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## Unshrouding effects on demand for a costly add-on: Evidence from bank overdrafts in Turkey

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## **Unshrouding Effects on Demand for a Costly Add-on: Evidence from Bank Overdrafts in Turkey**

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# Unshrouding Effects on Demand for a Costly Add-on: Evidence from Bank Overdrafts in Turkey

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## Abstract

Models of shrouding predict that firms lack incentives to compete on add-on prices. Working with a large Turkish bank to test SMS direct marketing promotions to 108,000 existing checking account holders, we find that messages promoting a large discount on the overdraft interest rate *reduce* overdraft usage. In contrast, messages that mention overdraft availability without mentioning price *increase* usage. Neither change persists long after messages stop, suggesting that induced overdrafting is not habit-forming. Our results are consistent with a model of limited memory and attention.

Keywords: contingent charges, limited attention, salience, advertising, habit formation, consumer banking, retail banking, deposit accounts

JEL codes: D12, D14, G2

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## 1. Introduction

Theorists, empiricists and policymakers are scrutinizing add-on prices, such as penalty fees on financial products, as potentially deceptive and inefficient. Yet empirical evidence is lacking on key questions posed by the theoretical literature, such as whether firms have incentives to shroud add-on prices (Gabaix and Laibson 2006; Heidhues, Koszegi, and Murooka 2014), and whether and which aspects of add-ons are salient for consumers (Bordalo, Gennaioli, and Shleifer 2014).

We provide empirical evidence on these questions from a direct marketing field experiment on checking account overdrafts, a prevalent and economically important add-on that has helped motivate much of the recent theoretical work and triggered several recent regulatory actions in the US and the EU. An overdraft occurs if the checking account holder initiates a transaction that makes her balance negative, or more negative. Checking accounts in much of the world moved to a “free if nonnegative balance, very expensive if in overdraft” equilibrium during the 1990s, with overdraft revenue from fees and interest charges replacing monthly subscription fees as the major source of explicit income from checking accounts. In the US, banks collected \$32 billion in overdraft revenue in 2013 (source: Moebs). In the UK, banks derive almost as much income from overdrafts as from re-investing checking account deposits (Competition and Markets Authority 2014). In Turkey, the site of our field experiment, the post-experiment (June 2013) announcement of a binding price ceiling on overdrafts was immediately followed by a 1.4% reduction in bank share prices, with a 2.1% drop for the most overdraft-reliant bank.

Descriptive evidence suggests that the bank overdraft market is a prime example of shrouded equilibrium where firms lack incentives to draw attention to, or compete on, add-on prices. Despite the economic importance of overdrafts, banks rarely market these services, at least at the customer acquisition stage (General Accounting Office 2008; Competition and Markets Authority 2014).<sup>2</sup> Banks moreover blur the line between positive and negative balances for consumers by reporting an available-to-withdraw figure that adds the available credit amount to the checking account balance, and by making information on disaggregated balances and finance charges more difficult to find than the aggregate available balance. On the consumer side, overdrafts happen passively in the sense that they are triggered in the course of

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<sup>2</sup> Casual empiricism suggests that some banks are now starting to market low-cost or no-overdraft products in the U.S., perhaps in response to recent regulations and ongoing regulatory pressure (see Section 2.5).

checking account usage rather than by separate transactions where a consumer explicitly draws from a line of credit. Some descriptive data are consistent with consumers underestimating overdraft likelihood and costs (Armstrong and Vickers 2012; Stango and Zinman 2014) and experiencing “bill shock” (Grubb 2015).

Nevertheless there are reasons to doubt the descriptive power of shrouding models. Stango and Zinman (2014) finds that low balances ( $< \$100$ ) are common but not typically followed by overdrafts in a US sample, and that many checking account holders report a willingness to pay a market price (e.g., a \$25-\$30 fee) to settle even a small-dollar overdraft. The bulk of overdraft costs are paid by a small number of checking account holders who overdraft repeatedly (Bakker et al. 2014; Financial Conduct Authority 2014), raising the broader question of whether experience unshrouds or at least bounds the distortions or duration of a shrouded equilibrium.<sup>3</sup> Indeed, Heidhues et al (2014) notes that the profitability of high add-on prices is “limited by consumers’ ex-post demand response to add-on prices” (p. 11), raising the possibility that, at the customer level, the firm wants to shroud at the acquisition stage but then unshroud while cutting the price of the add-on. Practices in our setting seem consistent with some degree of unshrouding, as we discuss below.

In short, empirical evidence on what drives overdraft pricing, advertising, and usage is mixed and largely descriptive. More broadly, empirical work on contingent and possibly-deceptive pricing is in its early stages.

Yapi Kredi (YK), one of the largest banks in Turkey, sought to learn more about the overdraft market and its optimal strategy for pricing and marketing the product. In particular, YK was interested in understanding whether pricing and advertising content tactics it had tried in the past work to increase demand, and if not why not. YK’s interest rate (60% APR) and product design was in line with standard practices and regulations. We worked with YK to design field experiments to distinguish between neoclassical and shrouding models, and YK implemented the experiments by randomly varying the messaging and pricing (promotional offers) it sent, via SMS, to 108,000 existing checking account clients.

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<sup>3</sup> Gabaix and Laibson (2006, Section III.A) speculates that learning causes shrouding to disappear, eventually, despite potential countervailing dynamic forces.

Figure 1 summarizes the experimental design. The design produces random variation, across clients and over time, in prices and in messaging content, frequency, and duration.<sup>4</sup> The primary pricing test was a rebate of half of the interest accrued on overdrafts, with other messages promoting overdraft availability without mentioning price. The bank also tested price promotions for bill payment by automatic-debit and debit card usage. We track data on overdraft usage, as well as on bill payment auto-debit and debit card usage. The mechanics here include both direct and indirect effects: messaging and pricing changes for each of the three services could directly alter the usage of that service, and usage of a service may in turn alter usage of the others (specifically, using an automatic bill payment or debit card may subsequently lead one to overdraft their checking account).

We find that messages offering a 50% discount on the overdraft interest rate *reduce* overdraft usage by about 2%, relative to messages that do not offer the discount. This is a striking finding: offering a price reduction on a commodity reduces demand for that commodity.<sup>5</sup> It is all the more striking given our sample of existing customers; as noted above, firms probably have lesser incentives to shroud at this post-acquisition stage than at the customer acquisition stage. Note that not all price promotions backfire; rather, we find evidence that the discounts we tested on non-overdraft services—debit cards and auto-debit for bill payments—*increase* demand for those services.<sup>6</sup>

Why does the overdraft interest discount backfire? The overdraft discount messages must change something else in the consumer's mind besides price: we do not think that the demand curve for overdrafts is actually upward-sloping. We find some clues in theory—particularly in Bordalo et al's model (2014) of how limited memory and limited attention interact to drive consumer choice when facing new or forgotten information—and in some additional results from our experiment. It may be that some consumers typically ignore overdraft charges when using their checking account, behaving as if the cost is zero. The overdraft interest discount promotion brings costs to mind, and makes people realize that the cost is strictly greater than

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<sup>4</sup> The bank also sent half of the sample a message on August 30<sup>th</sup> that was identical to the September 15<sup>th</sup> Overdraft Availability Reminder message. This randomization was independent with respect to the September 15<sup>th</sup> treatment assignments. We discuss this message in Sections 3.1, 4.1, and 4.6.

<sup>5</sup> Our finding is reminiscent of the Hsee (1998) finding explained in Bordalo et al (2014). In isolation, people have higher willingness to pay for a dinner set with 24 plates than for one with >24 intact plates but a few broken ones. But in a pairwise choice people prefer the set with >24 intact plates. Having said that, we do not actually offer consumers in our sample a pairwise choice between more-expensive and less-expensive overdrafts.

<sup>6</sup> We also find some evidence that a one-shot message about the Overdraft Interest Discount actually increases demand.

zero, depressing usage.<sup>7</sup> Additional evidence, that demand decreases in the intensity of messaging about the interest discount, is consistent with this hypothesized behavioral mechanism. So is evidence that the most demand-depressing messaging treatments are ones that offer bundled discounts—on overdrafts plus either debit card usage or auto-debit enrollment—repeatedly.<sup>8</sup> This suggests that bundling creates associations between checking account usage and the likelihood of incurring overdraft costs.<sup>9</sup>

Meanwhile, the overdraft availability reminder message that mentions the overdraft service, but says nothing about its cost, *increases* overdraft usage relative to messages that do not mention overdraft at all (and relative to overdraft cost-mentioning messages), by about 4%. Also in contrast to the overdraft discount messages, sending more overdraft availability reminders increases demand. These findings are consistent with the overdraft feature—and not just its cost—being far from top of mind: reminding someone that it is there for “cash needs” increases use of the add-on feature.

What do our results imply for shrouding models? First, they support the key prediction of these models. The demand-depressing effect of overdraft interest discount messages suggests that firms have incentives to shroud add-on prices because drawing attention to a contingent charge—unshrouding it—reduces profits earned from that charge. Second, the perverse effect of the overdraft interest discount messaging, and the demand increase from overdraft availability reminders, support the models’ motivating assumption of consumer confusion and/or inattention at baseline. As Bordalo et al (2014) states, “... salience plays a role only when attribute realizations differ from expectations and thus draw attention. If the consumers had correct expectations, there would be no surprise.” Third, our results at least partially support the shrouding models’ key assumption that consumers are not merely confused in a

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<sup>7</sup> More generally, it may be the case that the discount causes consumers to revise their cost estimate upward, perhaps inferring that if the bank is offering a 50% discount, the interest rate must be high. Bordalo et al (2014) show that a cost reminder can have a demand-depressing effect if the reminder’s cost realization is sufficiently surprising. In our setting, this implies that demand can fall if marginal clients underestimated overdraft charges at baseline, and the Overdraft Interest Discount messaging caused them to increase their estimate of the overdraft interest rate by enough.

<sup>8</sup> These bundled messages are also longer than the single-discount messages, but if longer messages tax limited attention we would expect them to push treatment effects on overdrafting toward zero instead of further depressing demand. The idea is that getting a too-long message is akin to getting no message at all, since the recipient ignores the too-long message. JZ is still trying to convince his wife of this phenomenon.

<sup>9</sup> Stango and Zinman (2014) also finds evidence of associative attention shocks: survey questions about spending control, monitoring account balances, or other bank fees reduce overdrafting, while survey questions that are plausibly unrelated to overdrafting—about auto loans, gift cards, or contactless cards—have no effects.

mean-zero error sense, but rather tend to underestimate add-on charges.<sup>10</sup> The demand-depressing effects of the overdraft interest discount messages are certainly consistent with this assumption. The demand-increasing effects of the overdraft availability reminders are less evidently consistent with this assumption. But they could still be consistent with the assumption if the overdraft availability reminders work by distracting consumers from overdraft costs, perhaps by drawing their focus to a different attribute like availability or quantity (credit line). Bordalo et al (2014) formalizes this sort of salience-driven “overreaction”.

Indeed, the demand-inducing effect of the overdraft availability messages does not persist long after the messaging stops, which is consistent with consumers correcting an overreaction. Of course it is also consistent with forgetting the true cost and/or quality of overdrafts. Similarly, the demand-depressing effect does not persist beyond the treatment period.

In both cases, and regardless of the underlying cognitive mechanics, the lack of habit formation among marginal overdrafters is noteworthy, as policymakers have asserted that overdrafting is habit-forming (Financial Conduct Authority 2014). Our treatments induced some consumers to overdraft more, and some to overdraft less, but we find little evidence that these behavior changes persisted for more than a few weeks after the treatments stopped.

Welfare analysis is beyond the scope of this paper, in part because we do not actually have the ability to sharply test existing models of shrouded equilibria given that our experiment considers the existing client base of a single firm rather than competition for customers across firms (Armstrong and Vickers 2012; Gabaix and Laibson 2006; Grubb 2015; Heidhues, Koszegi, and Murooka 2014). But we note that our findings do not bode well for third-party efforts—by regulators, personal financial management app providers, etc.—to reduce contingent fee payments by “debiasing” consumers. Our results suggest that add-on suppliers—in this case banks—have incentives to keep contingent charges shrouded, even

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<sup>10</sup> Behavioral industrial organization models make a variety of different assumptions about the cause of incorrect expectations about future consumption; see Spiegel (2011) for a review. In terms of the most closely related models to our setup, three of them assume that consumers ignore the add-on price. This leads to underestimation of the price and overconsumption of the add-on when the price of the add-on is greater than 0 (Armstrong and Vickers 2012; Gabaix and Laibson 2006; Heidhues, Koszegi, and Murooka 2014). In Grubb (2015), consumers underestimate their cost of attention to past usage (checking account balance in our case), assuming that the cost will always be zero, while in fact there are times when it will be strictly positive. Inattention to past usage leads consumers to pay more penalty fees than they anticipated ex-ante.



after acquiring a customer. They also suggest that sustained messaging is required to change consumer behavior, and that third-parties are likely to encounter counter-messaging from add-on suppliers that could well increase consumer demand. We are sympathetic to Heidhues et al.'s conjecture (p. 40) that third-parties will be outgunned in a messaging arms race with add-on suppliers.

Our treatments are standard in the sense that banks everywhere communicate frequently with their customers—indeed this is why we do not have a no-message control group, and instead compare across different types of messages. Turkish banks, including our implementing partner, frequently offer promotional discounts and rebates on various bank account services. The overdraft product seems representative in the sense that it is priced expensively relative to seemingly close substitutes (like credit cards in Turkey), and disproportionately to credit risk (as found recently by Turkish regulators and courts). Our sample is probably representative of a substantial population of marginal overdrafters in Turkey, and shares key characteristics with “banked” populations in both more- and less-developed countries.

Besides the theoretical literature on contingent and possibly deceptive pricing, our paper informs several other literatures on limited attention, salience, and advertising. We provide some evidence on what comes to mind and what does not (e.g., Bordalo, Gennaioli, and Shleifer 2013; Eliaz and Spiegel 2011; Hanna, Mullainathan, and Schwartzstein 2014; Karlan et al. forthcoming). Our results suggest that price promotions have attention effects that can be perverse from the promoter's perspective, thereby adding evidence to the literature on the psychology of incentives (Kamenica 2012). Our results are consistent with results from other domains suggesting that consumers respond differently to base prices vs. add-on prices (Anagol and Kim 2012; Brown, Hossain, and Morgan 2010; Chetty, Looney, and Kroft 2009).<sup>11</sup> Relatedly, our findings contrast with those in Ferman (2014) and Elizondo and Seira (2014), both of which find little impact of messaging that makes the *base* price (contract APR) of high-interest credit cards more prominent in Brazil and Mexico. Our results are broadly consistent with prior work finding that advertising content can have important and surprising effects on decisions about expensive debt (Bertrand et al. 2010), and that messaging from banks can change the behavior of existing customers (Cadena and Schoar 2011; Kast, Meier, and Pomeranz 2014; Karlan, Morten, and Zinman 2014). Our

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<sup>11</sup> We do not actually observe price sensitivity to the base price in our setting. But given our result that cutting overdraft prices depresses overdraft demand, we can infer differential price sensitivity merely by assuming that cutting the base price would not decrease demand for checking accounts.

results on the long-run effects of short-run messaging complement the literature on the dynamics of learning and/or attention regarding add-on charges (Agarwal et al. 2013; Ater and Landsman 2013; Haselhuhn et al. 2012; Stango and Zinman 2014), and suggest that short-run behavior changes do not induce learning or greater sophistication about attention among marginal consumers (Schwartzstein 2014).<sup>12</sup>

The most closely related empirical paper to ours is probably Stango and Zinman (2014). Using quasi-experimental variation in survey content in a market research panel in the U.S., Stango and Zinman (2014) identifies effects and dynamics of attention to overdraft fees. Similar to here, they find that an attention shock—a survey in their case, a promotional message in ours—mentioning overdraft costs reduces overdraft usage, and that repeated attention shocks cumulate to some extent, although they depreciate more quickly in our setting. Aside from the obvious differences between the two study designs—market research surveys versus bank advertising as attention shocks, quasi-random versus random variation, US versus Turkey—there are at least two other key differences. First, we have randomly assigned price variation. Second, our treatments include some messages that mention the overdraft service but not its cost. These differences lead to the surprising new inferences that bringing overdrafts to mind increases demand, but bringing the price of overdrafts to mind, even if accompanied by a discount, lowers demand.

## **2. Bank Overdrafts: Markets and Policies**

### *2.1 Overdraft Terms and Underwriting*

The focus of our experiment is a checking account overdraft product with a structure and terms that are common throughout the world. The product is an unsecured line of credit that allows qualifying customers to overdraw their account (i.e., to hold a negative balance). The bank approved about 55% of checking account customers for an overdraft credit line during our sample period, with an amount that varies with income and credit characteristics. During our sample period YK offered overdraft credit lines on an opt-out basis. Customers with a credit line can tap it at their discretion by initiating a debit transaction that exceeds the available balance in the checking account. The line is automatically tapped by such debits and negative balances begin to accrue interest immediately. During our sample period YK

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<sup>12</sup> See also Manoli and Turner (2014) on the rapid depreciation of information effects re: the Earned Income Tax Credit.

charged a typical APR for Turkey, in the range of 60%, or about 50% real after adjusting for inflation.<sup>13</sup>

Credit limits are generally lower than those offered on credit cards or unsecured loans, and interest rates are typically substantially higher than on credit cards. By law, any inflow to the checking account is automatically allocated first toward paying off overdraft credit. If inflows are not sufficient to clear the balance by the end of the statement date (four weeks), the client receives a bill and she is given a grace period of around two weeks to pay at least the accrued interest. If she fails to make the required payment after 60 days the bank freezes the overdraft line.

## *2.2 Turkish Retail Banking, the Overdraft Market, and Marketing*

Turkey's retail/consumer banking industry is concentrated. Only about 30 banks are licensed to take deposits, and the largest five banks have greater than 50% market share.<sup>14</sup> The largest retail banks tend to be for-profit and based in Turkey, like our partner bank Yapi Kredi (YK). YK is in the top five based on either total assets or the number of branches. In recent years the Turkish market has become known for innovation in retail banking, with one large bank rolling out the largest biometric ATM network in Europe, the Middle East, or Africa, and another large bank becoming the first bank in the world to make money transfers possible on Facebook. Turks have the highest rate of mobile banking in Europe among Internet users, at around 50%, according to a 2013 ING survey.

As in many other countries, overdraft services are an important profit source for banks. After the Turkish Central Bank halved the interest rate allowed on overdrafts at the end of May 2013 (see Section 2.5 below), bank share prices fell 1.4%, with that of the most overdraft-reliant bank falling by 2.1%.<sup>15</sup>

Nevertheless overdraft services are rarely featured in marketing to potential customers; e.g., we are not aware of any mass marketing campaigns during our sample period in Turkey or

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<sup>13</sup> Most U.S. and U.K. banks in recent years have charged fees, in the range of \$25-\$40 per overdrafting transaction, instead of or in addition to an interest rate on outstanding balances. But there is some anecdotal evidence that the U.S. and U.K. are moving more toward the Turkish/Continental model of a more traditional line of credit, in concert with regulatory pressure (FCA 2014 Section 3.8; our Section 2.5 below).

<sup>14</sup> As of September 2012 top branch bank had 1,510 branches, and the fifth largest bank had 949, out of 10,241 total. Of this total the top five owned 5,663 branches (source: [http://en.wikipedia.org/wiki/List\\_of\\_banks\\_in\\_Turkey](http://en.wikipedia.org/wiki/List_of_banks_in_Turkey), accessed 10/22/2014).

<sup>15</sup> <http://www.reuters.com/article/2013/05/27/markets-turkey-idUSL5N0E81DG20130527>.

elsewhere. Direct marketing overdrafts to existing customers is common however; YK is a case in point in the sense that it came to us for guidance about how to measure and improve the effectiveness of direct-messaging and price promotion campaigns it had conducted in the recent past.

### *2.3 Overdraft Users and Usage*

Who overdrafts? In Turkey there is not much data on the characteristics of overdrafters (e.g., our data lack information on education or income), but there are some clues. Over half of Turkey's population is unbanked, according to a 2012 World Bank report. Beyond that many checking account holders are not approved for overdraft lines of credit due to credit risk that banks cannot price. These facts suggest that overdrafters are drawn from the upper half or third of the income distribution in Turkey, if not from the uppermost percentiles, who presumably have the wealth and access to cheaper credit that would tend to render overdrafting unlikely and/or relatively unattractive.

Our sample overdrafts frequently in the 10 months after our experiment started, despite having been selected for the experiment based on infrequent overdraft activity prior to the experiment (Section 3.2). 45.8% of our sample overdrafts at least once between September 1, 2012-June 30, 2013, and in any given month 15-24% of our sample overdrafts. The mean amount of finance charges paid over the ten months is 30.82 TL (1 TL = \$0.56 USD during our sample period), with 75<sup>th</sup> and 95<sup>th</sup> percentiles of [] and 228.08 TL.

### *2.4 Are Bank Overdraft Services Deceptive?*

As noted at the outset, much of the recent theory on potentially deceptive add-on pricing has been motivated by descriptive evidence on overdraft supply and demand. US and UK government reports have concluded that banks shroud overdraft prices and practices, both in upfront marketing and downstream communications with checking account customers (General Accounting Office 2008; Competition and Markets Authority 2014). Anecdotally it seems that Turkish banks do more marketing post-customer acquisition, although during our sample period at least there is other descriptive evidence suggesting that this produced only partial unshrouding. For example, it seems that customers lacked ready access to information

on their own overdraft usage and charges.<sup>16</sup> Perhaps relatedly, Turkish authorities have found that banks benefit from substantial markups over risk-based prices (Section 2.5).

On the demand side, descriptive evidence from the US and UK suggests that many consumers underestimate their overdraft usage and/or costs conditional on usage. For example, Stango and Zinman (2014) finds that 60% of survey respondents report overdrafting when they “thought there was enough money in my account”, and 24% of checking account holders report not knowing or remembering whether their bank described different overdraft coverage options at account opening (e.g., linking to a credit card or savings account for much lower-cost “overdraft protection”). Stango and Zinman (2009) finds that over 50% of overdrafts are avoidable in the sense that the account holder has ample available credit on a credit card that would cost a small fraction of a typical overdraft fee. In the UK, the Financial Conduct Authority recently summarized years of market research by concluding that “consumers pay little attention to overdrafts when choosing a bank account”, and “there is widespread confusion... for example, many wrongly thought that overdrafts were simple or free...” (Financial Conduct Authority 2014).

Nevertheless, as discussed at the outset, there are reasons to doubt the descriptive power of theoretical models of deceptive contingent pricing. Stango and Zinman (2014) finds that low balances (<\$100) are very common—occurring in 83% of account-months of those who overdraft at least once over a period averaging 15 months—but not typically followed by overdrafts. Moreover many U.S. survey respondents report a willingness to pay a market price (e.g., a \$35 fee) to settle even a small-dollar overdraft. The bulk of overdraft costs in the U.S. and U.K. are paid by a small number of checking account holders who overdraft repeatedly (Bakker et al. 2014; Financial Conduct Authority 2014), raising the broader question of whether experience unshrouds or at least bounds the distortions or duration of a shrouded equilibrium. In Turkey, the active direct marketing of overdraft discounts and services to existing customer bases is consistent with at least partial unshrouding.

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<sup>16</sup>E.g. banks typically presented customers with an available balance that was the sum of their checking account balance and available overdraft credit, meaning that a customer would need to know and remember, or search for, the amount of their overdraft credit line to infer their checking account balance. Similarly, information on the overdraft interest rate, and the amount paid, was not prominently featured in online/mobile banking or in account statements.

## 2.5 Policy Issues and Recent Actions

Overdraft pricing has been attracting legal scrutiny around the globe. As noted above, the Turkish Central Bank imposed a binding price ceiling on overdraft APR in May 2013. In July 2013 the Turkish Competition Authority fined 12 banks for price-fixing on loans, including overdrafts. In the U.S., the Fed began requiring banks to secure consumer opt-in for overdrafts on debit card and ATM transactions in 2010, and the Consumer Financial Protection Bureau's scrutiny of overdraft practices has led to speculation that more restrictions are in the offing (Dougherty 2014).<sup>17</sup> In the U.K., regulators have secured voluntary measures from banks regarding pricing, enrollment, and communications, and the Financial Conduct Authority recently announced that it will “start to consider making some voluntary measures mandatory in Autumn 2014”.<sup>18</sup> The European Parliament issued a Directive on Payment Accounts in April 2014 (effective Autumn 2014) that promotes transparency and comparison shopping by requiring “a standard form fee information document detailing the fees for the most representative services linked to the account such as withdrawals and overdrafts”.<sup>19</sup>

## 3. Experimental Design, Sample and Data

### 3.1 Experimental Design and Implementation

Figure 1 summarizes the experimental design and details the script of each message variant. The field experiment randomly assigns message content, frequency, and duration, as well as promotional offers on overdraft, debit card, and automated debit (for bill payment), to a sample of 108,000 checking account holders (we describe the sample in Section 3.2). YK did not send this sample any other promotional communications during this campaign. The only other communications YK sent to this sample were monthly account statements.

The bank (which is described in Section 2) sent the messages by SMS, which is the most common way banks communicate with their clients in Turkey (91% of Turkish adults have a cell phone, for one of the highest penetration rates in the world). As noted above, it is also

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<sup>17</sup> Also, the FDIC has issued supervisory guidances in the past few years that warn banks about risks of “excessive use” of overdrafts by customers and “maximizing fees” by banks.

<sup>18</sup> <http://www.fca.org.uk/firms/firm-types/consumer-credit/consumer-credit-research/overdrafts> , accessed January 14, 2015.

<sup>19</sup> [http://europa.eu/rapid/press-release\\_MEMO-14-300\\_fr.htm?locale=fr](http://europa.eu/rapid/press-release_MEMO-14-300_fr.htm?locale=fr) , accessed January 14, 2015.

common for clients to use their phone to access banking services; e.g., Turkey has the highest ratio of mobile banking users to Internet users in Europe.

YK began the experiment by sending half of the sample an “overdraft availability reminder” message on August 30, 2012 that mentions the overdraft service and credit line but nothing about its cost.<sup>20</sup> This first randomization is not crucial for testing our main hypotheses; it served primarily as a pilot for the subsequent randomizations and also allows us to test for a heterogeneous treatment effect suggested by some of the motivating theoretical models (Section 4.6).

YK continued the experiment on September 15, 2012 by sending each person in the sample one of six randomly assigned messages: (1) 50% (n=53,953) received an “overdraft interest discount” message;<sup>21</sup> (2) Among the 53,953 clients sent the overdraft interest discount, one third (n=17,981) also received information about an auto-debit discount<sup>22</sup> in the message, one-third (n=17,995) also received information about a debit card discount<sup>23</sup> in the message, and one-third (n=17,997) received no further information beyond the overdraft interest discount; (3) among the 54,047 clients not sent one of the above overdraft interest discount messages, one-third (n=18,021) received information about the auto-debit discount only,<sup>24</sup> one-third (n=17,983) received information about the debit card discount only,<sup>25</sup> and one-third (n=18,043) received the overdraft availability reminder message described above.<sup>26</sup>

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<sup>20</sup> “We remind you that, for your immediate cash needs, you have a Flexible Account at Yapi Kredi with [custom fill]TL limit. Have a nice day.” We refer to this message as a “reminder” because the bank’s policy and Turkish law require upfront disclosure of the overdraft features and pricing. However, given that the service is offered on an opt-out basis, and that our motivating questions concern shrouding, we allow for the possibility that this message provides new information rather than being a simple reminder. We explore this in Section 4.6.

<sup>21</sup> “Use your Yapi Kredi Flexible Account and we will give you back half of your Flexible Account’s accrued interest between now and [November/December] 15...”

<sup>22</sup> “Authorize automatic bill payments from your account before [November/December] 15, receive up to a maximum of 30TL WP, and we will give you back half of your Flexible Account’s accrued interest between now and [November/December] 15 as WP.” Note that “WP” refers to reward points, which are easily redeemable at point-of-sale using the account’s debit card; anecdotally, most of the bank’s customers view them as equivalent to cash.

<sup>23</sup> “Use your Yapi Kredi debit card and earn 5% of your shopping, up to 25TL WP, and we will give you back half of your Flexible Account’s accrued interest between now and [November/December] 15 as WP.”

<sup>24</sup> “Authorize automatic bill payments from your account before [November/December] 15, receive up to a maximum of 30TL WP.”

<sup>25</sup> “Use your Yapi Kredi debit card and earn 5% of your shopping, up to 25TL WP, between now and [November/December] 15 as WP.”

<sup>26</sup> “We remind you that, for your immediate cash needs, you have a Flexible Account at Yapi Kredi with [customfill] TL limit...”

A frequency randomization determined whether YK repeated the September 15 message frequently (every 10 days), less-frequently (every 20 days), or not at all during the campaign period. A duration randomization determined whether the price promotion(s) or overdraft availability reminder, and any related messaging subsequent to September 15, lasted until November 15 or December 15.

Note that the bank sent at least one message to everyone in our sample during the experiment. It elected to do this because, like other banks, it often sends promotional and reminder messages to its customers. Thus it makes sense to evaluate the effects of an overdraft (incentive) message relative to a message that does not mention overdraft (incentives), rather than relative to an artificial no-message counterfactual.

### *3.2 Baseline Data on Sample Characteristics, and Balance Checks*

The bank sought to promote overdraft usage among existing clients who might not otherwise overdraft, and therefore conducted the experiment on 108,000 checking account holders who had: (1) the overdraft service in place; (2) owned a YK checking account for at least a year and were in good standing; (3) a debit card linked to their YK checking account; (4) not used the overdraft service (to a first approximation) during the three months prior to the month the experiment started: May-July 2012. Many of these customers did have some prior experience with the product however. Our pre-treatment data go back as far as September 2011, and from September 2011-April 2012 18.4% of our sample overdrafted at least once, with an average daily balance of 4.42TL (SD 23.51, Max 940.47) among these accountholders. For comparison, 31% of our sample overdrafted at least once during the experiment (September 15-December 31), with an average of 2.77 overdrafts during that period (SD 6.05, Max 27) and an average daily balance of 26.85TL (SD 77.97, Max 2696.58).

Table 1 summarizes the baseline data available to us (Column 1) and checks balance across treatment assignments (Columns 2 -10). In terms of demographics, we only have information on gender (29% female), the city of residence (28% Istanbul, 23% outside the four largest cities), and marital status (57% married). This kind of information is collected by the bank at the account opening stage and can be updated later by the client. Besides pre-treatment data on overdraft usage (described above and in Table 1), we also have data on the other behaviors targeted by the experiment: debit card usage and automatic debits for bill payments. Each of columns 2-10 reports the results from an OLS regression of the treatment variable in the column heading on each of the row variables. As expected, point estimates tend to be small in



magnitude and statistically insignificant. The count of significant results is about what one would expect to find by chance. The second-to-last-row reports the p-value from an F-test of the hypothesis that the RHS variables = 0.

### 3.3 Follow-up data

YK provided us with data on overdraft usage, debit card usage, direct debit authorizations, and deposit account balances, at the account-month level, from September 1, 2012 through the end of June 2013. In addition to the monthly data, YK provided us with daily data on overdraft usage for the experimental period: September 15-December 15, 2012. We use this data to construct outcome variables for estimating the short-run and longer-run treatment effects detailed in the next section.

## 4. Specifications and Results

We aggregate data to the client level (indexed by  $i$ ) and estimate OLS regressions of the form:

$$(1) Y_i = a + BT_i + CX_i + e,$$

where  $Y$  is an outcome of interest, in most cases some measure of a behavior targeted by the marketing campaign: overdraft usage, debit card usage, or an automatic debit for bill payment. In Tables 2-5 we measure outcomes over a time period designed to capture immediate/short-run treatment effects: September 15-December 31, since the bank sent everyone at least one promotional message starting September 15 and sent the last promotional messages on December 15. Tables 6-8 measure outcomes over a post-experiment time period: January 2013-May 2013. We do not use June 2013 data in our analysis of long-run effects because the Turkish Central Bank announced an interest rate ceiling for overdrafts on May 27.

$T$  is a vector of treatment assignments (see Figure 1), with  $B$  the vector of estimated coefficients on those treatment variables. Our main tables define the treatment vector to test key predictions and features of models of shrouding and limited attention; Appendix Table 1 presents results for each cell created by the randomizations.  $X$  is a vector of the stratification variables used to block the randomization (see Table 1).

#### 4.1 Main Results: Effects of Promotional Overdraft Pricing and Message Content on Overdrafting

Table 2 reports estimates of the paper’s key treatment effects: the effects of different overdraft messages on overdraft usage during the experiment.

Columns 1, 3, and 5 report estimates of the effect of offering a 50% discount on overdraft interest—and thereby mentioning something about the cost of overdrafting—on three different measures of overdraft usage. The row variable (2) captures this effect by comparing the performance of the three overdraft interest discount arms to the three arms that do not offer that discount. Column 1 shows that the effect on the extensive margin is negative: offering to cut the cost of overdrafting by one-half *reduces* the likelihood of overdrafting by 0.65 percentage points (SE= 0.28).

The magnitude of the effect in Column 1 is small—2 percent relative to the sample mean of 0.31—but likely economically significant, for several reasons. First, it suggests that drawing attention to overdraft costs induces upward-sloping demand. Framed differently, it suggests that messaging about costs without offering a discount—as one might contemplate as part of a pure debiasing strategy—would depress demand even more. Second, the messaging here does not mention the level of costs— again as one might contemplate as part of a pure debiasing strategy like “Beware of overdrafts at 60% APR!” Instead it offers to give back “half of the interest”. It seems plausible to think that messaging around the cost level might depress demand even more, particularly if consumers tend to underestimate add-on costs as assumed by shrouding models. Third, messaging costs are low, and hence bank strategy is sensitive to small changes in demand. Fourth, our estimates are in intention-to-treat (ITT) units, and we should keep in mind that some recipients may have ignored the messages and hence not actually been “treated”. Treatment-on-the-treated effects might be more informative for mapping the steady-state implications of our results, and they would be larger than the ITTs, but we have no good way of estimating how much larger in the context of this study.

Turning to other measures of overdraft use, Column 3 shows that the overdraft discount offer reduces the count of days with an overdraft balance, by 0.073 days (SE= 0.037 days) over the course of the experiment. This is a 3% reduction relative to the mean of 2.77 days. Column 5’s point estimate suggests a small reduction in the average daily overdraft balance (-0.11 TL on a base of 27TL) that is not statistically significant (SE =0.47). Overdraft balances are

right-skewed, and so we test sensitivity to outliers in Appendix Table 2. We find similar results across four different rules for dealing with the top 1% of overdraft balances: each of the four point estimates is small and negative.

In all, Columns 1, 3, and 5 support a key prediction of shrouding models: drawing attention to the cost of a shrouded attribute reduces the demand for it (even, in our case, when offering a 50% discount!). We confirm that this lower demand likely maps into lower profitability for the bank in Appendix Table 3, which shows that deposit account balances (checking + saving) do not increase to offset promotion costs and lost overdraft revenue with increased implicit interest.<sup>27</sup>

Columns 2, 4, and 6 report estimates for each of the four different overdraft messages relative to the two messages that did not mention overdrafts (instead mentioning only the debit card or auto-debit bill registration promotions). This specification unpacks the three different overdraft interest discount messages to test whether they have differential effects (p-values reported at the bottom of the table), and also identifies our second key result: the effect of the overdraft availability reminder that does not mention costs or offer a discount.

Comparing the three different overdraft interest discount messages, we see two interesting patterns in Columns 2, 4, and 6. First, the negative point estimate for the overdraft interest discount goes away compared to Columns 1, 3 and 5 (it actually becomes slightly positive but not statistically significant in each case), suggesting that the overdraft discount by itself does not depress demand (row 3). Second, comparing the overdraft discount (row 3) to the bundled discounts (overdraft discount + auto-debit discount in row 4, overdraft discount + debit card discount in row 5), we find the reduced demand from the overdraft interest discount only manifests itself when mentioned in tandem with the debit card discount (and to a lesser extent, the auto-debit discount). We posit a salience mechanism: using the debit card without paying attention to one's balance is exactly how one can find oneself in overdraft status without intending to do so. By bundling the two together, the consumer not only becomes increasingly aware of the price of overdraft, but is also reminded of the exact behavior to reduce, in order to reduce use of the overdraft. This is consistent with Stango and Zinman (2014), which finds that survey questions about spending control, monitoring account balances, or other bank fees induce overdraft reductions.

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<sup>27</sup> Stango and Zinman (2014) also find that consumers do *not* engineer overdraft reductions by holding larger/buffer balances in their deposit accounts.

The key finding in the even-numbered columns is that the overdraft availability reminder, which does not mention overdraft costs, *increases* overdraft usage relative to the non-overdraft messages. In Column 2 we see that the availability reminder sent on September 15th increases the likelihood of overdrafting during the experiment by 9/10 of a percentage point (SE= 4/10 of a pp), or 3% relative to the sample proportion. Column 4 shows that the simple reminder increases the count of days with an overdraft balance by 5%. Column 6 shows an average daily balance increase of 0.95 TL (SE=0.70) on a base of 27 TL.<sup>28</sup> We see a similar pattern of results for the days used and balance outcomes in the first row of Table 2, which reports estimates of the effect of getting the overdraft availability reminder on August 30<sup>th</sup> relative to not getting any message on August 30<sup>th</sup>.

The demand increase from the overdraft availability reminder is consistent with the overdraft feature—and not just its cost-- being far from top of mind: reminding someone of its availability and quantity (the size of the credit limit) increases usage.

#### *4.2 Do All Promotional Discounts Backfire? No.*

Table 3 checks whether other promotional discounts backfire as well, by estimating treatment effects of the debit card and auto-debit discount offers on their targeted behaviors during the experiment. Columns 1-4 show estimates of the effects of the debit card discount messages on two measures of debit card use for point-of-sale (POS) transactions: the extensive margin (Columns 1 and 2), and the count of debit card (POS) transactions. Each of the point estimates is positive, with one marginally statistically significant, suggesting that debit card discounts, unlike overdraft interest discounts, work (weakly) as intended by the bank. Columns 5-8 show estimates of the effects of the auto-debit discount message on the extensive margin of registering a bill payment for auto-debit. Because this type of transaction is low-prevalence—only 1.4% of our sample do it during the experiment— we report probit marginal effects (Columns 7 and 8) as well as OLS estimates (Columns 5 and 6). Here again each of the point estimates is positive. Both estimators find that the bundled discount—overdraft interest discount + auto-debit discount—increases bill payment registration significantly (Columns 6 and 8). This suggests that bundled discounts have their intended effect on auto-debit enrollment, in contrast to their perverse effect (from the bank’s perspective) on overdrafting.

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<sup>28</sup> We get similar results in the outlier sensitivity checks of Appendix Table 2.

In all, we find no evidence that promotional discounts targeting debit card use and auto-debit bill payments backfire, and some evidence that they increase demand as intended.

#### *4.3 Effects of Messaging Frequency on Overdrafting*

Returning to treatment effects on overdrafting, Table 4 examines the effects of the frequency treatments. Here we take the specifications in Table 2 and break out treatments by whether the bank sent any promotional messages after September 15 (odd-numbered columns), and then by the frequency of any messages subsequent to September 15 (even-numbered columns). The treatments of interest here vary only the frequency of messaging, not message content (Tables 2 and 3) or the amount of time promotional incentives are in place (Table 5).

Columns 1, 2, 5, 6, 9, and 10 suggest that demand decreases the more the bank advertises the overdraft interest discount. The point estimate for sending post-Sept 15 messages promoting the discount is more negative than the point estimate for not sending any post-Sept 15 messages, for each of the three demand measures (Columns 1, 5, and 9), with p-values for the difference of 0.446, 0.003, and 0.007.<sup>29</sup> Breaking out the post-Sept 15 messages into more versus less-frequent (every 10 vs. every 20 days), we find a bit more evidence suggesting that more intense messaging about the overdraft discount decreases demand (Columns 2, 6, and 10): the point estimate on more-frequent messages is more negative than that on less-frequent messages for each of the three overdraft usage measures (row 3 vs. row 4), although none of these differences are statistically significant.

Columns 3, 4, 7, 8, 11, and 12 suggest that demand increases the more the bank advertises overdraft availability. The overdraft availability reminder has no effect when sent on Sept 15 without follow-up messages, but strongly increases demand when the bank does send subsequent messages (row 17 vs. row 18).

All told, the results here suggest that messaging intensity reinforces the main effects we find in Table 2: messaging more depresses demand more in the case of the overdraft interest discount, and increases demand more in the case of the overdraft availability reminder.

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<sup>29</sup> There is even a bit of evidence that one-shot messaging about the overdraft interest discount actually increases demand (row 1, Columns 9 and 10). We discuss some additional evidence on one-shot messaging in the next sub-section, with respect to our analysis of the duration treatment.

#### 4.4 Effects of Promotional Duration (\*Messaging Frequency) on Overdrafting

Table 5 examines another margin of messaging and promotional intensity—the “duration”, or length of time over which the bank continued to send messages and offer discounts. Short-duration campaigns lasted until November 15<sup>th</sup>, while long-duration campaigns continued until December 15<sup>th</sup>. We find little evidence that duration alone affects demand, either for the overdraft interest discount (row 1 versus row 2), or for the overdraft availability reminder (row 7 versus row 8).

Promotional intensity depends on duration *and* frequency, so we explore these interactions in the remaining columns of Table 5. Columns 2, 5, and 8 focus on the overdraft interest discount. Comparing, e.g., the most-intense promotion (row 3: long duration + messages after Sept. 15) to the least-intense promotion (row 6: short duration, no messages after Sept 15), we find lower demand for the most-intense promotion in all three cases, with p-values of 0.55, 0.15, and 0.03. Columns 3, 6, and 9 also show results for the overdraft availability reminder, and again we find bigger effects on demand—an increase in this case-- for the most-intense promotion (row 7) compared to the least-intense promotion (row 9), with p-values of 0.07, 0.25, and 0.02.

Table 4 shows a hint of evidence that one-shot messaging about the overdraft interest discount induces a normal rather than perverse demand response, and we explore that further in rows 5 and 6 of Table 5. These rows capture groups that received only one message about the discount, on Sept 15, with an offer that was good until Dec. 15 (row 5) or Nov. 15 (row 6). These one-shot messages have basically null effects on the extensive margin (Column 2), while three of the four coefficients on overdraft days and overdraft balance are positive (Columns 5 and 8), with p-values of 0.1479, 0.0446, and 0.8158. Columns 3, 6, and 9 permit the same comparison between row 5 and row 6, but with the omitted group as no mention of overdraft instead of no overdraft interest discount.

All told, we infer two qualitative findings from Table 5. First, more-intense promotions amplify the demand-depressing effect of the overdraft interest incentive and the demand-increasing effect of the overdraft availability reminder. This also implies that demand responds more normally—in relative terms at least—to less-intense price promotion. Second, there is a bit of evidence that demand responds normally, in absolute terms, to a one-shot message about the overdraft interest discount.

#### *4.5 Results for Full-Factorial Design*

The regression models estimated thus far impose some theory to group treatment cells; we also report results for each individual test cell in Appendix Table 1.

#### *4.6 Heterogeneous Effects of Overdraft Messaging?*

Shrouding models, and models of limited attention and salience like Bordalo et al (2014), predict that responses to the advertising of add-ons will vary with how well-informed and/or attentive the consumer is. For example, a well-informed and attentive consumer should respond normally to the overdraft interest discount, and weakly if at all to the overdraft availability reminder.

We construct two proxies for baseline exposure to the overdraft product and then test for whether each proxy mediates our main treatment effects. The first proxy is recent overdraft use prior to the experiment. 18% of our sample overdrafted at some point during February-August 2012. (Recall that the pre-treatment proportion overdrafting is lower than the proportion overdrafting during or post- the experiment, presumably because the bank selected clients with low pre-experiment overdraft activity for the study.) Appendix Table 4 interacts a prior use indicator with our main treatment variables and shows little evidence of heterogeneous treatment effects (p-values at the bottom of the table). The second proxy is generated by the August 30<sup>th</sup> message YK sent to half of the sample. This initial overdraft availability reminder may have provided some consumers with information and/or drawn their attention to the add-on. But Appendix Table 5 finds little evidence that the August 30<sup>th</sup> message dampens (or amplifies) the effects of subsequent messages (p-values at bottom of the table).

#### *4.7 Do Treatment Effects Persist? Post-Experiment Effects of Overdraft Messaging*

Tables 6, 7, and 8 re-estimate our primary specifications (Table 2), message frequency specifications (Table 4), and duration specifications (Table 5) on overdraft usage after the promotional campaign stops. Specifically, we measure the extensive margin and average daily balances using monthly data covering the period January-May, 2013.<sup>30</sup> (Recall that the most-intensively treated accountholders in our experiment received their last message on December 15, 2012.) We find little evidence that treatment effects persist—there are no more

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<sup>30</sup> We lack daily data for the post-experiment period and hence cannot calculate our days-with-a-balance variable.

statistically significant results than one would expect to find by chance—and therefore little evidence that consumers persist with the behaviors induced by the bank’s promotions during the experiment.

## 5. Conclusion

Working with a large Turkish bank to test SMS direct marketing promotions to 108,000 existing checking account holders, we find that messages promoting a 50% discount on the overdraft interest rate *reduce* overdraft usage. In contrast, messages that merely mention overdraft availability without mentioning price *increase* usage. Neither change persists long after messages stop, suggesting that induced change in overdrafting is not habit-forming. We also find some evidence that messaging intensity reinforces the main effects of overdraft discounts and availability reminders—messaging more about the overdraft *discount* further reduces demand, while messaging more about overdraft *availability* further increases demand—and that messages offering discounts on debit card or auto-debit use along with overdraft backfire more than simply offering a discount on overdrafts. But not all messages backfire: we find some evidence that debit card and auto-debit discounts increase usage of those features, and that a one-shot message about the overdraft discount actually increases overdraft usage.

These results are consistent with the Bordalo et al (2014) model of limited memory and attention. They also support the key prediction of equilibrium shrouding models: that firms lack incentives to draw attention to, or otherwise compete on, add-on prices. However we emphasize that our study does not map directly to most shrouding models, as most shrouding models focus on competition at the customer acquisition stage rather than the post-acquisition setting we have here.

Our results also support policymakers’ increasing scrutiny of add-on features, pricing, and practices, although we emphasize that we do not conduct welfare analysis that ought motivate and guide policy interventions.

Practically speaking, our results suggest that competing on overdraft prices will *not* capture market share or increase usage, and thus will lower revenue. Although cutting overdraft prices could in principle generate more customer loyalty or reciprocity, the fact that induced overdraft behavior does not persist suggests these sorts of long-term benefits will not materialize for banks. More subtly, our results should also give pause to third parties seeking



to improve overdraft markets with messages (like social marketing campaigns) that draw attention to overdraft costs.<sup>31</sup> The lack of habit formation in our results suggests that messaging would have to be sustained to affect behavior, and the effects of various bank messages on short-term demand suggest that banks would have incentives to counter any “debiasing” campaigns with overdraft-promoting campaigns.

Opportunities for future work abound. We think the most promising direction is one that pushes towards welfare analysis. This may require far more household-level consumption and expenditure data than is typically available from administrative data alone, although the growth of electronic payments and credit bureaus suggests possibilities for complementing or substituting for survey data. Furthermore, refinements to our design could help further tease out and test across models, for instance testing promotions that mention price without cutting it, and mentioning information on price levels as well as or instead of discounts. Other key potential refinements include measuring consumer price and usage perceptions at baseline and/or endline, as well as examining how awareness and pricing of overdrafts, and other additions in consumer finance, influences customer acquisition.

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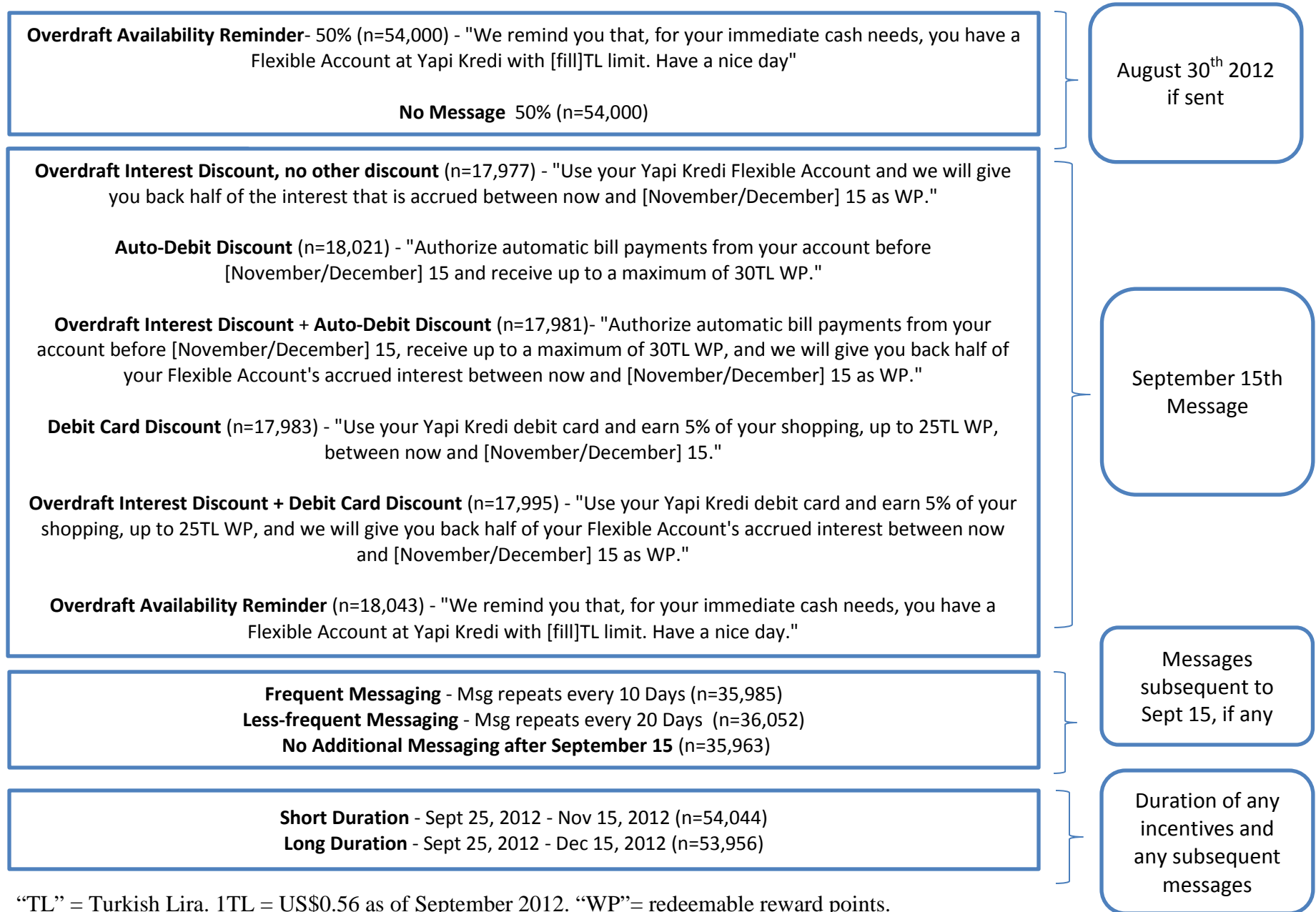
<sup>31</sup> Such third parties might include personal financial management providers, regulators, nonprofit credit counselors, and consumer advocacy groups.

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**Figure 1. Experimental Design**



“TL” = Turkish Lira. 1TL = US\$0.56 as of September 2012. “WP”= redeemable reward points.  
Yapi Kredi = the implementing bank.

Table 1: Orthogonality Checks

	Baseline Mean & SE	August 30	September 15	Overdraft	Auto-Debit Discount Only	Auto-Debit	September 15	Debit Card Discount Only	September 15
		Message: Overdraft Availability Reminder	Message: Overdraft Interest Discount	Interest Discount + Subsequent Messages		Discount (w/o OI Discount) + Subsequent Messages	Message: Overdraft Interest Discount + Auto-Debit Discount		Message: Overdraft Interest Discount + Debit Card Discount
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Baseline Stratification Variables (July 2012)									
Female	0.289 (0.001)	-0.0004 (0.0034)	-0.0005 (0.0034)	-0.0006 (0.0032)	-0.0009 (0.0025)	-0.0005 (0.0021)	0.0002 (0.0025)	-0.0000 (0.0025)	-0.0001 (0.0021)
Lives in Istanbul	0.275 (0.001)	0.0000 (0.0036)	-0.0002 (0.0036)	-0.0000 (0.0034)	-0.0002 (0.0027)	-0.0001 (0.0023)	0.0001 (0.0027)	0.0002 (0.0027)	-0.0004 (0.0023)
Lives in Ankara	0.090 (0.001)	-0.0004 (0.0055)	0.0011 (0.0055)	0.0020 (0.0052)	0.0010 (0.0041)	-0.0000 (0.0035)	0.0005 (0.0041)	-0.0022 (0.0041)	-0.0013 (0.0035)
Lives in Izmir	0.050 (0.001)	-0.0009 (0.0071)	-0.0020 (0.0071)	0.0007 (0.0067)	-0.0009 (0.0053)	-0.0005 (0.0045)	-0.0010 (0.0053)	0.0012 (0.0053)	-0.0015 (0.0045)
Lives in Bursa	0.057 (0.001)	-0.0008 (0.0067)	0.0004 (0.0067)	0.0012 (0.0063)	0.0012 (0.0050)	0.0029 (0.0042)	-0.0000 (0.0050)	-0.0008 (0.0050)	-0.0002 (0.0042)
Married	0.572 (0.002)	0.0001 (0.0031)	0.0000 (0.0031)	0.0004 (0.0029)	-0.0003 (0.0023)	-0.0002 (0.0020)	0.0004 (0.0023)	0.0006 (0.0023)	-0.0002 (0.0023)
Overdraft Limit Between 1/2 and 1 monthly min wage	0.284 (0.001)	-0.0000 (0.0035)	-0.0012 (0.0035)	-0.0010 (0.0033)	0.0006 (0.0026)	0.0002 (0.0022)	-0.0012 (0.0026)	0.0003 (0.0026)	0.0000 (0.0022)
Overdraft Limit > monthly min wage	0.081 (0.001)	-0.0004 (0.0058)	-0.0054 (0.0058)	-0.0047 (0.0055)	0.0018 (0.0043)	0.0019 (0.0036)	-0.0001 (0.0043)	-0.0004 (0.0043)	-0.0043 (0.0036)
omitted category: overdraft limit < 1/2 monthly min wage	0.428 (0.002)	0.0042 (0.0047)	0.0016 (0.0047)	0.0004 (0.0044)	-0.0000 (0.0035)	-0.0002 (0.0029)	0.0003 (0.0035)	-0.0002 (0.0035)	-0.0002 (0.0029)
Overdraft Acct Bal: Balance below med	0.427 (0.002)	0.0038 (0.0046)	0.0021 (0.0046)	0.0007 (0.0044)	0.0008 (0.0035)	0.0003 (0.0029)	0.0007 (0.0035)	-0.0009 (0.0035)	-0.0008 (0.0029)
omitted category= zero balance									
Baseline Values of Outcome Variables									
Avg Overdraft Balance Sept 2011-Apr 2012 > 0	0.184 (0.001)	0.0023 (0.0040)	-0.0014 (0.0040)	-0.0004 (0.0037)	-0.0059** (0.0030)	-0.0029 (0.0025)	-0.0001 (0.0030)	0.0049* (0.0030)	0.0024 (0.0025)
Auto Bill Pay Registered any time Sept 2011-July 2012	0.012 (0.000)	0.0023 (0.0139)	0.0094 (0.0139)	0.0052 (0.0131)	0.0083 (0.0104)	-0.0102 (0.0088)	0.0198* (0.0104)	-0.0072 (0.0104)	-0.0034 (0.0087)
Count Debit Card POS Transactions Sept 2011-July 2012 > 0	0.334 (0.001)	-0.0011 (0.0034)	0.0031 (0.0034)	0.0032 (0.0032)	-0.0039 (0.0025)	-0.0031 (0.0021)	-0.0026 (0.0025)	0.0040 (0.0025)	0.0026 (0.0021)
(omitted category= zero transactions)									
F-test of joint significance of all RHS variables	0.9369	0.6596	0.7164	0.0592	0.1136	0.2385	0.1033	0.4176	0.1976
Observations	108000	108000	108000	108000	108000	108000	108000	108000	108000

Notes: Column 1 reports the baseline mean and standard error of each row variable. Columns 2-10 each report the coefficients of a single OLS regression of each treatment in the column header on each row variable.

Table 2. Effects of First Two Overdraft Messages on Overdraft Usage, During Experiment

	Overdraft Account Used		Days with Overdraft Balance		Avg Overdraft Account Balance (TL)	
	(1)	(2)	(3)	(4)	(5)	(6)
August 30 Message: Overdraft Availability Reminder (1)	0.0007	0.0007	0.0869**	0.0869**	1.0552**	1.0554**
Omitted category for (1): No August 30 Message	(0.0028)	(0.0028)	(0.0365)	(0.0365)	(0.4701)	(0.4701)
September 15 Message: Overdraft Interest Discount (2)	-0.0065**		-0.0728**		-0.1057	
Omitted cat for (2): No Overdraft Interest Discount	(0.0028)		(0.0365)		(0.4688)	
September 15 Message: Overdraft Interest Discount; No Other Discount (3)		0.0020		0.0467		0.6179
		(0.0042)		(0.0550)		(0.6887)
September 15 Message: Overdraft Interest Discount; Auto-Debit Discount (4)		-0.0048		-0.0564		-0.1347
		(0.0042)		(0.0544)		(0.6988)
September 15 Message: Overdraft Interest Discount; Debit Card Discount (5)		-0.0078*		-0.0763		0.1573
		(0.0042)		(0.0541)		(0.7236)
September 15 Message: Overdraft Availability Reminder (6)		0.0089**		0.1321**		0.9562
Omitted category for (3)-(6): No Mention of Overdraft		(0.0042)		(0.0553)		(0.7029)
p-value on F-test of equality between rows (3) & (6)		0.1588		0.1824		0.6765
p-value on F-test of equality between rows (3) & (4)		0.1592		0.1035		0.3519
p-value on F-test of equality between rows (3) & (5)		0.0432		0.0509		0.5782
p-value on F-test of equality between rows (4) & (6)		0.0048		0.0030		0.1831
p-value on F-test of equality between rows (5) & (6)		0.0006		0.0010		0.3414
Mean of Dependent Variable	0.3077	0.3077	2.7676	2.7676	26.8511	26.8511
std dev	(0.46)	(0.46)	(6.05)	(6.05)	(77.97)	(77.97)
Observations	108,000	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56 USD. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the dependent variable (column header) on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. All variables cover the time period September 15-December 31, 2012.

Table 3. Effects of Auto-Debit and Debit Card Messages on Auto Debit and Debit Card Usage, During Experiment

	Any Debit Card Purchase Transactions		Count Debit Card Purchase Transactions		Any Bill Payment Registered for Auto-Debit			
	OLS	OLS	OLS	OLS	OLS	OLS	Probit Mfx	Probit Mfx
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Debit Card Discount Only	0.0055 (0.0038)	0.0067* (0.0039)	0.0222 (0.0398)	0.0347 (0.0405)				
Overdraft Interest Discount + Debit Card Discount		0.0059 (0.0039)		0.0622 (0.0408)				
Auto-Debit Discount Only					0.0010 (0.0010)	0.0014 (0.0010)	0.0007 (0.0006)	0.0010 (0.0007)
Overdraft Interest Discount + Auto-Debit Discount						0.0022** (0.0010)		0.0015** (0.0007)
Mean (standard deviation) dependent variable	0.3367 (0.47)	0.3367 (0.47)	1.9872 (4.93)	1.9872 (4.93)	0.0141 (0.12)	0.0141 (0.12)	0.0141 (0.12)	0.0141 (0.12)
Omitted Category	All Other Messages	No mention of Debit Card Discount	All Other Messages	No mention of Debit Card Discount	All Other Messages	No Mention of Auto-Debit Discount	All Other Messages	No Mention of Auto-Debit Discount
Observations	108,000	108,000	107,999	107,999	108,000	108,000	108,000	108,000

Notes: OLS or Probits (marginal effects) with Huber-White Standard Errors. 1.0TL = \$.56 USD. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the dependent variable on the treatment variables shown, a control for the treatment assignment in the August 30th mailer, and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. All variables cover the time period September 15-December 31, 2012.

Table 4. Effects of Message Frequency on Overdraft Usage, During Experiment

	Overdraft Account Used				Days with Overdraft Balance				Avg Overdraft Account Balance (TL)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Overdraft Interest Discount + No Messages after Sept 15 (1)	-0.0044 (0.0040)	-0.0044 (0.0040)			0.0374 (0.0525)	0.0374 (0.0525)			1.2119* (0.6885)	1.2119* (0.6885)		
Overdraft Interest Discount + Messages after Sept 15 (2)	-0.0076** (0.0031)				-0.1278*** (0.0404)				-0.7636 (0.5187)			
Overdraft Interest Discount + More-Frequent Messages (3)		-0.0100** (0.0039)				-0.1690*** (0.0508)				-0.8826 (0.6639)		
Overdraft Interest Discount + Less-Frequent Messages (4)		-0.0051 (0.0040)				-0.0865* (0.0511)				-0.6447 (0.6486)		
Overdraft Interest Discount + No Other Discount + No Messages after Sept 15 (5)			-0.0037 (0.0064)	-0.0037 (0.0064)			0.1136 (0.0858)	0.1136 (0.0858)			1.5653 (1.0885)	1.5653 (1.0885)
Overdraft Interest Discount + No Other Discount + Messages after Sept 15 (6)			0.0049 (0.0049)				0.0132 (0.0631)				0.1441 (0.7838)	
Overdraft + No Other Discount + More-Frequent Messages (7)					0.0012 (0.0064)			-0.0110 (0.0834)				-0.1341 (1.0296)
Overdraft + No Other Discount + Less-Frequent Messages (8)					0.0085 (0.0065)			0.0374 (0.0835)				0.4222 (1.0411)
Overdraft Interest Discount + Auto-Debit Discount + No Messages after Sept 15 (9)			0.0026 (0.0064)	0.0026 (0.0064)			0.1158 (0.0856)	0.1158 (0.0856)			2.5741** (1.1938)	2.5741** (1.1938)
Overdraft Interest Discount + Auto-Debit Discount + Messages after Sept 15 (10)			-0.0085* (0.0048)				-0.1426** (0.0620)				-1.4901* (0.7665)	
Overdraft Interest Discount + Auto-Debit Discount + More-Frequent Messages (11)				-0.0112* (0.0064)				-0.1852** (0.0817)				-1.5869 (1.0044)
Overdraft Interest Discount + Auto-Debit + Less-Frequent Messages (12)				-0.0059 (0.0064)				-0.0999 (0.0817)				-1.3933 (1.0160)
Overdraft Interest Discount + Debit Card Discount + No Messages after Sept 15 (13)			-0.0031 (0.0064)	-0.0031 (0.0064)			0.0148 (0.0839)	0.0148 (0.0839)			0.4512 (1.0820)	0.4512 (1.0821)
Overdraft Interest Discount + Debit Card Discount + Messages after Sept 15 (14)			-0.0101** (0.0048)				-0.1216** (0.0619)				0.0111 (0.8535)	
Overdraft Interest Discount + Debit Card + More-Frequent Messages (15)				-0.0112* (0.0064)				-0.1785** (0.0806)				0.0303 (1.1850)
Overdraft Interest Discount + Debit Card + Less-Frequent Messages (16)				-0.0090 (0.0064)				-0.0649 (0.0827)				-0.0083 (1.0906)
Overdraft Availability Reminder + No Msgs after Sept 15 (17)			0.0003 (0.0064)	0.0003 (0.0064)			0.0429 (0.0835)	0.0429 (0.0835)			-0.3107 (1.0420)	-0.3106 (1.0420)
Overdraft Availability Reminder + Msgs after Sept 15 (18)			0.0132*** (0.0049)				0.1765*** (0.0644)				1.5874* (0.8283)	
Overdraft Availability Reminder + More-Frequent Msgs (19)				0.0136** (0.0065)				0.2119** (0.0854)				1.4985 (1.0996)
Overdraft Availability Reminder + Less-Frequent Msgs (20)				0.0127** (0.0065)				0.1411* (0.0855)				1.6761 (1.1017)
p-value on F-test of equality between rows (1) & (2)	0.4461				0.0028				0.0066			
p-value on F-test of equality between rows (3) & (4)		0.3103				0.1838				0.7673		
p-value on F-test of equality between rows (5) & (6)			0.2359				0.2991				0.2437	
p-value on F-test of equality between rows (7) & (8)				0.9162				0.5284				0.9025
p-value on F-test of equality between rows (9) & (10)			0.1265				0.0070				0.0018	
p-value on F-test of equality between rows (11) & (12)				0.3903				0.6576				0.6809
p-value on F-test of equality between rows (13) & (14)			0.3291				0.1478				0.7266	
p-value on F-test of equality between rows (15) & (16)				0.5285				0.4237				0.8830
p-value on F-test of equality between rows (17) & (18)			0.0785				0.1623				0.1167	
p-value on F-test of equality between rows (19) & (20)												
Mean of Dependent Variable	0.3077 (0.46)	0.3077 (0.46)	0.3077 (0.46)	0.3077 (0.46)	2.7676 (6.05)	2.7676 (6.05)	2.7676 (6.05)	2.7676 (6.05)	26.8511 (77.97)	26.8511 (77.97)	26.8511 (77.97)	26.8511 (77.97)
Omitted category	No Overdraft Discount	No Overdraft Discount	No Mention Overdraft	No Mention Overdraft	No Overdraft Discount	No Overdraft Discount	No Mention Overdraft	No Mention Overdraft	No Overdraft Discount	No Overdraft Discount	No Mention Overdraft	No Mention Overdraft
Observations	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the dependent variable on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. All variables cover the time period September 15-December 31, 2012.



Table 5. Effects of Message and Discount Duration on Overdraft Usage, During Experiment

	Overdraft Account Used			Days with Overdraft Balance			Avg Overdraft Account Balance (TL)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Overdraft Interest Discount: long duration (1)	-0.0075** (0.0034)			-0.0587 (0.0448)			-0.4292 (0.5768)		
Overdraft Interest Discount: short duration (2)	-0.0055 (0.0034)			-0.0868* (0.0444)			0.2174 (0.5773)		
Overdraft Interest Discount: long duration + messages after Sept 15 (3)		-0.0102*** (0.0040)	-0.0072* (0.0042)		-0.1392*** (0.0510)	-0.0952* (0.0541)		-1.4967** (0.6487)	-1.1777* (0.6858)
Overdraft Interest Discount: short duration+ messages after Sept 15 (4)		-0.0049 (0.0040)	-0.0020 (0.0042)		-0.1163** (0.0509)	-0.0722 (0.0540)		-0.0323 (0.6648)	0.2866 (0.7005)
Overdraft Interest Discount: long duration, no messages after Sept 15 (5)		-0.0021 (0.0052)	0.0009 (0.0054)		0.1020 (0.0705)	0.1461** (0.0727)		1.7020* (0.9366)	2.0211** (0.9619)
Overdraft Interest Discount: short duration, no messages after Sept 15 (6)		-0.0067 (0.0052)	-0.0037 (0.0054)		-0.0276 (0.0686)	0.0165 (0.0709)		0.7186 (0.8987)	1.0371 (0.9256)
Overdraft Availability Reminder: long duration+ messages after Sept 15 (7)			0.0154** (0.0065)			0.1719** (0.0857)			3.1078*** (1.1832)
Overdraft Availability Reminder, short duration+ messages after Sept 15 (8)			0.0109* (0.0065)			0.1811** (0.0853)			0.0710 (1.0162)
Overdraft Availability Reminder, no messages after Sept 15 (9)			0.0003 (0.0064)			0.0430 (0.0835)			-0.3088 (1.0420)
p-value on F-test of equality between rows (1) & (2)	0.6185			0.5849			0.3365		
p-value on F-test of equality between rows (3) & (4)		0.2764	0.2764		0.7113	0.7112		0.0692	0.0692
p-value on F-test of equality between rows (3) & (5)		0.1706	0.1706		0.0022	0.0022		0.0021	0.0021
p-value on F-test of equality between rows (3) & (6)		0.5526	0.5526		0.1481	0.1481		0.0277	0.0278
p-value on F-test of equality between rows (5) & (6)		0.5011	0.5011		0.1556	0.1556		0.4179	0.4176
p-value on F-test of equality between rows (7) & (8)			0.5931			0.9346			0.0370
p-value on F-test of equality between rows (7) & (9)			0.0738			0.2460			0.0206
Mean of Dependent Variable	0.3077	0.3077	0.3077	2.7676	2.7676	2.7676	26.8511	26.8511	26.8511
std dev	(0.46)	(0.46)	(0.46)	(6.05)	(6.05)	(6.05)	(77.97)	(77.97)	(77.97)
Omitted Category	No Overdraft Discount		No Mention Overdraft	No Overdraft Discount		No Mention Overdraft	No Overdraft Discount		No Mention Overdraft
Observations	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the LHS variable on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. All variables cover the time period September 15-December 31, 2012. Long duration campaign ends Dec 15, short duration campaign ends Nov 15.

Table 6. Effects of First Two Overdraft Messages on Overdraft Usage, After Experiment

	Overdraft Account Used		Avg Overdraft Account Balance (TL)	
	(1)	(2)	(3)	(4)
August 30 Message: Overdraft Availability Reminder (1)	-0.0004	-0.0004	0.7385	0.7383
Omitted category for (1): No August 30 Message	(0.0029)	(0.0029)	(0.6262)	(0.6262)
September 15 Message: Overdraft Interest Discount (2)	-0.0013		0.1405	
Omitted cat for (2): No Overdraft Interest Discount	(0.0029)		(0.6242)	
		0.0031		0.9005
September 15 Message: Overdraft Interest Discount; No Other Discount (3)		(0.0044)		(0.9471)
September 15 Message: Overdraft Interest Discount; Auto-Debit Discount (4)		-0.0012		-0.6743
		(0.0044)		(0.9127)
September 15 Message: Overdraft Interest Discount; Debit Card Discount (5)		-0.0004		0.2274
		(0.0044)		(0.9532)
September 15 Message: Overdraft Availability Reminder (6)		0.0055		0.0320
Omitted category for (3)-(6): No Mention of Overdraft		(0.0044)		(0.9344)
p-value on F-test of equality between rows (3) & (6)		0.6312		0.4310
p-value on F-test of equality between rows (3) & (4)		0.4042		0.1463
p-value on F-test of equality between rows (3) & (5)		0.4933		0.5473
p-value on F-test of equality between rows (4) & (6)		0.1884		0.5101
p-value on F-test of equality between rows (5) & (6)		0.2434		0.8597
Mean of Dependent Variable	0.3713	0.3713	34.0032	34.0032
std dev	(0.48)	(0.48)	(103.98)	(103.98)
Observations	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the LHS variable on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. Overdraft data covers January-May 2013; experimental messages and promotional prices stopped December 15, 2012 at latest.

Table 7. Effects of Message Frequency on Overdraft Usage, After Experiment

	Overdraft Account Used				Avg Overdraft Account Balance (TL)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overdraft Interest Discount + No Messages after Sept 15 (1)	0.0039 (0.0042)	0.0039 (0.0042)			1.2187 (0.9166)	1.2187 (0.9166)		
Overdraft Interest Discount + Messages after Sept 15 (2)	-0.0040 (0.0033)				-0.3978 (0.6908)			
Overdraft Interest Discount + More-Frequent Messages (3)		-0.0043 (0.0041)				-0.7662 (0.8815)		
Overdraft Interest Discount + Less-Frequent Messages (4)		-0.0037 (0.0041)				-0.0299 (0.8666)		
Overdraft Interest Discount + No Other Discount + No Messages after Sept 15 (5)			0.0052 (0.0067)	0.0052 (0.0067)			3.1489** (1.5726)	3.1489** (1.5727)
Overdraft Interest Discount + No Other Discount + Messages after Sept 15 (6)			0.0020 (0.0051)				-0.2227 (1.0586)	
Overdraft + No Other Discount + More-Frequent Messages (7)				-0.0011 (0.0067)				-0.0027 (1.4184)
Overdraft + No Other Discount + Less-Frequent Messages (8)				0.0051 (0.0067)				-0.4430 (1.3828)
Overdraft Interest Discount + Auto-Debit Discount + No Messages after Sept 15 (9)			0.0103 (0.0068)	0.0103 (0.0068)			0.5568 (1.4538)	0.5568 (1.4538)
Overdraft Interest Discount + Auto-Debit Discount + Messages after Sept 15 (10)			-0.0069 (0.0051)				-1.2907 (1.0333)	
Overdraft Interest Discount + Auto-Debit Discount + More-Frequent Messages (11)				-0.0060 (0.0067)				-2.0946 (1.3311)
Overdraft Interest Discount + Auto-Debit + Less-Frequent Messages (12)				-0.0078 (0.0067)				-0.4861 (1.3940)
Overdraft Interest Discount + Debit Card Discount + No Messages after Sept 15 (13)			0.0018 (0.0067)	0.0018 (0.0067)			-0.0186 (1.4535)	-0.0186 (1.4535)
Overdraft Interest Discount + Debit Card Discount + Messages after Sept 15 (14)			-0.0015 (0.0051)				0.3498 (1.1122)	
Overdraft Interest Discount + Debit Card + More-Frequent Messages (15)				-0.0001 (0.0067)				-0.1692 (1.5320)
Overdraft Interest Discount + Debit Card + Less-Frequent Messages (16)				-0.0029 (0.0067)				0.8672 (1.4300)
Overdraft Availability Reminder + No Msgs after Sept 15 (17)			-0.0021 (0.0067)	-0.0021 (0.0067)			-1.9972 (1.3155)	-1.9972 (1.3155)
Overdraft Availability Reminder + Msgs after Sept 15 (18)			0.0093* (0.0051)				1.0436 (1.1198)	
Overdraft Availability Reminder + More-Frequent Msgs (19)				0.0106 (0.0067)				1.3578 (1.4935)
Overdraft Availability Reminder + Less-Frequent Msgs (20)				0.0080 (0.0067)				0.7297 (1.4928)
p-value on F-test of equality between rows (1) & (2)	0.0731				0.0952			
p-value on F-test of equality between rows (3) & (4)		0.9108				0.4919		
p-value on F-test of equality between rows (5) & (6)			0.1366				0.0511	
p-value on F-test of equality between rows (7) & (8)			0.6815				0.0530	
p-value on F-test of equality between rows (9) & (10)				0.7627				0.7505
p-value on F-test of equality between rows (11) & (12)			0.0239				0.2541	
p-value on F-test of equality between rows (13) & (14)				0.4818				0.8103
p-value on F-test of equality between rows (15) & (16)			0.6656				0.8255	
p-value on F-test of equality between rows (17) & (18)				0.8399				0.3655
Mean of Dependent Variable	0.3713 (0.48)	0.3713 (0.48)	0.3713 (0.48)	0.3713 (0.48)	34.0032 (103.98)	34.0032 (103.98)	34.0032 (103.98)	34.0032 (103.98)
Omitted Category	No Overdraft Discount		No Mention Overdraft		No Overdraft Discount		No Mention Overdraft	
Observations	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization; the account-holder. Each column presents results from a single regression of the dependent variable on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. Overdraft data covers January-May 2013; experimental messages and promotional prices stopped December 15, 2012 at latest.

Table 8. Effects of Message and Discount Duration on Overdraft Usage, After Experiment

	Overdraft Account Used			Avg Overdraft Account Balance (TL)		
	(1)	(2)	(3)	(4)	(5)	(6)
Overdraft Interest Discount: long duration (1)	0.0027 (0.0036)			0.1781 (0.7704)		
Overdraft Interest Discount: short duration (2)	-0.0054 (0.0036)			0.1029 (0.7665)		
Overdraft Interest Discount: long duration + messages after Sept 15 (3)		-0.0013 (0.0042)	0.0006 (0.0044)		-1.2159 (0.8622)	-1.2054 (0.9122)
Overdraft Interest Discount: short duration+ messages after Sept 15 (4)		-0.0067 (0.0041)	-0.0048 (0.0044)		0.4173 (0.8873)	0.4277 (0.9359)
Overdraft Interest Discount: long duration, no messages after Sept 15 (5)		0.0106* (0.0055)	0.0124** (0.0057)		2.9604** (1.2653)	2.9710** (1.2994)
Overdraft Interest Discount: short duration, no messages after Sept 15 (6)		-0.0028 (0.0055)	-0.0009 (0.0057)		-0.5295 (1.1759)	-0.5197 (1.2129)
Overdraft Availability Reminder: long duration+ messages after Sept 15 (7)			0.0073 (0.0067)			2.5203 (1.5348)
Overdraft Availability Reminder, short duration+ messages after Sept 15 (8)			0.0113* (0.0067)			-0.429 (1.4496)
Overdraft Availability Reminder, no messages after Sept 15 (9)			-0.0021 (0.0067)			-1.9961 (1.3155)
p-value on F-test of equality between rows (1) & (2)	0.0519			0.9331		
p-value on F-test of equality between rows (3) & (4)		0.2856	0.2856		0.1282	0.1282
p-value on F-test of equality between rows (5) & (6)		0.0642	0.0642		0.0307	0.0307
p-value on F-test of equality between rows (7) & (8)			0.652			0.1353
Mean of Dependent Variable	0.3713	0.3713	0.3713	34.0032	34.0032	34.0032
std dev	(0.48)	(0.48)	(0.48)	(103.98)	(103.98)	(103.98)
Omitted Category	No Overdraft Discount		No Mention Overdraft	No Overdraft Discount		No Mention Overdraft
Observations	108,000	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the LHS variable on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. Overdraft data covers January-May 2013; experimental messages and promotional prices stopped December 15, 2012 at latest.

Appendix Table 1: Panel A All Treatments on All Outcomes, During Experiment

	Overdraft Account Used	Days with Overdraft Balance	Avg Overdraft Account Balance (TL)	Whether Auto Bill Pay Registered	Any Debit Card POS Transactions
	(1)	(2)	(3)	(4)	(5)
Panel A: Ignoring August 30th Message					
Overdraft Interest Discount, Short Duration, No Subsequent Messages	0.4753*** (0.0513)	6.6465*** (0.9412)	69.4826*** (17.9091)	0.0206 (0.0144)	0.2621*** (0.0460)
Overdraft Interest Discount, Short Duration, Frequent Messages	0.4974*** (0.0513)	6.7480*** (0.9402)	69.0719*** (17.8925)	0.0172 (0.0144)	0.2938*** (0.0460)
Overdraft Interest Discount, Short Duration, Infrequent Messages	0.5033*** (0.0513)	6.7127*** (0.9409)	70.2925*** (17.9060)	0.0183 (0.0144)	0.2649*** (0.0460)
Overdraft Interest Discount, Long Duration, No Subsequent Messages	0.4965*** (0.0513)	6.8631*** (0.9401)	70.3677*** (17.8979)	0.0204 (0.0144)	0.2835*** (0.0461)
Overdraft Interest Discount, Long Duration, Frequent Messages	0.4845*** (0.0513)	6.5133*** (0.9391)	67.3878*** (17.8868)	0.0181 (0.0144)	0.2679*** (0.0460)
Overdraft Interest Discount, Long Duration, Infrequent Messages	0.4931*** (0.0513)	6.6454*** (0.9388)	67.2711*** (17.8759)	0.0211 (0.0144)	0.2869*** (0.0460)
Overdraft Interest Discount + Auto-Debit Discount, Short Duration, No Subsequent Messages	0.4921*** (0.0513)	6.6946*** (0.9396)	70.8506*** (17.9119)	0.0211 (0.0144)	0.2702*** (0.0461)
Overdraft Interest Discount + Auto-Debit Discount, Short Duration, Frequent Messages	0.4803*** (0.0513)	6.4125*** (0.9396)	66.6089*** (17.8884)	0.0235 (0.0145)	0.2766*** (0.0460)
Overdraft Interest Discount + Auto-Debit Discount, Short Duration, Infrequent Messages	0.4898*** (0.0513)	6.6194*** (0.9391)	68.8597*** (17.8933)	0.0229 (0.0145)	0.2787*** (0.0460)
Overdraft Interest Discount + Auto-Debit Discount, Long Duration, No Subsequent Messages	0.4925*** (0.0513)	6.8203*** (0.9400)	71.0241*** (17.9075)	0.0227 (0.0145)	0.2819*** (0.0460)
Overdraft Interest Discount + Auto-Debit Discount, Long Duration, Frequent Messages	0.4767*** (0.0513)	6.5010*** (0.9391)	66.9488*** (17.8876)	0.0183 (0.0144)	0.2656*** (0.0460)
Overdraft Interest Discount + Auto-Debit Discount, Long Duration, Infrequent Messages	0.4777*** (0.0513)	6.4638*** (0.9388)	65.0691*** (17.8787)	0.0240* (0.0145)	0.2628*** (0.0460)
Overdraft Interest Discount + Debit Card Discount, Short Duration, No Subsequent Messages	0.4905*** (0.0513)	6.6338*** (0.9403)	67.8737*** (17.8880)	0.0214 (0.0144)	0.2694*** (0.0460)
Overdraft Interest Discount + Debit Card Discount, Short Duration, Frequent Messages	0.4758*** (0.0513)	6.4961*** (0.9393)	69.0251*** (17.9083)	0.0205 (0.0144)	0.2830*** (0.0460)
Overdraft Interest Discount + Debit Card Discount, Short Duration, Infrequent Messages	0.4797*** (0.0513)	6.4287*** (0.9399)	68.0465*** (17.9057)	0.0185 (0.0144)	0.2858*** (0.0461)
Overdraft Interest Discount + Debit Card Discount, Long Duration, No Subsequent Messages	0.4828*** (0.0513)	6.6793*** (0.9399)	69.7591*** (17.9093)	0.0178 (0.0144)	0.2784*** (0.0460)
Overdraft Interest Discount + Debit Card Discount, Long Duration, Frequent Messages	0.4811*** (0.0513)	6.4305*** (0.9391)	67.7640*** (17.9156)	0.0209 (0.0144)	0.2683*** (0.0460)
Overdraft Interest Discount + Debit Card Discount, Long Duration, Infrequent Messages	0.4817*** (0.0513)	6.7251*** (0.9397)	68.6645*** (17.8901)	0.0232 (0.0145)	0.2885*** (0.0460)
Auto-Debit Discount, Short Duration, No Subsequent Messages	0.4935*** (0.0513)	6.7328*** (0.9397)	69.4325*** (17.8869)	0.0257* (0.0147)	0.2911*** (0.0461)
Auto-Debit Discount, Short Duration, Frequent Messages	0.4764*** (0.0513)	6.5336*** (0.9404)	66.2380*** (17.8830)	0.0206 (0.0144)	0.2714*** (0.0460)
Auto-Debit Discount, Short Duration, Infrequent Messages	0.4814*** (0.0513)	6.5338*** (0.9385)	67.2283*** (17.8815)	0.0179 (0.0144)	0.2616*** (0.0460)
Auto-Debit Discount, Long Duration, No Subsequent Messages	0.4831*** (0.0513)	6.5890*** (0.9401)	69.3451*** (17.8996)	0.0227 (0.0145)	0.2646*** (0.0460)
Auto-Debit Discount, Long Duration, Frequent Messages	0.4800*** (0.0513)	6.5468*** (0.9395)	66.9282*** (17.8943)	0.0211 (0.0144)	0.2811*** (0.0461)
Auto-Debit Discount, Long Duration, Infrequent Messages	0.4940*** (0.0513)	6.6645*** (0.9397)	69.3493*** (17.9034)	0.0197 (0.0144)	0.2742*** (0.0460)
Debit Card Discount, Short Duration, No Subsequent Messages	0.4976*** (0.0513)	6.7254*** (0.9399)	69.3384*** (17.9203)	0.0190 (0.0144)	0.2697*** (0.0460)
Debit Card Discount, Short Duration, Frequent Messages	0.4968*** (0.0513)	6.7938*** (0.9396)	69.0150*** (17.8869)	0.0189 (0.0144)	0.2964*** (0.0460)
Debit Card Discount, Short Duration, Infrequent Messages	0.4965*** (0.0513)	6.6716*** (0.9393)	68.7787*** (17.8921)	0.0196 (0.0144)	0.2774*** (0.0461)
Debit Card Discount, Long Duration, No Subsequent Messages	0.4916*** (0.0513)	6.5828*** (0.9411)	68.0561*** (17.8832)	0.0200 (0.0144)	0.2821*** (0.0460)
Debit Card Discount, Long Duration, Frequent Messages	0.4849*** (0.0513)	6.6024*** (0.9403)	67.1635*** (17.8856)	0.0219 (0.0145)	0.2733*** (0.0460)
Debit Card Discount, Long Duration, Infrequent Messages	0.5006*** (0.0513)	6.7248*** (0.9407)	69.4946*** (17.8924)	0.0200 (0.0147)	0.2792*** (0.0460)
Overdraft Availability Reminder, Short Duration, No Subsequent Messages	0.4961*** (0.0513)	6.7395*** (0.9397)	69.2084*** (17.8994)	0.0187 (0.0144)	0.2605*** (0.0460)
Overdraft Availability Reminder, Short Duration, Frequent Messages	0.5027*** (0.0513)	6.9343*** (0.9417)	69.0230*** (17.9376)	0.0207 (0.0144)	0.2645*** (0.0460)
Overdraft Availability Reminder, Short Duration, Infrequent Messages	0.4984*** (0.0513)	6.7113*** (0.9392)	67.8470*** (17.8816)	0.0182 (0.0144)	0.2832*** (0.0460)
Overdraft Availability Reminder, Long Duration, No Subsequent Messages	0.4839*** (0.0513)	6.6301*** (0.9392)	66.9013*** (17.8800)	0.0192 (0.0144)	0.2633*** (0.0460)
Overdraft Availability Reminder, Long Duration, Frequent Messages	0.5039*** (0.0513)	6.7725*** (0.9415)	70.7033*** (18.2977)	0.0212 (0.0144)	0.2741*** (0.0460)
Overdraft Availability Reminder, Long Duration, Infrequent Messages	0.5064*** (0.0513)	6.8546*** (0.9403)	72.2391*** (17.9163)	0.0210 (0.0144)	0.2669*** (0.0460)
Mean of Dependent Variable	0.3077	2.7676	26.8511	0.0141	0.3367
std dev	(.46)	(6.05)	(77.97)	(.12)	(.47)
Observations	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the LHS variable on the treatment variables shown and the randomization strata (not shown) and no constant. Figure 1 summarizes the experimental design and shows message scripts. Outcome data from Sept 15-Dec 31, 2012.

Appendix Table 1: Panel B1 All Treatments on All Outcomes, During Experiment

	Overdraft Account Used	Days with Overdraft Balance	Avg Overdraft Account Balance (TL)	Whether Auto Bill Pay Registered	Any Debit Card POS Transactions
	(1)	(2)	(3)	(4)	(5)
Panel B1: With August 30th Message (Aug 30 Msg vs No Aug 30 Msg)					
No Aug 30 Mess, Overdraft Interest Discount, Short Duration, No Subsequent Messages	0.4799*** (0.0518)	6.6662*** (0.9464)	69.3940*** (17.9384)	0.0196 (0.0146)	0.2442*** (0.0467)
No Aug 30 Mess, Overdraft Interest Discount, Short Duration, Frequent Messages	0.4887*** (0.0518)	6.8659*** (0.9469)	69.5985*** (17.9085)	0.0178 (0.0145)	0.2863*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount, Short Duration, Infrequent Messages	0.4898*** (0.0518)	6.7603*** (0.9465)	71.4926*** (17.9571)	0.0204 (0.0146)	0.2776*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount, Long Duration, No Subsequent Messages	0.5085*** (0.0519)	7.0577*** (0.9474)	72.1432*** (17.9219)	0.0164 (0.0145)	0.2795*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount, Long Duration, Frequent Messages	0.4818*** (0.0518)	6.4903*** (0.9448)	68.1784*** (17.9290)	0.0183 (0.0145)	0.2684*** (0.0467)
No Aug 30 Mess, Overdraft Interest Discount, Long Duration, Infrequent Messages	0.4961*** (0.0518)	6.5427*** (0.9438)	67.3928*** (17.8854)	0.0218 (0.0146)	0.2796*** (0.0467)
No Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Short Duration, No Subsequent Messages	0.4897*** (0.0518)	6.6956*** (0.9459)	70.9056*** (17.9555)	0.0231 (0.0146)	0.2688*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Short Duration, Frequent Messages	0.4672*** (0.0518)	6.3453*** (0.9440)	64.7294*** (17.8960)	0.0204 (0.0146)	0.2770*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Short Duration, Infrequent Messages	0.4914*** (0.0518)	6.6671*** (0.9453)	70.0249*** (17.9444)	0.0229 (0.0146)	0.2723*** (0.0467)
No Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Long Duration, No Subsequent Messages	0.5012*** (0.0519)	6.7395*** (0.9460)	68.4124*** (17.8889)	0.0245* (0.0147)	0.2885*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Long Duration, Frequent Messages	0.4740*** (0.0518)	6.3911*** (0.9444)	66.0834*** (17.9184)	0.0182 (0.0145)	0.2761*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Long Duration, Infrequent Messages	0.4712*** (0.0518)	6.3540*** (0.9436)	62.9540*** (17.8701)	0.0269* (0.0147)	0.2500*** (0.0467)
No Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Short Duration, No Subsequent Messages	0.4885*** (0.0518)	6.5931*** (0.9466)	67.1984*** (17.8947)	0.0212 (0.0146)	0.2703*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Short Duration, Frequent Messages	0.4903*** (0.0518)	6.5423*** (0.9448)	70.2569*** (17.9322)	0.0177 (0.0145)	0.2862*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Short Duration, Infrequent Messages	0.4707*** (0.0518)	6.3435*** (0.9458)	67.3047*** (17.9444)	0.0156 (0.0145)	0.2854*** (0.0469)
No Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Long Duration, No Subsequent Messages	0.4805*** (0.0518)	6.6976*** (0.9460)	69.8575*** (17.9221)	0.0184 (0.0145)	0.2771*** (0.0468)
No Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Long Duration, Frequent Messages	0.4785*** (0.0518)	6.3559*** (0.9438)	66.0402*** (17.9086)	0.0179 (0.0145)	0.2562*** (0.0467)
No Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Long Duration, Infrequent Messages	0.5109*** (0.0518)	6.9246*** (0.9460)	71.2456*** (17.9142)	0.0261* (0.0147)	0.3020*** (0.0468)
No Aug 30 Mess, Auto-Debit Discount, Short Duration, No Subsequent Messages	0.4954*** (0.0518)	6.7201*** (0.9459)	69.2238*** (17.9171)	0.0228 (0.0151)	0.3107*** (0.0469)
No Aug 30 Mess, Auto-Debit Discount, Short Duration, Frequent Messages	0.4709*** (0.0518)	6.4666*** (0.9452)	67.1620*** (17.8949)	0.0201 (0.0146)	0.2669*** (0.0467)
No Aug 30 Mess, Auto-Debit Discount, Short Duration, Infrequent Messages	0.4845*** (0.0518)	6.5196*** (0.9438)	66.7958*** (17.8859)	0.0181 (0.0145)	0.2626*** (0.0467)
No Aug 30 Mess, Auto-Debit Discount, Long Duration, No Subsequent Messages	0.4918*** (0.0518)	6.8353*** (0.9467)	71.9419*** (17.9330)	0.0209 (0.0146)	0.2569*** (0.0467)
No Aug 30 Mess, Auto-Debit Discount, Long Duration, Frequent Messages	0.4844*** (0.0518)	6.5763*** (0.9451)	65.5831*** (17.8906)	0.0217 (0.0146)	0.2742*** (0.0469)
No Aug 30 Mess, Auto-Debit Discount, Long Duration, Infrequent Messages	0.4935*** (0.0518)	6.7819*** (0.9459)	70.4994*** (17.9307)	0.0189 (0.0146)	0.2945*** (0.0468)
No Aug 30 Mess, Debit Card Discount, Short Duration, No Subsequent Messages	0.4989*** (0.0518)	6.5988*** (0.9445)	68.3653*** (17.8998)	0.0183 (0.0145)	0.2629*** (0.0467)
No Aug 30 Mess, Debit Card Discount, Short Duration, Frequent Messages	0.4856*** (0.0518)	6.5659*** (0.9445)	67.8823*** (17.8933)	0.0194 (0.0146)	0.2930*** (0.0468)
No Aug 30 Mess, Debit Card Discount, Short Duration, Infrequent Messages	0.4947*** (0.0518)	6.8316*** (0.9462)	68.8482*** (17.8954)	0.0210 (0.0146)	0.2867*** (0.0469)
No Aug 30 Mess, Debit Card Discount, Long Duration, No Subsequent Messages	0.5065*** (0.0518)	6.7300*** (0.9466)	67.7379*** (17.8865)	0.0197 (0.0146)	0.2941*** (0.0468)
No Aug 30 Mess, Debit Card Discount, Long Duration, Frequent Messages	0.4811*** (0.0518)	6.6299*** (0.9445)	66.8286*** (17.8852)	0.0234 (0.0146)	0.2799*** (0.0467)
No Aug 30 Mess, Debit Card Discount, Long Duration, Infrequent Messages	0.4927*** (0.0518)	6.6332*** (0.9457)	68.2741*** (17.9126)	0.0236 (0.0151)	0.2674*** (0.0468)
No Aug 30 Mess, Overdraft Availability Reminder, Short Duration, No Subsequent Messages	0.4948*** (0.0518)	6.6903*** (0.9452)	68.6244*** (17.9401)	0.0168 (0.0145)	0.2743*** (0.0468)
No Aug 30 Mess, Overdraft Availability Reminder, Short Duration, Frequent Messages	0.4809*** (0.0518)	6.5452*** (0.9466)	66.6261*** (17.9107)	0.0216 (0.0146)	0.2610*** (0.0467)
No Aug 30 Mess, Overdraft Availability Reminder, Short Duration, Infrequent Messages	0.5042*** (0.0518)	6.6334*** (0.9445)	67.2795*** (17.8919)	0.0214 (0.0146)	0.2745*** (0.0468)
No Aug 30 Mess, Overdraft Availability Reminder, Long Duration, No Subsequent Messages	0.4872*** (0.0518)	6.6246*** (0.9449)	67.3870*** (17.8872)	0.0220 (0.0146)	0.2553*** (0.0467)
No Aug 30 Mess, Overdraft Availability Reminder, Long Duration, Frequent Messages	0.5042*** (0.0518)	6.9050*** (0.9486)	73.0950*** (18.7279)	0.0224 (0.0146)	0.2713*** (0.0468)
No Aug 30 Mess, Overdraft Availability Reminder, Long Duration, Infrequent Messages	0.5068*** (0.0519)	6.9194*** (0.9471)	73.3227*** (17.9530)	0.0171 (0.0145)	0.2772*** (0.0468)
Mean of Dependent Variable	0.3077 (0.46)	2.7676 (6.05)	26.8511 (77.97)	0.0141 (0.12)	0.3367 (0.47)
std dev					
Observations	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the LHS variable on the treatment variables shown and the randomization strata (not shown) and no constant. Figure 1 summarizes the experimental design and shows message scripts. Outcome data from Sept 15-Dec 31, 2012.

Appendix Table 1: Panel B2 All Treatments on All Outcomes, During Experiment

	Overdraft Account Used	Days with Overdraft Balance	Avg Overdraft Account Balance (TL)	Whether Auto Bill Pay Registered	Any Debit Card POS Transactions
	(1)	(2)	(3)	(4)	(5)
Panel B2: With August 30th Message (Aug 30 Msg vs No Aug 30 Msg)					
Aug 30 Mess, Overdraft Interest Discount, Short Duration, No Subsequent Messages	0.4713*** (0.0518)	6.7056*** (0.9486)	70.5159*** (17.9377)	0.0215 (0.0146)	0.2811*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount, Short Duration, Frequent Messages	0.5067*** (0.0519)	6.7093*** (0.9464)	69.4927*** (17.9113)	0.0164 (0.0145)	0.3024*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount, Short Duration, Infrequent Messages	0.5174*** (0.0519)	6.7440*** (0.9476)	70.0354*** (17.9068)	0.0161 (0.0145)	0.2534*** (0.0467)
Aug 30 Mess, Overdraft Interest Discount, Long Duration, No Subsequent Messages	0.4851*** (0.0518)	6.7489*** (0.9463)	69.5513*** (17.9178)	0.0241* (0.0147)	0.2888*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount, Long Duration, Frequent Messages	0.4878*** (0.0518)	6.6154*** (0.9451)	67.5291*** (17.8818)	0.0177 (0.0145)	0.2688*** (0.0467)
Aug 30 Mess, Overdraft Interest Discount, Long Duration, Infrequent Messages	0.4906*** (0.0518)	6.8270*** (0.9461)	68.0957*** (17.8923)	0.0202 (0.0146)	0.2955*** (0.0467)
Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Short Duration, No Subsequent Messages	0.4951*** (0.0518)	6.7728*** (0.9459)	71.7434*** (17.9420)	0.0190 (0.0146)	0.2729*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Short Duration, Frequent Messages	0.4941*** (0.0518)	6.5587*** (0.9464)	69.4398*** (17.9078)	0.0264* (0.0147)	0.2775*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Short Duration, Infrequent Messages	0.4888*** (0.0518)	6.6508*** (0.9446)	68.6421*** (17.8896)	0.0228 (0.0146)	0.2864*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Long Duration, No Subsequent Messages	0.4844*** (0.0518)	6.9799*** (0.9474)	74.5776*** (18.0103)	0.0208 (0.0146)	0.2766*** (0.0467)
Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Long Duration, Frequent Messages	0.4801*** (0.0518)	6.6898*** (0.9458)	68.7595*** (17.8931)	0.0182 (0.0145)	0.2564*** (0.0467)
Aug 30 Mess, Overdraft Interest Discount + Auto-Debit Discount, Long Duration, Infrequent Messages	0.4848*** (0.0518)	6.6531*** (0.9455)	68.1416*** (17.9078)	0.0210 (0.0146)	0.2769*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Short Duration, No Subsequent Messages	0.4930*** (0.0518)	6.7532*** (0.9460)	69.4921*** (17.9111)	0.0214 (0.0146)	0.2699*** (0.0467)
Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Short Duration, Frequent Messages	0.4619*** (0.0517)	6.5286*** (0.9452)	68.7370*** (17.9526)	0.0231 (0.0146)	0.2811*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Short Duration, Infrequent Messages	0.4892*** (0.0518)	6.5927*** (0.9451)	69.7326*** (17.9266)	0.0212 (0.0146)	0.2875*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Long Duration, No Subsequent Messages	0.4856*** (0.0518)	6.7400*** (0.9466)	70.6072*** (17.9675)	0.0169 (0.0145)	0.2809*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Long Duration, Frequent Messages	0.4842*** (0.0518)	6.5841*** (0.9453)	70.4350*** (18.0066)	0.0237 (0.0147)	0.2816*** (0.0468)
Aug 30 Mess, Overdraft Interest Discount + Debit Card Discount, Long Duration, Infrequent Messages	0.4529*** (0.0517)	6.6039*** (0.9461)	67.0223*** (17.9081)	0.0202 (0.0146)	0.2761*** (0.0468)
Aug 30 Mess, Auto-Debit Discount, Short Duration, No Subsequent Messages	0.4923*** (0.0518)	6.8243*** (0.9463)	70.5879*** (17.8924)	0.0283* (0.0147)	0.2728*** (0.0468)
Aug 30 Mess, Auto-Debit Discount, Short Duration, Frequent Messages	0.4825*** (0.0518)	6.6793*** (0.9478)	66.2581*** (17.8944)	0.0209 (0.0146)	0.2771*** (0.0468)
Aug 30 Mess, Auto-Debit Discount, Short Duration, Infrequent Messages	0.4788*** (0.0518)	6.6268*** (0.9448)	68.6067*** (17.9172)	0.0176 (0.0145)	0.2618*** (0.0467)
Aug 30 Mess, Auto-Debit Discount, Long Duration, No Subsequent Messages	0.4749*** (0.0518)	6.4210*** (0.9456)	67.6859*** (17.9223)	0.0244* (0.0147)	0.2737*** (0.0468)
Aug 30 Mess, Auto-Debit Discount, Long Duration, Frequent Messages	0.4763*** (0.0518)	6.5968*** (0.9461)	69.2013*** (17.9395)	0.0203 (0.0146)	0.2892*** (0.0468)
Aug 30 Mess, Auto-Debit Discount, Long Duration, Infrequent Messages	0.4950*** (0.0518)	6.6252*** (0.9456)	69.1369*** (17.9325)	0.0204 (0.0146)	0.2551*** (0.0467)
Aug 30 Mess, Debit Card Discount, Short Duration, No Subsequent Messages	0.4969*** (0.0518)	6.9319*** (0.9477)	71.2650*** (17.9804)	0.0195 (0.0145)	0.2779*** (0.0468)
Aug 30 Mess, Debit Card Discount, Short Duration, Frequent Messages	0.5085*** (0.0519)	7.1027*** (0.9475)	71.1029*** (17.9161)	0.0182 (0.0145)	0.3011*** (0.0468)
Aug 30 Mess, Debit Card Discount, Short Duration, Infrequent Messages	0.4989*** (0.0518)	6.5913*** (0.9442)	69.6550*** (17.9247)	0.0181 (0.0145)	0.2694*** (0.0467)
Aug 30 Mess, Debit Card Discount, Long Duration, No Subsequent Messages	0.4774*** (0.0518)	6.5156*** (0.9473)	69.3186*** (17.9188)	0.0202 (0.0146)	0.2715*** (0.0468)
Aug 30 Mess, Debit Card Discount, Long Duration, Frequent Messages	0.4892*** (0.0518)	6.6541*** (0.9481)	68.4450*** (17.9195)	0.0202 (0.0146)	0.2679*** (0.0468)
Aug 30 Mess, Debit Card Discount, Long Duration, Infrequent Messages	0.5090*** (0.0518)	6.8954*** (0.9484)	71.6639*** (17.9212)	0.0163 (0.0145)	0.2922*** (0.0468)
Aug 30 Mess, Overdraft Availability Reminder, Short Duration, No Subsequent Messages	0.4979*** (0.0519)	6.8676*** (0.9465)	70.7397*** (17.9044)	0.0204 (0.0146)	0.2479*** (0.0468)
Aug 30 Mess, Overdraft Availability Reminder, Short Duration, Frequent Messages	0.5250*** (0.0519)	7.4001*** (0.9501)	72.3517*** (18.0052)	0.0196 (0.0146)	0.2692*** (0.0468)
Aug 30 Mess, Overdraft Availability Reminder, Short Duration, Infrequent Messages	0.4932*** (0.0518)	6.8690*** (0.9463)	69.3660*** (17.8975)	0.0149 (0.0145)	0.2932*** (0.0468)
Aug 30 Mess, Overdraft Availability Reminder, Long Duration, No Subsequent Messages	0.4812*** (0.0518)	6.7144*** (0.9458)	67.3570*** (17.9064)	0.0162 (0.0145)	0.2727*** (0.0468)
Aug 30 Mess, Overdraft Availability Reminder, Long Duration, Frequent Messages	0.5041*** (0.0518)	6.7186*** (0.9469)	69.2527*** (17.9193)	0.0197 (0.0146)	0.2782*** (0.0468)
Aug 30 Mess, Overdraft Availability Reminder, Long Duration, Infrequent Messages	0.5065*** (0.0519)	6.8686*** (0.9470)	72.1015*** (17.9629)	0.0246* (0.0147)	0.2579*** (0.0467)
Mean of Dependent Variable	0.3077	2.7676	26.8511	0.0141	0.3367
std dev	(0.46)	(6.05)	(77.97)	(0.12)	(0.47)
Observations	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the LHS variable on the treatment variables shown and the randomization strata (not shown) and no constant. Figure 1 summarizes the experimental design and shows message scripts. Outcome data from Sept 15-Dec 31, 2012.

Appendix Table 2. Effects of First Two Overdraft Messages on Overdraft Balances (Outlier Robustness Checks), During Experiment

	Avg Overdraft Account Balance (TL)		Avg Overdraft Account Balance (top 1% winsorized)		Avg Overdraft Account Balance (top 1% dropped)		Avg Overdraft Account Balance (top 1% of positive values winsorized)		Avg Overdraft Account Balance (top 1% of positive values dropped)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
August 30 Message: Overdraft Availability Reminder (1)	1.0552**	1.0554**	0.7883**	0.7884**	0.4584	0.4584	0.8782**	0.8784**	0.7521**	0.7519**
Omitted category for (1): No August 30 Message	(0.4701)	(0.4701)	(0.3757)	(0.3757)	(0.3279)	(0.3279)	(0.4128)	(0.4128)	(0.3788)	(0.3788)
September 15 Message: Overdraft Interest Discount (2)	-0.1057		-0.3302		-0.7058**		-0.2134		-0.3530	
Omitted cat for (2): No Overdraft Interest Discount	(0.4688)		(0.3753)		(0.3276)		(0.4122)		(0.3786)	
September 15 Message: Overdraft Interest Discount; No Other Discount (3)		0.6179 (0.6887)		0.5033 (0.5664)		0.0841 (0.4924)		0.6351 (0.6235)		0.5577 (0.5744)
Omitted category: No Overdraft Interest Discount										
September 15 Message: Overdraft Interest Discount; Auto- Debit Discount (4)		-0.1347 (0.6988)		-0.3622 (0.5613)		-0.5305 (0.4899)		-0.2595 (0.6187)		-0.5291 (0.5644)
September 15 Message: Overdraft Interest Discount; Debit Card Discount (5)		0.1573 (0.7236)		-0.3294 (0.5619)		-0.7268 (0.4872)		-0.2582 (0.6173)		-0.3564 (0.5677)
		0.9562		0.8008		0.9421*		0.7563		0.7301
September 15 Message: Overdraft Availability Reminder (6)		(0.7029)		(0.5629)		(0.4961)		(0.6150)		(0.5657)
Omitted category for (3)-(6): No Mention of Overdraft										
p-value on F-test of equality between rows (3) & (6)		0.6765		0.6496		0.1341		0.8661		0.7943
p-value on F-test of equality between rows (3) & (4)		0.3519		0.1856		0.2787		0.2153		0.0999
p-value on F-test of equality between rows (3) & (5)		0.5782		0.2029		0.1512		0.2151		0.1681
p-value on F-test of equality between rows (4) & (6)		0.1831		0.0737		0.0098		0.1549		0.0536
p-value on F-test of equality between rows (5) & (6)		0.3414		0.0824		0.0033		0.1546		0.0973
Mean of Dependent Variable	26.8511	26.8511	24.9654	24.9654	21.7815	21.7815	26.0092	26.0092	24.4586	24.4586
std dev	(77.97)	(77.97)	(62.22)	(62.22)	(53.83)	(53.83)	(68.47)	(68.47)	(62.61)	(62.61)
Observations	108,000	108,000	108,000	108,000	106,920	106,920	108,000	108,000	107,668	107,668

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the dependent variable (column header) on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. All variables cover the time period September 15-December 31, 2012.



Appendix Table 3. Effects on Checking + Savings Balances, During Experiment

	Avg Monthly Deposit		Avg Monthly Deposit		Avg Monthly Deposit		Avg Monthly Deposit	
	Assets		Assets (top 1% winsorized)		Assets (top 1% dropped)		Assets (Log)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
August 30 Message: Overdraft Availability Reminder (1)	-8.8772	-8.8742	-8.5695*	-8.5665*	-7.3427*	-7.3425*	-0.0118	-0.0118
Omitted category for (1): No August 30 Message	(9.7693)	(9.7695)	(4.9101)	(4.9100)	(3.7965)	(3.7965)	(0.0115)	(0.0115)
September 15 Message: Overdraft Interest Discount (2)	9.0521		4.7638		4.6077		0.0054	
Omitted cat for (2): No Overdraft Interest Discount	(9.7355)		(4.9104)		(3.7965)		(0.0115)	
September 15 Message: Overdraft Interest Discount; No Other Discount (3)		20.7432		14.9608**		11.9637**		0.0155
		(15.0104)		(7.5158)		(5.8106)		(0.0173)
September 15 Message: Overdraft Interest Discount; Auto-Debit Discount (4)		16.2004		9.7244		4.6246		-0.0035
		(15.1406)		(7.4376)		(5.6585)		(0.0172)
September 15 Message: Overdraft Interest Discount; Debit Card Discount (5)		-13.3622		-7.7783		1.1798		-0.0040
		(14.3609)		(7.1361)		(5.6016)		(0.0171)
		-3.5934		2.5969		3.9228		-0.0082
September 15 Message: Overdraft Availability Reminder (6)		(13.9766)		(7.3736)		(5.7159)		(0.0171)
Omitted category for (3)-(6): No Mention of Overdraft								
p-value on F-test of equality between rows (3) & (6)		0.1193		0.1532		0.2322		0.2337
p-value on F-test of equality between rows (3) & (4)		0.7855		0.5479		0.2721		0.3411
p-value on F-test of equality between rows (3) & (5)		0.0329		0.0072		0.1042		0.3263
p-value on F-test of equality between rows (4) & (6)		0.2079		0.4067		0.9153		0.8147
p-value on F-test of equality between rows (5) & (6)		0.5146		0.2130		0.6754		0.8321
Mean of Dependent Variable	415.3350	415.3350	359.4495	359.4495	305.0098	305.0098	4.2853	4.2853
std dev	(1631.25)	(1631.25)	(847.06)	(847.06)	(654.51)	(654.51)	(2.11)	(2.11)
Observations	108,000	108,000	108,000	108,000	106,920	106,920	106,020	106,020

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the dependent variable (column header) on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. All variables cover the time period September 15-December 31.

Appendix Table 4. Heterogenous Treatment Effects by Prior Use?

	Overdraft Account Used		Days with Overdraft Balance		Avg Overdraft Account Balance (TL)	
	(1)	(2)	(3)	(4)	(5)	(6)
August 30 Overdraft Availability Reminder * Prior Overdraft Acct Use (1)	-0.0070 (0.0072)	-0.0070 (0.0072)	0.1889 (0.1214)	0.1880 (0.1214)	2.3233 (1.7323)	2.3214 (1.7326)
August 30 Overdraft Availability Reminder * No Prior Overdraft Acct Use (2)	0.0008 (0.0029)	0.0008 (0.0029)	0.0469 (0.0342)	0.0470 (0.0342)	0.6031 (0.4217)	0.6041 (0.4217)
September 15 Message: Overdraft Interest Discount * Prior Overdraft Acct Use (3)	-0.0078 (0.0072)	-0.0013 (0.0081)	-0.0939 (0.1214)	-0.0084 (0.1360)	0.8178 (1.7290)	1.0118 (1.9370)
September 15 Message: Overdraft Interest Discount * No Prior Overdraft Acct Use (4)	-0.0057** (0.0029)	-0.0039 (0.0032)	-0.0615* (0.0342)	-0.0311 (0.0381)	-0.2284 (0.4191)	0.0665 (0.4599)
September 15 Message: Overdraft Availability Reminder (No Incentive) * Prior Overdraft Acct Use (5)		0.0193* (0.0107)		0.2532 (0.1807)		0.5743 (2.5329)
September 15 Message: Overdraft Availability Reminder (No Incentive) * No Prior Overdraft Acct Use (6)		0.0055 (0.0044)		0.0914* (0.0521)		0.8857 (0.6385)
	0.3287***	0.3241***	4.0805***	4.0258***	40.7065***	40.8089***
Used Overdraft Account in Six Months Before Treatment (7)	(0.0067)	(0.0078)	(0.1085)	(0.1259)	(1.5001)	(1.7283)
p-value on F-test of equality between rows (1) & (2)	0.3164	0.3122	0.2606	0.2637	0.3345	0.3354
p-value on F-test of equality between rows (3) & (4)	0.7853	0.7678	0.7971	0.8723	0.5561	0.6347
p-value on F-test of equality between rows (5) & (6)		0.2332		0.3895		0.9051
Mean(LHS) Sept-Nov	0.3077	0.3077	2.7676	2.7676	26.8511	26.8511
std dev	(0.46)	(0.46)	(6.05)	(6.05)	(77.97)	(77.97)
Omitted Category:	No Overdraft	No Mention of	No Overdraft	No Mention of	No Overdraft	No Mention of
	Discount	Overdraft	Discount	Overdraft	Discount	Overdraft
Observations	108,000	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the LHS variable on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. Overdraft outcomes cover Sept 15-Dec 31, 2012. Overdraft prior use indicates the 17% of the sample that overdrafted at least once during Feb-Aug 2012.

Appendix Table 5. Does the August 30 Message Mediate Treatment Effects of Later Messages?

	Overdraft Account Used		Days with Overdraft Balance		Avg Overdraft Account Balance (TL)	
	(1)	(2)	(3)	(4)	(5)	(6)
August 30 Message: Overdraft Availability Reminder (1)	0.0016 (0.0040)	-0.0001 (0.0049)	0.0943* (0.0518)	0.0476 (0.0631)	1.0338 (0.6541)	1.1444 (0.7875)
September 15 Message: Overdraft Interest Discount w/ Aug 30 Msg (2)	-0.0075* (0.0040)		-0.0802 (0.0522)		-0.0842 (0.6774)	
September 15 Message: Overdraft Interest Discount w/o Aug 30 Msg (3)	-0.0055 (0.0040)		-0.0653 (0.0509)		-0.1271 (0.6488)	
September 15 Message: Overdraft Interest Discount; No Other Discount w/ Aug 30 Msg (4)		0.0032 (0.0060)		0.0203 (0.0778)		-0.2016 (0.9581)
September 15 Message: Overdraft Interest Discount; No Other Discount w/o Aug 30 Msg (5)		0.0008 (0.0060)		0.0731 (0.0778)		1.4372 (0.9865)
September 15 Message: Overdraft Interest Discount; Auto Debit Discount w/ Aug 30 Msg (6)		-0.0021 (0.0059)		0.0127 (0.0785)		0.8122 (1.0244)
September 15 Message: Overdraft Interest Discount; Auto Debit Discount w/o Aug 30 Msg (7)		-0.0076 (0.0059)		-0.1253* (0.0754)		-1.0793 (0.9514)
September 15 Message: Overdraft Interest Discount; Debit Card Discount w/ Aug 30 Msg (8)		-0.0121** (0.0059)		-0.0713 (0.0773)		-0.0710 (1.0665)
September 15 Message: Overdraft Interest Discount; Debit Card Discount w/o Aug 30 Msg (9)		-0.0034 (0.0059)		-0.0812 (0.0757)		0.3861 (0.9770)
September 15 Message: Overdraft Availability Reminder w/ Aug 30 Msg (10)		0.0114* (0.0060)		0.2021** (0.0797)		0.7912 (1.0046)
September 15 Message: Overdraft Availability Reminder w/o Aug 30 Msg (11)		0.0063 (0.0060)		0.0622 (0.0767)		1.1212 (0.9815)
p-value on F-test of equality between rows (2) & (3)	0.7291		0.8383		0.9635	
p-value on F-test of equality between rows (4) & (5)		0.7720		0.6313		0.2327
p-value on F-test of equality between rows (6) & (7)		0.5111		0.2049		0.1762
p-value on F-test of equality between rows (8) & (9)		0.2982		0.9267		0.7518
p-value on F-test of equality between rows (10) & (11)		0.5477		0.2058		0.8140
Mean of Dependent Variable	0.3077	0.3077	2.7676	2.7676	26.8511	26.8511
std dev	(0.46)	(0.46)	(6.05)	(6.05)	(77.97)	(77.97)
Observations	108,000	108,000	108,000	108,000	108,000	108,000

Notes: OLS with Huber-White Standard Errors. 1.0TL = \$.56. Unit of observation is the unit of randomization: the account-holder. Each column presents results from a single regression of the dependent variable (column header) on the treatment variables shown and the randomization strata (not shown). Figure 1 summarizes the experimental design and shows message scripts. Overdraft outcomes cover September 15-December 31, 2012.