

Motivating Consumers via Goal Enabling Technology: The Role of Goal Setting Characteristics

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MOTIVATION 1/3

Consumer trend: Consumers are increasingly motivated to achieve physical, mental, social, or financial well-being goals. The self-improvement market is expected to grow by 5.6% per year.

Illustration:



U.S. Personal Development Market

size, by instrument, 2020 - 2030 (USD Billion)



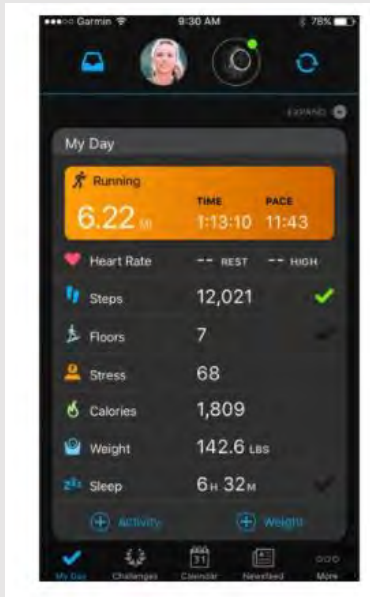
→ Challenge for consumers and companies: How to stay motivated?

MOTIVATION 2/3

Industry trend: Increasing number of companies in this industry employ goal enabling technologies (GETs) allowing consumers to set goals and track goal progress within their company apps

Popular Examples:

Health



Education



Banking



→ Unclear: Given that consumers lack literacy in respective domains: Do they set the right goals?
Is GET usage beneficial for the customer? For the company?

MOTIVATION 3/3

Selection effect: Consumers adopting GETs may be inherently different from consumers not adopting GETs, which complicates the assessment of GET effectiveness

General Relevance:

- Identifying and estimating the causal impact of a treatment is difficult if the treatment is not allocated randomly.
- Effectiveness of treatment may further depend on characteristics of treated unit
- Usual difference in difference methods require parallel trend of treated and untreated units before intervention

Some Related Examples:

- Effect of Brexit on UK productivity (may vary by region)
- Payment disclosure effect on physical prescription behavior (may vary by physician characteristics)
- Mobile hailing technology adoption on drivers' hourly earnings (may vary by driver characteristics)

→ **How to identify the impact of GET and its boundary conditions statistically?**

DATA

A Data from Raiz Invest, Australia's No1 investment app;
Consumers can make deposits via

- Lump sums
- Round ups
- Auto- investments

B GET (launched 22nd March 2018)

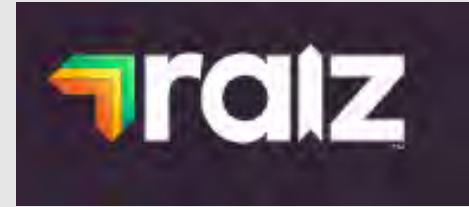
- Only one goal at a time
- Allows to set specific saving amount & name goal
- Displays time to achieve goal

- ~10% of customers adopted GET since launch
- Median size goal ~\$5k
- Median weekly contribution ~\$25

C Progress feedback

- Via sliding bar
- Only upon sign-in when selecting respective tab

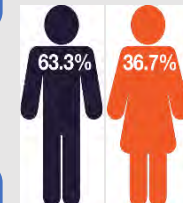
→ Unique dataset where we observe rather than force or infer goals



<https://raizinvest.com.au/blog/how-raiz-works/>

240,000+
Active
customers

1 Million+
downloads



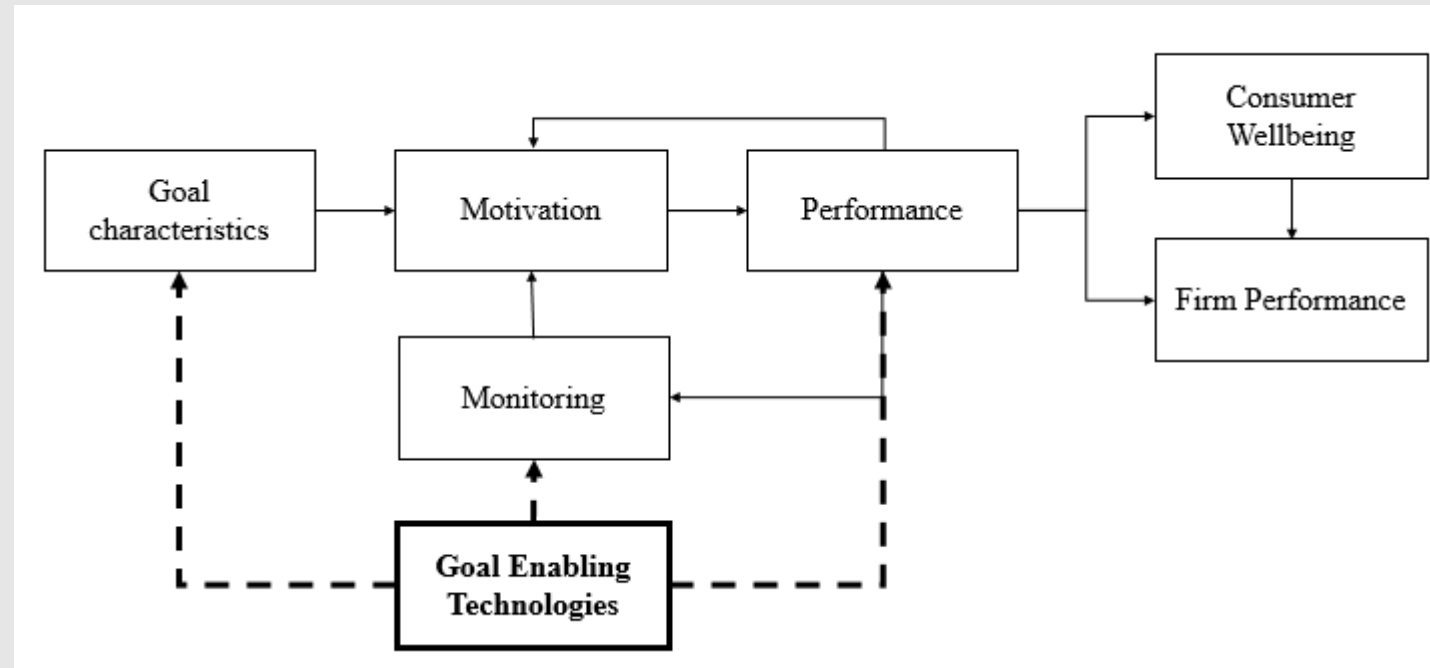
84%
between
18 – 44 years

80%
invest
once a month

IMPACT OF GETs

GETs functionality: GET makes goals specific at desired level of difficulty, enables monitoring of progress and allows precommitment of resources, thus directly impacting performance

Illustration:

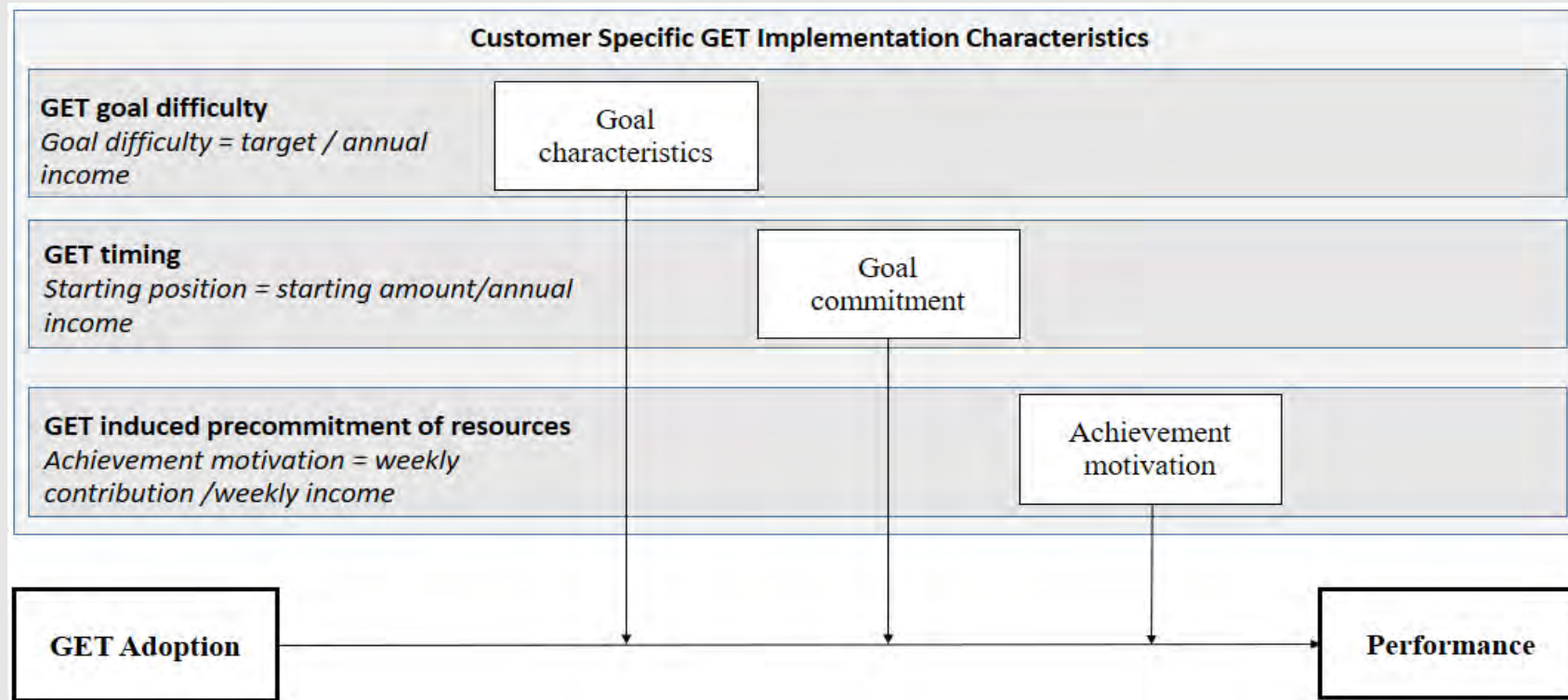


→ GETs influence several elements of the technology-facilitated self-improvement chain

PERSONALIZATION OF GET

GET personalization: GET usage is customer specific as customers differ in the goal they set, their commitment to the goal and their achievement motivation

Illustration:



→ Effectiveness of GET adoption may depend on boundary conditions

METHOD – SYNTHETIC CONTROL

Basic Idea:

- combine (using weights) untreated units so that they mimic the behavior of the treated unit as closely as possible before the treatment

$$\sum_{i=1}^{I_0} w_i^{i^*} Y_{jit} = Y_{j i^* t}$$

i^* = treated unit
 i = untreated unit
 $w_i^{i^*}$ = weight
 Y_{jit} = outcome variable j
 $t < T_0^{i^*}$ (time of treatment)

- compare behavior of combined unit with treated unit after treatment, which gives the effect of the treatment on outcome j

$$\hat{\alpha}_{jt}^{j^*} = Y_{j i^* t} - \sum_{i=1}^{I_0} w_i^{i^*} Y_{jit}, \quad t > T_0^{i^*}$$

Requirements

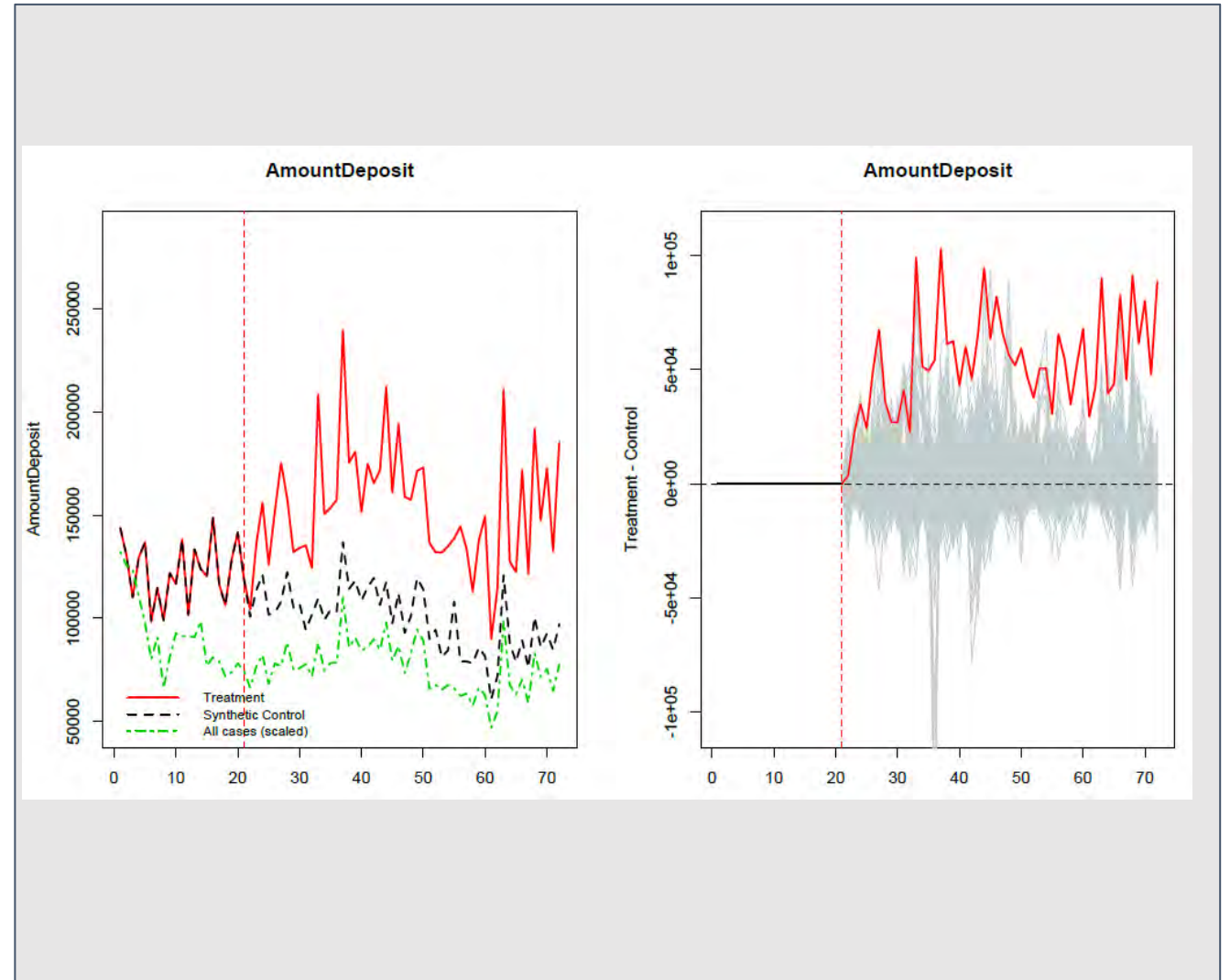
- 1) Size of treatment effect must be sufficiently large relative to the volatility of the outcome variables
- 2) Existence of suitable comparison group
- 3) No anticipation effect of the intervention
- 4) No spillover effects between units
- 5) Differences in the pre-treatment characteristics between the treated units and the synthetic control must be small

METHOD – SYNTHETIC CONTROL

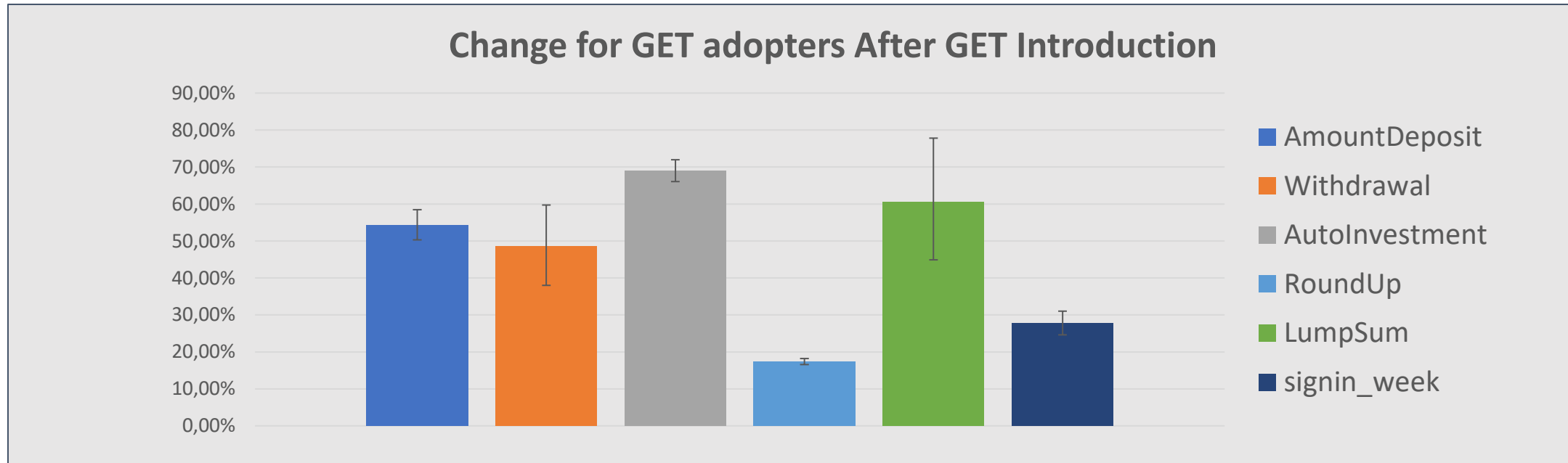
Compare outcomes (savings, sign-ins, etc) of **all** GET adopters against the outcomes of an artificial (synthetic) consumer being a weighted average of GET non adopters.

Based on weekly data from 21 weeks before launch of goal feature till 52 weeks after launch; 3114 customers set goals, 40468 controls

Robustness of effects tested using different methods including cohort analysis, PSM, backdating

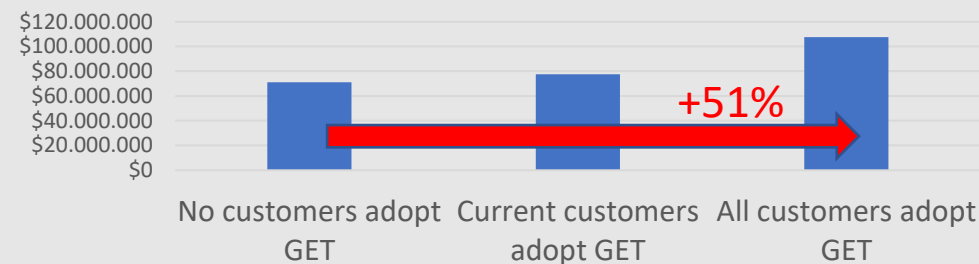


AVERAGE TREATMENT EFFECTS



GET adopters show more **positive** engagement with the company (higher deposits, more sign-ins & referrals etc), but also **more withdrawals**

Economic implications Sum of residual life-time values over current active customers:

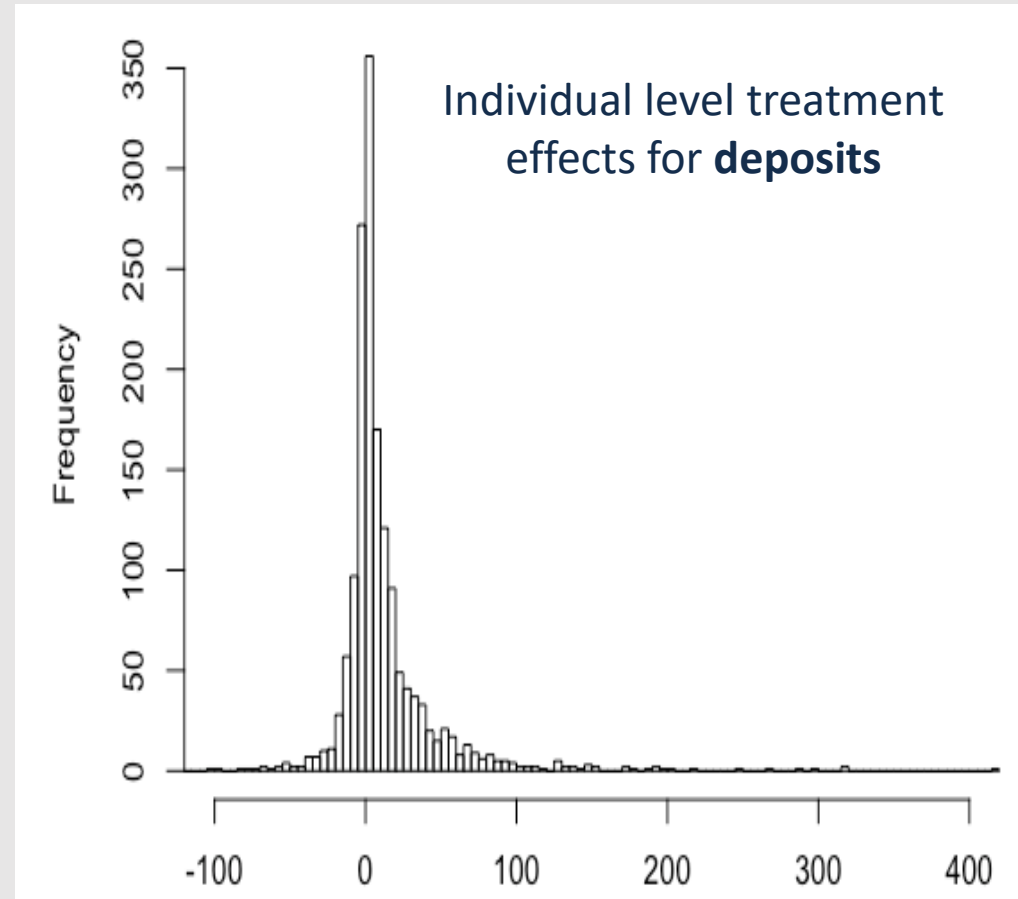


HETEROGENEOUS TREATMENT EFFECTS

We extend existing methods for micro-level data (Robins et al 2017) by estimating treatment effects for **each** GET adopter; we **bootstrap** candidate sets from the non-treated customers to obtain standard errors of the treatment effect

Heterogeneity in treatment effects is evident: only ~70% of consumers exhibit positive change in behavior after GET adoption

Heterogeneity in treatment effects is evident



BOUNDARY CONDITIONS

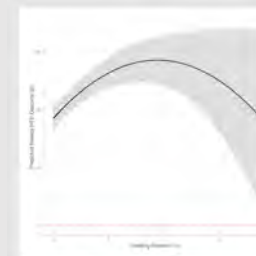
We use weighted regression of individual customers' average treatment effects for **deposits** on customer characteristics (gender, age, income, employment,...) and **goal implementation characteristics** to determine boundary effects of GET effectiveness

	Dependent variable:					
	Weekly HTE (Total Deposits)					
	(1)		(2)		(3)	
Age	0.055	(0.054)			0.096*	(0.051)
Gender: Male	0.096	(1.031)			0.201	(0.996)
Gender: Unknown	-0.487	(3.485)			-2.505	(3.298)
Income ($\times 100$)	0.004**	(0.002)			0.010***	(0.002)
Portfolio Risk Preference	1.661***	(0.390)			1.289***	(0.380)
Goal Pre-Commitment			4.978***	(1.164)	5.248***	(1.178)
Goal Pre-Commitment ²			-0.691***	(0.242)	-0.702***	(0.242)
Goal Difficulty			0.295***	(0.081)	0.274***	(0.081)
Goal Difficulty ²			-0.004***	(0.001)	-0.003***	(0.001)
Achievement Motivation			3.709***	(0.311)	3.918***	(0.309)
Achievement Motivation ²			-0.146***	(0.016)	-0.148***	(0.016)
Constant	5.312**	(2.341)	4.677***	(0.906)	-9.757***	(2.387)
R ²	0.011		0.098		0.122	

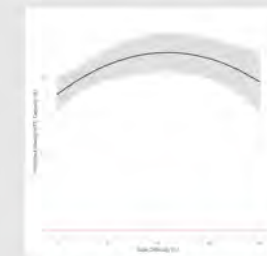
n = 2,484; *p<0.1; **p<0.05; ***p<0.01 (two-sided); Standard errors in parentheses.

Performance is maximized if

- starting position=3.8%
- goal difficulty=43.6%
- achiev. motivation=13.4%.



Starting position



Goal difficulty



Achievement motivation

TAKE HOME MESSAGES

GETs can help improve customer and firm performance, but GET setting should be guided to be effective.

Synthetic control method applied at microlevel and combined with weighted regression can be used to investigate heterogeneous treatment effects

THANK YOU!

Christine.Eckert@ebs.edu

BACKUP

STA

Literature On Goal Setting

- Goals influence decision making (Bagozzi & Dholakia 2016)
- Attaining goals can increase satisfaction and loyalty (Heitman et al 2007)
- High Specificity of goal increases motivation for goal pursuit (Wallace & Etkin, 2018)
- Failure to achieve goal can decrease motivation (Soman & Cheema, 2004)

→ Goals increase motivation, but can backfire – unclear external validity

Literature on CRM

- Satisfaction, affective commitment & customer engagement predecessors to successful CRM (Verhoef 2003, Verhoef et al 2010)
- Positive impact of customer centricity on customer satisfaction (Payne & Frow 2005)
- Focus on loyalty programs and direct mailings (Rust & Verhoef, 2005)

→ Goals tick all boxes, but haven't been studied from a CRM perspective

Literature on Gamification

- Goal features have several game design elements such as clear objective, several possibilities to achieve it, limited resources to do so
- Gamification has experienced huge uptake in industry
- discrepancy between popularity and research into effectiveness (Harwood & Garry, 2015)

→ Goals related to gamification, but scarce literature wrt the latter

RESEARCH GAP AND RESEARCH AIM

RESEARCH GAP

Service providers such as **fitness apps, online education or financial services** allow customers to set individual goals

Literature on customer relationship management, goal setting and gamification would predict **impact of GET adoption on goal congruent behaviour** (Verhoef et al. 2010, Bagozzi & Dholakia 2016, Harwood & Garry 2015), but **effect is likely to depend on boundary conditions** (Soman & Cheema, 2004)

→ **Lack of empirical investigation of effect of GETs despite ubiquity in industry practice**

RESEARCH AIM

Study how introducing GETs affects **value for consumer and customer value** for service providers

Investigate **boundary conditions** of this effect & derive suggestions for successful **implementation** of GETs

→ **Improve managerial practice by providing research based evidence of usefulness and limitations of GETs**

Methodological Contributions

- Extended micro-level synthetic control approach to allow for individual-specific treatment effects
- Weighted regression of individual treatment effects on individual covariates

→ Individual level alternative to diff-in-diff approach

Managerial Contributions

- Goal features can significantly increase customer retention and customer equity
- Effect is contingent on design of goal feature: very long horizons decrease effect

→ Size and boundary condition for goal features' effectiveness

Future Research Opportunities

- Test effect of goal features in other service settings
- Methodology can be applied to any situation where a) it is difficult to find control group, b) impact of covariates on effects is of interest, e.g. effectiveness of micro-targeting of ads

→ Methodological & context specific future opportunities

DATA

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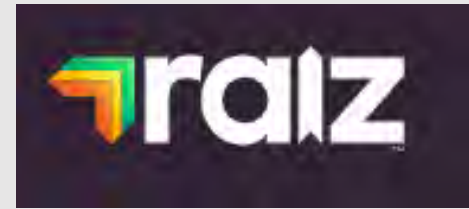
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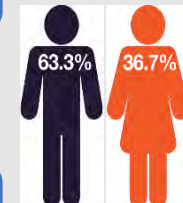
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DATA DESCRIPTIVES

- Weekly transaction data from Oct 2017 to March 2019
- Observations from 2,501 goal adopters & 34,331 non-adopters
- Observation of deposits (3 main types), withdrawals, measures of customer engagement, demographics & email activity by company
- For goal adopters:
 - Median goal amount: \$5000
 - Median weekly contribution: \$25
 - Median starting balance: \$472

Descriptive statistics before and after GET was introduced

	Non-Adopters		Adopters	
	Before	After	Before	After
<i>Deposits</i>	33.30 (6.68)	28.67 (3.09)	44.61 (5.19)	57.67 (11.27)
{ <i>AutoInvestments</i>	12.65 (1.20)	12.09 (0.97)	19.74 (2.78)	30.47 (3.58)
{ <i>LumpSums</i>	12.50 (5.66)	8.94 (2.42)	14.91 (3.84)	16.86 (8.44)
{ <i>RoundUps</i>	7.77 (0.80)	6.91 (0.48)	9.58 (0.93)	9.45 (0.61)
<i>Withdrawals</i>	19.96 (5.36)	18.52 (2.53)	26.93 (7.62)	35.76 (8.87)
<i>Signins</i>	0.19 (0.02)	0.20 (0.04)	0.37 (0.04)	0.44 (0.07)
<i>Inactivity</i>	0.07 (0.02)	0.13 (0.01)	0.06 (0.00)	0.06 (0.01)
<i>Age</i>	35.17 (11.41)		32.62 (9.45)	
<i>Income</i>	50k (42k)		46k (37k)	
<i>Gender: Male</i>	59%		58%	
<i>Employment: FullTime</i>	61%		59%	

Values are average weekly amounts per person. Standard deviations in parentheses. All monetary values are in Australian Dollars (AUD).

Q3: COUNTERFACTUALS

Q1: Do customers who used the goal feature perform better over time than those who do not?

→ Overall balance, comprised of deposits minus withdrawals over time.

→ Individual components of deposits.

Q2: Do customers who use the goal feature engage more with the app?

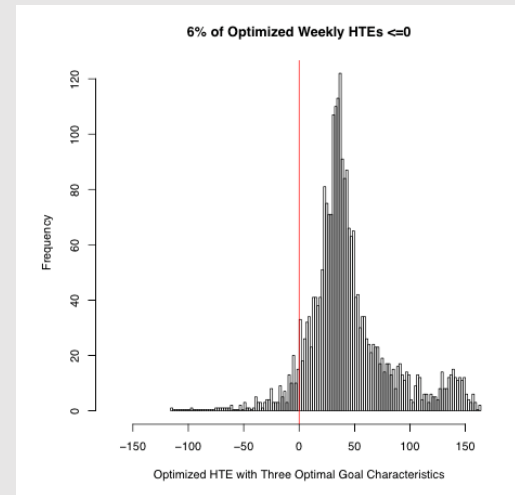
→ Customer app sign-in count, inactivity (balance greater than \$5)

Q3: Heterogenous effects: what goal features moderate the improvement after goal setting?

→ Focus on goal features (initial starting position, goal difficulty, achievement motivation)

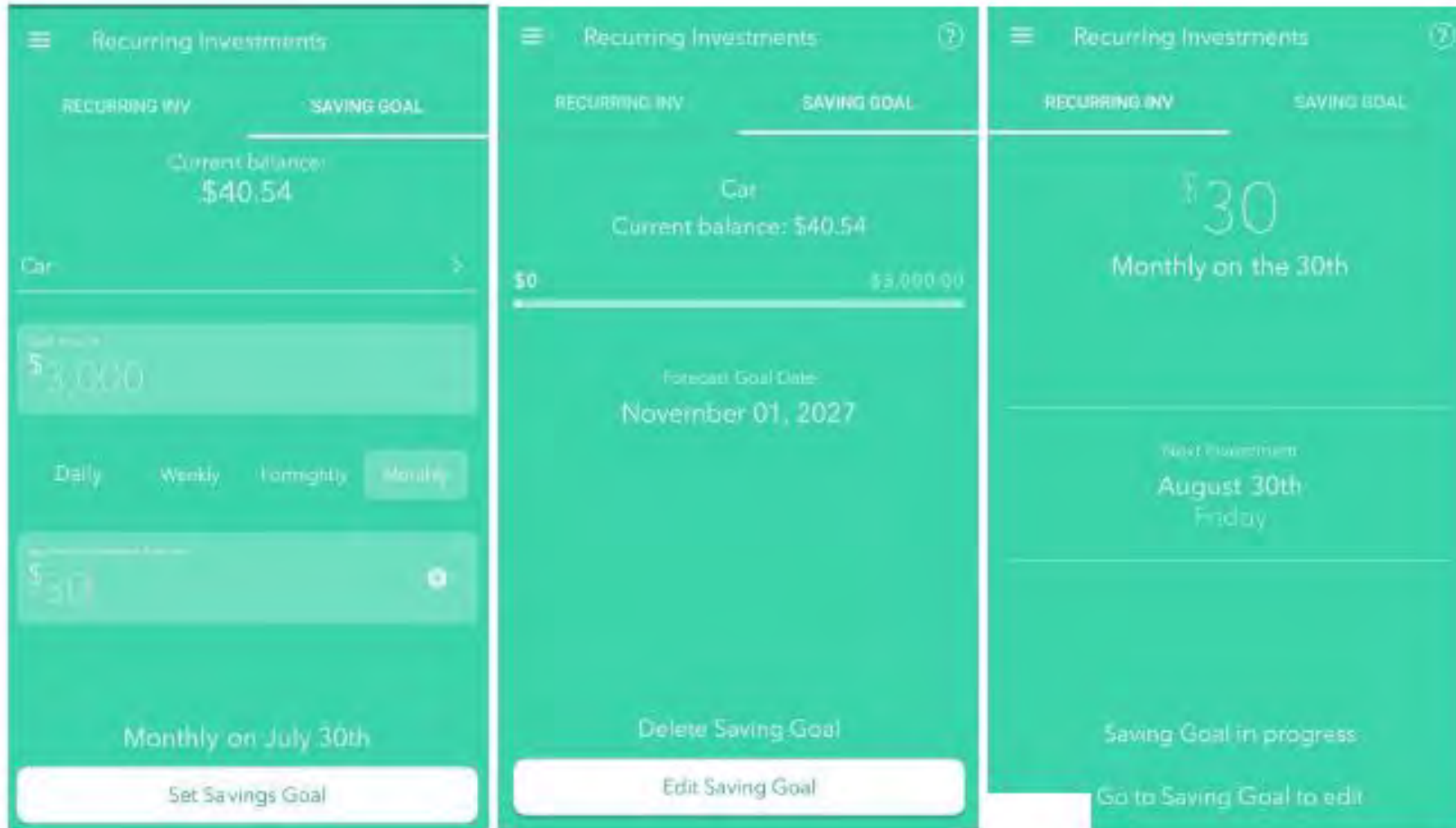
What would happen to HTEs if every GET adopter had adopted GET with best design?

Yearly Income	\$	25,000	\$	50,000	\$	75,000	\$	100,000	\$	125,000
Weekly Income	\$	481	\$	962	\$	1,442	\$	1,923	\$	2,404
Optimal Starting Position (3.8%)	\$	950	\$	1,900	\$	2,850	\$	3,800	\$	4,750
Optimal Goal Difficulty (43.6%)	\$	10,900	\$	21,800	\$	32,700	\$	43,600	\$	54,500
Achievement Motivation (13.4%)	\$	64	\$	129	\$	193	\$	258	\$	322
Years Until Goal Achievements = 3 Years										



→ If each of the GET adopters we observed had adopted the GET at the optimal time with the optimal savings amount and the optimal level of precommitment, then 84% (versus 72%) of them would have benefitted from using the GET

Goal Setting Process

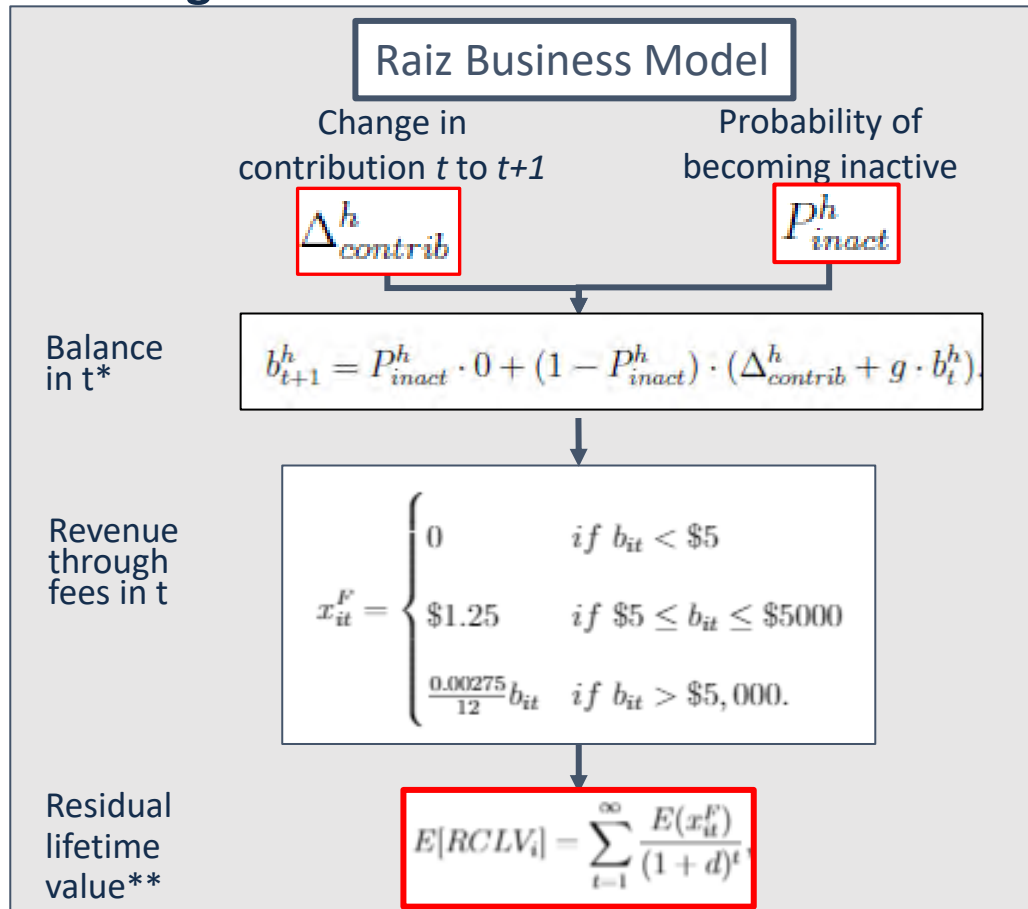


Who sets goals?

<i>Constant</i>	-2.388***	(0.119)
<i>Age</i>	-0.020***	(0.003)
<i>Income</i>	-0.209***	(0.069)
Gender		
<i>Gender:Male</i>	-0.130***	(0.045)
<i>Gender:NA</i>	-0.164	(0.115)
ReasonForInvest		
<i>LongTerm</i>	0.130**	(0.053)
<i>ShortTerm</i>	0.067	(0.058)
<i>Children</i>	0.126	(0.095)
<i>MajorPurchase</i>	0.607***	(0.077)
<i>NA</i>	8.977	(86.166)
AcquisitionChannel		
<i>Referral</i>	-0.176**	(0.068)
<i>NonSocialMedia</i>	-0.277*	(0.165)
<i>SocialMedia</i>	0.387***	(0.064)
Portfolio Risk Preference	0.168***	(0.018)
Employment		
<i>SelfEmployed</i>	-0.147*	(0.087)
<i>FullTime</i>	-0.164**	(0.066)
<i>Student</i>	-0.283***	(0.085)
<i>Unemployed</i>	-0.030	(0.133)
<i>Retired</i>	-0.871***	(0.296)
<i>NA</i>	-8.790	(86.165)
Prelaunch Behavior		
<i>PreAveAutoInvestments</i>		
<i>PreAveRewards</i>		
<i>PreAveRoundUps</i>		
<i>PreAveLumpSums</i>		
<i>PreAveWithdrawals</i>		
<i>PreAveReferrals</i>		
<i>PreAveSignIn</i>		
Log Likelihood	-8974.479	
AkaikeInf.Crit.	17,988.960	
PseudoR2 (McFadden)	0.019	

COUNTERFACTUALS PART 1

What would happen to residual customer lifetime values if we get no/some/all customers to set goals?



➤ From ATE model:

- The net contributions are 53% higher for goal setters
- The probability of becoming inactive is 24.8% lower

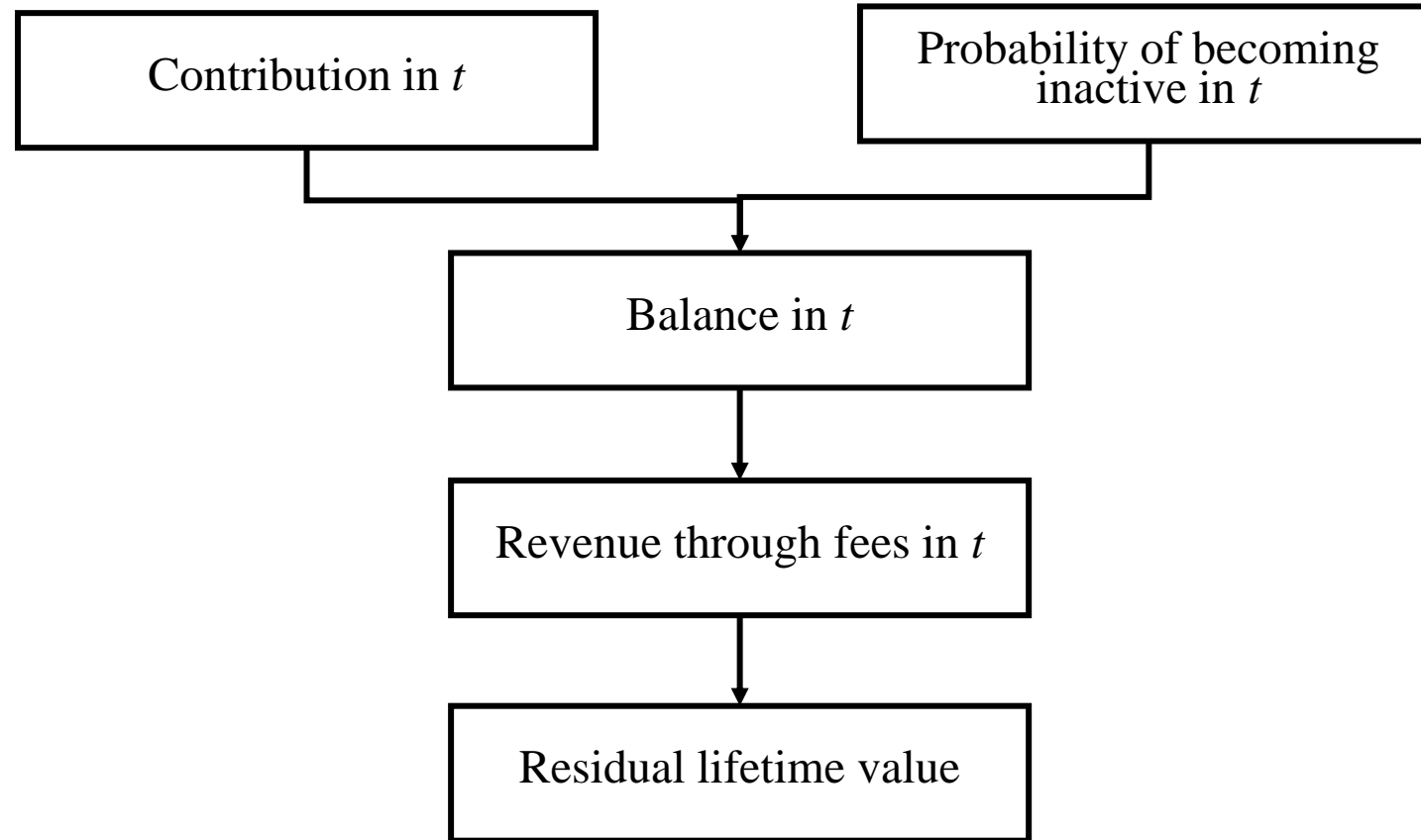
➤ Bootstrapping customer life (20 years):

- Bootstrap 500 balance paths for each customer
- Residual lifetime value \$100 higher for goal setters (\$252 vs \$351) – mainly due to less inactivity

➤ Comparison of scenarios; sum of residual lifetime values over current active customers^{***}:

- No customers use GET: \$42.6m
- Only current goal setters use GET: \$45.5m (+7%)
- All customers use GET: \$59.3m (+39%)

^{***} current active customers = 188,603 (29,339) goal setters



STATE OF KNOWLEDGE

Literature on CRM

- Positive impact of customer centricity on satisfaction (Payne & Frow 2005)
- Satisfaction, affective commitment & customer engagement lead to CRM success (Verhoef et al, 2003, 2010)
- App based engagement initiatives benefit customer relation (Gill et al 2017)

→ GETs tick all boxes, but haven't been studied from a CRM perspective

Literature On Goal Setting

- Goals influence decision making (Bagozzi & Dholakia 2016)
- Attaining goals can increase satisfaction and loyalty (Heitman et al 2007)
- High specificity of goal increases motivation for goal pursuit (Wallace & Etkin, 2018)
- Failure to achieve goal can decrease motivation (Soman & Cheema, 2004)

→ Goals increase motivation, but can backfire – unclear external validity

Literature on Gamification

- Goal features have several game design elements such as clear objective, multiple ways to achieve, and limited resources
- Gamification has experienced huge uptake in industry
- Very limited research into effectiveness (Harwood & Garry , 2015)

→ Goals related to gamification, but limited research on latter

Lit Review

Table 1: Selected Study Findings Highlighting the Complex Chain of Effects in Goal Setting.

Path	Independent Variable	Dependent Variable	Findings
i	Goal Type*	Motivation	<ul style="list-style-type: none"> As goal specificity increases, attention and effort to attain the goal should become more focused (Beehr and Love, 1983). High specificity has also been linked to higher motivation to further pursue the goal, particularly when some progress has already been achieved (Wallace and Etkin, 2018). Specific, difficult goals consistently leads to higher performance than urging people to do their best (Locke and Latham, 2002). Yet, nonspecific goals work better if the person lacks the capacity to perform the task. (Kanfer and Ackerman, 1989) Goal difficulty has an inverse U-shaped effect on motivation: If the goal is too easy, it will not be motivating; if it is too difficult and the limits of ability are reached, goal motivation decreases (Erez and Zidon 1984).
ii	Motivation	Performance	<ul style="list-style-type: none"> In general, there is a positive relationship between motivation and performance (Locke et al. 1981). The positive relationship between motivation and performance is however moderated by capability: High motivation is beneficial under high resources but detrimental under low resources (Roets et al., 2013)
iii	Performance	Motivation	<ul style="list-style-type: none"> Research has shown that motivation changes with goal progress (Kivetz et al., 2006) This relationship is moderated e.g. by goal specificity (Wallace and Etkin, 2018), whether progress is monitored (Bonzetti et al. 2011), or the focus of attention when evaluating goal progress (Koo and Fishbach, 2012).
iv	Performance	Monitoring	<ul style="list-style-type: none"> The intensity of seeking performance feedback depends on the progress of goal pursuit (Huang 2018)
v	Monitoring	Motivation	<ul style="list-style-type: none"> Being able to track goal progress has been shown to increase ad hoc goal congruent behavior (Chaudhry et al., 2020; Cheema and Bagchi, 2011). If the goal is specific, the addition of more information, feedback, or progress indicators may generate complacency and sway motivation away from the end goal (Amir and Ariely 2008); other moderators exist (see meta-analysis study by Harkin et al. 2016)
vi	Performance	Consumer Well-being**	<ul style="list-style-type: none"> Need fulfillment is a major determinant of consumption satisfaction (e.g., Spreng et al. 1996) Wolf et al. (2021) find a positive impact of performance on self-improvement goals on life satisfaction and personal growth.
vii	Consumer	Firm Performance	<ul style="list-style-type: none"> Satisfaction positively affects loyalty, willingness to recommend, and both the amount and the tone of word of mouth (Heitmann et al., 2007). Customer satisfaction is strongly related to future business performance (Morgan and Rego, 2006).

Notes: *We only consider goal specificity and goal difficulty. Other typologies are possible, e.g. subconscious vs conscious (Shantz and Latham 2009), focal vs subordinate (Bagozzi and Dholakia, 1999), intrinsic vs extrinsic (Lee and Pounders 2019), performance vs learning (Latham and Seijts, 1999; Seijts and Latham, 2005) **We define consumer well-being in the spirit of Sirgy and Lee 2008 as a state of objective and subjective wellbeing involved in the various stages of the consumer/offering's life cycle — here in relation to a particular self-improvement service.

HOW COULD GETS IMPACT VALUE FOR RAIZ?

RAIZ' business model (revenue generated through fees):

$$x_{it}^F = \begin{cases} 0 & \text{if } b_{it} < \$5 \text{ (customer is inactive)} \\ \$1.25 & \text{if } \$5 \leq b_{it} \leq \$5000 \\ \frac{0.00275}{12} b_{it} & \text{if } b_{it} > \$5,000. \end{cases}$$

x_{it}^F = revenue through fee for customer i in period t

b_{it} = balance of customer i in period t

GET adoption could lead to...

Higher balances

- Technology allows to **pre-commit resources** (e.g. automated savings plan)
- Technology allows to **track and visualize** goal progress and act upon (e.g. via lump sum payments)

Lower inactivity

- **Act of GET adoption** leads to greater engagement
- **Goal attainment** can lead to higher satisfaction and loyalty

Q1 & Q2: COUNTERFACTUALS

Q1: Do customers who used the goal feature perform better over time than those who do not?

→ Overall balance, comprised of deposits minus withdrawals over time.

→ Individual components of deposits.

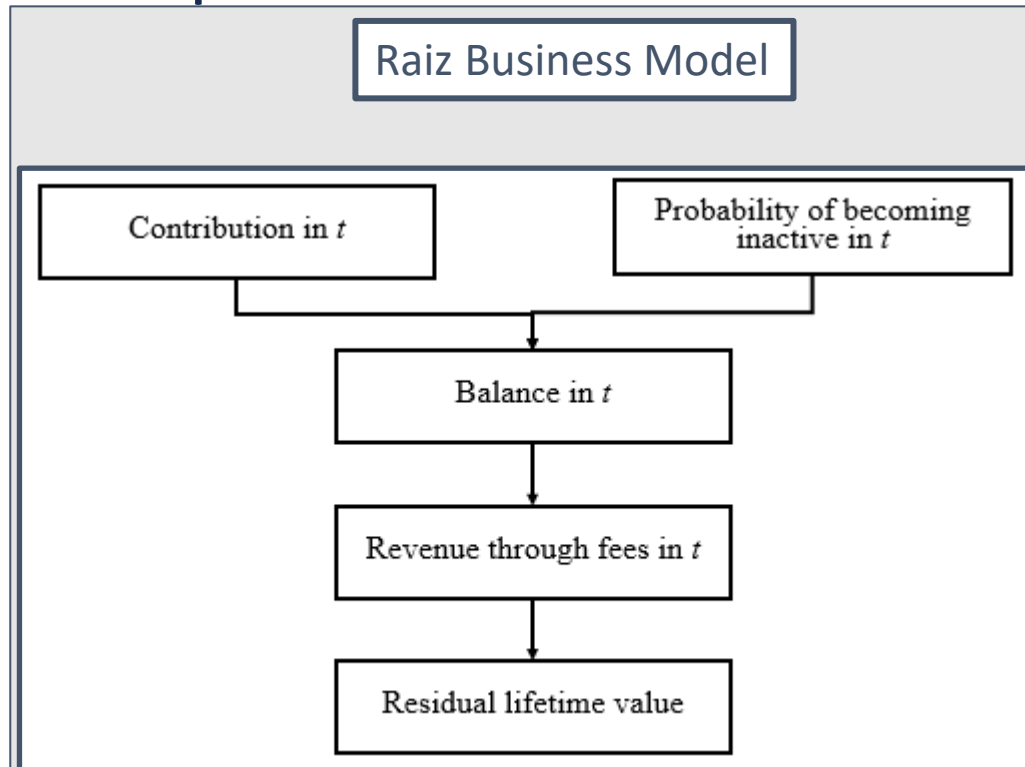
Q2: Do customers who use the goal feature engage more with the app?

→ Customer app sign-in count, inactivity (balance greater than \$5)

Q3: Heterogenous effects: what goal features moderate the improvement after goal setting?

→ Focus on goal features (initial starting position, goal difficulty, achievement motivation)

What would happen to residual customer lifetime values if we get no/some/all customers to adopt the GET?



Assumptions

* g = weekly growth through investment = 0.17% (ca 9% annually)

**d = weekly discount factor = 0.02% (10% annually)

*** current active customers = 188,603 (29,339) goal setters

➤ From ATE model:

- The net contributions are 66.5% higher for GET adopters
- The probability of becoming inactive is 37.6% lower

➤ Bootstrapping customer life (20 years):

- Bootstrap 500 balance paths for each customer
- Residual lifetime value \$215 higher for GET adopters (\$235 vs \$420) – mainly due to less inactivity

➤ Comparison of scenarios; sum of residual lifetime values over current active customers***:

- No customers adopt GET: \$71.1m
- Only current goal adopters use GET: \$77.4m (+9%)
- All customers adopt GET: \$107.4m (+51%)

Q3: RESULTS

Q1: Do customers who used the goal feature perform better over time than those who do not?
 → Overall balance, comprised of deposits minus withdrawals over time.
 → Individual components of deposits.

Q2: Do customers who use the goal feature engage more with the app?
 → Customer app sign-in count, inactivity (balance greater than \$5)

Q3: Heterogenous effects: what goal features moderate the improvement after goal setting?
 → Focus on goal features (initial starting position, goal difficulty, achievement motivation)

Impact of covariates on weekly HTE for amount deposit

	Dependent variable:					
	Weekly HTE (Total Deposits)					
	(1)		(2)		(3)	
<i>Age</i>	0.055	(0.054)			-0.096*	(0.051)
<i>Gender: Male</i>	0.096	(1.031)			-0.201	(0.996)
<i>Gender: Unknown</i>	-0.487	(3.485)			-2.505	(3.298)
<i>Income</i>	0.00004**	(0.00002)			0.0001***	(0.00002)
<i>Portfolio Risk Preference</i>	1.661***	(0.390)			1.289***	(0.380)
<i>Starting Position</i>			4.978***	(1.164)	5.248***	(1.178)
<i>Starting Position²</i>			-0.091***	(0.242)	-0.702***	(0.242)
<i>Goal Difficulty</i>			0.295***	(0.081)	0.274***	(0.081)
<i>Goal Difficulty²</i>			-0.004***	(0.001)	-0.003***	(0.001)
<i>Achievement Motivation</i>			3.709***	(0.311)	3.918***	(0.309)
<i>Achievement Motivation²</i>			-0.146***	(0.016)	-0.148***	(0.016)
Constant	5.312**	(2.341)	4.677***	(0.906)	9.757***	(2.387)
R ²	0.011		0.098		0.122	

N=2,484; *p<0.1; **p<0.05; ***p<0.01 (two-sided); Standard errors in parentheses.

GET design elements

- **Timing of GET adoption**

Starting position = starting amount/annual income

- **Goal difficulty**

Goal difficulty == target / annual income

- **Precommitment of resources**

Achievement motivation = weekly contribution / weekly income

Take-Away

- Older, higher income, and risk seeking consumers benefit most from GET adoption
- For all GET design elements we find an inverse U-shaped relation, suggesting optimal levels for each of them