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Customer Centricity: Managing Customer Retention to Maximize Firms' Profits

CentER Honors Program - April 4, 2017

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Key Marketing Goals: Customer Management

FIGURE 1: What are your company's top marketing priorities?

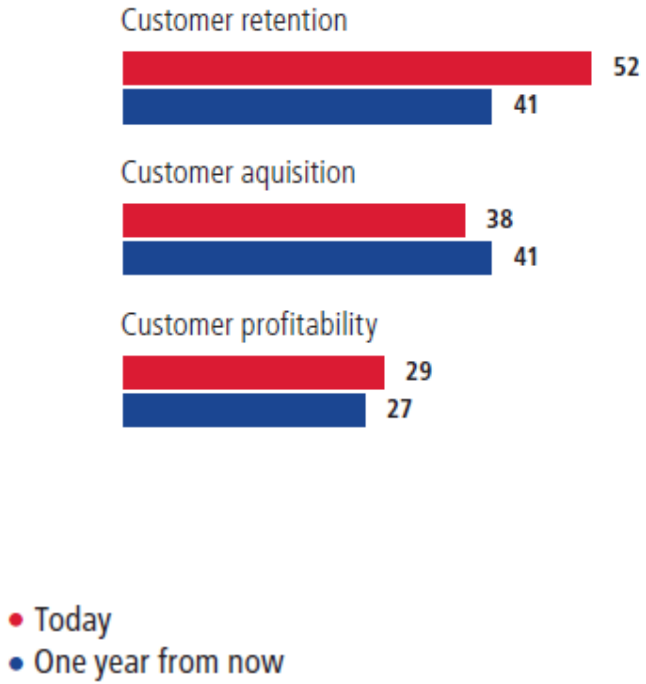
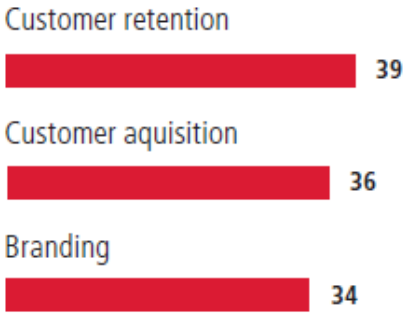


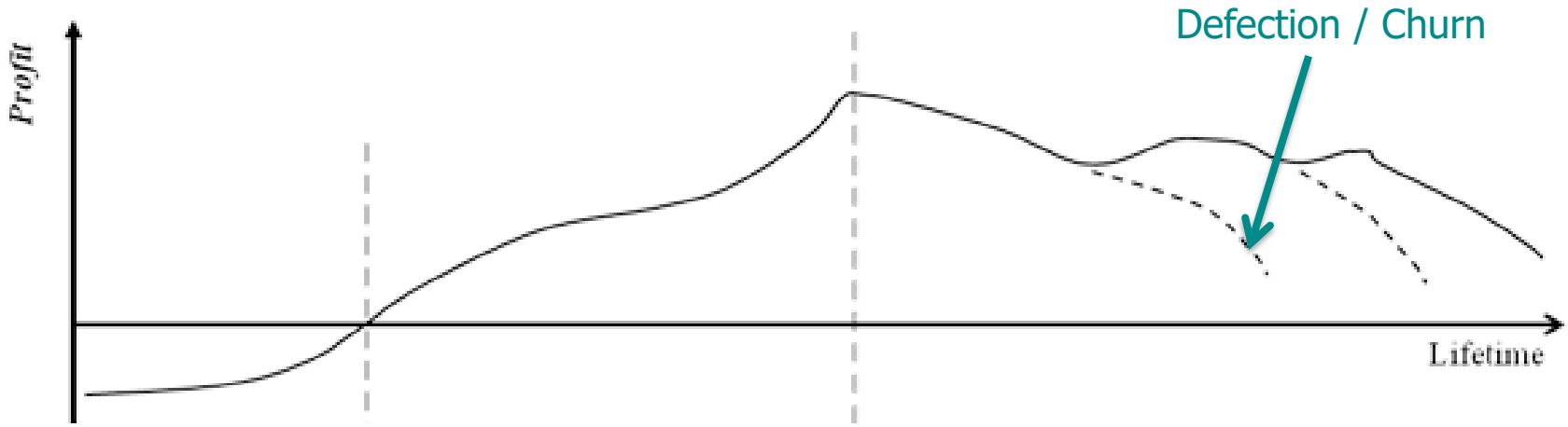
FIGURE 2: What are the top areas in terms of spending in your current marketing budget?



Forbes (2011) report on 321 CEO and CMO of major U.S. & U.K. firms

CUSTOMER CENTRICITY

Customer Life Cycle



Customer acquisition

Designing incentives to **recruit new customers**

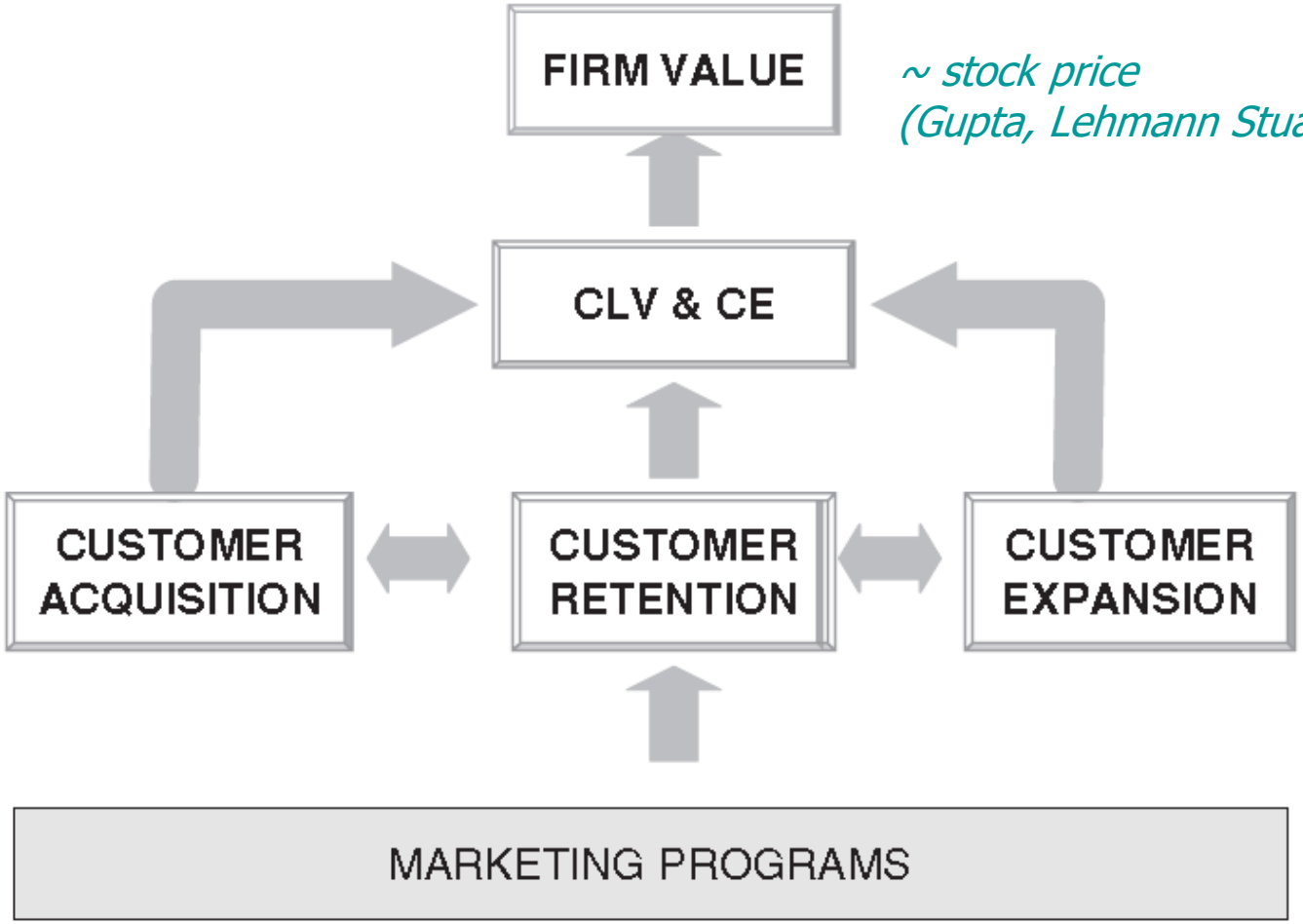
Customer expansion

Designing incentives to **grow the spending of existing customers**

Customer retention

Designing incentives to **avoid loosing customers**

Customer Profitability



~ stock price
(Gupta, Lehmann Stuart 2004)

Gupta et al. (2006), Journal of Service Research

CUSTOMER LIFETIME VALUE

Customer Lifetime Value CLV

- Among the most popular metrics in marketing because…

1. CMOs become accountable: **ROI** on marketing actions

➔ *Question: what is the financial profit of a given marketing campaign?*

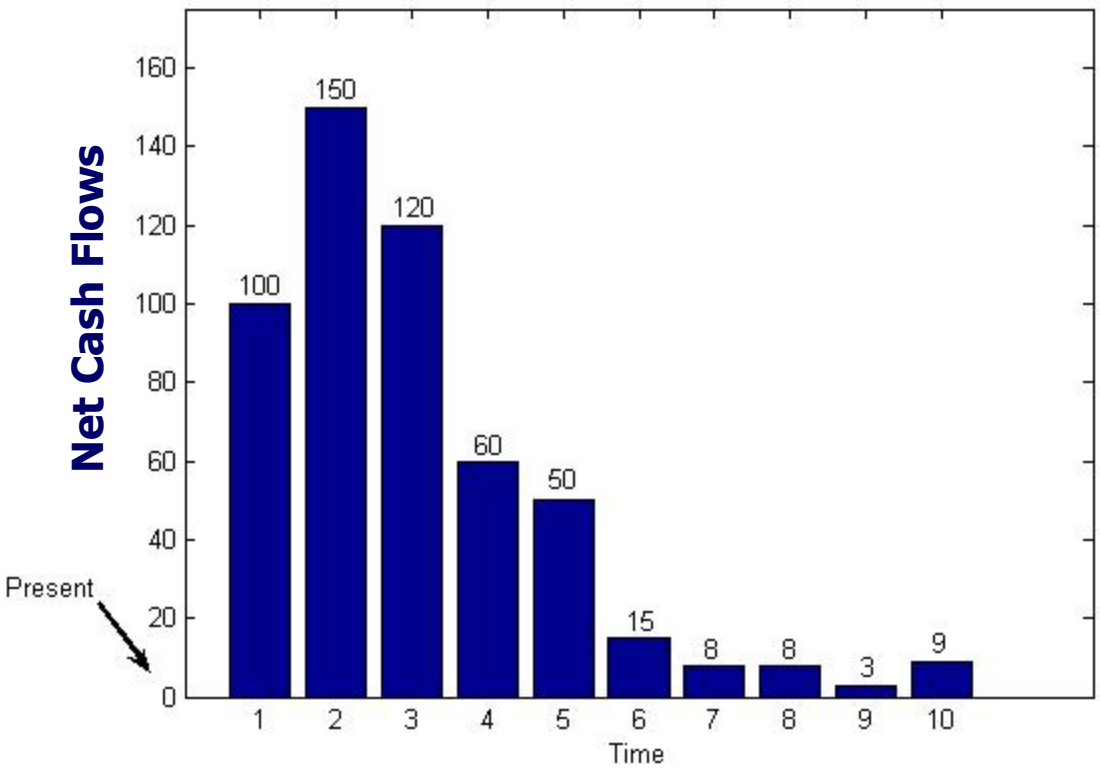
2. Financial metrics are **aggregate** measures and do not help firms to better allocate the marketing dollars across their customer base

➔ *Question: which customers should receive more (less) marketing dollars?*

3. Individual transaction data are now available: **Big Data** era

➔ *Question: which data sources can companies combine to measure customers' value?*

Calculating the CLV of Mister X?



Glady (2007)

Calculating the CLV

- The CLV of a customer i is the discounted value of the future profits yielded by this customer

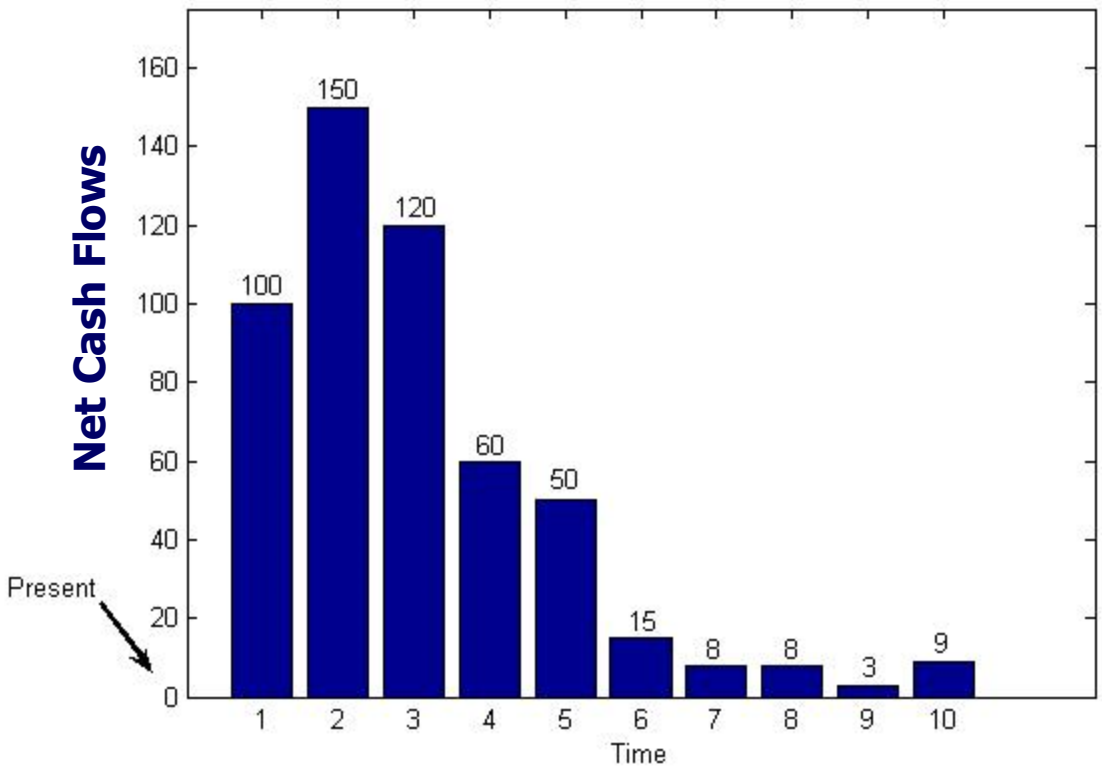
$$CLV_i = \sum_{t=0}^{h} \frac{netcashflow_{i,t}}{(1+d)^t} - AC_i$$

where

  - $netcashflow_{i,t}$ = net cash flow (spending minus the costs) of a consumer *i* at time *t*
  - d = discount rate
  - AC_i = acquistion cost for the customer *i*
  - h = time horizon for estimating the CLV

- The CLV is the value added, by an individual customer, to the company

Calculating the CLV of Mister X?



- The sum of the future net cash flows of Mister X is 523
- Assuming a discount rate of 10%, the CLV at moment 0 is 398,11

The Time Horizon

- Theoretically, the horizon should be infinite. It is unmanageable in the reality
  - Long-term relationship is important
    - Take a long horizon, e.g. 10 years
  - Short-term relationship is important
    - Take a small horizon, e.g. 1 year

Glady (2007)

The Discount Rate

- Check the Cost of Capital in the industry in Financial Data Repositories,
  - e.g. the one maintained by Prof. Damodaran at the Stern School of Business at New York University (http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/wacc.html.htm).

Cost of Capital by Sector

Data Used: Value Line database, of 6177 firms

Date of Analysis: Data used is as of January 2013

Variable Definitions can be obtained by clicking here

Download Detail on which companies are included in each industry

Industry Name	Number of Firms	Beta	Cost of Equity	E/(D+E)	Std Dev in Stock	Cost of Debt	Tax Rate	After-tax Cost of Debt	D/(D+E)	Cost of Capital
Advertising	32	1.68	11.51%	71.00%	97.40%	4.76%	16.02%	4.00%	29.00%	9.33%
Aerospace/Defense	66	0.98	7.45%	78.97%	44.98%	2.76%	20.08%	2.21%	21.03%	6.35%
Air Transport	36	1.03	7.73%	62.86%	64.94%	3.26%	21.35%	2.56%	37.14%	5.81%
Apparel	54	1.36	9.68%	87.89%	74.88%	3.76%	18.57%	3.06%	12.11%	8.87%
Auto Parts	54	1.76	11.94%	80.41%	57.43%	3.26%	18.77%	2.65%	19.59%	10.12%
Automotive	12	1.73	11.79%	49.16%	59.23%	3.26%	16.24%	2.73%	50.84%	7.18%
Bank	416	0.77	6.24%	43.82%	50.34%	3.26%	16.39%	2.73%	56.18%	4.27%

Customer Centricity requires CLV

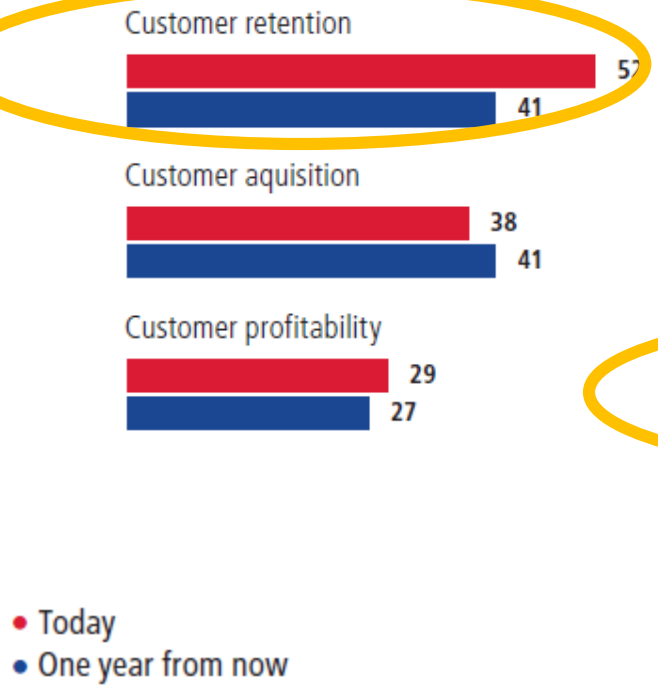
https://www.youtube.com/watch?v=eicCJ6jJxmI

Peter Fader, Wharton School of Business, University of Pennsylvania

RETENTION MANAGEMENT

Customer Retention: nº1 Priority for Firms

FIGURE 1: What are your company's top marketing priorities?



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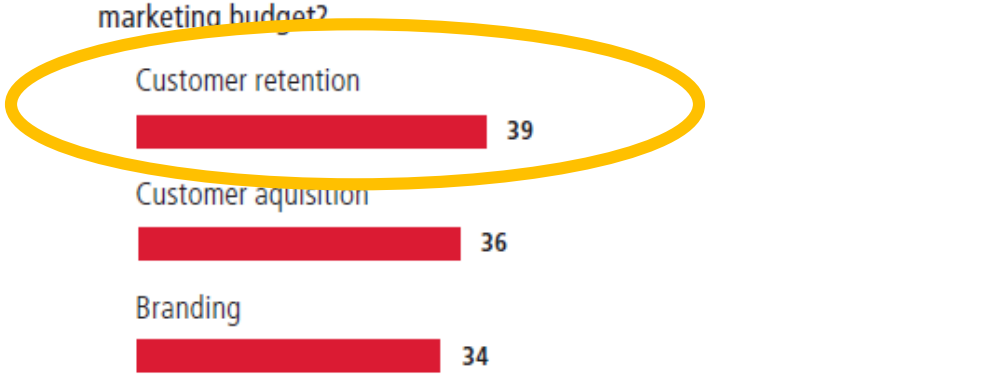
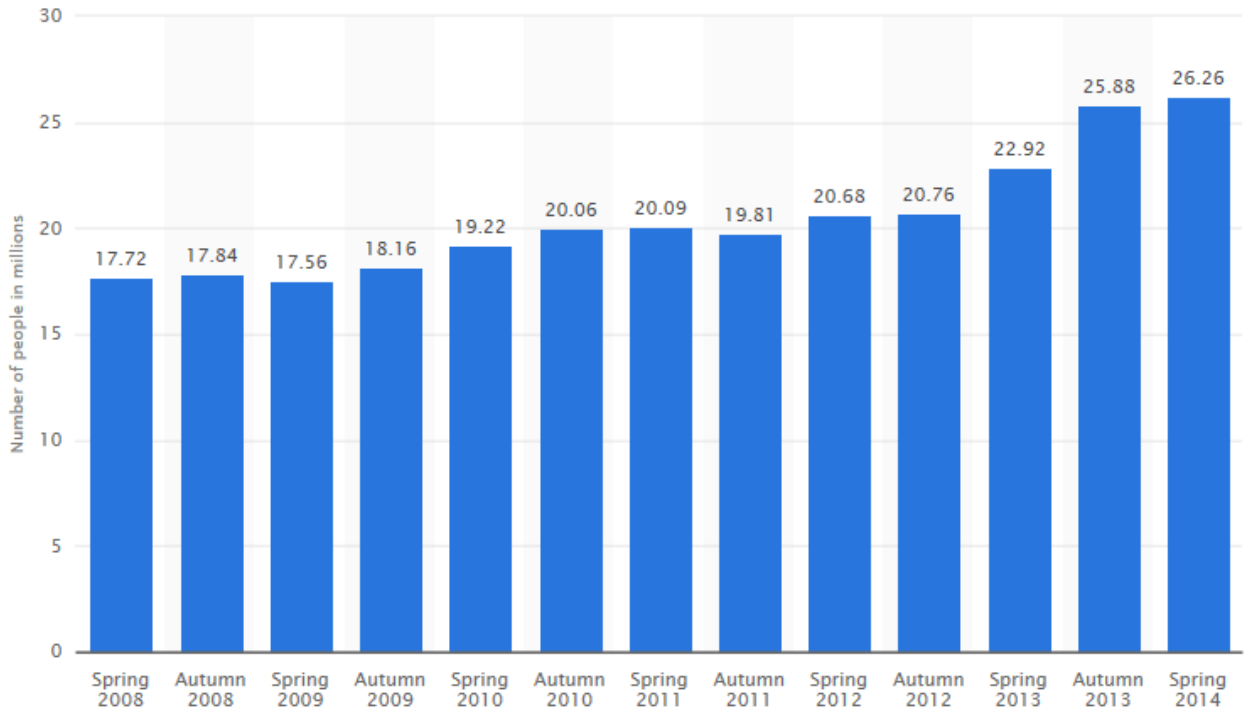


Why do you think retention is the number one priority?

Customer Retention: nº1 Priority for Firms

High(er) churn rates

Cell phone carrier: Number of people who plan to switch their wireless/cell phone carrier within the next 12 months in the United States (USA) from spring 2008 to spring 2014 (in millions)

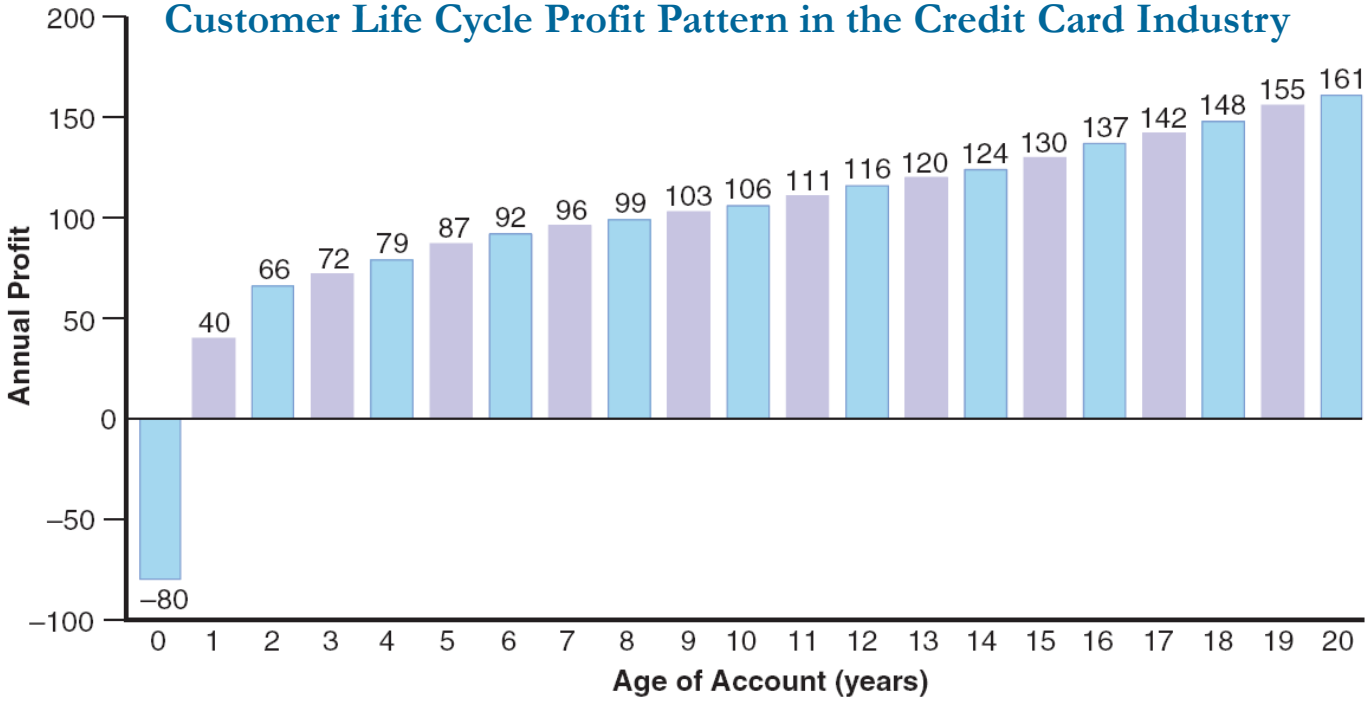


Additional Information
Sign Up for Account

Source:
Sign Up for Account

Why is Retention a Top Priority?

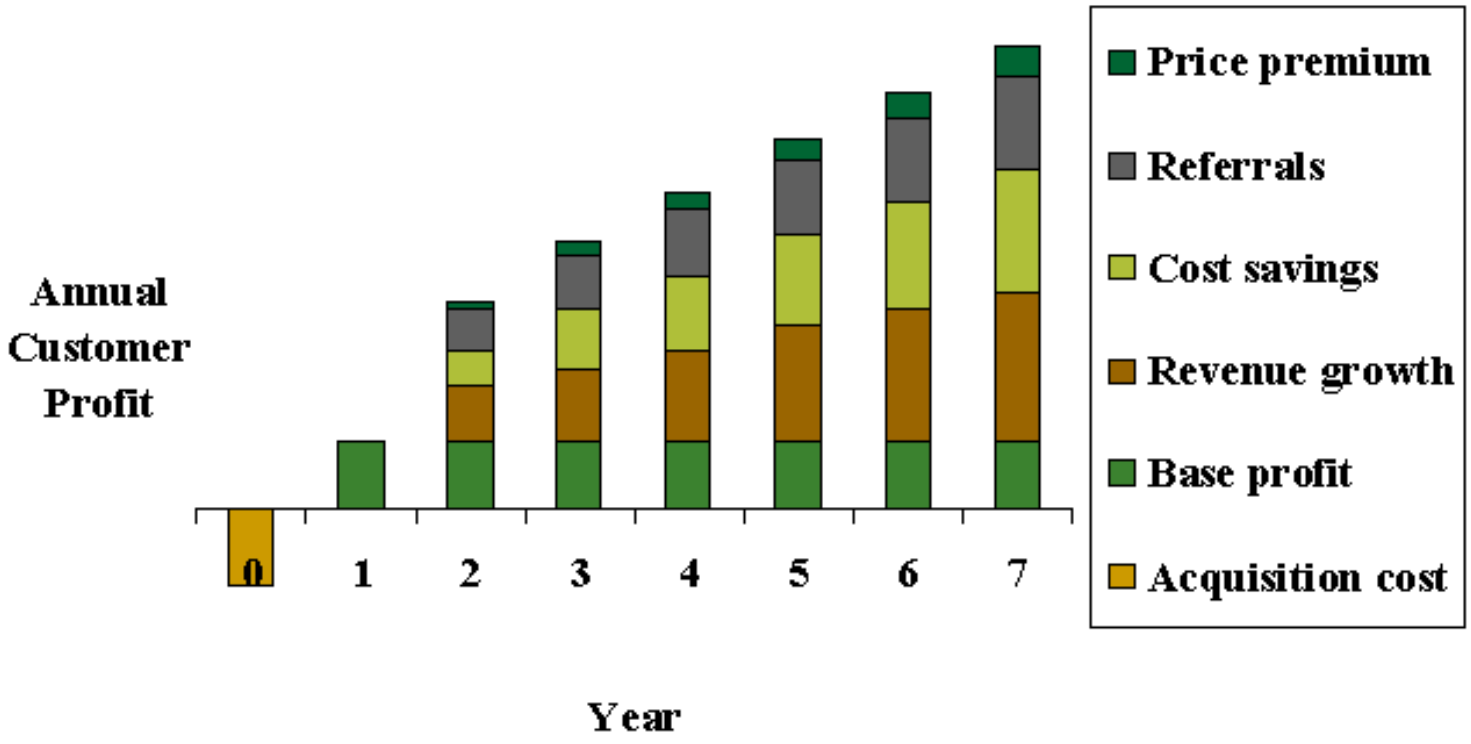
Profitability increases over the lifetime



(Reichheld 1996)

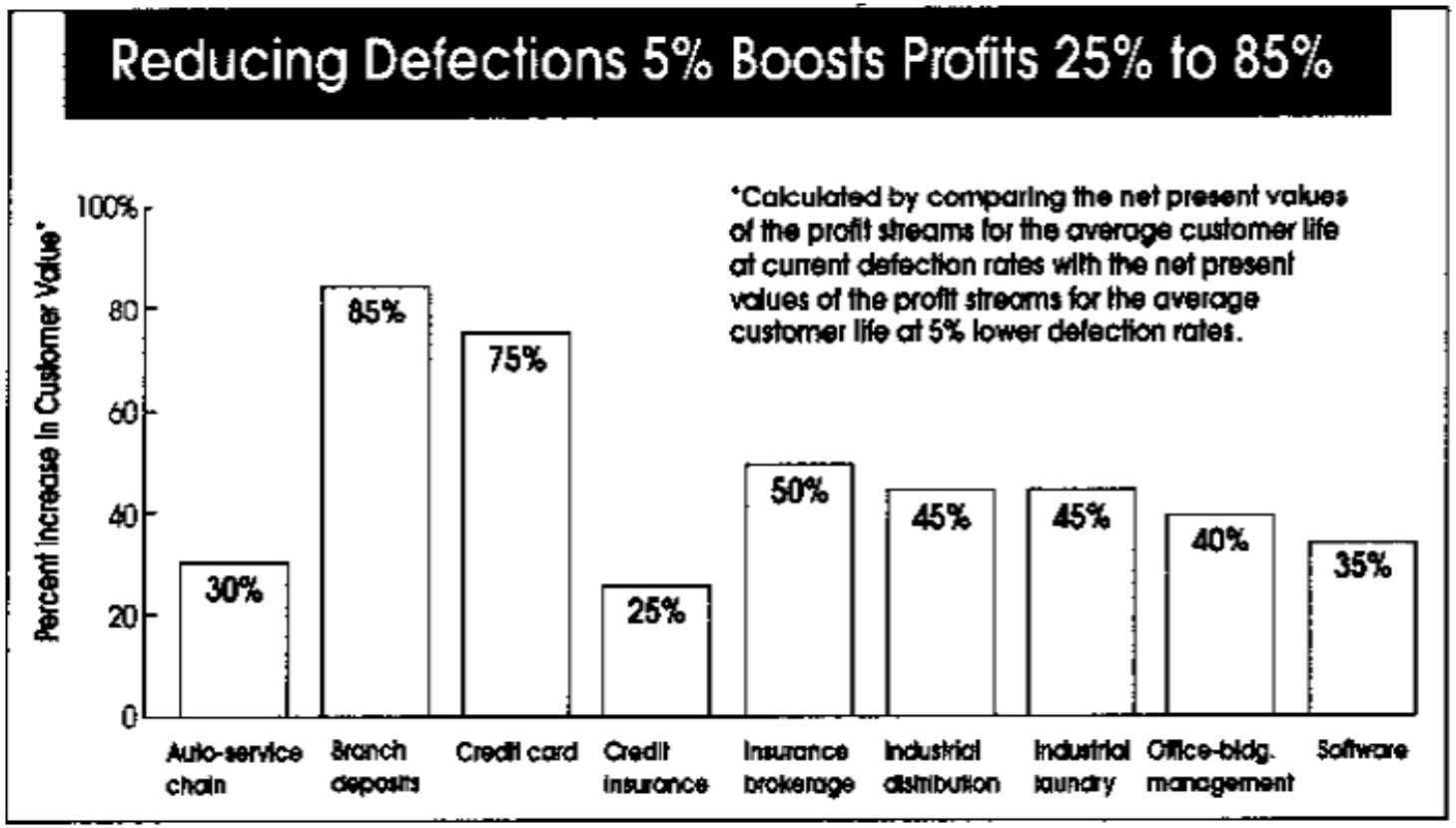
Why is Retention a Top Priority?

Why? The so-called Loyalty Effect (Reichheld 1996)



Fader (2014), Wharton

Why is Retention a Top Priority?



Although these numbers have to be taken carefully :
https://www.youtube.com/watch?v=Tw80Wu53PVQ&feature=youtu.be

Fader (2014), Wharton

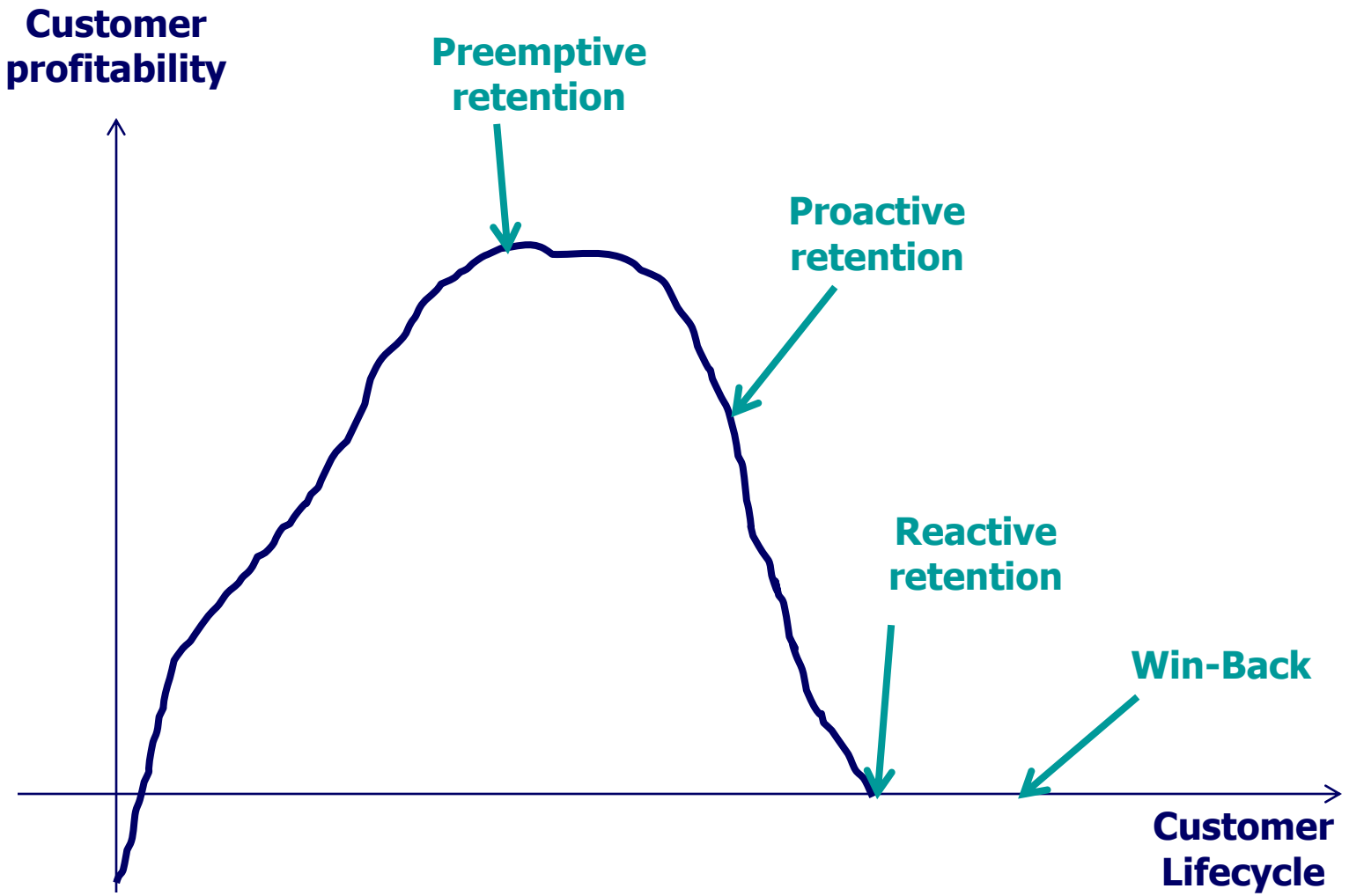
Terminology

- **Attrition (aka defection)** = any customer who leaves
  - Disadoption = leaving the category
  - Churn = switching brands / service provider
- However, the research literature (and most managers) often use these terms interchangeably
- (We should avoid using "retention" in a non-contractual setting)
- **Two types of attrition:**
  - **Revealed attrition**: the customer notifies the firm (mostly contractual)
  - **Latent attrition**: the customer stops using the product but does not notify the firm (mostly noncontractual) ➔ the firm uses an arbitrary cutoff, e.g. 3 months in telecom, 1 year for Amazon.

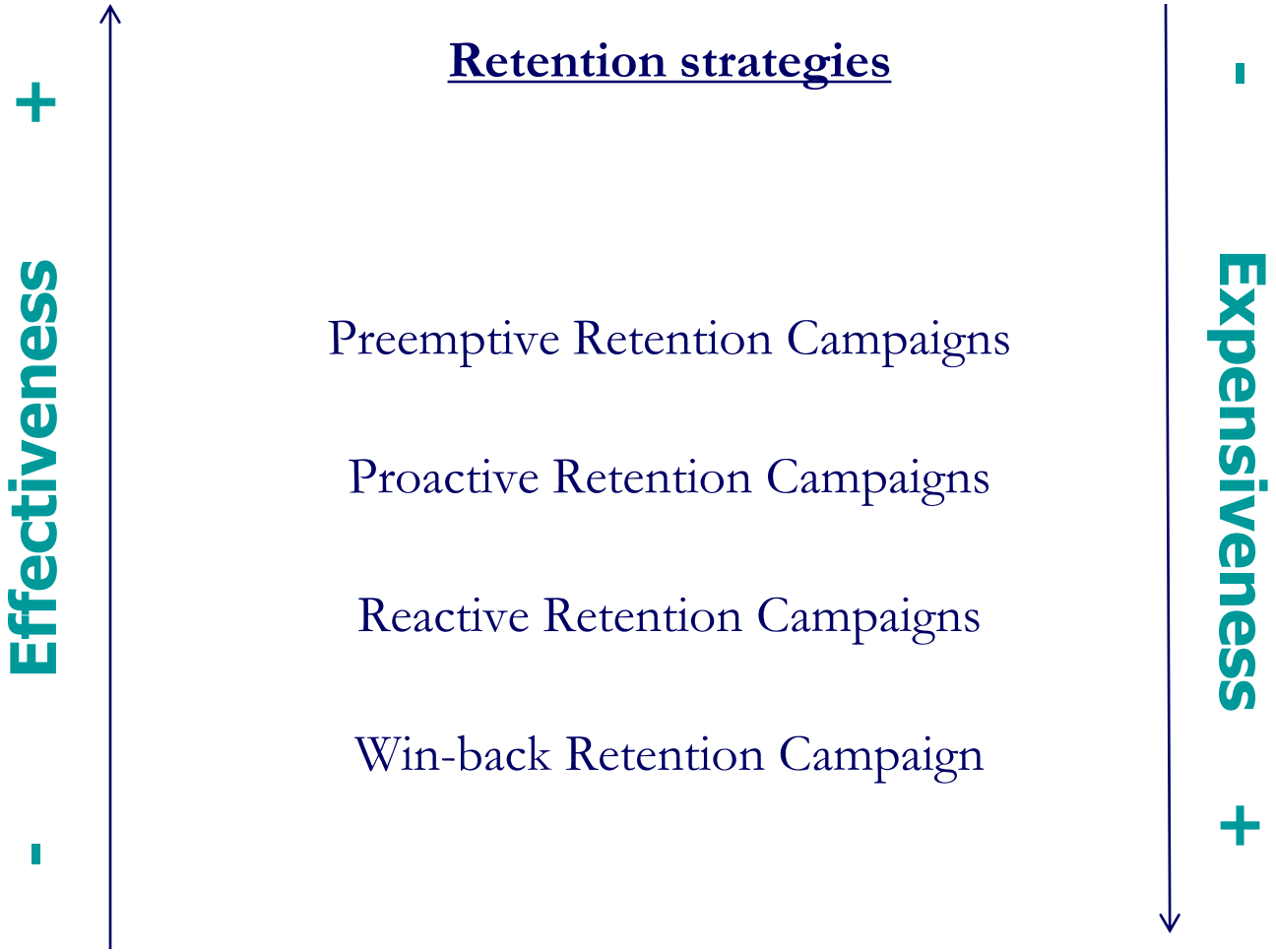
Types of Retention Strategies

Leaving?		Retention strategies
		BEFORE DEFECTION
1. Not thinking about it	→	Preemptive Retention Campaigns
2. Thinking about it	→	Proactive Retention Campaigns
3. Doing it	→	Reactive Retention Campaigns
4. Did it	→	Win-back Retention Campaign
		AFTER DEFECTION

Types of Retention Strategies



Types of Retention Strategies



Preemptive Retention Campaigns

- **Principle**:
  - Offering incentives to customers ***before*** they even considered leaving
- **Examples:**
  - Mass retention campaigns rewarding loyalty: e.g. price discount over a customer lifetime, loyalty cards with earn and redeem points.
  - Campaigns targeted at specific customer segments, e.g. high-value customers

Mass Retention Campaigns

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(Rewarding loyalty)

Preemptive Retention Campaigns

- **Principle**:
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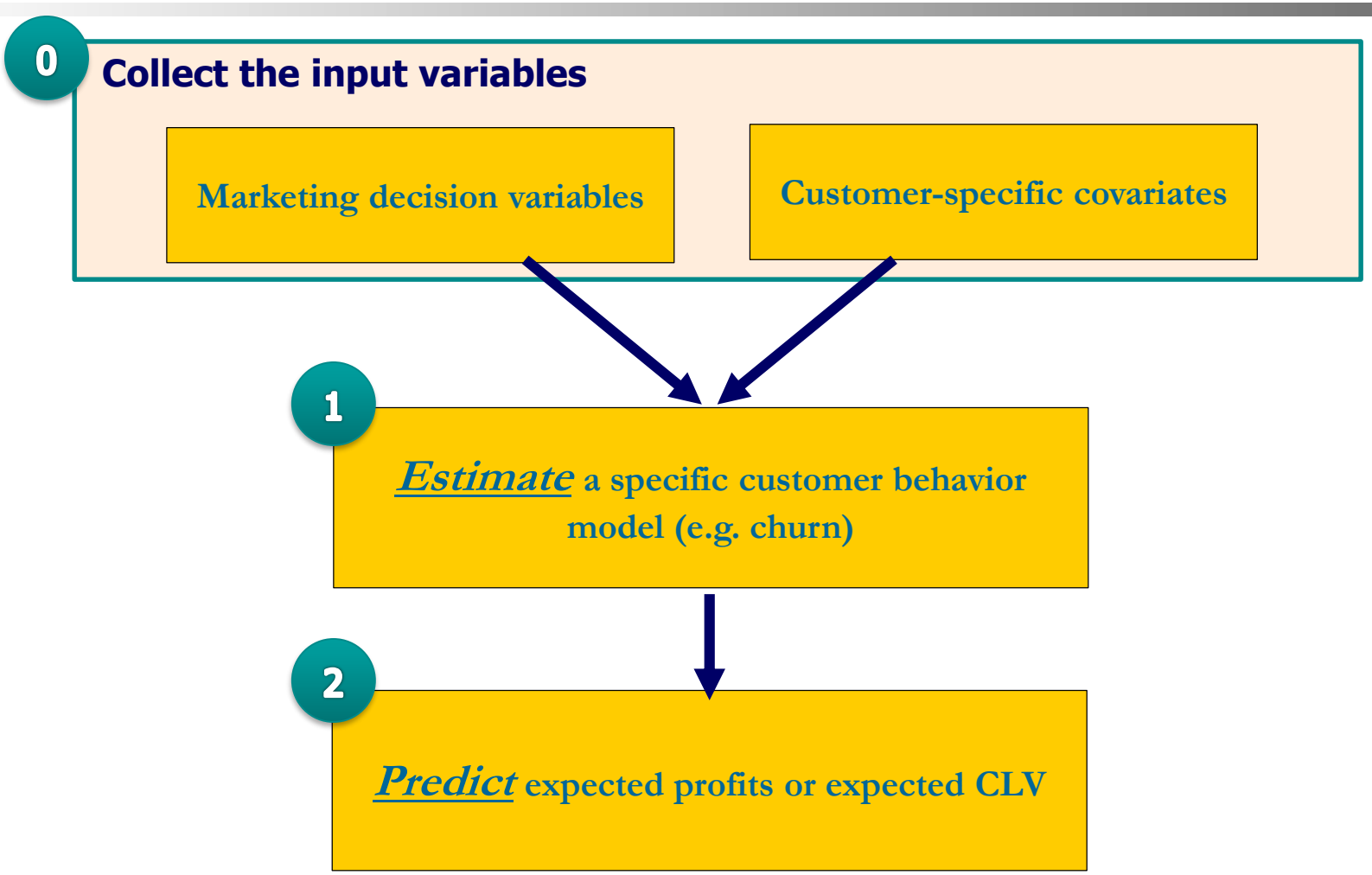
- **Examples:**
  - Mass retention campaigns rewarding loyalty: e.g. price discount over a customer lifetime, loyalty cards with earn and redeem points.
  - Campaigns targeted at specific customer segments, e.g. high-value customers
- **Benefits**:
  - No need for high-tech prediction analytics
  - Encourage loyalty (rather than encouraging strategic cancellations)
- **Threats**:
  - Expensive strategies as they involve targeting many individuals
  - "Waste" money on customers who have no intention to leave
  - Less room for personalized offers towards specific customers at the time where it might be the most needed (e.g. a customer might be thinking about leaving early on in her lifecycle)

Proactive Retention Campaigns

- **Principle**:
  - Predict which customers will ask for cancellation
  - Contact the customers at risk before they cancel and make a retention offer to avoid churn
- **Facts**:
  - Growing interest in the Big Data Era
  - The challenge is the analytics it requires

How to Design Proactive Retention Actions



Proactive Retention Campaigns

In the four years from the beginning of 2002 through the end of 2005, Verizon Wireless used this tactic to cut the churn rate among its contract customers in half, reducing a blistering 2.6% attrition per month to just 1.3% per month. They used analytics (1) to anticipate those customers most likely to leave, (2) to decide what "save" offer would be most effective for each different customer, and (3) to calculate how likely each such customer was to respond to the offer. By mailing the right offer, only to those with a good likelihood of accepting it, the company saved some 60% of what it would otherwise have had to spend.

Don Peppers & Martha Rogers (2008)
Rules to Break and Laws to Follow: How Your Business Can Beat the Crisis of Short-Termism, Wiley Press

Proactive Retention Campaigns

- **Principle**:
  - Predict which customers will ask for cancellation
  - Contact the customers at risk before she cancels and make a retention offer to avoid churn
- **Facts**:
  - Growing interest in the Big Data Era
  - The challenge is the analytics it requires
- **Benefits**:
  - Early in the decision process
  - No strategic cancellation
- **Threats**:
  - Targeting non-churners & waking up sleeping dogs (false positives)
  - Missing out on true churners (false negatives)

Reactive Retention Programs

- **Principle**:
  - Wait that the customer contacts the firm to ask for cancellation
  - Make a retention offer to avoid churn
- **Facts**:
  - Due to its simplicity, it has been popular for many years across multiple industries (Telco, Banking, Energy)
- **Benefits**:
  - Only targeting the customers at risk
  - No need for high-tech analytics
- **Threats**:
  - Is it effective ? Customers might have made their mind already
  - Is it affordable ? Customers might want a lot more to change their mind
  - Is it sustainable ? Customers start making strategic cancellations (Lewis 2005)

Win-Back Retention Programs

- **Principle**:
  - Contact a customer after she determinates her contract and offer her the possibility to stay at better conditions than previously offered
- **Facts**:
  - Popular in industries where some hardware has to be recollected after cancellation. The firm contacts the customer before she returns the hardware
  - Often used in combination with reactive retention
  - Thomas, Blattberg & Fox (2004), Homburg, Hoyer & Stock (2007), Tokman, Davis & Lemon (2007)

Win-Back Retention Programs

Win-Back Retention Programs

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- **Facts**:
  - Popular in industries where some hardware has to be recollected after cancellation. The firm contacts the customer before she returns the hardware
  - Often used in combination with reactive retention
- **Benefits**:
  - Only targeting the customers who actually meant to defect
  - No need for high-tech analytics
- **Threats**:
  - Is it effective ? What is the mindset of a customer who was already gone?
  - Is it affordable ? Larger discounts are usually offered compared to reactive retention
  - Is it sustainable ? Customers start making strategic cancellations

Reactive vs. Proactive Retention

Hypotheses	Reactive	Proactive
H1: Initial investment in analytics capabilities	**Minimum**: mass/broad targeting	**Substantial**: requires strong predictive analytics
H2: Accuracy of the targeting	-**No false positives**: only target customers at risk -**No false negatives**: don't miss out on any churner	-**Some false positives**: sleeping dogs BUT delight effect -**Some false negative**: missing out on some churners
H3: Short-run effectiveness of the action	**Limited**: Late in the decision process, so the customer already made up her mind	**High**: early in the decision process, so higher success probability
H4: Cost of the action	**Steeper discounts**: late in the decision process: higher incentives are needed	**Smaller discount**: early in the decision process: smaller incentives are sufficient
H5: Sustainability	**Endangered**: risk of strategic cancellations	**Likely**: but requires a enduring effect on loyalty

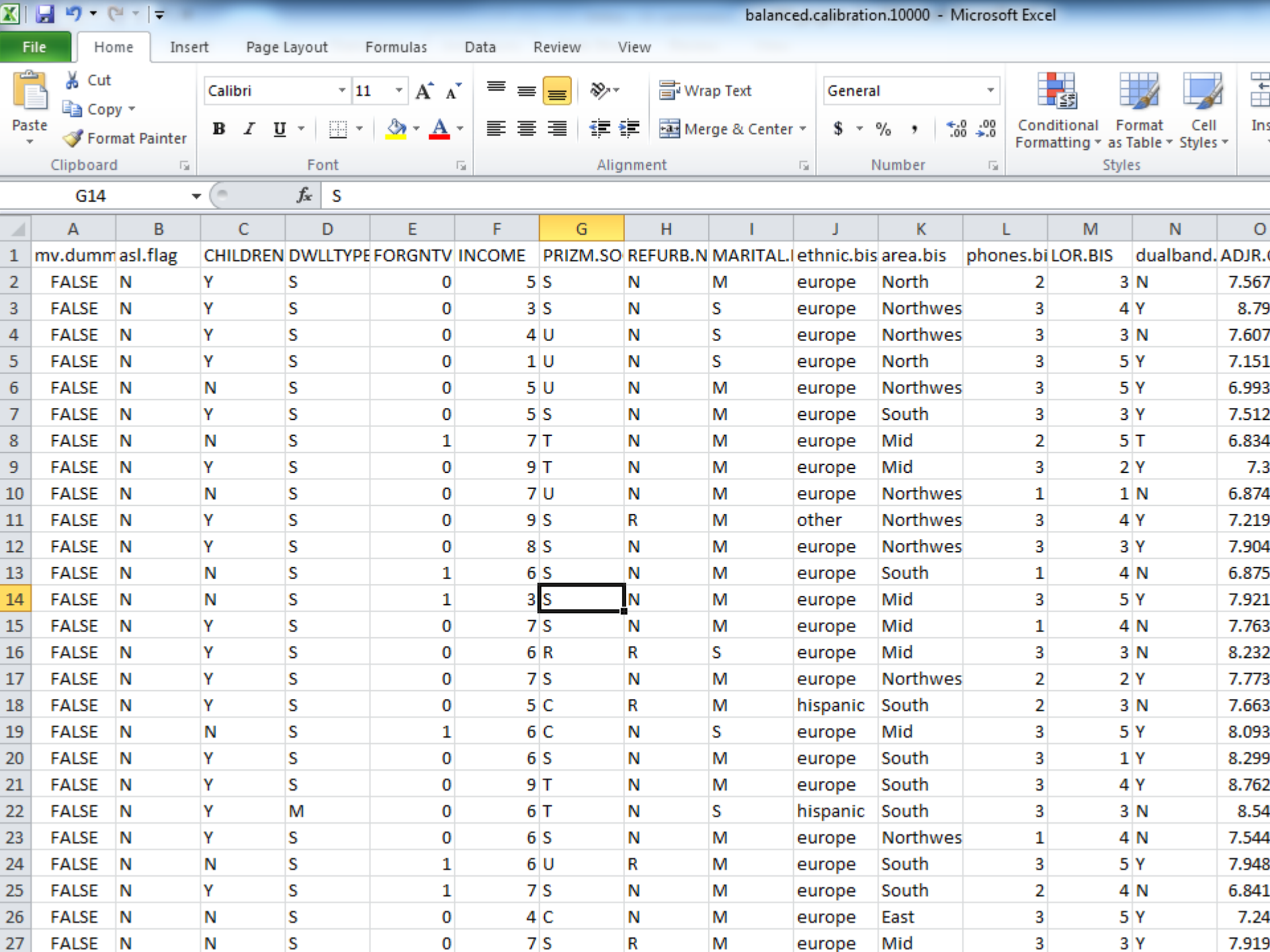
CHURN MODELING

0 Collect the input variables

Marketing decision variables

Customer-specific covariates

- Data
  - Customer database of an **anonymous U.S. wireless telecom company** (Neslin et al. 2004)
  - **Monthly churn rates** of approximately 2.6%
  - > 40 predictor variables



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	mv.dumm	asl.flag	CHILDREN	DWLLTYPE	FORGNTV	INCOME	PRIZM.SO	REFURB.N	MARITAL.I	ethnic.bis	area.bis	phones.bi	LOR.BIS	dualband.	ADJR.(
2	FALSE	N	Y	S	0	5	S	N	M	europe	North	2	3	N	7.567
3	FALSE	N	Y	S	0	3	S	N	S	europe	Northwes	3	4	Y	8.79
4	FALSE	N	Y	S	0	4	U	N	S	europe	Northwes	3	3	N	7.607
5	FALSE	N	Y	S	0	1	U	N	S	europe	North	3	5	Y	7.151
6	FALSE	N	N	S	0	5	U	N	M	europe	Northwes	3	5	Y	6.993
7	FALSE	N	Y	S	0	5	S	N	M	europe	South	3	3	Y	7.512
8	FALSE	N	N	S	1	7	T	N	M	europe	Mid	2	5	T	6.834
9	FALSE	N	Y	S	0	9	T	N	M	europe	Mid	3	2	Y	7.3
10	FALSE	N	N	S	0	7	U	N	M	europe	Northwes	1	1	N	6.874
11	FALSE	N	Y	S	0	9	S	R	M	other	Northwes	3	4	Y	7.219
12	FALSE	N	Y	S	0	8	S	N	M	europe	Northwes	3	3	Y	7.904
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15	FALSE	N	Y	S	0	7	S	N	M	europe	Mid	1	4	N	7.763
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18	FALSE	N	Y	S	0	5	C	R	M	hispanic	South	2	3	N	7.663
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26	FALSE	N	N	S	0	4	C	N	M	europe	East	3	5	Y	7.24
27	FALSE	N	N	S	0	7	S	R	M	europe	Mid	3	3	Y	7.919

AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
PLCD.GTQ	PLCD.1RD	ADULTS.IN	RECV.AP3	ROAM.ZA	THRE.1Q2	UNAN.QM	UNAN.0XF	change.m	eqpdays	hnd.price	totmrc.Me	AGE1.INT	churn	
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0.693147	2.197225	2	0	0	0	0	1.609438	-15.5	138	99.98999	16.99	74	0	
0	3.78419	2	0	0	0	0	1.791759	94.25	630	149.99	30	36	0	
0	3.401197	2	0	0	0	0	3.555348	26.25	1570	29.98999	16.99	54	1	
0.693147	3.258097	3	0	1.271164	0.510826	0	2.197225	54.5	179	29.98999	29.99	50	1	
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0	0	5	0	0	0	0	1.386294	-3.75	1661	29.98999	16.99	64	1	
0	2.197225	3	0	0	0	0	1.098612	25.25	985	29.98999	29.99	72	1	
0	2.079442	4	0	0	0	0	1.098612	-34	1646	29.98999	30	56	1	
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0	3.218876	2	0	1.046441	0	0	1.94591	0.5	1023	29.98999	44.99	40	1	
0	3.931826	6	0	0	0	0	3.258097	88	901	9.989998	40	50	0	
0.693147	3.218876	3	0	0	0	0.287682	2.302585	15	37	129.99	51.99	54	0	
0	4.174387	4	0	0	0	0	1.609438	75.75	530	29.98999	29.99	40	0	
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1.609438	5.204007	6	0	0	0.847298	0	5.278115	-230.5	307	299.99	149.99	50	1	
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0	1.94591	3	0	0	0	0	0	10.25	839	29.98999	18.87	54	0	
0	3.178054	3	0	0.460584	0	0	1.609438	-16	716	29.98999	35	72	1	
0	5.209486	3	0	2.038294	0	0	4.025352	-51.75	163	29.98999	59.99	54	0	

0 Collect the input variables

Marketing decision variables

Customer-specific covariates

Example from the telecom industry:

Behavioral Predictors	*Company Interaction Predictors*	*Customer Demographics*
Billing adjusted total revenue over the life of the customer ("total revenue over life")	Having responded to an offer in the mail (yes/no)	Age of the first household member ("age")
Mean number of attempted calls placed ("mean attempted calls")	Mean minutes of use of customer care calls	Estimated income
Percentage change in monthly minutes of use versus previous three-month average ("change in monthly minutes of use")		Social group
Mean total monthly recurring charge ("base cost of the calling plan")		Marital status
Average monthly minutes of use over the previous six months ("average monthly minutes of use [six months]")		Geographic area
Mean number of completed calls ("mean completed calls")		Account spending limit
Mean number of peak calls ("mean peak calls")		Children in the household (yes/no)
Total number of months in service ("months in service")		Dwelling unit type
Mean number of inbound calls less than one minute ("mean inbound calls less one minute")		Number of days of current equipment ("Equipment days")
Mean of overage revenue ("mean overage revenue")		Refurbished or new handset
Mean number of monthly minutes of use ("mean monthly minutes of use")		Current handset price ("handset price")
Mean unrounded minutes of use of outbound wireless to wireless calls ("mean monthly minutes wireless to wireless")		

Lemmens and Croux (2006)

1

Estimate a specific customer behavior model (e.g. churn)

Customer	Demographics	Consumption history	Marketing actions	Churn
1				???
2				???
…	…	…	…	…
…	…	…	…	…
9,998				???
9,999				???
10,000				???

1

1 *Estimate* a specific customer behavior model (e.g. churn)

- Churn as a binary classification issue:
  - Classify a customer i characterized by k variables $x_i = (x_{i1}, \ldots, x_{iK})$ as
    - Churner : $y_i = +1$
    - Non-churner : $y_i = -1$ (or 0 depending on the coding)

- Churn is the response binary variable to predict:
  - $y_i = F(x_i) + \varepsilon_i$

Choice of the binary choice model $F(.)$?

1

Estimate a specific customer behavior model (e.g. churn)

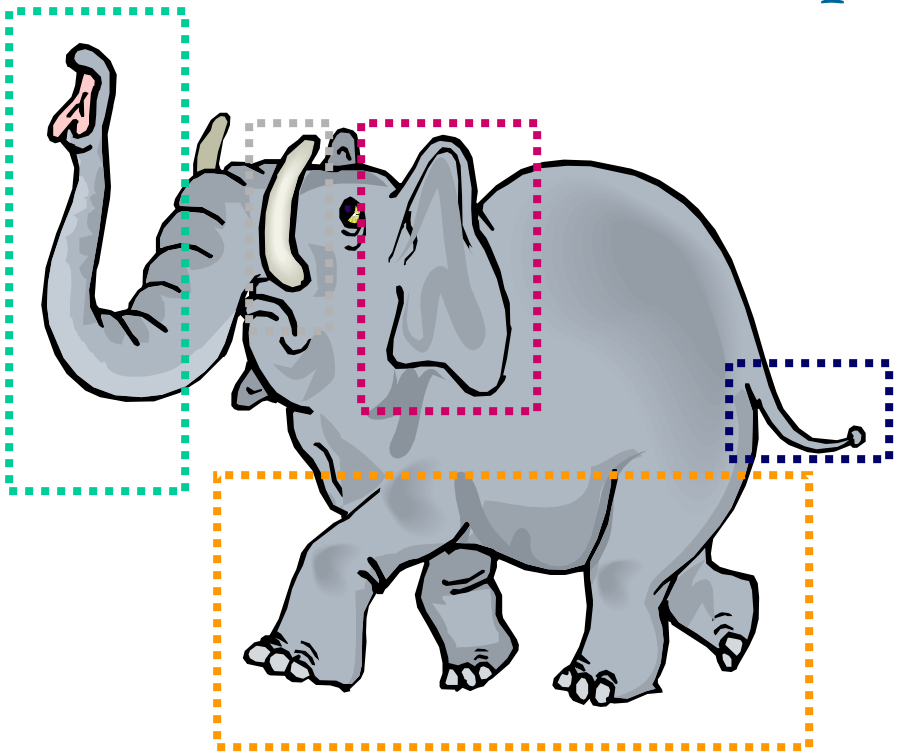
- Logistic regression (Lemon, White and Winer, 2002)
- Decision trees (Risselada, Verhoef, Bijmolt, 2010)
- Random forests (Lariviere and Van den Poel, 2005)
- Bagging and stochastic gradient boosting (Lemmens and Croux, 2006)
- ….

➔ **Neslin et al. (2006) show that the tree-based methods work best.**

1

Estimate **a specific customer behavior model (e.g. churn)**

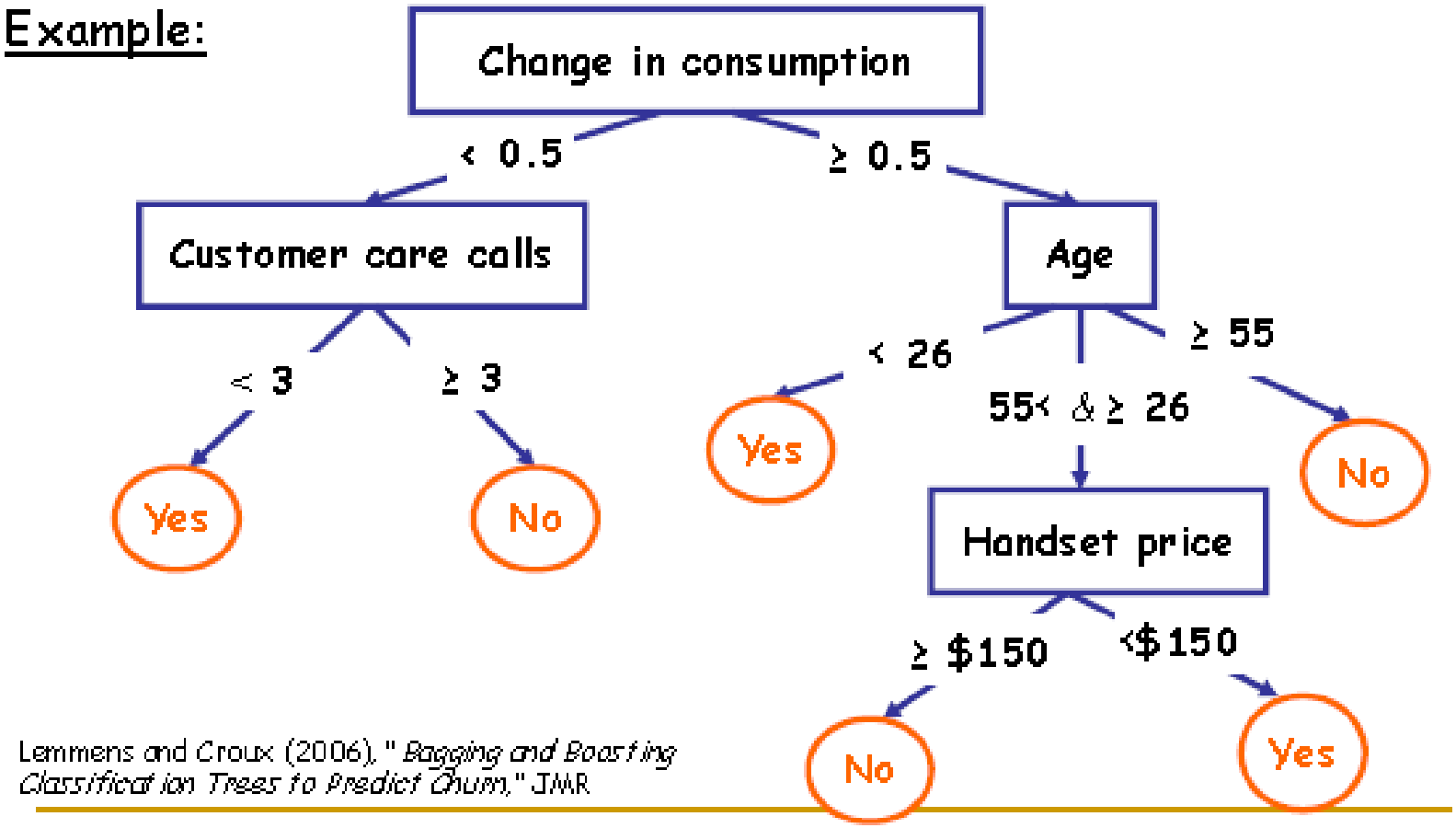
How Decision Trees See an Elephant



1

Estimate **a specific customer behavior model (e.g. churn)**

Decision Trees



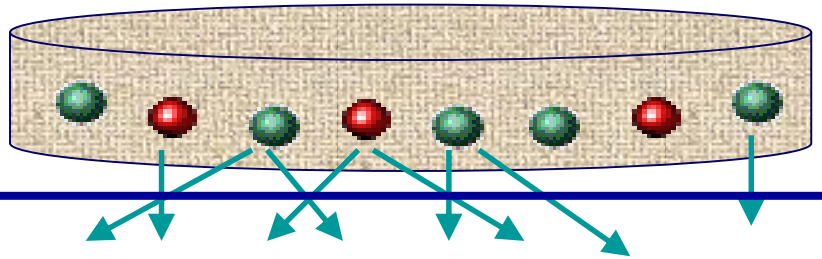
Lemmens and Croux (2006), "*Bagging and Boosting Classification Trees to Predict Churn*," JMR

Combining models

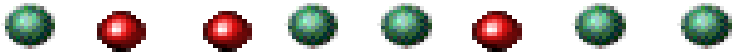
- Unity makes strength!
- Instead of one decision tree, let's take 1000 of them and average the predictions
- It is like asking 1000 experts to make their forecasts and combine their wisdom

- Examples
  - Bagging
  - Boosting
  - Random forests
  - ….

Customer sample

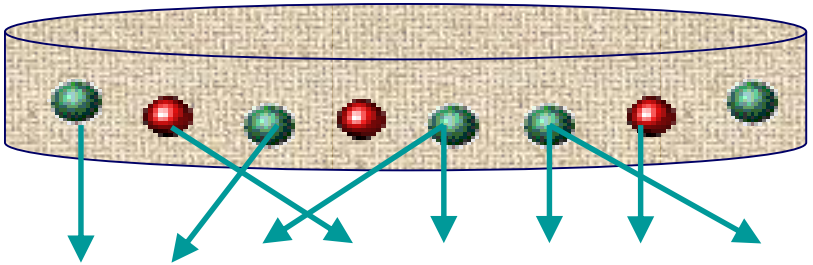


Random sample *1*

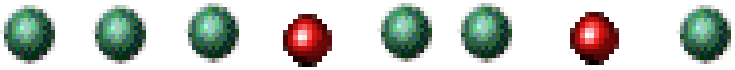


e.g. tree

$$\hat{F}_1^*(x)$$

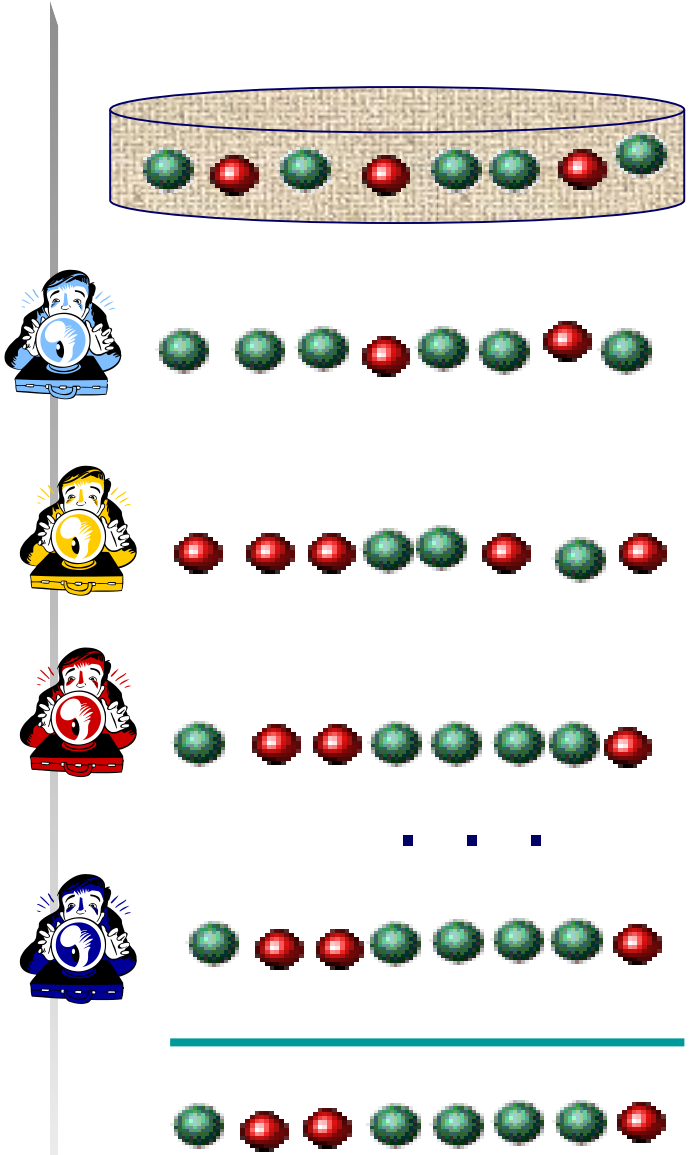


Random sample *2*



$$\hat{F}_2^*(x)$$

Combining the predictions



$$\hat{F}_{bag}(x) = \frac{1}{M}\sum_{m=1}^{M}\hat{F}_m^*(x)$$

Boosting variants

- Assume that some experts (decision trees) do better than others, what should we do?
- The solution is called boosting

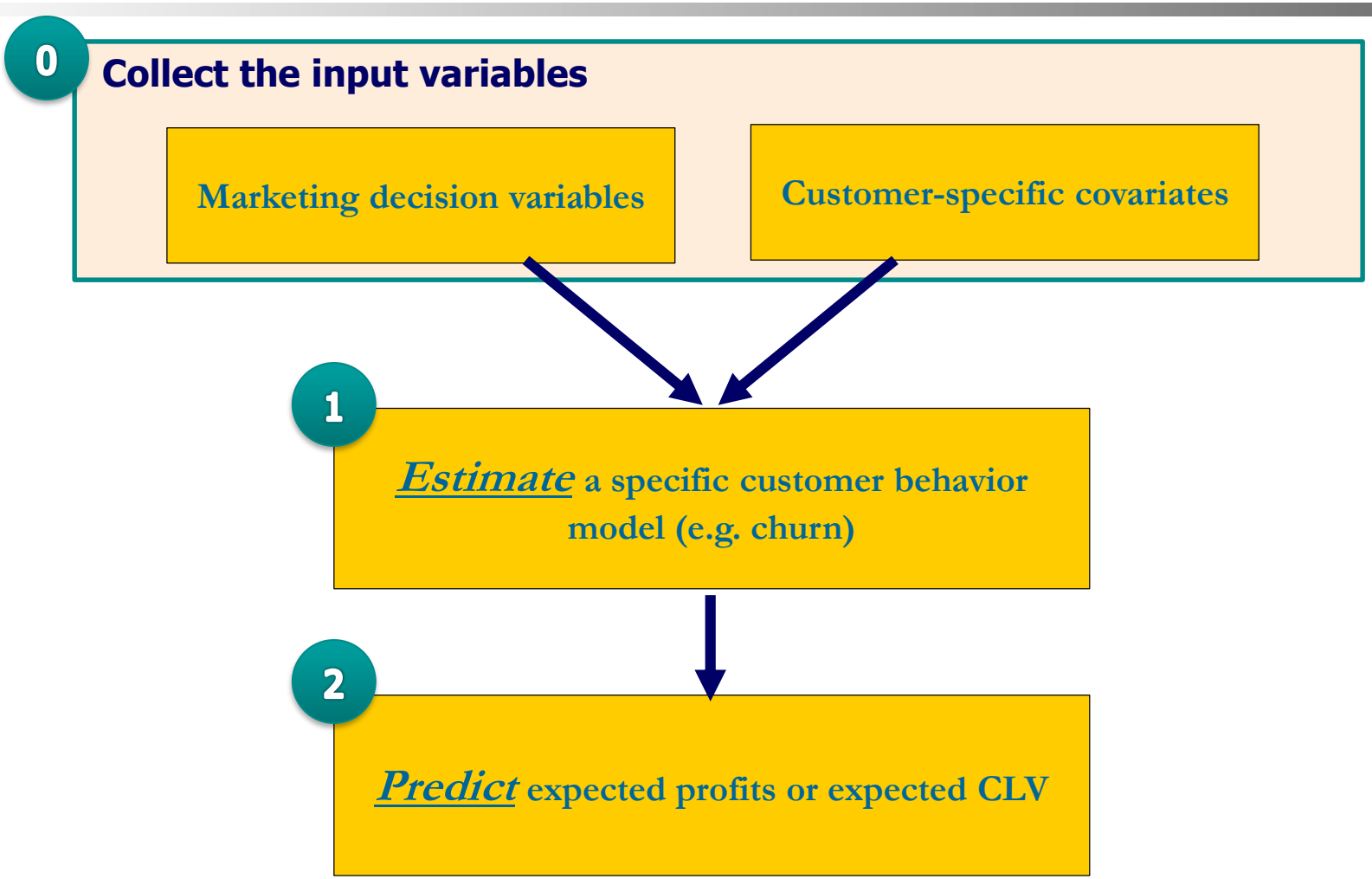
1

Estimate **a specific customer behavior model (e.g. churn)**

Once we have our predictions, who do we target?

- Rank-order customers from highest risk to churn to lowest risk to churn
- Our target are the customers in the top of the ranking
- Question: how many customers do we want to target?

How to Design Targeted Retention Actions



2

Predict expected profits or expected CLV

- The profit of the overall retention campaign across all customers:

$$\Pi = \sum_{i \in \text{target}}^{N} \pi_i$$

N = total number of customers

π_i = the profit of targeting customer i

- The profit generated by targeting customer i with a retention action is

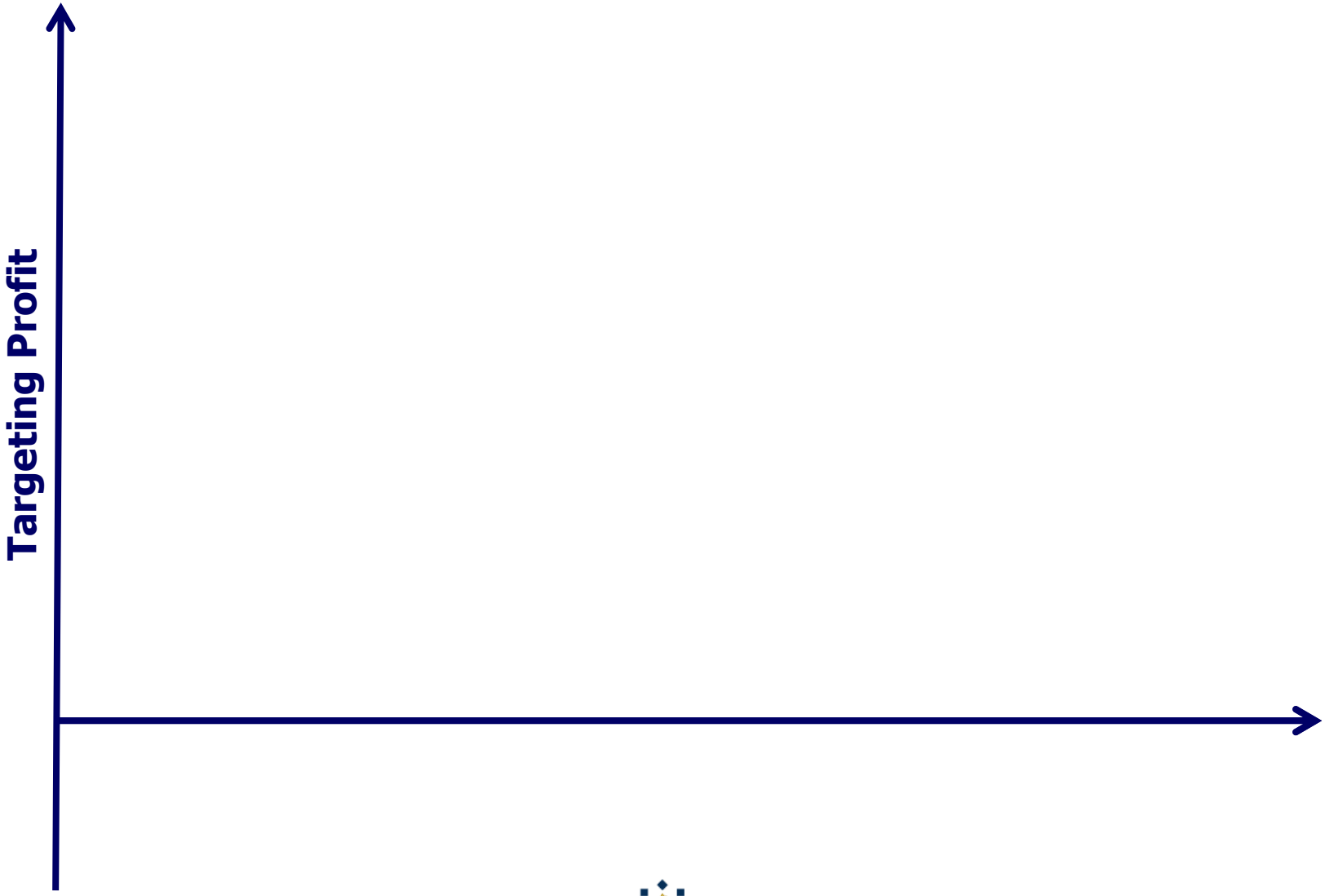
$$\pi_i = CLV_i' - CLV_i - \delta$$

CLV_i' = CLV if customer i is targeted

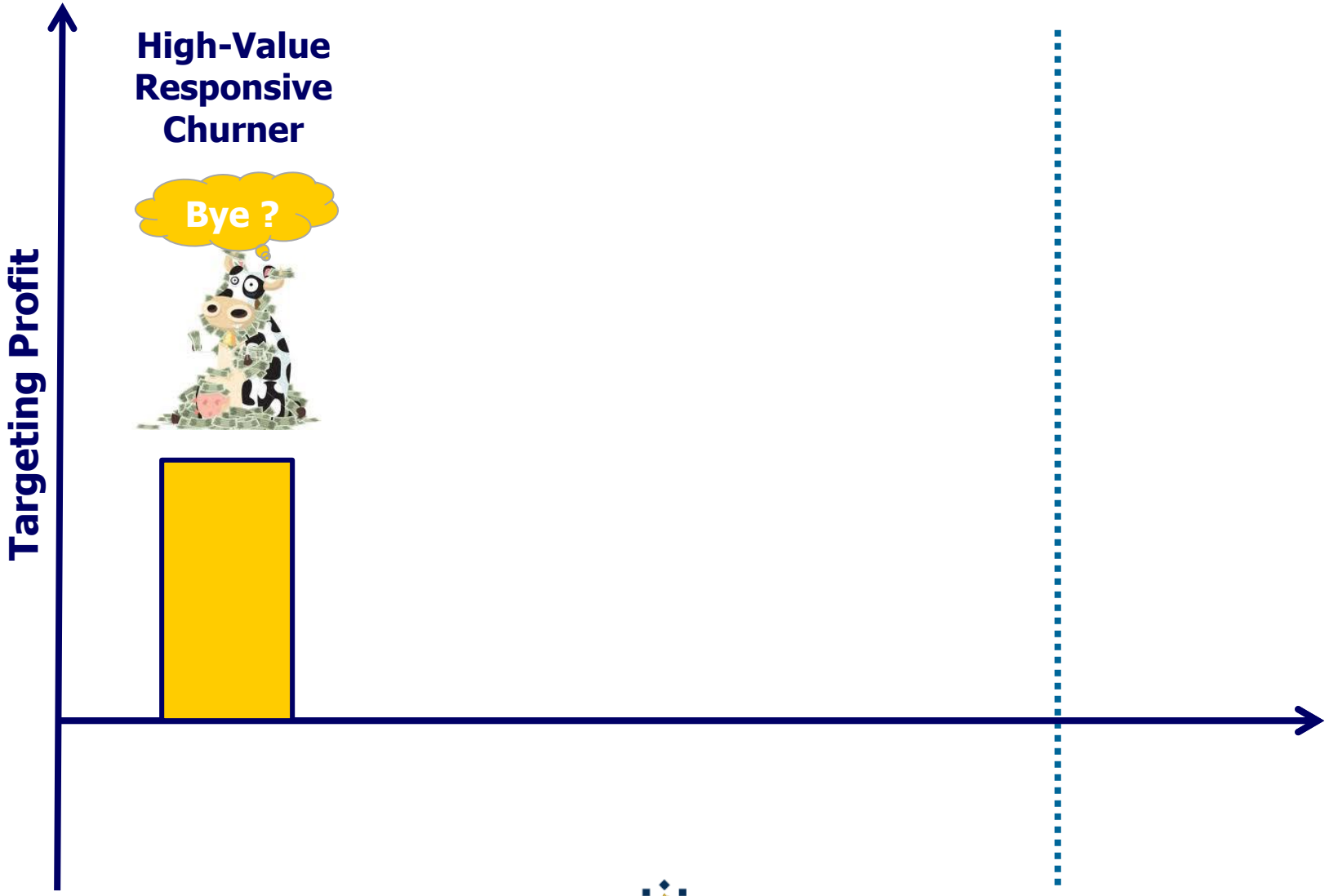
CLV_i =CLV if customer i if is not targeted

δ = action cost

What is the Profit of Targeting…



What is the Profit of Targeting…



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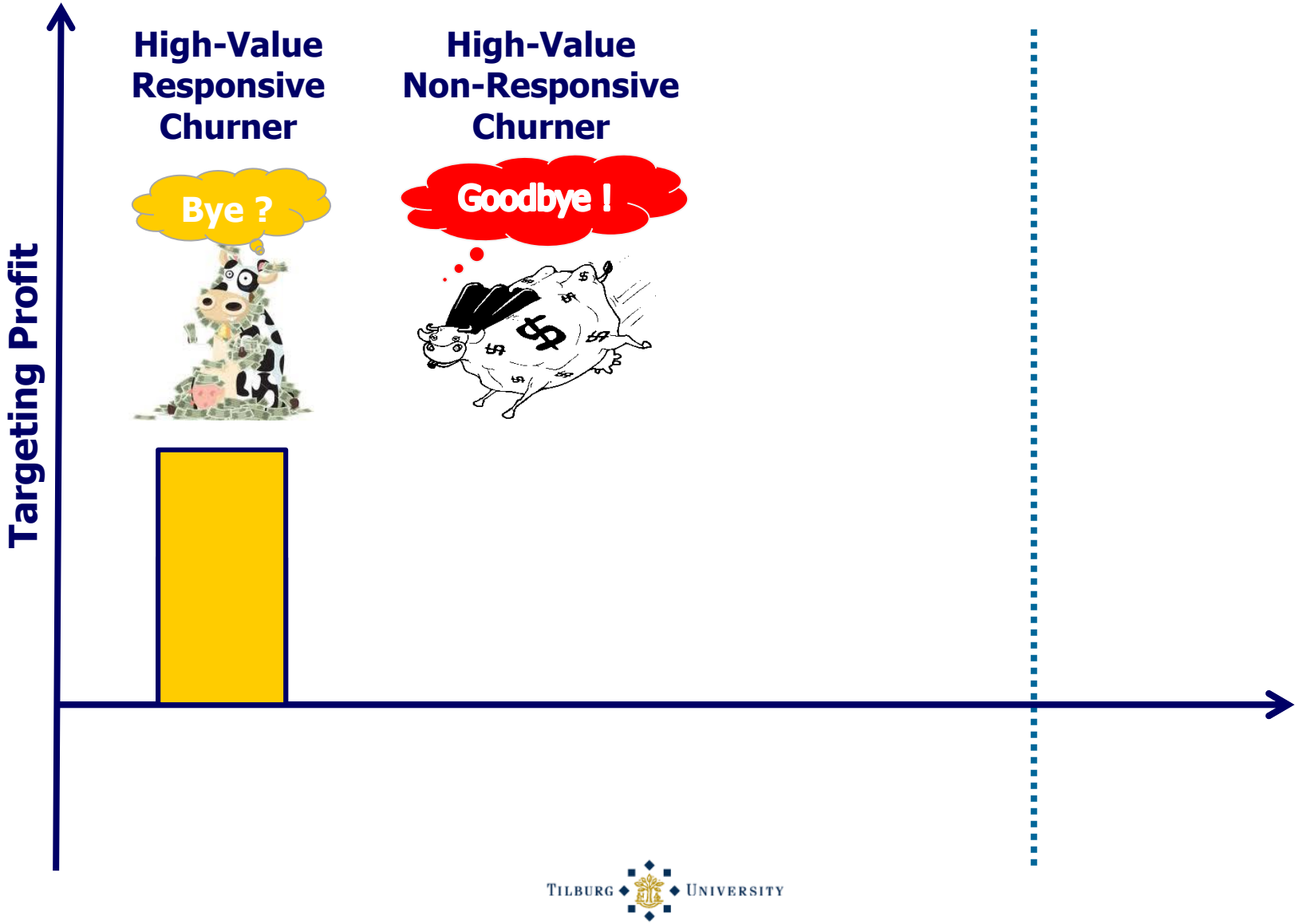

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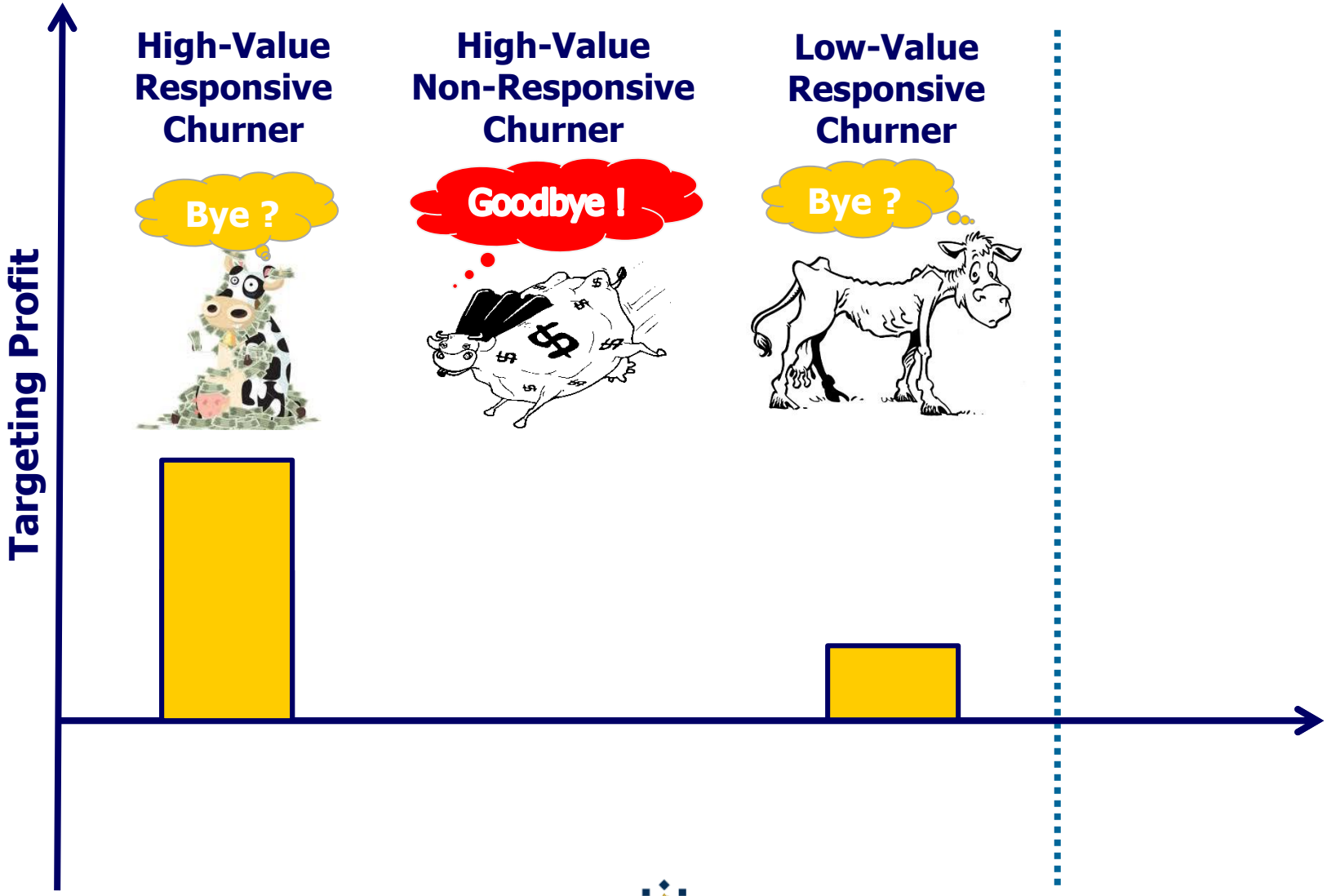
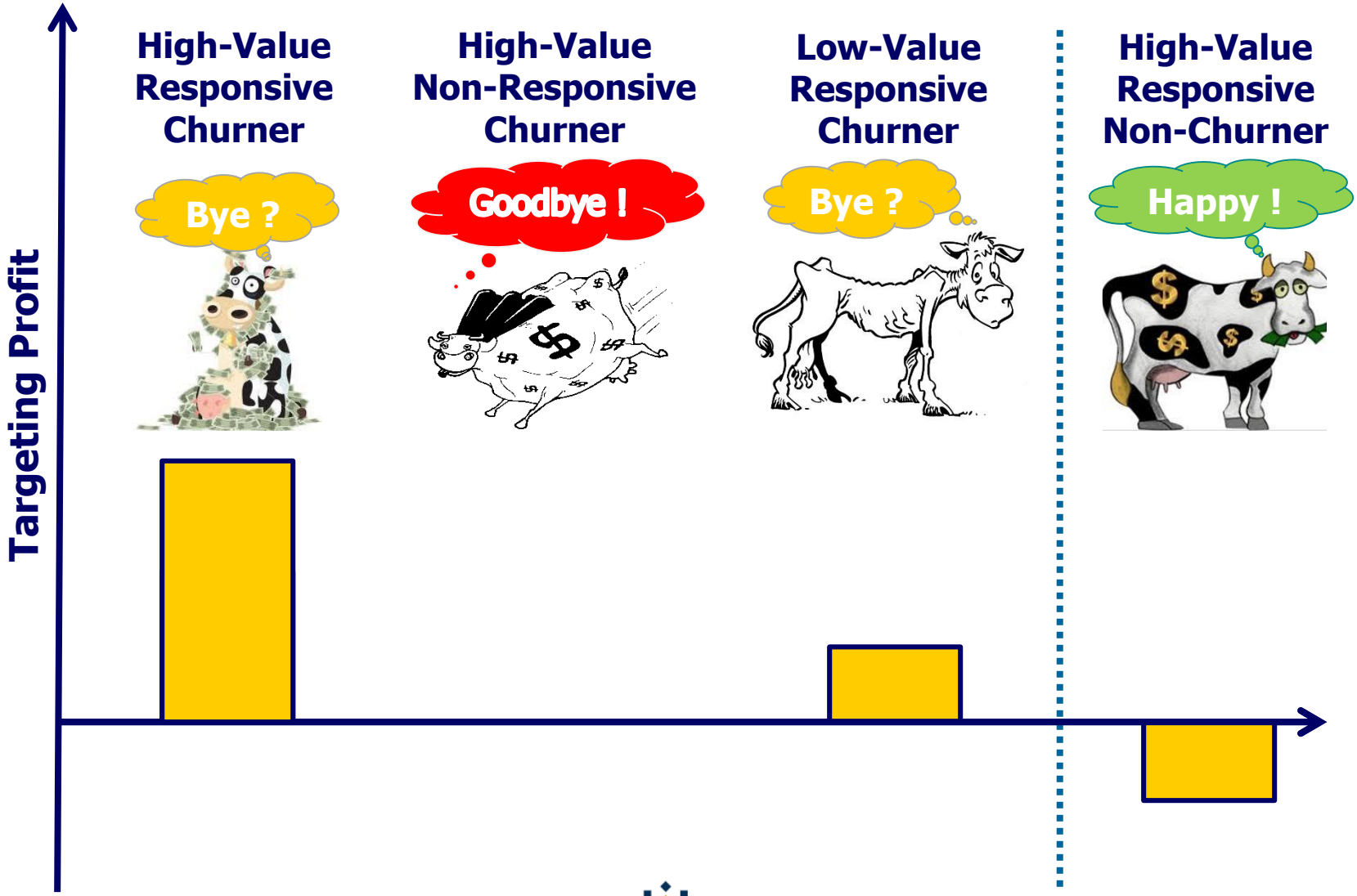


What is the Profit of Targeting…



2

Predict expected profits or expected CLV

- For a would-be churner i ($y_i = +1$), her $CLV_i = 0$ if she is not targeted (i.e. she is leaving the firm). Hence, her individual targeting profit is

$$\pi_{y_i=+1} = \gamma_i(CLV_i' - \delta)$$

γ_i = the probability that the targeted would-be churner would accept the retention offer.

- For a non-churner i ($y_i = -1$), her CLV is not lost. Hence, targeting this customer leads to a negative profit equal to the retention cost,

$$\pi_{y_i=-1} = -\delta$$

2

Predict expected profits or expected CLV

*** Winner of the Teradata Churn Modeling Tournament (Neslin et al. 2006)**

Model (Hold-out sample)	Financial Profits
Binary logit model	**$ 21,728,000**
Bagging (tree-based)	**$ 28,157,000**
Stochastic gradient boosting *	$ 28,758,000

>+30%

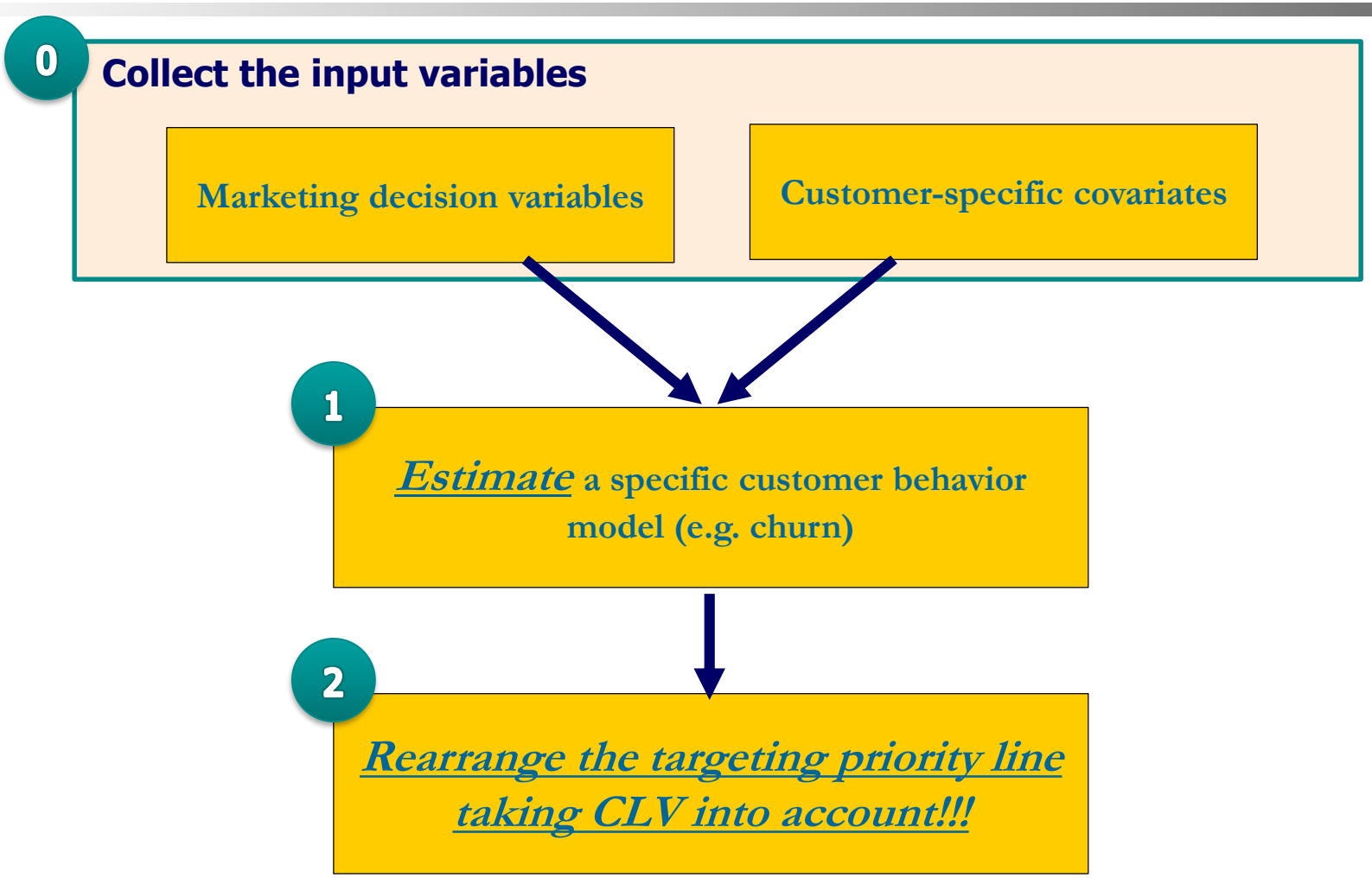
Lemmens and Croux (2006)

What could we do better?

Are all high-risk customers equally profitable?

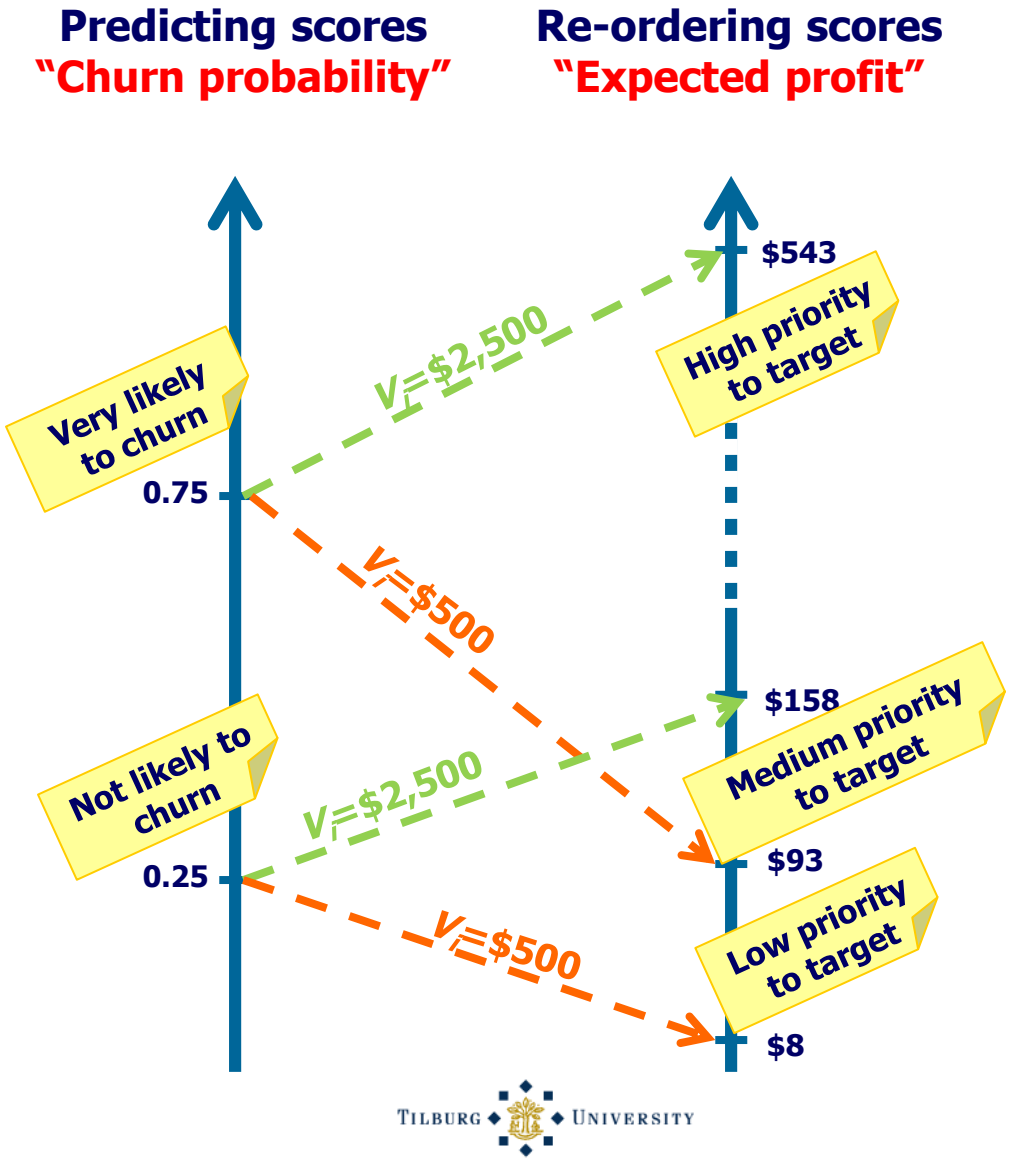
Who do we want in the top of the ranking?

How to Design Targeted Retention Actions



2

Rearrange the targeting priority line taking CLV into account!!!



2

Rearrange the targeting priority line taking CLV into account!!!

- Using the estimated churn probabilities $\hat{p}_i^*$ from step 1, we can now calculate the expected targeting profits by plugging $\hat{p}_i^*$ into the profit function:

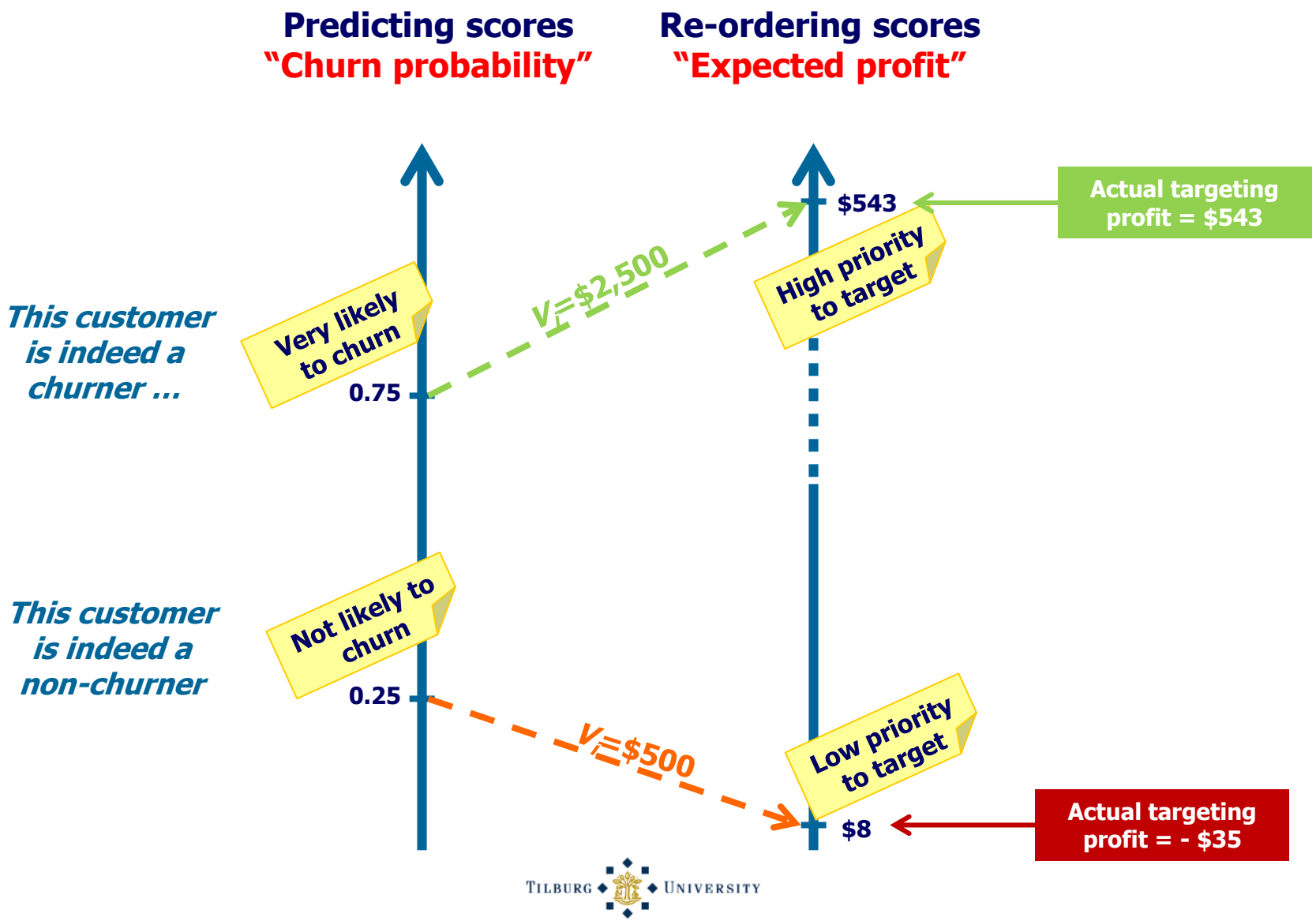
$$\hat{\pi}_i = [\gamma_i(CLV_i' - \delta)]\ \hat{p}_i^* - \delta(1 - \hat{p}_i^*).$$

What can go “wrong” with this approach?

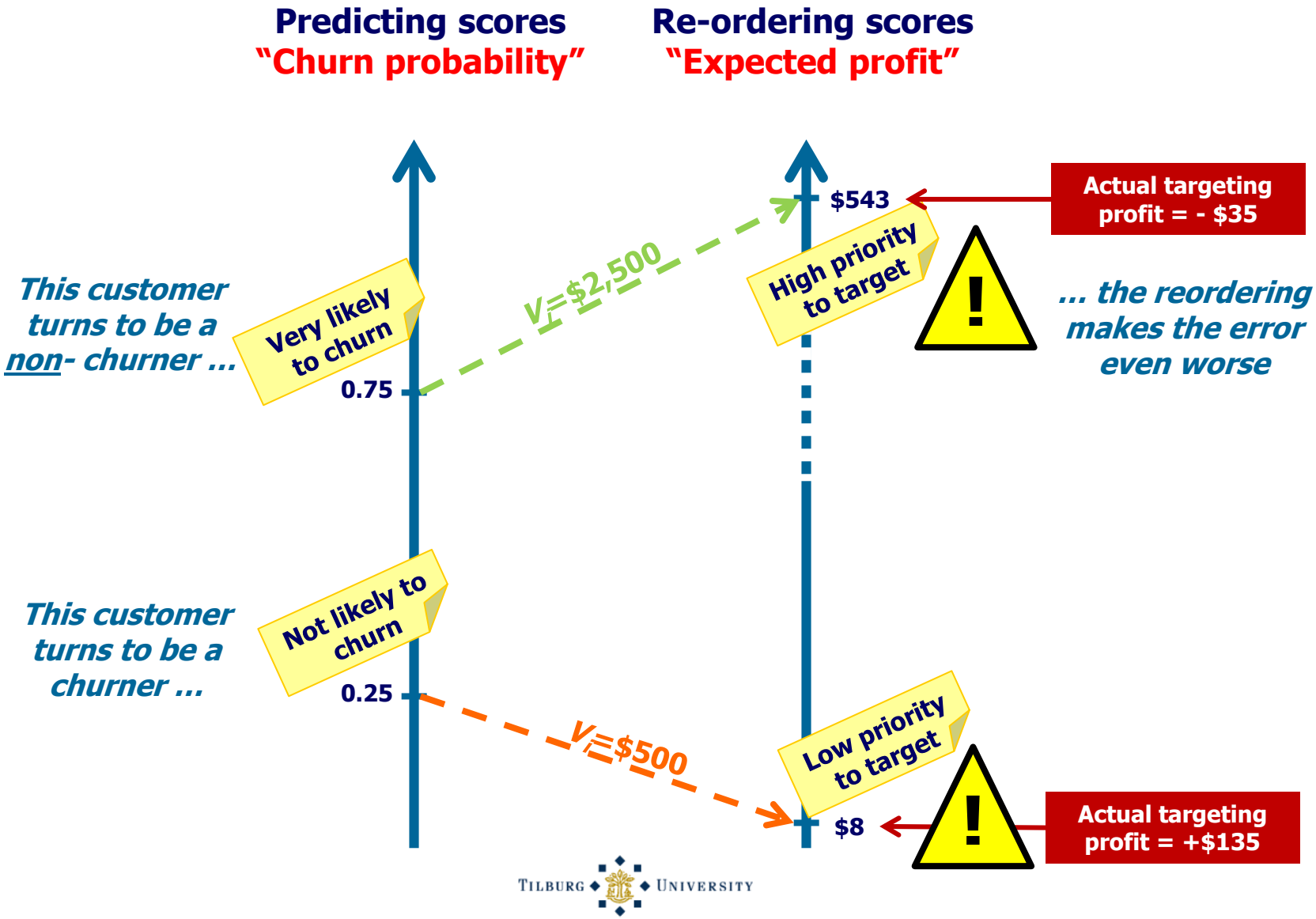
What happens to the high-value customers ?

What if some of them are predicted churners but are actual non-churners?

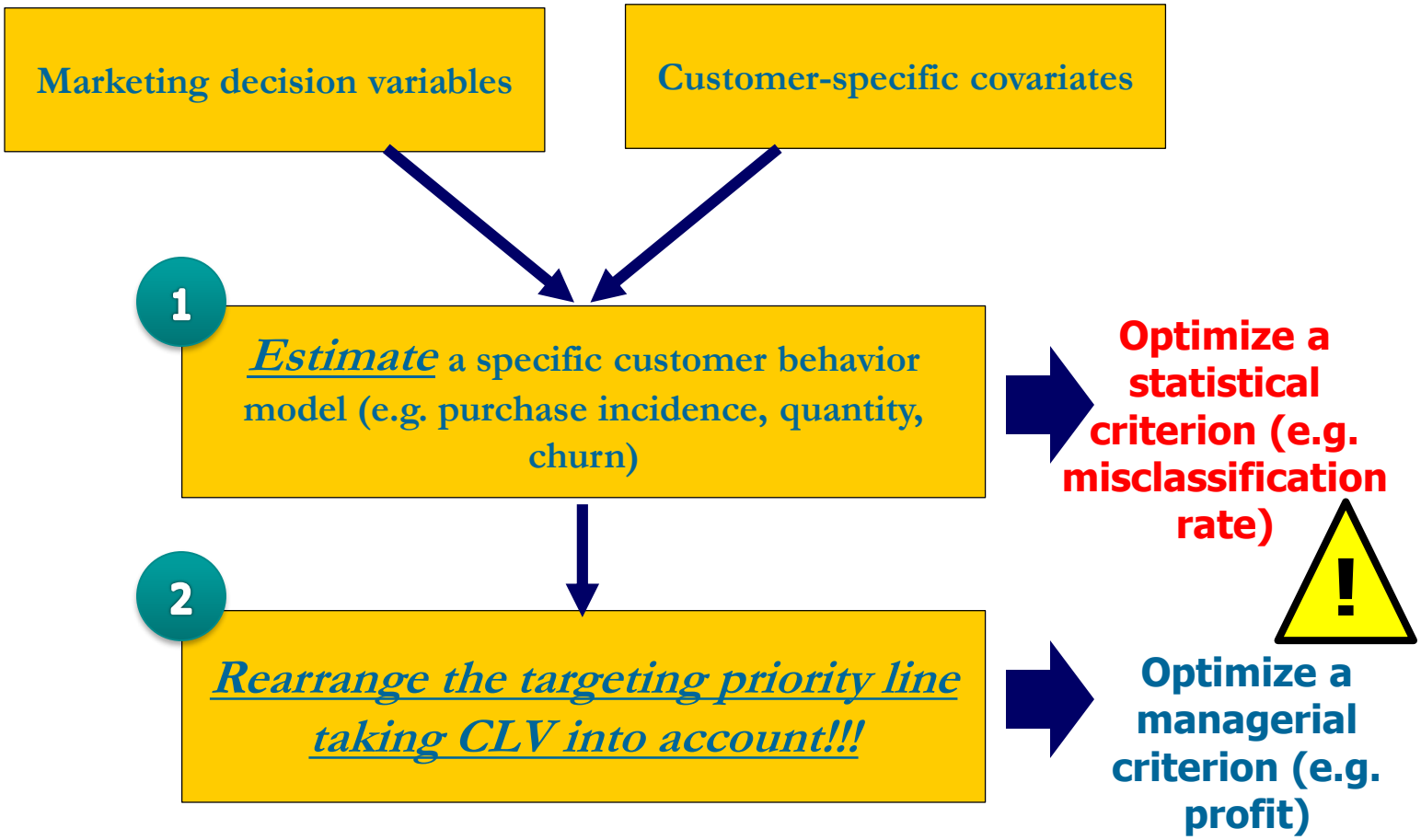
If predictions are accurate, all is fine



If predictions are inaccurate, things get worse!



What is Wrong with the Current Approach?



Conclusions

- **Customer Centricity** is important and can yield great profits
- It is important to take the **CLV** into consideration at all times!!!
- Think about the same issue for the other aspects of the customer lifecycle (**customer acquisition**).
- For the future, CLV is not only about what a customer spends at the firm, but also about her "**social value**" (**customer engagement**). Can we incorporate this in our retention model?
- Many firms prefer to wait that customers call them and then offer them an incentive to stay (**passive retention strategies**). What are the advantages and disadvantages of such an approach? How can we model this?

Assignment

- Write a proposal for an academic research project that may advance our knowledge of customer management.
- Any topic within the domain of customer centricity, retention and lifetime value.
- The proposal should at least include:
  - A clear research question (what do you want to research?)
  - A solid motivation (why is this an interesting question? why would your proposal be worth executing?);
  - Main contribution (if executed, what does your project add to literature? how do managers and/or other stakeholders benefit?);
  - Relevant literature (what literature stream(s) do you build on?);
  - A description of the suggested methodology (which data would you need, if any, and how would you analyze the data?).

Assignment

- Evaluation will be based on the quality and innovativeness of your idea, the feasibility, and the clarity.
- Proposals that build on insights and/or methods from fields other than marketing are highly encouraged.
- 10 pages max.

Thank you!