

The Disparate Effect of Nudges on Minority Groups

Maya Haran Rosen[†]

Business School, The Hebrew University of Jerusalem and
The Bank of Israel, Israel

Orly Sade[†]

Business School, The Hebrew University of Jerusalem, Israel

December 2021

Abstract

We compare the effect of a text message sent to mobile phones on the actions of minority groups versus the general population in Israel. Using proprietary data from a dedicated survey, we show that the text message had an overall positive effect, but a significantly smaller effect on minority groups. We provide insights into potential channels (low digital literacy, low financial literacy, and low trust) that contribute to the differential effect. This evidence suggests that policy interventions relying on voluntary take-up by participants may be disproportionately taken up by nonmarginalized groups, an unintended effect that can exacerbate rather than mitigate disparities. (*JEL* D14, G38, G41, G51, G53, I38)

[†] We have benefited from comments from Steffen Altmann, Anat Bracha, Andrew Ellul, Isil Erel, Radhakrishnan Gopalan (discussant), Camelia Kuhnen, Uday Rajan, and Wentao Ren; participants in the 2021 RCFS Winter Conference and the NZFM 2021 conference; and seminar participants at the ESA 2021 Job Market seminar, the Bank of Israel, and the Hebrew University of Jerusalem. This work was supported by the Zanbar Research Institute for Public and Private Economics, the School of Business Administration, and the College of Management Academic Studies. Sade acknowledges financial support from the Krueger Center at the Hebrew University, the Cherrick Center Elisia Fund, the Albertson-Waltuch Chair in Business Administration, and the National Insurance Institute of Israel. We would like to thank the National Insurance Institute of Israel for the data. All findings and conclusions expressed are those of the authors and not the official views of the Bank of Israel or any of the other institutions with which the authors are affiliated. Send correspondence to Maya Haran Rosen, maya.haran@mail.huji.ac.il.

Policy makers are testing different kinds of nudges and choice architectures to help households increase their saving. Sending text messages via mobile is an attractive channel for communication because it is relatively simple and cheap. Theoretically, text messages and reminders raise the salience of an issue and hence increase the probability that individuals will take action (e.g., Karlan et al. 2016b; Gabaix 2019; Ericson 2017).

While text messages and similar prompts may be effective for the overall population, our understanding of their effect on specific, less-privileged populations is still very limited. Additionally, as technology innovations and Fintech applications are introduced, some costs might be mitigated, but other costs may emerge and exacerbate some limitations. Hence, it is important to investigate the sensitivity of the effect of mobile text messages on different sections of the population, to avoid exacerbating disadvantages.

To better understand the effect of reminders on minority groups, we base our empirical investigation on the new child development account (CDA) program in Israel. CDAs are a government-sponsored program designed to help households to save by making it easy to open a saving account. The program can include other government incentives to save, ranging from tax incentives and matching to government deposits (e.g., Sherraden 1991; Clancy et al. 2016; Loke and Sherraden 2009). In 2017 the Israeli National Insurance Institute (NII) introduced the Savings for Every Child Program (SECP). Under this program the government deposits NIS 50 (\$16) per month into a savings account for every Israeli child under the age of 18.¹ The government pays the fees on the account until the child reaches age 21. Initially, 6 months transpired before the program defaults (explained below) went into effect. During these 6 months parents could actively choose to enroll in the program and to (a) deposit an additional NIS 50 per month to the SECP account, (b) select an investment provider to hold the funds (several banks or investment funds), and (c) choose among several investment options. In addition to high- or low-yield/high- or low-risk investment track, options include Sharia-based and Halakhic investment tracks that are consistent with Islamic and Jewish religious strictures. All of the large banks and many of the leading financial institutions in Israel participate in the program. As the fees are paid by the government

¹ The exchange rate is 3.1.

and parents can choose their level of risk and investment fund or bank, the program is an attractive saving vehicle.

The program was launched with a major media campaign. As the campaign wound down, on February 6th and 7th the NII sent text messages to the mobile phones of a subset of Israeli households in two specified geographical areas that have relatively high concentrations of Israel's two most notable minority groups. The text message asked whether parents had enrolled in the program and included a hyperlink to the NII SECP enrollment page. A 2-week period of zero measures followed to encourage enrollment. Our investigation focuses on this text message campaign.

Our main contribution is to determine whether text messages have a disparate impact on different subgroups in the population. In particular, we ask whether text messages have a disparate impact on two minority groups with distinct characteristics, the Arab and Ultra-Orthodox Jewish populations.

Minority groups in general and in Israel specifically have distinct characteristics that are correlated with having higher specific frictions. The Arab population and the Ultra-Orthodox Jewish population (19% and 10% of the 2019 population, respectively) are such minority groups.¹ The Arab population in Israel is a religious and ethnic minority with cultural and language barriers; it is a minority with similar features to many other minority groups around the world. The Ultra-Orthodox community is insular, with a very strong leadership that affects the lifestyle and choices of individuals in the community. Both groups have a very high poverty rate. Forty-five percent of Arab households and 42% of Ultra-Orthodox households lived in poverty in 2018, with less than half of the median household income.

For our primary investigation we use two data sources. First, we obtain rich and unique administrative data from the NII on all the children in Israel, including the children of almost 40,000 parents who received the text message. The data include information on enrollment choices and household characteristics, such as parents' income, education, age, number of children, and minority affiliation. The data also include the device used to enroll in the program (such as mobile phone or computer, among others). Second, we also gather information from an NII telephone survey on parents' additional

¹ All data on Israel's demographics are from Israel's Central Bureau of Statistics (CBS).

characteristics, giving further insight into the potential effects of different frictions. The NII performed the survey and integrated it with their proprietary data and parents' choices in the program. These characteristics include trust in government, objective financial literacy (actual knowledge) and subjective financial literacy (confidence in one's knowledge). The survey database includes 4,838 parents (11,215 children) who answered the full survey with a high response rate of nearly 50% and had a relatively high representation from the Ultra-Orthodox and Arab populations. Around 600 households received the text message intervention.

As text messages were sent to individuals from two specific geographical areas, we use a matching technique to mitigate selection biases. Using parents' personal characteristics, including socioeconomic status indicators, we match between households that received the text message intervention and did not make a choice before the intervention (treated) and those that did not receive one (in the investigated period) and did not make a choice before the intervention (control). We perform the matching exercise on the administrative data full sample and minority populations' samples, and on the survey full data sample and minority populations' samples.

We first check whether the text message motivated parents to make any enrollment choice in the program. Investigating multiple possible actions enables us to investigate households' involvement that is free of choice architecture (Sethi-Iyengar, Huberman, and Jiang 2004; Thaler and Sunstein 2009) or money constraints (such as choosing an investment provider and level of investment risk). In addition, active participation in saving programs can also promote financial inclusion, as it increases self-efficacy and makes future interactions with financial institutions and regulators more likely (Sherraden 1991). Given the program characteristics, default may result in less wealth in the long term because of lower deposits from parents and/or less risky and lower return investment tracks (Grinstein-Weiss et al. 2019a), as we will elaborate on in the setting (Section 2.1). For these reasons, the NII placed large emphasis on active enrollment, including the text message interventions. Hence, we also specifically investigate the decision to deposit an additional NIS 50 per month to the program and the choice of a high-yield/high-risk investment track. Third, we investigate the relative effect of the examinations on minority populations compared to the general population.

While controlling for other variables (coefficient 0.12 [$p < .01$]) during a period of 2 weeks following the receipt of the text message, we find the text message effect for any

enrollment choice was significant and positive for the general population. However, for the Arab and Ultra-Orthodox populations, the coefficients are about half the size (all $p < .01$).

Among the general population, the coefficient of the text message dummy for the specific choice of depositing additional savings is 0.07 and 0.03 for choosing a higher-yield/higher-risk investment track (all $p < .01$). In the Arab population, the coefficients are 0.02 and 0.003 for depositing additional funds and for choosing a high-yield/high-risk investment track (both $p < .01$). In the Ultra-Orthodox population, the coefficients of the text message are 0.02 and 0.01 and remained significant for depositing additional funds ($p < .01$), but were not significant for choosing a higher-yield/higher-risk investment track.

The mobile text messages were expected to increase the salience of the issue and hence lower the observation costs, and possibly to affect digital transaction costs because there was a link to the website in the text message. However, individuals who have characteristics correlated with frictions might have been less receptive to the digital text message. Based on the academic literature, we propose and test several channels that have been found to affect financial behavior and have been found to be lower for minorities. First, we look at digital literacy and the effect of the text message on transaction costs by investigating choices enacted using a smartphone. For those with higher digital literacy, the option to use the embedded link in the text message should have lowered transaction costs and increased the number of people who used their phone to actively enroll in the program. Next, using survey data, we look at trust and financial literacy, the latter being made up of both objective knowledge and a subjective measure of confidence in one's financial knowledge (affecting either real or anticipated costs). Furthermore, some parents may have had financial constraints that affected their ability to take advantage of the information in the text message. Beyond the channels stated above, cultural barriers and frictions could have affected recipients' response to the text message (including language barriers).

We find that minority populations have a lower probability of using a smartphone digital platform (or computer) to enroll, compared with the overall population. While for the general population the text message dummy coefficient is 0.04 ($p < .01$), it is 0.01 ($p < .05$) for the Arab population and is not statistically significant for the Ultra-

Orthodox Jewish population. This hints at the role of digital literacy in the response to the text message. Using the survey data, we also find an interaction effect between the text message and parents' trust in government, and with financial literacies (objective knowledge and subjective confidence). We show that parents who have higher levels of trust are more affected by the text message (for making any active enrollment choice coefficients between 0.10 and 0.38, all $p < .01$), while those with lower financial literacies are less affected (for making any active enrollment choice low subjective financial literacy coefficients between -0.10 and -0.22 and the low objective financial literacy coefficient is only negative statistically significant for the general population, and is -0.07 , all $p < .01$). Even after controlling for these potential explanations, and adding additional controls, including for liquidity constraints, we still find a mitigated effect of the text message on minority populations. We interpret this to mean that minority populations, especially the Arab population, have additional cultural frictions.

For additional validation we use a principal component analysis (PCA), which reveals that the factors with a high loading of trust and financial literacies have a statistically significant effect on individuals making any active choice. This provides additional evidence that trust and financial literacies are main attributes affecting active choices. In additional robust specifications, we find that those coming from more peripheral and rural localities are less affected by the text message. We interpret this outcome to mean that those with more cultural frictions, as captured by living in less central rural localities, are less affected by the text message. Interestingly we also find that minority populations were not more likely to choose the religious investment tracks offered, suggesting that providing religious options did not do much to reduce cultural frictions.

We contribute to the academic literature on minorities and finance. We find that some segments of the population have a lower response rate to text messages, especially minority groups with low socioeconomic backgrounds. We provide evidence that well intentioned policy interventions that rely on voluntary take-up by participants may be disproportionately taken up by nonmarginalized groups. This can cause potentially well-intentioned interventions to exacerbate rather than mitigate disparities.

1. Literature Review: Text Messages and Reminders

A vast academic literature tackles the effect of text messages and reminders. Research projects differ along several dimensions, including (a) the economic and financial

decisions the intervention focuses on; (b) the channel of communication by which the text message or reminder is sent, and (c) the specific characteristics of the groups the reminders were sent to. We elaborate on each of these dimensions, which we will relate to our work and hypothesis.

1.1 Text message reminders' effect on economic decisions and the setting for interventions

A large body of evidence on the positive effect of text messages and reminders for many financial actions.² Examples include payment of fees and credit (e.g., Medina 2021; Ben-David, Sade, and Mintz 2019; Laudenbach, Pirschel, and Siegel 2018; Heffetz, O'Donoghue, and Schneider 2017; Cadena and Schoar 2011), retirement savings (e.g., Bauer, Eberhardt, and Smeets 2018; Choi et al. 2017; Benartzi et al. 2017; Dolls et al. 2018), take-up of social benefits (e.g., Finkelstein and Notowidigdo 2019; Guyton et al. 2017; Bhargava and Manoli 2015; Strawczynski and Myronichev 2015), and attendance at financial education programs (Chande et al. 2015).³ Of direct relevance, reminders have been found to have a positive effect on private savings behavior (e.g., Loibl, Jones, and Haisley 2018; Karlan et al. 2016b). In Loibl, Jones, and Haisley (2018), a reminder was sent to parents for a CDA saving mechanism in the United States. The investigation in this paper included a small sample size and programs based on voluntary periodic savings. The reminder provided an outcome with relatively low significance and economic effect, although it was mostly positive.

Based on literature that documents a relatively wide effect in different contexts, we hypothesize that a text message should have a positive effect on parents' active enrollment in the Israeli Savings for Every Child Program as well as on overall savings for children.

² The size of the effect of the reminders can differ by the setting characteristics of the intervention and different manipulations of the messages. Examples include behavioral nudges incorporated into the message (such as monetary incentives), and which information is being highlighted by the text message or reminder (e.g., Loibl, Jones, and Haisley 2018; Bauer, Eberhardt, and Smeets 2018; Clark et al. 2017; Choi et al. 2017; Karlan, Morten, and Zinman 2015).

³ Some papers find that reminders can also have a negative effect on outcomes by crowding out the salience of other information and considerations not highlighted by the reminders (Damgaard and Gravert 2018; Medina 2021; Bracha and Meier 2014) or by highlighting bad behavior (Thunström, Gilbert, and Ritten 2018).

1.2 Mobile text messages and choices about digital platforms

Messages can be sent using different formats. The academic literature has investigated written messages and reminders that were sent by regular mail (e.g., Finkelstein and Notowidigdo 2019; Strawczynski and Myronichev 2015), by e-mail (e.g., Clark et al. 2017; Benartzi et al. 2017) and recently by digital applications (e.g., Ben-David, Sade, and Mintz 2019; Medina 2021) and mobile text messages (e.g., Karlan, Morten, and Zinman 2015; Gurol-Urganci et al. 2013). The text message in our setting was sent to mobile phones and included an embedded hyperlink giving easy, immediate access to a website for enrolling in, and making choices about, the Savings for Every Child Program. Mobile text messages with embedded hyperlinks should have an additional effect on costs as they lower observation costs and reduce transaction costs, because users can navigate directly to the website from the text message, without needing a web browser (e.g., Google or Safari) or a computer. The effectiveness of this intervention is partly a function of digital literacy. Some evidence also indicates that text messages that lower transaction costs (by providing an embedded tool to submit forms easily) have an additional beneficial effect (e.g., Bhargava and Manoli 2015).

The literature also informs us about the overall connection between digital platforms and actions. While Fintech advancements can be overwhelming for users, they do lower information costs by allowing easy access to once-costly information, thus reducing inattention. Younger people and males are more likely to use Fintech advancements (e.g., Levi and Benartzi 2020; Carlin, Olafsson, and Pagel 2019; Benartzi and Lehrer 2015; Shefrin and Nicols 2014; Goldfarb and Tucker 2019). Individuals' decision-making processes on digital platforms also have been found to be different from those on nondigital platforms (Hurwitz, Lahav, and Mugeran 2021; Karlan et al. 2016a).

The minority groups we study exhibit lower digital literacy than the general population (PIAAC 2014–2015 survey).⁴ Only 53% of the Arab population and 33% of the Ultra-Orthodox Jewish population have a personal internet subscription, compared with a 75% national average (Israel's Expenditure Survey for 2018). The Ultra-Orthodox community also has a cultural aversion to digital media. They try to minimize their use

⁴ The Program for the International Assessment of Adult Competencies (PIAAC) 2014–2015 survey of workers' competence in a digital environment shows that Israeli adults have a slightly lower-than-average grade (274) than the OECD average (279). Further, the Jewish population's grade is 280, while the Arab population's is 238.

of digital media, and most cannot access the internet or receive text messages on their phones (they instead receive a voice mail that reads aloud the text message).

In our unique setting, participants can opt in using a digital platform or by attending a NII branch in person, or by phone. We expect that in our context the text message should have had a larger effect on those with higher digital literacy (nonminority group) and that those people would be more likely to enroll in the program via smartphones using the embedded hyperlink.

1.3 Text messages and minority characteristics, including those of the Israeli minority groups

As text messages affect observation costs (or digital transaction costs), they should have a smaller effect on those with high transaction costs (actual or expected) because these individuals still have higher costs than utility. The literature documents heterogeneity in the effect of reminders on different individuals with respect to certain characteristics. For example, Heffetz, O'Donoghue, and Schneider (2017) finds that those who are more financially illiquid or who are procrastinators are not affected by letter reminders. Stango and Zinman (2014) find a larger effect for survey reminders about overdrafts on those with lower education and lower subjective financial literacy (which might stem from sample selection). Bracha and Meier (2014) find that a reminder with information on credit scores sent to those with high credit scores increased their past due amounts, while it lowered past due amounts when sent to those with low credit scores.

Nonetheless, very limited focus has been trained on the effect of the text messages or reminders on minority groups; this is the focus of our project. Strawczynski and Myronichev (2015) is one example that looks at the effect of a reminder for EITC take-up in Israel; the authors find a smaller effect of the reminder on Israel's minority groups. The literature provides evidence that beyond socioeconomic attributes, liquidity constraints, and low digital literacy, all of which are associated with certain types of minority groups. Other characteristics might affect the populations' response to the text message. We start by focusing on trust. Trust has been found to affect financial behavior (Sapeinza and Zingales 2011; Guiso, Sapienza, and Zingales 2004, 2009; Glaeser et al. 2000). The literature shows that in many cases, minority groups have low levels of trust (Gupta et al. 2018; Guiso et al. 2004). In our context, with respect to the Arab minority, the literature suggests that the relationship is more complex. Malul, Rosenboim, and

Shavit (2010) document that the Arab community in Israel has low levels of trust. The Arab minority in Israel also has low civic voting rates, which are strongly related to trust (Guiso, Sapienza, and Zingales 2004; Putnam 1993).⁵ Yet, interestingly, the literature also documented that the measured level of trust that the Arab minority exhibits in surveys is usually similar or even larger than that of the general population (e.g., Hermann et al. 2012, 2020). Pe'er et al. (2019) show that the Arab population had higher trust in the government's ability to act but had lower levels of trust that the government will act to help their community. Related to this, in terms of measuring trust via surveys, potential sample selection issues should be noted: those responding to the survey might be doing so because they have higher levels of trust (minority groups have been known to have low response rates to surveys (Ahlmarm et al. 2015). Nonetheless, this potential bias should affect those that received the text message and those that did not.

Another channel is financial literacy: both objective knowledge and a subjective measure of one's confidence in one's financial knowledge. We know from previous research that financial literacies (objective knowledge and subjective confidence) can affect financial behavior (for a review, see Lusardi and Mitchell 2014, as well as examples in Shefrin 2021; Cupák, Kolev, and Brokešová 2019; Cupák et al. 2020; Van Rooij, Lusardi, and Alessie 2012; Bucher-Koenen et al. 2011; Lusardi and Mitchell 2008, 2011a, 2011b, 2017; Hilgert, Hogarth, and Beverly 2003), and that low financial literacy, and specifically confidence in financial knowledge, affected financial behavior and responses to financial consumer regulations (e.g., Bucher-Koenen et al. 2021; Haran Rosen and Sade forthcoming; Allgood and Walstad 2016; Anderson, Baker and Robinson 2017; Barber and Odean 2001). The literature shows that those with low socioeconomic status, which includes most minority groups, generally have low levels of financial literacy and confidence (e.g., Bucher-Koenen et al. 2021; Atkinson and Messy 2012; Lusardi and Mitchell 2008, 2014). Some evidence points to noncognitive abilities, such as self-efficacy and optimism, affecting financial behavior and being lower for those with low socioeconomic status (e.g., Das, Kuhnen, and Nagel 2020; Kuhnen and Meltzer 2018; Kuhnen and Miu 2017; Bénabou and Tirole 2002). Other papers directly show that minority groups have low financial literacy (e.g., Lusardi and Mitchell 2011b), and that minority groups in Israel have low objective and subjective

⁵ https://bechiro22.bechirot.gov.il/election/English/Committees/Pages/Overview_eng.aspx

financial literacy compared to the general population (CBS Financial Literacy Survey 2012; Haran Rosen and Sade forthcoming). Among other things, the latter shows that the proportion of the Arab and Ultra-Orthodox community with high objective financial literacy (14% and 10%, respectively) and high subjective financial literacy (15% and 11%, respectively) is lower than their representation in the survey (18% and 15%, respectively). Hence, Israel's minority groups' levels of financial literacy might have had an adverse effect on how they responded to text messages.

Given the specific characteristics of the minority groups described above, we expect to find that minority populations have a different level of response to the text messages, relative to the general population. We expect digital literacy, trust, objective financial literacy, and subjective financial literacy to be significant factors in the decision of whether or not to act.

2. Setup

2.1 Savings for Every Child Program

The Savings for Every Child Program (SECP) came into effect in January 2017. The government program creates an account for every Israeli child under the age of 18 and deposits NIS 50 each month into the account. The National Insurance Institute of Israel (NII) administers this program. The account has default settings, but parents can actively choose to enroll in the program and to deposit an additional NIS 50 per month from their monthly child allowance in to the SECP account, select an investment provider to manage their children's SECP funds, and choose an investment track. Parents can choose between deposits into lower-yield bank savings accounts or managed investment funds that tend to have higher average rates of return, although returns may vary depending on the fund selected. Parents can choose between low-, medium-, and high-yield investment tracks, as well as religious investment accounts (Sharia and Halakhic) that are compliant with Islamic or Jewish religious principles, and typically have lower rates of return. Except in the case of a child's severe illness or death, accumulated savings in SECP accounts can be accessed when the child is 18, with parental permission. From the age of 21, parental permission is not required. The government pays the fees on the savings account until the child reaches age 21. Additionally, several bonuses embedded in the program at different points in the child's

life until the age of 21 provide additional increases in savings and encourage children and their parents to keep funds in the SECP accounts.

Eligibility for the funds started in May 2015, but the funds were transferred by the government starting in January 2017 (Figure 1). At the outset, for children born before 2017, parents could make an active enrollment choice between mid-December 2016 and the beginning of June 2017, until automatic defaults were in place. The default savings vehicle was a low-return investment fund for children under the age of 15 and a bank savings account for those aged 15 years or older. For infants born after January 2017 the defaults come into effect after 6 months. As shown by Grinstein-Weiss et al. (2019a), making additional deposits doubles the child's funds at age 21 for a low-yield/low-risk investment track from NIS 12,650, which is about 1 year of university tuition. Funds can reach NIS 61,700 when additional deposits and a high-yield/high-risk track is chosen, which is 6 years of tuition.

Active enrollment in the SECP program can be done online, via phone, or in person. In the first 6 months of the program in 2017, before defaults came into effect, a widespread media campaign to launch the program was followed by high active enrollment rates throughout January. From the end of January until May active enrollment rates dropped, and then the media campaign and lobbying activity resumed. Despite general high levels of program enrollment (active enrollment choice in two-thirds of accounts by the end of the default period) and participation, economically vulnerable households—minority groups and especially the Arab minority, less-educated, and less-employed households—tended to engage less with the program, while usually opting out of depositing extra funds (Haran Rosen et al. 2020; Grinstein-Weiss et al. 2019a, 2019b).

2.1 The text message campaign

On February 6 and 7, 2017, a sample of parents served by two large NII branches, the Beer-Sheva and the Bnei-Brak branch, who had not made an active enrollment choice up until that point, received a text message on their mobile phones from the NII (Figure 1). These parents were chosen from two geographical areas in the country, not by any other attribute.

In 90% of cases, the father received the text message. The message read: “Did you hear about the SECP program? If you haven’t enrolled yet you can use the attached link or call *2637.” The message included a hyperlink to the SECP enrollment website.

On February 20th, the NII continued to send text messages to all other parents, from all NII branches, who had not made an active enrollment choice about their children's savings and were not a part of the intervention from the beginning of the month. This means that the period of February 6–19 (Figure 1) offers an experiment setting in which only a relatively random sample of families received a reminder about actively enrolling in the SFEC program. We know that up to February 19th, the NII issued no other prompts to increase enrollment, giving us a 2-week period to cleanly investigate the effect of the reminders.

[Insert Figure 1]

The two NII branches were chosen for the text messages because they service a large proportion of Arab and Ultra-Orthodox families. The Beer-Sheva branch is more peripheral, includes more rural localities, and serves a large Arab community as well as a large Jewish community. The Bnei-Brak branch provides service to a large Ultra-Orthodox Jewish community as well as other urban communities in Israel's geographical center. These branches were picked because of initial low enrollment rates of these minority populations into the program. Up until the date of the text message intervention, an active enrollment choice was made for 42% of first-born children under the age of 15. Only 11% of them come from the Arab population and only 7% come from the Ultra-Orthodox Jewish population, lower rates than the minority population's relative size in the population. Hence, the investigated population probably had more frictions enrolling in the program compared to the overall population.

Many Ultra-Orthodox Jewish parents received the message as a voice message and were unable to use the embedded link because of this community's aversion to smartphones. The Ultra-Orthodox Jewish population's strong network raised participation levels, but only toward the end of the default period. Religious leaders sent out a recommendation to choose specific religious halakhic funds that led to high enrollment rates for this community following lobbying activity (Grinstein-Weiss et al (2019b)). It should be emphasized that during the period under investigation, no recommendation was offered, and the Ultra-Orthodox population did not have high enrollment rates before and during the period under investigation.

3. Data

Data for this research come from the NII administrative data on all eligible accounts. The database covers all children under the age of 18 in Israel. The data include information on choices made in the SECP, the platform used to register choices (digital/nondigital), the date on which choices were made, whether a family member received a text message, the date the text message was sent, and administrative data on the household's characteristics and attributes. Household attributes include marital status of the parents (if the child's parents are married to each other), number of children, age of each child, parents' ages, parents' income, parents' education (indicator if parents studied at a university or college), and minority affiliation (classified using an NII classification based mostly on residential address).

When building the main data sets, we only considered choices made for the first-born children, so choices between observations are not codependent. We partitioned the sample by children's ages and only considered children younger than 15 at the beginning of 2017. This means that the same default option—a low-risk investment fund—applied. We focus on the period February 6–19, when the government experiment occurred, and split the population between those who received a text message in that period and those that did not (but we know they received one later).

In Appendix A, we provide summary statistics on the administrative data sample before the matching procedure including variables descriptions. The administrative database includes 886,920 accounts that had not made an active enrollment choice before February 6th for first-born children under the age of 15. Of those for 39,286 accounts, the parents of the child received a text message and for 23,771 accounts, an active enrollment choice was made by 19 February. Nine percent of parents are Ultra-Orthodox Jews, and 21.5% of the parents are Arab. The average family income in the database is NIS 17,000 (around \$5,000) a month, 40% of mothers and 28% of fathers have university or college attainment. Eighty percent of parents are married; both parents have together an average of 2.3 children; and the average child's age is 7.5.

In addition to administrative data, between July and December of 2017, the NII administered a telephone survey to a random sample of parents of SECP-eligible children. Parents' information from the telephone survey was added to the children's (and households') administrative data. It is a relatively large survey, conducted under

the guidance of experts in sampling methods. The survey was conducted using a stratified random sample of the population with over sampling of minority groups. This was done to make sure Arab and Ultra-Orthodox minority groups are represented in the sample and these populations can be investigated. Of approximately 10,000 families that were invited to participate in the survey, 4,838 parents completed it (11,215 children), a response rate of nearly 50%. From the survey database, 593 households received the text message intervention during the period under investigation and answered the full questioner.

The survey includes additional information on households including the parents' objective and subjective financial literacy. We use the term *objective financial literacy* to describe *objective* knowledge regarding general financial issues and we based our measure on a common measure in the academic literature (an index of the number of correct answers to three financial questions first presented by Lusardi and Mitchell 2007). The basic questions in the index have been shown to accurately differentiate naïve from sophisticated respondents and are stable over time: Stango and Zinman (2020). Given that it was a telephone survey, the wording of the questions was adapted to the method used and included fewer calculations.⁶ We use the term *subjective* financial literacy to refer to confidence in one's own knowledge of financial issues. People with high subjective financial literacy answered that they feel they understand financial issues to a very large extent or large extent.⁷ This question was asked at the beginning of the survey so that the answer would not be affected by how individuals answered the other questions.

The survey also includes questions about households' trust in the government. The trust variable is calculated as a dummy for those that had a high level of agreement with the following statements: (1) "when the government makes important decisions, it takes into consideration the needs of people like me," and (2) "the government can be trusted

⁶The wording of the questions goes like "I would like to know if you agree or disagree with the following statements (or: Don't know, refused)":

1. It is usually possible to reduce the risk of the investment in the stock market by buying a wide range of different stocks and shares.
2. The higher the interest rate, the bigger will be your savings next year
3. High inflation means that the cost of living is increasing rapidly

⁷ Bucher-Koenen et al. (2021) present evidence of the importance of subjective financial literacy. They measure subjective financial literacy by looking at those individuals who answer that they do not know the answers to the objective financial literacy questions, and we measure it directly using a designated question.

to keep its promises.” The level of agreement was calculated by coding answers from 1 to 5 (5 for those who highly agree with the sentence) and averaging both questions. Those with an average of four and above were classified as having high levels of trust. While we present the measure discussed above, we conduct several robustness tests for this measure and our results remain the same.⁸

In Appendix B, we provide summary statistics on the survey sample data before the matching procedure and additional variables descriptions from the survey data. Among the survey respondents, 17.5% are Arab and 15% are Ultra-Orthodox Jews. The average monthly family income is NIS 19,000, which is higher for the Arab population and lower for the Ultra-Orthodox Jews; 44% of mothers and 30% of fathers have academic attainment (university or college). These rates are much lower for the Arab population, and the father’s academic attainment is much lower for the Ultra-Orthodox Jewish population (men in this minority undertake religious studies exclusively). The average rate of married parents is high and stands at 90%, and is even higher for both minority populations; both parents have together an average of 3.3 children (higher for the Ultra-Orthodox Jewish population), and the average child’s age is 8 (lower for the Ultra-Orthodox Jewish population). Fifty-three percent of survey respondents have low objective financial literacy (answering correctly one or fewer objective knowledge questions). For the subsamples of the Arab population and Ultra-Orthodox Jews this rate is higher at 63% and 61%, respectively. Fourteen percent of the full sample have low subjective financial literacy (low confidence) compared to 16% in the Arab population sample and 22% in the Ultra-Orthodox population sample. Thirteen percent of the full sample have a high level of trust in the government. This rate goes up to 40% for the Arab population and down to 8% in the Ultra-Orthodox population, in line with the literature review above. Nonetheless, the variable shows that the majority of parents, including minority parents, exhibit low levels of trust.

⁸ For robustness, we use different trust variables. Outcomes remain similar, and the trust coefficient sign is positive and statistically significant when using all the different trust variables. The measures used include (1) the average level of agreement to the trust in government questions (the average score between the two questions leads to an index between 0 and 5); (2) a measure of trust in the NII (average score of level of agreement to two questions: “NII treats people like me fairly and justly” and “NII does not mislead people like me,” index between 0 and 5); (3) a dummy variable for having high trust in the NII (average index score over 4 for attitude toward two trust in NII questions); and (4) the average measure of both trust in the NII and trust in government measures (index between 0 and 5).

4. Methodology

4.1 Matching procedures and the resultant data sets

The parents targeted with a text message were affiliated to two specific NII branches. This means that comparisons between parents who received a text message and those who did not might be affected by sample selection. To mediate this, we use a matching exercise to make sure the comparison is between similar groups of parents.

We use propensity score nearest-neighbor matching with replacement for our main method (Imbens and Wooldridge 2009). The propensity score from the matching exercise is the probability that a parent with given characteristics (that are used in the matching process) received a text message from the NII. For the main specification, we allow the matching to be done with replacements, an option that lowers bias and leads to better matches, although it increases variance (Abadie and Imbens 2011), and we use 1:1 matching.

The main matching exercise uses the following eight variables to match between the treatment group (received a text message in early February) and the control group (did not receive a text message until February 20th): mother's wage, father's wage, mother's academic attainment, father's academic attainment, marital status of parents, parents' number of children, age of child, and minority affiliation dummies for the Arab and Ultra-Orthodox Jewish populations.⁹ We only investigate parents that did not make any choice before the the period under investigation and match between those that received a text message during the period under investigation and those that did not.

In Appendix C, we provide summary statistics on the administrative data sample after the matching procedure. The full sample matched data set has 60,363 observations with 37,293 treated observations and 23,070 nontreated observations (main matching method with replacement and hence number of observations between treated and control are not the same). The matched data set has a high rate of minority populations—41% Arab population and 22% Ultra-Orthodox Jews—a fact that makes sense because these populations were targeted in the intervention. Relative to the unmatched data set, the high level of minority population leads to a sample with

⁹ The quality of the academic attainment dummy drops for individuals over the age of 50 (less than 4% of observation). As we investigate choices for first-born child, the quality of the variables is high. Nonetheless, for robustness tests, we limit the data to individuals under the age of 45, and outcomes are very similar.

relatively low income, low academic attainment, and relatively more children. The average monthly family income is NIS 9,660, 33% of mothers have academic attainment and 15% of fathers. The average child's age is 7.3, and parents have on average 3 children. Appendix D provides evidence of common support and shows that treated and control units were taken from throughout the propensity score range. Appendix E shows the balance between treatment and control groups for the matched data sets.¹⁰

We partitioned the original database for minority affiliation and redid the matching exercise (without the minority dummies) to build three additional data sets: matched Arab population data set, matched Ultra-Orthodox Jews data set, and matched nonminority population data set. The observations for each data set are 23,560 (14,659 treated + 8,901 control, also done with replacement) for the Arab population, 13,329 (10,275 treated + 3,054 control) for the Ultra-Orthodox population and for the nonminority population, 22,850 (12,361 treated + 10,489 control).¹¹ All three data sets provide evidence of common support (Appendix D). Appendix E presents the balances of the data sets.¹²

In Appendix C, we provide summary statistics on the administrative data sample after the matching procedure. The minority groups' matched data sets have a relatively low socioeconomic status as indicated by income and education (although mother's education in the Ultra-Orthodox population is, as expected, high as they are the main bread earners and do not have religious barriers to education). In the Arab- and Ultra-Orthodox-Jewish-population-matched data sets, 12% and 61% of mother's have academic attainment, 15% and 3% of father's have academic attainment, and the average monthly household income is 6,700 and 6,500 NIS, respectively.

We conduct several robustness tests on our matching procedure. First, in the matching procedure, we include information on the locality where parents live, based on indexes

¹⁰ The absolute standardized mean differences between treated and control variables are very small post-matching, and all less than 0.5 of a standard deviation, a rule of thumb for good balance in matched data sets (Rubin 2001). All are also lower than a stricter rule of thumb of a difference of 0.1 standard deviation (Austin 2009). Appendix E also presents *t*-test and proportion test differences between variables means, but because of the large sample size the differences between treated and control observations are mostly statistically significant.

¹¹ As each matching exercise matches with replacement each database separately, the overall observations do not sum to the full database matching exercise.

¹² All standardized mean variations are less than 0.1, which is a strict rule of thumb for good balance (Austin 2009) except for one. The father's wage variable in the Arab-population-matched data set has an absolute standardized mean difference of 0.13 between the groups.

published by the Israeli Central Bureau of Statistics (CBS), in the matching process: socioeconomic index, centrality index, and rural status of the locality.^{13,14,15} Second, we also use alternative matching methods, including (a) nearest neighbor without replacement, (b) caliper matching that does not allow matching if the propensity score distance between observations is more than 0.1 standard deviations, (c) pairing 1:3 observations, and (d) Mahalanobis matching, all of which provide similar outcomes, as expected when using a big database (Pan and Bai 2015).¹⁶ Robust matching outcomes are not presented unless stated otherwise and are available on request.

Next, we conduct a matching exercise using the NII telephone survey population. From observations for which we have survey data, we match observations where parents received a text message to those that did not receive one during the period under investigation. We use this database to investigate the interaction effect of financial literacies and trust, and the text message intervention. We investigate children for whom no choice was made by February 6. As this database has many fewer observations, we use a matching exercise that controls for child and household characteristics. For the main specification, we do not partition by the child's age or number of children in the family.¹⁷ We build four matched data sets from the survey database: full sample, only Arab population, only Ultra-Orthodox Jewish population, and only nonminority population. The full sample matched survey data set has 1,076 observations (593 treated + 483 control). The Arab population survey data set has 377 observations (253 treated + 124 control). The Ultra-Orthodox population survey data set has 355 observations (196 treated + 159 control). The nonminority population data set has 284 observations (144 treated + 140 control). We provide evidence of common

¹³ Calculated using data from the 2015 national survey on demographic and standard-of-living features of the population in each locality, such as data on income, level of education, level of employment, and national insurance allowances given to the population in each locality. Each locality is given a ranking between 1 and 10. This variable can be used to characterize localities and their population on average but is a noisy proxy for individual data.

¹⁴ Calculated using data from 2015 and grades localities' proximity to economic activity or the potential for activity. Each locality is given a ranking between 1 and 10.

¹⁵ Calculated using data from 2015 and indicates whether or not a locality is rural.

¹⁶ Mahalanobis matching is a type of propensity score matching using calipers. The caliper required that the matching of parents that received and did not receive a text message is done only if the log-odds of their propensity score are within 0.25 standard deviations. Within this caliper, parents are matched to minimize the sum of the Mahalanobis distance between matched partners.

¹⁷ When partitioning the database by first-born children under the age of 15, we find outcomes very similar in size and sign as presented in the paper, but they are not as statistically significant because of smaller sample sizes.

support for the survey samples matching exercises in Appendix D and balances of the data sets are presented in Appendix E.¹⁸

In Appendix F, we provide summary statistics on the survey sample data after the matching procedure. In the full sample data set 39% are from the Arab population, 33% are from the Ultra-Orthodox population, 35% of mothers and 11% of fathers have academic attainment, and the average household's income is 10,500 NIS per month. In the Arab and Ultra-Orthodox data sets, 15% and 50% of mothers have academic attainment, 7% and 1% of fathers have academic attainment, and the average monthly household's income are 6,200 and 7,800 NIS, respectively.

4.1 Empirical model

We aim to quantify the effect of receiving a text message on active enrollment in the SECP program, while controlling for other relevant factors. We estimate the following model: for each set of parents i we estimate each outcome (y_i), dummy value of 1 or 0 for the different outcomes, on parents' characteristics:

$$Y_i = \beta_0 + \beta_1 * I_i + \beta_2 * X_i * I_i + \beta_3 * X_i + \epsilon_i,$$

where Y_i is the outcome variable for parents i for four outcomes: (1) any active enrollment choice regarding the SECP program (choosing a provider, choosing an investment track, choosing to deposit an additional NIS 50 per month to the child's account, or actively choosing not to deposit additional funds), (2) depositing an additional NIS 50 per month to the child's account, (3) choosing a high-yield/high-risk investment track, or (4) actively enrolling in the program while using a mobile phone.¹⁹ As stated before, we initially focus on any active enrollment outcome, as any specific choice might be affected by choice architecture or money constraints (such as choosing an investment provider and level of investment risk). Then, we investigate choices that should increase the amount of funds in the savings program. Finally, as the text message had an embedded link to the website that should have lowered transaction costs for those with high digital literacy, we investigate choices made via smartphone. This last investigation is aimed at investigating the effect of potential differences in digital literacy and higher digital frictions between the different populations.

¹⁸ All standardized mean differences are less than 0.5 standard deviations (Rubin 2001).

¹⁹ For robustness checks we investigate any active enrollment choice without including those that actively choose the default and the outcomes are very similar.

We estimate the regressions for making the active enrollment choices from February 6 to 19, the 2 weeks of the government experiment before additional text messages were sent to other parents. I_i is a dummy for parents receiving a mobile text message. Although we use a matching exercise, and the treated and untreated groups are supposed to have similar attributes, for additional caution and to find differences in the effect of the text message by parents' attributes, we add interactions and controls for parents' characteristics. We use in the matching process X households and i characteristics. These include family income and parents' academic attainment as well as parents' minority affiliation. In the survey data, we also include in X parents' level of trust in government, objective financial literacy, and subjective financial literacy. Doing so allows us to investigate the interaction between the text message and these characteristics above and beyond household characteristics. Appendix A defines the variables for the administrative data, and Appendix B defines the additional survey database variables.

For the main regression, we use a linear model regression on the matched data (Imbens and Wooldridge 2009) using cluster-robust standard errors that account for dependence between observations within matched pairs (Abadie and Spiess 2021).

5. Results: The Effect of Text Messages on Choices Made in the SECP

5.1 Any active enrollment

We start by investigating any active enrollment choice during the period following the text message intervention. This reveals the general effect of the text message as an intervention that lowers observation and transaction costs with no money constraints. We also investigate whether the effect was different for minority populations.

The average active enrollment rate prior to the intervention date was 42% for all first-born children under the age of 15. Our investigation of the intervention finds that the text message significantly increased any active enrollment, while controlling for other related variables as previously described. Outcomes from the linear regression (OLS) on the full sample on making any enrollment choice show that the coefficient of the text message is positive and significant and stands at 0.12 ($p < .01$) (Table 1). Yet, this effect is not similar for all subgroups in the population. The effect of the text message is halved for the Arab and the Ultra-Orthodox populations, both when looking at the interaction in the full sample and when comparing the size of the effect of the text

message between the full sample and the minority groups'. Regarding socioeconomic status, for the Arab population sample, there is also a significant effect for the text message if the mother has academic attainment. Control variables without the interaction with the text message dummy do not have a significant effect (omitted from regressions). During the period under investigation, no active campaign took place; hence, those actively participating during this period (without receiving a text message) are those that did not make a choice up until this point. This means socioeconomic attributes may have contradictory effects during the period under investigation if early enrollers have high or low socioeconomic attributes. Indeed, we do not find that household attributes by themselves had a large effect on choices during the period under investigation.²⁰

Table 1

5.2 Choosing to make additional contributions to the SECP

Given the results regarding any choice, next we study a specific action: the decision to contribute an additional NIS 50 per month. This choice has a substantial effect on the final savings outcome, resulting in greater wealth inequality in the future. Yet, this choice might be affected by liquidity constraints and may not be optimal for all households. Additionally, we investigate whether we observe differences in the effect of the text message for minority populations.

The average additional deposit rate prior to the intervention date was 32% for all first-born children under the age of 15 (75% of any active enrollment choice). Our investigation of the intervention indicates a positive effect of 0.07 ($p < .01$) of the text messages on choosing to deposit an additional NIS 50 per month in the full sample (Table 2), lower than for the "any active enrollment choice." Similar to "any active enrollment choice" the effect of the text messages on minority populations choosing to deposit additional funds is smaller than for the full sample. The interaction coefficients are 0.02 in the minority samples ($p < .01$ for the Arab population samples, $p < .01$ for the Ultra-Orthodox Jewish population samples). For choosing to add NIS 50 per month, the interaction between income and the text message dummy is statistically significant

²⁰ We find significant effects for making any enrollment choice for the dummy variables for married parents and Arab parents in the full sample (regression outcomes presented in column 1). The first coefficient is -0.0004 ($p < .05$) and the second is 0.003 ($p < .01$). These effects are even smaller in the regressions investigating choosing to deposit additional funds or a riskier investment track.

and positive for all samples. This indicates that income, which is most likely correlated with liquidity constraints, influences the ability to deposit more and hence, to save more. The interaction between the text message dummy and father's academic attainment dummy is positive and statistically significant in the full sample but the interaction with mother's academic attainment dummy is statistically significant for the Arab population sample. This indicates that socioeconomic attributes have a larger interaction effect with the text message for depositing additional funds to the SECP. This may be correlated with liquidity constraints, due to low financial literacy, or due to cultural frictions.

Table 2

5.3 Choosing a high-yield/high-risk investment track

The next active choice that we study is the decision to choose a higher-yield/higher-risk investment track that yields higher expected savings with higher volatility, and again might be affected by higher costs and frictions. We test for differences in the effect of the text message for minority populations for this choice.

The average higher-risk/higher-yield choice prior to the intervention date was 22% for all first-born children under the age of 15 (51% of any active enrollment choice). Our investigation of the intervention indicates a positive effect of 0.03 ($p < .01$) for the text message on choosing a high-yield/high-risk investment track in the full sample (Table 3). The effect on minority populations is one tenth the size in the Arab population sample and not statistically significant in the Ultra-Orthodox Jewish population sample. For this choice in the full sample, the interaction between the text message dummy and income, mother's academic attainment dummy and father's academic attainment dummy is statistically significant and positive, indicating a larger effect for socioeconomic attributes and frictions for this choice.

It is also interesting to note that the effect of the text messages on choosing a religious investment track (either Sharia or Halakhic) is much smaller not only in the full sample but also for minorities. The coefficient of the text message is 0.01 in the full sample ($p < .01$) and not statistically significant in the minority populations samples (data not presented). On the other hand, the effect of the text message was stronger for choosing to invest in a bank (data not presented). The coefficients are 0.06 for the full sample and 0.04 for the minority populations samples (all $p < .01$). Hence, we find that minority

populations did not refrain from choosing an investment track with higher expected savings because they choose a religious investment track. It seems that they were more inclined to save in an investment track with even lower expected return in a bank. We conjecture that this stems from low financial literacy and cultural nonreligious frictions that will be tested next.

Table 3

Sections 6.1–6.3 provide evidence that although the text message had a positive effect on any active enrollment and on choices that lead to higher overall savings in the program, the effect was mitigated for minorities. In the following sections we investigate different channels that could affect this differential effect: digital literacy, trust, objective financial literacy, subjective financial literacy, and other remaining cultural frictions.

5.4 Digital literacy: Investigating the effect of text messages on making a choice using a smartphone

Parents who received the text message on an internet-enabled smartphone could click the embedded link to enroll in the program directly. For those with sufficient digital literacy and access, the text messages may have reduced transaction costs and increased the salience of the issue. The administrative data tell us which device was used to enroll in the program, so we can observe the extent to which the embedded link facilitated enrollment. Minority groups in Israel have low digital literacy that might have affected their engagement with the text message. We investigate differences between the full sample and minority populations to test the potential effect of the friction stemming from low digital literacy among minority populations who received the text message.

Outcomes indicate a positive effect of 0.04 ($p < .01$) for the text message on making any active enrollment choice using a smartphone in the full sample (Table 4). The effect of the text message in the full sample for making an active enrollment choice using a computer or nondigitally (data not presented) is smaller and half as large as the effect from using a smartphone. This suggests that for those receiving the text message, costs were lowered for using smartphones to enroll in the SECP.²¹

²¹ Throughout the initial phase in the general population the percent of parents making an active choice using a digital device (smartphone or computer) stays similar. During the text message campaign, the

The effect of the text message on making an active enrollment choice using a smartphone goes down to 0.01 ($p < .01$) in the Arab population sample and is not statistically significant in the Ultra-Orthodox population sample. For the Arab population the effect of the text message on making choices using the other nonsmartphone options (computer, nondigitally) is similar in size and statistical significance. This suggests that for this population, transaction costs for using a smartphone were not lowered more than they were lowered for other platforms. The Ultra-Orthodox Jewish population had a similar in size but nonsignificant effect for using a smartphone or computer to enroll following the text message but had a positive and significant effect for enrolling using a nondigital platform (0.02, $p < .01$) (data not presented). As this population has low digital literacy and part of this population probably received the message by voice mail (because of cultural frictions), transaction costs for using a smartphone were not lowered and if they did choose to enroll, they did not do so by digital means.

Table 4

5.5 Trust and financial literacies investigation: Telephone survey matching exercise

Using our main rich set of administrative data has advantages because it has information on actual choices that were made and households' socioeconomic attributes. However, the administrative data do not contain information about perceptions, emotions, and knowledge. As the NII conducted an extensive survey and was able to link it to the administrative database, we have access to additional "soft" information. We use this information to enhance our understanding of the channels that interact with the effect of the text messages on the overall population and minority populations.

In this section, we investigate the interaction effect between the text message and trust, objective financial literacy, and subjective financial literacy, to see if the effect of the text message depends on these channels. Additionally, we investigate this interaction effect for the full sample and minority populations separately, to discover whether these channels affect the differences between groups in their response to the text message.

percentage of those making a choice via smartphone is higher and those making a choice via computer is smaller than those percentages throughout the initial SECP installation period.

We know from the academic literature that these characteristics affect financial behavior and minority populations should have lower levels of these characteristics.

We present the regressions on any active enrollment in the SECP, on choosing to deposit additional funds, and discuss additional outcomes (Table 5). We do not present outcomes for using a smartphone to enroll in SECP, but we discuss outcomes in the text. Because of the small sample size, the regression on making any active choice by using a mobile smartphone for the Ultra-Orthodox population cannot be investigated. We do not present or discuss outcomes for choosing a high-yield/high-risk investment track, as outcomes are statistically not significant because of the small proportion of population choosing these investment tracks. Nonetheless, the signs of the investigated coefficients for choosing a high-yield/high-risk investment track are the same as those on any enrollment choice and on depositing additional funds. Additionally, we ran step regressions when adding interactions and dropping variables using different specifications and our results remain the same (data not presented).

In the full sample, the interaction between the text message dummy and having a high level of trust in the government is significant and—compared to other variables’ coefficients—large, at 0.16 and 0.10 ($p < .01$) for making any active enrollment choice and for choosing to deposit additional funds, respectively. The interaction effect is stronger for minority populations. The coefficients of these interactions for making any active enrollment choice and for choosing to deposit additional funds are 0.29 and 0.17 ($p < .01$) in the Arab population sample and 0.38 and 0.38 ($p < .01$) in the Ultra-Orthodox Jewish population sample. It is not surprising that for making an active enrollment choice using a smartphone (data not presented) trust seems to have a smaller effect. In the regressions in Table 5, column 4 (nonminority population sample), trust has a nonsignificant effect for the nonminority population sample indicating that the interaction effect of trust and the text message dummy found in the full sample stems mostly from the trust effect on minority populations. It is also interesting to note that the effect is higher for any active enrollment choice, smaller for depositing additional funds and smallest for using a smartphone to make an active enrollment choice. This could mean that trust has a larger effect on basic interactions, and a smaller effect on other choices.

Having low subjective financial literacy has a negative, large and statistically significant effect for making any active enrollment choice and for choosing to deposit additional funds when receiving a text message. For the full sample, the low financial literacy coefficient is -0.10 for both regressions ($p < .01$). This interaction effect is also stronger for minority populations. The coefficients of the interaction between low subjective literacy and the text message dummy are -0.20 and -0.15 ($p < .01$) in the Arab population sample and -0.22 and -0.20 , respectively ($p < .01$), in the Ultra-Orthodox population sample. For making an active enrollment choice by using a smartphone for the full and Arab population samples (data not presented), subjective financial literacy seems to have a smaller effect and is not statistically significant. For the nonminority population sample the subjective financial literacy interaction effect is smaller and not statistically significant for all choices. This also indicates that a large part of the interaction effect of subjective financial literacy and the text message in the full sample (especially for making any active enrollment choice) stems from minority populations. For minorities the coefficient of the interaction between low subjective financial literacy and the message dummy is smaller for depositing additional funds and using a smartphone to make an active enrollment choice. This indicates that for minorities subjective financial literacy has a larger general effect on any active choice and a smaller effect for specific choices.

The interaction between the text message dummy and having low objective financial literacy is negative and statistically significant for all choices in the full sample. It is -0.07 ($p < .01$), both for making any active enrollment choice and for depositing additional funds, and -0.05 ($p < .01$) for using a smartphone to make any active enrollment choice (data not presented). The similar and even smaller size of the interaction between objective financial literacy and the text message on making a choice using a smartphone indicates that objective financial literacy is not a major channel for the use of digital platforms in the general population. For the Arab population sample, the interaction between low objective financial literacy and the text message is only statistically significant for using a smartphone to make any active enrollment choice, -0.10 ($p < .01$) (data not presented). This means that objective financial literacy might be a channel for the use of digital platforms for this minority.

From these regressions, we learn that trust and financial literacies affect how recipients respond to the text message. It also seems that these effects are stronger and mostly

stem from their effect on minority populations. This is on top of the effect that stems from the fact that minority populations have lower levels of financial literacy and should generally be less affected by the text message.

These regressions also present evidence that even after controlling for trust, subjective and objective financial literacy, and socioeconomic attributes, the text message effect is still weaker for minority populations (Table 5). In the minority population samples, the coefficient of the text message dummy by itself is either negative or smaller than the coefficient of the full population. For the full population the coefficients are 0.07 ($p < .01$) for making any enrollment choice and 0.06 ($p < .01$) for depositing additional funds. The coefficients are -0.16 ($p < .01$) for making any enrollment choice and -0.13 ($p < .01$) for depositing additional funds for the Arab population sample. In the Ultra-Orthodox Jewish population sample, the coefficient is 0.05 ($p < .01$) for making any enrollment choice and is similar in size but is not statistically significant for depositing additional funds. In the full sample, the interaction effect between the text message dummy and minority affiliation is not statistically significant but remains negative (not presented in table). We find one outlier, for making an active enrollment choice using a smartphone. In this investigation, the text message effect on the Arab minority is actually stronger: the coefficient for the Arab population sample is larger and statistically significant and the interaction effect between the text message dummy and the Arab population dummy in the full sample is also positive and significant (0.03 $p < 0.1$, not presented). We know from Table 4 that the effect of the text message on the Arab population for making any active enrollment choice using a smartphone is actually smaller than for the full sample. It seems that for this choice a large portion of the difference between the minority and the full sample stems from low financial literacy and trust.

Table 5

5.6 Robustness: Liquidity and ability to cover expenses

Liquidity constraints might be correlated with minority affiliation; we controlled for this in the previous regressions using the socioeconomic income and education variables. For more insights into the effect of liquidity constraints on our results, we use the answers to survey questions about the parents' ability to cover expenses. The survey asked: "Do you have difficulty covering day-to-day expenses?" The answers

were on a scale from 1 to 5, from no difficulty at all to having a very large difficulty. We use a dummy variable to indicate if a parent answered that the household has a large or very large difficulty covering day-to-day expenses. The outcomes of the regressions, which include an additional interaction term between the text message dummy and the difficulty-to-cover-expenses dummy on making any active enrollment choice, are presented in Table 6. The regressions in Table 6 are the same as those in Table 5 with the additional interaction term. The results in Table 6 are evidence that liquidity constraints had a negative effect on the response to the text message. The coefficient of the interaction is -0.06 ($p < .01$) and -0.21 ($p < .01$) for the full sample and Arab population sample, respectively. As shown in Table 6, even after adding additional controls for liquidity constraints, outcomes remain similar; the size and significance of the effects of the text message on enrollment—as well as the coefficients of the interactions of the text message with parents' attributes, including trust, objective financial literacy, and subjective financial literacy—do not change.

Table 6

5.7 Robustness: Culture and locality variables

The text messages had a smaller effect on minority populations above and beyond all the measurable variables (socioeconomic status, trust, financial literacies). This can be thought of as the remainder cultural affect (including language frictions). Our assumption, based on the geography of Israel, is that cultural effects may be stronger at more rural locations. People living in remote localities should be more affected by the local culture and less aligned with the general population. Hence, they should be less affected by the text message as they have higher cultural frictions. Accordingly, for an additional robustness check we use the matched data sets and additional variables for household location to investigate the effect of rural and peripheral localities. In Table 7 we show evidence of such an effect for making any active enrollment choice and that cultural frictions are higher for the Arab population. The interaction between the text message dummy and the centrality index of the locality is positive and statistically significant for the full sample (0.003 , $p < .01$) and stronger in the Arab population sample (0.01 , $p < .01$). Additionally, the interaction between the text message dummy and the dummy variable if a locality is rural is negative and statistically significant for the full sample (-0.01 , $p < .01$) and this interaction effect is stronger in the Arab

population sample as well (-0.02 , $p < .01$). Results are similar but less statistically significant for choosing to deposit additional funds, choosing a high-yield/high-risk investment track, and making a choice by smartphone (data not presented).

Table 7

As described above, we are unable to distinguish between language frictions and other remaining cultural frictions. However, in a different context, Strawczynski and Myronichev (2015) provide evidence that even when a message (mail) is in the native language of minority groups, the effect is still mitigated. The mitigated effect we find for the Ultra-Orthodox population, which does not have a language barrier, also indicates that the remaining cultural frictions include more than just language frictions.

6 Additional Tests

6.1 Does SECP participation change one's overall savings?

In terms of the welfare effect, we want to know whether additional contributions to the SECP increased the saving rate, or simply displaced other saving. A question in the survey for those who knew about the program was: "Did you change your deposits to your child's/children's previous savings due to the Savings Account program?" The possible answers were: No, Increased, Decreased, Don't know, Refuse to answer. We coded a dummy for parents answering that they decreased savings following the program. For this investigation, we use the unmatched survey data. We include children over the age of 15, as defaults are not of interest for this investigation, and use all available observations. When we ran the regressions for making any active enrollment choice or choosing to deposit additional funds on the indicator that parents decreased savings following the program, we find a small coefficient of 0.01 ($p < .01$) in the full sample (data not presented).²² For the nonminority population sample the coefficient rises to 0.02 ($p < .01$); in the minority populations samples it is not significant. When adding controls to the regressions, outcomes remain similar.²³ Hence, parents saving in the program and depositing additional funds are likely to increase the child's overall saving and we do not find indications of transfers between other savings.

²² Outcomes remain the same when investigating choices made during the full installation period of the SECP installation (January–June 2017) or during the period under investigation (February 6th–19th).

²³ For the full sample, the Arab dummy coefficient is -0.01 ($p < .05$) and the coefficient for the child's age is -0.001 ($p < .01$).

6.2 PCA analysis: Trust and financial driving effects

To gain additional insights into the interaction and explanatory effect of these variables we use a principal component analysis (PCA) (data not presented). This yields information about the relative weights of the components and their variable loading. We further use these components in the regression on any active enrollment choice, to learn which components are statistically significant in our investigation. Four components have eigenvalues above one. When running the regression of these four components and their interaction with the text message dummy, the interaction terms with two components are statistically significant and negative. The first has a high negative loading of trust and a high loading of minority attributes variables and the second component has a high positive loading of the low objective and subjective financial literacy variables. This is additional evidence for our previous findings that the effects of trust and financial literacy are substantial.

7 Conclusion and Discussion

In this paper, we estimate the effect of a mobile text message with an embedded link on enrollment in the SECP, a government-based child saving program that gives small monthly deposits to all children in Israel under the age of 18, and offers parents a choice to opt in with additional contributions of their own. We use matching-based exercises between those that received a text message and those that did not, to investigate the effect of the text message during a 2-week period when the initial campaign subsided, and no other measure was taken to raise enrollment. This gave us an experiment setting of 2 weeks.

This is a unique setting to investigate the effect of the text message on a large population. We have rich administrative data on all eligible children and households in Israel and a large survey attached to the administrative data to investigate differences in the effect on minority groups. Israel has two distinct minority groups: the Arab population and the Ultra-Orthodox Jewish population. Both have high poverty rates, low digital literacy, low financial literacy, and unique cultural differences.

We find that for the general population the text messages raised the proportion of parents enrolling to the program. We investigate specific choices that should raise the overall amount of funds saved in the program following the text message. In the general population, the text message dummy coefficient for depositing additional funds is lower

than that for making any active enrollment choice, and is even lower for choosing a high-yield/high-risk investment track. Nonetheless, they are all statistically significant and positive.

When investigating the effect of the text messages on minority populations we find an overall mitigated effect; the coefficient sizes drop significantly for making any enrollment choice or depositing additional funds for both minority populations. For choosing a high-yield/high-risk investment track the coefficients drop for both minority groups but also become nonsignificant for the Ultra-Orthodox Jewish population. This means that beyond socioeconomic status (including income) minority populations' predicted savings and welfare from the program are lower than for the nonminority population.

We investigate the existence of different channels leading to the mitigated effect of the text message on minority groups. We provide evidence that minority groups' low digital literacy is a channel that mitigates the effect of the text message, by showing that minority populations are much less likely to make an active enrollment choice by using a smartphone (and the hyperlink in the text message). We also show that trust, subjective financial literacy (confidence in one's knowledge), and to some extent objective financial literacy affect the engagement with the text message and that this effect is stronger for minority populations. In these regressions, we show that even after controlling for these and other socioeconomic variables (including an indication of liquidity constraints) the text message effect on minority groups' enrollment in the SECP is still smaller than for the general population. This leads to the conclusion that additional cultural barriers exist (including language barriers). Nonetheless, we provide evidence that effect of trust and financial literacies is consistent and substantial. We provide additional evidence that the text messages have a smaller effect on those living in more peripheral and rural localities. As those living in more peripheral and rural localities are more affected by local culture, we believe this is an indicator of higher cultural frictions and is further evidence of cultural barriers to engagement with the mobile text message. We also use the survey data to show that saving in the SECP program does not decrease saving elsewhere. Hence, SECP savings are mostly additional savings that can boost children's welfare.

As we find a remaining negative effect for minority populations, we might attribute this to language frictions. However, in a different context, Strawczynski and Myronichev (2015) provide evidence that even when the message (mail) is sent in the native language of minority groups, the effect is still mitigated. The mitigated effect we find for the Ultra-Orthodox Jewish population, which does not have a language barrier, also indicates that the remaining cultural frictions include more than just language frictions.

Interventions and nudges can be effective tools to strengthen policy outcomes, but they need to be calibrated (Benartzi et al. 2017; Madrian 2014; Datta and Mullainathan 2014). The low costs of text messages and their potential benefits make them an attractive tool for many financial innovations. We show that text messages can significantly raise participation rates in government programs, but the method comes with shortcomings and not all populations respond in the same manner.

We present evidence that well-intentioned interventions may exacerbate rather than mitigate disparities. If the government relies heavily on interventions and text messages, especially in financial consumer regulation, and minority groups are much less responsive to these interventions, this will have a long-term effect. This is especially true in a program, such as the SECP, where the defaults will result in less wealth in the long term (lower deposits from parents and less risky, lower return investment tracks). Active enrollment can also affect the way these populations address and trust financial institutions and regulations in wider contexts and for future savings. As we find that text messages have a larger effect on those with high digital literacy, trust and subjective financial literacy, more infrastructure and education, emphasizing confidence in financial management, is needed to make consumer financial regulations and nudges more effective. Another policy implication is that regulatory campaigns need to be accompanied by explanations that will enhance self-efficacy and allow individuals to opt into programs that will improve their long-term outcomes.

We believe that our results highlight the need to tailor solutions to different minority groups, based on their specific characteristics. Indeed, we were informed that certain Fintech initiatives are considering introducing personalized messages for different individuals. We leave the investigation of personalized options to future research.

References

- Abadie, A., and J. Spiess. 2021. Robust post-matching inference. *Journal of the American Statistical Association*. Published online January 14, 2021, 10.1080/01621459.2020.1840383.
- Abadie, A., and G.W. Imbens. 2011. Bias-corrected matching estimators for average treatment effects. *Journal of Business and Economic Statistics* 29:1–11.
- Ahlmark, N., M. H. Algren, T. Holmberg, M. L. Norredam, S. S. Nielsen, A. B. Blom, A. Bo, and K. Juel. 2015. Survey nonresponse among ethnic minorities in a national health survey – A mixed-method study of participation, barriers, and potentials. *Ethnicity & Health* 20:611–32.
- Allgood, S., and W. Walstad. 2016. The effects of perceived and actual financial literacy on financial behaviors. *Economic Inquiry* 54:675–97.
- Anderson, A., F. Baker, and D. T. Robinson. 2017. Precautionary savings, retirement planning and misperceptions of financial literacy. *Journal of Financial Economics* 126:383–98.
- Atkinson, A., and F. Messy. 2012. Measuring financial literacy: Results of the OECD/International Network on Financial Education (INFE) Pilot Study. Working Paper, OECD.
- Austin, P. C. 2009. Using the standardized difference to compare the prevalence of a binary variable between two groups in observational research. *Communications in Statistics-Simulation and Computation* 38:1228–34.
- Barber, B. M., and T. Odean. 2001. Boys will be boys: Gender, overconfidence, and common stock investment. *Quarterly Journal of Economics* 116:261–92.

- Bauer, R., I. Eberhardt, and P. Smeets. 2018. Financial incentives beat social Norms. A Field Experiment on Retirement Information Search. Netspar Academic Series, 15.
- Bénabou, R., and J. Tirole. 2002. Self-confidence and personal motivation. *Quarterly Journal of Economics* 117:871–915.
- Ben-David, D., O. Sade, and I. Mintz. 2019. Using AI and behavioral finance to cope with limited attention and reduce overdraft fees. Working Paper, Hebrew University of Jerusalem.
- Benartzi, S., J. Beshears, K. L. Milkman, C. R. Sunstein, R. H. Thaler, M. Shankar, W. Tucker-Ray, W. J. Congdon, and S. Galing. 2017. Should governments invest more in nudging? *Psychological Science* 28:1041–55.
- Benartzi, S., and J. Lehrer. 2015. *The smarter screen: What your business can learn from the way consumers think online*. Paris, France: Hachette.
- Bhargava, S., and D. Manoli. 2015. Psychological frictions and the incomplete take-up of social benefits: Evidence from an IRS field experiment. *American Economic Review* 105:3489–529.
- Bucher-Koenen, T., R. J. Alessie, A. Lusardi, and M. Van Rooij. 2021. Fearless woman: Financial literacy and stock market participation. Working Paper, Max Planck Institute.
- Bucher-Koenen, T., and A. Lusardi. 2011. Financial literacy and retirement planning in Germany. *Journal of Pension Economics and Finance* 10:565–84.
- Bracha, A., and S. Meier. 2014. Nudging credit scores in the field: The effect of text reminders on creditworthiness in the United States. Working Paper, Yale University.

- Cadena, X., and A. Schoar. 2011. Remembering to pay? Reminders vs. financial incentives for loan payments. Working Paper, Harvard University.
- Carlin, B., A. Olafsson, and M. Pagel. 2019. Generational differences in managing personal finances. *AEA Papers and Proceedings* 109:54–59.
- Carroll, G. D., J. J. Choi, D. Laibson, B. C. Madrian, and A. Metrick. 2009. Optimal defaults and active decisions. *Quarterly Journal of Economics* 124:1639–74.
- Choi, J. J., E. Haisley, J. Kurkoski, and C. Massey. 2017. Small cues change savings choices. *Journal of Economic Behavior and Organization* 142:378–95.
- Chande, R., M. Luca, M. Sanders, X. Z. Soon, O. Borcan, N. Barak Corren, E. Linos, E. Kirkman, and S. Robinson. 2015. Curbing adult student attrition: Evidence from a field experiment. Working Paper, Harvard Business School.
- Clancy, M. M., S. G. Beverly, M. Sherraden, and J. Huang. 2016. Testing universal child development accounts: Financial effects in a large social experiment. *Social Service Review* 90:683–708.
- Clark, R. L., R. G. Hammond, M. S. Morrill, and C. Khalaf. 2017. Nudging retirement savings: A field experiment on supplemental plans. Working Paper, North Carolina State University.
- Cupák, A., P. Fessler, J. W. Hsu, and P. R. Paradowski. 2020. Confidence, financial literacy and investment in risky assets: Evidence from the Survey of Consumer Finances. Finance and Economics Discussion Series 2020-004. Washington: Board of Governors of the Federal Reserve System, <https://doi.org/10.17016/FEDS.2020.004>.

- Cupák, A., G. I. Kolev, and Z. Brokešová. 2019. Financial literacy and voluntary savings for retirement: Novel causal evidence. *European Journal of Finance* 25:1606–25.
- Damgaard, M. T., and C. Gravert. 2018. The hidden costs of nudging: Experimental evidence from reminders in fundraising. *Journal of Public Economics* 157:15–26.
- Das, S., C. M. Kuhnen, and S. Nagel. 2020. Socioeconomic status and macroeconomic expectations. *Review of Financial Studies* 33:395–432.
- Datta, S., and S. Mullainathan. 2014. Behavioral design: A new approach to development policy. *Review of Income and Wealth* 60:7–35.
- Dolls, M., P. Doerrenberg, A. Peichl, and H. Stichnoth. 2018. Do retirement savings increase in response to information about retirement and expected pensions? *Journal of Public Economics* 158:168–79.
- Ericson, K. M. 2017. On the interaction of memory and procrastination: Implications for reminders, deadlines, and empirical estimation. *Journal of the European Economic Association* 15:692–719.
- Finkelstein, A., and M. J. Notowidigdo. 2019. Take-up and targeting: Experimental evidence from SNAP. *Quarterly Journal of Economics* 134:1505–56.
- Gabaix, X. 2019. Behavioral inattention. In *Handbook of behavioral economics: Applications and foundations I*, vol. 2, pp. 261–343. Amsterdam, the Netherlands: North-Holland.
- Glaeser, E. L., D. I. Laibson, J. A. Scheinkman, and C. L. Soutter. 2000. Measuring trust. *Quarterly Journal of Economics* 115:811–46.

- Goldfarb, A., and C. Tucker. 2019. Digital economics. *Journal of Economic Literature* 57:3–43.
- Grinstein-Weiss, M., O. Kondratjeva, S. P. Roll, O. Pinto, and D. Gottlieb. 2019a. The Saving for Every Child Program in Israel: An overview of a universal asset-building policy. *Asia Pacific Journal of Social Work and Development* 29:20–33.
- Grinstein-Weiss, M., O. Pinto, O. Kondratjeva, S. P. Roll, S. Bufe, N. Barkali, and D. Gottlieb. 2019b. Enrollment and participation in a universal child savings program: Evidence from the rollout of Israel’s National Program. *Children and Youth Services Review* 101:225–38.
- Guiso, L., P. Sapienza, and L. Zingales. 2004. The role of social capital in financial development. *American Economic Review* 94:526–56.
- . 2009. Cultural biases in economic exchange? *Quarterly Journal of Economics* 124:1095–131.
- Gupta, G., Mahmud, M., Maitra, P., Mitra, S., and Neelim, A., 2018. Religion, minority status, and trust: Evidence from a field experiment. *Journal of Economic Behavior & Organization* 146:180–205.
- Gurol-Urganci, I., T. de Jongh, V. Vodopivec-Jamsek, R. Atun, and J. Car. 2013. Mobile phone messaging reminders for attendance at healthcare appointments. *Cochrane Database of Systematic Reviews* (12).
- Guyton, J., P. Langetieg, D. Manoli, M. Payne, B. Schafer, and M. Sebastiani. 2017. Reminders and recidivism: using administrative data to characterize nonfilers and conduct EITC outreach. *American Economic Review* 107:471–75.

- Haran Rosen, M., O. Pinto, O. Kondratjeva, S. Roll, A. Huseynli, and M. Grinstein-Weiss. 2021. Household savings decisions in Israel's Child Savings Program: The role of demographic, financial, and intrinsic factors. *Journal of Family and Economic Issues* 42:368–86.
- Haran Rosen, M., and O. Sade. Forthcoming. Does financial regulation unintentionally ignore less privileged populations? The investigation of a regulatory fintech advancement, objective and subjective financial literacy. *AEA Papers and Proceedings*.
- Hilgert, M. A., J. M. Hogarth, and S. G. Beverly. 2003. Household financial management: The connection between knowledge and behavior. *Federal Reserve Bulletin* 89:1–32.
- Heffetz, O., T. O'Donoghue, and H. S. Schneider. 2017. Forgetting and heterogeneity in task delay: Evidence from New York City parking-ticket recipients. Working Paper, Cornell University.
- Hermann, T., O. Anabi, A. Rubabshi-Shitrit, R. Ritov, and E. Heller. 2020. The Israeli democracy index 2020. The Israel Democracy Institute, Jerusalem.
- Hermann, T., N. Atmor, E. Heller, and Y. Lebel. 2012. The Israeli democracy index 2012. The Israel Democracy Institute, Jerusalem.
- Hurwitz, A., E. Lahav, and Y. Mugerman. 2021. "Financial Less Is More:" An Experimental Study of Financial Communication. *Journal of Behavioral and Experimental Economics* 94:101756.
- Imbens, G.W., and J. M. Wooldridge. 2009. Recent developments in the econometrics of program evaluation. *Journal of Economic Literature* 47:5–86.

- Karlan, D., J. Kendall, R. Mann, R. Pande, T. Suri, and J. Zinman. 2016a. Research and impacts of digital financial services. Working Paper, Northwestern University.
- Karlan, D., M. McConnell, S. Mullainathan, and J. Zinman. 2016b. Getting to the top of mind: How reminders increase saving. *Management Science* 62:3393–411.
- Karlan, D., M. Morten, and J. Zinman. 2015. A personal touch in text messaging can improve microloan repayment. *Behavioral Science and Policy* 1:25–31.
- Kuhnen, C. M., and B. T. Melzer. 2018. Noncognitive abilities and financial delinquency: The role of self-efficacy in avoiding financial distress. *Journal of Finance* 73:2837–69.
- Kuhnen, C. M., and A. C. Miu. 2017. Socioeconomic status and learning from financial information. *Journal of Financial Economics* 124:349–72.
- Laudenbach, C., J. Pirschel, and S. Siegel. 2018. Personal communication in a Fintech world: evidence from loan payments. Working Paper, University of Bonn.
- Levi, Y., and S. Benartzi. 2020. Mind the app: Mobile access to financial information and consumer behavior. Working Paper, University of Southern California.
- Loibl, C., L. Jones, and E. Haisley. 2018. Testing strategies to increase saving in individual development account programs. *Journal of Economic Psychology* 66:45–63.
- Loke, V., and M. Sherraden. 2019. Building assets from birth: Singapore's policies. *Asia Pacific Journal of Social Work and Development* 29:6–19.
- Lusardi, A. 2008. Financial literacy: An essential tool for informed consumer choice? Working Paper, George Washington University.

- Lusardi, A., and O. S. Mitchell. 2007. Financial literacy and retirement planning: New evidence from the Rand American Life Panel. Research Paper, Michigan Retirement Research Center.
- . 2008. Planning and financial literacy: How do women fare? *American Economic Review* 98:413–7.
- . 2011a. Financial literacy and planning: Implications for retirement wellbeing. Working Paper, George Washington University.
- . 2011b. Financial literacy around the world: an overview. *Journal of Pension Economics and Finance* 10:497–508.
- . 2014. The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature* 52:5–44.
- . 2017. How ordinary consumers make complex economic decisions: Financial literacy and retirement readiness. *Quarterly Journal of Finance* 7:1750008.
- Madrian, B. C. 2014. Applying insights from behavioral economics to policy design. *Annual Review of Economics* 6:663–88.
- Madrian, B. C., and D. F. Shea. 2001. The power of suggestion: Inertia in 401 (k) participation and savings behavior. *Quarterly Journal of Economics* 116:1149–87.
- Malul, M., M. Rosenboim, and T. Shavit. 2010. Costs of mistrust between ethnic majority and minorities: Evidence from Israel. *Review of Social Economy* 68:447–64

- Medina, P. C. 2021. Side effects of nudging: Evidence from a randomized intervention in the credit card market. *Review of Financial Studies* 34:2580–607.
- Pan, W., and H. Bai. 2015. *Propensity score analysis: Fundamentals and developments*. New York: Guilford Publications.
- Parker, A. M., W. B. Bruin, J. Yoong, and R. Willis. 2012. Inappropriate confidence and retirement planning: Four studies with a national sample. *Journal of Behavioral Decision Making* 25:382–9.
- Pe'er, E., Y. Feldman, E. Gamliel, L. Sahar, A. Tikotsky, N. Hod, and H. Schupak. 2019. Do minorities like nudges? The role of group norms in attitudes towards behavioral policy. *Judgment and Decision Making* 14:40–50.
- Rubin, D. B. 2001. Using propensity scores to help design observational studies: application to the tobacco litigation. *Health Services and Outcomes Research Methodology* 2:169–88.
- Sapienza, P., and L. Zingales. 2011. Trust and finance. NBER Reporter, Northwestern University.
- Sethi-Iyengar, S., G. Huberman, and W. Jiang. 2004. How much choice is too much? Contributions to 401 (k) retirement plans. In *Pension design and structure: New lessons from behavioral finance* 83:84–87. Oxford, UK: Oxford University Press.
- Shefrin, H. 2021. Broadening the scope of financial literacy to incorporate self-control, budgeting and heuristics. In *Financial education and risk literacy*. Cheltenham, UK: Edward Elgar Publishing.

- Shefrin, H., and C. M. Nicols. 2014. Credit card behavior, financial styles, and heuristics. *Journal of Business Research* 67:1679–87.
- Sherraden, M. W. 1991. *Assets and the poor*. St. Louis: Washington University in St. Louis.
- Stango, V., and Zinman, J., 2020. Behavioral biases are temporally stable. Working Paper, University of California at Davis.
- . 2014. Limited and varying consumer attention: Evidence from shocks to the salience of bank overdraft fees. *Review of Financial Studies* 27:990–1030.
- Strawczynski, M., and N. Myronichev. 2015. The persuasive role of information: The case of EITC reminders by mail. *Public Policy and Administration* 30:115–44.
- Thaler, R. H., and S. Benartzi. 2004. Save more tomorrow™: Using behavioral economics to increase employee saving. *Journal of Political Economy* 112:S164–S187.
- Thaler, R. H., and C. R. Sunstein. 2009. *Nudge: Improving decisions about health, wealth, and happiness*. New York: Penguin.
- Thunström, L., B. Gilbert, and C. J. Ritten. 2018. Nudges that hurt those already hurting—distributional and unintended effects of salience nudges. *Journal of Economic Behavior and Organization* 153:267–82.
- Van Rooij, M. C., A. Lusardi, and R. J. Alessie. 2012. Financial literacy, retirement planning and household wealth. *Economic Journal* 122:449–78.

Figure 1. Savings for Every Child Program text message intervention timeline

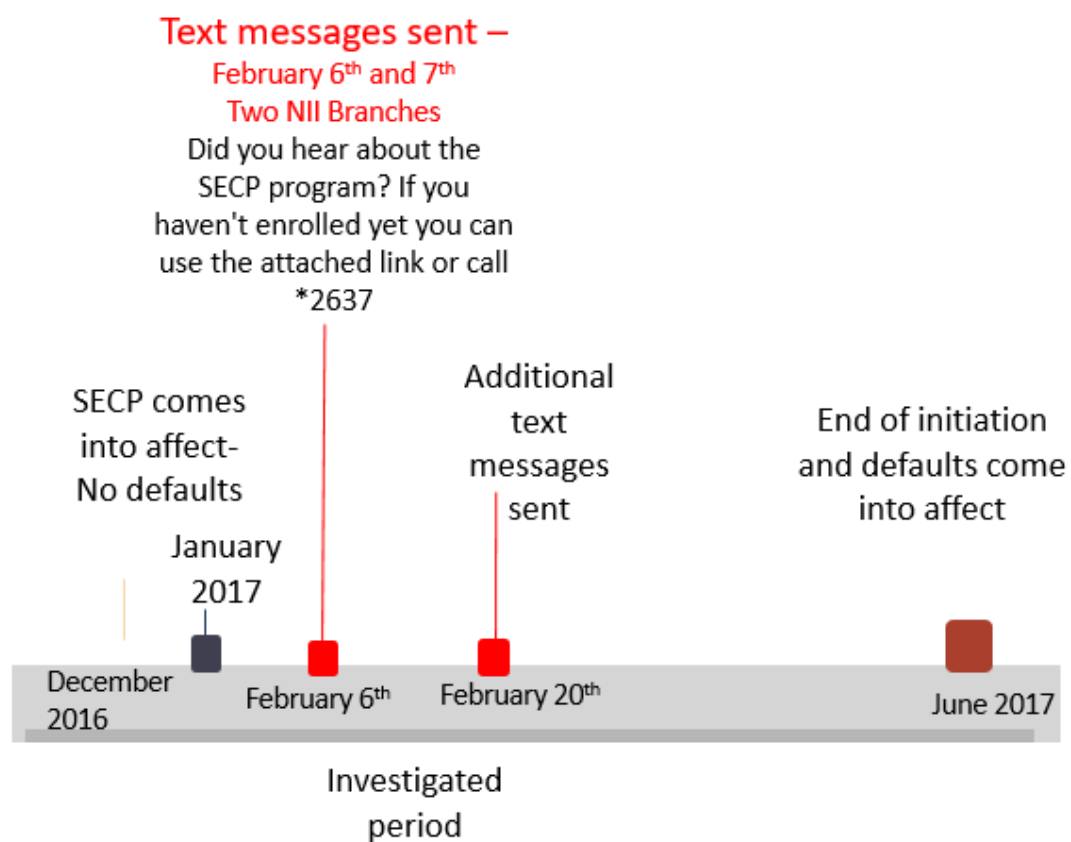


Table 1. Made any choice by February 19th

	Full sample	Arab	Ultra-Orthodox	Nonminority
	(1)	(2)	(3)	(4)
<i>Message</i>	0.12*** (0.01)	0.06*** (0.01)	0.06*** (0.02)	0.15*** (0.01)
<i>Message*Arab</i>	-0.05*** (0.004)			
<i>Message*Ultra-Orthodox Jew</i>	-0.05*** (0.004)			
<i>Message*Income</i>	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<i>Message*Mother's academic attain</i>	-0.004 (0.01)	0.01* (0.01)	-0.002 (0.01)	-0.01 (0.01)
<i>Message*Father's academic attain.</i>	0.01 (0.01)	0.002 (0.01)	0.002 (0.02)	0.01 (0.01)
<i>Message*Number of children</i>	-0.001 (0.002)	-0.001 (0.002)	-0.003 (0.003)	-0.002 (0.002)
<i>Message*Child's age</i>	-0.002*** (0.001)	-0.001* (0.001)	0.001 (0.001)	-0.003*** (0.001)
<i>Message*Married parents</i>	-0.02*** (0.01)	0.002 (0.01)	-0.03 (0.02)	-0.03*** (0.01)
Noninteraction controls	Yes	Yes	Yes	Yes
Constant	0.004*** (0.001)	0.004 (0.01)	-0.001 (0.02)	0.003 (0.01)
Observations	60,363	23,560	13,329	22,850
R^2	.03	.02	.01	.05

Each column in this table represents a different linear regression of the effect of receiving a text message on February 6th and 7th and its interactions with additional individual characteristics on making any active enrollment to the SECP program by February 19th. Column 1 reports the results of a regression on the full sample matched data set. Column 2 reports the results of a regression on the Arab minority-matched data set. Column 3 reports the results of a regression on the Ultra-Orthodox-minority-matched data set. Column 4 reports the results of a regression on the non-minority-matched data set. Data come from the NII administrative database. * $p < .1$; ** $p < .05$; *** $p < .01$.

Table 2. Choose to deposit additional funds by February 19th

	Full sample (1)	Arab (2)	Ultra-Orthodox (3)	Nonminority (4)
<i>Message</i>	0.07*** (0.01)	0.02*** (0.004)	0.02* (0.01)	0.08*** (0.01)
<i>Message*Arab</i>	-0.04*** (0.003)			
<i>Message*Ultra-Orthodox Jew</i>	-0.03*** (0.003)			
<i>Message*Income</i>	0.00*** (0.00)	0.00* (0.00)	0.0000** (0.0000)	0.00*** (0.00)
<i>Message*Mother's academic attain.</i>	0.003 (0.01)	0.01*** (0.005)	0.0000 (0.01)	0.004 (0.01)
<i>Message*Father's academic attain.</i>	0.01** (0.01)	0.01 (0.01)	0.01 (0.02)	0.01 (0.01)
<i>Message*Number of children</i>	-0.001** (0.002)	-0.001 (0.001)	-0.004* (0.002)	-0.003* (0.002)
<i>Message*Child's age</i>	-0.001*** (0.001)	-0.001** (0.0004)	0.001 (0.001)	-0.002*** (0.001)
<i>Message*Married parents</i>	-0.01*** (0.01)	-0.0000 (0.003)	-0.001 (0.01)	-0.02*** (0.01)
Noninteraction controls	Yes	Yes	Yes	Yes
Constant	0.001 (0.0003)	0.003 (0.003)	-0.0003 (0.01)	0.0001 (0.005)
Observations	60,363	23,560	13,329	22,850
R^2	.03	.01	.01	.03

Each column represents a different linear regression of the effect of receiving a text message on February 6th and 7th and its interactions with additional individual characteristics on choosing to deposit additional NIS 50 savings into the SECP program by February 19th. Column 1 reports the results of a regression on the full sample matched data set. Column 2 reports the results of a regression on the Arab-minority-matched data set. Column 3 reports the results of a regression on the Ultra-Orthodox-minority-matched data set. Column 4 reports the results of a regression on the non-minority-matched data set. Data come from the NII administrative database. * $p < .1$; ** $p < .05$; *** $p < .01$.

Table 3. Choose high-yield/high-risk track by February 19th

	Full sample (1)	Arab (2)	Ultra-Orthodox (3)	Nonminority (4)
<i>Message</i>	0.03*** (0.004)	0.003*** (0.001)	0.01 (0.01)	0.03*** (0.005)
<i>Message*Arab</i>	-0.03*** (0.002)			
<i>Message*Ultra-Orthodox Jew</i>	-0.02*** (0.002)			
<i>Message*Income</i>	0.00*** (0.00)	0.00 (0.00)	0.0000** (0.0000)	0.00*** (0.00)
<i>Message*Mother's academic attain.</i>	0.003** (0.004)	-0.0001 (0.002)	-0.003 (0.002)	0.01*** (0.004)
<i>Message*Father's academic attain.</i>	0.01*** (0.005)	-0.0001 (0.002)	0.01 (0.01)	0.02*** (0.005)
<i>Message*Number of children</i>	0.001* (0.001)	-0.0001 (0.0003)	-0.002* (0.001)	-0.0003 (0.001)
<i>Message*Child's age</i>	-0.001*** (0.0004)	-0.0002* (0.0001)	0.0004 (0.0004)	-0.002*** (0.0004)
<i>Message*Married parents</i>	-0.003* (0.004)	-0.0004 (0.001)	-0.0003 (0.01)	-0.004 (0.005)
Noninteraction controls	Yes	Yes	Yes	Yes
Constant	0.0002 (0.0004)	0.00 (0.001)	0.00 (0.01)	0.001 (0.004)
Observations	60,363	23,560	13,329	22,850
R^2	.03	.001	.01	.03

Each column represents a different linear regression of the effect of receiving a text message on February 6th and 7th and its interactions with additional individual characteristics on choosing a high-yield/high-risk investment track in the SECP program by February 19th. Column 1 reports the results of a regression on the full sample matched data set. Column 2 reports the results of a regression on the Arab-minority-matched data set. Column 3 reports the results of a regression on the Ultra-Orthodox-minority-matched data set. Column 4 reports the results of a regression on the non-minority-matched data set. Data come from the NII administrative database. * $p < .1$; ** $p < .05$; *** $p < .01$.

Table 4. Choose by smartphone by February 19th

	Full sample (1)	Arab (2)	Ultra-Orthodox (3)	Nonminority (4)
<i>Text message</i>	0.04*** (0.01)	0.01** (0.004)	0.01 (0.01)	0.06*** (0.005)
<i>Message*Arab</i>	-0.02*** (0.002)			
<i>Message*Ultra-Orthodox Jew</i>	-0.02*** (0.002)			
<i>Message*Income</i>	0.00*** (0.00)	0.00 (0.00)	0.0000** (0.0000)	0.00 (0.00)
<i>Message*Mother's academic attain.</i>	-0.003 (0.004)	0.02*** (0.004)	-0.005* (0.003)	-0.01** (0.004)
<i>Message*Father's academic attain.</i>	0.002 (0.004)	0.01** (0.005)	0.001 (0.01)	-0.0003 (0.005)
<i>Message*Number of children</i>	-0.001** (0.001)	-0.0001 (0.001)	-0.002* (0.001)	-0.003** (0.001)
<i>Message*Child's age</i>	-0.001*** (0.0004)	-0.001 (0.0003)	0.0003 (0.0005)	-0.002*** (0.0004)
<i>Message*Married parents</i>	-0.001 (0.004)	0.004 (0.003)	-0.001 (0.01)	-0.003 (0.004)
Noninteraction controls	Yes	Yes	Yes	Yes
Constant	0.001*** (0.001)	0.003 (0.003)	0.00 (0.01)	0.001 (0.004)
Observations	60,363	23,560	13,329	22,850
R^2	.02	.01	.01	.02

Each column represents a different linear regression of the effect of receiving a text message on February 6th and 7th and its interactions with additional individual characteristics on making an active enrollment choice in the SECP program while using a smartphone by February 19th. Column 1 reports the results of a regression on the full sample matched data set. Column 2 reports the results of a regression on the Arab-minority-matched data set. Column 3 reports the results of a regression on the Ultra-Orthodox-minority-matched data set. Column 4 reports the results of a regression on the non-minority-matched data set. Data come from the NII administrative database. * $p < .1$; ** $p < .05$; *** $p < .01$.

Table 5. Made choice by February 19th: Survey database

<i>A. Any active enrollment choice</i>				
	Full sample	Arab	Ultra-Orthodox	Nonminority
	(1)	(2)	(3)	(4)
<i>Text message</i>	0.07*	-0.16***	0.05*	0.03
	(0.06)	(0.06)	(0.03)	(0.05)
<i>Text message*Trust</i>	0.16***	0.29***	0.38***	-0.02
	(0.08)	(0.05)	(0.07)	(0.10)
<i>Text message*Low Subjective financial literacy</i>	-0.10***	-0.20***	-0.22***	0.01
	(0.08)	(0.06)	(0.05)	(0.10)
<i>Text message*Low Objective financial literacy</i>	-0.07**	0.04	-0.04	0.01
	(0.07)	(0.06)	(0.04)	(0.07)
<i>R²</i>	.06	.14	.20	.05
<i>B. Choose to add additional 50 NIS</i>				
	Full sample	Arab	Ultra-Orthodox	Nonminority
	(1)	(2)	(3)	(4)
<i>Text message</i>	0.06*	-0.13***	0.04	0.04
	(0.06)	(0.04)	(0.02)	(0.05)
<i>Text message*Trust</i>	0.10***	0.17***	0.38***	0.03
	(0.04)	(0.04)	(0.04)	(0.09)
<i>Text message*Low Subjective financial literacy</i>	-0.10***	-0.17***	-0.15***	-0.06
	(0.04)	(0.04)	(0.04)	(0.09)
<i>Text message*Low Objective financial literacy</i>	-0.07***	0.03	-0.05	-0.06
	(0.06)	(0.04)	(0.04)	(0.06)
Constant	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes
Observations	1,076	377	355	283
<i>R²</i>	.07	.14	.25	.06

Each column represents a different linear regression of the effect of receiving a text message on February 6th and 7th and its interactions with additional individual characteristics on making an active enrollment choice in the SECP program by February 19th. Panel A presents the results of regressions on making any active enrollment choice. Panel B presents the results of regressions on depositing additional funds. Column 1 reports the results of a regression on the full sample matched data set. Column 2 reports the results of a regression on the Arab-minority-matched data set. Column 3 reports the results of a regression on the Ultra-Orthodox-minority-matched data set. Column 4 reports the results of a regression on the non-minority-matched data set. Data come from the NII administrative database. * $p < .1$; ** $p < .05$; *** $p < .01$.

Table 6. Made any choice by February 19th: Survey database

	Full sample	Arab	Ultra-Orthodox	Nonminority
	(1)	(2)	(3)	(4)
<i>Text message</i>	0.09** (0.07)	-0.10* (0.06)	0.05 (0.03)	0.06 (0.06)
<i>Text message*Difficulty to Cover expenses</i>	-0.06* (0.09)	-0.21*** (0.06)	0.01 (0.04)	-0.06 (0.07)
<i>Text message*Trust</i>	0.15*** (0.09)	0.31*** (0.05)	0.40*** (0.07)	-0.0004 (0.10)
<i>Text message*Low Subjective financial literacy</i>	-0.10*** (0.08)	-0.24*** (0.06)	-0.22*** (0.05)	0.004 (0.10)
<i>Text message*Low Objective financial literacy</i>	-0.07** (0.08)	0.01 (0.06)	-0.04 (0.04)	-0.01 (0.07)
Constant	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes
Observations	1,076	377	355	283
R^2	.07	.16	.21	.08

Each column represents a different linear regression of the effect of receiving a text message on February 6th and 7th and its interactions with having a higher level of trust dummy variable (having an average of four or higher to two questions regarding level of trust in government), having a low level of objective financial literacy dummy variable (knowing the answer to one or fewer objective financial literacy questions) and having a low level of subjective financial literacy dummy variable (having a self-proclaimed low or very low understating of financial issues) on making any active enrollment choice in the SECP program by February 19th. Column 1 reports the results of a regression on the full sample matched data set. Column 2 reports the results of a regression on the Arab-minority-matched data set. Column 3 reports the results of a regression on the Ultra-Orthodox-minority-matched data set. Column 4 reports the results of a regression on the non-minority-matched data set. Data come from the NII survey database. * $p < .1$; ** $p < .05$; *** $p < .01$.

Table 7. Made any choice, including locality indexes

	Full sample	Arab	Ultra-Orthodox	Nonminority
	(1)	(2)	(3)	(4)
<i>Text message</i>	0.10*** (0.02)	0.04*** (0.01)	0.06*** (0.02)	0.14*** (0.02)
<i>Text message *Arab</i>	0.003** (0.001)			
<i>Text message *Ultra-Orthodox Jew</i>	-0.001 (0.001)			
<i>Text message *Centrality index</i>	0.003*** (0.002)	0.01*** (0.002)	-0.0005 (0.002)	0.002 (0.002)
<i>Text message *Socioecon index</i>	0.0003 (0.002)	-0.005** (0.002)	0.002 (0.003)	-0.002 (0.002)
<i>Text message *Rural</i>	-0.01*** (0.01)	-0.02*** (0.005)	-0.004 (0.01)	0.01 (0.01)
Additional controls	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Observations	60,363	23,560	13,329	22,850
R^2	.03	.02	.01	.05

Each column represents a different linear regression of the effect of receiving a text message on February 6th and 7th and its interactions with minority affiliation variables as well as locality variables on making any active enrollment choice in the SECP program by February 19th. Locality variables include socioeconomic index, centrality index and rural indicator calculated using data from the 2015 national survey on demographic and standard of living. For the socioeconomic index, each locality is ranked between 1 and 10. Centrality index grades localities' proximity to economic activity or potential for activity. Column 1 reports the results of a regression on the full sample matched data set. Column 2 reports the results of a regression on the Arab-minority-matched data set. Column 3 reports the results of a regression on the Ultra-Orthodox-minority-matched data set. Column 4 reports the results of a regression on the non-minority-matched data set. Data come from the NII administrative database. * $p < .1$; ** $p < .05$; *** $p < .01$.