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Consumer Savings App Strategies and Savings Outcomes

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NOTE: This report represents the views of the authors and does not indicate concurrence either by the CFPB or other members of the CFPB staff.

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1. Introduction

Technological innovations have changed the way consumers manage money and conduct their financial lives. Today's technological landscape offers a range of personal finance apps that allow consumers to pay bills, monitor budgets, manage cash flow, and save. The automation built into personal finance apps provides consumers with flexibility to manage their finances. A savings app, for example, may provide flexibility by allowing consumers to set rules for when and how much to save. Such rules might be set to save regularly over time, for example, on the first day of each month or with every payday. Other rules might be used to save small amounts with high frequency, such as saving $5 with every gym workout or rounding up each purchase to the nearest dollar. Despite the prevalence of automation technology and how it is often marketed as an effective way to help people save, there is limited evidence on how automation affects consumers' savings and broader financial lives, or on the relative efficacy of specific types of saving rules.

This report provides new insights into the relationship between different automated saving rules and savings outcomes. In collaboration with Common Cents Lab and Qapital—a mobile savings app that allows consumers to pursue customizable financial goals (e.g., save for a home, travel)—we examine a large, novel dataset of automated saving behavior.[1] We analyze the extent to which consumers use different automated saving rules, which trigger transfers from a consumer's bank account to a goals account with Qapital,[2] and how these rules relate to the amount saved. We group Qapital's various saving rules into three broad categories: guaranteed saving (e.g., save every Friday or on payday), saving that is contingent on spending (e.g., round up each purchase to the nearest dollar), and saving that is contingent on a nonfinancial action or behavior (e.g., save with each workout or social media post).[3]

Using these categories of saving rules, we focus on three research questions.

- What categories of saving rules do people implement in pursuit of their savings goals?
- How often and how much do people save using different saving rule categories?
- How do saving rule categories relate to the amount saved and the likelihood of achieving specific milestones (i.e., $200, $500, $1,000, and $2,000) within one year?

[1] Reference herein to any specific commercial products, vendor, or service by trade name or otherwise, does not constitute or imply an endorsement, recommendation, or support by the CFPB.

[2] Customers' deposits are made to either (depending upon the plan selected by the customer) (i) an umbrella fiduciary account for the benefit of Qapital's users or (ii) a demand deposit account opened specifically for the customer. In each case, the account is maintained at one of Qapital's partner banks and eligible for Federal Deposit Insurance Corporation (FDIC) insurance.

[3] For greater detail on these saving rule categories and the specific rules they comprise, see the data section.

Insights into these questions will improve our understanding of the relationship between how people save and how much they save. Specifically, grouping Qapital's saving rules into three categories and exploring these categories' relationships with savings outcomes will enable two novel and practical comparisons. First, we contrast rules that facilitate saving using more traditional approaches (i.e., guaranteed) with rules contingent on specific behaviors or events (contingent spending; contingent nonfinancial).[4] Second, comparing saving rules that involve spending (contingent spending) with rules that do not (contingent nonfinancial; guaranteed) allows us to explore an emerging behavioral strategy—saving through spending.[5]

Our analysis of deidentified Qapital data includes 127,243 savings goals established between January 1, 2019 and September 28, 2020. For each savings goal, we observe saving activity and account balances over a 12-month period or the life of the goal if it is open for less than 12 months. We do not observe savings or saving activity that may take place outside of the app.

Our review of the literature finds no empirical research on how categories of automated saving rules relate to saving behavior. Some past research, however, suggests that savings success is related to how people pursue their goals. One study finds that setting a specific savings goal target amount affects saving rates; goals with nonspecific targets tend to have greater saving rates early, while goals with specific targets tend to have greater saving rates as the goal nears completion.[6] Other research has found that the framing of savings amounts can increase sign-up rates for recurring deposits into a savings account. Specifically, framing savings using smaller but more frequent amounts (e.g., $5 a day) increased sign-ups relative to a less granular framing (e.g., $150 a month).[7] Theoretical research on goal motivation suggests that setting specific plans for what events will trigger a desired behavior (i.e., implementation intentions) can apply to savings, although empirical evidence for this claim is mixed.[8]

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[4] For a description of how self-control and attention can impede goal progress, one part of our rationale for distinguishing between guaranteed and contingent saving rules, see Shefrin and Thaler (2004).

[5] For a summary of the "saving through spending" strategy and its growing popularity in the public and private sectors see https://behavioralscientist.org/how-to-increase-your-savings-while-spending/.

[6] See Wallace and Etkin (2018).

[7] See Hershfield, Shu, and Benartzi (2020).

[8] See Gollwitzer (1999) for the theory underlying implementation intentions. Loibl and Scharff (2010) observed in one small experimental study (a sample of 76 people who had volunteered to participate in a nationwide savings campaign) that setting implementation intentions, such as writing down when they would save over the next month, how much they would save, and where the money would come from, did not increase self-reports of actual savings one or two months later compared to the control group. In this study, 178 people completed the initial survey, but a final sample of 76 was reached after exclusions for incomplete data and follow-up survey attrition.

We contribute to the literature on how people save by examining how a large sample of consumers use different automated saving rules and how these rules relate to saving outcomes over one year. Key findings corresponding to our research questions are:

- *What categories of saving rules do people implement in pursuit of their savings goals?* Saving rules that are contingent on spending, such as rounding up each purchase, are the most popular rule category (81 percent of goals), followed by guaranteed rules, such as saving every Friday (41 percent of goals). Rules contingent on nonfinancial events or behaviors, such as saving with each workout, are the least popular (2 percent of goals).

- *How often and how much do people save using different saving rule categories?* Contingent spending rules have a significantly higher saving frequency than guaranteed or contingent nonfinancial rules, though the amounts saved per transaction are smaller. On average, contingent spending rules are triggered 58 times per month with an average of $1.40 saved per transaction. As a comparison, guaranteed saving rules are triggered 5 times per month with an average of $32.57 saved per transaction.

- *How do saving rule categories relate to the amount saved and the likelihood of achieving specific milestones within one year?* Guaranteed saving rules are associated with higher overall savings accumulation and increased likelihoods of reaching specific savings milestones (e.g., save $500, $1,000) within one year relative to contingent spending and contingent nonfinancial rules. Specifically, guaranteed saving rules are associated with roughly a 1.5 to 3.5 times larger increase in the maximum amount saved and in the likelihood of milestone attainment than either category of contingent rules.

Taken together, these key findings reveal an intriguing pattern of results that warrants further study. Although contingent spending is the most popular saving rule category, our regression analyses find that guaranteed saving rules are associated with greater savings accumulation. This result raises one potential unintended consequence of behavior-based saving strategies (including linking savings to spending): that these strategies could reduce savings by diverting consumers from more traditional guaranteed saving approaches that we find to be associated with greater savings (e.g., save on payday or every two weeks). It is also possible, however, that consumers use behavior-based strategies to supplement and diversify their more traditional saving strategies, or would not save at all in their absence, thereby increasing overall savings. Our study does not provide a full enough picture of individual behavioral choices and savings outcomes to identify whether behavior-based strategies increase or decrease overall savings, and for whom. We return to these points in the conclusion.

Below we provide an overview of the Qapital app, a discussion of the data used for our analyses, and answers to our three research questions.

2. About the Qapital App

Qapital is a personal finance app that allows users to create, contribute to, and track progress toward one or more customized savings goals. When creating a savings goal in Qapital, users may select one of several broad categories (e.g., "emergency fund", "vacation", "education") to identify the savings goal, or they may enter their own customized goal name (e.g., "my summer trip," "college fund"). Users may also enter a target amount that they would like to save (see the box for information about Qapital users' savings goal categories and target amounts).

To save toward a goal using Qapital, users must link a personal bank account to the app so that funds can be transferred from their bank account into a Qapital-sponsored custodial account. Qapital holds users' goal funds in FDIC-insured savings accounts at one of Qapital's partner banks.[9] After Qapital users have created a goal and linked one or more bank accounts, they are prompted to create one or more saving rules that will apply to a savings goal. Saving rules may be triggered at pre-specified frequencies (e.g., daily, weekly, monthly) or by pre-specified events detected by the Qapital app (e.g., spending on a connected debit card, deposit of a paycheck, reaching a health goal in a connected fitness app). Users set how much money should be transferred into the goal savings account each time a rule is triggered. For the round up saving rule, for example, purchases made with a linked debit card are rounded up to the nearest dollar, and the round up amount is transferred to the Qapital account. Beyond these rules, users can manually transfer funds into the goal savings accounts. Saving rules can be paused, resumed, or edited at any time. Users can access their savings by transferring funds from the Qapital-sponsored account back to their personal bank account, which they can do at any time.

Additional Insights
Savings Goal Categories and COVID-19

In a separate analysis, we examine the categories of goals that Qapital users were saving for and how saving priorities changed with the onset of the COVID-19 pandemic. We find:

- COVID-19 brought with it a large *increase* in savings goals related to both **emergency savings** and **housing**
- The popularity of other savings goals *decreased* after the start of the COVID-19 pandemic, including goals related to **travel**, **shopping**, and **debt repayment**

Click **here** or go to the report appendix to learn more about the goals people save toward.

[9] Most savings accounts do not earn interest.

3. Data

We use deidentified data for goals that users created in the Qapital app between January 1, 2019 and September 28, 2020. We restrict our analyses to goals that attained at least $1 in total deposits to filter out goals that were created but not pursued. We also restrict analyses to each user's first goal, since the Qapital app often autogenerates new goals after a previous goal is completed. This restriction ensures that we only analyze goals that users set for themselves. These two sample restrictions result in an analysis sample of 127,243 unique savings goals.

Each goal has a name (entered by the user) and a unique identifier (assigned by Qapital). All account activity associated with each goal's unique identifier has a timestamp. Account activity includes creation of the goal, the amount of money transferred during a transaction, and a description of the activity (e.g., saving rule that triggered the deposit, withdrawal of funds, or manual transfer into savings). For approximately 90 percent of goals, the user provided a savings goal target amount. The median target amount for goals in our sample is $2,000.

For each goal, we observe saving activity and account balances over a 12-month period (starting with the goal's creation) or over the life of the goal if the goal is open for less than 12 months. Among goals in our sample, most (91 percent) are still open after one year. Qapital does not automatically close goals when money is withdrawn and the balance falls to $0. So, while most goals remain open after one year, about a third of goals in our sample (29 percent) have a non-zero balance at the end of the one-year period.[10]

Table 1 shows how we classify the saving rules available in the Qapital app. Specifically, we create three broad groups of rules based on what triggers saving: guaranteed, contingent spending, and contingent nonfinancial rules. For the *guaranteed* rules, saving occurs automatically without any external event (other than receiving income) and without behavior on the part of the user. These rules may be particularly effective if certain behavioral factors, such as limited self-control or limited attention, significantly inhibit Qapital users' savings accumulation; this is a long-standing and important question in the literature on goal motivation and pursuit.[11] For the two contingent groupings, saving is conditional on a specific event or behavior. The *contingent spending* group includes rules that are triggered by a user's spending behavior (e.g., round up of spending), and the *contingent nonfinancial* group includes saving rules that are triggered by a nonfinancial event or behavior (e.g., meet an exercise target).

[10] The majority of goals in our sample—85 percent—have at least one withdrawal within the one-year period. Users do not need to withdraw the entire balance and can make a withdrawal at any time.

[11] Shefrin, H. M., & Thaler, R. H. (2004). Mental accounting, saving, and self-control. *Advances in Behavioral Economics*, 395-428.

Little is known about the efficacy of these behavior-based saving strategies, even though numerous institutions and apps allow users the opportunity to link saving to spending and other behaviors.[12]

TABLE 1: SAVING RULE CATEGORIES AND SAVING RULE DESCRIPTIONS

Saving rule category	Specific saving rules and descriptions
Guaranteed	Payday: Save specified amount on payday
	Autosave: Save with scheduled, recurring deposits (e.g., every Friday)
	52-week challenge: Save $1 week 1, $2 week 2, and so on for one year
	Point of sale: Save when you make a sale (i.e., generate income) with an online payment system
	Income tax/freelance: Save a percentage of deposits over a specified dollar amount
Contingent spending	Round up: Round up purchases to the nearest dollar and save the rounded amount (can supplement by adding a set dollar amount)
	Uber: Save with every Uber trip
	Guilty pleasure: Save when you buy what you're trying to resist
	Place budget/spend less rule: If you spend less than the budgeted amount at specified merchant, the difference is saved
Contingent nonfinancial	Fitness: Save when you reach defined fitness goals with a fitness app
	Trigger signal: Save when you say a phrase to a virtual assistant (e.g., Alexa), post on social media, or "like" a video online

For each goal, we calculate account balance amounts from goal creation through the goal's first year (or over the life of the goal if open for less than 12 months). To measure savings attainment, we then capture a savings goal's maximum balance attained over the year. The average maximum account balance for goals in our sample is $482, while the median is $153.[13] In addition to examining average savings balances, we also explore savings attainment across the distribution. In particular, our analyses examine whether a goal's balance reaches specific milestones—$200, $500, $1,000, and $2,000. These milestones allow us to examine whether goals accumulate relatively small, medium and large amounts of savings, and correspond to roughly the 10th, 20th, 25th, and 50th percentiles of the distribution of users' savings goal targets.

[12] See, for example, https://www.bankofamerica.com/deposits/keep-the-change.

[13] We winsorize maximum balances at the 99th percentile due to some large outliers.

4. Findings

4.1 What categories of saving rules do people implement in pursuit of their savings goals?

Across the three rule categories, contingent spending is the most popular (81 percent) followed by guaranteed saving (41 percent; **Table 2**). The use of contingent nonfinancial rules trails far behind at 2 percent. Some goals—6 percent—do not use a rule from any of the three categories (e.g., use only manual transfers into savings).

TABLE 2: CONTINGENT SPENDING IS THE MOST POPULAR SAVING RULE CATEGORY

Saving rule category	Goals that use at least one rule in category
Guaranteed	41%
Contingent spending	81%
Contingent nonfinancial	2%
Other only	6%

How many rules are people choosing to use, and does this vary between the three rule categories? In short, most goals use only one rule. Looking broadly at the total number of saving rules assigned to goals, the majority of goals (64 percent) use one rule, 19 percent of goals use two rules, and 11 percent of goals use three or more rules (**Table 3**, bottom panel). The average number of rules used per goal is 1.4. This pattern is consistent when looking more narrowly within each category of rules. Among goals that use a contingent spending rule, 95 percent use just one rule in that category (round up is the most popular). The comparable shares of goals that use only one rule in the contingent nonfinancial and guaranteed rule categories are 85 percent and 75 percent, respectively (**Table 3**, top panel). In the contingent nonfinancial category, most goals use a health-related rule, while the most popular rules in the guaranteed category are 52-week challenge (where users save an increasing amount every week for one year), autosave, and payday (these three are similarly popular). Within each rule category, the average number of rules used ranges from 1.1 to 1.3. Finally, while most goals use rules in only one rule category, 28 percent of goals use rules in more than one of the categories—26 percent

combine guaranteed and contingent spending rules, while 2 percent of goals use a different combination.

TABLE 3: MOST GOALS USE ONLY ONE SAVING RULE

Saving rule category	Average number of rules in the category	Share of goals that use…		
		One rule in category	Two rules in category	Three plus rules in category
Guaranteed*	1.3	75%	20%	5%
Contingent spending*	1.1	95%	5%	0%
Contingent nonfinancial*	1.2	85%	11%	4%

	Average number of rules per goal	Share of goals that use**…		
		One rule in total	Two rules in total	Three plus rules in total
Total (all goals)	1.4	64%	19%	11%

* These rows include the subset of goals that use a saving rule in this specified saving rule category.
** These shares do not add to 100 percent because some goals (6 percent) do not use a rule from any of the three categories (e.g., use only manual transfers into savings).

4.2 How often and how much do people save using different saving rule categories?

Looking across all transactions triggered by a saving rule, individual transaction amounts tend to be small—the average amount saved per transaction is $2.62 (**Table 4**). However, the average amounts saved per transaction differs substantially across the three rule categories, ranging from a low of $1.40 for contingent spending rules to a high of $32.57 for guaranteed rules. The amount for contingent nonfinancial rules falls in the middle, although closer to the contingent spending amount, at $4.02.

TABLE 4: SAVINGS TRANSACTION AMOUNTS AND FREQUENCY DIFFER SUBSTANTIALLY ACROSS RULE CATEGORIES

Saving rule category	Average amount per transaction	Average number of transactions per month	Average amount per month
Guaranteed	$32.57	5	$167.84
Contingent spending	$1.40	58	$80.36
Contingent nonfinancial	$4.02	9	$35.32
Total	$2.62	51	$136.36

While the average transaction amount is lowest for contingent spending rules, these rules are triggered far more frequently than the other rules. On average, contingent spending rules are triggered 58 times per month, while contingent nonfinancial rules and guaranteed rules are triggered only a fraction as often—an average of 9 times and 5 times per month, respectively.

Turning to the amount saved per month (versus per transaction), guaranteed rules have the highest average amount saved per month ($167.84), followed by contingent spending rules ($80.36) and contingent nonfinancial rules ($35.32). The sizeable amount saved per transaction for guaranteed rules, even when coupled with fewer transactions per month, results in their having the highest amount saved per month. Although contingent spending rules have the lowest average amount saved per transaction, the high transfer frequency results in their having the second highest average amount saved per month.

4.3 How do saving rule categories relate to the amount saved and the likelihood of achieving specific milestones within one year?

Our analysis of the relationship between saving rule categories and the amount of savings reached examines multiple measures of savings. Specifically, we examine the (1) maximum balance in the Qapital savings account in the first year and (2) indicators for whether the Qapital savings account achieved specific savings milestones in the first year ($200, $500, $1,000, and

$2,000).[14] The share of goals that reach these milestones within a year are: 45 percent ($200), 25 percent ($500), 13 percent ($1,000), and 5 percent ($2,000). For each of these five measures of savings, we use an ordinary least squares regression model to estimate the relationship between savings and the number of rules used in each of the three saving rule categories (guaranteed, contingent spending, and contingent nonfinancial).[15] Examining these various milestones allows us to explore whether the relative position of the three saving rule categories changes as we move from lower to higher savings milestones. In all models, we also include controls for whether a goal used other transfer approaches to save (e.g., use manual transfers), the target amount, and an indicator for whether the goal was created after the onset of the COVID-19 pandemic.[16]

We note two caveats with our analysis. First, we only see the amount users save in their Qapital account; we do not observe savings outside the Qapital app so we have an incomplete picture of their savings. Second, because Qapital users choose the rules they save by, as well as all other elements of the saving decisions (e.g., what to save for, target amount of savings), we do not estimate the causal effect of saving rules on savings outcomes, but rather we estimate the association between saving rules and savings outcomes. Nonetheless, these findings provide new insight into how saving rules are related to savings outcomes.

Overall, results from the regression analyses described below suggest that guaranteed saving rules are associated with greater savings than contingent spending or contingent nonfinancial rules. This finding holds in models that examine the maximum balance attained in the first year and in models that examine the specific savings milestones (i.e., save $200, $500, $1,000, and $2,000 in the first year). Generally speaking, guaranteed saving rules are associated with roughly a 1.5 to 3.5 times larger increase in maximum amount saved and in the likelihood of

[14] As mentioned above, we winsorize maximum balances at the 99th percentile due to some large outliers.

[15] Probit models examining the likelihood of achieving each of the milestones yield qualitatively similar results. The regression models are specified as $Y_g = \alpha + \beta_1(Guar_g) + \beta_2(ContSpend_g) + \beta_3(ContNonFin_g) + \delta_1 X_g + \varepsilon_g$ (the subscript "g" indicates goals) where Y_g is the dependent variable (e.g., maximum balance of goal account in the first year, indicator of whether the balance of the goal account reaches at least $500 in the first year), $guar_g$ is the number of guaranteed rules the goal uses, $ContSpend_g$ is the number of contingent spending rules the goal uses, $ContNonFin_g$ is the number of contingent nonfinancial rules the goal uses, X_g is a vector of other goal characteristics (number of other rules and transaction types (e.g., interest payments and fee refunds), whether the goal used manual transfers, measure(s) of savings target amount, and an indicator for whether the goal was created after the onset of the COVID-19 pandemic), and ε_g is the error term. The primary coefficients of interest—β_1, β_2, and β_3—are discussed below and presented in Figures 1 and 2.

[16] More specifically, our models include controls for the number of other rules and transaction types (such as interest payments and fee refunds), whether the goal used manual transfers, and whether a target amount was not specified. Additionally, the model for maximum balance reached, includes a logarithmic transformation of a goal's target amount (due to several large outliers) and the savings milestone models (e.g., $200) include an indicator of whether the target amount is less than the milestone amount. The variable indicating whether the goal was created after the onset of the pandemic uses March 11, 2020, the date the World Health Organization declared COVID-19 a pandemic.

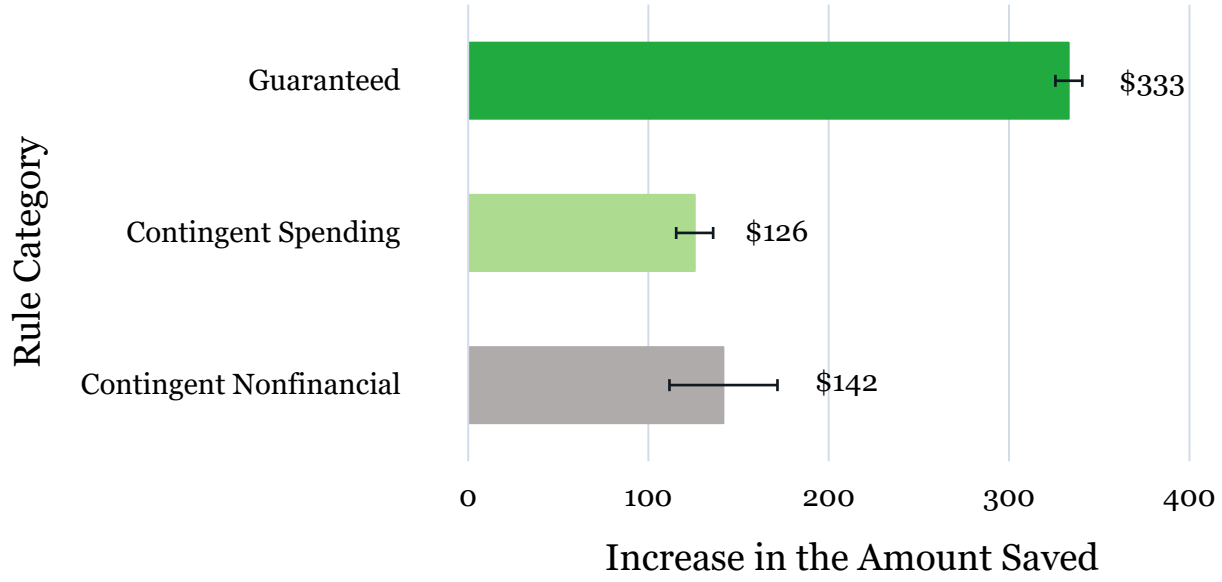
milestone attainment than contingent rules. We discuss the results from the amount saved and savings milestone regression models in turn below.

4.3.1 Amount saved

Analyses of the amount users save find that, on average, each guaranteed saving rule a user adopts is associated with a $333 increase in the maximum balance within the first year (**Figure 1**).[17] As the average amount saved in the first year is $482, this $333 represents a 69 percent increase relative to the average.

FIGURE 1: EACH GUARANTEED SAVING RULE IS ASSOCIATED WITH A LARGER INCREASE IN THE MAXIMUM ACCOUNT BALANCE THAN EACH CONTINGENT RULE

Association between saving rule categories and maximum account balance within the first year



Note: This figure presents coefficients from the regression model that estimates the relationship between maximum account balance in the first year and the number of rules used in each of the three saving rule categories (guaranteed, contingent spending, and contingent nonfinancial). The bars show the 95 percent confidence interval for each estimated coefficient.

[17] Figure 1 presents results from our regression model where the dependent variable is maximum account balance in the first year. This model includes the number of guaranteed rules the goal uses (see "$guar_g$" in the earlier footnote). The estimated coefficient of $333 indicates that, on average, each guaranteed saving rule a goal uses is associated with a $333 increase in the maximum account balance. While this specification does not separately estimate whether the relationship differs, for example, when moving from zero to one or one to two guaranteed rules, results from sensitivity analyses with a more flexible regression specification suggest the relationship is approximately linear. Specifically, these models (not shown) find that moving from zero to one guaranteed rule is associated with a similar increase in the maximum balance as moving from one to two (and two to three) guaranteed rules.

Turning to the contingent rules, we find that, on average, each contingent spending rule a user adopts is associated with a $126 increase in the maximum balance, while each contingent nonfinancial rule is associated with a $142 increase in the maximum balance (**Figure 1**). Both contingent rule categories are associated with less savings accumulation than guaranteed rules: the magnitudes of these estimates suggest that each guaranteed saving rule is associated with about a 2.5 times larger increase in maximum balance than each contingent rule.

4.3.2 Savings milestones

Consistent with the findings above, analyses that examine specific savings milestones (i.e., reaching $200, $500, $1,000, and $2,000 within 12 months) find that guaranteed saving rules are associated with a larger increase in the likelihood of milestone attainment than contingent rules. We do, however, find differences in the magnitudes across the different milestones.

Looking first at the likelihood of saving $200 within the first year, we find that, on average, each guaranteed saving rule a user adopts is associated with a 20 percentage point increase in the likelihood of saving at least $200 (**Figure 2**, first set of bars).[18] With nearly half (45 percent) of goals reaching $200 in the first year, this 20 percentage point increase represents a 44 percent increase relative to the sample mean. We find smaller estimated magnitudes for the contingent rules. Specifically, we find that each contingent spending rule a user adopts is associated with a 13 percentage point increase in reaching $200, while each contingent nonfinancial rule a user adopts is associated with a considerably smaller 3 percentage point increase in the likelihood of reaching $200 in the first year.

For the other three savings milestones (i.e., $500, $1,000, $2,000), we again find that guaranteed saving rules are associated with a larger increase in the likelihood of reaching the milestone in the first year than contingent rules (**Figure 2**). In general, guaranteed spending rules are associated with a 1.5 to 3.5 times larger increase in the likelihood of reaching each milestone than contingent rules.

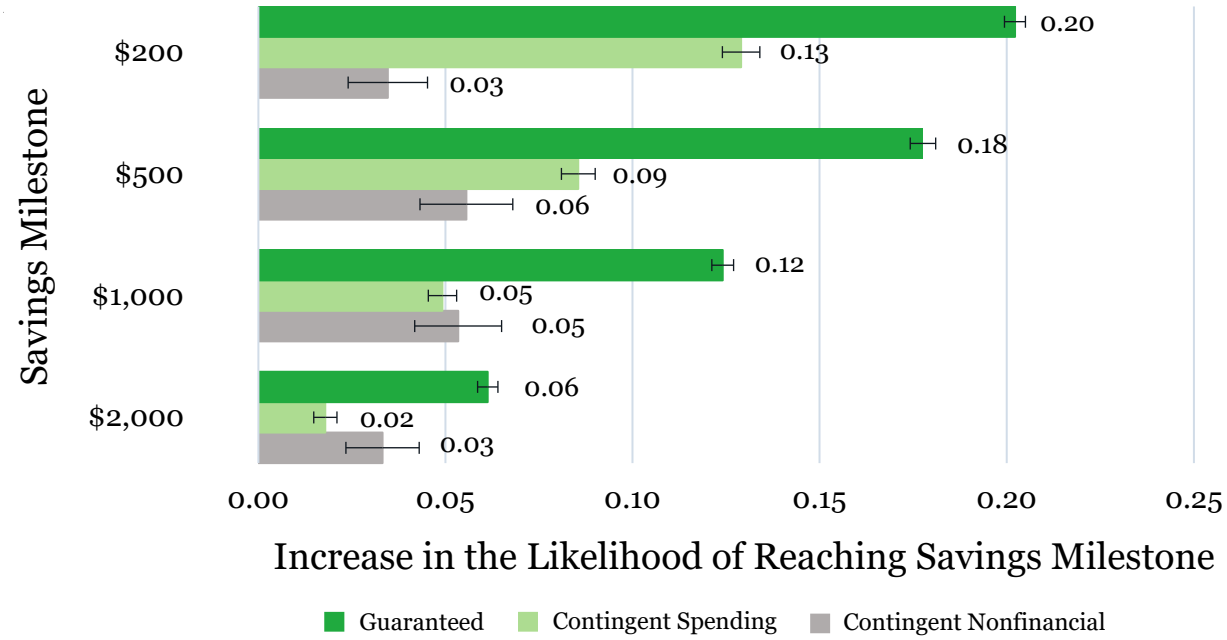
Figure 2 shows that the magnitudes of the estimated coefficients tend to decline as we move to higher milestone amounts (i.e., from $200 to $2,000), consistent with a lower share of goals reaching the higher milestone amounts within the first year. The decline is particularly pronounced for contingent spending rules. While contingent spending rules are associated with a larger increase in the likelihood of achieving small savings milestones ($200 and $500) than contingent nonfinancial rules, the difference is statistically indistinguishable at the $1,000 milestone, and contingent spending rules are associated with a statistically smaller increase in

[18] Figure 2 presents results from four separate regression models where the dependent variables indicate whether the goal reached a specific savings milestone (i.e., $200, $500, $1,000, and $2,000) within the first year.

the likelihood of reaching $2,000 than contingent nonfinancial rules. Thus, while contingent spending rules (like round up) may help users save small amounts, they may be less effective than other methods in achieving higher savings balances.

FIGURE 2: EACH GUARANTEED SAVING RULE IS ASSOCIATED WITH A LARGER INCREASE IN THE LIKELIHOOD OF REACHING SAVINGS MILESTONES THAN EACH CONTINGENT RULE

Association between saving rule categories and the likelihood of reaching specific savings milestones within the first year



Note: This figure presents estimated coefficients from regression models that estimate the relationship between savings milestones and the number of rules used in each of the three saving rule categories (guaranteed, contingent spending, and contingent nonfinancial). The bars show the 95 percent confidence interval for each estimated coefficient.

5. Conclusion

The findings in this report provide new insights into the relationship between automated saving rules and savings outcomes. We analyze consumers' use of different automated saving rules—guaranteed, contingent spending, and contingent nonfinancial—and how these rules relate to the amount saved. We do this using new data from a mobile savings app—Qapital—that allows consumers to customize savings goals and the rules they use to save.

We find that contingent spending rules, such as rounding up purchases to the nearest dollar and saving the rounded amount, are the most popular (used by 81 percent of goals). These are followed by guaranteed rules (41 percent) and contingent nonfinancial rules (2 percent). While contingent spending rules are the most popular, their use is associated with lower savings accumulation than guaranteed saving rules, which enable more traditional strategies such as save on payday or every Friday. We find that guaranteed saving rules are associated with greater savings than contingent rules—roughly a 1.5 to 3.5 times larger increase in the maximum amount saved and in the likelihood of achieving specific milestones (e.g., $500, $1,000). While contingent spending rules are triggered most often, the individual transaction amounts are small, yielding lower savings than guaranteed saving approaches.

Numerous financial institutions and apps allow users to link saving to their spending behavior and use other behavior-based saving triggers, although relatively little is known about the efficacy of these saving strategies. It is possible that these behavior-based strategies help people build savings—either by starting to save or supplementing their existing saving strategies—by linking saving to routine behaviors in their day-to-day lives. Conversely, behavior-based saving strategies could have the unintended negative consequence of lowering savings by diverting consumers from more traditional, guaranteed saving strategies. Our research only estimates the relationship between saving rules and amount saved, not any causal effects of saving rules on amount saved, so we cannot quantify whether or how often behavior-based strategies supplement or crowd out more traditional saving approaches. However, our findings warrant further research (e.g., field experiments) examining the causal effects of automation and behavior-based strategies on consumers' finances.

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7. Appendix: Insights into savings goal categories and changes with COVID-19

Despite the growing prevalence and popularity of automated financial services, little is known about what goals consumers use automation technology to pursue and how this might have changed during the COVID-19 pandemic. The analyses presented here use de-identified Qapital data to explore (1) what kinds of goals consumers are saving for and how much are they trying to save and (2) whether consumers' savings goals changed after the onset of the COVID-19 pandemic.

Our analyses are based on a dataset of 147,100 unique savings goals Qapital users created between January 2019 and September 2021.[19] As in the research report, we restrict analyses to each user's first goal and to goals that received at least $1.00 in deposits.

When Qapital users create a savings goal, they are asked to specify what they are saving for and a target savings amount. For example, a user might specify the goal label "Rainy day fund" with a savings target of $1,000. In previous research by Qapital and Common Cents Lab, these goal labels were classified into one of 39 goal categories (e.g., *Travel/Vacation* or *Emergency Savings*). We proceed using these 39 goal categories to answer our research questions.[20]

What are consumers who use automation saving for and how much are they trying to save?

Among the savings goal categories, seven categories comprise most savings goals.[21] **Figure 3** (left) displays these seven categories and the share of goals belonging to each category across the nearly three-year observation period. The three most common goal categories are *Travel/Vacation* (20 percent), *Debt* (15 percent), and *Emergency Savings* (6 percent).

[19] This dataset is larger than the one analyzed in the research report because the analyses reported here do not require an observation period of one year. We therefore include in our dataset an additional 19,857 goals that were opened after September, 2020.

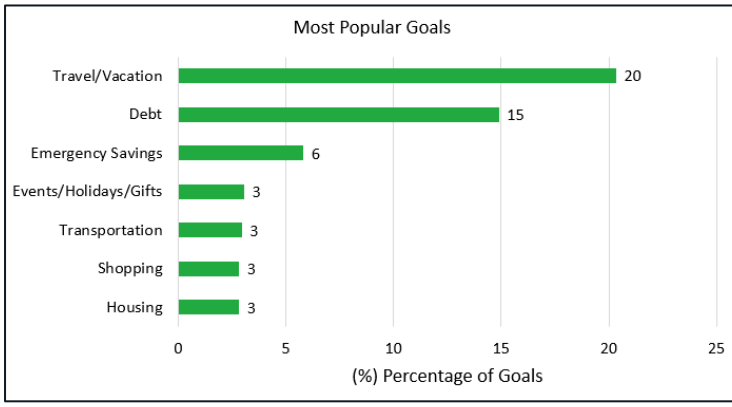
[20] The user-defined goal labels are sorted into broad categories by a machine learning classification algorithm previously developed by Qapital and Common Cents Lab. A miscellaneous category contains goals for which there was no consumer-generated label and goals with labels that the machine learning method struggled to classify. Because this category contains many unspecified or otherwise unclassifiable goals, we exclude it from our analyses.

[21] This excludes the miscellaneous category noted in the prior footnote.

Events/Holidays/Gifts, *Transportation*, *Shopping*, and *Housing* each represent about 3 percent of goals, and the remaining 32 goal categories (not displayed) each make up less than 1 percent of the total.

Just how much are consumers trying to save using Qapital? About 90 percent of the goals have a target amount specified by the user. **Figure 3** (right) displays the median of these user-defined target savings amounts within each category of goal.[22] Typical target amounts are in the thousands of dollars but depend on the goal categories. Among the seven most popular goal categories, those with the largest target amounts are *Housing* and *Debt*, while those with the smallest target amounts are *Travel/Vacation*, *Shopping*, and *Events/Holidays/Gifts*.

FIGURE 3: THE MOST POPULAR GOAL LABEL CATEGORIES ARE *TRAVEL/VACATION*, *DEBT*, AND *EMERGENCY SAVINGS*; SAVINGS GOAL LABEL CATEGORIES VARY IN THEIR TARGET AMOUNTS



Goal Category	Median Savings Target Amount
Travel/Vacation	$1800
Debt	$5000
Emergency Savings	$3000
Events/Holidays/Gifts	$2000
Transportation	$3921
Shopping	$2000
Housing	$5000

Note: The left panel displays the percentage of goals in each goal label category. The right panel displays the median target amount for each savings goal label category.

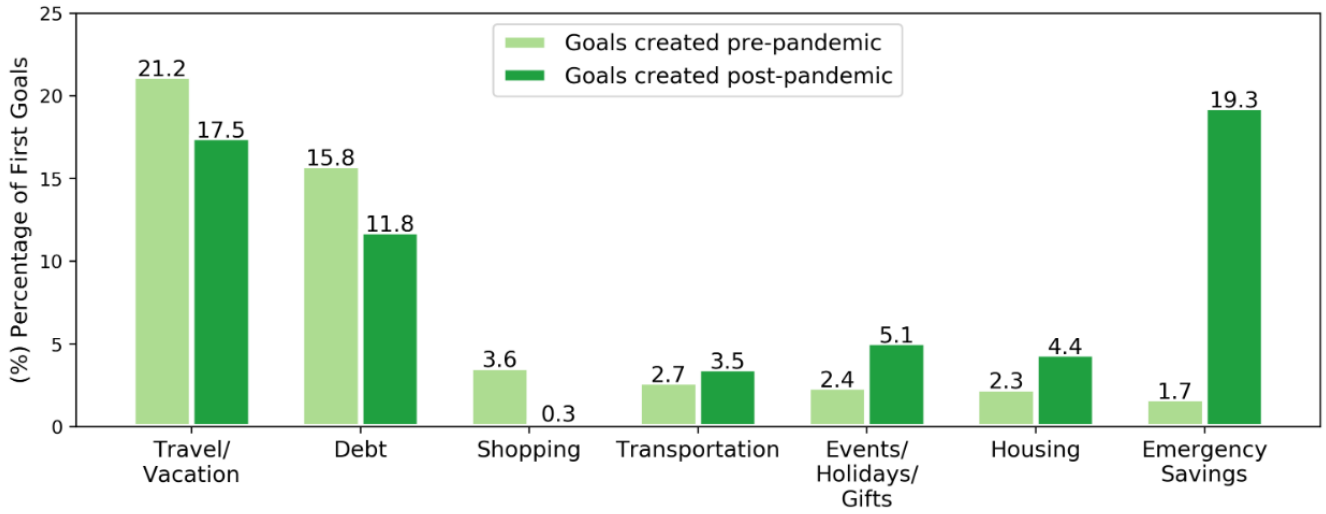
How did the popularity of automated savings goal categories change with the COVID-19 pandemic?

The most popular savings goal categories change substantially after the beginning of the COVID-19 pandemic. **Figure 4** displays this pattern by plotting goal category popularity for goals created before and after the start of the pandemic. This figure shows a notable decrease in the popularity of *Travel/Vacation*, *Debt*, and *Shopping*, and an increase in the popularity of *Transportation*, *Events/Holidays/Gifts*, *Housing* and *Emergency Savings*. Some of these changes align with broader trends in the U.S. economy during this time. For example, the

[22] To compute these medians, we excluded 15,238 goals that did not have a target amount entered (approximately 10 percent of the sample).

decline in *Travel/Vacation* goals aligns with the decrease in travel in 2020 and 2021 as many attractions shut down and the public was urged to stay home.[23]

FIGURE 4: THE POPULARITY OF SEVERAL SAVINGS GOAL LABEL CATEGORIES CHANGED AFTER THE ONSET OF THE COVID-19 PANDEMIC, WITH A PARTICULARLY LARGE INCREASE IN EMERGENCY SAVINGS



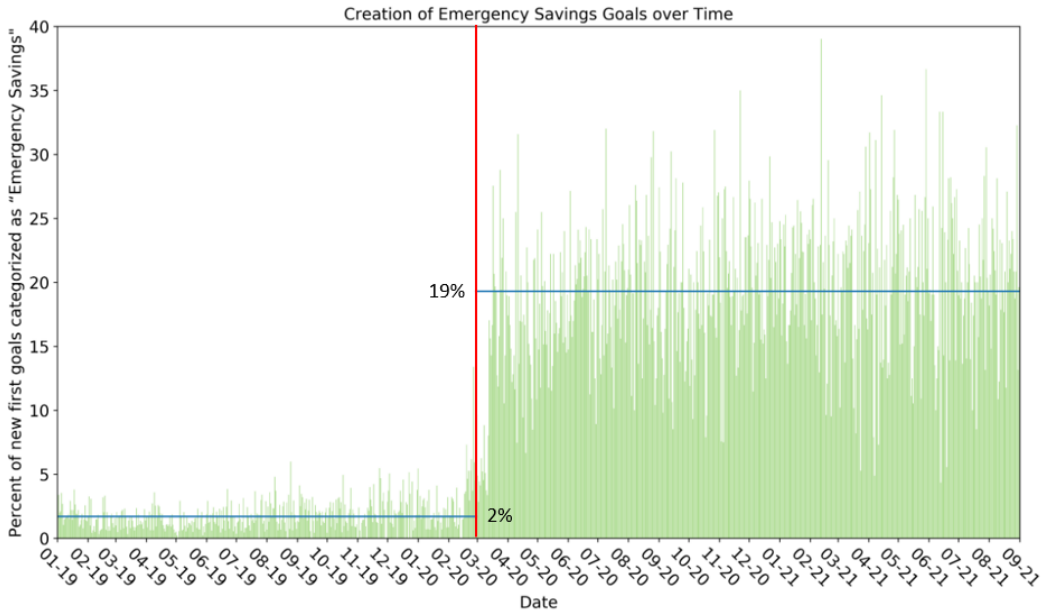
Note: A goal in the pre-pandemic period was defined as starting before 03/11/2020, the date the World Health Organization declared COVID-19 to be a pandemic.

The most striking change is in the popularity of *Emergency Savings* goals (see **Figure 5** for a detailed look at daily rates of goals established in this category). Specifically, *Emergency Savings* goals increased from representing 1.7 percent of Qapital users' goals during the pre-pandemic period to 19.3 percent after the pandemic emerged—over an elevenfold increase in popularity. Part of this increase likely can be explained by an uptick in marketing *Emergency Savings* goals by the app provider.[24] However, we suspect that it was also driven by the many financial impacts of the pandemic.

[23] https://www.nytimes.com/2021/03/08/travel/tourism-2020-coronavirus.html.

[24] Some of this increase likely can be explained by an increase in Qapital's outreach related to *Emergency Savings* goals. However, this category of savings goals began to spike in popularity before the app provider began encouraging users to create goals related to emergency savings.

FIGURE 5: EMERGENCY SAVINGS GOALS INCREASED SUBSTANTIALLY WITH THE ONSET OF THE COVID-19 PANDEMIC



Note: The vertical red line marks the onset of the pandemic and the horizontal blue lines mark the overall percent of goals classified as “Emergency Savings” before and after the beginning of the pandemic.

Takeaways for savings goal categories and COVID-19

Many aspects of consumers’ financial lives shifted after the onset of the COVID-19 pandemic, including what kinds of goals people were using automation to save for. Our analysis reveals that COVID-19 brought with it an increase in the share of goals focused on emergency savings and housing. Other savings goal categories decreased substantially in popularity, including goals related to travel, shopping, and debt repayment.

Although many consumers are just beginning to adopt automation to manage their personal finances and pursue their goals, it is clear that this technology can be used to research what types of goals consumers set for themselves and how these goals change with economic shifts brought about by major world events. More research is needed to learn what kinds of financial automation can be effective (or ineffective) in helping consumers customize, pursue, and achieve their goals.