuals. In another study by Karlan et al. (2012), a payment reminder with a message "to have a good standing [sic]" did not have any effect on payment discipline.

Author	Year	Country	Target group and total sample size	Treatment & Control	Treatment effect for the level of late payments
Karlan et al (2012)	2009- 2010	Philippines	Mobile text messages to 1,259 individual microcredit borrowers	Treatment: "To have a good standing, please pay your loan on time." Control: No message	+1%
Bracha & Meier (2014)	2013	USA	Mobile text messages to 386 individual credit card holders	Treatment: "Ur credit score: btwn 680-739. Pay bills on time & at least min amt. Goal: reduce balance." Control: No message	Individuals with low credit score: -4.5%** Mid-score group: +0.03% High-score group: +2.5%*
Homonoff (2018)	2015- 2017	USA	E-mails to 406,994 student loan borrowers	Treatment: Information on free availability of FICO Credit score Control: No message	-9%***
Homonoff (2018)	2015- 2017	USA	E-mails to 406,994 student loan borrowers	Treatment: Economic consequences of FICO Credit score Control: a message that informs on free availability of FICO Credit score	No statistically significant differences
Bursztyn et al (2019)	2015- 2016	Indonesia	Mobile text messages to 6,346 individual credit card holders	Treatment: "Late payments are reported monthly to Bank Indonesia Sistem Informasi Debitur (SID), which all banks consult. This will diminish your ability to get credit in the future." Control: Generic reminder	-10.3%***

Table 2.1. Effects of reputational costs treatment on debt repayment

Notes: ***p<0.01; **p<0.05; *p<0.1.

All experiments delivered messages via mailed letters. Source: Compiled by the author. Overall, these studies complement rational choice theory by identifying the effect of interest rates and reputational concerns on forestalling default. In some contexts, it reaches more than 10% points, while in other cases the effect is close to zero relative both to no message or a generic reminder. These empirical studies do not challenge the assumption of rationality as the basis for decision-making. Instead, they provide further insights that under particular circumstances reputational concerns are significant motive for maintaining payments in order to avoid default. Hence, a **reputational concerns hypothesis** in this thesis examine the effect of credit scoring systems on payment:

H1: Priming individuals to a reputational concern statement increases the payment rate.

The reputational concerns hypothesis is examined in Experiment 2 with regular mail letters. These are being addressed personally to the postal address of an individual, keeping the correspondence and the information of the outstanding debt confidential. As such, the reputational concerns hypothesis enables us to study the impact of *rational* reputational concerns, which are related to the costs of borrowing.

However, could it be that the motive for paying up the debt is not based on calculations of borrowing costs – that is to say, *rational* reputational concerns – but instead on *social* reputational concerns? In other words, how likely it is that underlying intention of paying the debt is a moral rather than an economic one? In the following sections, I address morality and pro-social behaviour as motives for repaying outstanding debt.

2.2. Morality and pro-social behaviour

So far, I have discussed the reasons why individuals keep up with their payments exclusively from the rational choice perspective. However, next to economic calculations and constraints, individuals in markets act in a pro-social manner (Small and Cryder 2016). Credit market transactions are based on broader propositions than explicit goal to rationally maximize economic utility (Eisenberg 2014; Ketelaar 2006; Seiler et al. 2012; Wilkinson-Ryan 2015). For instance, debtors might follow cultural and moral norms, or may base their transaction on a willingness to reciprocate (Fehr and Fischbacher 2006).

Moral concerns and pro-social behaviour forestall individuals from walking away from debt. For instance, in a survey study by Guiso et al. (2013), moral reasons were significant reasons given by respondents for maintaining payments. In particular, a respondent seeing strategic default as immoral was 75% less likely to default on a mortgage even where the value of the property exceeds the equity. However, morality is context-based. In an online experiment by Wilkinson-Ryan (2011), debtors have been found more likely to dismiss strategic default as a moral problem where the loan contract explicitly stated the option of default and its monetary consequences.

On the other hand, moral concerns can also work in other direction and *trigger* individuals to default. Sense of fairness plays an important role in economic decisions (Kahneman, Knetsch, and Thaler 1986). It is well known that under specific circumstances, individuals punish unfair behaviour even to the extent of their own material cost (Eckel and Grossman 1996; Czura 2015).⁴ The contract between lender and borrower is one in which emotions—especially a sense of fairness—are important(<u>Kilborn 2009; Poster 2013. See also Murphy 2008 for the similar role of</u> <u>emotions in tax compliance</u>). During the decision-making process of either to default or not, the borrower takes into account how just or ethical the lender is. The probability of walking away from debt is minimized if the borrower considers the actions of the lender to be fair.

This view is supported by studies exploring the reasons behind defaults, noting that it cannot be fully explained by the pursuit of wealth maximization or liquidity constraints. Using data from the Financial Trust Survey Index of the United States, Guiso et al. (2013) found that debtors who are angry at banks and believe there should be stricter regulation of the financial sector are significantly more likely to opt for a strategic default. An online survey experiment by Wilkinson-Ray (2011) found similar results, as individuals were more likely to walk away from a loan agreement with a financial institution that has been the beneficiary of substantial government bailout funding, as well with a bank whose aggressive and high-risk lending practices have received prominent treatment in the media.

Hence, rational choice theory cannot fully explain the behaviour of individuals when it comes to the decision to repay debt. In what follows, I review the literature focusing on various

⁴ Fairness does not prevail in every kind of economic transaction. As noted by Fehr and Schmidt (2009), fairness becomes important only under specific economic conditions. When the competing players have no influence on the distribution and price of the goods, fairness will not play a significant role and actors will act in a selfish manner. This is evident in most markets for goods. In these contexts, consumers do not have any power to set prices or determine the outcome of the transaction. The opposite is true in markets where individuals are able to choose the amount of effort to invest in the transaction. For instance, in labour markets employees can decide how hard to work for the employer. In such an environment, fairness will play a role in decision-making. As paying off the debt implies an effort by the debtor, it must be considered as a market in which fairness prevails.

aspects of the pro-social behaviour of individuals regards debt repayment. The goal is to identify those behavioural traits which also influences the decisions regards the financial commitments next to rationality and self-interest.

Social distance

Pro-social behaviour is mediated by the social distance between the parties involved in the transaction. In a laboratory experiment on charitable giving by Cryder and Loewenstein (2012), individuals were more generous when the recipient of the money was a single individual rather than a pool of individuals. The authors coined the term 'responsibility effect' to capture this impulse (Cryder and Loewenstein 2012). Their study shows how the effect emerges particularly in one-to-one relationships. The effect is visible also in the credit market. The absence of close ties between lender and borrower increases the risk of default. For instance, in a study by Wilkinson-Ryan (2015), debt transferred to a third party increased the delinquency rate.

Social distance can be decreased – and thus willingness to pay improved – by *personalization*. A study by Haynes et al. (2013) found that personalized messages to non-payers of delinquent fines are superior to a simple reminder. As suggested by Peter John, one of the authors of the study, the effect could be because of expressed interest in a individual's personal circumstances, triggering feelings of relational reciprocity (John 2018, 130).

An alternative explanation is that the effect of personalized message is in its ability to stand out in an environment of multiple stimuli that the one receives daily (Bargh 1982). Still,

evidence from a field experiment by Karlan et al. (2012) with two microlenders in the Philippines, shows that getting attention with self-relevant information in terms of personalization alone does not necessarily trigger a payment on adebt. A personalized message (a reminder dispatched from a loan officer by name) was found to be effective only among those who have borrowed more than once from the bank. At the same time, no effect was found for a reminder with the loan taker's name: neither among first-time borrowers nor those who have borrowed repeatedly.

Hence, it seems that getting attention is not enough to change the behaviour of a debtor. It might be that decision to make a payment is mediated by the trust level between the borrower and the debtor. As noted in a thorough review of tax compliance by Kirchler et al. (2010), the decision on whether to pay taxes depends on the level of trust in the state authorities. In case of low trust, the decision to comply is based on rational choice. Effective enforcement mechanism, including high audit probabilities and fines, are necessary then. In the case of high trust, such an approach can even backfire on collection efforts. In a high-trust environment, cues for pro-social behaviour and emphasis on voluntary compliance based on morality are effective in tax collection efforts.

Another trait of cooperation might stem from the so-called trust responsiveness effect. Individuals are keen to fulfil a promise if the partner expresses explicit trust that the trustee will act accordingly (Bacharach, Guerra, and Zizzo 2007). When the lender trusts the borrower and agrees to provide the credit, the debtor reciprocates with the repayment, thus signalling trustworthiness. As such, trust is assumed to induce the behaviour of repayment, an action that perhaps paradoxically—has also been found to be a precondition for trust to emerge in the first

place (see Gambetta 1990, 234). It also reminds us that the form of reciprocity is conditional: people respond to friendliness with cooperation and to hostility with retaliation (Fehr and Schmidt 2003).

Together with the findings on fairness, trust and reciprocity, the review of social distance effect on debt repayment allows me to propose the following **personalization hypothesis** to be examined in the field experiments:

H2: The debtor's willingness to repay the debt increases when the message to him/her is personalized.

Personalization is examined in three out of four field experiments presented in this thesis. I use various ways of personalizing the message, departing from the design of Karlan et al. (2012) experimental study. In their field experiment with microlenders in the Philippines, the authors examine three modes of personalization. The payment reminder included either the name of the borrower, or the bank manager—or both. I question whether the personalization of a message is effective in decreasing the social distance between the credit servicer and a defaulter, thus triggering an increase in the payment rate.

Social norms

When a majority of individuals pay back their debts for whatever reason, repayment becomes a *social norm*. As noted by Jon Elster, social norms "consist of non consequentialist obligations and interdictions, from which permissions can be derived" (Elster 1989, 101). In a more recent work, he emphasizes that social norms rely on sanctioning mechanisms (Elster 2007). These sanctions are more social than economic in nature.

If over-indebtedness and defaulting on debt is widespread, priming to the social norm can backfire on payment discipline. An experimental study by Trautmann and Vahu (2013) found that solvent borrowers are less likely to repay the debt if other borrowers' repayment capacity is expected to be low. An online survey experiment found a causal relationship between the existence of a social norm and its impact on paying back the debt. Individuals were randomly assigned to either rare or frequent foreclosure condition. In the former, the respondent was informed that the foreclosure rate is 1 in 200 homes, while the latter was primed with a foreclosure rate of 1 in 10 homes. Those primed with a frequent foreclosure condition. This finding is confirmed by observational studies on determinants of strategic default in which the foreclosure rate has a significant effect on the probability of strategic default (Bradley, Cutts, and Liu 2015; Guiso, Sapienza, and Zingales 2013), as well as in a laboratory setting (Brown, Schmitz, and Zehnder 2016).

To my knowledge, no field experiments have yet examined the effect of social norm messaging on debt repayment in credit markets.⁵ However, social norms have been extensively examined in the field of tax collection (Coleman 1996; Fellner, Sausgruber, and Traxler 2013; Dwenger et al. 2016; Hallsworth et al. 2014). Although private (a loan from a bank) and public (tax bill) debts are not the same, both share the underlying notion of liability and therefore are comparable to some extent.

⁵ Cialdini et al. (1991) make a distinction between *descriptive* and *injunctive* social norms. The former "characterize the perception of what most people do", while the latter "refer to norms that characterize the perception of what most people approve or disapprove" (Cialdini, Kallgren, and Reno 1991, 203). In my thesis, I focus on the former kind of social norms.

A review of tax collection field experiments with a social norm as a treatment and payment as the dummy variable of interest suggests that the way a social norm is presented has a radically different effect on debt collection. When social norm statement includes an explicit declaration that delinquent individuals engage in a *minority* behaviour, the effect in increasing repayment among taxpayers is positive (see Table 2.2). When social norm includes only the *basic* statement of what the majority does, the effect in most cases is not significant or even backfires the collection efforts.

A minority norm emphasizes the group identity to which the individual belongs. Wenzel (2005) provides empirical evidence that messages targeting those with a tax liability that emphasize the social norm of paying taxes is effective in cases where the individual concerned has a strong group identity. This explains why the minority social norm is more effective than the basic one. The only field experiment where both the basic and the minority social norm has been examined is Hallsworth et al. (2017). They found that the treatment message with minority social norm was significantly more effective compared to both a generic reminder and the basic social norm (in both cases p<0.001).

In sum, one takeaway from tax debt-collection field experiments is that a minority social norm is the most effective way to increase the payment rate relative to a generic reminder, as well as to basic social norm. This allows me to develop the following **social norm hypothesis**, tested in all four of my field experiments:

H3: Priming to a minority social norm increases the payment rate.

Author	Year	Country	Target group	Rate	Effect	Baseline (Simple reminder)	
FIELD EXPERIMENTS WITH MINORITY SOCIAL NORM TREATMENT							
Kettle et al.	2014	Guatemala	43,387 individuals, who have failed to declare income tax	64.50% pay	1.7%**	11.30%	
Hallsworth et al. (2017)	2011	UK	101,471 individual taxpayers with outstanding bill	9 out of 10 pay	5.1%***	35.80%	
Hallsworth et al. (2017)	2012	UK	101,471 individual taxpayers with outstanding bill	9 out of 10 pay	4.5%***	33.60%	
I	FIELD EX	XPERIMENTS	S WITH BASIC SOCI	AL NORM TH	REATMENT		
Fellner et al. (2013)	2005	Austria	50,498 potential TV license fee evaders	94% pay	-2.3%***	43.10%	
Del Carpio (2014)	2012	Peru	22,318 individual property tax payers	72% pay	2.20%	31.10%	
Castro & Scartascini (2015)	2011	Argentina	23,195 individual property taxpayers	30% does not pay	-0.80%	40.40%	
Dwenger et al. (2016)	2012	Germany	39,782 individual church taxpayers (full sample)	n/a	-0.90%	22.70%	
Dwenger et al. <u>(2016)</u>	2012	Germany	39,782 individual church tax evaders (subgroup)	n/a	-1.5%*	7.65%	
Hallsworth et al. <u>(2017)</u>	2011	UK	101,471 individual taxpayers with outstanding bill	9 out of 10 pay	1.3%**	35.80%	
John & Blume <u>(2018)</u>	2014	UK	11,880 individual council taxpayers	95% pay	-2.43%	47.09%	
John & Blume <u>(2018)</u>	2015	UK	56,568 individual council taxpayers	96% pay	- 5.55%***	43.57%	

Table 2.2 Effects of basic and minority social norm treatments on tax debt collection

Notes: ***p<0.01; **p<0.05; *p<0.1.

All experiments delivered messages via mailed letters.

Source: Compiled by the author.

The public nature of goods

Another important element in pro-social behaviour are outcomes that contribute to general welfare (i.e., the public good). Individually, following a social norm might involve some material cost, but collectively it has the potential for joint gains (Bicchieri 2006). To achieve the joint gain, individuals must believe that the social norm exists, as well as expect that others will act according to the social norm (and vice versa). In other words, cooperation under the social norms is conditional, as individuals will cooperate only if others do so as well.

Gächter's (2014) discussion of human pro-social behavioural motives suggests that only a small number of individuals act in a purely selfish manner. Many laboratory experiments on public good games have provided evidence that conditional co-operators form the majority of individuals (Fischbacher, Gächter, and Fehr 2001; also see Chaudhuri 2011 for a review on this), as well as that the presence of public goods increases tax compliance (Alm, Jackson, and McKee 1993; Becker, Büchner, and Sleeking 1987).

Effective governance of public goods provisions fosters citizen compliance. In the analysis by Frey and Torgler (2007) of a survey data from 30 European countries, including Latvia, a positive correlation was found between institutional quality and tax morale. Another survey data from Nigeria suggest that citizens are more willing to pay taxes if they believe the public money is being spent effectively and services are being delivered (Bodea and LeBas 2016). However, field experiments, which attempt to utilize the message of public goods provision, suggest that it has limited power to persuade individuals or businesses to comply with their tax obligations (see Table 2.3). Only two studies deliver statistically significant effects (Hallsworth et al. 2017;

<u>Hasseldine et al. 2007</u>). Together with the study by Ariel (2012), these are the only studies with treatment effects of public goods message larger than 1% point. At the same time, Ariel's (2012) field experiment suggests that a public good message has the potential to backfire, as one of the dependent variables – the amount of claimed tax return – increased among those who received a letter with a public good message.

Author	Year	Country	Target group and total sample size	Treatment text	Treatment effect relative to a generic reminder
Dwenger et al. <u>(2016)</u>	2012	Germany	39,782 individual church taxpayers (full sample)	Message emphasizing the social benefits of making a payment to the local public good of parish services (and specifically naming the parish the individual belongs to).	0.13%
Dwenger et al. <u>(2016)</u>	2012	Germany	39,782 individual church tax evaders (subgroup)	Message emphasizing the social benefits of making a payment to the local public good of parish services (and specifically naming the parish the individual belongs to).	-0.84%
Bott et al. <u>(2017)</u>	2012	Norway	15,708 individual taxpayers who likely misreported their foreign incomeYour tax payment contributes to the funding of publicly financed services in education, health and other important sectors of society		0.56%
Hallswort h et al. <u>(2017)</u>	2011	UK	101,471 individual taxpayers with outstanding bill	Paying tax means we all gain from vital public services like the NHS, roads, and schools.	1.6%***
Hallswort h et al. <u>(2017)</u>	2011	UK	101,471 individual taxpayers with outstanding bill	Not paying tax means we all lose out on vital public services like the NHS, roads, and schools.	1.5%***
Castro and Scartascini <u>(2015)</u>	2011	Argentina	23,195 individual property taxpayers	Information about the actual use of revenues by the municipality by showcasing investment works.	-0.8%
Ortega and Sanguinetti <u>(2013)</u>	2011	Venezuela	6,000 corporate businesses Informs about policies geared to improving the provision of general public goods and business services.		0.2%
Ortega and Sanguinetti <u>(2013)</u>	2011	Venezuela	6,000 corporate businesses	000 corporateInforms about initiatives regarding000 corporatesocial assistance for the poor andbusinessesthe elderly, and improvements inpublic health services.	
Ariel <u>(2012)</u>	2006	Israel	4,395 corporate businesses	The societal consequences of not paying one's true tax liability and information on how tax dollars were allocated to finance public commodities were listed.	Gross sales: 1.8%; Tax payments: 3.1% Tax deductions: 5.8%** (i.e., negative)

Table 2.3. Effects of public good treatments in the field experiments

Hasseldine et al. <u>(2007)</u>	2001	UK	7,307 sole proprietors	"Most people in this country pay their proper taxes. But even small mistakes by a lot of people can add up to a lot of lost tax and, therefore, less money avail-able for public spending on things like hospitals, schools and pensions."	5.1%**
Torgler <u>(2004)</u>	2001	Switzerland	580 individual taxpayers	"If the taxpayers did not contribute their share, our commune with its 6226 inhabitants would suffer greatly. With your taxes you help keep Trimbach attractive for its inhabitants."	-0.9%
Blumenthal et al. <u>(2001)</u>	1994	USA	60,061 individual taxpayers.	A paragraph with description how income tax dollars are allocated amongst state services in Minnesota and sentence "So when taxpayers do not pay what they owe, the entire community suffers."	0.8%

Notes: ***p<0.01; **p<0.05; *p<0.1.

All experiments delivered messages via mailed letters. Source: Compiled by the author.

As suggested by Luttmer and Singhal (2014), the reason that a public good message does not deliver a strong effect is that individuals update their beliefs on the competence of the government and its ability to provide public services—as well as their overall quality—over their lifetimes. One letter is not powerful enough to change these beliefs and behaviour effectively in many contexts.

However, what if individuals have direct experience of receiving a public good? For instance, while there was no effect for a public good message in a field experiment by Castro and Scartascini (2015), the delivery of public goods had a significant positive correlation with the overall tax compliance across the sample. There is also causal evidence that public goods delivery and visibility is important and carries a positive effect in relation to tax compliance. A study by Gonzalez-Navarro and Quintana-Domeque (2015) used randomly assigned first-time asphalting of streets in Mexico City residential neighbourhoods to examine its effect on property tax payments. They found that tax compliance significantly increased due to the pavement of the roads. Another study by Carrillo et al. (2017) found a similar effect for a randomly assigned construction of sidewalks in a municipality of Argentina. Not only did it have a positive and persistent effect on compliance among the individuals who were awarded the construction of a sidewalk, but significant spillover effects were observed, extending the positive effect to a much broader population.

The proximity of the delivered public service is important in the context of one of my experiments, in which I examine the effect of a public good message on outstanding bill payment with a public hospital. Individuals in the sample for the experiment received the service for treatment in a public hospital. As such, they should be more likely to pay the bill if primed to a public good message relative to a generic reminder. Hence, I have developed the following general welfare or **public good hypothesis**:

H4: Priming to public good messages increases payment discipline among debtors.

Naturally, public good messages cannot be investigated in credit markets when the lender is a private institution. It is only possible where the lender is a *public institution providing public services*. Therefore, I examine the general welfare/public good hypothesis in Chapter 6, reporting on a field experiment with public hospitals in Latvia. The hypothesis is tested via a treatment text that refers to the fact that provision of hospital's services to the public depends on whether the individual has paid the bill for the received treatment. A slightly relevant field experiment in a hospital setting was carried out by Hallsworth et al. (2015). In this study, messages were sent to remind on the scheduled appointment. When the treatment text included the cost of a missed appointment to the National Health Service, it significantly reduced the occurrence of nonattendance.

2.3. Non-informative dimensions

Besides rational and social motives, there is an additional trait influencing the behaviour of individuals. These are the non-informative dimensions that are related to the dual models of the decision-making process. The two ways of reasoning in everyday life have been variously described, among many others, as: 'automatic' versus 'reflective' systems (Thaler and Sunstein 2008), 'affective' versus 'deliberate' judgements (Loewenstein and O'Donoghue 2004) and 'fast' versus 'slow' thinking (Kahneman 2011). The former mode of thinking executes cognitive shortcuts to activate existing scripts and schemata (Bicchieri 2006). The latter reflects the rational choice model.

Many scholars have expressed deep criticism of the broad application of the dual-system theory. They stress that in every encounter we combine both ways of thinking to a greater or lesser extent (Bargh 1994; Bicchieri 2006; Keren and Schul 2009). The two types of thinking are not independent, but rather interdependent; they are not contradictory, but complementary. Some writers assume that automated behaviour is prioritized in any given situation and that reflective thinking, which is based on calculations and extensive information processing, may or may not intervene (Evans and Stanovich 2013). Indeed, many non-informative dimensions can activate cognitive shortcuts, which effectively leads to reflective thinking. My study examines the potential of sequencing, framing and salience.

Sequencing

Sequencing refers to the order in which discrete pieces of information are presented to the individual. In a study by Guiso et al. (2013), the order of questions on morality and strategic default changed the willingness to walk away from the debt. Among respondents for whom the value of home equity was \$50k below the remaining outstanding debt, willingness to strategically default decreased from 10.6% to 6.2% when the morality question – "Do you think that it is morally wrong to walk away from a house when one can afford to pay the monthly mortgage?" – was asked first.

All of the debtors in my field experiments should be aware of the reputational costs associated with unpaid debt, as the relevant information about the limited likelihood they will be offered a new loan agreement is written at the end of the generic reminder letter. I use sequencing to test reputational concern hypothesis (H1) in the field experiment presented in Chapter 5. It is done by placing the sentence on reputational concerns in a header of a collections letter instead of having it at the end of it.

Framing

Framing effects draw on the prospect theory developed by Kahneman and Tversky (1979) and concern the way that a message is constructed. In this present study, I am interested in 'goal framing', whereby attention in the message is directed either to gains or losses associated with a given decision (see Levin, Schneider, and Gaeth 1998). In the area of finance, this kind of framing has been examined in the field experiment by Ganzach and Karsahi (1995), offering credit card products to bank customers. The results of the experiment found the significance of the

loss-framed message while no effect was found for the gain-framed message. In a different field experiment with loan takers (Karlan, Morten, and Zinman 2012), negative and positive framing text messages of payment reminders were used to examine loan repayment. In this case, no effect was found: neither positive, nor negative frame was more effective than no reminder at all. Hence, when debtors are offered new services, a loss-framed message might work, but this does not improve payment discipline when the actual payment for the debt has to be made.

Framing effects have also been studied experimentally in the case of public goods messages in the field of tax collection. Usually, no significant effects of framing are found (see Kirchler 2007, 129–51). For instance, in a field experiment with tax payers in the United Kingdom by Hallsworth et al. (2017), both gain- and loss-framed public good messages increased the payment rate by 1.3% points. In other words, no goal framing effect was found, although men were more willing to pay than women under the loss-framed public good message. Similarly, in a field experiment on goal framing of a sanction-based message on tax payment by Hasseldine and Hite (2003), no significant effect was found, but men were persuaded by loss-framed messages while women, in contrast, were persuaded by a gain-framed one.

I use framing in an examination of the general welfare/public good hypothesis on hospital debts in the field experiment presented in Chapter 6. The loss-framed message states that unpaid bills limit the hospital's ability to provide services to the public. The gain-framed message states that paid bills increase it.

Salience

The practice of sending a message in a non-white envelope is common in marketing communications (James and Li 1993). It is not uncommon among state authorities as well. For instance, in Croatia, receiving a blue envelope can imply two things: someone is pressing a criminal charge or an unpaid tax bill (Delimar 2007). There are field experiments, which have examined the effect of a customized envelope. For instance, Huck and Rasul (2010) implemented a field experiment in a fundraising campaign for Bavarian State Opera. One of the experimental conditions examined the 'ex-ante transaction costs' of making a donation. Under this treatment, the message 'Bring Opera to the Children!' was written on the envelope. As such, the recipients of a letter could avoid opening the envelope or even considering whether to donate. Although there was no treatment effect of the customized envelope design, the authors note that it might be that there is a heterogeneous effect with the two types of recipients of the letter. On the one hand, there might be individuals who are more likely to open the envelope after being primed to the clue on the outside, reducing their *ex-ante* transaction costs. On the other hand, there might be as many individuals who act the opposite way in order to avoid soliciting attempts (see also DellaVigna 2009).

A field study in the field of finance by Behavioural Insights Team revealed that customized envelope increases the rate of successful communication (inbound contact from the customer, and outbound contact from the bank being answered) between the lender and individuals with long-term mortgage arrears (<u>Behavioural Insights Team 2018</u>). The treatment letter was sent "in a handwritten, [blue] coloured envelope to increase salience, with a handwritten post-it note attached to the letter imploring the customer to make contact" (<u>Behavioural Insights Team 2018</u>,

<u>5)</u>. Such a letter increased the successful contact rate by 16.3% points. However, there were several behaviourally-informed characteristics of the envelope next to its colour in this trial. The developed **salience hypothesis** for my study is devoted to identifying the separate effect of a coloured envelope:

H5: A message in a red envelope increases the payment rate relative to a message in a white envelope.

In order to experimentally examine the salience hypothesis, half of the regular mail letters in the field experiment presented in Chapter 5 were sent in red envelopes.

2.4. The effect of a reminder

The review of the theoretical literature and empirical findings from the laboratory and field experiments in this chapter suggests various ways to improve the payment rate among defaulters. It allowed me to set out several specific hypotheses as to how debt-repayment rates might be improved. The hypotheses examining the effect of communication and reputational concerns are based on rational choice theory. At the same time, personalization, social norm and public good messages examine if nudging individuals with pro-social cues deliver behavioural change. Lastly, I intend to explore the effect of several non-informative dimensions on payment rate, i.e., sequencing, framing and salience.

All of the hypotheses I have developed rely on the content of a message. However, it has been long established that a simple act of communication improves payment discipline, irrespective of the content of the message (Hallsworth 2014; Ortega and Sanguinetti 2013). Generic reminder about a monthly payment can be as effective as a financial incentive, as evident in a field experiment by Cadena and Schoar (2011) with a micro-lender in Uganda. In their study, a simple reminder increased timely payments on average by 9% points compared to the control group, which did not receive any reminder. At the same time, no significant difference was found between the generic reminder group and the treatment group, which was offered various financial incentives if payments were made on time.

A simple reminder is also effective among individuals who have already missed the payment due date. In the United Kingdom, a generic reminder via regular mail increased the tax payment rate by around 8% points compared to the no message condition (Hallsworth et al. 2014). In a similar vein, individuals with delinquent fines in the United Kingdom who were reached by mobile text message with a simple reminder on average paid for £5 more than those who did not receive the reminder (Haynes et al. 2013).

The findings above indicate that a simple act of communication can be a nudge by itself. The reason is that in a world of multiple stimuli, even the most committed individual is under the risk of deviance simply because attention is a limited resource (DellaVigna 2009, 348–50). On the one hand, the function of a reminder is to turn an individual's focus to a specific behaviour. Therefore, reminders are not effective among individuals with self-control problems, but are effective among those with inconsistent consumption behaviour because of a lack of attention to future goals (Karlan et al. 2016, 3403). Therefore, a reminder citing a specific goal is the most effective one. However, when the authors of the study examined the proposed model of limited attention in a field experiment with savings, experimental results showed that even a reminder without a specific goal could reach an individual's 'top of mind' and increase saving levels. Hence, a simple act of communication can deliver behavioural change. In what follows, I explain how and under what circumstances a simple act of communication can trigger behavioural change.

According to Taubinsky (2014), reminders provide effective clues in order for a task to be considered. Even a repeated reminder is effective to deliver behavioural change. A study by Huck and Rasul (2010) found that sending a second reminder to donate to the Bavarian State Opera has a positive outcome. Instead of sticking with the previous decision, "the mere receipt of a reminder triggers recipients to receive another draw from their distribution of transaction costs" (Huck and Rasul 2010, 14). On the other hand, a reminder will have no effect if the task has become habitual, as reminder and habit are substitutes (Taubinsky 2014, 14–24; Aarts, Verplanken, and Knippenberg 1998). Also, piling up individuals with reminders can trigger 'desensitization' – decrease in response for a repeated application of stimulus (Rankin et al. 2009, 136).

On the other hand, a reminder can also have a negative effect on the sender's preferred outcome because of the "costs of annoyance", as suggested by Damgaard and Gravert's (2018) developed model of donation and unsubscription behaviour. Authors define the costs of annoyance as "an effort cost of looking at the message or to a first approximation of a moral cost of feeling guilty for having to be reminded" (Damgaard and Gravert 2018, 17). In order to test the model, the authors carried out two field experiments with a charity and found that a repeated

reminder with an invitation to donate increases both donations and the number of unsubscriptions.

In the context of my study, the main goal of the CMS firm in sending a reminder about an unpaid debt is to increase the annoyance costs. In contrast to the case of charitable giving, in debt collecting, the only way to halt the communication from the CMS firm is by making a payment on a defaulted debt.⁶ Therefore, we can assume that an individual will change his or her behaviour and make the payment if the annoyance costs of a reminder are high enough relative to the costs of paying the debt. On the other hand, as noted before, it can provoke desensitization, as it might be just another reminder individuals are receiving.

Taking into account the effect of a reminder in different contexts—namely, the nature of the task being prompted and the repetitiveness of the reminder—any examination of advanced messages communicated to the debtor must distinguish between the effect of a simple act of communication and that of the content. For this reason, experiments in this thesis include an examination of the following **communication effect hypothesis**:

H6: Sending a reminder message for a one-shot task increases the payment rate relative to not sending a reminder;

The communication effect hypothesis implies the introduction of an experimental condition under which no communication is carried out throughout the intervention period of

⁶ An alternative would be to avoid communication entirely, either by blocking the phone number or e-mail address (or both) of the CMS firm. This is taken into account.

the experiment. Three out of the four field experiments presented in this thesis includes a 'No Message' condition compared to a control group, which receives a generic reminder.

3. Method

In this chapter, I provide an overview of the four field experiments conducted for this thesis, including the setting, design, treatments and other properties. In so doing, I offer a general overview of the experimental procedure, focusing on commonalities among the experiments. A more detailed description of each is included in the respective chapter devoted to that experiment.

The hypotheses I developed in the previous chapter are based on the reviewed theories, as well as on evidence from various field and laboratory experiments. The field experiments test the effectiveness of these theoretical postulates among defaulters at different stages of the debtrecovery process, with various types of debts, and via various communication channels. The research question is whether sophisticated messages change the behaviour of individuals by successfully increasing the payment rate relative to a generic reminder.

3.1. Advantages and pitfalls of the experimental method

I have chosen field experiments deliberately as a method of inquiry. The main advantage of the experimental study compared to the observational one is the ability to build an accurate counterfactual. This is accomplished through randomization. The random assignment of an individual to either a control or a treatment group constitutes the basic and fundamental difference between experimental and non-experimental research in the social sciences (Gerber and Green 2012). The advantage of randomization is that it balances both observable and non-observable confounding factors among the treatment and control groups and eliminates the

selection-bias problem (Floyd and List 2016). Creating an accurate counterfactual makes it possible to establish a reliable causal relationship between the intervention and the outcome. The causal effect of the intervention in an experimental study – called the average treatment effect (ATE) – is estimated by comparing the outcome variable in the control and treatment group.

Hence, the main advantage of the experimental approach is the elimination of the selection-bias problem, which is common in observational studies. However, as noted by Heckman and Smith (1995), even in a randomized trial there can be a selection-bias problem. Individuals in the study might not represent the general population, from which the sample is drawn. The solution to this is to gather information on covariates, which are important in terms of the dependent variable (Deaton and Cartwright 2018, 5–6). This solution is adopted for the experiments undertaken in the thesis and blocked randomization is used in all cases (see Chapter 3, Section 7 "Randomization procedure").

Another issue facing experimental studies is the lack of external validity when a treatment effect might not hold over the variation of different contexts, and therefore cannot be generalized <u>(Shadish, Cook, and Campbell 2001, 53)</u>. However, any trial that replicates treatments applied in previous studies, considers the issue of the external validity of these trials and builds on this prior knowledge of external validity of particular treatment effects. Different messaging strategies examined in this thesis have been found to be effective in many contexts, including tax collection and finance, as extensively reported in Chapter 2. This thesis explores whether these strategies are effective also in more aggressive environments, such as debt

collection. Of course, replication of previous studies does not fully solve the issue of the external validity. One of the solutions to test the robustness of the external validity is to conduct a metaanalysis of the trials (<u>Banerjee and Duflo 2017, 6–7</u>). This is done In the Conclusions part of this thesis, where I combine the results from all four trials, using fixed effects meta-analysis (see Chapter 3, Section 13).

Another issue facing trials is that the treatment effect reports on the average outcomes of the experimental groups, not the individuals in the sample. Thus, experimental studies are not effective in revealing the reasons behind the treatment effect and cannot determine the reason for the causal relation between the treatment and the outcome (Deaton and Cartwright 2018). Such a ground can only be determined through exploratory analysis, looking at heterogeneous effects and information gathered from the covariates. Together with solid theory, doing so allows the researcher to address the question of why something works rather than simply that it works. Although exploratory analysis might not reveal the real patterns of a treatment effect in the general population, it can explain the phenomenon in the context in which the sample is drawn. For the present thesis, the trials reveal the underlying motives for fulfilling commitments in the financial markets and how nudging can improve it. More particularly, the thesis provides extensive information on a minority that has always existed in credit markets—namely, defaulted individuals. Exploration of the behaviour of these individuals using randomized controlled trials can provide useful information on how to improve the functionality of financial markets in general.

3.2. Ethics and registration

The experimental design was reviewed and approved by the European University Institute Ethics Committee on February 4th, 2016. After the initial approval, the Ethics Committee was informed of additional treatment messages included in the Experiment 2 and Experiment 3 before the scheduled interventions. The report on the experimental design as sent to the Ethics Committee – as well as the answers for the questions raised by the committee – can be found in the Appendix 3.1.

Participants were taking part in the study without their knowledge and consent, as approved by the Ethics Committee. Informed consent would have undermined the validity of the study, as knowledge of participation in the study would have likely changed participants' behaviour (Glennerster 2017, 207–8). Informed consent is necessary where a study exposes participants to *significant risk or harm* (Gerber and Green 2012, 450). The interventions in my studies entailed no significant difference regarding the intensity of communication from the CMS company in comparison to the interaction before and after the intervention. As such, study participants were not exposed to any risk of significant harm.

As noted by Banerjee et al. (2017, 155), pre-registration commits researchers to a particular experimental design. Pre-registration was done in two ways for this study. The experimental design and all of the treatment messages examined in the trials were submitted to the Ethics Committee at the European University Institute for a review and ethics clearance. As such, they provide transparent and truthful information on all the treatment texts examined in the treatment texts examined in the experiments (see Appendix 3.1. for the materials submitted to the committee and the follow-

up correspondence). For Phase 2 of Experiment 2 the trial was pre-registered on the AEA RCT Registry before the start of the trial (see Saulitis 2018), as it also included the hypothesis for interaction of gender with the treatment (see Chapter 5, Section 7).

3.3. Setting

Interventions in field experiments are carried out in a real-world setting. For this reason, they have the advantage of realism and possess robust external validity (Harrison and List 2004). In other words, as the participants are not aware they are taking part in a field experiment, the study captures naturally–occurring behaviour (Floyd and List 2016). What matters for field experiments is the internal validity of the experimental results. For the field experiments carried out for this project, the results are generalizable to debtors with non-performing loans.⁷ Additionally, in all experiments in the present study, the collection processes are managed by a third party, not by the institution or bank originating the debt. As such, the results explain the relationships that occur between borrowers and credit servicers in credit markets.

Field experiments were conducted at the CMS firm I partnered with for the study, which is located in Riga, Latvia. The company, *Intrum* (previously called *Lindorff*), is one of the largest CMS enterprises in Latvia. It purchases debt portfolios from lenders—assuming full ownership of these debts—in line with recent trends in the financial industry globally (see Pal 2017). The thesis that deal with consumer debts – namely, Experiments 1, 2 & 4 – are of this kind. Individuals included in these trials took out the debt with a range of entities, from traditional lenders (e.g.

⁷ Both the International Monetary Fund (2005) and the Council of Europe (2013) consider a loan to be non-performing when payments on interest and/or principal are not made in full for at least 90 days.

banks) to fast-credit companies and catalogue merchandisers, but now have a liability with the CMS firm.

The CMS firm also works as an outsourced CSM company with institutions such as telecommunication firms to public service providers. In these cases, the CMS firm does not possess ownership of the debts but is only authorized to carry out credit servicing on behalf of the original lender. This kind of debt collection process is observed in Experiment 3, focusing on defaulted individuals with public hospital debts.

Figure 3.1 provides an overview of the debt-recovery process and the timing of intervention in each of the experiments. Each debtor had received at least one simple reminder to repay the debt – either a call, a text or email message, or a letter sent by regular post – before the start of the experiment. Experiment 1 examines whether more sophisticated message than a simple reminder sent via mobile text message and email altered the behaviour of 24,950 defaulters with consumer debts. Experiment 2 studies the behaviour of 4,821 defaulters with consumer debts following an intervention carried out via regular mail. The sample for Experiment 2 consists of defaulters with consumer debts who could not be reached via mobile text message or email in Experiment 1 (i.e., were not treated in Experiment 1).

Experiment 3 differs from the previous one with the type of debts individuals have. All of the 9,196 debtors in the sample have unpaid bills to a public hospital rather than a defaulted consumer debt. As in Experiment 1, the interventions were carried out via mobile text messages and emails.



Figure 3.1 Points within the debt-recovery process when the experiment took place

Source: Compiled by the author.

While Experiments 1 to 3 explore the potential of behavioural change among defaulters, Experiment 4 is carried out on debtors who have started to repay the debt. As in the other experiments, debtors in this sample received at least one generic reminder prior to the experiment commencing. After receiving this note, they agreed on a monthly debt-repayment plan with the CMS firm. The sample for Experiment 4 consists of 2,497 such debtors. In this experiment, the goal is to examine the effect of various types of payment reminders on payment discipline, as usually around half of the debtors who start to repay their debt lapse repeatedly during the debt-repayment period. The interventions in this experiment are carried out via mobile text and email communication channels, like in Experiment 1 and Experiment 3.

3.4. Design

Many characteristics—such as the experimental conditions, debt type, delivery channel and design type—are identical across the experiments. This allows me to compare the results, which I do in the final chapter of the thesis, which contains a general discussion of the results. Table 3.1 summarizes the characteristics of each experiment, thus capturing both the commonalities and differences.

Category	Experiment 1	Experiment 2	Experiment 3	Experiment 4
	Defaulted con	nsumer debts	Defaulted	Consumer debts
Debt type	(bank loans, fast o	credits, catalogue	public hospital	on repayment
	merch	nants)	debts	plan
Delivery	SMS & Emails	Regular mail	SMS & Email	SMS & Emails
channel				
Dowload	Feb 11 - March 1,	May 5, 2016 –	Aug 31 - Sept	Feb 11 - March
reriou	2016	July 5, 2018	6, 2016	31, 2016
Exposures	Max 4 SMS &	1 regular	Max 2 SMS &	Max 8 SMS &
	4 emails	mail letter	2 emails	8 emails
Conditions	9	9	8	9
N	24,950	4,821	9,196	2,497

Table 3.1 Main characteristics of the study experiments

Source: Compiled by the author.

In each case, a randomly assigned message was sent through one or more communication channel: regular mail, mobile phone or email. The first interventions were sent out on February 11th, 2016 for Experiment 1 (defaulted consumer debts via SMS & emails) and Experiment 4

(consumer debtors on payment plans). Experiment 2 with regular mail letters was launched on May 5th 2016. The first messages in Experiment 3 (hospital bills) were sent on August 31st 2016.

The number of exposures to the treatment message differs from one experiment to another. For Experiment 4, the debtor might be exposed to the treatment message as many as eight times while in Experiment 2, the individuals receive only one regular mail letter. Although the number of exposures differs, each individual is exposed to the same treatment message. Note that each debtor is included in one—and only one—of the four study experiments. For instance, an individual receiving a message in Experiment 1 is not included in any other of the thesis' experiments.

3.5. Treatments

The message for the control group is a generic reminder (see Table 3.2). The social norm hypothesis is examined in all the experiments. Reputational concerns and salience hypotheses (red envelopes) are examined only in Experiment 2 (regular mail letters). The public good hypothesis is examined only with hospital debts in Experiment 3.

The personalization hypothesis is examined using two different factors. On the one hand, I examine the effect of addressing the debtor by his or her first name. On the other, I explore the effect of signing and sending the message from a CMS firm agent instead of a company. As a result, I examine the effect of personalization in terms of both the *message receiver* and the *sender*. One personalization factor or another is examined in each of the experiments. Table 3.2 summarizes which hypotheses and factors are examined in each of the experiments of this thesis.

		Experiment 1	Experiment 2	Experiment 3	Experiment 4
Hypothesis	Factor	(consumer debts;	(consumer debts;	(hospital debts;	(Consumer debts on
		SMS & Email	regular mail)	SMS & email)	repayment plan)
Control group:		/	1	/	/
Generic reminder		V	\checkmark	V	V
Communication		/		/	/
effect		V		V	V
	Debtor	/		/	/
Dorsonalization	name	V		V	V
Personalization	Agent	/	1		/
	name	V	V		V
Social norm		\checkmark	\checkmark	\checkmark	\checkmark
Reputational			1		
concerns			\checkmark		
Public good	Loss-			/	
	framed			\checkmark	
	Gain-			/	
	framed			\checkmark	
Calianaa	Red		/		
Salience	colour		\checkmark		

Table 3.2 Experimental conditions included in the experiments of the study

Source: Compiled by the author

Where the experimental condition includes a social norm, reputation or public good message, the placement of the treatment text it is always in the main body of the message. In addition, the debtor's name is always located at the beginning of the message. The agent name is included at the end of the message, as well as in the sender line in those cases where email is used as the communication channel. I also use the subject line to place the treatment text, or the header line if the communication is carried out via regular mail (Experiment 2).

I also combine several treatment texts in one message. For instance, in Experiment 1 personalization in terms of sender and receiver is examined both separately and together in one message. Three different treatments in one message (social norm, sequencing and

personalization) is examined in Experiment 2. By interacting treatments with each other, I am able to assess the effect of having several nudges in one message.

3.6. Sample allocation

The experimental procedure for all experiments is identical. It includes two steps. First, I prepare and randomize the sample among the assigned experimental conditions determined by the particular design of the experiment. Second, the assigned message is sent to the debtors, after which the delivery status, as well as the payment activity is monitored and logged. The overall scheme of the experimental procedure, which I describe in detail in the following paragraphs, is visualized in Figure 3.2.

Preparation of the sample for each experiment began one week before the intervention. The list of debtors is anonymized by the CMS firm and then shared with me. The dataset consists of information on each debtor's first name, age, the value of the loan, type of debt (bank loan, payday loan companies, catalogue purchases, debts assumed from another CMS company, etc.), and the debtor's region of residence. This information allows me to create new variables at the individual level in the sample. For instance, information on the first name is used to identify the gender and ethnicity of each debtor. I also have the date that the debtor took out the loan, as well as the date when the debt was handed to the CMS firm. This information is used to create two additional control variables. 'Debt due age' refers to the time elapsed since the payment due date. 'Time at the CMS firm' refers to the amount of time the debt has been on the CMS firm's books. Both are coded in years. The glossary of control variables used in the experiments can be found in Appendix 3.2.

In all the experiments, except for Experiment 2, the assigned treatment was intended to be delivered to each recipient via two channels—mobile text message and email. However, there were individuals with only a phone number or only an email address. The number and type of communication channels available were taken into account when individuals were subjected to blocked randomization. In those cases where the experimental design entailed use of mobile text messages and emails, there were individuals who were treated only via mobile text messages or only via email, or by both channels, but the share of individuals of each communication channel used for treatment text delivery did not significantly differ across the experimental conditions (see Appendix). Hence, delivery was not randomized and used as a treatment. Instead, treatment of the delivery channel is a covariate, which was used during the randomization procedure, as I explain in the following section.

3.7. Randomization procedure and balance tests

As the sample consists of information on various characteristics for each individual, I use blocked randomization to reduce sampling variability (see Gerber and Green 2012, 71–77; John 2017, 38–39). Blocked randomization implies that the allocation of an individual to any of the experimental conditions occurs after individuals are randomized within the blocks (strata) of the covariates. In my experiments, randomization is undertaken within the blocks (strata) of gender, ethnicity, the value of the loan, communication channel, and other covariates – depending on the available information in the sample. After blocked randomization, I assess any imbalance in my covariates in the sample. This is accomplished through pairwise comparisons of means with adjusting for multiple comparisons, using Dunnet's method (see Gerber and Green 2012, 431–32). In case the

Figure 3.2 Experimental procedure for the experiments



Source: Compiled by the author.

difference of means for any covariate between any two of the experimental conditions is statistically significant (p<0.05), I repeat the blocked randomization procedure until there is no imbalance in covariates among the experimental conditions. Rerandomization allows to achieve better sampling properties in terms of variance and does not create any complications for assessing the treatment effect of an experimental study (Athey and Imbens 2017, 108–9). The
results from the balance tests are reported in the Appendixes together with descriptive statistics for each experiment.

Once the blocked randomization is completed, each individual is assigned to one of the experimental conditions as determined by the design of the experiment. The randomly assigned messages are sent by the CMS firm's automated software via the communication channel as many times as the design of the experiment determined.

3.8. Identification and estimation of causal parameters of interest

The variable of interest in all the experiments is whether an individual makes (marked as "1") or does not make a payment (marked as "0") within the month following the final intervention. This information at the individual level is used to estimate the payment rate in each experimental condition. The data on the outcomes was prepared by the CMS employee, who did not know the results of the random assignment in the experiments. In other words, the study was doubleblinded, as both the participants and the data collectors were not aware of which treatments individuals received.

The sharp null hypothesis in the experiments is that individuals are indifferent to any alternative message or not sending a message at all relative to a generic reminder. This implies the use of two-tailed tests, as the effect of an alternative messaging strategy can hypothetically be negative. The estimation of treatment effect in all the cases is accomplished by fitting a linear probability model using ordinary least squares regression, as the variable of interest is binary (Freedman 2008). The coefficient is considered to be statistically significant if p<0.05. However,

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relying only on p-values of a coefficient is not sufficient to estimate to accept or reject the hypothesis (<u>Bernardi, Chakhaia, and Leopold 2017; Nickerson 2000</u>). The p-value can be affected by the design of a study, i.e., sample size and statistical power thereof, non-compliance among the participants, as well as by testing multiple hypotheses and heterogeneity – all of which I discuss in the following sections.

3.9. Statistical power and design analysis

The sample size for each experiment was determined by the number of debtors on the CMS firm's books at the start of the experiment. The only exception is the trial in Phase 2 of Experiment 2, where power was calculated with an aim to detect a 1.5% point change in payment rate with 80% power. In all other cases, the statistical power of the trials has not been calculated ad-hoc to estimate the relevant sample size.

Post-hoc calculations of statistical power as a way to explain non-significant results is criticized among experimentalists (Senn 2002). Also, reliance on sufficient statistical power to explain statistically significant result, can lead to overestimation of the effect size (Hoenig and Heisey 2001). For this reason, doing power analysis after the data has been collected is not a meaningful way to assess the true effect size. An alternative is to focus on confidence intervals instead. For instance, Bernardi et al. (2017) note that it is misleading to interpret a statistically insignificant (p>0.05) coefficient from the regression models as a zero effect. One must look into the substantive meaning of the effect size instead of mechanically reporting on statistical significance. The latter only tells us that the coefficient is not precisely estimated. In order to estimate the sociological significance of the effect, Bernardi et al. (2017) suggest reporting the

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results from regressions with confidence intervals, as well as using the strategy of "informed benchmarking of estimates" (<u>Bernardi, Chakhaia, and Leopold 2017, 5–7</u>). The goal is to preestimate a meaningful effect size, based on prior knowledge and external information of the object of the study. For the experiments carried out in this project, I consider that the treatment effect as substantial if it reaches at least 0.5% points. Such an effect generates meaningful accelerated revenue for the CMS firm (see Table 3.3).

Experiment	Portfolio value	Predicted revenue under 1% recovery	0.5% point increase effect on revenue
1 (defaulted consumer debts via SMS & emails)	€40,638,730	€406,388	€203,194
2 (defaulted consumer debts via regular mail)	€2,228,949	€22,289	€11,144
3 (defaulted hospital debts via SMS & emails)	€497,924	€4,979	€2,490
4 (consumer debtors on repayment plans via SMS & emails)	€2,630,861	€26,309	€13,154

Table 3.3 Generated revenues under 0.5% point effect size in the experiments

Source: compiled by the author.

The overview on the effect of the treatment on revenues in each of the experiments is provided in Table 3.3. For instance, in Experiment 1 with consumer debts, the total value of debts is around €40 million euros. In case the collection efforts succeed in recovering 1% of the total value of portfolio, it brings around €400,000 revenue. Each additional 0.5% points adds additional €200,000 in revenues.

Gelman and Carlin (2014) note that a retrospective power calculation, which focuses on the sign and direction of effects, as well as on an effect size that is determined from the literature review, is both meaningful and helpful to understand the true effect of a study. Their suggested approach focuses on the question: "What might be expected to happen in studies of this size"? rather than the plainer one: "What is the power of a test"? (Gelman and Carlin 2014, 649). They examine the trustworthiness of a null-hypothesis significance test by introducing Type S/M errors. Type S error (sign) refers to a situation where the replicated estimate has the incorrect sign, if statistically significant from zero. Type M error (magnitude) refers to a situation where the effect size is being overestimated. Hence, the design analysis for Type S/M errors focuses on the likely direction of an estimate and its size. In order to estimate Type S/M error, the information on the hypothesized true effect size (i.e., treatment effect identified in the experiment) and the standard error of the estimate is used. In addition to power calculation, as done under classic null-hypothesis significance testing [see formula (1), where μ refers to the effect size, Z is the test statistic and α is the significance level], the probability of the Type S error [see formula (2)], and the expected Type R error or the "exaggeration ratio" [see formula (3)] is calculated.

- (1) $p = \Pr(|Z| > \sigma z_{\alpha} \mid \mu).$
- (2) $s = \Pr(Z < 0 \mid \mu, |Z| > \sigma z_{\alpha});$
- (3) $m = E(|Z| | \mu, |Z| > \sigma z_{\alpha})/\mu.$

(Lu, Qiu, and Deng 2019, 4-5)

As noted by the authors, "problems with the exaggeration ratio start to arise when power is less than 0.5, and problems with the Type S error rate start to arise when power is less than 0.1" (Gelman and Carlin 2014, 643–44). Using the provided R function by Gelman and Carlin (2014, 649), I calculate the three estimates for the observed treatment effects in my studies and take them into account when interpreting the experimental results.

3.10. Non-compliance

The goal of the empirical method is to identify the ATE between the control group and any of the treatment arms. This is accomplished by comparing the payment rate among the different experimental conditions. ATE is an unbiased estimator where all the treatment messages are delivered to the participants of the experiment. However, in field experiments quite often a substantial share of individuals targeted end up being so-called "non-compliers". These are individuals who are assigned to the treatment but are not treated for some reasons. In such cases, the ATE is not a proper estimate for an unbiased comparison. To address this issue, the empirical method measures two different estimates: first, the average intention-to-treat (ITT) effect; second, the complier average causal effect (CACE) (Gerber and Green 2012, 131–66).

The estimation of the ITT effect is made by subtracting the average outcomes between the experimental groups. Estimation of CACE entails using the delivery rate as an instrument where the comparison is made between a condition in which the treatment message is sent and a condition of not sending a message. The ITT effect in the No Message condition is divided with the proportion of compliers (subjects who received the message) in the experimental condition group, which was assigned to receive the message. The basic logic behind this operation is that

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in both experimental conditions, the average delivery rate must be similar because of the randomization of individuals before the start of the experiment. Hence, the delivery rate is a proper instrumental variable to be used when estimating the CACE.

Where one wishes to compare the CACE between two experimental conditions, both of which are assigned to receive a treatment message, the logic is simple. CACE is the average treatment effect among those who have received the treatment message. In both conditions, the message is sent at the same time and under the same conditions, so the number of compliers is equivalent and the CACE estimator is not biased (Gerber et al. 2010).

Which of the two estimates—ATE or CACE—is more informative vis-à-vis the effectiveness of the intervention? It depends on the design of the experiment and how compliance is defined. The most common issues that undermine compliance are monotonicity, stable unit treatment value (SUTVA), and the exclusion restriction (Peugh et al. 2017, 9–10; Gerber and Green 2012, 39–44). Monotonicity applies in cases where the so-called two-sided non-compliance appears—namely, where some individuals in the treatment group go untreated while others in the control group are treated. SUTVA assumes that the individual outcome is independent of the group assignment and CACE is an average effect across individuals from the treatment group. Exclusion restriction refers to the assumption that CACE is zero for all non-compliars. For instance, individuals in behavioural trials might exhibit 'resentful demoralization' for not obtaining the desired treatment (Onghena 2005). Even more complicated issues arise when compliance is partial. For instance, some individuals assigned to the treatment might drop out during the experiment.

The experiments in this thesis are not subject to the issues of monotonicity, SUTVA, or exclusion restriction. First, the experimental design does not require the consent of the participants, which would limit the sample to always-takers only. Second, there is no possibility for individuals in the control group to receive a treatment, as the messages are sent to the personal addresses of individuals. Third, the information on having an unpaid debt is strictly confidential and therefore not shared among the participants of the experiment, just as with the received electronic messages, excluding the risk of violating the exclusion restriction. However, there is a possibility of non-compliance among individuals who are assigned to receive a message because of a wrong/outdated delivery address. In other words, there are never-takers in the sample. This is quite common in experimental studies, which delivers treatment via various communication channels. For instance, in a study by Haynes et al. (2013) on collecting delinquent fines, both ITT and CACE are used as estimates, using delivery of a message as an indicator for receiving the treatment. The ITT result is informative on the overall effectiveness of the intervention and allows us to calculate the necessary resources for delivering the intended policy. The CACE result delivers information on a subset of the subject pool—namely, compliers. No information is gathered on never-takers, as they are not observed in a treated state.

For this study, the most important result is CACE, as it delivers information on the treatment effect among the treated individuals. For this reason, when reporting on experimental results, only CACE is discussed. The regressions for the ITT effect of the study can be found in the Appendixes.

I use separate regression models to calculate CACE for the No Message condition and for other treatment arms, which are assigned to receive a message. In the No Message condition, I use two-stage least squares regression, which is equal to instrumental variable regression with the delivery rate used as an instrument (Gerber and Green 2012, 157–60). To calculate CACE for any other treatment condition, I apply the same regression model as used to calculate ATE by removing non-compliers from the sample.

3.11. Multiple hypothesis testing

An experimental design with several experimental conditions faces the multiple hypotheses problem. Each additional treatment group in the experiment increases the probability that a statistically significant effect will appear merely by random chance (see Gerber and Green 2012, 300). The probability increases even further if subgroup analysis is performed. There are many ways to address the issue, including applying the so-called Bonferroni Correction or by bootstrapping the sample, among others (Gerber and Green 2012, 300–301; Shaffer 1995). Bonferroni-adjustment reduces the target p-value in proportion to the number of significance tests (Gerber and Green 2012, 300).

One of the alternatives to this rather technical adjustment for multiple hypothesis testing is the procedure proposed by List et al. (2019). It offers a bootstrap-based procedure for testing null hypotheses simultaneously and allows to asymptomatically control the familywise error rate – the probability of one or more false rejections – and is asymptomatically balanced in that the marginal probability of rejecting any true null hypothesis is approximately equal in large samples (List, Shaikh, and Xu 2019, 3). The incorporation of dependence in the procedure delivers greater

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ability to detect truly false null hypotheses than the Bonferroni Correction. Nevertheless, I use both Bonferroni-adjustment and the method proposed by List and colleagues (2019) with the STATA code provided (Seidel and Xu 2016). The results of multiple hypotheses testing are included in the relevant Appendixes of the empirical chapters.

3.12. Exploratory analysis

The goal of the exploratory analysis is twofold. First, to address the heterogeneity issues. For this reason, the coefficients are reported after adjusting for covariates. Heterogeneity is particularly important where the treatment effect is relatively small (Gerber and Green 2012, 295). Second, analysis of covariates moves the study from confirmatory objectives to exploratory ones. On the one hand, it proposes future confirmatory studies. On the other, it serves to the purpose of gathering broader behavioural insights on defaulted individuals. As such, the exploratory analysis provides a deeper understanding and explanation of the treatment effects.

Although I look at the covariates in my interpretation, it has to be noted that the relation between the covariates and the dependent variable has no causal explanation (Gerber and Green 2012, 102–5). Also, they do not reveal whether there is an interaction effect in an experiment. Theoretically, there might be a possibility that individual characteristics (such as gender, age, place of residence etc.) can influence the treatment effect. A separate analysis of subgroups in which the so-called conditional ATE is measured helps to investigate this issue (see Gerber and Green 2012, 299–303). In each experiment, I examine the interaction effects of gender, age and debt size on the treatment effect. Just as when covariates are introduced into a regression, caution has to be taken when studying interaction effects. Overall, the exploratory part of the experimental results are predictions without causal relation and are merely descriptive.

3.13. Meta-analysis of experimental results

The four field experiments of this thesis are devoted to a single goal: gather behavioural insights on recalcitrant debtors. In order to integrate the findings from all the experiments, I carry out the so-called 'fixed effects meta-analysis' (see Gerber and Green 2012, 358–65). This method allows to pool experimental research findings to estimate the overall effect of the intended treatment. As all of the trials have similar design and treatment texts, as well as the sample is drawn from the same population: individuals at the CMS firm. Of course, there are different type of debts, as well as the stages at which the debt-collection is carried out (see Figure 3.1) and the meta-analysis of the experimental results have to be analysed with these issues in mind (<u>Rice, Higgins, and Lumley 2018</u>).

The fixed effects meta-analysis is based in Bayesian framework. In this approach, the probability of a likelihood for an event to occur is defined in reference to the prior beliefs. As new information becomes available, these prior beliefs are updated to assess the probabilities. The goal for the fixed effects meta-analysis is to estimate the weight of each independent study for the pooled estimate of the treatment effect. This is done by weighting each experimental result by the inverse of its squared standard error, and divided by the sum of the precisions (Gerber and Green 2012, 361–62). Hence, the parameters used in the fixed effects meta-analysis are the size of the effect (ATE) and the variance (σ), expressed as the standard error of the trial:

$$\widehat{\text{ATE}}_{\text{pooled}} = \frac{\frac{1}{\hat{\sigma}_1^2}}{\frac{1}{\hat{\sigma}_1^2} + \frac{1}{\hat{\sigma}_2^2}} \widehat{\text{ATE}}_1 + \frac{\frac{1}{\hat{\sigma}_2^2}}{\frac{1}{\hat{\sigma}_1^2} + \frac{1}{\hat{\sigma}_2^2}} \widehat{\text{ATE}}_2$$

(Gerber and Green 2012, 361)

According to the formula for estimating the pooled result for the average treatment effect, greater weight is given to a study with a smaller standard error. Second, the standard error for the pooled result will always be smaller than that of any separate study included in the metaanalysis.

The fixed effects meta-analysis is used in two occasions in this thesis. First, in Chapter 5, I pool the experimental results from both phases to estimate the personalization effect. Second, in the concluding chapter, I pool the experimental results from all the experiments according to the treatments examined in each of them.

The next four chapters are devoted to each of the experiments. Although the experimental design for each of them differs slightly, all four chapters assume a similar structure. First, I explain the particular setting in which the experiment takes places. Then, I introduce the experimental design, describing the treatment conditions and the exact wording and placement of the treatment texts. This is followed by a description of the sample and the experimental procedure. Finally, I report on results. Here, I examine the hypotheses set out in Chapter 2 and examine the interaction effects in the exploratory analysis of the experimental results.

4. Non-performing Consumer Debts via SMS & Email

This chapter examines the extent to which sending a randomly assigned message via mobile phone and email to a defaulted debtor with a consumer debt can induce her to repay the debt. Treatments included in the field experiment test the three hypotheses set out in the previous chapter: (1) communication effect; (2) personalization; (3) social norm.

In cooperation with a CSM firm in Latvia, the field experiment was carried out on 24,950 individuals with unpaid consumer debts. The object of interest in this study is whether any of the alternative messages next to a generic reminder improves debt-repayment rate. The results of the experiment reveal that two out of three hypotheses examined in this chapter must be rejected. The personalization of a message has no effect on the repayment rate, and neither does exposing defaulters to a social norm statement. However, there is a statistically significant communication effect. Sending a generic reminder to an individual increases the repayment rate. Exploratory analysis of the experimental results suggests that referring to the debtor by his or her first name and/or communicating a social norm statement has a positive effect on payment rate among debtors with loans of a relatively small size.

4.1. Setting

The sample for the field experiment presented in this chapter focuses on debtors who have defaulted on their loans and have not made a payment for at least 90 days. All of the loans taken out by the individuals in the sample were sold to the CMS enterprise after being considered nonperforming by the original lender. At the time of the experiment, all these debts belonged to the CMS firm who had attempted to collect the debt by sending simple reminders via all available communication channels: phone calls, text and email messages, as well as via regular mail letter at least once a year. Debtors in the sample had been unresponsive to these attempts and remained in default at the start of the experiment.

4.2. Treatments

There are nine experimental conditions in a factorial design for the experiment presented in this chapter. In total, I examine three hypotheses (communication effect; personalization; social norm) both separately and in interaction with each other. As a result, each debtor was randomly assigned either to a group that did not receive any message throughout the experiment, or to one that was sent one of the eight constructed messages (see Table 4.1 for all the text templates in the experiment, as well as Appendix 4.1. & Appendix 4.2 for examples of the email and mobile text messages).

Hypothesis	Treatment line in email Mobile text message		
[Control group]	Reminder about the debt!	ebt!This is a reminder that you have a debt, case nr. 1234567. Contact us to find a solution: 76543210	
Communication effect	No message.		
Social norm	Around 80% pay their liabilities on time. You are in a minority that has not done so. This is a reminder that you have a debt, case 1234567. Around 80% pay their liabilities on time. You are in a minority that has not done Contact us to find a solution: 76543210		
Personalization: Debtor name	[Name], reminder about the debt!	{name], this is a reminder that you have a debt, case nr. 1234567. Contact us to find a solution: 76543210	

 Table 4.1 Experimental conditions in Experiment 1

Personalization:	Contact me, [company]	This is a reminder that you have a debt, case nr.	
	consultant [name] to find an	1234567. Contact me, [company] specialist	
Agent name	individual solution!	[name] to find a solution: 76543210	
Personalization: [Name], contact me, [company]		[Name], This is a reminder that you have a debt,	
Debtor & Agent consultant [name] to find an		case nr. 1234567. Contact me, [company]	
name individual solution!		specialist [name] to find a solution: 76543210	
		[Name], This is a reminder that you have a debt,	
Personalization	[Name], around 80% pay their	case nr. 1234567. Around 80% pay their	
(Debtor name)	liabilities on time. You are in a	liabilities on time. You are in a minority that has	
& Social norm	minority that has not done so.	not done so. Contact us to find a solution:	
		76543210	
Personalization (Agent name) & Social norm	Around 80% pay their liabilities on time. You are in a minority that has not done so. Contact me: consultant [name]!	This is a reminder that you have a debt, case nr. 1234567. Around 80% pay their liabilities on time. You are in a minority that has not done so. Contact me, [company] specialist [name] to find a solution: 76543210	
Personalization (Debtor & Agent name) & Social norm	[Name], around 80% pay their liabilities on time. You are in a minority that has not done so. Contact me: consultant [name]!	[Name], this is a reminder that you have a debt, case nr. 1234567. Around 80% pay their liabilities on time. You are in a minority that has not done so. Contact me, [company] specialist [name] to find a solution: 76543210	

Source: Compiled by the author.

4.3. Sample

The sample for the experiment consists of unsecured consumer loans, which had been taken out with banks, payday loan companies, catalogue merchants. The original lender considered the debt as non-performing with a small chance to recover it and sold it at a discounted price to the CMS firm. In total, the sample consists of 24,950 individuals, who have unpaid liabilities ranging from ≤ 1 to approximately $\leq 40,000$ with a median loan size of ≤ 310 (see Appendix 4.3 for the descriptive statistics of each experimental condition with balance tests included).

On average, debtors had been on the CMS firm's books for around 7.7 years at the time of the experiment. Throughout this time, each debtor has been contacted regularly by the credit servicer via all the available channels: phone calls, mobile text messages, emails, as well as by regular mail at least once a year. However, these various attempts to collect money via simple reminder had not succeeded. Therefore, the generic message sent by the CMS firm is deemed unlikely to induce the debtors in this experiment to make a payment on the debt.

4.4. Procedure

The random allocation of individuals to one of nine experimental conditions was carried out following the procedure described in Chapter 3 (see Section 7 "Randomization procedure"). The descriptive statistics, including the balance tests, for each experimental condition can be found in Appendix 4.3.

The randomly assigned message was sent by the CMS firm via its automated software on Monday. Every subsequent Monday after the messages were sent, the CMS firm's software monitored both the delivery status of each message, as well as the payment status on each case. The ensuing report was used to update the list of debtors for future communication. If both email and mobile text message were not delivered, no further communication was carried out. Additionally, if the debtor agreed on a repayment plan or paid back the debt in full in the meantime, no additional messages were sent. In all other cases, the same assigned message was resent to the debtor the following day. The procedure was repeated for three consecutive weeks. As a result, the debtor received the same treatment text a maximum of four times via one channel or eight times if both communication channels were available.

The field experiment was launched on February 11th, 2016. The last intervention was sent out on March 1st, 2016. The final update on all cases—whether a payment had been made—was carried out 30 days after the last message was sent, i.e., on April 1st, 2016.

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4.5. Results

The variable of interest is whether the debtor begins to repay debt. Figure 4.1 presents the share of payers in each of the experimental conditions. The only two treatment arms with a positive coefficient compared to the control group (simple reminder) is the one which includes debtor name and social norm text in one message. However, the only statistically significant (p>0.05) treatment effect is for No message condition.⁸



Figure 4.1 Payment rate in each experimental condition in Experiment 1

Notes: Marginal effects from the linear probability model with control variables included (see Appendix 4.5 Model (4)). Confidence intervals at 95% level. Vertical line represents payment rate in the control group (Simple reminder). Source: Compiled by the author.

⁸ When tested against multiple hypothesis (see Chapter 3, Section 11 "Multiple hypothesis testing), the negative effect of the No message treatment on the payment rate remains statistically significant at 10% level for the List et al. (2019) multiplicity-adjusted specifications, but not for Bonferroni and Holm multiplicity-adjustments (see Appendix 4.9). When the dimensions of personalization and social norm are examined against multiple hypothesis, No message treatment remains statistically significant at 5% level (Personalization dimension) and 1% level (Social norm dimension) for multiplicity-adjusted specifications (see Appendix 4.9. sections "Personalization dimension" and "Social norm dimension".

Communication effect

The communication effect hypothesis states that sending a message to debtor will have a positive effect on the payment rate. The experimental results confirm the hypothesis. The ITT for not sending a message is around 0.7% points lower compared to any of the experimental conditions involving the sending of a message. It suggests that there are certain annoyance costs attached to the reminder, disregards the content of the message. The estimated CACE for No Message condition is -1.3% points (p<0.05) relative to a generic reminder (see Appendix 4.6 for the regression results).⁹ In other words, sending a reminder about the unpaid debt is still effective among individuals who have been in default for many years and have previously already received a generic reminder to pay back the debt.

Of all the messages sent, only 54% were delivered.¹⁰ In what follows, I report both on ITT and CACE, but I focus my analysis on the latter estimates, i.e., the effect of treatment among those who received the treatment (see Chapter 3, Section 10 "Non-compliance").

⁹ The post-hoc power calculations (see Chapter 3, Section 9 "Statistical power and design") reveals that the power of the study is 65% (alpha=0.05). A statistically significant result of 1.3% points within this study design has a 0.13% chance of having a wrong sign and the magnitude of the true effect might be overestimated by an expected factor of 1.25. Hence, given the sample, standard error and the observed effect of the study, there is a very small likelihood of a statistically significant result appearing with a wrong sign, as well as the magnitude of the true effect would be overestimated by a relatively small factor (see Appendix 4.10 for post-hoc power analysis of all regression models). ¹⁰ The delivery rates across all experimental conditions can be found in Appendix 4.4. The delivery rate is relatively equal among the treatment arms which were assigned to receive the treatment (a chi-square test of equal proportions across the eight treatment groups has a p-value of 0.71).

Personalization effect

As noted, the personalization hypothesis is examined in three different dimensions in this experiment: the message includes either the *debtor's name*, the *agent's name*, or *both*. The payment rates across compliers for each of these experimental conditions are presented in Figure 4.2.



Figure 4.2 Effect for personalization treatment in Experiment 1

Notes: Coefficients from the linear probability model with control variables (see Appendix 4.7, Model (2) & (4))). The control group is a message with no personalization (baseline payment rate: 1.7%). Confidence intervals at 95% level. Vertical line represents payment rate in the non-personalized message condition. Source: Compiled by the author.

The payment rate among individuals who received the message with no personalization is 3.1%. For a personalized message, the payment rate does not change substantively among the treated individuals, nor is the difference statistically significant compared to a non-personalized message. Messages with a debtor name included slightly improves the payment rate relative to a non-personalized one by 0.16% points among those who received the message. Inclusion of an agent name slightly worsens the payment rate relative to a non-personalized one by -0.38% points. Hence, the personalization hypothesis has to be rejected.

Social norm effect

As in cases where the debtor name is included, the estimated CACE for the social norm is positive. Still, the effect is rather small. Among those who received the message inclusion of a social norm increased the payment rate by 0.23% points (see Figure 4.3). It is both statistically and substantively insignificant.



Figure 4.3 Effect for social norm treatment message in Experiment 1

Notes: Coefficients from the linear regression model with control variables included (see Appendix 4.8, Model (2) & (4)). The control group is a message with no social norm included (baseline payment rate: 1.7%). Confidence intervals at 95% level. Vertical line represents payment rate in the control group (Simple reminder). Source: Compiled by the author.

Exploratory analysis

Regression models with all control variables show some statistically significant covariates which correlates with the payment rate (see Appendix 4.5, Model (2)). On average, the payment rate among women is 0.7% points higher than among men (p<0.01). In addition, non-Latvians are less likely to repay debt, with the difference being around 0.38% points (p<0.05). Albeit it is statistically significant, it is not substantive, i.e., below 0.5% points (see Chapter 3, Section 9 "Statistical power and design analysis" for evaluating the size of an effect).

The collection fees as a share of total loan value has a positive effect on payment rate. Particularly, every 10% points increase in the share of collection fees increases the probability of payment by 0.3% points. The most likely explanation for this effect is that collection fees are a bargaining chip for CMS firms. In case the debt belongs to the CMS firm, it is common practice to offer individuals a discount on collection fees, as long as the debtor agrees to pay. The larger the original amount of fees – and, consequently, the possible discount on the final amount to be paid – the higher the probability that debtor will agree to pay in case of a discount offer.

Loan value has a statistically significant (p<0.05) value on payment rate. Taken into account the significance of communication effect and the nature of the annoyance costs (see Chapter 3, Section 4 "The effect of a reminder"), I interacted loan value with the message delivery. I categorized individuals in three separate groups: (1) No message: individuals who were assigned to No message condition; (2) Treated: individuals who were assigned to receive any message and were treated; (3) Not treated: individuals who were assigned to receive any message but were not reachable. The regression results reveal that loan value has statistically significant effect only among those individuals who received a message (see Figure 4.5). The finding confirms the effect of annoyance costs, highlighting its strong correlation with the loan value. Among treated individuals, the difference in payment rate between a debt of \pounds 25 relative to a debt of \pounds 150 is around 1.5% points. However, the differences between debts of \pounds 150 and \pounds 300 are not as substantive, reaching only around 0.56% points. At the same time, loan value has practically no effect on payment rates among individuals who did not receive a reminder: either because were not assigned to receive one or were unreachable (see Figure 4.5).



Figure 4.4 Interaction effect of loan value on receiving a message in Experiment 1

Notes: Coefficients from the linear regression model with control variables included (see Appendix 4.10. Model (2)). Loan value is transformed and measured in log scale. Confidence intervals at 95% level. Source: Compiled by the author.

I also interacted message treatments with gender and age. None of the interactions are statistically significant (p>0.05). However, while the effect of a simple reminder—and that of a personalized message—increases within the age, the social norm effect is relatively constant across all age groups (see Figure 4.5). This suggests that a social norm message is effective among debtors younger than 39 years old.



Figure 4.5 CACE of social norm with interaction effect of debtor age in Experiment 1

Notes: Coefficients from the linear regression model with control variables included (see Appendix 4.11, Model (4)). The control group is a message with no social norm included (baseline payment rate among reached: 3%). Confidence intervals at 95% level. Source: Compiled by the author.

4.6. Conclusions

The field experiment in this chapter examined the potential of personalized and social norm messages to improve the payment rate among debtors in default on consumer debts. The experimental results suggest that the only effective way to collect debts is to constantly remind the individual about her liability. The communication effect is the only one that appears to be statistically significant from the experimental results.¹¹ Hence, it is not the content, but the reminder *per se*, which improves the payment rate among the defaulted individuals. As such, it suggests that behavioural change among the defaulted individuals can be enacted by increasing the annoyance costs by sending a repeated reminder.

Exploratory analysis of the experimental results reveals statistically significant correlation between receiving a reminder and loan value on the payment rate. This suggests that when the sums involved are relatively small, increasing the annoyance costs with nudging are effective in triggering repayment.

The effect of debt size on payment rate is similar to the findings from a tax compliance field experiment by Blumenthal, Charles, and Slemrod (1998). They also examine the effects of interacting the treatment text and the income level groups. A positive treatment effect was observed among middle- and low-income groups while a negative effect was recorded among high-income individuals (gross annual income over \$100,000). However, the effect was not because of the annoyance costs, as in this chapter's field experiment. There, the treatment text stated that the taxpayer had been randomly selected in a study and that individual income tax returns would be closely examined. Hence, the treatment would more likely be thought of as a threat. The experimental results of this study show that threats are not necessary to improve

¹¹ As a robustness check, I controlled for the delivery status of a treatment message. In case the message was delivered, the payment rate increased for 3% points (p>0.01), confirming the communication effect hypothesis.

repayment rates and behavioural change can be achieved by effectively increasing the annoyance costs.

Exploratory analysis of the results also suggests that the debtor's age is a significant factor in the effects of social norm messaging. Among relatively young individuals (less than 39 years old) a social norm message is more effective than a generic reminder. This is not the case for any other treatment message (i.e., personalization). It might be that young people are more willing to adjust to existing social norms in the financial sphere than their older peers.

5. Non-performing Consumer Debts via Regular Mail

The results of the field experiment in the previous chapter suggest that defaulted debtors are unresponsive to payment reminders referring to social norm and/or being personalized. One of the reasons might be that the debtors have become immune to payment reminders since they receive them on a regular basis. In other words, the costs of annoyance are very low relative to the loan size. Another reason for a relatively low payment rate across the sample is that around half of the mobile text messages and emails sent during the experiment could not be delivered. Either the contact information held for the debtor was no longer current or applicable, or the debtor had blocked messages sent by the CMS firm.¹²

The field experiment in this chapter addresses these two problems, which were encountered in the previous chapter. First, the sample consists of individuals who have not been contacted via phone or email for almost two years. As such, they are more likely to pay attention to the message, as payment reminders do not arrive on a regular basis and debtors do not experience the annoyance costs. Second, I use regular mail as a communication channel. This communication channel is old-fashioned and a more expensive way of contacting debtors compared to mobile text messages and emails. However, it is more reliable in terms of delivery. There is no spam folder for regular mail letters.

¹² It is well documented that defaulters use various strategies to limit the possibilities that credit servicers can reach them (Alper 2007; Dawsey and Ausubel 2002; Drozd and Serrano-Padial 2013; Peebles 2011, 137)

In total, there are two research questions to be answered within this chapter. First, what is the effect of priming related to the ex-ante transaction costs for the debtors? Third, does any of the sophisticated messages deliver higher payment rate relative to generic reminder?

The experimental design is an adaptive–randomized trial, consisting of two phases. In Phase 1, the effect of five different messages is examined. Each debtor in the sample was randomly assigned to one of the following treatment messages: (1) a generic simple reminder; (2) a personalized message "signed" by the agent; (3) a social norm statement; (4) a reputation concern statement, and; (5) a combination of all previously mentioned treatments in one message. Additionally, half of all the letters were sent in red envelopes to examine the possible effect of salience on the repayment rate. As a result, Phase 1 consists of 10 different experimental conditions in a factorial design. In Phase 2, the single most effective treatment from Phase 1 is examined on a different and larger sample of debtors. The sample consisted of 2,000 debtors in Phase 1 and 2,821 debtors in the consequent Phase 2.

The results of the study suggest that messages with social norm or reputational concern statements are not effective at persuading debtors to repay, relative to a generic reminder. Personalization has a positive effect, but it is relatively small (i.e., not substantively meaningful). At the same time, mailing a message in a red envelope has a *negative effect*. A debtor receiving the reminder in a red envelope is 1.5% points less likely to repay the debt than a debtor receiving the message in a white envelope. This is the only statistically significant and substantial result of the experiment presented in this chapter. The chapter starts with a short review on adaptive designs regarding the randomized controlled trials. It is followed by a description of the experimental setting in which the field experiment took place. Then I focus on Phase 1 of the experiment. At first, I describe the experimental procedure and the treatments. Then, I present the findings on treatment effects and introduce exploratory analysis. The same structure is used to report on Phase 2 of the experiment. The last section summarizes the overall findings from the study.

5.1. On adaptive designs

Adaptive trial designs are common in multi-arm designs with an advantage of identifying the best-performing treatment with higher precision. The rule of thumb in adaptive designs is to identify the most effective treatments while the experiment is ongoing. Inefficient treatments are dropped, and all the financial resources are concentrated on the most promising ones. As such, adaptive trial designs increase the efficiency and minimizes the cost of randomized trials, as well as the statistical power of the study. It also prevents wasting of scarce resources on treatments that are found to produce no effect during the early stages of the experiment (Solomon, Cavanaugh, and Draine 2009, 135–36).

Another advantage of adaptive design is the increased robustness of the experimental results. If the experiment is done properly, replication should produce similar results. Deviations, if any, should be explainable. Adaptive designs integrate replication into the original study. It allows for a dramatic increase in confidence that the original finding is true and not a false positive (Maniadis, Tufano, and List 2014).

The risk of adaptive trial designs is in case of many competitive treatments with none of them being superior. In this case, decisions on which treatments invest more resources and which ones to drop can be based on sampling variability rather than the superiority of a treatment arm. Offer-Westort et al. (2019) have found that in that case adaptive trial designs do not provide better estimates than static designs.

There are several versions of adaptive trial designs. One approach is to allocate relatively more individuals to the most promising treatment arm than to other treatment arms. Other applications drop the least promising treatment arms from the trial completely, allocating individuals to remaining experimental conditions evenly. Such adaptive trial design is used in a study by Haynes et al. (2013). Their field experiment on the collection of delinquent fines in the United Kingdom consists of two phases. In the first phase, they use five treatment conditions. For the second phase, they drop the least effective condition. In the result, the study provides more precise estimate of the treatment effect, as well as minimizes the possibility of false-positive finding (Berman et al. 2018).

This study builds on the adaptive trial design as set out in Haynes et al. (2013). In Phase 1, the experiment includes five different treatment conditions plus an examination of the effect of the red-coloured envelope. In Phase 2, only the most effective condition from Phase 1 is included and is examined repeatedly. The control group in both phases is a generic simple reminder sent from the CMS firm in a white envelope. In each phase, a different sample of defaulted debtors is used. The size of the sample for Phase 2 is adjusted to reach 80% statistical power assuming that the treatment effect size remains similar to Phase 1.

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5.2. Setting

Regular mail plays an important role in the credit servicing process in Latvia, even as communication technologies develop and other channels become more popular. The continued salience of regular mail is an outcome of a legal requirement. According to the law, if no reminder about a debt is sent within a three-year period, the debtor is automatically released of any further obligation to repay it. Hence, credit servicers make sure to send a debt reminder via regular mail at least once every three years. However, as this is more expensive than sending a mobile text message or email, CMS firms eschew using mail letters on a regular basis, instead using this channel only to fulfil the legal requirement.

5.3. Sample

The main criteria for selecting a debtor for the experiment presented in this chapter is no recent contact via digital channels. More specifically, the debtors in the sample had not been reached by the CMS firm via phone call, text message and/or email since at least January 2015, i.e., almost 1.5 years from the start of the experiment. As noted earlier, this is because either the phone number and email address on file for the debtor were either incorrect or no longer current/valid, or because the debtor had blocked messages from the CMS firm's number and/or email address.

In all other respects, the sample is similar to the experiment presented in the previous chapter. In this chapter, as in the last, debtors in the sample had defaulted on debts with banks, leasing firms, payday loan companies, or catalogue merchants. Those debts had then been ceded to the CMS firm after being considered non-performing by the original lender. Usually, this means that there has been no payment activity for at least 90 days.

5.4. Phase 1: Treatments

The treatments in Phase 1 examine several of the hypotheses set out in Chapter 2. The design of the experiment allows for the estimation of the effect of personalization, reference to social norm and reputational concerns on payment rate. Examination of personalization is accomplished by framing the treatment text as if sent personally from a credit servicing agent instead of the company. The letter is signed by an agent and a personal tone is used in offering the debt-repayment plan to the debtor. The other two treatment groups are not personalized and receive the message from the CMS firm. In these experimental conditions, I manipulate the content of the message. It examines either social norm or reputational concerns hypothesis.

For an individual assigned to receive a social norm message, the text includes a statement that 80% of individuals fulfil their payment obligations. It also points out that the addressee is in a minority that does not pay. For an individual assigned to receive the reputational concern treatment, the information regarding reputational risk is placed in the heading in addition to the footer of the letter as for everybody else in the experiment. Lastly, an additional treatment group is given a combined treatment comprising all of the three aforementioned statements (personalization, social norm and reputational concern) in one text template. As such, I use five different text templates in Phase 1.

1st level hypotheses	2nd level hypothesis: Salience	Header	Treatment text	Signature
[Control group]	White	THIS IS A	So far we have not reached agreement on repayment of the debt.	Lindorff
	Red	OFFER		
Social norm	White	YOU'RE ONE OF THE FEW WHO	Around 80% of Latvians pay their liabilities on time.* You are one of the few who does not do so.	Lindorff
	Red	WE HAVE AN OFFER		
Personalization (Agent)	White	MY OFFER FOR YOU	This is John writing, a consultant from Lindorff. After investigating your case, I can see that so far you have not reached agreement on repayment of the debt.	John, Lindorff consultant
	Red			
Reputation	White	YOUR REPUTATION IS IMPORTANT	This envelope was delivered by the mailman to you because so far we have not reached agreement on repayment of the debt.	Lindorff
	Red			
All in one (Reputation & Social norm & Agent)	White	YOUR REPUTATION IS IMPORTANT; YOU'RE ONE OF THE FEW WHO DOES NOT PAY; I HAVE AN OFFER FOR YOU	This is John writing, a consultant from Lindorff. After investigating your case, I can see that so far you have not reached agreement on repayment of the debt. This red envelope was delivered by the mailman to only a few people, as around 80% pay their liabilities on time.* You are one of the few who does not do so.	John, Lindorff consultant
	Red			

Source: Compiled by the author.

When individuals are randomized among these five treatment groups, I add another manipulation to the experimental design. Namely, one half of all the letters are sent in red envelopes while the other half are sent in white envelopes. This allows me to examine the salience hypothesis and ex-ante transaction costs (see Chapter 2, Section "Salience"). Hence, the experiment has a factorial design with ten experimental conditions. One factor is the content of the letter and the other is the colour of the envelope (see Table 5.1). For an individual assigned to receive a social norm message, the text includes a statement that 80% of individuals fulfil their payment obligations. It also points out that the addressee is in a minority that does not pay. For an individual assigned to receive the reputational concern treatment, the information regarding reputational risk is placed in the heading in addition to the footer of the letter as for everybody else in the experiment. Lastly, an additional treatment group is given a combined treatment comprising all of the three aforementioned statements (personalization, social norm and reputational concern) in one text template. As such, I use five different text templates in Phase 1.

5.5. Phase 1: Procedure

The anonymized sample was prepared and delivered to me by the CMS firm using the following criteria: (1) the debt was at least ≤ 50 and; (2) there had been no contact with the debtor since at least January 2015. As a result, the sample consisted of 2,000 individuals with a debt size ranging from $\leq 50-\leq 4,400$. The available information on each of the individuals in the sample allowed me to create new variables such as region, gender and ethnicity. All of the covariates were used for blocked randomization, as well as in regressions when estimating the results (see Appendix 5.1 for descriptive statistics).

After allocating each individual to one of the ten experimental conditions, the list of debtors was sent back to the CMS firm to execute the dispatch of the regular mail letters. The letters were sent out on May 2nd, 2016. Usually, it takes 1–3 business days for the mail letter to

arrive in the post box. The letters were sent on Monday, meaning that individuals should receive them no later than by the end of the week.

One month after the letters are sent, the CMS firm prepared the report on payment status of each case. It was used to create the dependent variable – payment rate. If a debtor had started to pay back the debt or have paid it in full during the period of May 3rd to June 6th, 2016, the case is marked as "1", In all other cases, the case is marked as "0".

5.6. Phase 1: Results

The average payment rate in the sample is 2%. The payment rate across the treatment arms ranges from 1% to 5% (see Figure 5.1), suggesting that some treatments are more effective among debtors than others.



Figure 5.1 Payment rate in each experimental condition in Experiment 2, Phase 1

Notes: Coefficients from the linear probability model with controls (see Appendix 5.3, Model (4)). Confidence intervals at 95% level. Vertical line represents payment rate in the control group (Simple reminder) Source: Compiled by the author.

A small number of letters were returned to the CMS firm and most of the messages (95.8%) were delivered. The relative frequency of returned letters ranged from 2% to 7% among the treatment arms (see Appendix 5.2 on delivery rates for each of the experimental conditions).¹³ In the subsequent analysis, I am reporting on both ITT and CACE estimates (see Chapter 3, Section 10 "Non-compliance"), but focus on the latter.

Salience effect

The results suggest that the red colour of the envelope backfires, undermining successful credit servicing efforts. On average, those who received the message from the CMS firm in a red envelope are 1.5% points less likely to repay their debt compared to those who receive a letter in a white envelope (p<0.05) (see Appendix 5.4, Model (4)).¹⁴

All of the treatment messages in a red envelope have a lower payment rate than the identical treatment messages in a white envelope. This suggests that red envelope reduces the ex-ante transaction costs relative to white envelope, as the recipient does not read the letter after noticing the distinctive colour of the envelope.

¹³ A chi-square of equal proportions of delivery rates across the treatment groups is statistically significant (p<0.001), meaning that some of the treatment groups (red envelope with a simple reminder or agent treatment; white letter with all the treatment messages included) were more likely to have been incorrectly addressed. However, it might be that the statistical significance is a false positive, as I am examining nine hypotheses simultaneously. Following a check, this turned out to be true. None of the experimental condition is statistically significant when examined against the multiple hypothesis assumption, following the procedure suggested by List et al. (2019).

¹⁴ The post-hoc power calculations (see Chapter 3, Section 9 "Statistical power and design") estimate the power of the red envelope effect at the 56% level (alpha=0.05). A statistically significant result of 1.5% points within this study design has a 0.004% chance of having a wrong sign and the magnitude of the true effect might be overestimated by an expected factor of 1.34 (see Appendix 5.9 for post-hoc power analysis of all regression models).

Personalization effect

A message signed personally from a credit servicing agent is the most effective treatment condition in Phase 1 (see Figure 5.2). The CACE is 2.1% points. However, it is statistically significant only at the marginal level (p<0.1) when regressed with all the control variables included. It becomes statistically insignificant when examined against the multiple hypothesis assumption (see Appendix 5.6), following the procedure suggested by List et al. (2019) (see Chapter 3, Section 11 "Multiple hypothesis testing).¹⁵

Social norm and reputational concerns

Messages with either social norm or reputational concern statements are around 1% point more effective than a simple reminder (see Figure 5.2). Although such a treatment effect is substantive, it is not statistically significant (p>0.1). Hence, it cannot be ruled out that priming an individual to social norm or reputational concerns has no effect compared to a generic reminder. When social norm and reputational concern message is included in one message and personalized by an agent name, the message has practically the same payment rate as generic reminder.

¹⁵ The post-hoc power calculations (see Chapter 3, Section 9 "Statistical power and design") for a 2% points treatment effect with a standard error of 00121 estimate the power of the study at 41% level (alpha=0.05). A statistically significant with such coefficients would presume a 0.028% probability of a wrong sign for a coefficient, as well as an exaggeration of a coefficient by an expected factor of 1.55 (see Appendix 5.9 for post-hoc power analysis of all regression models).


Figure 5.2 Effects for content treatment in Experiment 2 Phase 1

Notes: Coefficients from the linear probability model with controls (see Appendix 5.5 Model (2) and Model (4)). Confidence intervals at 95% level. Source: Compiled by the author.

Exploratory analysis

No covariate included in the linear probability model with standard robust errors has a statistically significant effect on the payment rate. As debt size has a marginal statistical significance (p<0.1), I interacted it with the assigned treatments—however, no significant effects were found.

I also looked at the treatment effects separately by gender. The salience effect is similar for both men and women. There are some substantive (albeit not statistically significant) gender effects regarding the content of the letter (see Figure 5.3) —namely, that women are more likely to respond to a personalized message. The ITT of a personalized message compared to a simple reminder among women is 4.4% points, while for men there is almost no effect—irrespective of whether the message was issued in the name of the company or personally signed by an agent. On the other hand, men are more responsive to the reputation treatment, which delivers a 2.7% points higher payment rate than the simple reminder condition. In both cases reported above, the coefficients are statistically significant at a marginal level (p<0.1). However, the estimates become statistically insignificant (p>0.1) when examined for multiple hypothesis issue (see Appendix 5.8).



Figure 5.3 CACE in subgroups of men and women in Experiment 2, Phase 1

Note: Coefficients from the linear probability model with controls (see Appendix 5.6, Model (4) & Appendix 5.7, Model (4)). Confidence intervals at 95% level. Source: Compiled by the author.

I also examined whether the gender of the agent makes a difference. There were in total 12 different agents working at the CMS firm by the time the experiment was launched, and each was randomly assigned to a personalized message. As a result, 41% of personalized letters were sent from a female agent while the remaining 59% were signed by a male agent. No statistically significant effects were found on the payment rate for the gender of an agent. I also interacted the gender of the debtor with the gender of the agent, but there were no significant effects.

5.7. Phase 2: Treatments

During the Phase 2, only two experimental conditions were included: (1) a simple reminder as a control group and; (2) the agent condition as a treatment group. The treatment text of letters for each condition was exactly the same as in Phase 1.¹⁶ In Phase 2, both templates were sent in white envelopes. The predicted CACE of a personalized message was 1.5% points. Power calculation was carried out before the start of the Phase 2 to reach 80% statistical power at a significance level $\alpha = 0.05$.¹⁷ As a result, each experimental condition was applied to 1,410 individuals. The study was pre-registered at the American Economic Association's Registry for randomized controlled trials (Saulitis 2018).

I also distinguished the agents signing the personalized message by gender. As a result, I randomized the debtors among three groups that received either: (1) a simple reminder or; (2) a personalized message from a female agent or; (3) a personalized message from a male agent (see Table 5.2 for all the conditions).

¹⁶ There were two minor changes across both conditions: (1) the footnote on data privacy was amended to comply with the EU General Data Protection Regulation, which was not in force when Phase 1 was launched and; (2) the name of the debt collection firm in Phase 2 was *Intrum*. In the intervening period, *Lindorff* had merged with *Intrum Jutstita*—a credit management services conglomerate originating in Sweden—and the combined entity was rebranded *Intrum*.

¹⁷ Stata command: sampsi 0.0175 0.0375, power(0.8)

The exploratory analysis of the experimental results from Phase 1 suggested that women respond more than men to a personalized message. For this reason, the experimental design for Phase 2 was pre-registered with the second prediction: there would be a significant difference in treatment effect between men and women under the personalization condition. In particular, the payment rate among the women is predicted to be significantly higher than the payment rate among men under the personalized message condition.

Sender/ Treatment	Header	Treatment text	Signature	Ν
Intrum	THIS IS A REMINDER & OFFER	So far, we have not reached agreement on repayment of the debt.	Intrum	1,410
Eduards	MV OFFER	This is Eduards/Rita writing, a consultant from Intrum. After investigating your	Eduards/Rita, Intrum consultant	705
Rita	FOR YOU	case, I can see that so far you have not reached the agreement on the repayment of the debt.		706

Table 5.2 Experimental conditions in Experiment 2, Phase 2

Source: Compiled by the author

The experimental procedure does not differ from Phase 1. The list of debtors is prepared and anonymized by the CMS firm and given to me to carry out blocked randomization to allocate the individuals among the experimental conditions (the descriptive statistics of the sample for the Phase 2 can be found in Appendix 5.10). The letters were sent on June 4th, 2018. The checkup on payment status for each case was carried out on July 6th, 2018. This was used to create the binary dependent variable, the payment rate.

5.8. Phase 2: Results

The average delivery rate across the three conditions is around 95% and does not significantly differ among the treatment conditions (see Appendix 5.11 for delivery rates across the experimental conditions). As with Phase 1, I focus my analysis on treated individuals, estimating CACE across the experimental conditions.

The payment rate in the control group (simple reminder sent by the CMS firm) is 1.1%. For messages signed personally by a credit servicing agent, the payment rate is higher than those issued in the name of the company. The CACE of a message signed by an agent is 0.5% points. This is substantively smaller than the treatment effect of a personalized message found in Phase 1, albeit within the 95% confidence interval. For messages signed personally by a female agent, there was a slightly higher treatment effect (0.7% points), as was seen in Phase 1, but still far from the predicted 1.5% point effect (see Figure 5.4).

The second prediction for Phase 2 was that women would pay significantly more following a personalized message. This hypothesis turns out to be false as well. Although a personalized letter was more effective among women than men, the difference is extremely small (0.05% points) and statistically not significant (see Appendix 5.14). The exploratory analysis reveals that none of the control variables correlates with the payment rate.



Figure 5.4 Treatment effect for the experimental conditions in Experiment 2, Phase 2

Note: Coefficients from the linear probability model with controls (see Appendix 5.12, Model (4) & Appendix 5.13, Model (4)). Confidence intervals at 95% level. Source: Compiled by the author.

Given the similarities of experimental design and setting for both phases, it is reasonable to pool the results to obtain the most precise estimate of the effect of personalization relative to simple reminder. In doing so, I am using fixed effects meta-analysis, using Bayesian (see Chapter 3, Section 13 "Meta-analysis of experimental results").

Table 5.3. Fixed Effects Meta-Analysis of Phases 1 & 2 in Experiment 2

Study	CACE	Standard error	p-value
Phase 1	3.2%*	0.0189	0.089
Phase 2	0.45%	0.0044	0.311
Pooled results	0.59%	0.0043	0.168

Notes: CACE estimates from regression models with controls. Estimate for pooled result calculated based on fixed effects meta-analysis procedure (Gerber and Green 2012, 358–65). ***p<0.01; **p<0.05; *p<0.1

When pooled, the study yields a CACE estimate of 0.6% of a personalized letter from a CMS agent in a white envelope relative to generic reminder in a white envelope (see Table 5.4). The result is not statistically significant (p<0.1), as both studies were not statistically significant.

5.9. Conclusions

There are three takeaways from the experiment presented in this chapter. The first is that the content of the letter does not have an effect on the payment rate. Neither a social norm message, nor a reputational concern statement significantly increases the number of debtors who make a payment on debt. When all treatment texts are combined in a single message, no higher payment rate among the debtors was found.

The second finding concerns the effect of personalization. Albeit the effect of personalization is consistently positive throughout both phases in the experiment, it is not statistically significant (p<0.05). In Phase 1 the effect was around 3% points, while in Phase 2 the effect was only around 0.5% points. The adaptive design of the experiment presented in this chapter allowed to pool together both phases to estimate the most precise result of a personalized messages, revealing that the effect is around 0.6% points. This result is not statistically significant (p>0.1).

The estimate of personalization of this study is also lower to that found in an experiment with microlenders in the Philippines (Karlan, Morten, and Zinman 2012). Although not statistically significant, among first-time borrowers the effect of a text message signed by a named officer increased the payment rate by 2.2% points relative to a simple reminder. The CACE for

personalization of this study was predicted to reach 1.5% points. The experimental results reveal that the effect of personalization among defaulted individuals is much lower, it cannot be ruled out that no difference with generic reminder exists. Probably, the reason why this study does not deliver significant effect of personalization is the specific sample for the experiment presented in this chapter. It is qualitatively different from previous studies on personalization effect of reminders. In this study, debtors have been in default on their debts for a long time and the communication was carried out only by regular mail.

The third finding concerns the salience effect. Messages communicated via a red envelope decreased the payment rate across all treatment conditions. If credit servicing is considered a marketing activity, then the finding is consistent with the observational study on salience effects in the field of direct mail marketing. Feld et al. (2013) found that marketing communications delivered in coloured envelopes other than the standard white envelope have a negative effect on the performance of a campaign. The reason for this is the ability for the receivers of the envelope to lower their *ex-ante* transaction costs when the design of an envelope signals the identity of the sender (see Chapter 2, subsection "Salience"). In such a case, the receiver does not have to open the letter to anticipate the content of the letter. Apparently, red colour of the envelope triggers individuals to consider that the content of the letter is not worth to read it.

Although previous observational studies in marketing have provided the evidence that the effect of a red colour is likely to be negative, this is the first causal evidence of such an effect. Secondly, as noted in Chapter 2, the evidence from laboratory studies suggest that while red

colour indeed triggers avoidance, it also enhances performance on a detail-oriented task (Mehta and Zhu 2009). However, in case the red colour of the envelope works as a trigger to lower the *ex-ante* transaction costs, it does not affect the task to be considered after reading the letter. Overall, this study provides causal evidence of a salience effect, i.e., the red colour of an envelope, in regular mail communication, but not in favour of the sender. The red envelope might stand out from other delivered letters in white envelope. However, it does not deliver better results than a message in a white envelope, but backfires and undermines credit servicing efforts.

6. Non-performing Debts with Public Hospitals via SMS & Emails

The aim of this chapter is to experimentally investigate the behavioural effects of social norm and public good statements, and personalization of the message on payment rate among those debtors with unpaid debt specifically to public institutions. This is accomplished by running a randomized controlled trial on a sample of 9,196 individuals with unpaid public hospital bills in Latvia. The field experiment was completed in cooperation with a CMS firm that is collecting unpaid bills on behalf of 16 public hospitals in Latvia. The experiment was launched at the end of August 2016 in a country where around 7% of hospital bills are paid late or not at all (Briede 2014; LETA 2014). The randomly assigned treatment texts were sent to recipients via mobile phone SMS and email text message.

The experimental results of this study indicate that addressing the recipient by name increases the payment rate among debtors with hospital bills. On the other hand, social norm and public goods messages have almost no effect on the payment rate compared to a generic reminder. The experimental design implied framing of a public good message as either a gain or a loss, but no framing effect for the public good message on the payment rate was observed.

6.1. Setting

Almost every patient in Latvia must pay a co-payment for public hospital services.¹⁸ The co-pay ranges from €1.42 to €35.57, depending on the service provided; the total sum of co-payments

¹⁸ There are some social groups, like children and the poor, who are exempted from the co-payments and are completely covered by the state.

for all services received for one treatment cannot exceed €355.72. There are no official estimates on unpaid patient liabilities, but journalistic reports indicate that the problem is large and that patients owe around €10 million to public hospitals in Latvia (Paparde 2014). To put this in perspective, there are aprox. 2 million people permanently resident in Latvia, meaning that each citizen owes, on average, €5 in unpaid hospital liabilities. The patient co-pay for public hospital services is considered to be one of the highest in Europe (OECD/EU 2016, 199; Paparde 2015; Vaivare 2014). On average, the patient co-pay on hospital visits in Latvia equates to about 35% of the total public expenditure on healthcare in the country (World Health Organization 2014).

Hospitals are not allowed to turn down a patient because of unpaid liabilities. Hence, the cost of defaulting is zero. However, as argued in Chapter 2, defaults cannot be explained by rational choice assumptions only, as individuals have other reasons to pay the debt. The goal of this study is to examine the potential of alternative messaging strategies next to sending a generic reminder to induce payment of a hospital debt.

6.2. Treatments

This study examines four hypotheses, which I developed in Chapter 2. First, I examine the communication effect hypothesis. I predict that receiving a generic reminder increases the payment rate relative to not sending a message because of increased annoyance costs. Second, I test the personalization hypothesis by addressing the recipient by name. I predict that it will increase the payment rate because of decreasing the social distance between the sender of a message and the receiver. Third, I examine various moral appeals as a way to improve the payment rate among the defaulted individuals with public hospital debts. Particularly, I examine

the social norm hypothesis, as I have done in all other experiments of this thesis. I look at whether information that 80% of patients pay their debt—including an explicit statement that the recipient is in the minority that does not pay—induces her to clear the debt. Fourth, the fact that individuals owe the money to public institutions allows me to examine another hypothesis. I have developed two treatment messages under the public good hypothesis. Both of these messages emphasize the consequences on provision of public goods from the recipient's action (i.e., failure to pay). This is based on prospect theory and goal framing (Kahneman and Tversky 1979). Lossframed message indicates that unpaid bills mean the hospital's ability to provide public health services is constrained. Gain-framed message, in contrast, indicates that a paid bill will increase a hospital's ability to provide those services.

I examine the effects of the constructed text messages separately, as well as interacting personalization with loss- and gain-framed public good messages. Such an experimental design allows me to additionally investigate whether a public good message, when addressed personally, is more effective than if it is sent without referring to the debtor personally. As a result, I have eight different experimental conditions, including the control group (see Table 6.1).

Hypothesis	Treatment line in email	Mobile text message
[Control group]	A reminder about your debt to the hospital!	A reminder: you have a debt to the hospital, case nr. 0123456. For the solution, call:76543210
Communication effect	No message	
Loss-framed public good	Unpaid bills limit the ability of the hospital to provide services to the public!	A reminder: you have a debt to the hospital, case nr. 0123456. Unpaid bills limit the ability of the hospital to provide services to the public! For the solution, call:76543210
Gain-framed public good	Paying your bill will increase the hospital's ability to provide services to the public!	A reminder: you owe to the hospital, case nr. 0123456. Paying your bill will increase the hospital's ability to provide services to the public! For the solution, call:76543210
Social norm	Around 80% of patients pay their hospital bill on time. You are in the minority that has not done so.	This is a reminder that you have a debt, case nr. 1234567. Around 80% of patients pay their hospital bill on time. You are in the minority that has not done so. Contact us to find a solution: 76543210
Personalization: Debtor name	[Name], a reminder about your debt to the hospital!	[Name], this is a reminder that you have a debt to the the hospital, case nr. 0123456. For the solution, call:76543210
Personalization & Loss-framed public good	[Name], unpaid bills limit the ability of the hospital to provide services to the public!	[Name]. you have a debt to the hospital, case nr. 0123456. Unpaid bills limit the ability of the hospital to provide services to the public! For the solution, call:76543210
Personalization & Gain-framed public good	[Name], paying your bill will increase the hospital's ability to provide services to the public!	[Name], you owe the hospital, case nr. 0123456. Unpaid bills limit the ability of the hospital to provide services to the public! For the solution, call:76543210

Table 6.1 Experimental conditions in Experiment 3

Source: Compiled by the author.

6.3. Sample

In total, there were 51 public hospital in Latvia when the experiment was launched. Sixteen of them had signed an agreement on debt collection with the particular CMS firm partnering with me on the experiment. Table 6.2 presents the number and kind of hospitals included in the study.

Type of a hospital	Total number of hospitals	Included in the experiment
University hospitals	3	2
Multi-profile hospitals	18	10
Specialized hospitals	12	2
Care hospitals	7	0
Outpatient hospitals	11	2
Total	51	16

Table 6.2 Summary data on Latvian hospitals

Source: National Health Service, 2017

The sample is relatively balanced both in terms of hospital type and regional coverage. Around one third of hospitals are based in capital Riga while the remaining ones are from different regions across Latvia. The majority of unpaid bills (77%) are with five hospitals. Three of those are located in Riga. The two remaining are located in Jelgava and in Liepāja, both of which are the largest cities in their respective regions (see Figure 6.1 for the location of hospitals).





Source: Compiled by the author.

The total sample for the experiment consisted of 9,196 unique debtors (see Appendix 6.1. for descriptive statistics of the study). The debtors have been on the CMS firm's books for at least 30 days prior and had received at least one generic reminder about the unpaid bill before the start of the experiment. The majority of cases had been in the collections process with the CMS firm for at least one year (75% of cases). Most of the debtors (79%) in the sample had only a phone number available, while 20% had both phone number and email address. The unpaid amounts ranged from $\xi 2$ to $\xi 3,785.57$ with a mean of around $\xi 54$.

Using the individual level information in the sample, I created a variable, which measures the distance between the hospital and the debtor's region of residence. This allows me to control the findings for correlation between the payment rate and debtor's distance to the hospital. Empirical findings from tax collection experiments indicate that if revenues are spent locally, the payment rate is higher than where revenues are allocated at the federal level (Torgler 2007, Chapter 5). Tax collection has also been proven to be significantly higher under a de-centralized taxation regime than a centralized one in a laboratory setting (Casal et al. 2016; Güth, Levati, and Sausgruber 2005).

6.4. Procedure

To allocate individuals to one of eight experimental conditions, I use blocked randomization. As a result, the individuals are assigned either to a group that receives no message at all throughout the experiment, or one of the seven groups that receives a message (different for all seven

groups). The use of blocked randomization ensures that treatment groups are not significantly different in terms of covariates.¹⁹

Both emails and text messages are sent at the same time via the CMS firm's automated system. After a week, subjects who had not paid back the debt or signed up for a repayment plan receives the same assigned message repeatedly. As a result, the debtor receives a maximum of two emails and two mobile text messages if both communication channels are available. The first message was sent on Wednesday, August 31st, 2016.

The variable of interest in the experiment is the payment rate, which was marked "1" if a debtor started to pay back the debt or "0" otherwise. The report on each individual's payment activity was prepared by the CMS firm on October 4th, 2016, one month after the final intervention. Having a month between the last intervention and the check on payment activity ensured that the debtor had had enough time to respond to the intervention and make a payment. No communication was carried out from the CMS firm with the debtors in the sample between 30 days before the start of the experiment and the final check of payment activity.

6.5. Results

The overall payment rate in the sample is extremely low. On average, only 1% of individuals in the sample made any payment on the debt within the month following the final intervention Figure 6.2 shows the payment rate in each experimental condition.

¹⁹ See Chapter 3 for more detail on sample preparation for the randomization procedure and blocked randomization. Descriptive statistics for each experimental condition are available in Appendix 6.1.



Figure 6.2 Payment rate in each experimental condition in Experiment 3

Notes: Coefficients from the linear probability model with control variables included (see Appendix 6.3). Confidence intervals at 95% level. Source: Compiled by the author.

More than half of the assigned messages (54%) were not delivered during the experiment. The delivery rate was relatively similar across all the conditions.²⁰ The relatively low delivery rate means that the CACE — which captures the payment rate among those actually reached—is a more meaningful estimate than the overall ATE, which includes both compliers and noncompliers (see Chapter 3, Section 10 "Non-compliance" on the differences between the two

²⁰ See Appendix 6.2 for delivery rates across conditions. A chi-square test of equal proportions across the seven treatment groups has a p value of 0.085, meaning that none of the conditions was more likely to have individuals who were assigned, but not treated.

estimates). In what follows, I report on both ITT and CACE, but focus on analysing the latter estimate.

Communication effect

I hypothesized that a generic reminder would increase the payment rate among defaulters relative of not receiving a message. The ITT for not sending a message is around 0.7% points lower compared to any of the experimental conditions involving the sending of a message. It suggests that there are certain annoyance costs attached to the reminder, disregards the content of the message. The estimated CACE for No Message condition is –1.3% points (p<0.05) relative to a generic reminder (see Appendix 4.6 for the regression results)

Although not receiving a message delivers 0.53% point increase in CACE estimate (see Appendix 6.4.), the communication effect hypothesis has to be rejected, as the difference is not statistically significant (p>0.1).²¹ Hence, the annoyance costs associated with sending a repeated reminder on a debt are not sufficient to trigger behavioural change to make a payment on a debt with a public hospital.

Personalization effect

As already visible in Figure 6.2, personalized messages are substantively more effective than nonpersonalized ones. The regression analysis confirms that the difference between non-

²¹ The post-hoc power analysis (see Chapter 3, Section 9 "Statistical power and design analysis") reveals that the statistical power of the study is 11%, the probability of statistically significant estimate to have a wrong sign is 3.7% and the exaggeration rate is 3.58 (see Appendix 6.10 for full report on post-how power analysis of all treatments).

personalized and personalized message is statistically significant (p<0.05).²² Among compliers, a message addressed to the debtor's name increases the payment rate by 1% point compared to a non-personalized message, confirming the personalization hypothesis (see Appendix 6.5 for full regression results).



Figure 6.3 Treatment effect of personalization (Debtor name) in Experiment 3

Notes: Coefficients from the linear probability model with control variables included (see Appendix 6.5, Model (2) & (4)). Confidence intervals at 95% level. The payment rate in the control condition (No personalization) is 1.57%. Source: Compiled by the author.

Social norm and public goods effect

Neither social norm, nor any kind of a frame for public goods message is significantly more effective than the generic reminder. All treatments deliver payment rate of around 2% among

²² As there are more than one treatment group, I carried out a separate robustness check to address the multiple hypothesis problem (List, Shaikh, and Xu 2019). Results remained significant for personalization effect at p<0.05 level (see Appendix 6.8 for full report on multiple hypothesis testing).

those who received the message. It is almost the same as in the case when no moral appeals are included in the message (see Figure 6.3).

Hence, the remaining two hypotheses (social norm; public good) have to be rejected. Neither social norm, nor public good message increased the payment rate. Also, there is no framing effect in relation to the public good messages, as the difference between both kinds of messages is small and not statistically significant.



Figure 6.4 Content treatment effect in Experiment 3

Notes: Coefficients from the marginal effects of linear probability model with control variables included (see Appendix 6.6, Model (2) & (4)). Vertical line represents baseline payment rate in the control group. Confidence intervals at 95% level. Source: Compiled by the author.

Albeit all of the moral appeals messages are with negative coefficients, it is more likely that these kind of messages do not have a substantive effect at all rather than a negative one. When all of the treatment groups of moral appeals messages are pooled together (see Appendix 6.7), the coefficient is still close to zero and not statistically significant (p>0.1) relative to a message with no moral appeals.

Exploratory analysis

There are several control variables that correlate strongly with the payment rate (see Appendix 6.3, Model (2)). First, the likelihood of payment increases as the age of the debtor increases. In particular, each ten-year increase in age increases the payment rate by 0.23% points (p<0.05). women are almost 0.6% point more likely to pay back the debt across all the conditions (p<0.05). This confirms previous findings on taxation whereby women are usually more inclined to pay their tax debt than men (e.g., Alm et al. 2010; Kirchler and Maciejovsky 2001; Spicer and Hero 1985; Torgler 2003).

Another variable, which is significant in relation to the payment rate is the time since the bill is in the collection. Particularly, the longer the bill has been in collection, the lower the probability of a behavioural change. Each year decreases the likelihood of making a payment by around 0.5% points. It suggests that being under the radar of the CMS firm, who regularly sends reminders on the unpaid bill, progresses in 'desensitization' (see Chapter 2, Section 4). In other words, each next reminder makes the receiver care less and less about the outstanding bill.

As men make up more than two thirds of those included in the experiment, the findings here could reasonably be construed as describing the behaviour only of the predominant gender in the sample (Fagley and Miller 1997). Different outcomes under different treatment conditions have been evident in laboratory experiments on taxation (Brockmann, Genschel, and Seelkopf 2015). However, the gender subgroup analysis of the experimental results does not show any statistically significant differences among men and women under various experimental conditions (see Appendix 6.8).

There are statistically significant effects (p<0.05) of loan amount on payment rate (see Appendix 6.3, Mode (2)). First, the larger the debt, the lower the payment rate. Second, the higher the share of collection fees as of the total amount owed, the lower the likelihood of debt repayment. Particularly, every 10% points increase of collection fee ratio as of total debt amount lowers the probability of payment by 0.25% points. As a result, in case the collection fees constitute 50% of the total amount to be paid, the probability of making a payment is 1% point lower than in the case when collection fees constitute only 10% of the total outstanding amount.

6.6. Conclusions

Overall, there are two main findings from the field experiment presented in this chapter. First, personalizing the message has a strong effect on the payment rate. Addressing the message to the debtor by name in the treatment text increases the payment rate by 1% point, which is statistically significant (p<0.05). Similar results have been found in a field experiment carried out by Haynes et al. (2013). In their study, personalized messages were found to be the most effective way to collect delinquent court fines in the United Kingdom. The positive effect of a message

with a debtor name included confirms the personalization hypothesis set out in Chapter 2. Hence, the social distance is important in debt repayment and it can be decreased by referring to a debtor personally.

There are many possible explanations what exactly relatively close social distance evokes: sense of fear of being caught or willingness to reciprocate. The former relates to rational choice while the latter – to pro-social behaviour. It might be also that it is the combination of both that personalization effectively triggers and, subsequently, changes the behaviour of a debtor. Hence, a small and costless nudge—adding a recipient's name to the message—can potentially increase the payment rate for public services.

On the other hand, neither social norm nor public good messages had an effect. This suggests that these kinds of moral appeals do not work for individuals for individuals with a track record of poor payment discipline when it comes to debt. This confirms the previous finding from a tax compliance field experiment in Austria (Fellner, Sausgruber, and Traxler 2013), which found that a social norm message was not effective among potential TV fees evaders contacted via regular mail. Also, no framing effect of a public goods message was found to be statistically significant: neither relative to generic reminder, nor between the frames.

To put the statistically significant finding of a personalized message in a perspective, note that there are around 12 million visits per year at the hospitals in Latvia. As mentioned before, it is estimated that around 7% of all bills are not paid, which means it is around 840,000 outstanding bills not paid each year. The delivery rate for the sample in this experiment was around 60%, therefore, it means there are roughly 500,000 bills with a possibility to be recovered by sending

a reminder. Imagine that holders of these bills receive reminder with no personalization, which recovered on average ≤ 1 per case in this experiment. That would result in revenues of $\leq 500,000$. Next, suppose that, instead, the reminder would include the first name of the debt holder. This kind of message customization increased the collected revenues on average by ≤ 0.80 per case in this experiment. This change would therefore recover additional $\leq 400,000$ among the unpaid hospital bills each year. Hence, the effect of a personalized message on the full universe of unpaid bills would deliver substantively more value in recovered debts.

Lastly, the statistically significant effect of the share of collection fees in the total amount owed suggests that sense of justice plays significant role for the motivation to pay the outstanding bill (see Chapter 2, Section 2.). If the debtor considers that the collection fees are unreasonably high as a share of the total amount to be paid, the debtor is more likely to remain in the status of default.

7. Performing Consumer Debts via SMS & Email

The studies presented in the previous chapters have dealt with debtors who have already gone into default before the start of the experiments conducted. However, as noted in the chapter on reasons for paying debt, defaulters are a slight minority in society. Most people repay their debts. The larger problem is one of *timely payback*. A recent pan-European household survey has revealed that more than half of European households missed at least one payment on their credit, mortgage or utilities bills in the previous 12 months (Saulītis 2018). Does a payment reminder make people more disciplined? The goal of the field experiment presented in this chapter is to explore the effect of personalization and social norm messaging in forestalling repeated default among the individuals with monthly payments on their debt.

The treatment conditions for the field experiment presented in this chapter do not differ from the field experiment presented in Chapter 4, which examined the effect of reminders on the behaviour of debtors who have defaulted on consumer loans. In this field experiment, I also examine the communication effect, social norm and personalization hypotheses. Individuals either receive no message at all or one of eight assigned treatment texts via mobile text messages and emails. I examine their effect relative to generic reminder on a sample of non-defaulted debtors with consumer loans on a monthly debt-repayment plan.

The results of the field experiment show that annoyance costs have strong effect on payment rate. Individuals who did not receive the reminder during the experiment were more likely to pay than individuals who received the message. Hence, the best strategy would be to

not remind about the scheduled payment. On a condition that a reminder is being sent, the most effective messages are the personalized ones.

7.1. Experimental setting

According to a survey carried out by the CMS firm *Intrum*, with whom I cooperated for this thesis project, 21% of respondents in Latvia are late on making a payment because they simply forgot about it (Saulītis 2018). For this reason, a payment reminder should be effective in improving the payment rate, as it does exactly what is needed—reminding of a payment due.

As already noted in Chapter 3, section "The effect of a reminder", reminders in some cases improve the payment rate while in other cases they have no effect. A study by Cadena and Schoar (2011) found that payment reminders significantly increase timely payment by 9% points and are as effective as financial incentives. In another study, text messages improved payment discipline among the credit card customers of an Islamic bank in Indonesia on average by 4.4% points from a baseline of 66% (Bursztyn et al. 2015). However, there was no effect for a simple reminder; only messages with various moral appeals worked. No effect for any kind of a reminder was observed in a field experiment by Karlan et al. (2012) with a microlender in Philippines. The only subgroup in which a positive effect was found were repeat borrowers. In that case, a personal message from a bank manager improved the payment rate.

7.2. Treatments

It is a daily practice for a CMS firm to send a simple reminder via mobile text messages and emails on a scheduled payment. For this reason, the control group for the experiment is generic

reminder. Individuals assigned to treatment groups either receive one of the seven treatment messages or no message at all. Experimental conditions examined the various ways of personalizing the message or including a social norm statement in the message. I examine the hypotheses both separately and in combination with each other (see Table 7.1).

Hypothesis	Treatment line in email	Mobile text message
[Control group]	Reminder about the payment!	This is a reminder that you have a payment due, case nr. 1234567. Thank you if the payment has been already made. Tel. 76543210
Communication effect	No message	
Social norm	Around 80% pay their liabilities on time. Don't be in the minority that does not do so.	This is a reminder that you have a payment due, case nr. 1234567. Around 80% pay their liabilities on time. Don't be in the minority that does not do so. Thank you if the payment has been already made. Tel. 76543210.
Personalization: Debtor name	[Name], reminder about the payment!	[Name], this is a reminder that you have a payment due, case nr. 1234567. Thank you if the payment has been already made. Tel. 76543210
Personalization: Agent name	I remind you of a payment due!	I remind you of a payment due, case nr. 1234567. Thank you if the payment has been already made. Tel. 76543210. Best, Anna
Personalization: Debtor & Agent name	[Name], I remind you of a payment due!	[Name], I remind you of a payment due, case nr. 1234567. Thank you if the payment has been already made. Tel. 76543210. Best, Anna
Personalization (Debtor name) & Social norm	[Name], around 80% pay their liabilities on time. Don't be in the minority that does not do so.	[Name], this is a reminder that you have a payment due, case nr. 1234567. Around 80% pay their liabilities on time. Don't be in the minority that does not do so. Thank you if the payment has been already made. Tel. 76543210.
Personalization (Agent name) & Social norm	Around 80% pay their liabilities on time. Don't be in the minority that does not do so.	I remind you of a payment due, case nr. 1234567. Around 80% pay their liabilities on time. Don't be in the minority that does not do so. Thank you if the payment has been already made. Tel. 76543210. Best, Anna.
Personalization (Debtor & Agent name) & Social norm	[Name], around 80% pay their liabilities on time. Don't be in the minority that does not do so.	[Name], I remind you of a payment due, case nr. 1234567. Around 80% pay their liabilities on time. Don't be in the minority that does not do so. Thank you if the payment has been already made. Tel. 76543210. Best, Anna.

 Table 7.1 Experimental conditions in Experiment 4

Source: Compiled by the author.

7.3. Sample

The sample consists of 1,682 debtors with consumer debts. These individuals were once in a state of default, but had agreed with the CMS firm on a debt-repayment plan before the experiment began. The usual monthly payment is between €20 and €50. Payment is made via bank transfer to the CMS firm's bank account. At the start of the experiment all of the individuals in the sample were either making payments (i.e., the most recent payment had been made no later than 30 days prior), or, alternatively, they had promised in the 30 days prior to the start of the experiment to make the first payment on a previously defaulted debt.

7.4. Procedure

The blocked randomization process was used to create nine experimental conditions with no statistically significant differences regarding loan value, debtor's age and other characteristics (for descriptive statistics with balance tests across the experimental conditions see Appendix 7.1). The intensity of the intervention with a treatment message replicated the daily operations of the CMS firm. The debtor received the assigned message at least two times in a period of eight weeks. It was sent during the week the monthly payment was due. Additionally, if the payment was not made before or on the due date, the debtor received the same assigned message repeatedly for another week until the end of the experiment on March 31st, 2016. The final check on files was done on April 3rd, 2016 to set the dependent variable—namely, the payment rate. This is a binary variable indicating whether a debtor had paid according to the payment plan (marked as "1") or had not made a payment (marked as "0").

7.5. Results

On average, nearly half of all debtors (47%) did not make the scheduled payment during the eight weeks of the experiment (see Figure 7.1). Sending a simple reminder is as effective as sending no message. Moreover, all the treatment texts deliver lower payment rates than the control group. The greatest difference is with the social norm message condition. On average, receiving a social norm message decreased the payment rate by 9% points. The treatment effect for the social norm message becomes statistically significant (p<0.05) when the linear probability model includes covariates (see Appendix 6.2, Model (2)). However, it is not statistically significant when examined against the multiple hypothesis assumption (see Appendix 7.8 for full report on multiple hypothesis robustness check).





Notes: Marginal effects from the linear probability model with control variables included (see Appendix 7.2 Model (4)). Confidence intervals at 95% level. Vertical line represents payment rate in the control group (Simple reminder). Source: Compiled by the author.

Communication effect

There is no statistically significant communication effect in sending a simple reminder to debtor on a payment plan, with a coefficient suggesting that no communication brings around 1% point higher payment rate (see Appendix 7.4 model (2)). The post-hoc power analysis (see Appendix 7.9) reveals that there is a high chance that the direction of a sign of the estimate might be misleading (28% chance), as well as that the magnitude of the true effect might be overestimated 11 times. In other words, it cannot be ruled out that there is no effect, as well as that the effect might be a negative one.

As a robustness check, I used the delivery of a message as an instrument, as around one in four assigned messages (27%) were not delivered (see Appendix 7.4 for the delivery rates across the experimental conditions). I compared the payment rate between those who received the message (compliers) and those who were assigned to the treatment, but the message was not delivered (non-compliers).

The linear probability model with the delivery status of a treatment message included as a covariate shows that non-compliers have a higher payment rate relative to compliers (see Appendix 7.5). In other words, if a debtor received the assigned reminder message, the likelihood of making a payment is 12% points lower relative to a debtor who was assigned to receive the same reminder, but the message was not delivered (p<0.01).²³ I also interacted the experimental condition with the delivery of a message (see Figure 7.2).

²³ As a robustness check, I also introduced the delivery rate to the linear probability models for the experiments of the three other studies discussed in this thesis. The experiment presented in this chapter is the only one where the delivery of a message decreased the payment rate. In all other experiments, the delivery of a message increased the payment rate.



Figure 7.2 Payment rates (delivered vs non-delivered messages) in Experiment 4

Notes: Marginal effects from the linear regression model with control variables included (see Appendix 7.5., Model (3)). Confidence intervals at 95% level. Source: Compiled by the author.

The introduced interaction effect of delivery on treatment message reveals that noncompliers have a higher payment rate than compliers. For instance, among those individuals who received the assigned simple reminder, the payment rate is 46%. Among those individuals who did not receive the assigned simple reminder, the payment rate is 66%. The difference between the two conditions is statistically significant (p<0.05). Hence, there is strong evidence to reject the communication effect hypothesis. Receiving a reminder on a scheduled payment *does not* increase payment rate. Rather, it increases the annoyance costs related to the payment. As a result, reminding on a scheduled payment backfires the collection efforts, reducing the overall payment rate.

Personalization effect

It is daily practice for a CMS firm to send a reminder to a debtor on a scheduled payment. Therefore, it is important to discuss the most effective way to approach the debtor despite the fact that examination of communication effect revealed that the best strategy would be *not* to send a message. Also, as noted in Chapter 2, the goal of this study is to gather behavioural insights on what makes people to pay. Comparison between generic reminder and more sophisticated messages delivers broader understanding behind the motivation among the individuals regards their financial decisions. It may reveal what is the best strategy to remind on a payment, conditional on a rule that the reminder is being sent. As around one in four messages were not delivered I focus on the so CACE estimates, albeit I report also on estimates on full sample, i.e., ITT.

The experimental results reveal that personalized messages increase the payment rate by 3.7% points, but the difference between non-personalized message and any personalized one is not statistically significant (p>0.1). A message with a debtor's name included is statistically significant at the marginal level (p<0.1) in a model with no covariates included (see Appendix 7.6, Model (3)), but when controlled for covariates, the CACE for a message with debtor name included reaches 5% points and becomes statistically insignificant (see Appendix 7.6, Model (4)).²⁴

²⁴ The post-hoc power analysis (see Chapter 3, Section 9 "Power calculations and design analysis") reveals that the effect of personalization (Debtor name) has a statistical power of 30%, the probability of having a wrong sign of the estimate is 1%, the magnitude of the true effect might be overestimated by an expected factor 1.84.

Figure 7.3 CACE regards personalization in Experiment 4



Notes: Coefficients from the linear regression model with control variables included (see Appendix 7.6., Models (2) & (4)). Confidence intervals at 95% level. Vertical line represents the baseline, i.e., payment rate in the No personalization condition. Source: Compiled by the author.

Hence, the personalization hypothesis has to be rejected. Although when a reminder is customized and includes a personalization, the CACE is positive compared to a message with no personalization, none of the personalized messages are statistically significant.

Social norm effect

The experimental condition in which only a social norm message is included is the one that has the largest negative coefficient relative to a simple reminder (see Figure 7.1). When treatments are pooled together based on whether the social norm is included in the message, the social norm effect on the payment rate becomes similar to that of the simple reminder (see Figure 7.4). In other words, there is no effect for inclusion of a social norm statement in a message. Hence, the social norm hypothesis has to be rejected.



Figure 7.4 Treatment effect regards social norm in Experiment 4

Notes: Coefficients from the linear regression model with control variables included (see Appendix 7.7 Model (2) & (4)). Confidence intervals at 95% level. Source: Compiled by the author.

Exploratory analysis

Regression models with all control variables included reveal that the most important covariate regarding the payment rate is the *type of debt* (see Appendix 4.5, Model (2)). When the debt has originated from one kind of financial institution or another (e.g. bank or payday loan provider), the debtor is more likely to make the payment compared to debts with catalogue merchants or service providers (e.g. phone company). The difference in the likelihood of paying the debt ranges from 19% points (payday loans) to 26% points (banks) compared to catalogue merchants

(p<0.01). The reason might be that banks and payday loan providers do substantial screening of the potential loan-taker while catalogue merchants and service providers do little evaluation of the person's creditworthiness before extending credit. As a result, banks and payday loan service providers attract less-risky borrowers (see Chapter 2, Section 2.1.), who are less likely to default on their debts.

The size of debt does not have a statistically significant effect on debt repayment. At the same time, the share of collection fees in the total value of debt correlates with the likelihood of making a payment. Particularly, every 10% points increase of collection fees as the share of total debt value decreases the payment rate by 2% points.

There are significant differences in the payment rate in terms of the communication channel through which the message is delivered. The most effective way to increase the payment rate is to remind the debtor of the scheduled payment via both channels: mobile text message and email. In that case, the probability of making a payment increases by 5.2% points relative to sending only a text message (p<0.05). There are no significant differences if a message is sent only through one communication channel (either a mobile text message or an email). However, it has to be reminded that the communication channel has not been randomized among the individuals in the experiment.

Women are 9.7% points more likely to pay back the debt than men. Also, the debtor's age has a large effect whether the scheduled payment is fulfilled or not (see Figure 7.5). A debtor who is 20 years old is 20% points less likely to make a payment compared to a 50-year-old. In addition,
as the size of the loan increases, the likelihood of payment decreases. Finally, the further back in time the date when the loan was taken is, the lower the probability of making a payment.



Figure 7.5 Payment rate in relation to debtor age in Experiment 4

7.6. Conclusions

The field experiment in this chapter differs from other studies presented in this thesis. It examines the behaviour among debtors who have committed to repay the debt. The overall conclusion from the field experiment presented in this chapter is that sending a reminder backfires the collection efforts by the CMS firms.

Notes: Coefficients from the linear regression model with control variables included (see Appendix 7.3., Model (2)). Confidence intervals at 95% level. Source: Compiled by the author.

One of the interpretations for this finding is related in the nature of annoyance costs and in the context of the CMS firm operating business. As noted in Chapter 2, increasing the costs of annoyance by sending repeated reminders on an unpaid debt is one of the strategies how CMS firms attempt to change the behaviour of default individuals that they would start to repay their debt. In case costs of annoyance, i.e., receiving a message from CMS firm, have been the reason for a debtor to agree on a debt repayment plan, having received another reminder on a debt – even for a scheduled payment – does not diminish these costs. In that case, it can trigger the debtor to punish CMS firm and strategically default repeatedly on a debt.

I would like to underscore that a reminder is effective in certain circumstances. It has improved the payment rate in several field experiments among the debtors on a repayment plan, as I noted before, as well as in the experiment presented in Chapter 3. Reminder is effective among a specific segment of debtors: those who lack attention to future goals (Karlan et al. 2016, 3403). These individuals should welcome a reminder, as it helps them to fulfil their goals. The most important thing is to identify this group within the entire population of debtors. One of the solutions to make a reminder of a scheduled payment effective is to ask to whether the debtor would like to be reminded in the first place. Such a step makes the relationship between the debtor and the lender more personal and equal, as the CMS firm is requesting the debtor's permission to send future communications.

Hence, there are two types of recipient that are having opposite behaviour after receiving a reminder on a scheduled payment. For individuals, who are forgetful, reminder will improve the payment behaviour *despite of* increased costs of annoyance. For individuals, who are not

forgetful, reminder can backfire *because of* increased costs of annoyance. Therefore, one interpretation why no statistically significant differences were found between simple reminder and various treatment texts among those who received the randomly assigned message is that the sample of the experiment is compounded with both types of recipient.

8. General Discussion of the Results

The four field experiments presented in this thesis explore the effect of various messaging strategies to increase the payment rate among debtors. The messages were constructed based on models of rational choice, pro-social behaviour and non-informative dimensions. I used an experimental methodology to examine the effect of communication and personalization of a message, as well as statements of social norms, public goods and reputational concerns. The non-informative dimensions included in the treatments were related to framing and salience effects.

I was interested if any of these messages—or avoiding communication at all—makes individuals pay more than they would if they received only the usual generic reminder sent by the CMS firm. As such, the goal of this thesis has been to gather behavioural insights on the motives behind making a payment on a debt. In total, I studied the behaviour of more than 40,000 individuals in Latvia after randomly assigning them either to a condition where no reminder was sent or to one of several treatment messages.

As explained in Chapter 3, the random assignment of the experimental condition allows me to establish an unbiased causal relationship between the treatment message and the financial decision made by the individual debtors. This concluding chapter presents an overview of the results from all four studies of this thesis and a summary of the key findings and implications. In what follows, I summarize the findings regards each hypothesis set out in Chapter 2. Next to discussing the results of each experiment separately, I also pool the relevant treatment messages from each experiment and carry out a fixed-effects meta-analysis (see Chapter 2, Section "Meta-

analysis of research findings"). This allows me to aggregate the research findings on the behavioural insights of debt repayment. I report only CACE, as this is the most precise estimation of the treatment effect on those who were actually treated. I also discuss related findings from the exploratory analysis on the experimental results to explain the findings from the studies carried out in this thesis.

8.1. Communication effect

There are several reasons why a reminder on an unpaid debt—even a repeated one—can trigger behavioural change and result in repayment. First, a reminder for a defaulted individual can increase the assertion of the expected probability of legal enforcement on unpaid debt. This assumption is based on rational choice theory, which underlines that one of the reasons individuals follow obligations and obey rules is the fear of punishment (Becker 1968). Another reason that a generic reminder can do its intended job is that it can be annoying to the recipient. In this case, the behavioural change occurs because the costs of annoyance are high enough relative to the outstanding bill. However, these costs can also trigger adverse reactions under specific circumstances (Damgaard and Gravert 2018). The third explanation is related to the fact that individuals have limited attention in a world of multiple stimuli. Reminders help to concentrate recipients' attention on a particular issue, like paying a bill. A reminder is a cue that increases the likelihood that the choice that the message prompts recall of rises again to the top of the recipient's mind (Karlan et al. 2016). However, the effect of a reminder can diminish if the task is repetitive, and it becomes habitual (Taubinsky 2014). Also, it can develop a

"desensitization" effect with a repeated stimulus leading to no response at all (<u>Rankin et al.</u> 2009).

Three field experiments of this thesis examined the effect of a generic reminder. In Experiment 1 (consumer debts via SMS & e-mail) and Experiment 3 (public hospital debts via SMS & e-mail), defaulted individuals were reminded about outstanding debt with the intention that doing so would prompt a change in behaviour and repayment of the debt. In Experiment 4 (consumer debts via SMS & e-mail), individuals were reminded of an upcoming payment due per a previously agreed debt repayment plan. Hence, in Experiments 1 & 3, the intended goal of the reminder was to *change behaviour*. In Experiment 4, the intended goal was to prompt individuals to *stick with previously agreed behaviour*. The results of the meta-analysis of all three studies are shown in Table 8.1.

Study	CACE	Standard error	p-value
Experiment 1	1.26%**	0.0054	0.018
Experiment 3	-0.52%	0.0077	0.514
Experiment 4	-1.00%	0.0462	0.839
Pooled result	0.67%	0.0044	0.128

Table 8.1. Meta-analysis of the communication effect in the experiments

Notes: CACE estimates from two-stage least squares regressions with control variables included. Estimate for pooled result calculated based on a fixed effects meta-analysis procedure (Gerber and Green 2012, 358–65) ***p<0.01; **p<0.05; *p<0.1

Among the holders of consumer debts (Experiment 1), sending a generic reminder yields a statistically significant effect of 1.26% points relative to not sending a reminder (p<0.05). However, for individuals with hospital debts, there is no statistically significant communication effect, just as for individuals on a debt repayment plan. However, the exploratory analysis in Experiment 4 suggested that receiving a message has a *negative* effect on the payment rate. Notably, individuals who were assigned to any of the treatment messages but failed to receive it, are 14.4% points *less likely* to default (p<0.01) than those who were assigned to a message and treated.

There are two questions related to the findings from the experimental results on the communication effect. First, why there is a communication effect among defaulted individuals with *consumer debts* but no effect for those with *hospital debts*? One interpretation is that this is due to the different consequences arising from the non-repayment. With an unpaid or outstanding consumer debt, the likelihood the individual will be able to take out another consumer loan is circumscribed. However, with an unpaid public hospital debt, the individual can still access the services at the hospital. Hence, the expectation of being penalized for debts differs depending on whether the provider is a private or a public institution. For this reason, a generic reminder is effective among defaulted consumer debtors while it is not effective for individuals with unpaid public hospital bills.

Second, why is there a negative effect of receiving a reminder among individuals on a debt repayment plan? One interpretation is related to the nature of the task being prompted. Repetition and reminders are substitutes. If making a payment becomes habitual, a reminder is not necessary for the task to be fulfilled. That can explain why there is no positive effect for receiving a reminder on a scheduled payment, as for many in the sample making a monthly payment could have become a routine task, for which no reminder is necessary (Aarts, Verplanken, and Knippenberg 1998).

However, this does not explain why there would be a negative effect from receiving a message on a monthly payment, as well as no effect for debtors with hospital debts. An alternative explanation is that there are different evaluations of the costs of annoyance among the holders of various debts. For defaulted debtors with hospitals, the costs of annoyance for receiving a repeated reminder are not sufficient to change behaviour. This might be because the debt is from a public institution that provides a public good (I elaborate on this in section 8.2, explaining the positive personalization effect among holders of hospital debts).

For defaulted debtors with private lenders, the costs of annoyance are large enough to change behaviour. This interpretation is supported by the fact that the size of the consumer loan the individual has defaulted on has a statistically significant positive effect on the payment rate *under certain circumstances*. If the loan is smaller than ≤ 150 , individuals are more likely to pay if they have received a reminder relative to those individuals who have not received a message. When the loan is larger than ≤ 150 , the ability to change behaviour by increasing the costs of annoyance with a repeated reminder on a defaulted consumer loan diminishes. The interpretation that the costs of annoyance are significant for defaulted individuals with consumer debts is supported by exploratory analysis of the experimental results in Experiment 1. For debtors who were assigned to receive a treatment message, but were not treated, loan value has no effect on the payment rate.

For debtors with consumer loans on a repayment plan, an increase in the costs of annoyance by sending a reminder about a scheduled payment has the opposite effect than among the defaulted consumer debtors. Namely, a reminder triggers repeated default on a debt.

This occurs because with a promise to repay the debt, individuals expect that no further communication from the CMS firm will be sent. When this does not happen, it provokes a feeling of injustice for the debtor and thus increases the willingness to strategically default on a debt. In other words, debtors are willing to punish the CMS firm for its misconduct with countervailing misbehaviour. This is especially the case where the collection fees are relatively large as a share of the total value of the loan (the higher the share, the higher the likelihood of default), as identified in the exploratory analysis of the experimental results of debtors on a repayment plan.

Hence, among individuals who have already agreed to repay, a further reminder triggers psychological reactance—namely, "an unpleasant motivational arousal that emerges when people experience a threat to, or loss of, their free behaviors" (Steindl et al. 2015). The goal of such behaviour is the restoration of freedom of choice, autonomy, and a sense of control (Brehm 1966). Receiving a message on a scheduled payment might signal to individuals that they lack fully independent control over their own finances. This triggers individuals to act in a manner that manifests complete freedom on the debt they owe. In order to demonstrate this ability, *debtors choose not to pay*.

Another interpretation for the negative effect of a reminder among individuals on a debt repayment plan is that a reminder effectively pushes an individual to reconsider a previous decision to repay the debt. This is related to the phenomenon of *limited attention*. When a defaulted debtor has agreed on a repayment plan, the decision leaves the mind. Receiving a reminder reverses this action. Thus, the debtor is reminded that the promise can be broken (as was already done once before) and increases the likelihood of strategic default. The effect is close

to one when loan contracts explicitly state the possibility of walking away from the debt, effectively increasing the number of defaults (Wilkinson-Ryan 2011). Although the goal of additional information—be it a reminder or a description of the consequences of default—is to improve the payment rate, experiments in this thesis have proved that it can trigger the opposite effect when debtors are not acting according to the rational choice model.

The knowledge accumulated from field experiments around the world has suggested that generic reminders have no effect on the payment rate among non-defaulted borrowers. Reminders sent to individuals by a microlender in the Philippines were not effective irrespective of whether the reminder was sent on the due date or one or two days before (Karlan, Morten, and Zinman 2012). Another study on credit card holders in Indonesia has found no effect of a simple reminder on payment among those customers who had missed the payment due date (Bursztyn et al. 2015). However, it might be that in these studies, two types of debtors are present. There are debtors, who would welcome reminder, as they have self-control problems. Reminder helps them to focus on their task and complete it, as evident in a field study by Karlan (2016). At the same time, there is another type of debtor, for whom a reminder on a task they have promised to fulfil provokes psychological reactance. If both are present, the positive and negative results from a reminder cancel one another out. According to this interpretation, the majority of debtors in Experiment 4 are of the latter type.

To sum up, each of the three experiments examining the communication effect tells a nuanced story about how individuals decide to make a payment on a debt. For defaulted individuals with consumer debts, both the consequences of default and the costs of annoyance

are taken into account. As such, a generic reminder is effective to change the behaviour—but only on the condition that the debtor can afford it (i.e., the loan is relatively small). For defaulted debtors with public hospitals, the consequences of default and the costs of annoyance are not considered significant. Hence, a generic reminder is not effective to change behaviour. For consumer debtors on a repayment plan, the costs of annoyance are significant but in a direction that might not be expected, as a reminder can trigger a repeated default.

8.2. Personalization

I hypothesized that personalization would have a positive effect on the repayment rate because it effectively decreases the social distance between the debtor and the CMS firm. From this perspective, both rational and pro-social motives can trigger behavioural change. From a rational choice perspective, receiving a personalized message for the receiver increases the expected probability of being caught. On the other hand, it can also provoke reciprocal and pro-social behaviour or trust responsiveness (Gambetta 1990; Fehr and Fischbacher 2006).

In my experiments, I personalized the treatment messages in two ways—either by addressing the debtor by name or by signing the message with the name of a specific credit servicing agent instead of a company. Another treatment message combined both ways of personalization in one message. Table 8.2. pools all experiments that included any of the personalized messages as a treatment.

DEBTOR NAME	CACE	Standard error	p-value	
Experiment 1	0.12%	0.005	0.808	
Experiment 3	1.03%**	0.005	0.031	
Experiment 4	4.96%	0.034	0.149	
Pooled result	0.62%*	0.003	0.065	
AGENT NAME	CACE	Standard	n-value	
AGENTINAME	0.12% 0.005 1.03%** 0.005 4.96% 0.034 0.62%* 0.003 CACE Standard error -0.4% 0.005 2.1%* 0.012 0.5% 0.004 3.3% 0.034 0.2% 0.003 2.1%* 0.012 0.5% 0.004 3.3% 0.034 0.2% 0.003 0.2% 0.005 2.6% 0.034	p-value		
Experiment 1	-0.4%	0.005	0.417	
Experiment 2: Phase 1	2.1%*	0.012	0.086	
Experiment 2: Phase 2	0.5%	0.004	0.311	
Experiment 4	3.3%	0.034	0.335	
Pooled result	0.2%	0.003	0.509	
DERTOR & AGENT NAME	CACE	Standard	p-value	
DEBTOR & AGENT NAME	CACE	error		
Experiment 1	0.2%	0.005	0.747	
Experiment 4	2.6%	0.034	0.463	
Pooled result	0.2%	0.005	0.673	

Table 8.2. Meta-analysis of the personalization effect in the experiments

As visible in Table 8.2., in most cases, personalization delivers a positive effect on a payment rate across the experiments. However, in only one case is it statistically significant namely, a personalized message with the debtor's name included, which is effective among individuals with public hospital debts. In all other cases, personalization does not deliver a significant increase in the payment rate. For this reason, none of the ways of personalizing a message significantly increases the payment rate among the treated individuals when studies are pooled. Only debtor name reaches marginal statistical significance (p<0.1) for an estimated CACE of 0.6% points.

Notes: CACE estimates from regression models with controls. Estimate for pooled result calculated based on a fixed effects meta-analysis procedure (Gerber and Green 2012, 358–65) ***p<0.01; **p<0.05; *p<0.1

Do these experimental results shed light on whether personalization is based on rationality—namely, the fear of being caught—or in a willingness to reciprocate? I believe that both play the role. Personalized message signals that the particular debtor has been identified and is being monitored closely. This might enhance the motivation to repay debt based on the rational choice model since it indicates that one cannot get away from an unpaid debt. As such, it is not about social distance per se, but about *exposure*. The reason that personalization works— particularly among debtors with outstanding hospital debts—is the likelihood that one will return to the hospital in the future and encounter the same personnel. One may avoid a prior lender for consumer goods by switching to another, but it is much harder to avoid the local hospital and its personnel.

This interpretation is supported by exploratory analysis of the effect of debtor age on the payment rate. The older the debtor, the greater the likelihood he or she will repay the debt. Only if it comes to hospital bills, however. The reason that age is significant exclusively among the holders of hospital debts might be that, as one ages, the probability of visiting a hospital increases. This may motivate individuals to pay the bill for the received services.

On the other hand, the fact that personalization works only on debts with public hospitals suggests that personalization can decrease the social distance between the provider of public services and the individual who has received such services. Personalization, in this case, triggers feelings of reciprocity in those who have received a public service. Consumer debts, in contrast, have not been acquired in exchange for public goods and, therefore, the social distance between the giver and receiver is not meaningful for the defaulted consumer debtor.

8.3. Moral appeals

Moral concerns are one of the reasons individuals keep up their promises and do not walk away from debt. Morality and pro-social behaviour are important drivers of payment for public services, such as taxes. Morality is related to both pro-social and rational behaviour. On the one hand, doing the right thing, such as following the social norm, provides giver the so-called feeling of warm-glow (<u>Andreoni 2006</u>). On the other hand, sanctioning mechanisms makes reputational concerns crucial on debt repayment. These costs can be both social, as well as monetary ones, as defaulting on a debt brings economic consequences, such as limited access to credit and increased interest rate for future borrowing.

The experiments examined three different text templates related to moral appeals in order to increase the payment rate. Individuals who were assigned to the social norm message read in the reminder that "around 80% pay their liabilities on time. You are in the minority that has not done so".²⁵ Individuals who were assigned to the reputational concerns treatment received a message with a heading that personal reputation is important. Individuals who were assigned to the public good message were exposed to the consequences for the hospitals of paid/unpaid bills. This was framed either positively (the services hospitals can continue to offer if bills are paid) or negatively (what limits befall hospitals if bills remain unpaid). As shown in Table 8.3., none of the moral appeals messages delivers a significant increase in the payment rate relative to a generic reminder.

²⁵ In the case of Experiment 4 (debtors on a repayment plan), the message appealed to debtors to avoid (re)joining the minority that does not pay.

Treatment	CACE	Standard error	p-value
SOCIAL NORM			
Experiment 1	0.3%	0.003	0.462
Experiment 2: Phase 1	1.0%	0.011	0.359
Experiment 3	-0.6%	0.007	0.448
Experiment 4	1.0%	0.029	0.756
Pooled result	0.2%	0.003	0.553
REPUTATIONAL CONCERNS	CACE	Standard error	p-value
Experiment 2: Phase 1	-1.3%	0.017	0.365
PUBLIC GOODS	CACE	Standard error	p-value
Experiment 3: Gain-framed	-0.2%	0.006	0.735
Experiment 3: Loss-framed	-0.3%	0.006	0.589

Table 8.3. Effect of moral appeals in the experiments

Notes: CACE estimates from regression models with controls. Estimate for pooled result calculated based on fixed effects meta-analysis procedure (Gerber and Green 2012, 358–65) ***p<0.01; **p<0.05; *p<0.1

The social norm treatment is the only one included in all four field experiments. The pooled result yields an estimated CACE of 0.2% points for the social norm, a statistically non-significant result (p>0.1). Social norms—especially, descriptive minority social norms—have been effective in the collection of unpaid tax obligations (Hallsworth 2014; Alm 2012; Carpio 2014; Dwenger et al. 2016) and as triggers for payment of credit card instalments (Bursztyn et al. 2015), however, *the effect does not work for non-performing loans*. Moreover, it has no effect on debts to either private or public institutions.

Public good messages also have no effect on the payment rate. In Chapter 2, I reviewed several empirical studies related to public goods messages and suggested that direct experience of receiving a public good enhances citizen compliance. However, the results from Experiment 3

with hospital debts reveal no effect of a public good message—be it a loss- or gain-framed one on the payment rate among individuals who have received treatment from a public hospital. Likewise, reputational concerns have no effect among holders of consumer debts in Experiment 2. Overall, these findings point to the fact that moral appeals have no effect on recalcitrant debtors, irrespective of whether they have debt with a public or a private institution.

Another explanation could be that there generally exists a different morality in terms of debts in Latvia, which affects repayment culture. However, a recent survey by *Intrum* suggests that Latvia is not substantively different in terms of morality towards paying debts relative to the European Union (Saulītis 2018). In fact, Latvians are somewhat close to the European Union average both when it comes to paying bills on time and on rating how important it is to pay back debts on time. On the other hand, Latvians are more likely to be in arrears relative to average European Union levels (see Chapter 1, section 1.1). That might explain why moral appeals are not effective, as being in arrears is not considered something unusual or uncommon.

As noted in Chapter 2, reputational concerns in this study deemed to focus individual's attention to the monetary consequences for being in the books of the CMS firm. As such, reputational concerns message examined the effect of reputational *costs* on a fully rational acting individual. However, the reputational concerns message proved to be as ineffective as any other moral appeals treatment in this study. This might indicate that fully rational individuals consider that credit reporting systems are not effective in harming their economic activities.

Does this mean that morality plays no role in debt repayment among defaulted individuals? The exploratory analysis of the experimental results reveals that this might not be

accurate. However, morality—at least in this case—is related to the actions and intentions of the CMS firm. Consider the effect of collection fees on debt repayment. For some individuals in the experiments, they are significantly large. The regression models in which control variables were included suggest that the level of collection fees influence individuals' decision to repay debt. Collection fees have a substantively and statistically significant negative effect on hospital debt repayments (Experiment 3). The larger the fees concerning the original bill, the higher the probability the individual will default on a debt. A *sense of fairness* can explain this effect among defaulted individuals (see Chapter 2, Section 2 "Morality and pro-social behaviour"). Collection fees can be seen as unfair or even immoral—especially if they are deemed excessive—and for this reason, the debtor chooses to default strategically on a debt. This is observable also among the debtors on a repayment plan—those with higher collection fees are more likely to default repeatedly on their debt.

While for hospital debts, collection fees have a negative effect, they have the inverse effect in Experiment 1 and no effect in Experiment 2. Both of these experiment deals with defaulted consumer debts. The explanation for the non-negative effect of collection fees on the repayment rate in these two experiments consists in the way the various debts are managed at the CMS firm. For debts that the CMS firms own—as is in Experiments 1 & 2—collection fees are used as *a bargaining chip*. CMS firms can offer a concession on collection fees as an incentive for the debtor to agree to a repayment plan. When a CMS firm is used as a third-party to collect someone's else debts—as in Experiment 3—or the debtor is already on a repayment plan—as in Experiment 4—the collection fees are constant and non-negotiable. The way the collection fees

approach correlates with debt repayment in Experiments 3 & 4 thus shows that morality is important among debtors when considering repayment.

8.4. Non-informative dimensions

As much as the content of a message does, non-informative dimensions have the potential to trigger behavioural change. For instance, the wording of a message can have an effect. I examined two ways of writing a message—namely, *by sequencing* and *by framing*. In Experiment 2, a reputational concerns message examined the effect of sequencing. The text detailing reputational concerns was placed in the title of the letter. As noted before, it did not have any significant effect on the repayment rate. Likewise, there was no framing effect concerning the public good message in Experiment 3. The difference between the two treatment texts was less than 0.1% points and was not statistically significant (see Table 8.3).

Another non-informative dimension examined in this study is the *effect of salience*. In Experiment 2, I examined the effect of red envelopes. I hypothesized that the red colour would have a positive effect on defaulted debtors. A red envelope naturally stands out; additionally, the aposematic colour should trigger a feeling of danger. It came out that the effect is *the complete opposite*. On average, debtors receiving the message in a red envelope are less inclined than the debtors who receive the message in a white envelope to repay. The CACE for the red envelope message is -1.54% points (p<0.05) relative to the white one. Although the difference is not large,

the business effect of such a difference is substantive, as the cost of producing a red envelope is higher than the regular white one.²⁶

To my knowledge, there is only one study that has examined the effect of envelope colour on debt collection. Among many customized elements of envelope design, the appeal for debtors in arrears to get in contact with the bank was sealed in a blue envelope in a trial carried out by the Behavioural Insights Team (2018). In my experiment, the red colour was the only change implemented in customizing the envelope. As such, it is possible to examine the effect of redcoloured envelopes on collection efforts.

As noted before, the effect is negative. On the one hand, this finding is in line with those of laboratory experiments in the field of social cognition, which conclude that the red colour triggers avoidance (Mehta and Zhu 2009). An alternative explanation is that salience is effective in decreasing the *ex-ante* transactions costs (Huck and Rasul 2010). A red envelope *does* stand out, as predicted. However, the colour cue allows recipients to save time by immediately throwing it away, instead of opening it. As such, the red envelope allows individuals to avoid the necessity of making a choice based on the content of the letter. Either the red envelope triggers avoidance or effectively saves recipient the *ex-ante* transaction costs. In both cases, the choice is made based only on the envelope's characteristics—namely, its red colour.

²⁶ In fact, this finding has been the most disappointing and painful for the debt collector I worked with, as this little nudge is quite costly to administer. We tend to believe that expensive solutions deliver substantial positive results. Thanks to the experimental method, I was able to show that the expensive red-coloured envelope is not effective in debt collection.

8.5. Interaction effects of different treatments

I examined the hypotheses not only separately, but also in different combinations. As such, I was able to see whether any of the nudges together deliver any effect on the payment rate. I found no interaction effects among different text templates throughout all experiments. Neither a reminder sent from a credit servicing agent personally with a social norm message nor a public good message with the debtor's name included (or any other combination of nudges) brings a substantive increase in the payment rate relative to a single nudge.

It might be that the length of a message has a negative effect on the outcome. Many field experiments have shown that individuals are more responsive to shorter messages, which contain less information (John and Blume 2018; Glazebrook, Larkin, and Costa 2017). Each additional message increases the number of words included in the treatment and makes it less likely that a debtor will read the whole message and change his or her behaviour. While for some individuals receiving more than one treatment in one message might increase the payment rate, for others, it might trigger not to read the text at all.

8.6. The future of a nudge

To sum up, the four field experiments indicate that defaulted individuals in most of the cases act rationally. A simple act of communication increases the sense of being caught and/or the costs of annoyance among individuals with consumer debt. In some cases, both rational and pro-social behaviour is combined. The personalization of a message identifies the debtor recipient as a former hospital patient and that he or she might return for future treatment but also evokes the potential willingness to reciprocate.

On the other hand, nudges can backfire even if sent with the best of intentions. A redcoloured envelope can save *ex-ante* transaction costs for the receiver—who is behaving entirely rationally—but entail, at the same time, negative consequences for the sender—namely, a fall in the repayment rate. Likewise, it can trigger behaviour that appears to contradict the rational model. For instance, sending a reminder on a scheduled task can trigger psychological reactance.

Another finding from this study is how morality and a sense of fairness affect defaulted individuals. On the one hand, individuals judge the behaviour of the lender or its representative, namely, CMS firm. They care if CMS firm act in a good faith: whether their actions are modest (sending appropriate number of reminders) and proportionate (collection fees are reasonable). At the same time, it does not work the other way round: reminders with moral appeals have no effect on the payment rate.

My final remarks regarding the experimental results are inspired by an old painting by the British humourist and illustrator Robert Seymour titled *Four New Ways of Paying Old Debts*. The drawing highlights that defaulting on debt has a long history (see Figure 8.1). It also illustrates the common understanding of why individuals choose not to repay.



Figure 8.1 A drawing by Robert Seymour (1829)

Source: Catalogue of prints and drawings in the British Museum (UK)

For Seymour, defaulting on a debt is more a *moral failure* than an *economic one*. However, unwillingness to pay is based in rationality rather than in morality. That is the reference, then, in Seymour's illustration to 'new' ways of paying old debts. Experiments in this thesis highlights that debt repayment can also be based on broader assumptions than a plain maximization of economic utility.

However, only one treatment message proved to be statistically significant among the treatment messages of this thesis. So, at the end, the question is, *can a nudge make debtors budge*? Can we rely on nudges as a way to trigger behavioural change and make debtors pay? In

order to answer this question, I have pooled all the developed treatment messages within this

thesis and compared their effect relative to the simple reminder. The results are listed in Table

8.4.

Experiment	CACE	SE	p-value
Experiment 1	-0.05%	0.005	0.932
Experiment 2: Phase 1	1.05%	0.008	0.205
Experiment 2: Phase 2	0.45%	0.004	0.311
Experiment 3	1.07%**	0.005	0.04
Experiment 4	0.01%	0.037	0.997
Pooled result	0.53%**	0.0026	0.044

<i>Table 8.4.</i>	Meta-ana	lysis of	f the	nudge	effect	in	the e	experimen	ts

Notes: CACE estimates from regression models with controls. Estimate for pooled result calculated based on a fixed effects meta-analysis procedure (Gerber and Green 2012, 358–65) ***p<0.01; **p<0.05; *p<0.1 Source: Compiled by the author

The meta-analysis of experimental results suggests that there is some reason to be confident that nudging can succeed in boosting collection efforts among recalcitrant debtors. When pooled, the four field experiments yield an estimate of 0.5% points for a nudge sent to a debtor. This is a statistically significant result (p<0.05), albeit with a rather small effect. It could also be that it is effective only among debtors with public institutions (Experiment 3). Moreover, as I explained earlier, there are heterogeneous effects when it comes to the impact of a nudge. Therefore, getting to know one's debtor better is the first step to enact behavioural change in a positive way. This has to be done *before* any kind of communication is carried out with defaulters. And with anybody else, of course.

Much more research is necessary in the area of credit servicing to gain a complete picture of the behaviour of defaulted individuals, as well as on the various motives for repaying debt. All the debtors in my experiments have been under the remit of the CMS firm for a significant time and have received at least one reminder from the firm. Whether the nudges examined in this thesis have the same effect among fresh defaulters—who have yet to receive the first reminder remains an open question. As the baseline payment rates for this type of defaulted individual are higher, we should expect greater responsiveness to various nudges.

The exploratory analysis of the experimental results suggests several directions for future research. First, what is the most effective communication channel to deliver a nudge these days? In the four field experiments I carried out, the communication channel was not randomized among the debtors and only observational claims can be made. Likewise, all of the reminders were sent on a Monday, which might not be the best day for a nudge to be sent. Both issues can be studied readily via an experimental approach.

Importantly, many of the findings could be readily transferred to the field of tax debt collection. For instance, the distance between the hospital and the debtor correlated with the payment rate, albeit not statistically significantly. An experimental design, which would seek to prove a causal relation between of distance on the payment rate would be welcomed (for instance, randomizing individuals with debt from both local and state tax revenue services). Personalization has not been examined in the field of tax debt. Another possible avenue of research could investigate the interaction between debt relief and the social mechanisms underlying willingness to pay off a debt. For instance, are monetary incentives (e.g., partial debt

relief) more effective than moral appeals? These are just a few research areas that remain unexplored, and that could provide a more detailed picture on the behaviour of defaulters both in the field of finance as well as in tax collection.

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Appendixes

Chapter 3 Appendixes

Appendix 3.1. Ethics review and the follow-up correspondence with the committee

Andris Saulītis European University Institute

FIELD EXPERIMENTS IN A DEBT-COLLECTOR ENTERPRISE OUTLINE OF THE RESEARCH DESIGN

The proposed field experiments will be carried out in cooperation with the debtcollector enterprise in Latvia. It will be used to assess what kind of norms and stimuli must be evoked in order to motivate the overindebted to pay back their debts instead of giving up and defaulting. The experiments will replicate those few studies which have been carried out in the experimental field regarding debt-collecting practices (see Hallsworth et al. 2014; Karlan, Morten, and Zinman 2012)

The experiments will be carried out from February 2016 onwards and will be based on a communication with the debtors via three communication channels: mobile text messages, e-mails and phone calls. Overall, the research will include two field experiments:

Experiment 1: Weekly messages with an invitation to pay back the debt to the debtors with unpaid liabilities. The types of debts in this group are consumer credits for small purchases, fast-credits and other small amount debts;

Experiment 2: Monthly messages of reminders to the debtors in the process of repaying various types of debt.

Two dimensions will be tested in the experiments: (a) timing and (b) content. Regarding the timing treatment, the control group will not receive any messages during the experiment to examine the effect of the communication. Treatment groups will receive mobile phone message with the treatment text, as well as an e-mail, in which the subject line will include the treatment text. Overall, four kinds of messages will be examined: (1) simple reminder; (2) minority descriptive norm; (3) personalization and (4) the combination of minority descriptive norm and personalization. None of the treatment messages exceed 160 signs in Latvian. The translation in English of the texts can be found in Appendix 1.

In addition, e-mails to all the groups will include the standard information on the debt and payment methods and other information in the body text as prescribed by the Law On Extrajudicial Recovery of Debt. As regarding the telephone calls, all the debtors will follow the standard procedure according to the general practice of the debt-collector enterprise and no treatment will be carried out.

The assigned messages for each group in Experiment 1 will be sent out each Monday for six consecutive weeks. Experiment 2 will be carried out for 8 weeks. However, the number of received messages will differ: each of the treatment groups will be contacted at least 2 times, on the monthly payment due date. Additionally, any debtor who delays the monthly payment in the Experiment 2, will receive additional text or email message weekly, and the debtor will also be contacted via phone call on the third week after the missed payment.

In order to monitor the results during the experiments, every Friday at 17:00 the debt-collector company will send a report on the status of every case. The identities of debtors will not be disclosed to the researcher and they will remain anonymous: the report will not include the surname of the debtors, as well as the physical address will be disclosed only at the district level. The disclosed status codes will provide the information on the performance of debt repayment in each of the groups and will be used in the analysis.

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	Exp	periment 1	I	Experiment 2
Group	E-mail subject line	Text message	E-mail subject line	Text message
Control group	No message	No message	No message	No message
T1: Simple reminder	Reminder about the debt!	This is a reminder that you have a debt, case nr. 1234567. Contact us to find a solution: 76543210	Reminder about the debt!	We would like to remind you that you are due to pay an instalment of your debt according to the agreement. Case nr. 1234567. Thank you if the payment has already been made. Phone nr. 76543210
T2: Minority descriptive norm	Close to 80% pay their liabilities on time. You are in a minority that has not done so.	This is a reminder that you have a debt, case nr. 1234567. Close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact us to find a solution: 76543210	Payment due! Close to 80% pay their liabilities on time. Don't be a minority who does not keep the promises.	We would like to remind you that you are due to pay an instalment of your debt according to the agreement Case nr. 1234567. Close to 80% pay their liabilities on time. Don't be part of a minority that does not keep its promises. Thank you if the payment has been already made. Phone nr. 76543210
	[company] consultant [name] to find an individual solution!	that you have a debt, case nr. 1234567. Contact me, [company] specialist [name] to find a solution: 76543210	Payment due!	that you are due to pay an instalment of your debt according to our agreement. Case nr. 1234567. Thank you if the payment has already been made. [Company] consultant [name], 76543210
14: Minority descriptive norm + Personalization	close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact me: consultant [name]!	that you have a debt, case nr. 1234567. Close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact me, [company] specialist [name] to find a solution: 76543210	a remind you: payment is due! Close to 80% pay their instalments on time. Don't be part of the minority that does not keep its promises.	to pay an instalment of your debt according to the agreement. Close to 80% pay their liabilities on time. Don't be part of a minority that does not keep its promises. Thank you if the payment has been already made .Case nr.1234567. Consultant [name],76543210.

Appendix 1. Groups and the assigned messages in the experiments

RESEARCH ETHICS INITIAL CHECKLIST

Introduction;

Every EUI-research project asking for a review by the Ethics Committee needs to complete this check list. It enables you as researcher and the Ethics Committee to decide whether a more detailed application for ethics approval needs to be submitted.

Before completing this form, please consult the EUI Code of Ethics in Academic Research. The Ethics Committee is responsible for exercising appropriate professional judgment in this review.

Please note that this checklist must be completed before potential participants are approached to take part in any part of the research.

Checklist:

Section I: Project Detalls

1. Project title: Field experiment in the debt-collector enterprise

Section II: Applicant Details

- 2. Name of researcher (applicant): Andris Saulitis
- 3. Role: Researcher
- 4. Email address: andris.saulitis@gmail.com
- 5a. Contact address: Badia Fiesolana

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San Domenico di Fiesole (FI) - Italy

5b. Telephone number: +37126473310

Section III: Research Checklist

Please answer each question by ticking the appropriate box: Yes No

- 1. Does the study comply with the all the rules, norms and values of the EUI Code of Ethics in Academic Research?
- Yes

2. Does this research project involve the use of the standard EUI- Consent Form of participation in research interviews or other research activities?

3. Does the study involve participants who are unable to give informed consent?

Yes

The experiments will be carried out in cooperation with the debt-collector enterprise in Latvia from February 2016 onwards. During the period of two months debtors will be randomly assigned either to a control group, which will not receive any messages, or one of the several treatment groups to receive weekly assigned mobile text messages and e-mails with a different text. No deception will be used and it will follow the established practices in the field experiments.

4. Does the research involve other vulnerable groups: children or teenagers under legal age, those with cognitive impairment, or those in unequal relationships e.g. your own supervisees?

No

5. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? (E.g. students at school, members of self-help group, residents of Nursing home?)

No

No 6. Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (E.g. covert observation of people in non-public places)? No

7. Will the study involve discussion of sensitive topics (e.g. sexual activity, drug use, others)?

No

- 8. Will the study involve invasive, intrusive or potentially harmful procedures of any kind? No
 - 9. Is any form of discomfort likely to result from the study? Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?

No

10. Will the research involve administrative or secure data that requires permission from the appropriate authorities before use?

No

No

- 11. Does the research involve members of the public in a research capacity (participant research)?
- 12. Will the research involve respondents to the internet or other visual/vocal methods where respondents may be identified?

No

13. Will research involve the sharing of data or confidential information beyond the initial consent given?

No

14. Does the source and or the form of the external funding of your research project raise ethical concern?

No

15. Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?

No

16. Are there any risks to researchers, (physical, emotional and situational)? If yes, please explain how researchers will be protected / supported especially in the field, either inside or outside the European Union?

No

17. Have you reached an agreement relating to collaborative working within your research team if applicable?

No/Not applicable

18. Have you agreed the roles of researchers and responsibilities for management and supervision if applicable?

Yes

The contract has been signed with the debt-collector enterprise to comply with the rules and regulations of the enterprise and the legal requirements as regulated by Latvian law.

19. Have all possible conflicts of interest relating to your research been identified, declared and addressed?

No/Not applicable

- 20. Do your methods of data collection and or archival research raise ethical concerns?
- No

21. Do your methods of data analysis and interpretation raise ethical concerns?

No

22. Does your research project comply with the EUI Data Protection Policy?

Yes

23. Have any conditions of use of data and or archival materials been set by secondary providers? If yes, do these conditions raise ethical concerns?

No

- 24. Does your research project yield any kind of benefits/incentives to research participants or third parties? If yes do these benefits/incentives raise ethical concerns?
- No
- 25. Do the plans for the dissemination of your research results raise ethical concerns related

to intellectual property, publication and authorship?

No

Further Procedure:

- If you have answered 'no' to all questions, please send the completed and signed form to . the Ethics Committee with any further required documents, for the records.
- If you have answered 'yes' to any of the questions in Section III (except for questions no. . 1 & 2), Please describe more fully how you plan to deal with the ethics issues raised by your research. Your research proposal will need to be scrutinized more fully by the Ethics Committee.

Please note once more that it is your responsibility to follow the EUI Code of Ethics in Academic Research and any relevant academic or professional guidelines in the conduct of your study. This includes providing appropriate information sheets and consent forms, and ensuring confidentiality in the storage and use of data.

It is accepted that in some cases as research progresses, further ethics issues may arise. Any significant change in the question, design or conduct over the course of the research raising ethical concerns should be notified to the Ethics Committee and may require a new application for ethics approval.

Signed: Date:

Chair of Ethics Committee

Andris Saulītis EUI SPS 2nd year

EXPLANATION OF ISSUES RAISED BY THE ETHICS COMMITTEE

	Question	Answer	Notes
1	Is he going to receive the first names of the debtors? If yes, what is the necessity for that?	 Yes, I will receive the first names and only the first names. This will not be sufficient information to identify any debtor. The last names of the debtors will not be given to me and therefore I will not be able to identify the debtors. The first names of the debtors serve two purposes: they identify the debtors' gender making it possible to control for any gender differences in the experiment. they will be used in some of the treatment texts to personalise the message sent to the debtor. 	Previous draft of the experiment design did not include the personalization treatment in terms of debtor's name. The revisited treatment texts, which take into account the concerns by the Ethics Committee, can be found in Appendix 1.
2	Is there a necessity for him to receive the status codes of the debts/debtors and if yes, is it likely reasonable that this status code could be used for identification?	Yes, status codes are indispensable. They do not include sufficient information to identify the debtor. They are used in the experiment to monitor the results of the field experiments.	The list of status codes can be found in the Appendix 2.
3	If both first names and status codes are going to be received by him, is it likely that the combination of these details along with the address at district level may also be pretty conclusive in some circumstances and lead to direct or indirect identification?	No, there is no possibility to achieve indirect or direct identification of debtors with the information provided to me. District level scale is substantially large, there are in total 109 districts in Latvia (of a territory of 64 589 km ²), which makes impossible to identify any debtor.	
4	Is it possible that despite the fact that the information may be presented as aggregated data, the original sample is not sufficiently large and other pieces of information may enable the identification of individuals?	No, there is no possibility to identify individual debtors, as there will be no other pieces of information shared with me (i.e., exact address, last name, etc.).	

5	Will the researcher be a subcontractor of the debt collection company, helping them with data analysis? Or will it be the other way around, the research project driving the actions of the company?	No, I will not in any way be the subcontractor of the company. My research is independent and the company will follow my instructions.	
6	The question of whether the researcher manipulates the messages or only analyses what is planned by the debt collector? It should be added that if manipulation is involved an issue of "credit score" enters. Assuming one type of message is predicted to create less payment this may mean hindering the credit scores of those receiving it. Some kind of guarantee should be given that if a manipulation is made, the credit score of those affected would not be downgraded.	The credit score of debtors will not be downgraded because of the experiment. On the contrary, every message is constructed with the goal to improve the repayment of the debt.	
7	What is the nature of the text that will be sent to debtors and its frequency? And are the messages the researcher intends to use are already part of a standard practice at debt collection companies or whether the researcher is using one of those companies as a medium to test the reaction of debtors in situations designed by him-self?	The debtors will not feel the difference in terms of communication frequency from the debt-collector during the experiment. The messages, which debtors will receive, are in accordance to the The Law On Extrajudicial Recovery of Debt and, particularly, its section "Communication Culture", forbidding an aggressive means of communication, including the expression of threats or to communicate "in a manner offensive to his or her dignity or honor".	The English version of the law can be accessed following this link: http://www.vvc.gov.lv /export/sites/default/ docs/LRTA/Likumi/La w_On_Extrajudicial_R ecovery_of_Debt.doc
8	Whether any potential emotional and psychological distress for the participants "results from" the study (as is asked in question 9) or whether the researcher will be a mere observer of practices that may cause that emotional and psychological distress, but which already occur without the experiment being carried out.	No additional emotional and psychological distress to the debtors will be caused by the research as I will replicate the daily operations of the debt-collector. Additionally, the treatment, which included the reference to promise keeping, has been removed from the experiment, minimizing the risks of emotional and psychological distress.	The new treatment texts can be found in Appendix 1.

9	Define the exact role of the debt collection company, is it going to act as a subcontractor, or do "business as usual"? The researcher says that the debt collection company will send a report on "the status of each case". But does that mean that the researcher will be only told about whether the participants have paid their debt already? Does it mean that the researcher will be given full access to the responses that the participants have given, and then make the results of the analysis of the data more anonymous?	No, I will not have access to the data which would allow me to identify any debtor. Data will be anonymized by the debt-collector before it will be shared with me. I will use data only at the aggregate level as no identification of any debtor is possible.	The list of status codes can be found in the Appendix 2.
10	When the researcher says that the surname and concrete address of participants will not be disclosed, does that mean that they will not be disclosed to him by the debt collection companies or that they will not be disclosed by the researcher when he presents the results of his research (say, in Articles or presentations)?	No, I will not receive surnames and concrete address of any debtor at any stage of the research. Hence, no identification of a particular debtors will be possible.	
11	Doesn't the debt-collector entreprise represent such a gatekeeper? And if so, what does this imply in terms of disclosure of results? As far as I understood, the debt-collector entreprise will submit a weekly report on the status of every case. Does this mean that the entreprise is tracking and collecting the results of the text-messaging, emailing? As far as I got it, this will be done by the entreprise, so that all information will be collected by this gatekeeper and the researcher does not have any insight into the answers of the participants. This could to a certain extend mean that the experiment design is open to pollution of results given that the researcher does not have hands on the results/responses in the first place.	The weekly report on performance of debts is generated by an automated system of the debt-collector. The signed agreement between me and the debt-collector company determines that debt-collector acts in a good faith.	Please dismiss the previous answer to the question 5 in the initial checklist.
12	Will it be necessary for participants to take part in the study without their knowledge and consent at the time?	Participants are taking part in the study without their knowledge and consent, however, the participants will not feel any significant difference during the experiments in comparison to the interaction before and	Please dismiss the previous answer to the question 6 in the initial checklist.

	-		
		after the experiments in terms of the communication intensity. The information	
		provided to me will not allow to identify any participant individually, but only at the	
		aggregate level.	
13	Would the debt-collector enterprise	Yes. I will replicate the daily operations of the	
	use the same frequency in contacts	debt-collector and the messages will be sent as	
	also without the experiment?	would be if there was no experiment carried	
1.4	la thora portioular consitivity to	out by me.	
14	is there particular sensitivity to	No additional anonymization of data is	
	rolated data involved (first name	the debters from the information I will receive	
	debt case number, district level) for	from debt-collector. Therefore, all the data can	
	research? Does data have to be	he kent in one file and no additional	
	stored in separate systems? Is a full	anonymisation is required	
	anonymisation required?		
15	Data seems to be collected and	I believe that this question has been answered	
	hence shared with the debt-collector	in the assessment of the experiments by the	
	entreprise. The question is if that	Data Protection Officer on Data Protection	
	results in issues for data protection	Questions: "No personal data of debtors will	
	that the researcher has to pay	be processed by him [the researcher – A.S.].	
	tribute to.	He will only receive anonymous and statistical	
		data, insufficient to identify the debtors. It is	
		the Latvian enterprise that will carry out the	
		phone calls and send reminding text messages	
		and e-mails to debtors whose personal data it	
		already processes on other grounds (collecting	
		their debts). The Data Controller is the said	
		enterprise and it is obliged to ensure that data	
		is processed in compliance with the applicable	
10	To many understanding the date is the	regulations."	
10	To my understanding the data is not	I will not be able to identify any debtor from	
	fully anonymised. First name, debt	the information I will receive from the debt-	
	callected and can bence be	debt collector bafare it will be chared with	
	combined So the concrete cases	me	
	could well be identified and traced	I need to have information on debtor's first	
	back Why is it necessary to collect	name and district level to control the results	
	first name debt case number and	for gender and regional differences as well as	
	district level?	to include the treatment of personalization.	
17	How is the data stored and	The data file, which will be used for analysis	
1	analysed?	will not allow to identify any debtor. Before	
		being shared with me, it will be anonymized	
		by the debt-collector. The data will be stored	
		electronically on my computer, which has a	
		password protection. The data will be analyzed	
		using STATA software.	

Appendix 1. Groups and the assigned messages in the experiments

		EXPERIMEN	T 1: OVERINDEBTED	EXPERIME	NT 2: PROMISED-TO-PAY
		E-MAIL SUBJECT LINE	TEXT MESSAGE	E-MAIL SUBJECT LINE	TEXT MESSAGE
CONTRO	DL GROUP	No message	No message	No message	No message
T1 COMPANY	T5 SIMPLE REMINDER	Reminder about the debt!	This is a reminder that you have a debt, case nr. 1234567. Contact us to find a solution: 76543210	Reminder about the payment!	We would like to remind you that you are due to pay an instalment of your debt according to the agreement. Case nr. 1234567. Thank you if the payment has already been made. Phone nr. 76543210
	T6 MINORITY DESCRIPTIVE NORM	Close to 80% pay their liabilities on time. You are in a minority that has not done so.	This is a reminder that you have a debt, case nr. 1234567. Close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact us to find a solution: 76543210	Payment due! Close to 80% pay their liabilities on time. Don't become a part of the minority who does not pay on time.	We would like to remind you that you are due to pay an instalment of your debt according to the agreement Case nr. 1234567. Close to 80% pay their liabilities on time. Don't become a part of the minority that does not pay on time. Thank you if the payment has been already made. Phone nr. 76543210
T2 OFFICER	T7 SIMPLE REMINDER	Contact me, [company] consultant [name] to find an individual solution!	This is a reminder that you have a debt, case nr. 1234567. Contact me, [company] specialist [name] to find a solution: 76543210	I remind you: Payment due!	I would like to remind you that you are due to pay an instalment of your debt according to our agreement. Case nr. 1234567. Thank you if the payment has already been made. [Company] consultant [name], 76543210

	T8 MINORITY DESCRIPTIVE NORM	Close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact me: consultant [name]!	This is a reminder that you have a debt, case nr. 1234567. Close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact me, [company] specialist [name] to find a solution: 76543210	I remind you: payment is due! Close to 80% pay their instalments on time. Don't become a part of the minority that does not pay on time.	I remind you that you are due to pay an instalment of your debt according to the agreement. Close to 80% pay their liabilities on time. Don't become a part of the minority that does not pay on time. Thank you if the payment has been already made .Case nr.1234567. Consultant [name],76543210.
	T9 SIMPLE REMINDER	[Name] Reminder about the debt!	{name], this is a reminder that you have a debt, case nr. 1234567. Contact us to find a solution: 76543210	[Name] Reminder about the payment!	[Name], we would like to remind you that you are due to pay an instalment of your debt according to the agreement. Case nr. 1234567. Thank you if the payment has already been made. Phone nr. 76543210
T3 COMPANY + DEBTOR	T10 MINORITY DESCRIPTIVE NORM	[Name], close to 80% pay their liabilities on time. You are in a minority that has not done so.	[Name], This is a reminder that you have a debt, case nr. 1234567. Close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact us to find a solution: 76543210	[Name], payment due! Close to 80% pay their liabilities on time. Don't become a part of the minority who does not pay on time.	[Name], we would like to remind you that you are due to pay an instalment of your debt according to the agreement Case nr. 1234567. Close to 80% pay their liabilities on time. Don't become part of the minority that does not pay on time. Thank you if the payment has been already made. Phone nr. 76543210
	T11 SIMPLE REMINDER	[Name], contact me, [company] consultant [name] to find an individual solution!	[Name], This is a reminder that you have a debt, case nr. 1234567. Contact me, [company] specialist [name] to find a solution: 76543210	[Name], I remind you: Payment due!	[Name], I would like to remind you that you are due to pay an instalment of your debt according to our agreement. Case nr. 1234567. Thank you if the payment has already been made. [Company] consultant [name], 76543210
T4 OFFICER + DEBTOR	T12 MINORITY DESCRIPTIVE NORM	[Name], close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact me: consultant [name]!	[Name], this is a reminder that you have a debt, case nr. 1234567. Close to 80% pay their liabilities on time. You are in a minority that has not done so. Contact me, [company] specialist [name] to find a solution: 76543210	[Name], I remind you: payment is due! Close to 80% pay their instalments on time. Don't become a part of the minority that does not pay on time.	[Name], I remind you that you are due to pay an instalment of your debt according to the agreement. Close to 80% pay their liabilities on time. Don't become a part of the minority that does not pay on time. Thank you if the payment has been already made .Case nr.1234567. Consultant [name],76543210.

Statuss code	Description
100	written request
101	debt collection continues
102	agreement on the repayment plan
103	other debtor has signed the agreement on the repayment plan
104	debt collection via e-mail
105	debt collection via sms
106	A call from the debtor has been received
107	Debt collection by telephone with the debtor
108	there has been no contact with the debtor
109	request of late fee payment/ request of debt collecting fee
110	contact with the third person (neighbors, parents)
118	Written claim received
121	The debtor has no money
122	Refuse to pay - disputes the debt
124	Paid to different account, need a confirmation from the third party
131	Need a confirmation of the payment from the third party
136	Request from the third party to reduce/cancel penalty fee
140	Recommendation to collect the debt through the court
142	Repeated request
143	repayment plan cancelled, debt collection continues
152	international debt collecting/import
180	Request of address
181	Request of address from the State Register
187	Letter returned from specified addresses
188	Local address search
274	Repayment plan with specific conditions
903	voluntary debt collection finished, long-term debt collecting continues
904	voluntary debt collection finished, long-term debt collecting continues
931	Unknown location of the debtor
933	Debtor does not live at the address indicating (the information in State Register is not checked)
934	The debtor is abroad
977	Long-term debt collection continues
978	Debt collecting continues
988	Debt collecting continues

Appendix 2. Status codes of the cases

Re: Research ethics review

Andris Saulītis <andris.saulitis@gmail.com> Kam: "Sayed, Fatma" <Fatma.Sayed@eui.eu> Cc: Diego Gambetta <diego.gambetta@eui.eu> 2016. gada 25. augusts 11:51

Dear Fatma,

I believe that a full review is not necessary at this point, as this is an addition to the previous design, which have been approved by the Committee. I would appreciate if you could share the update with the Committee. If any of the members have questions or concerns, I will be pleased to address them!

Best,

Andris

On Wednesday, 24 August 2016, Sayed, Fatma <Fatma.Sayed@eui.eu> wrote:

Thank you Andris for informing the Ethics Committee about the update of your research design.

Are you sharing this to request further advice from the Committee regarding the update of the research design, and need a second review? or you simply want me to share the update with the members of the Committee for information?

All the best

Fatma

Dr. Fatma H. Sayed

Academic Administrator

Academic Service

European University Institute

Via dei Roccettini 9 – 50014

San Domenico di Fiesole – Italy

+39-055-4685301 www.eui.eu

From: Andris Saulītis [mailto:andris.saulitis@gmail.com]
Sent: 23 August 2016 12:28
To: Sayed, Fatma
Cc: Gambetta, Diego
Subject: Re: Research ethics review

Dear Fatma,

I hope this message finds you well. I would like to update my research design with additional treatments, which you can find in the attachment.

The overall design of the research does not change - the same procedure will apply to the data privacy and delivery of the messages and it will be carried out with the same debt-collector. I have discussed all of the treatments included in the attachment with my advisor prof. Diego Gambetta (Cc).

Overall, there are two additional treatments to the previously approved design: public goods message and reputational cost treatment. The former will be integrated into the experiment, where the messages will be delivered only through the regular mail (page 1 in the attachment). The latter will be sent through the mobile text messages and e-mails, as before, but only to the debtors who owe to the public institutions, i.e., public hospitals (page 2).

I hope this brief description of the updated design is clear enough, but do not hesitate to contact me with any questions or concerns.

Best,

Andris

2016-02-04 16:07 GMT+02:00 Sayed, Fatma <Fatma.Sayed@eui.eu>:

Dear Andris

I am writing to inform you that the Ethics Committee has examined your recent adjustments of the document of the experiment and detailed answers to the questions of the checklist sent to you last week and find them satisfactory. Therefore, the Committee agrees to give you the 'Ethics Clearance' to go ahead with your research experiment. The members of the Committee strongly advise you to maintain an open discussion with your supervisor, Prof. Diego Gambetta, about the ethics' concerns related to the nature of the research

and the safe course of action. You are invited to consult with the Ethics Committee when needed. Please let me know if you need a formal statement and to whom such a statement needs to be addressed to. All the best

Fatma

Dr. Fatma H. Sayed

Academic Administrator

Academic Service

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+39-055-4685301 www.eui.eu

From: Andris Saulitis [mailto:andris.saulitis@gmail.com]
Sent: 02 February 2016 16:44
To: Sayed, Fatma
Subject: Re: Research ethics review

Dear Fatma,

Please find my answers in the attachment. For the sake of clarity, I have created the table with the questions raised by the committee and my answers, where I addressed the concerns by the committee.

If there is anything else necessary to clarify my proposed research, I am available all this week on campus. I hope that ethics committee can revisit my answers and give an assessment before I leave for the fieldwork on Saturday.

Best,

Andris

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Loan size	The total outstanding amount, including all fees and interest, which a debtor owes to the CMS firm (in euros).
Loan size (log)	Logarithmic expression of the value of the loan.
Fee ratio	Share of collection fees in the total value of the loan
Debt due age	Years from the debt maturity date as of the day of the start of experiment.
Time at the CMS firm	Years from the moment when credit servicing of the debt was overtaken from the original lender to the CMS firm.
Debt type	The type of the lender originating the debt: (1) Catalogue merchants, which sell consumer goods via mail (2) Banks and leasing companies, which have provided unsecured loans and credit card overdrafts to customers; (3) Fast-credit companies, which offer short-term loans online (4) Services, such as gas, electricity; (5) Debts that have been acquired from other CMS companies and the original lender cannot be identified.
Gender	The gender of the debtor. Marked "0" for females; "1" for males. Identified in the sample by the debtor's first name.
Ethnicity	The debtor's ethnicity, based on the first name. Marked "0" for Latvian names, "1" for other. In case of ambiguity (for instance, Aleksandrs), marked as "0".
Debtor age	The age of the debtor (in years) as of the start of the experiment.
Region	Region of a debtor's place of residence. Statistical regions of Latvia used and coded as follows: (1) Riga (capital); (2) Pierīga (area around the capital); (3) Kurzeme; (4) Zemgale; (5) Vidzeme; (6) Latgale.

Distance	Distance in kilometres from the hospital to the debtor's county of residence.
Delivery channel	Communication channel through which the treatment message was sent: either (1) SMS or (2) SMS & Email, or (3) only email.
Delivery status	Whether the assigned message has been delivered to the debtor, as reported by the CMS firm's automated delivery monitoring system. Marked "0" if not delivered or "1" if delivered.

Chapter 4 Appendixes (Experiment 1)

Appendix 4.1. Example of a text message for a Simple reminder treatment (left) and Agent + Debtor + Social norm treatment (right) in Latvian (above) with English translation





Appendix 4.2. Example of an email for Agent + Debtor + Social norm treatment (translated to English)



Covariate	Simple reminde	0N0	Social	Debtor	Agent	Debtor &	Debtor name & Social	Agent name & Social	Agent & Debtor name	p-value from joint orthogonality test
	r	IIICSSage				Agent name	norm	norm	norm	of treatment arms
Gender	0.430	0.441	0.455	0.447	0.434	0.446	0.430	0.467	0.443	0.168
	(0.010)	(0.007)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	
Loan size	5.615	5.685	5.651	5.682	5.660	5.691	5.687	5.656	5.710	0.341
(log)										
	(0.027)	(0.019)	(0.027)	(0.027)	(0.026)	(0.027)	(0.027)	(0.027)	(0.028)	
Fee ratio	0.231	0.220	0.218	0.221	0.221	0.215	0.219	0.222	0.219	0.398
	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Ethnicity	0.263	0.276	0.266	0.253	0.268	0.273	0.257	0.258	0.271	0.502
	(0.00)	(0.006)	(0.00)	(0.009)	(0.009)	(600.0)	(600.0)	(0.00)	(6000)	
Debtor age	41.624	41.168	41.557	41.480	41.619	41.483	41.503	41.193	41.247	0.688
	(0.240)	(0.169)	(0.246)	(0.236)	(0.240)	(0.237)	(0.239)	(0.231)	(0.235)	
Debt due age	7.730	7.727	7.761	7.766	7.833	7.795	7.776	7.835	7.978	0.255
	(0.071)	(0.050)	(0.072)	(0.072)	(0.072)	(0.072)	(0.072)	(0.072)	(0.073)	
Region	3.064	2.958	2.966	2.960	3.013	2.994	3.004	2.954	3.050	0.114
	(0.034)	(0.024)	(0.033)	(0.033)	(0.034)	(0.034)	(0.034)	(0.033)	(0.034)	
Channel	2.314	2.291	2.311	2.325	2.305	2.324	2.314	2.289	2.298	0.074
	(0.011)	(0.008)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	
Debt type	2.042	2.080	2.120	2.081	2.053	2.105	2.060	2.051	2.028	0.165
	(0.025)	(0.017)	(0.026)	(0.025)	(0.024)	(0.025)	(0.025)	(0.025)	(0.024)	
Ν	2,495	4,990	2,495	2,495	2,495	2,495	2,495	2,495	2,495	
Note: Star	ndard errors	in parenthe	sis							

Appendix 4.3. Descriptive statistics

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		CMS firms	7%	7%	9%6	8%	7%	8%	7%	7%	7%	7%
		Services	1%	1%	1%	2%	1%	1%	1%	%7	1%	1%
	ebt type	Fast credits	32%	34%	33%	32%	33%	33%	33%	31%	32%	33%
	D	Banks	8%	8%	8%	9%6	0 %6	9%	9%	9%6	9%0	9%
		Catalogues	52%	50%	49%	49%	50%	49%	50%	51%	51%	50%
	ı channel	Phone & email	36%	34%	35%	36%	35%	35%	36%	33%	34%	35%
	inication	only Dhone	%09	61%	61%	61%	61%	62%	%09	62%	62%	61%
	Commu	Only email	4%	5%	4%	3%	4%	3%	4%	4%	4%	4%
		Latgale	11%	10%	9%6	9%6	10%	11%	9%0	6%	10%	10%
ontinued)	Region	Vidzeme	13%	12%	12%	12%	13%	13%	13%	12%	14%	13%
tatistics (co		Zemgale	17%	17%	17%	17%	16%	15%	17%	17%	17%	17%
scriptive stu		Kurzeme	17%	17%	18%	17%	18%	18%	17%	17%	17%	17%
De		Pieriga	16%	15%	15%	16%	16%	15%	15%	16%	14%	15%
5.643.		Riga	27%	29%	29%	28%	28%	29%	28%	29%	28%	28%
Appendix	Fynerimenta	condition	Simple reminder	No message	Social norm	Debtor name	Agent name	Debtor & Agent name	Debtor name & Social norm	Agent name & Social norm	Debtor & Agent name & Social norm	Total

2	<u> </u>
-	2
2	2
1	2
Ċ	-
2	5
õ	5
~	2
ι.	^
č	3
17	5
t	2
15	-
+	2
5	ب
- 7	2
	'
g	υ
.2	2
+	5
с	2
-	
÷	_
i, j	5
i''''	201
occri	
Jocrii	10001
Docrii	בכינו
Docri	בסכו
Docri	DCJU1
Docri	
Decri	
Decrii	
Decri	
Decri	

Appendix 4.4.	Delivery rates across the experimental conditions	
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Experimental condition	Share of delivered messages
Simple reminder	56%
No message	0%
Social norm	54%
Debtor name	55%
Agent name	53%
Debtor & Agent name	54%
Debtor name & Social norm	54%
Agent name & Social norm	54%
Debtor & Agent name & Social norm	54%
Total	43%

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple reminder)				
No message	-0.00741**	-0.00680**		
	(0.00303)	(0.00303)		
Social norm	-0.00120	-0.000808	-0.000710	-0.000521
	(0.00371)	(0.00369)	(0.00668)	(0.00666)
Debtor name	-0.00200	-0.00170	-0.00425	-0.00414
	(0.00366)	(0.00366)	(0.00646)	(0.00646)
Agent name	-0.00321	-0.00283	-0.00418	-0.00380
0	(0.00360)	(0.00360)	(0.00651)	(0.00653)
Debtor & Agent name	-0.000401	6.11e-05	0.000610	0.00100
0	(0.00375)	(0.00375)	(0.00674)	(0.00673)
Debtor name & Social norm	0.00240	0.00271	0.00596	0.00620
	(0.00389)	(0.00389)	(0.00701)	(0.00701)
Agent name & Social norm	-0.00361	-0.00268	-0.00526	-0.00429
-	(0.00358)	(0.00357)	(0.00643)	(0.00643)
Agent & Debtor name & Social norm	0	0.000998	0.000489	0.00172
	(0.00377)	(0.00377)	(0.00672)	(0.00675)
Gender	- ·	-0.00646***	· ·	-0.0113***
		(0.00170)		(0.00361)
Loan size (log)		-0.00277**		-0.00421*
		(0.00108)		(0.00236)
Fee ratio		0.0280***		0.0547***
		(0.00862)		(0.0169)
Ethnicity		-0.00366**		-0.00648*
		(0.00171)		(0.00379)
Debtor age		0.000129*		0.000186
		(7.14e-05)		(0.000171)
Debt due age		-0.000367		-0.000859
		(0.000294)		(0.000643)
Region (baseline: Riga)				
Pierīga		6.66e-06		0.00103
		(0.00256)		(0.00530)
Kurzeme		-0.000641		0.000319
		(0.00245)		(0.00518)
Zemgale		-0.00213		-0.00237
		(0.00241)		(0.00518)
Vidzeme		-0.000580		-0.00243
		(0.00274)		(0.00560)
Latgale		-0.00184		-0.00465

Appendix 4.5. Effect of the treatment message on the payment rate in Experiment 1 (Linear probability regression)

		(0.00280)		(0.00617)
Delivery channel (baseline: SMS)				
Only email		-0.000412		-0.0145**
		(0.00329)		(0.00581)
Both		0.0128***		0.000490
		(0.00196)		(0.00390)
Debt type (baseline: Catalogue				
merchants)				
Banks & Leasing		0.0140***		0.0286***
		(0.00312)		(0.00762)
Fast credits		0.0140***		0.0239***
		(0.00288)		(0.00601)
Services		0.00464		0.0145
		(0.00667)		(0.0136)
CMS firms		0.0109**		0.0240***
		(0.00442)		(0.00825)
Constant	0.0180***	0.0181**	0.0180***	0.0371**
	(0.00266)	(0.00797)	(0.00266)	(0.0166)
Observations	24,950	24,950	10,847	10,847
R-squared	0.001	0.008	0.000	0.008

Notes: Robust standard errors in parentheses. Model (1) and (2) present estimates on full sample, i.e., intention-to-treat effect; Model (3) and (4) present estimates on reached only sample, i.e., compliance average causal effect (see Chapter 3, section 10 "Non-compliance"). *** p<0.01, ** p<0.05, * p<0.1

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	Model (1)	Model (2)
CACE of Simple reminder	0.0131**	0.0126**
	(0.00536)	(0.00537)
Gender		-0.00498*
		(0.00291)
Loan size (log)		-0.00157
		(0.00183)
Fee ratio		0.0135
		(0.0130)
Ethnicity		-0.00553**
		(0.00274)
Debtor age		0.000112
		(0.000118)
Debt due age		-0.000469
		(0.000454)
Region (baseline: Riga)		0.00004
Pieriga		-0.00304
Kurzomo		(0.00425)
Kurzeme		-0.00741
Zomgolo		(0.00383)
Zenigale		-0.00092
Vidzeme		0.00380)
Vidzenne		(0.00233)
Latgale		-0.00238
		(0.00493)
Delivery channel (baseline: SMS)		(0.00100)
Only email		-0.0108***
- ,		(0.00354)
Both		0.00304
		(0.00321)
Debt type (baseline: Catalogue merchants)		
Banks & Leasing		0.0138**
		(0.00586)
Fast credits		0.0116**
		(0.00474)
Services		0.00231
		(0.0120)
CMS firms		0.00555
		(0.00704)

Appendix 4.6. Compliant average causal effect of communication on the payment rate (twostage least squares regression regression)

Constant	0.0106*** (0.00145)	0.0161 (0.0137)
Observations	7,485	7,485
R-squared	0.005	0.010

*** p<0.01, ** p<0.05, * p<0.1

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline:				
No personalization)				
No message	-0.00681***	-0.00640***		
	(0.00235)	(0.00235)		
Agent	-0.00281	-0.00235	-0.00438	-0.00379
	(0.00251)	(0.00251)	(0.00459)	(0.00459)
Debtor	0.000802	0.000910	0.00116	0.00124
	(0.00265)	(0.00265)	(0.00478)	(0.00479)
Agent + Debtor	0.000401	0.000933	0.000896	0.00162
	(0.00264)	(0.00263)	(0.00477)	(0.00477)
Gender		-0.00648***		-0.0114***
		(0.00170)		(0.00360)
Loan size (log)		-0.00277**		-0.00423*
		(0.00108)		(0.00237)
Fee ratio		0.0280***		0.0547***
		(0.00862)		(0.0169)
Ethnicity		-0.00366**		-0.00641*
		(0.00171)		(0.00380)
Debtor age		0.000129*		0.000184
		(7.14e-05)		(0.000172)
Debt due age		-0.000368		-0.000860
		(0.000294)		(0.000643)
Region (baseline: Riga)				
Pierīga		-7.25e-07		0.00108
		(0.00256)		(0.00529)
Kurzeme		-0.000642		0.000425
		(0.00245)		(0.00518)
Zemgale		-0.00212		-0.00228
		(0.00241)		(0.00518)
Vidzeme		-0.000544		-0.00232
		(0.00274)		(0.00560)
Latgale		-0.00183		-0.00453
		(0.00280)		(0.00616)
Delivery channel				
(baseline: SMS)				
Only email		-0.000339		-0.0143**
		(0.00328)		(0.00579)
Both		0.0128***		0.000585
		(0.00196)		(0.00390)

Appendix 4.7. Treatment effect of personalization on the payment rate (Linear probability regression) in Experiment 1

Debt type (baseline:			
Catalogue merchants)			
Banks & Leasing	0.0139***		0.0286***
	(0.00311)		(0.00762)
Fast credits	0.0140***		0.0240***
	(0.00288)		(0.00601)
Services	0.00453		0.0142
	(0.00668)		(0.0136)
CMS firms	0.0109**		0.0239***
	(0.00442)		(0.00825)
Constant	0.0177**	0.0316***	0.0369**
	(0.00777)	(0.00334)	(0.0164)
Observations	24 950	10 8/17	10 8/17
	24,950	10,047	10,047
K-squared	0.008	0.000	0.008

Notes: Robust standard errors in parentheses. Model (1) and (2) present estimates on full sample, i.e., intention-to-treat effect; Model (3) and (4) present estimates on reached only sample, i.e., compliance average causal effect (see Chapter 3, section 10 "Non-compliance"). *** p<0.01, ** p<0.05, * p<0.1

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline:				
message with no social				
norm included)				
No message	-0.00601***	-0.00568***		
	(0.00194)	(0.00193)		
Social norm	0.000802	0.00117	0.00205	0.00250
	(0.00183)	(0.00183)	(0.00333)	(0.00333)
Gender		-0.00651***		-0.0115***
		(0.00170)		(0.00360)
Loan size (log)		-0.00275**		-0.00422*
		(0.00108)		(0.00236)
Fee ratio		0.0280***		0.0548***
		(0.00862)		(0.0169)
Ethnicity		-0.00366**		-0.00643*
-		(0.00171)		(0.00379)
Debtor age		0.000130*		0.000184
C C		(7.14e-05)		(0.000172)
Debt due age		-0.000369		-0.000860
C		(0.000294)		(0.000643)
Region (baseline: Riga)		. ,		. ,
Pierīga		-1.57e-05		0.00106
U		(0.00256)		(0.00529)
Kurzeme		-0.000634		0.000456
		(0.00245)		(0.00517)
Zemgale		-0.00213		-0.00228
0		(0.00241)		(0.00518)
Vidzeme		-0.000540		-0.00230
		(0.00274)		(0.00561)
Latgale		-0.00179		-0.00442
5		(0.00280)		(0.00616)
Delivery channel		· · · /		/
(baseline: SMS)				
Only email		-0.000440		-0.0145**
,		(0.00328)		(0.00580)
Both		0.0129***		0.000631
		(0.00196)		(0.00389)
Debt type (baseline:		/		,,
Catalogue merchants)				
Banks & Leasing		0.0140***		0.0287***

Appendix 4.8. Treatment effect of social norm on the payment rate (Linear probability regression)

Dale of standard strength and the standard strength strength				
R-squared	0.000	0.008	0.000	0.008
Observations	24,950	24,950	10,847	10,847
	(0.00128)	(0.00768)	(0.00231)	(0.0163)
Constant	0.0166***	0.0169**	0.0300***	0.0353**
		(0.00442)		(0.00825)
CMS firms		0.0109**		0.0239***
		(0.00667)		(0.0136)
Services		0.00450		0.0142
		(0.00288)		(0.00601)
Fast credits		0.0140***		0.0240***
		(0.00311)		(0.00761)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 4.9.	Multiple Hypothesis	Testing Robustness Check

	DI	p-values				
		Unadjusted	Mu	Multiplicity-adjusted		
		Remark 3.1	Theorem 3.1	Bonferroni	Holm	
All treatments		(3)	(4)	(5)	(6)	
No message	-0.007	0.0127**	0.0703*	0.1013	0.1013	
Social norm	0.001	0.7367	0.9733	1	1	
Debtor name	0.002	0.587	0.955	1	1	
Agent name	0.003	0.3833	0.8903	1	1	
Debtor & Agent name	0.000	0.9137	0.9913	1	1	
Debtor name & Social norm	0.002	0.543	0.961	1	1	
Agent name & Social norm	0.004	0.306	0.842	1	1	
Agent & Debtor name &	0.000	1	1	1	1	
Social norm						
Personalization dimension						
No message	-0.007	0.0033***	0.0107**	0.0107**	0.0133**	
Debtor name	0.003	0.2667	0.5427	0.5427	1	
Agent name	-0.001	0.781	0.9477	0.9477	1	
Debtor & Agent name	0.000	0.8933	0.8933	0.8933	1	
Social norm dimension						
No message	-0.006	0.0017***	0.003***	0.003***	0.0033***	
Social norm	0.001	0.6693	0.6693	0.6693	1	

Notes: Estimations are based on procedure in List et al. (2019) using Stata command *mhtexp*. DI reports the "difference in means" with the Simple reminder as a control group for full sample (intention-to-treat estimate). Column (3)-(6) reports on p-values for the main regressions (payment rate on treatment group) computed based on the procedure in List et al. (2019). Column (3) reports a multiplicity-unadjusted p-value by using Remark 3.1; column 4 displays a multiplicity-adjusted p-value computed using Theorem 3.1; columns (5) & (6) display p-values obtained by applying Bonferroni (5) and Holm (6) adjustment to the p-values in column (3). *p<0.1 **p<0.05 ***p<0.01.
Source (Appendix & Model)	Treatment	CACE	Standard error	Power	Type S error	Exaggeration rate
4.5; (4)	Social norm	-0.000521	0.00666	5%	40.96%	30.29
4.5; (4)	Debtor name	-0.00414	0.00646	10%	4.73%	3.75
4.5; (4)	Agent name	-0.0038	0.00653	9%	6.15%	4.21
4.5; (4)	Debtor & Agent name	0.001	0.00673	5%	33.30%	15.20
4.5; (4)	Debtor name & Social norm	0.0062	0.00701	14%	1.55%	2.71
4.5; (4)	Agent name & Social norm	-0.00429	0.00643	10%	4.21%	3.64
4.5; (4)	Agent & Debtor name & Social norm	0.00172	0.00675	6%	23.29%	9.49
4.6; (2)	No message	0.0126**	0.00537	65%	0.001%	1.23
4.7; (2)	No message (ATE)	-0.00640***	0.00235	78%	0.0002%	1.14
4.7; (4)	Agent	-0.00379	0.00459	13%	2.04%	2.97
4.7; (4)	Debtor	0.00124	0.00479	6%	22.96%	9.07
4.7; (4)	Agent + Debtor	0.00162	0.00477	6%	16.96%	6.87
4.8; (2)	No message (ATE)	-0.00568***	0.00193	84%	0.0001%	1.11
4.8; (4)	Social norm	0.0025	0.00333	12%	2.88%	3.25

Notes: Estimations are calculated using *retrodesign* package in R. See Gelman and Carlin (2014) and Chapter 3 Section 9 "Statistical power and design analysis" for more on this procedure; *p<0.1 **p<0.05 ***p<0.01.

	Model (1)	Model (2)	Model (3)
Treatment (baseline: Treated)			
No message	-0.0204***	-0.0199***	-0.0440***
	(0.00221)	(0.00225)	(0.0100)
Not treated	-0.0307***	-0.0297***	-0.0644***
	(0.00168)	(0.00191)	(0.00804)
Loan size (log)		-0.00230**	-0.00572***
		(0.00108)	(0.00161)
Interaction effects			
No message*Loan size (log)			0.00430***
			(0.00164)
Not treated*Loan size (log)			0.00615***
			(0.00135)
Fee ratio		0.0263***	0.0246***
		(0.00856)	(0.00850)
Gender		-0.00532***	-0.00537***
		(0.00168)	(0.00168)
Ethnicity		-0.00342**	-0.00352**
		(0.00170)	(0.00170)
Debtor age		7.87e-05	8.35e-05
		(7.07e-05)	(7.07e-05)
Debt due age		-0.000475	-0.000431
		(0.000293)	(0.000292)
Region (baseline: Riga)			
Pierīga		0.000150	0.000119
		(0.00255)	(0.00255)
Kurzeme		-0.000763	-0.000708
		(0.00244)	(0.00244)
Zemgale		-0.00246	-0.00241
		(0.00240)	(0.00240)
Vidzeme		-0.000929	-0.000855
		(0.00273)	(0.002/3)
Latgale		-0.00152	-0.00149
		(0.00279)	(0.00278)
Delivery channel (baseline: SIVIS)		0 014 4***	0 0107***
Uniy email		-0.0114***	-0.010/***
Dath		(0.00343)	(0.00344)
ΒΟΣΠ		6.83e-05	0.000379
		(0.00224)	(0.00224)

Appendix 4.11. Treatment effect of the message delivery with interaction of loan size on the payment rate (Linear probability regression)

Debt type (baseline: Catalogue		
Banks & Loosing	0 0121***	0 0120***
Ballks & Leasing	(0.00200)	(0.00200)
	(0.00309)	(0.00309)
Fast credits	0.0132***	0.0135***
	(0.00286)	(0.00287)
Services	0.00363	0.00432
	(0.00659)	(0.00658)
CMS firms	0.0118***	0.0118***
	(0.00441)	(0.00441)
Constant	0.0364***	0.0551***
	(0.00784)	(0.0103)
Observations	24,950	24,950
R-squared	0.017	0.018
Robust standard e	rrors in narentheses	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline:				
No personalization (Model (1) & (2)/				
No Social norm message (Model (3) &	(4))			
No message	-0.00455		-0.00207	
	(0.00847)		(0.00747)	
Agent	0.00241	0.00710		
	(0.00909)	(0.0172)		
Debtor	0.00732	0.0123		
	(0.00963)	(0.0185)		
Agent + Debtor	0.00440	0.0102		
	(0.00952)	(0.0180)		
Social norm			0.0119*	0.0230*
			(0.00686)	(0.0132)
Debtor age	0.000207	0.000365	0.000251**	0.000431*
	(0.000146)	(0.000284)	(0.000112)	(0.000225)
Interactions				
No message*Debtor age	-4.40e-05		-8.67e-05	
	(0.000201)		(0.000179)	
Agent*Debtor age	-0.000115	-0.000266		
	(0.000213)	(0.000414)		
Debtor*Debtor age	-0.000154	-0.000270		
	(0.000225)	(0.000447)		
Agent + Debtor*Debtor age	-8.33e-05	-0.000209		
	(0.000224)	(0.000434)		
Social norm*Debtor age			-0.000259	-0.000502
			(0.000161)	(0.000317)
Loan size (log)	-0.00277**	-0.00426*	-0.00276**	-0.00419*
	(0.00108)	(0.00237)	(0.00108)	(0.00236)
Fee ratio	0.0279***	0.0547***	0.0280***	0.0550***
	(0.00863)	(0.0169)	(0.00862)	(0.0169)
			-	
			0.00650**	
Gender	-0.00647***	-0.0114***	*	-0.0114***
	(0.00170)	(0.00360)	(0.00170)	(0.00360)
Ethnicity	-0.00364**	-0.00637*	-0.00367**	-0.00646*
	(0.00172)	(0.00381)	(0.00171)	(0.00379)
Debt due age	-0.000366	-0.000856	-0.000373	-0.000855
// //	(0.000294)	(0.000644)	(0.000293)	(0.000643)
Region (baseline: Riga)				

Appendix 4.12. Treatment effect of the message with interaction of debtor age on the payment rate (Linear probability regression)

Pierīga	8.54e-06	0.00108	-4.25e-05	0.00103
	(0.00256)	(0.00530)	(0.00256)	(0.00529)
Kurzeme	-0.000645	0.000438	-0.000680	0.000463
	(0.00245)	(0.00519)	(0.00245)	(0.00517)
Zemgale	-0.00214	-0.00237	-0.00219	-0.00239
	(0.00241)	(0.00517)	(0.00241)	(0.00517)
Vidzeme	-0.000548	-0.00232	-0.000537	-0.00217
	(0.00274)	(0.00561)	(0.00274)	(0.00561)
Latgale	-0.00185	-0.00456	-0.00174	-0.00430
	(0.00280)	(0.00616)	(0.00280)	(0.00616)
Delivery channel (baseline: SMS)				
Only email	-0.000363	-0.0144**	-0.000460	-0.0146**
	(0.00327)	(0.00578)	(0.00328)	(0.00581)
Both	0.0128***	0.000582	0.0129***	0.000723
	(0.00196)	(0.00390)	(0.00196)	(0.00389)
Debt type (baseline: Catalogue				
merchants)				
Banks & Leasing	0.0139***	0.0287***	0.0140***	0.0289***
	(0.00311)	(0.00763)	(0.00311)	(0.00761)
Fast credits	0.0140***	0.0240***	0.0139***	0.0241***
	(0.00288)	(0.00601)	(0.00288)	(0.00601)
Services	0.00453	0.0141	0.00449	0.0141
	(0.00667)	(0.0136)	(0.00667)	(0.0136)
CMS firms	0.0109**	0.0239***	0.0109**	0.0240***
	(0.00442)	(0.00827)	(0.00442)	(0.00825)
Constant	0.0144	0.0296	0.0120	0.0249
	(0.00948)	(0.0191)	(0.00857)	(0.0179)
Observations	24,950	10,847	24,950	10,847
R-squared	0.008	0.008	0.008	0.008

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Appendix 5.1. Descriptive statistics for Phase 1

Covariate	Simple	Social	Agent	Reputation	All	RED	RED	RED	RED	RED All	p-value from joint
_	reminder	norm			treatments	Simple	Social	Agent	Reputation	treatments	orthogonality test
						reminder	norm				of treatment arms
nder	0.635	0.645	0.670	0.575	0.625	0.660	0.695	0.585	0.585	0.650	0.192
	(0.034)	(0.034)	(0.033)	(0.035)	(0.034)	(0.034)	(0.033)	(0.035)	(0.035)	(0.034)	
n size											
5)	6.078	6.143	6.138	6.222	6.180	6.260	6.197	6.125	6.077	6.139	0.689
	(0.070)	(0.074)	(0.070)	(0.068)	(0.071)	(0.068)	(0.069)	(0.069)	(0.068)	(0.070)	
0	0.125	0.114	0.101	0.098	0.097	0.103	0.098	0.105	0.110	0.109	0.258
	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	
nicity	0.380	0.440	0.410	0.410	0.445	0.410	0.410	0.435	0.420	0.415	0.977
	(0.034)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	
otor age	41.410	40.115	41.315	39.810	41.500	40.525	40.985	41.055	41.105	42.140	0.866
	(0.936)	(0.932)	(0.978)	(0.884)	(1.015)	(0.935)	(0.957)	(0.939)	(0.998)	(1.012)	
ot due age	5.231	4.928	4.942	4.997	4.891	5.117	5.101	4.986	4.911	5.108	0.930
	(0.177)	(0.169)	(0.174)	(0.167)	(0.165)	(0.186)	(0.186)	(0.166)	(0.180)	(0.180)	
jon	2.870	3.120	2.875	3.010	3.000	2.990	2.995	2.870	2.995	3.120	0.772
	(0.113)	(0.125)	(0.113)	(0.113)	(0.121)	(0.117)	(0.109)	(0.117)	(0.116)	(0.113)	
e e	2.400	2.475	2.380	2.435	2.395	2.425	2.375	2.345	2.435	2.400	0.912
	(0.059)	(0.054)	(0.057)	(0.054)	(0.057)	(0.055)	(0.054)	(0.058)	(0.053)	(0.056)	
	200	200	200	200	200	200	200	200	200	200	
1											

Note: Standard errors in parenthesis

F vnerimental	Ζ			R	egion					Type		
condition		Riga	Pieriga	Kurzeme	Zemgale	Vidzeme	Latgale	Catalogues	Banks	Fast credits	Services	CMS firms
White Simple reminder	200	31%	12%	22%	17%	13%	6%	20%	21%	56%	2%	%0
Red envelope & Simple reminder	200	32%	7%	20%	21%	15%	7%	17%	22%	%09	%0	%0
Social norm	200	29%	12%	17%	18%	12%	14%	15%	22%	61%	0%0	1%
Red envelope & Social norm	200	24%	14%	25%	20%	11%	7%	17%	29%	23%	1%	%0
Personalization (Agent)	200	31%	13%	20%	21%	11%	7%	19%	25%	25%	%0	1%
Red envelope & Personalization	200	33%	12%	19%	19%	11%	8%	700C	/07C	/0 C 3	107	10/
(Agency Reputation	200	28%	10%	22%	23%	11%	8%	20% 16%	23%	%09	0%0	0%0
Red envelope & Reputation	200	29%	13%	17%	21%	15%	7%	15%	25%	59%	0%0	%0
All treatment texts	200	30%	16%	11%	23%	11%	11%	19%	22%	59%	0%0	0%0
Red envelope & All treatment texts	200	24%	12%	24%	18%	16%	8%	18%	24%	58%	1%	1%
Total	2,000	29%	12%	19%	20%	12%	8%	20%	21%	56%	2%	0%

(continued)	
Descriptive statistics	
Appendix 5.1.	

Content	Colour of the envelope	Number of subject in the group	Number of returned letters	Relative frequency of returned letters
Simple	White	200	4	2%
reminder	Red	200	13	6.5%
Seciel norm	White	200	7	3.5%
Social norm	Red	200	6	3%
Officer	White	200	5	2.5%
Officer	Red	200	12	6%
Demotetien	White	200	8	4%
Reputation	Red	200	7	3.5%
Reputation &	White	200	15	7.5%
Agent	Red	200	7	3.5%
Total		2,000	84	4.2%

Appendix 5.2. Delivery rates across the experimental conditions in Phase 1

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple				
reminder)				
Social norm	0.0150	0.0147	0.0159	0.0152
	(0.0164)	(0.0165)	(0.0169)	(0.0170)
Agent	0.0300	0.0314*	0.0309	0.0321*
	(0.0184)	(0.0185)	(0.0188)	(0.0189)
Reputation	0.0250	0.0260	0.0265	0.0273
	(0.0177)	(0.0179)	(0.0183)	(0.0185)
All in one	-0.00500	-0.00494	-0.00419	-0.00431
	(0.0131)	(0.0132)	(0.0138)	(0.0138)
RED Simple reminder	-0.00500	-0.00340	-0.00437	-0.00308
	(0.0131)	(0.0132)	(0.0137)	(0.0138)
RED Social norm	-0	0.00240	0.000210	0.00263
	(0.0140)	(0.0141)	(0.0144)	(0.0144)
RED Agent	0.00500	0.00600	0.00619	0.00698
	(0.0149)	(0.0147)	(0.0155)	(0.0153)
RED Reputation	-0.0100	-0.0111	-0.0100	-0.0112
	(0.0122)	(0.0121)	(0.0125)	(0.0124)
RED All in one	-0	-0.000307	0.000317	4.29e-05
	(0.0140)	(0.0141)	(0.0144)	(0.0145)
Loan size (log)		-0.00844		-0.00890
		(0.00610)		(0.00636)
Fee ratio		0.0226		0.0195
		(0.0544)		(0.0564)
Ethnicity		0.00293		0.00262
		(0.00743)		(0.00772)
Gender		-0.00808		-0.00839
		(0.00753)		(0.00781)
Debtor age		0.000157		0.000185
		(0.000287)		(0.000304)
Debt due age		0.000641		0.000787
		(0.00268)		(0.00280)
Region (baseline: Riga)				
Pierīga		0.00944		0.00916
		(0.0128)		(0.0133)
Kurzeme		-0.00240		-0.00328
		(0.00940)		(0.00977)
Zemgale		0.00151		0.000952
		(0.00987)		(0.0103)
Vidzeme		0.0114		0.0113
		(0.0134)		(0.0141)

Appendix 5.3. Treatment effect on the payment rate in Phase 1 (Linear probability regression)

Latgale		0.00745 (0.0157)		0.00727 (0.0163)
Debt type (baseline: Catalogue merchants)				
Banks & Leasing		-0.00356		-0.00334
		(0.0202)		(0.0211)
Fast credits		0.0119		0.0127
		(0.0203)		(0.0210)
Services		-0.0263		-0.0271
		(0.0178)		(0.0185)
CMS firms		-0.0424*		-0.0427*
		(0.0247)		(0.0255)
Constant	0.0200**	0.0545	0.0204**	0.0564
	(0.00992)	(0.0451)	(0.0101)	(0.0471)
Observations	2,000	2,000	1,916	1,916
R-squared	0.007	0.013	0.007	0.013

	Model (1)	Model (2)	Model (3)	Model (4)
Red envelope	-0.0150**	-0.0148**	-0.0155**	-0.0152**
	(0.00705)	(0.00700)	(0.00734)	(0.00727)
Loan size (log)		-0.00830		-0.00874
		(0.00614)		(0.00640)
Fee ratio		0.0208		0.0177
		(0.0544)		(0.0565)
Ethnicity		0.00295		0.00274
		(0.00743)		(0.00771)
Gender		-0.00798		-0.00840
		(0.00740)		(0.00769)
Debtor age		0.000143		0.000174
		(0.000287)		(0.000304)
Debt due age		0.000632		0.000729
		(0.00269)		(0.00280)
Region (baseline: Riga)				
Pierīga		0.00873		0.00886
		(0.0126)		(0.0131)
Kurzeme		-0.00133		-0.00211
		(0.00949)		(0.00986)
Zemgale		0.00169		0.00119
		(0.00984)		(0.0102)
Vidzeme		0.0108		0.0110
		(0.0132)		(0.0140)
Latgale		0.00706		0.00700
		(0.0156)		(0.0162)
Debt type (baseline:				
Catalogue merchants)				
Banks & Leasing		-0.00353		-0.00335
		(0.0203)		(0.0211)
Fast credits		0.0113		0.0120
		(0.0203)		(0.0210)
Services		-0.0349**		-0.0363**
		(0.0160)		(0.0166)
CMS firms		-0.0337		-0.0341
		(0.0227)		(0.0236)
Constant	0.0330***	0.0681	0.0343***	0.0708
	(0.00565)	(0.0430)	(0.00588)	(0.0451)

Appendix 5.4. Treatment effect of the red envelope on the payment rate in Phase 1 (Linear probability regression)

Observations	2,000	2,000	1,916	1,916
R-squared	0.002	0.008	0.002	0.008

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple reminder)				
Social norm	0.01000	0.0102	0.0101	0.0104
	(0.0105)	(0.0106)	(0.0109)	(0.0111)
Personalization (Agent)	0.0200*	0.0204*	0.0209*	0.0213*
	(0.0116)	(0.0117)	(0.0121)	(0.0122)
Reputation	0.01000	0.00915	0.0103	0.00955
	(0.0105)	(0.0107)	(0.0109)	(0.0111)
All in one	-0	-0.000908	0.000242	-0.000555
	(0.00928)	(0.00945)	(0.00976)	(0.00991)
Loan size (log)		-0.00831		-0.00876
		(0.00612)		(0.00638)
Fee ratio		0.0218		0.0195
		(0.0545)		(0.0565)
Ethnicity		0.00263		0.00240
		(0.00746)		(0.00774)
Gender		-0.00788		-0.00806
		(0.00757)		(0.00786)
Debtor age		0.000144		0.000173
		(0.000287)		(0.000304)
Debt due age		0.000639		0.000844
		(0.00267)		(0.00279)
Region (baseline: Riga)				
Pierīga		0.00900		0.00887
		(0.0127)		(0.0132)
Kurzeme		-0.00191		-0.00273
		(0.00952)		(0.00991)
Zemgale		0.00176		0.00134
		(0.00982)		(0.0102)
Vidzeme		0.0109		0.0109
		(0.0133)		(0.0140)
Latgale		0.00798		0.00795
		(0.0158)		(0.0163)
Debt type (baseline: Catalogue				
merchants)				
Banks & Leasing		-0.00414		-0.00357
		(0.0202)		(0.0210)
Fast credits		0.0118		0.0130
		(0.0202)		(0.0210)
Services		-0.0281		-0.0288

Appendix 5.5. Treatment effect of the message text on the payment rate in Phase 1 (Linear probability regression)

		(0.0172)		(0.0178)
CMS firms		-0.0406*		-0.0405
		(0.0243)		(0.0252)
Constant	0.0175***	0.0527	0.0183***	0.0538
	(0.00656)	(0.0440)	(0.00685)	(0.0460)
Observations	2,000	2,000	1,916	1,916
R-squared	0.002	0.008	0.002	0.008

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple reminder)				
Social norm	0.00951	0.0143	0.00846	0.0133
	(0.0218)	(0.0224)	(0.0227)	(0.0235)
Personalization (Agent)	0.0387	0.0434*	0.0382	0.0431
	(0.0249)	(0.0255)	(0.0258)	(0.0264)
Reputation	-0.0165	-0.0130	-0.0179	-0.0143
	(0.0164)	(0.0163)	(0.0173)	(0.0172)
All in one	-0.0146	-0.0140	-0.0156	-0.0150
	(0.0171)	(0.0181)	(0.0182)	(0.0192)
Loan size (log)		0.00540		0.00531
		(0.0125)		(0.0128)
Fee ratio		0.137		0.140
		(0.121)		(0.125)
Ethnicity		-0.00128		-0.000797
		(0.0138)		(0.0144)
Debtor age		0.000501		0.000526
		(0.000458)		(0.000476)
Debt due age		0.000318		0.000353
		(0.00475)		(0.00486)
Region (baseline: Riga)				
Pierīga		0.0293		0.0299
		(0.0247)		(0.0262)
Kurzeme		0.00838		0.00745
		(0.0169)		(0.0178)
Zemgale		-0.00599		-0.00739
		(0.0145)		(0.0151)
Vidzeme		0.0562*		0.0569*
		(0.0304)		(0.0316)
Latgale		0.0141		0.0137
		(0.0271)		(0.0282)
Debt type (baseline: Catalogue				
merchants)				
Banks & Leasing		0.00187		0.00225
		(0.0414)		(0.0419)
Fast credits		-0.00378		-0.00311
		(0.0378)		(0.0386)
Services		-0.0501		-0.0519
		(0.0379)		(0.0387)
CMS firms		-0.0529		-0.0532

Appendix 5.6. Treatment effect of the message text on the payment rate among the women in Phase 1 (Linear probability regression)

		(0.0472)		(0.0484)
Constant	0.0284**	-0.0565	0.0303**	-0.0561
	(0.0140)	(0.0976)	(0.0150)	(0.0993)
Observations	735	735	704	704
R-squared	0.014	0.035	0.014	0.035

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple reminder)				
Social norm	0.0108	0.0114	0.0113	0.0123
	(0.0112)	(0.0115)	(0.0116)	(0.0119)
Personalization (Agent)	0.00834	0.00768	0.00914	0.00861
	(0.0111)	(0.0116)	(0.0116)	(0.0122)
Reputation	0.0272*	0.0253*	0.0282*	0.0269*
	(0.0143)	(0.0143)	(0.0148)	(0.0149)
All in one	0.00802	0.00657	0.00871	0.00728
	(0.0110)	(0.0112)	(0.0115)	(0.0117)
Loan size (log)		-0.0171***		-0.0184***
		(0.00606)		(0.00642)
Fee ratio		-0.0552		-0.0630
		(0.0446)		(0.0460)
Ethnicity		0.00432		0.00412
		(0.00867)		(0.00902)
Debtor age		-8.49e-05		-7.67e-05
		(0.000365)		(0.000392)
Debt due age		0.00133		0.00164
		(0.00209)		(0.00227)
Region (baseline: Riga)				
Pierīga		-0.00330		-0.00396
		(0.0141)		(0.0146)
Kurzeme		-0.00814		-0.00898
		(0.0116)		(0.0121)
Zemgale		0.00261		0.00288
		(0.0128)		(0.0133)
Vidzeme		-0.0135		-0.0148
		(0.0121)		(0.0128)
Latgale		0.00116		0.000879
		(0.0191)		(0.0199)
Debt type (baseline: Catalogue				
merchants)				
Banks & Leasing		0.00676		0.00738
		(0.0168)		(0.0179)
Fast credits		0.0334*		0.0360*
		(0.0183)		(0.0195)
Services		-0.00761		-0.00718
		(0.0160)		(0.0170)
CMS firms		-0.0183		-0.0181

Appendix 5.7. Treatment effect of the message text on the payment rate among the men in Phase 1 (Linear probability regression)

		(0.0219)		(0.0231)
Constant	0.0116*	0.0995**	0.0120*	0.105**
	(0.00666)	(0.0443)	(0.00687)	(0.0468)
Observations	1,265	1,265	1,212	1,212
R-squared	0.004	0.015	0.004	0.015

	DI	p-values			
		Unadjusted	Mı	ultiplicity-adjust	ted
		Remark 3.1	Theorem 3.1	Bonferroni	Holm
All treatments		(3)	(4)	(5)	(6)
Social norm	0.015	0.3603	0.8920	0.8920	1
Agent	0.03	0.1073	0.4963	0.4963	0.9660
Reputation	0.025	0.1720	0.6293	0.6293	1
All in one	0.005	0.7230	0.9947	0.9947	1
RED Simple reminder	0.005	0.7367	0.9887	0.9887	1
RED Social norm	0	0.9970	1	1	1
RED Agent	0.005	0.7560	0.9753	0.9753	1
Red Reputation	0.01	0.4467	0.9237	0.9237	1
Red All in one	0	0.9977	0.9977	0.9977	1
Content dimension					
Social norm	0.01	0.346	0.684	0.684	1
Agent	0.02	0.0943*	0.2963	0.2963	0.3773
Reputation	0.01	0.3513	0.5557	0.5557	1
All in one	0	0.9993	0.9993	0.9993	1
Content dimension and					
gender subgroups					
Female: Social norm	0.0095	0.6653	0.6653	1	0.6653
Female: Agent	0.0387	0.1277	0.5457	1	0.8937
Female: Reputation	0.0165	0.3547	0.8407	1	1
Female: All in one	0.0146	0.4060	0.8567	1	1
Male: Social norm	0.0108	0.3473	0.881	1	1
Male: Agent	0.0083	0.4687	0.8377	1	1
Male: Reputation	0.0272	0.056*	0.3313	0.448	0.448
Male: All in one	0.008	0.4800	0.724	1	0.9600

Notes: Estimations are based on procedure in List et al. (2019) using Stata command *mhtexp*. DI reports the "difference in means" with the Simple reminder as a control group for full sample (intention-to-treat estimate). Column (3)-(6) reports on p-values for the main regressions (payment rate on treatment group) computed based on the procedure in List et al. (2019). Column (3) reports a multiplicity-unadjusted p-value by using Remark 3.1; column 4 displays a multiplicity-adjusted p-value computed using Theorem 3.1; columns (5) & (6) display p-values obtained by applying Bonferroni (5) and Holm (6) adjustment to the p-values in column (3). *p<0.1 **p<0.05 ***p<0.01.

Source (Appendi x & Model)	Treatment	CACE	Standard error	Power	Type S error	Exaggeration rate
5.3; (4)	Social norm	0.0159	0.0169	16%	1.19%	2.58
5.3; (4)	Agent	0.0323*	0.0188	40%	0.03%	1.55
5.3; (4)	Reputation	0.0282	0.0185	33%	0.07%	1.72
5.3; (4)	All in one	-0.00356	0.0137	6%	22.88%	9.19
5.3; (4)	RED Simple reminder	-0.00236	0.0137	5%	30.88%	13.87
5.3; (4)	RED Social norm	0.00244	0.0145	5%	31.28%	13.68
5.3; (4)	RED Agent	0.00664	0.0153	7%	11.60%	5.45
5.3; (4)	RED Reputation	-0.0103	0.0123	13%	1.93%	2.98
5.3; (4)	RED All in one	0.000818	0.0144	5%	43.40%	40.93
5.4; (4)	Red envelope	-0.0153**	0.0073	54%	0.01%	1.36
5.5; (4)	Social norm	0.0103	0.0111	15%	1.27%	2.69
5.5; (4)	Personalization (Agent)	0.0209*	0.0122	40%	0.03%	1.53
5.5; (4)	Reputation	0.0101	0.0111	15%	1.38%	2.66
5.5; (4)	All in one	-0.000131	0.00985	5%	48.45%	176.40
5.6; (4)	Social norm	0.0141	0.0234	9%	5.62%	3.97
5.6; (4)	Personalization (Agent)	0.0435*	0.0262	38%	0.04%	1.62
5.6; (4)	Reputation	-0.0131	0.0171	12%	2.68%	3.21
5.6; (4)	All in one	-0.0138	0.0187	11%	3.05%	3.34
5.7; (4)	Social norm	0.0111	0.0118	16%	1.19%	2.57
5.7; (4)	Personalization (Agent)	0.00821	0.0121	10%	4.00%	3.70
5.7; (4)	Reputation	0.0275*	0.0149	10%	4.00%	3.49
5.7; (4)	All in one	0.00801	0.0117	11%	3.89%	3.65

Notes: Estimations are calculated using *retrodesign* package in R. See Gelman and Carlin (2014) and Chapter 3, Section 9 "Statistical power and design analysis" for more on this procedure; *p<0.1 **p<0.05 ***p<0.01.

Appendix :	5.10. Descriptive	statistics for	Experiment 2	Phase 2
прренал	5.10.Descriptive	statistics joi	LAPCIMENT 2	THUSE Z

Covariate	Simple reminder	Personalization (Female agent)	Personalization (Male agent)	p-value from joint orthogonality test of treatment
				arms
Gender	0.608	0.576	0.619	0.218
	(0.013)	(0.019)	(0.018)	
Loan size (log)	5.295	5.325	5.335	0.448
	(0.020)	(0.028)	(0.028)	
Fee ratio	0.111	0.107	0.106	0.482
	(0.003)	(0.004)	(0.004)	
Ethnicity	0.418	0.404	0.422	0.763
	(0.013)	(0.018)	(0.019)	
Debtor age	42.979	43.067	43.689	0.393
	(0.307)	(0.431)	(0.440)	
Debt due age	8.570	8.416	8.512	0.705
	(0.107)	(0.149)	(0.149)	
Region	2.422	2.336	2.456	0.383
	(0.046)	(0.062)	(0.065)	
Debt type	3.283	3.312	3.275	0.818
	(0.032)	(0.044)	(0.045)	
Ν	1,410	705	706	

Note: Standard errors in parenthesis

Kynerimental			Reg	ion				Debt ty	vpe	
condition	Riga	Pieriga	Kurzeme	Zemgale	Vidzeme	Latgale	Fast credits	Services	CMS firms	Banks
Simple reminder	49%	13%	11%	11%	7%	9%6	0.28%	39%	17%	44%
Female agent	20%0	11%	13%	12%	8%	6%	0.43%	41%	16%	42%
Male agent	49%	12%	12%	12%	8%	8%	0.28%	39%	16%	44%
Total	49%	12%	12%	12%	8%	8%	0.32%	40%	16%	43%

Descriptive statistics for Experiment 2 Phase 2 (continuation)

Experimental condition	Share of delivered messages
Simple reminder	96%
No message	95%
Social norm	96%
Total	95%

Appendix 5.11. Delivery rates across the experimental conditions in Phase 2

	Model (1)	Model (2)	Model (3)	Model (4)
Personalization (Agent)	0.00/95		0.00456	
reisonalization (Agent)	(0.00433)	(0.00434	(0.00430	(0.00431)
Loan size (log)	(0.00428)	-0.00720	(0.00443)	-0.00710
		(0.00720		(0,00924)
Fee ratio		-0 0/35		-0 0422
		-0.0433		-0.0422
Ethnicity		-0.00265		-0.00/22)
Limitity		(0.00205)		(0.00421
Gender		-0.00725		-0.00453
Gender		(0.00723		(0.00055)
Debtor age		-5 72e-05		-4 59e-06
		(0.000168)		(0,000169)
Deht due age		-0.000475		-0.000533
		(0.00116)		(0.00120)
Region (baseline: Riga)		(0.00110)		(0.00120)
Pierīga		0.00607		0.00596
		(0.00777)		(0.00812)
Kurzeme		0.00814		0.00848
		(0.00912)		(0.00964)
Zemgale		0.00206		0.00170
5		(0.00736)		(0.00770)
Vidzeme		0.0164		0.0124
		(0.0116)		(0.0114)
Latgale		0.000485		0.000270
C .		(0.00814)		(0.00840)
Debt type (baseline: Banks)				
Fast credits		-0.0216*		-0.0229*
		(0.0120)		(0.0125)
Services		-0.00691		-0.00723
		(0.00916)		(0.00953)
CMS firms		-0.0191*		-0.0195
		(0.0115)		(0.0119)
Constant	0.0106***	0.0684	0.0111***	0.0672
	(0.00273)	(0.0607)	(0.00285)	(0.0639)
Observations	2 821	2 821	2 602	2 602
R-squared	0,000	0,006	0,000	0.005
n squarca	0.000	0.000	0.000	0.005

Appendix 5.12. Personalization effect on the payment rate in Phase 2 (Linear probability regression)

	Model (1)	Model (2)	iviodel (3)	iviodel (4)
Treatment (baseline: Simple reminder)	0.00700		0.00000	0.00000
Female Agent	0.00780	0.00754	0.00692	0.00682
	(0.00576)	(0.00573)	(0.00589)	(0.00585)
Male Agent	0.00211	0.00214	0.00223	0.00223
	(0.00503)	(0.00496)	(0.00526)	(0.00521)
Loan size (log)		-0.00721		-0.00712
		(0.00878)		(0.00924)
Fee ratio		-0.0435		-0.0424
		(0.0688)		(0.0722)
Ethnicity		-0.00261		-0.00418
		(0.00453)		(0.00453)
Gender		-0.00713		-0.00642
		(0.00465)		(0.00477)
Debtor age		-5.37e-05		-2.31e-06
		(0.000168)		(0.000169)
Debt due age		-0.000476		-0.000534
		(0.00116)		(0.00120)
Region (baseline: Riga)				
Pierīga		0.00603		0.00596
		(0.00778)		(0.00812)
Kurzeme		0.00803		0.00841
		(0.00917)		(0.00968)
Zemgale		0.00218		0.00180
		(0.00731)		(0.00766)
Vidzeme		0.0165		0.0125
		(0.0116)		(0.0113)
Latgale		0.000602		0.000385
		(0.00811)		(0.00836)
Debt type (baseline: Banks)				
Fast credits		-0.0219*		-0.0232*
		(0.0121)		(0.0126)
Services		-0.00696		-0.00729
		(0.00916)		(0.00953)
CMS firms		-0.0191*		-0.0196
		(0.0115)		(0.0119)
Constant	0.0106***	0.0682	0.0111***	0.0672
	(0.00273)	(0.0607)	(0.00285)	(0.0639)
Observations	2,821	2,821	2 <i>,</i> 692	2,692
R-squared	0.001	0.006	0.001	0.006

Appendix 5.13. Agent gender effect on the payment rate in Phase 2 (Linear probability regression)

	Model (1)	Model (2)
Personalization (Agent)	0.00666	0.00510
	(0.00791)	(0.00806)
Gender	-0.00574	-0.00604
	(0.00593)	(0.00618)
Personalization*Gender	-0.00302	-0.000982
	(0.00934)	(0.00956)
Loan size (log)	-0.00719	-0.00710
	(0.00879)	(0.00925)
Fee ratio	-0.0433	-0.0422
	(0.0689)	(0.0723)
Ethnicity	-0.00262	-0.00420
	(0.00458)	(0.00458)
Debtor age	-5.87e-05	-4.93e-06
	(0.000170)	(0.000170)
Debt due age	-0.000469	-0.000531
	(0.00116)	(0.00120)
Region (baseline: Riga)		
Pierīga	0.00607	0.00596
	(0.00777)	(0.00812)
Kurzeme	0.00808	0.00846
	(0.00911)	(0.00963)
Zemgale	0.00196	0.00167
	(0.00739)	(0.00774)
Vidzeme	0.0164	0.0124
	(0.0116)	(0.0114)
Latgale	0.000472	0.000265
	(0.00816)	(0.00841)
Debt type (baseline: Banks)		
Fast credits	-0.0216*	-0.0229*
	(0.0120)	(0.0126)
Services	-0.00689	-0.00723
	(0.00917)	(0.00953)
CMS firms	-0.0190*	-0.0195
	(0.0115)	(0.0119)
Constant	0.0674	0.0669
	(0.0611)	(0.0643)
Observations	2.024	2 (22
Observations Discussed	2,821	2,092
n-squareu	0.006	0.005

Appendix 5.14. Treatment effect of the message with interaction of gender on the payment rate in Phase 2 (Linear probability regression)

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	DI		p-val	ues	
		Unadjusted	Mı	ultiplicity-adjust	ted
		Remark 3.1	Theorem 3.1	Bonferroni	Holm
All treatments		(3)	(4)	(5)	(6)
Female agent	0.0078	0.18	0.3193	0.36	0.36
Male Agent	0.0021	0.6833	0.6833	1	0.6833
Agent: Female subgroup	0.0067	0.426	0.673	0.852	0.852
Agent: Male subgroup	0.0037	0.4437	0.4437	0.8873	0.4437

Notes: Estimations are based on procedure in List et al. (2019) using Stata command *mhtexp*. DI reports the "difference in means" with the Simple reminder as a control group for full sample (intention-to-treat estimate). Column (3)-(6) reports on p-values for the main regressions (payment rate on treatment group) computed based on the procedure in List et al. (2019). Column (3) reports a multiplicity-unadjusted p-value by using Remark 3.1; column 4 displays a multiplicity-adjusted p-value computed using Theorem 3.1; columns (5) & (6) display p-values obtained by applying Bonferroni (5) and Holm (6) adjustment to the p-values in column (3). *p<0.1 **p<0.05 ***p<0.01.

Source (Appendi x & Model)	Treatment	CACE	Standard error	Power	Type S error	Exaggeration rate
5.12; (4)	Agent	0.0045	0.0044	18%	0.81%	2.45
5.13; (4)	Female agent	0.0068	0.0058	21%	0.41%	2.15
5.13; (4)	Male Agent	0.0022	0.0052	7%	11.89%	5.51
	Agent (pooled result)	0.006	0.0043	29%	0.14%	1.84

Notes: Estimations are calculated using *retrodesign* package in R. See Gelman and Carlin (2014) and Chapter 3, Section 9 "Statistical power and design analysis" for more on this procedure; p<0.1 * p<0.05 * p<0.01.

Covaniato	Simple	No	Loss-framed	Gain-framed	Social	Douconalization	Personalization	Personalization	p-value from joint
COVARIALE	reminder	message	Public Good	Public Good	norm	rersonauzauon	& Loss-Frameu Public Good	& Gam-Irameu Public Good	of treatment arms
Gender	0.677	0.705	0.681	0.660	0.697	0.661	0.672	0.685	0.239
	(0.014)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	
Debt amount (log)	3.826	3.820	3.791	3.861	3.845	3.866	3.905	3.828	0.096
	(0.026)	(0.026)	(0.026)	(0.027)	(0.026)	(0.027)	(0.026)	(0.027)	
Fee ratio	0.387	0.384	0.388	0.369	0.378	0.376	0.358	0.379	0.064
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	
Ethnicity	0.332	0.318	0.339	0.341	0.344	0.358	0.355	0.357	0.452
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	
Debtor age	41.338	40.906	41.254	41.128	40.591	41.687	42.342	41.597	0.141
	(0.429)	(0.424)	(0.427)	(0.421)	(0.411)	(0.434)	(0.433)	(0.432)	
Debt due age	1.715	1.644	1.642	1.656	1.688	1.645	1.612	1.647	0.473
	(0.033)	(0.033)	(0.032)	(0.033)	(0.032)	(0.032)	(0.032)	(0.032)	
Distance	21.236	21.627	26.959	21.570	24.855	23.652	21.495	21.957	0.085
	(1.549)	(1.243)	(1.813)	(1.249)	(1.417)	(1.975)	(1.446)	(1.516)	
Region	2.576	2.588	2.634	2.580	2.665	2.581	2.544	2.599	0.595
	(0.042)	(0.041)	(0.043)	(0.042)	(0.043)	(0.043)	(0.042)	(0.043)	
telem3	1.391	1.453	1.379	1.412	1.435	1.403	1.402	1.397	0.401
	(0.023)	(0.025)	(0.023)	(0.024)	(0.024)	(0.023)	(0.023)	(0.023)	
Ν	1150	1149	1149	1150	1150	1149	1149	1150	

Note: Standard errors in parenthesis

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Simple reminder	34%	14%	22%	22%	5%	2%	%0	1%	80%	19%
No message	33%	15%	22%	22%	7%	2%	%0	1%	77%	22%
Loss-framed Public Good	34%	14%	20%	21%	8%	2%	0.09%	1%	80%	19%
Gain-Framed Public Good	34%	14%	22%	23%	5%	3%	0%0	1%	79%	20%
Social norm	33%	14%	21%	22%	7%	4%	0%0	1%	78%	21%
Personalization	35%	14%	18%	24%	6%0	2%	0.17%	1%	%6L	20%
Personalization & Loss- framed Public Good	35%	16%	20%	21%	6%	2%	0.09%	1%	79%	20%
Personalization & Loss- framed Public Good	36%	13%	20%	23%	6%	3%	0%0	1%	80%	19%
Total	34%	14%	20%	22%	6%	2%	0.04%	1%	79%	20%

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AI	nnendix 6.2	1)eliver	i rates	across	the	exnerimen	tal	conditions
· •		Denvery	10100	aci 055	CITC	caperinten	cui	contantions

Experimental condition	Share of delivered messages
Simple reminder	46%
No message	0%
Social norm	44%
Debtor name	46%
Agent name	46%
Debtor & Agent name	46%
Debtor name & Social norm	46%
Agent name & Social norm	47%
Debtor & Agent name & Social	48%
norm	
Total	40%

	Model (1)	Model (2)	Model (3)	Model (4)	
Treatment (baseline: Simple					
reminder)					
No message	0.00262	0.00226			
	(0.00357)	(0.00357)			
Loss-framed Public Good	0.00523	0.00479	0.0107	0.0109	
	(0.00387)	(0.00387)	(0.00802)	(0.00803)	
Gain-framed Public Good	0.000870	0.000275	0.00177	0.00219	
	(0.00336)	(0.00334)	(0.00675)	(0.00667)	
Social norm	0.00261	0.00279	0.00551	0.00600	
	(0.00357)	(0.00356)	(0.00723)	(0.00714)	
Personalization	0.0104**	0.00993**	0.0230**	0.0232**	
	(0.00441)	(0.00436)	(0.00920)	(0.00907)	
Personalization & Loss-Framed PG	0.00523	0.00410	0.00701	0.00570	
	(0.00387)	(0.00386)	(0.00737)	(0.00736)	
Personalization & Gain-framed PG	0.00957**	0.00911**	0.0158*	0.0164**	
	(0.00432)	(0.00428)	(0.00831)	(0.00823)	
Gender		-0.00642**		-0.00830	
		(0.00253)		(0.00511)	
Loan size (log)		-0.00642***		-0.0118**	
		(0.00246)		(0.00482)	
Fee ratio		-0.0242***		-0.0482***	
		(0.00785)		(0.0153)	
Ethnicity		-0.00358		-0.00689	
		(0.00222)		(0.00502)	
Debtor age		0.000237***		0.000558***	
		(9.17e-05)		(0.000207)	
Debt due age		-0.00605***		-0.00978***	
		(0.00110)		(0.00234)	
Region (baseline: Riga)					
Pierīga		0.00332		0.00564	
		(0.00404)		(0.00845)	
Kurzeme		-0.00196		-0.00267	
		(0.00285)		(0.00642)	
Zemgale		-0.00312		-0.0106*	
		(0.00278)		(0.00605)	
Vidzeme		-0.00288		-0.0194*	
		(0.00526)		(0.0100)	
Latgale		-0.00127		0.00256	
		(0.00712)		(0.0176)	
Abroad		0.0159		0.0265	

Appendix 6.3. Treatment effects on the payment rate (Linear probability regression)

		(0.0182)		(0.0339)	
Delivery channel (baseline: SMS)					
Only email		-0.00222		-0.0117	
		(0.0103)		(0.0142)	
Both		-0.00791*			
		(0.00274)		(0.00480)	
Distance		-4.28e-05			
		(1.79e-05)		(3.44e-05)	
Constant	0.00609***	0.0475***	0.0113**	0.0817***	
	(0.00229)	(0.0127)	(0.00461)	(0.0251)	
Observations	9,196	9,196	3,719	3,719	
R-squared	0.001	0.012	0.003	0.023	
	Robust standard errors in parentheses				

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
	Model (1)	Model (2)
CACE of Simple reminder	-0.00569	-0.00517
	(0.00778)	(0.00773)
Gender		-0.00954**
		(0.00462)
Loan size (log)		-0.00816
		(0.00511)
Fee ratio		-0.0197
		(0.0144)
Ethnicity		-0.00108
		(0.00380)
Debtor age		6.92e-06
		(0.000137)
Debt due age		-0.00409**
		(0.00164)
Region (baseline: Riga)		
Pierīga		0.00642
		(0.00782)
Kurzeme		-0.00827**
		(0.00344)
Zemgale		-0.00294
		(0.00473)
Vidzeme		0.00250
		(0.0107)
Latgale		-0.00965*
		(0.00550)
Abroad		-
Delivery channel		
(baseline: SMS)		
Only email		0.0109***
		(0.00411)
Both		0.00710*
		(0.00411)
Distance		4.05e-06
		(3.28e-05)
Constant	0.00870***	0.0523**
	(0.00274)	(0.0229)
Observations	2,299	2,299

Appendix 6.4. Compliant average causal effect of communication on the payment rate (twostage least squares regression)

R-squared

0.014

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Model (1)	Model (2)	Model (3)	Model (4)
0.000441	0.000298		
(0.00305)	(0.00306)		
0.00624**	0.00575**	0.0108**	0.0103**
(0.00243)	(0.00240)	(0.00483)	(0.00478)
	-0.00641**		-0.00833
	(0.00253)		(0.00512)
	-0.00646***		-0.0118**
	(0.00246)		(0.00482)
	-0.0240***		-0.0475***
	(0.00783)		(0.0152)
	-0.00356		-0.00697
	(0.00221)		(0.00503)
	0.000236***		0.000550***
	(9.16e-05)		(0.000206)
	-0.00603***		-0.00985***
	(0.00110)		(0.00234)
	0.00326		0.00547
	(0.00402)		(0.00845)
	-0.00204		-0.00308
	(0.00285)		(0.00646)
	-0.00311		-0.0105*
	(0.00277)		(0.00605)
	-0.00274		-0.0192*
	(0.00526)		(0.0100)
	-0.00119		0.00232
	(0.00713)		(0.0177)
	0.0158		0.0309
	(0.0179)		(0.0337)
	-0.00217		-0.0106
	(0.0103)		(0.0142)
	0.000202		-0.00791*
	(0.00274)		(0.00478)
	-2.45e-05		-3.95e-05
	(1.78e-05)		(3.41e-05)
0.00826***	0.0495***	0.0157***	0.0868***
(0.00134)	(0.0122)	(0.00272)	(0.0243)
	Model (1) 0.000441 (0.00305) 0.00624** (0.00243) 0.00826*** (0.00134)	Model (1) Model (2) 0.000441 0.000298 (0.00305) (0.00306) 0.00624** 0.00575** (0.00243) (0.00240) -0.00641** (0.00253) -0.00646*** (0.00246) -0.0240*** (0.00783) -0.00356 (0.00221) 0.000236*** (9.16e-05) -0.00603*** (0.00110) 0.00326 (0.00240) -0.00204 (0.00285) -0.00217 (0.00277) -0.00274 (0.00526) -0.00119 (0.00713) 0.0158 (0.0179) 0.00326 (1.78e-05) (0.00274) -2.45e-05 (1.78e-05) 0.0495**** (0.00134) (0.0122)	Model (1) Model (2) Model (3) 0.000441 0.000298 (0.00305) (0.00306) 0.00624** 0.00575** 0.0108** (0.00243) (0.00240) (0.00483) -0.00641** (0.00246) -0.0046*** (0.00246) -0.0046*** (0.00246) -0.0240*** (0.00783) -0.00356 (0.00221) 0.000236*** (9.16e-05) -0.00603*** (0.00110) 0.00326 (0.00402) -0.00204 (0.00285) -0.00217 -0.00271 -0.00274 (0.00526) -0.00119 (0.00713) 0.0158 (0.0179) -0.00217 (0.00274) -2.45e-05 (1.78e-05) 0.00826*** 0.0495*** 0.0157***

Appendix 6.5. Treatment effect of personalization on the payment rate (linear probability regression)

Observations	9,196	9,196	3,719	3,719		
R-squared	0.001	0.011	0.001	0.022		
	Robust standard errors in parentheses					

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple		• •		•••
reminder)				
No message	-0.00261	-0.00270		
	(0.00352)	(0.00352)		
Gain-framed Public Good	-4.92e-06	-0.000264	-0.00255	-0.00210
	(0.00312)	(0.00310)	(0.00628)	(0.00619)
Loss-framed Public Good	4.92e-06	-0.000518	-0.00270	-0.00339
	(0.00312)	(0.00310)	(0.00633)	(0.00627)
Social norm	-0.00261	-0.00216	-0.00594	-0.00552
	(0.00352)	(0.00348)	(0.00723)	(0.00714)
Gender		-0.00640**		-0.00842
		(0.00254)		(0.00512)
Loan size (log)		-0.00642***	k	-0.0119**
		(0.00246)		(0.00482)
Fee ratio		-0.0241***		-0.0477***
		(0.00785)		(0.0153)
Ethnicity		-0.00348		-0.00679
-		(0.00222)		(0.00504)
Debtor age		0.000239***	*	0.000557***
-		(9.16e-05)		(0.000206)
Debt due age		-0.00608***	¢	-0.00993***
-		(0.00111)		(0.00235)
Region (baseline: Riga)		. ,		. , ,
Pierīga		0.00328		0.00561
-		(0.00403)		(0.00844)
Kurzeme		-0.00213		-0.00305
		(0.00285)		(0.00644)
Zemgale		-0.00309		-0.0102*
0		(0.00278)		(0.00605)
Vidzeme		-0.00273		-0.0184*
		(0.00525)		(0.00992)
Latgale		-0.00125		0.00242
5		(0.00712)		(0.0176)
Abroad		0.0180		0.0315
		(0.0178)		(0.0336)
Delivery channel (baseline:		. /		. ,
SMS)				
, Only email		-0.00226		-0.0110
,		(0.0103)		(0.0142)
		((<i>-</i> /

Appendix 6.6. Treatment effect of public goods and social norm on the payment rate (linear probability regression)

Both	0.000235 -0.00779						
		(0.00275)		(0.00480)			
Distance		-2.51e-05		-4.00e-05			
		(1.78e-05)		(3.40e-05)			
Constant	0.0113***	0.0523***	0.0228***	0.0935***			
	(0.00221)	(0.0127)	(0.00460)	(0.0253)			
Observations	9,196	9,196	3,719	3,719			
R-squared	0.000	0.011	0.000	0.021			
Robust standard errors in parentheses							

*** p<0.01, ** p<0.05, * p<0.1

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple				
reminder)				
No message	-0.00261	-0.00269		
	(0.00352)	(0.00352)		
Moral appeals	-0.000523	-0.000745	-0.00329	-0.00328
	(0.00259)	(0.00257)	(0.00532)	(0.00524)
Gender		-0.00642**		-0.00844*
		(0.00253)		(0.00512)
Loan size (log)		-0.00642***	:	-0.0118**
		(0.00246)		(0.00482)
Fee ratio		-0.0241***		-0.0475***
		(0.00785)		(0.0153)
Ethnicity		-0.00348		-0.00680
-		(0.00222)		(0.00504)
Debtor age		0.000240***	k	0.000557***
<u> </u>		(9.16e-05)		(0.000206)
Debt due age		-0.00609***	:	-0.00991***
U U		(0.00111)		(0.00234)
Region (baseline: Riga)		(, , , , , , , , , , , , , , , , , , ,		· · · ·
Pierīga		0.00327		0.00568
5		(0.00403)		(0.00845)
Kurzeme		-0.00214		-0.00306
		(0.00285)		(0.00644)
Zemgale		-0.00310		-0.0101*
5		(0.00277)		(0.00605)
Vidzeme		-0.00275		-0.0183*
		(0.00525)		(0.00994)
Latgale		-0.00133		0.00244
		(0.00712)		(0.0176)
Abroad		0.0182		0.0321
		(0.0178)		(0.0336)
Delivery channel (baseline:		(0.01/0)		(0.0000)
SMS)				
Only email		-0.00218		-0.0109
- ,		(0.0103)		(0.0142)
Both		0.000217		-0.00782
		(0.00275)		(0.00480)
Distance		-2.52e-05		-4.07e-05
		(1.78e-05)		(3.41e-05)
Constant	0.0113***	0.0524***	0.0228***	0.0934***

Appendix 6.7. Effect of moral appeals on the payment rate (linear probability regression)

	(0.00221)	(0.0127)	(0.00460)	(0.0253)
Observations	9,196	9,196	3,719	3,719
R-squared	0.000	0.010	0.000	0.020

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Model (1)	Model (2)
0.00645	
(0.00880)	
0.0110	0.0149
(0.00923)	(0.0184)
-0.00279	-0.00535
(0.00683)	(0.0138)
0.000979	0.000426
(0.00771)	(0.0156)
0.0180*	0.0313
(0.00984)	(0.0192)
0.00740	0.00425
(0.00867)	(0.0155)
-0.000192	-0.000713
(0.00762)	(0.0155)
-0.00497	-0.0125
(0.00558)	(0.0115)
. ,	. ,
-0.00600	
(0.00937)	
-0.00906	-0.00585
(0.00988)	(0.0199)
0.00468	0.0117
(0.00772)	(0.0155)
0.00257	0.00834
(0.00860)	(0.0173)
-0.0122	-0.0130
(0.0108)	(0.0214)
-0.00489	0.00206
(0.00951)	(0.0172)
0.0136	0.0255
(0.00921)	(0.0183)
-0.00655***	-0.0120**
(0.00245)	(0.00481)
-0.0245***	-0.0484***
(0.00786)	(0.0154)
-0.00366*	-0.00717
(0.00221)	(0.00500)
0.000239***	0.000569***
	Model (1) 0.00645 (0.00880) 0.0110 (0.00923) -0.00279 (0.00683) 0.000979 (0.00771) 0.0180* (0.00984) 0.00740 (0.00867) -0.000192 (0.00762) -0.00497 (0.00558) -0.00600 (0.00937) -0.00906 (0.00937) -0.00906 (0.00988) 0.00468 (0.00772) 0.00257 (0.00860) -0.0122 (0.0108) -0.00489 (0.00951) 0.0136 (0.00921) -0.00245*** (0.00786) -0.00366* (0.00221) 0.000239***

Appendix 6.8. Treatment effect of the message with interaction of gender on the payment rate (Linear probability regression)

	(9.24e-05)	(0.000209)
Debt due age	-0.00600***	-0.00972***
	(0.00110)	(0.00233)
Region (baseline: Riga)		
Pierīga	0.00313	0.00508
	(0.00403)	(0.00838)
Kurzeme	-0.00198	-0.00290
	(0.00284)	(0.00643)
Zemgale	-0.00323	-0.0109*
	(0.00277)	(0.00606)
Vidzeme	-0.00291	-0.0193*
	(0.00526)	(0.0100)
_atgale	-0.00116	0.00232
	(0.00714)	(0.0176)
Abroad	0.0152	0.0204
	(0.0182)	(0.0350)
Delivery channel (baseline: SMS)		
Only email	-0.00217	-0.0117
	(0.0102)	(0.0141)
Both	0.000182	-0.00792
	(0.00275)	(0.00483)
Distance	-2.49e-05	-4.05e-05
	(1.79e-05)	(3.42e-05)
Constant	0.0471***	0.0853***
	(0.0143)	(0.0287)
Observations	9,196	3,719
R-squared	0.013	0.025

	DI	p-values			
		Unadjusted	Multiplicity-adjusted		ted
		Remark 3.1	Theorem 3.1	Bonferroni	Holm
All treatments		(3)	(4)	(5)	(6)
No message	0.003	0.474	0.823	1	1
Loss-framed Public Good	0.005	0.185	0.512	1	0.740
Gain-framed Public Good	0.001	0.816	0.816	1	0.816
Social norm	0.003	0.477	0.699	1	0.954
Personalization	0.010	0.018**	0.102	0.124	0.124
Personalization & Loss-					
Framed PG	0.005	0.184	0.583	1	0.922
Personalization & Gain-					
framed PG	0.010	0.03**	0.151	0.212	0.182
Personalization dimension					
No message	0.001	0.85	0.85	1	0.85
Personalization	0.006	0.011**	0.022**	0.022**	0.022**
Content dimension					
No message	0.003	0.452	0.879	1	1
Social norm	0.000	0.998	0.998	0.003	0.998
Loss-framed Public Good	0.000	0.998	1	0.000	1
Gain-framed Public Good	0.003	0.475	0.828	0.000	1

Appendix 6.9. Multiple hypothesis testing robustness check in Experiment 3

Notes: Estimations are based on procedure in List et al. (2019) using Stata command *mhtexp*. DI reports the "difference in means" with the Simple reminder as a control group for full sample (intention-to-treat estimate). Column (3)-(6) reports on p-values for the main regressions (payment rate on treatment group) computed based on the procedure in List et al. (2019). Column (3) reports a multiplicity-unadjusted p-value by using Remark 3.1; column 4 displays a multiplicity-adjusted p-value computed using Theorem 3.1; columns (5) & (6) display p-values obtained by applying Bonferroni (5) and Holm (6) adjustment to the p-values in column (3). *p<0.1 **p<0.05 ***p<0.01.

Source (Appendix & Model)	Treatment	CACE	Standard error	Power	Type S error	Exaggeration rate
6.4; (2)	No message	0.00517	0.00773	10%	4.18%	3.57
6.3; (4)	Loss-framed Public Good	0.0109	0.00803	27%	0.17%	1.92
6.3; (4)	Gain-framed Public Good	0.00219	0.00667	6%	17.71%	7.04
6.3; (4)	Social norm	0.006	0.00714	13%	1.91%	2.99
6.3; (4)	Personalization	0.0232**	0.00907	73%	0.0004%	1.17
6.3; (4)	Personalization & Loss- Framed Public Good	0.0057	0.00736	12%	2.58%	3.14
6.3; (4)	Personalization & Gain- framed Public Good	0.0164**	0.00823	51%	0.01%	1.36
6.5; (4)	Personalization	0.0103**	0.00478	58%	0.0034%	1.31
6.6; (4)	Social norm	-0.0021	0.00619	6%	16.98%	7.22
6.6; (4)	Loss-framed Public Good	-0.00339	0.00627	8%	7.37%	4.38
6.6; (4)	Gain-framed Public Good	-0.00552	0.00714	12%	2.5976%	3.11

Notes: Estimations are calculated using *retrodesign* package in R. See Gelman and Carlin (2014) and Chapter 3, Section 9 "Statistical power and design analysis" for more on this procedure; *p<0.1 **p<0.05 ***p<0.01.

Covariates	Simple reminder	No message	Social norm	Debtor name	Agent name	Debtor & Agent name	Debtor name & Social norm	Agent name & Social norm	Debtor & Agent name & Social norm	p-value from joint orthogonality test of treatment arms
Gender	0.347	0.326	0.322	0.322	0.339	0.343	0.298	0.331	0.355	0.958
	(0.031)	(0.021)	(0.030)	(0.030)	(0.030)	(0.031)	(0.029)	(0.030)	(0.031)	
Debt amount (log)	5.870	5.978	5.938	5.802	5.803	5.841	5.874	5.982	5.678	0.311
	(0.094)	(0.071)	(0.098)	(0.098)	(0.092)	(0.098)	(0.096)	(0.097)	(0.090)	
Fee ratio	0.193	0.189	0.196	0.199	0.187	0.193	0.200	0.172	0.203	0.883
	(0.014)	(0.010)	(0.014)	(0.015)	(0.013)	(0.014)	(0.014)	(0.013)	(0.014)	
Ethnicity	0.285	0.225	0.223	0.260	0.252	0.310	0.244	0.215	0.289	0.138
	(0.029)	(0.019)	(0.027)	(0.028)	(0.028)	(0.030)	(0.028)	(0.026)	(0.029)	
Debtor Age	43.120	42.740	42.236	42.880	41.554	42.636	41.674	42.822	43.050	0.817
	(0.774)	(0.560)	(0.744)	(0.760)	(0.793)	(0.833)	(0.717)	(0.762)	(0.836)	
Debt Due Age	7.385	7.409	7.324	7.194	7.420	7.788	7.226	7.061	7.048	0.418
	(0.218)	(0.159)	(0.213)	(0.223)	(0.226)	(0.235)	(0.231)	(0.228)	(0.229)	
Region	3.033	3.050	3.091	3.112	2.913	2.860	2.777	2.839	3.058	0.188
	(0.110)	(0.075)	(0.110)	(0.110)	(0.103)	(0.111)	(0.104)	(0.104)	(0.104)	
Channel	2.566	2.568	2.570	2.607	2.620	2.537	2.574	2.645	2.566	0.424
	(0.033)	(0.024)	(0.033)	(0.032)	(0.033)	(0.035)	(0.032)	(0.033)	(0.033)	
Debt Type	2.161	2.202	2.248	2.219	2.240	2.161	2.140	2.355	2.256	0.703
	(0.082)	(0.056)	(0.085)	(0.079)	(0.080)	(0.078)	(0.073)	(0.077)	(0.081)	
Ν	242	484	242	242	242	242	242	242	242	

Note: Standard errors in parenthesis

	Co	mmunication char	nnel			Debt typ	e	
ЕХрегинения сопцион	Only phone	Phone & email	Only email	Catalogues	Banks	Fast credits	Services	CMS firms
Simple reminder	45%	54%	1%	47%	%6	33%	2%	9%
No message	45%	53%	2%	42%	12%	38%	0%0	8%
Social norm	44%	55%	1%	45%	0%L	37%	0%0	11%
Debtor name	40%	60%	0%0	42%	10%	38%	2%	7%
Agent name	39%	60%	1%	42%	10%	39%	1%	8%
Debtor & Agent name	49%	49%	2%	44%	12%	35%	1%	7%
Debtor name & Social norm	43%	57%	0%0	43%	%6	42%	1%	5%
Agent name & Social norm	38%	60%	2%	35%	12%	44%	2%	8%
Debtor & Agent name & Social norm	45%	54%	1%	41%	12%	36%	1%	10%
Total	43%	55%	1%	42%	11%	38%	1%	8%

T			Re	gion		
турегинения сонцинон	Riga	Pieriga	Kurzeme	Zemgale	Vidzeme	Latgale
Simple reminder	26%	19%	15%	16%	13%	11%
No message	25%	17%	18%	17%	14%	9%6
Social norm	28%	13%	16%	21%	11%	12%
Debtor name	26%	14%	18%	17%	14%	11%
Agent name	28%	19%	12%	20%	15%	5%
Debtor & Agent name	33%	16%	12%	16%	14%	9%6
Debtor name & Social norm	31%	19%	16%	17%	10%	7%
Agent name & Social norm	28%	21%	17%	16%	10%	9%6
Debtor & Agent name & Social norm	25%	17%	16%	21%	14%	7%
Total	28%	17%	16%	18%	13%	9%

Descriptive statistics for Experiment 3 (continued)

Appendix 7.2.	Deliverv rates	across the	experimental	conditions
, , , , , , , , , , , , , , , , , , , ,	Denveryraces		experimented	00110110110

Experimental condition	Share of delivered messages
Simple reminder	81%
No message	0%
Social norm	81%
Debtor name	81%
Agent name	84%
Debtor & Agent name	84%
Debtor name & Social norm	87%
Agent name & Social norm	86%
Debtor & Agent name & Social norm	84%

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: Simple reminder)				
No message	0.0124	-0.00653		
	(0.0394)	(0.0377)		
Social norm	-0.0826*	-0.0872**	-0.0743	-0.0843*
	(0.0451)	(0.0437)	(0.0496)	(0.0489)
Debtor name	-0.00826	-0.0290	0.0305	0.00715
	(0.0455)	(0.0438)	(0.0503)	(0.0489)
Agent name	-0.0248	-0.0327	-0.0202	-0.0282
	(0.0454)	(0.0438)	(0.0497)	(0.0483)
Debtor & Agent name	-0.0413	-0.0462	-0.0378	-0.0375
	(0.0454)	(0.0435)	(0.0496)	(0.0483)
Debtor name & Social norm	-0.00826	-0.0239	0.0178	0.00804
	(0.0455)	(0.0434)	(0.0495)	(0.0479)
Agent name & Social norm	0.00826	-0.0289	0.0364	0.0103
	(0.0455)	(0.0434)	(0.0497)	(0.0479)
Agent & Debtor name & Social norm	-0.0124	-0.0255	0.0164	0.00486
	(0.0455)	(0.0436)	(0.0499)	(0.0484)
Gender		-0.0995***		-0.0938***
		(0.0222)		(0.0276)
Loan size (log)		0.00291		0.0159
		(0.00972)		(0.0124)
Fee ratio		-0.200***		-0.113
		(0.0639)		(0.0801)
Ethnicity		-0.000963		0.0140
		(0.0233)		(0.0285)
Debtor age		0.00398***		0.00369***
		(0.000875)		(0.00109)
Debt due age		-0.00558		-0.00796*
		(0.00395)		(0.00475)
Region (baseline: Riga)				
Pierīga		-0.0361		-0.0180
		(0.0304)		(0.0370)
Kurzeme		0.0621**		0.0687*
		(0.0314)		(0.0383)
Zemgale		0.0271		0.0551
		(0.0306)		(0.0370)
Vidzeme		-0.00633		0.0357
		(0.0337)		(0.0408)
Latgale		0.0639*		0.0941*

Appendix 7.3. Treatment effects on the payment rate in Experiment 4 (Linear probability regression)

		(0.0382)		(0.0485)
Delivery channel (baseline: SMS)				
Only email		0.104		0.0833
		(0.0849)		(0.111)
Both		0.0544**		0.0509*
		(0.0218)		(0.0268)
Debt type (baseline: Catalogue				
merchants)				
Banks & Leasing		0.258***		0.213***
		(0.0379)		(0.0484)
Fast credits		0.194***		0.186***
		(0.0304)		(0.0373)
Services		0.00258		-0.127
		(0.0941)		(0.0937)
CMS firms		-0.0234		-0.00333
		(0.0445)		(0.0540)
Constant	0.483***	0.280***	0.447***	0.165
	(0.0322)	(0.0811)	(0.0355)	(0.103)
Observations	2,420	2,420	1,618	1,618
R-squared	0.003	0.086	0.005	0.083

Notes: Robust standard errors in parentheses. Model (1) and (2) present estimates on full sample, i.e., intention-to-treat effect; Model (3) and (4) present estimates on reached only sample, i.e., compliance average causal effect (see Chapter 3, Section 10 "Non-compliance"). *** p<0.01, ** p<0.05, * p<0.1

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	Model (1)	Model (2)
CACE of Simple reminder	-0.0152	0.00939
	(0.0483)	(0.0461)
Gender		-0.135***
		(0.0396)
Loan size (log)		-0.0106
		(0.0173)
Fee ratio		-0.303***
		(0.106)
Ethnicity		-0.0440
		(0.0427)
Debtor age		0.00408***
		(0.00156)
Debt due age		-0.00318
		(0.00714)
Region (baseline: Riga)		
Pierīga		-0.0938*
		(0.0560)
Kurzeme		-0.0321
		(0.0564)
Zemgale		-0.0908
		(0.0587)
Vidzeme		-0.104*
		(0.0593)
Latgale		-0.0655
		(0.0662)
Delivery channel (baseline: SMS)		
Only email		0.105
		(0.160)
Both		0.0812**
		(0.0392)
Debt type (baseline: Catalogue merchants)		
Banks & Leasing		0.344***
		(0.0647)
Fast credits		0.198***
		(0.0553)
Services		0.105
		(0.180)
CMS firms		-0.0108
		(0.0816)

Appendix 7.4. Compliant average causal effect of communication on the payment rate (twostage least squares regression regression)

Constant	0.496*** (0.0227)	0.418*** (0.136)
Observations	726	726
R-squared	0.001	0.109

*** p<0.01, ** p<0.05, * p<0.1

	Model (1)	Model (2)	Model (3)
Delivery status	-0.117***	-0.120***	-0.204***
-	(0.0305)	(0.0293)	(0.0737)
Treatment (baseline: Simple reminder)			
Social norm		-0.0898**	-0.121
		(0.0434)	(0.0939)
Debtor name		-0.0299	-0.180*
		(0.0437)	(0.0990)
Agent name		-0.0271	-0.0154
		(0.0433)	(0.0999)
Debtor & Agent name		-0.0394	-0.0368
		(0.0432)	(0.0975)
Debtor name & Social norm		-0.0164	-0.139
		(0.0435)	(0.108)
Agent name & Social norm		-0.0208	-0.174*
		(0.0435)	(0.105)
Debtor & Agent name & Social norm		-0.0241	-0.152
		(0.0436)	(0.100)
Interactions			
Delivery*Social norm			0.0386
			(0.106)
Delivery*Debtor name			0.184*
			(0.111)
Delivery*Agent name			-0.0109
, C			(0.111)
Delivery*Debtor & Agent name			-0.000538
			(0.109)
Delivery*Debtor name & Social norm			0.147
5			(0.118)
Delivery*Agent name & Social norm			0.183
5 8			(0.116)
Deliverv*Debtor & Agent name & Social			0.155
norm			
			(0.112)
Gender		-0.0970***	-0.0987***
		(0.0248)	(0.0250)
Loan Size (log)		0.0189**	0.0192**
		(0.00851)	(0.00851)
Ethnicity		0.0131	0.00982
- J		(0.0258)	(0.0259)
Debtor Age		0.00411***	0.00418***
······		(0.000984)	(0.000987)
Debt Due Age		-0.00965**	-0.0100**
2 2 uo 11go		(0.00406)	(0.00406)
Region (baseline: Riga)		(0.00.00)	
Pierīga		-0.0178	-0.0163
B		(0.0335)	(0.0336)
Kurzeme		0.0916***	0.0876**

Appendix 7.5. Linear regression of delivery status on payment rate

		(0.0351)	(0.0352)
Zemgale		0.0557*	0.0560*
		(0.0337)	(0.0338)
Vidzeme		0.0481	0.0448
		(0.0378)	(0.0379)
Latgale		0.0846**	0.0847**
		(0.0429)	(0.0427)
Delivery channel (baseline: SMS)			
SMS & Email		0.0554**	0.0551**
		(0.0244)	(0.0243)
Only email		0.134	0.132
		(0.0957)	(0.0943)
Debt type (baseline: Catalogue merchants)			
Banks & Leasing		0.233***	0.237***
-		(0.0429)	(0.0432)
Fast credits		0.202***	0.200***
		(0.0337)	(0.0337)
Services		-0.0140	-0.0168
		(0.0925)	(0.0908)
CMS firms		-0.000566	-0.00163
		(0.0493)	(0.0494)
Constant	0.560***	0.240***	0.309***
	(0.0279)	(0.0814)	(0.0964)
Observations	1,936	1,936	1,936
R-squared	0.008	0.091	0.095

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: No personalization)				
No message	0.0537*	0.0371		
	(0.0321)	(0.0310)		
Agent name	0.0331	0.0127	0.0453	0.0333
	(0.0320)	(0.0311)	(0.0350)	(0.0342)
Debtor name	0.0331	0.0170	0.0609*	0.0496
	(0.0320)	(0.0310)	(0.0351)	(0.0343)
Agent + Debtor name	0.0145	0.00762	0.0263	0.0257
	(0.0320)	(0.0310)	(0.0350)	(0.0343)
Gender		-0.0990***		-0.0932***
		(0.0222)		(0.0275)
Loan Size (log)		0.00266		0.0157
		(0.00974)		(0.0124)
Fee ratio		-0.201***		-0.113
		(0.0640)		(0.0803)
Ethnicity		0.000369		0.0158
		(0.0233)		(0.0284)
Debtor Age		0.00403***		0.00383***
		(0.000873)		(0.00109)
Debt Due Age		-0.00575		-0.00838*
		(0.00394)		(0.00474)
Region (baseline: Riga)				
Pierīga		-0.0338		-0.0147
		(0.0303)		(0.0370)
Kurzeme		0.0631**		0.0714*
		(0.0314)		(0.0383)
Zemgale		0.0270		0.0554
		(0.0306)		(0.0369)
Vidzeme		-0.00505		0.0368
		(0.0337)		(0.0409)
Latgale		0.0640*		0.0961**
		(0.0381)		(0.0483)
Delivery channel (baseline: SMS)				
SMS & Email		0.104		0.0782
		(0.0848)		(0.110)
Only email		0.0550**		0.0522*
		(0.0218)		(0.0267)
Debt type (baseline: Catalogue				
merchants)		0 250***		0 04 5 * * *
Banks & Leasing		0.259***		0.215***

Appendix 7.6. Personalization effect on payment rate (linear regression) in Experiment 4

		(0.0380)		(0.0483)
Fast credits		0.192***		0.184***
		(0.0304)		(0.0372)
Services		0.00819		-0.118
		(0.0938)		(0.0924)
CMS firms		-0.0259		-0.00649
		(0.0446)		(0.0540)
Constant	0.442***	0.236***	0.410***	0.120
	(0.0226)	(0.0781)	(0.0248)	(0.0989)
Observations	2,420	2,420	1,618	1,618
R-squared	0.001	0.085	0.002	0.081

Notes: Robust standard errors in parentheses. Model (1) and (2) present estimates on full sample, i.e., intention-to-treat effect; Model (3) and (4) present estimates on reached only sample, i.e., compliance average causal effect (see Chapter 3, Section 10 "Non-compliance"). *** p<0.01, ** p<0.05, * p<0.1

	Model (1)	Model (2)	Model (3)	Model (4)
Treatment (baseline: No personalization)				
No message	0.0288	0.0327		
C	(0.0340)	(0.0327)		
Social norm	-0.00147	-0.0127	0.0179	0.00977
	(0.0274)	(0.0260)	(0.0314)	(0.0298)
Gender	(, ,	-0.111***	, , , , , , , , , , , , , , , , , , ,	-0.121***
		(0.0272)		(0.0352)
Loan Size (log)		0.000986		0.0218
		(0.0113)		(0.0153)
Fee ratio		-0.286***		-0.178*
		(0.0709)		(0.0941)
Ethnicity		0.0496*		0.0895**
		(0.0279)		(0.0351)
Debtor Age		0.00412***		0.00481***
C C		(0.00102)		(0.00132)
Debt Due Age		-0.0114**		-0.0153**
		(0.00473)		(0.00596)
Region (baseline: Riga)				
Pierīga		-0.0108		0.00650
		(0.0366)		(0.0460)
Kurzeme		0.105***		0.107**
		(0.0374)		(0.0484)
Zemgale		0.0631*		0.104**
		(0.0364)		(0.0449)
Vidzeme		0.0532		0.138***
		(0.0413)		(0.0519)
Latgale		0.0549		0.0911
		(0.0435)		(0.0569)
Delivery channel (baseline: SMS)				
SMS & Email		0.0870		0.0552
		(0.0927)		(0.128)
Only email		0.0352		0.0365
		(0.0257)		(0.0330)
Debt type (baseline: Catalogue merchants)				
Banks & Leasing		0.291***		0.265***
		(0.0436)		(0.0586)
Fast credits		0.212***		0.215***
		(0.0365)		(0.0470)
Services		0.0582		-0.0324

Appendix 7.7. Social norm effect on payment rate (linear regression)

		(0.111)		(0.121)
CMS firms		0.0414		0.139*
		(0.0608)		(0.0769)
Constant	0.509***	0.325***	0.483***	0.121
	(0.0194)	(0.0905)	(0.0223)	(0.124)
Observations	1,652	1,652	1,016	1,016
R-squared	0.001	0.118	0.000	0.133
Dobust at	andard armora in	noronthagag		

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

	DI	p-values			
		Unadjusted	Multiplicity-adjusted		
		Remark 3.1	Theorem 3.1 Bonferroni		Holm
All treatments		(3)	(4) (5)		(6)
No message	0.0124	0.742	0.9977	1	1
Social norm	0.0826	0.0597*	0.2857	0.4773	0.4773
Debtor name	0.0083	0.851	0.9707	1	1
Agent name	0.0248	0.5723	0.9837	1	1
Debtor & Agent name	0.0413	0.35	0.8930	1	1
Debtor name & Social norm	0.0083	0.8513	0.8513	1	0.8513
Agent name & Social norm	0.0083	0.8497	0.9943	1	1
Agent & Debtor name &				1	1
Social norm	0.0124	0.7897	0.9967		
Personalization dimension					
No message	0.0537	0.0983*	0.2807	0.3933	0.3933
Debtor name	0.0331	0.2883	0.5737	1	0.8650
Agent name	0.0331	0.3087	0.4880	1	0.6173
Debtor & Agent name	0.0145	0.6537	0.6537	1	0.6537
Social norm dimension					
No message	0.029	0.384	0.606	0.767	0.767
Social norm	0.001	0.952	0.952	1.000	0.952

Appendix 7.8. Multiple hypothesis testing robustness check in Experiment 4

Notes: Estimations are based on procedure in List et al. (2019) using Stata command *mhtexp*. DI reports the "difference in means" with the Simple reminder as a control group for full sample (intention-to-treat estimate). Column (3)-(6) reports on p-values for the main regressions (payment rate on treatment group) computed based on the procedure in List et al. (2019). Column (3) reports a multiplicity-unadjusted p-value by using Remark 3.1; column 4 displays a multiplicity-adjusted p-value computed using Theorem 3.1; columns (5) & (6) display p-values obtained by applying Bonferroni (5) and Holm (6) adjustment to the p-values in column (3). *p<0.1 **p<0.05 ***p<0.01.

Appendix 7.9.	Post-hoc power analysis
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Source (Appendix & Model)	Treatment	CACE	Standard error	Power	Type S error	Exaggeration rate
7.3; (4)	Social norm	-0.0843*	0.0489	41%	0.03%	1.55
7.3; (4)	Debtor name	0.00715	0.0489	5%	33.54%	15.99
7.3; (4)	Agent name	-0.0282	0.0483	9%	6.10%	4.12
7.3; (4)	Debtor & Agent name	-0.0375	0.0483	12%	2.56%	3.19
7.3; (4)	Debtor name & Social norm	0.00804	0.0479	5%	31.33%	14.34
7.3; (4)	Agent name & Social norm	0.0103	0.0479	6%	26.78%	10.90
7.3; (4)	Agent & Debtor name & Social norm	0.00486	0.0484	5%	38.47%	23.33
7.4; (2)	No message	0.00939	0.0461	5%	27.84%	11.13
7.5; (3)	Delivery status	-0.204***	0.0737	79%	0.0001 %	1.13
7.6; (2)	No message (ATE)	0.0371	0.031	22%	0.36%	2.11
7.6; (4)	Agent	0.0333	0.0342	16%	1.02%	2.55
7.6; (4)	Debtor	0.0496	0.0343	30%	0.11%	1.79
7.6; (4)	Agent + Debtor	0.0257	0.0343	12%	2.90%	3.21
7.7; (2)	No message (ATE)	0.0327	0.0327	17%	0.90%	2.46
7.7; (4)	Social norm	0.00977	0.0298	6%	17.75%	7.27

Notes: Estimations are calculated using <i>retrodesign</i> package in R. See Gelman and Carlin (2014) and
Chapter 3, Section 9 "Statistical power and design analysis" for more on this procedure;
*p<0.1 **p<0.05 ***p<0.01.