

Marketing examples

DATA-DRIVEN DECISION MAKING FOR BUSINESS



Ted Kwartler

Data Dude

4 P's of marketing

1) Promotion



3) Product



2) Pricing

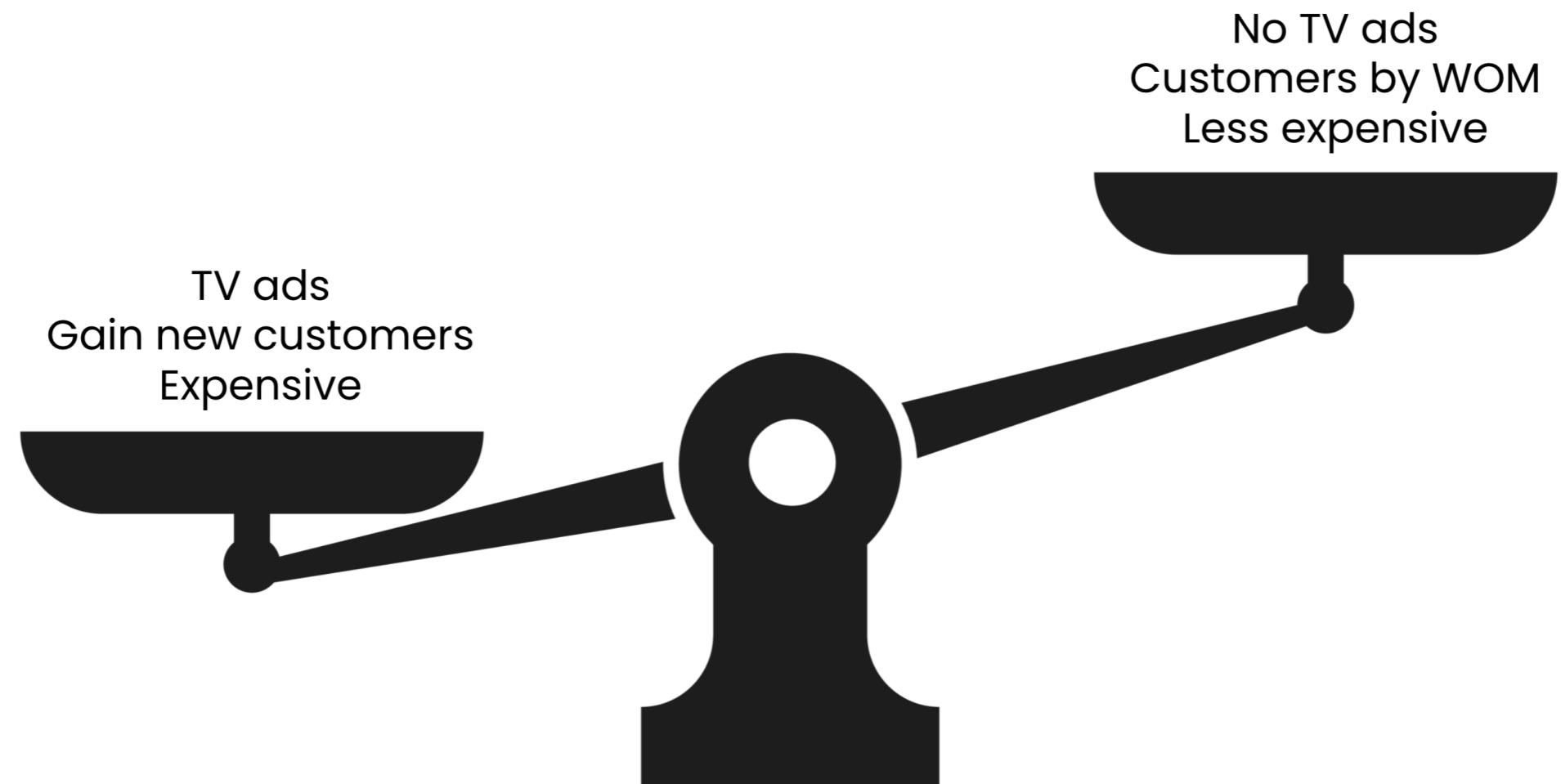


4) Placement



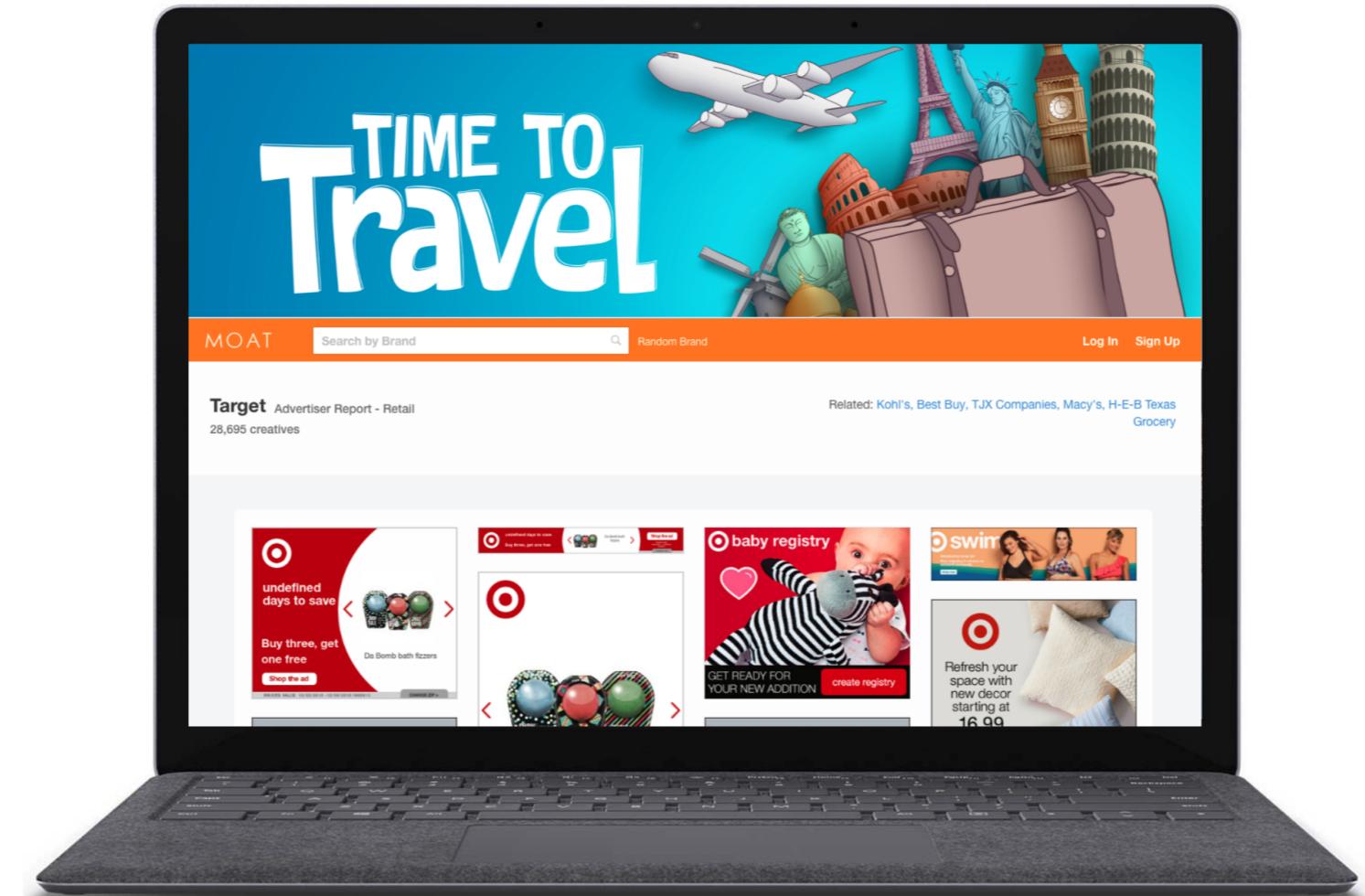
To grow or not to grow

- Should we grow at great expense?
- Should we focus on profitability?



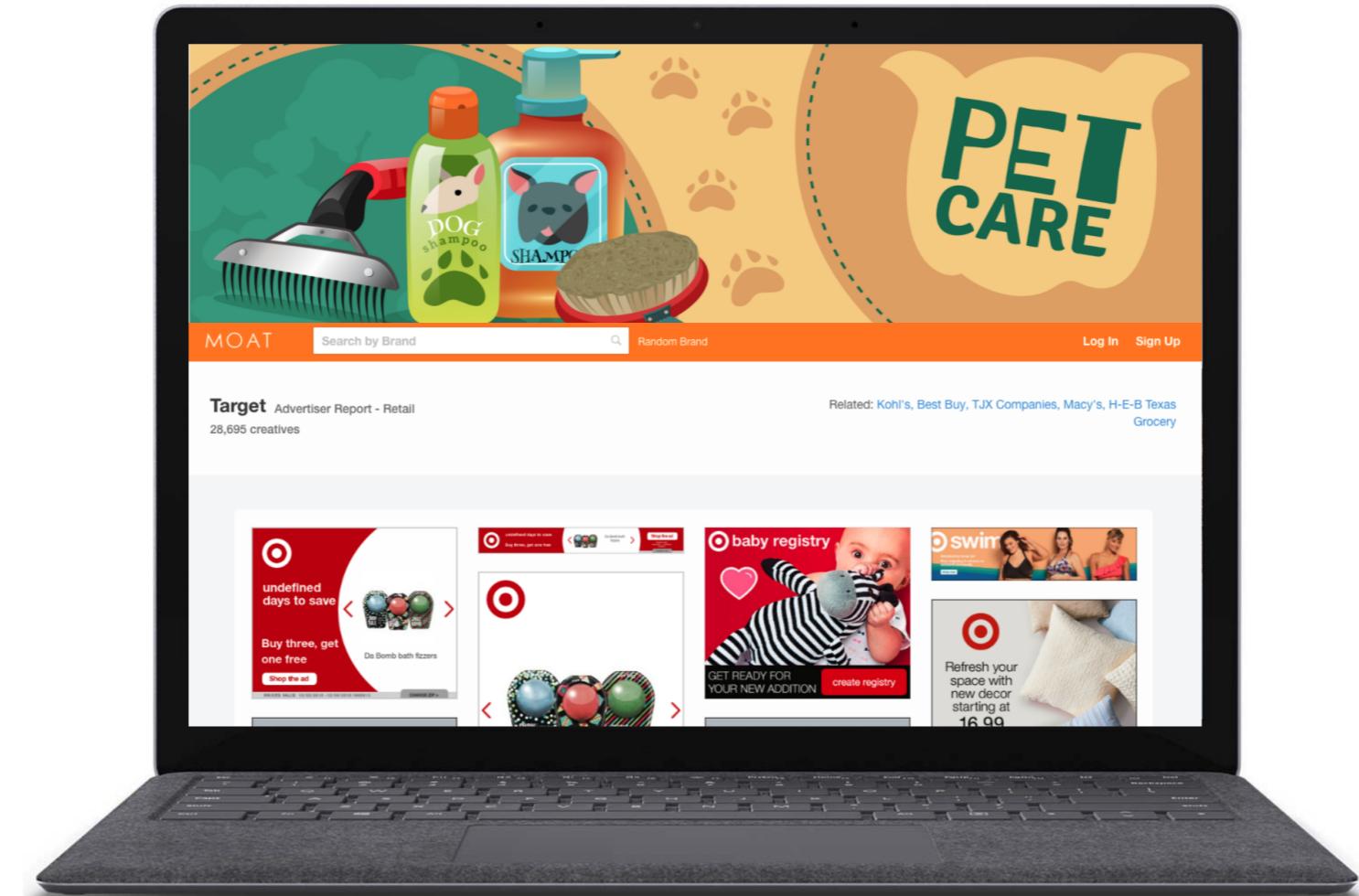
Modeling customer behavior

Customer propensity model: provide a likelihood a potential customer will accept the offer



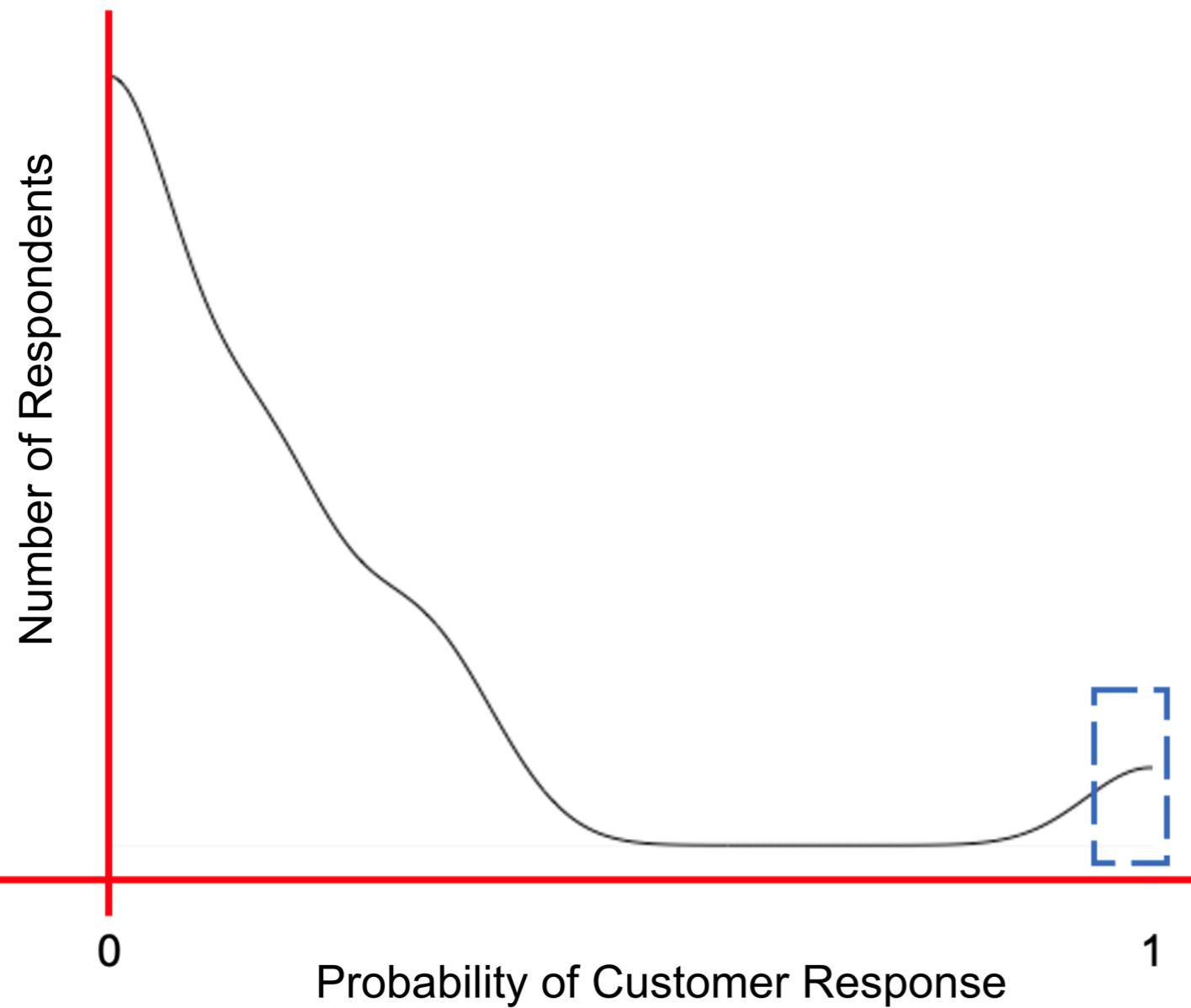
Modeling customer behavior

Customer propensity model: provide a likelihood a potential customer will accept the offer

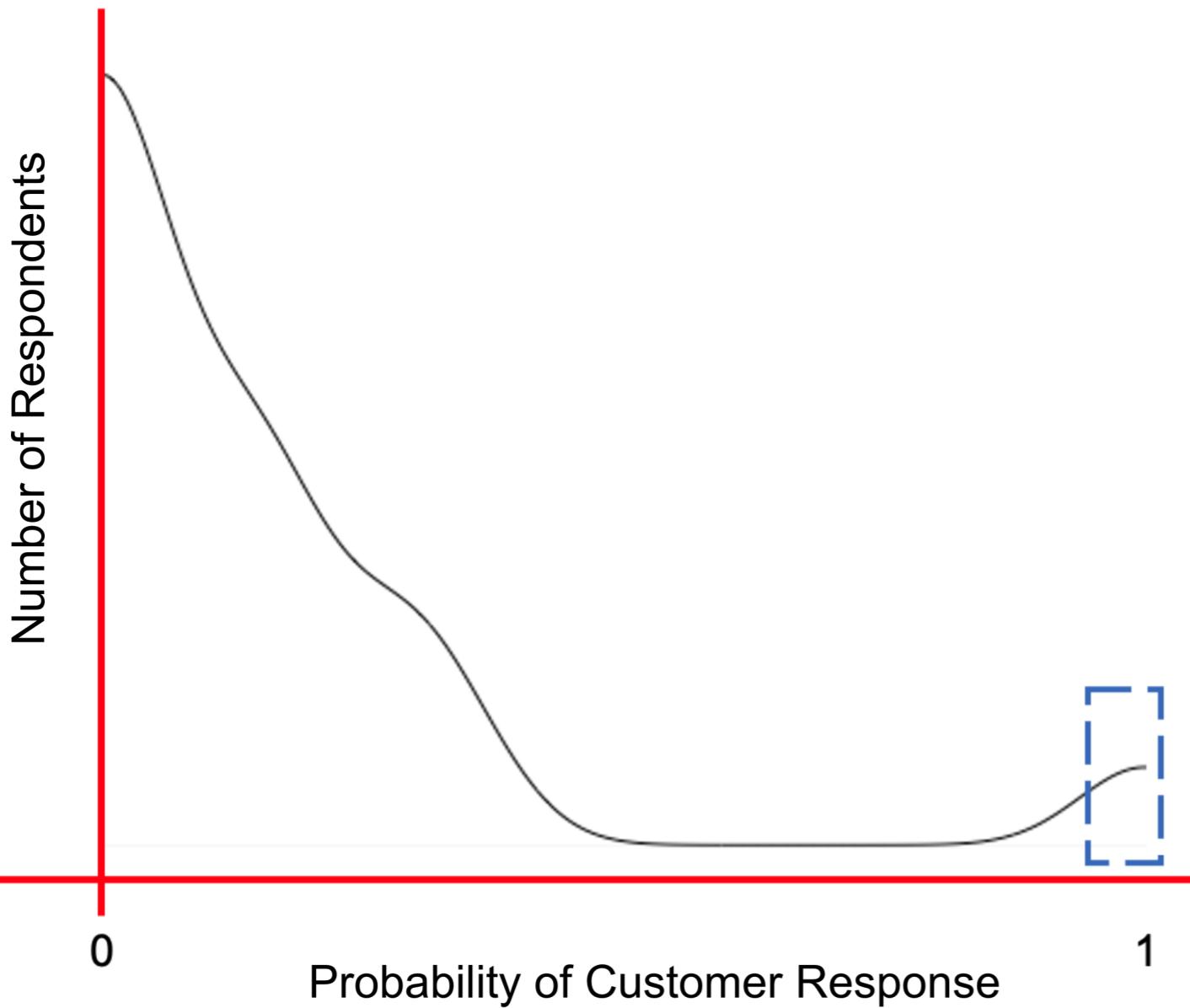


Understanding a propensity function

- Probabilities are between 0 and 1
- Most customers don't click on the ad

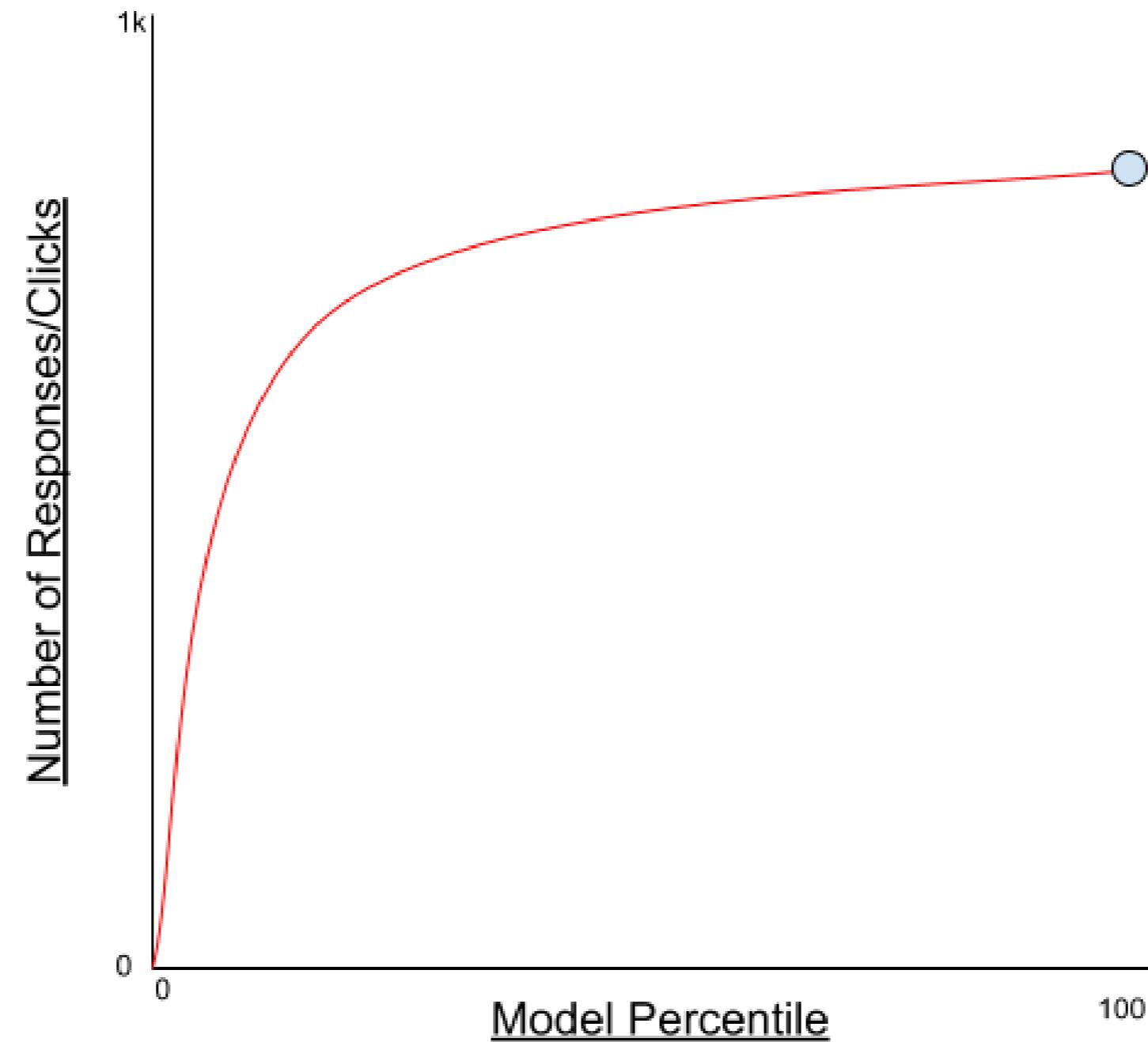


Identify the tail, most likely responses



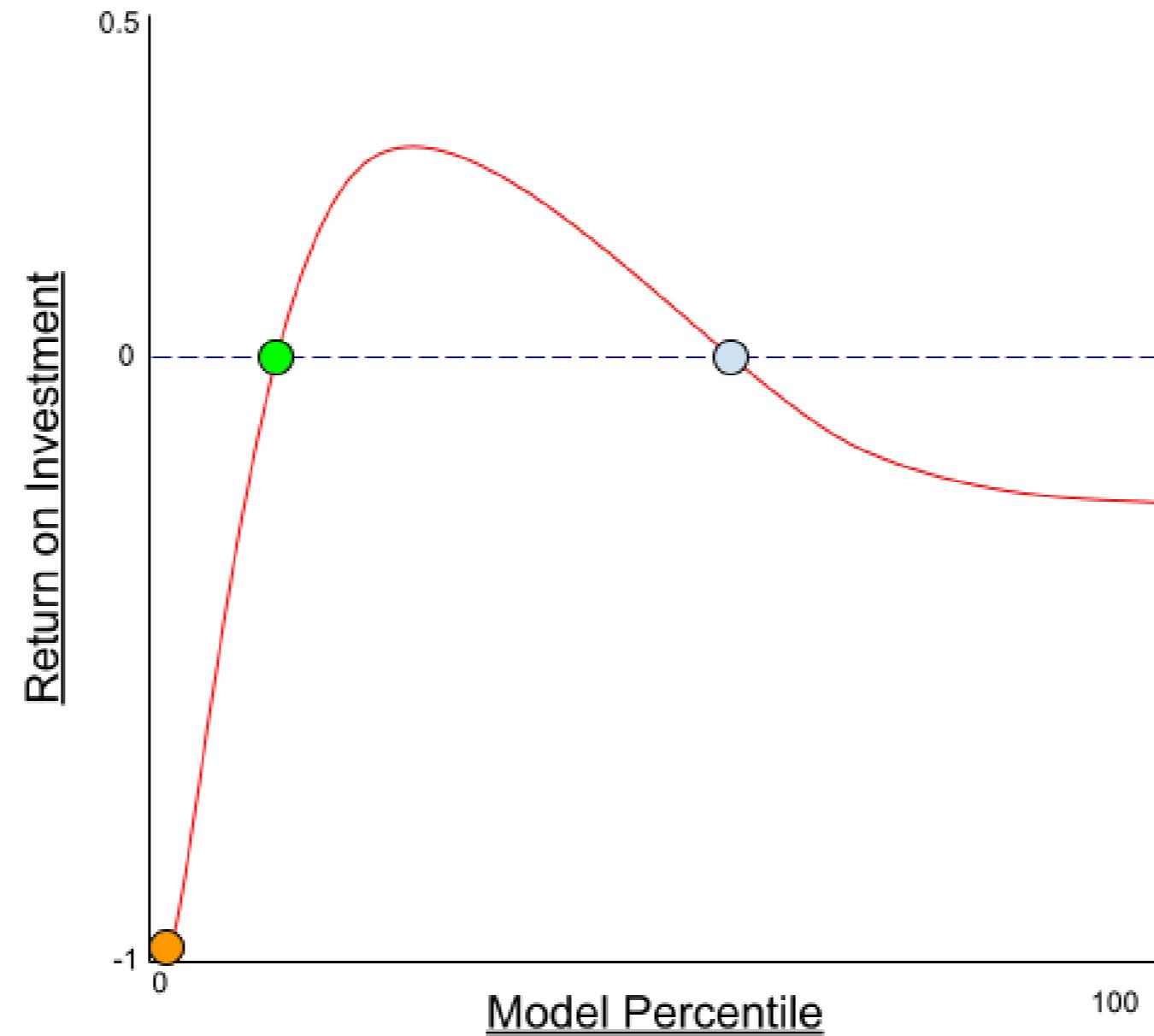
- Probabilities are between 0 and 1
- Most customers don't click on the ad
- If 95% of the time customers don't click, an accurate model would predict no-clicks
- So focus on the accuracy in the top decile (blue box)

Model predictions by expected responses



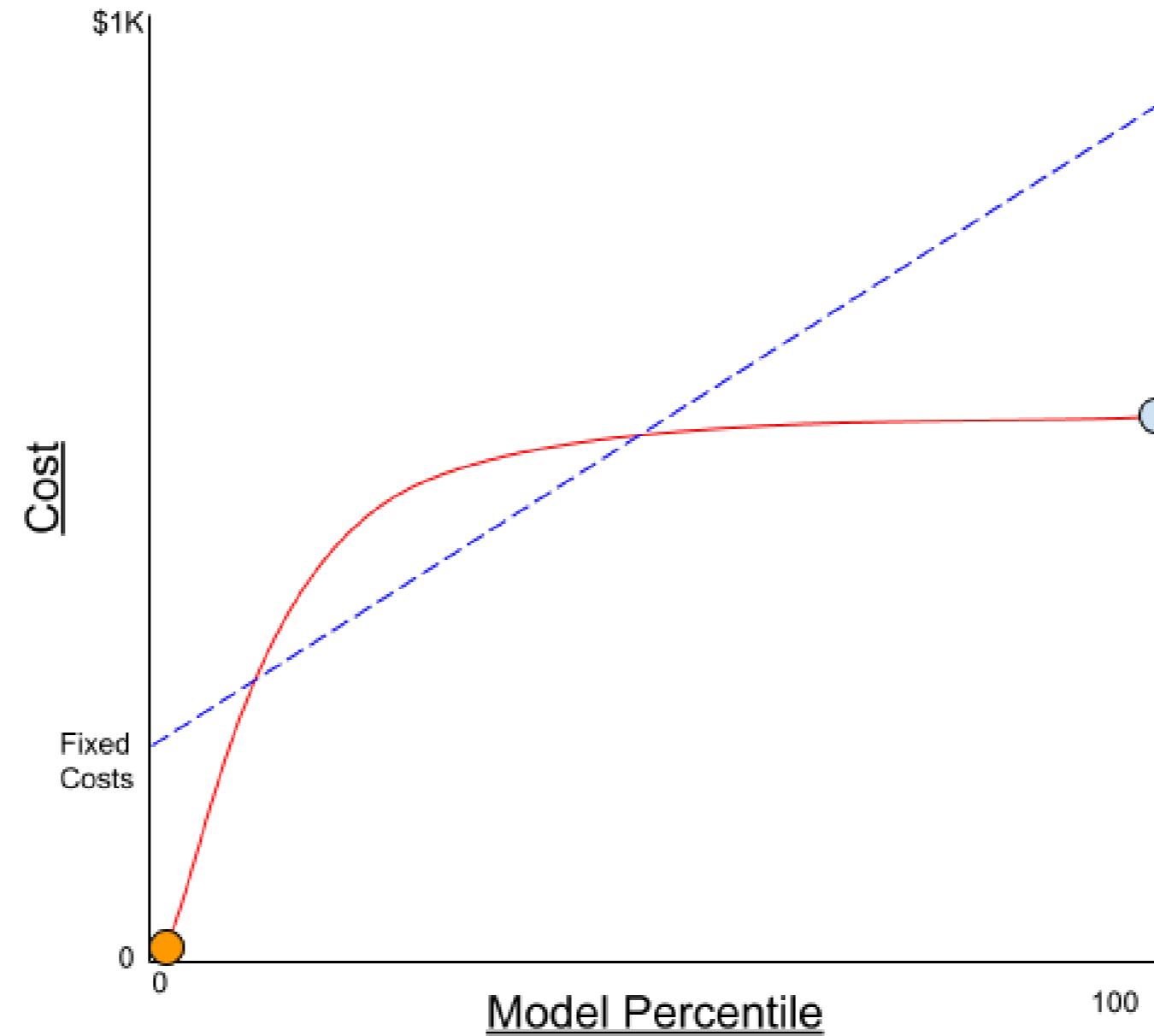
Return on investment

How much money is returned for each spent dollar?



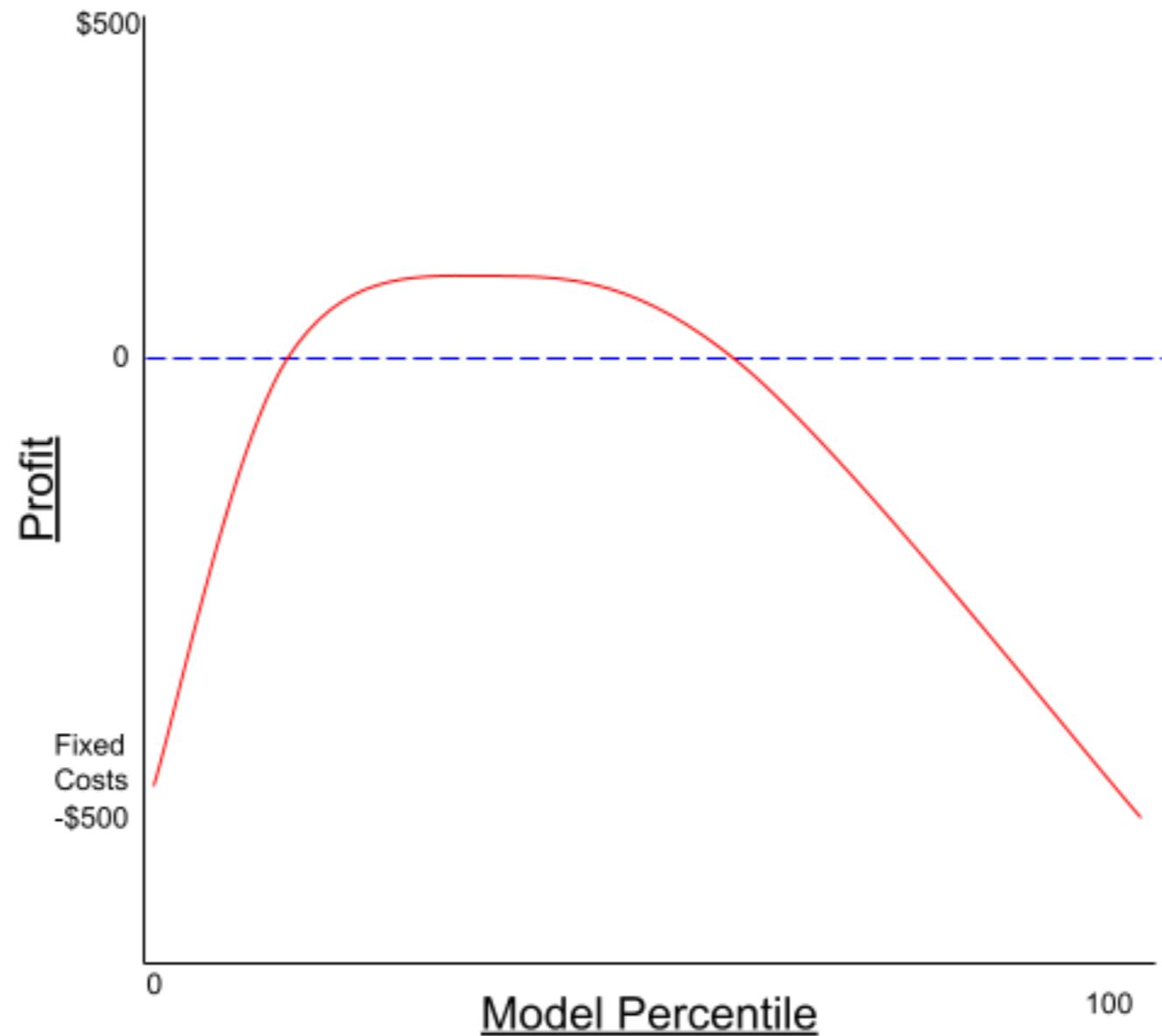
Costs and revenue

Let's compare cost and revenue



Profit curve

Ultimately, the model propensities by the profit are important



Off to it!

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Ad arbitrage

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Ted Kwartler
Instructor

What is arbitrage?

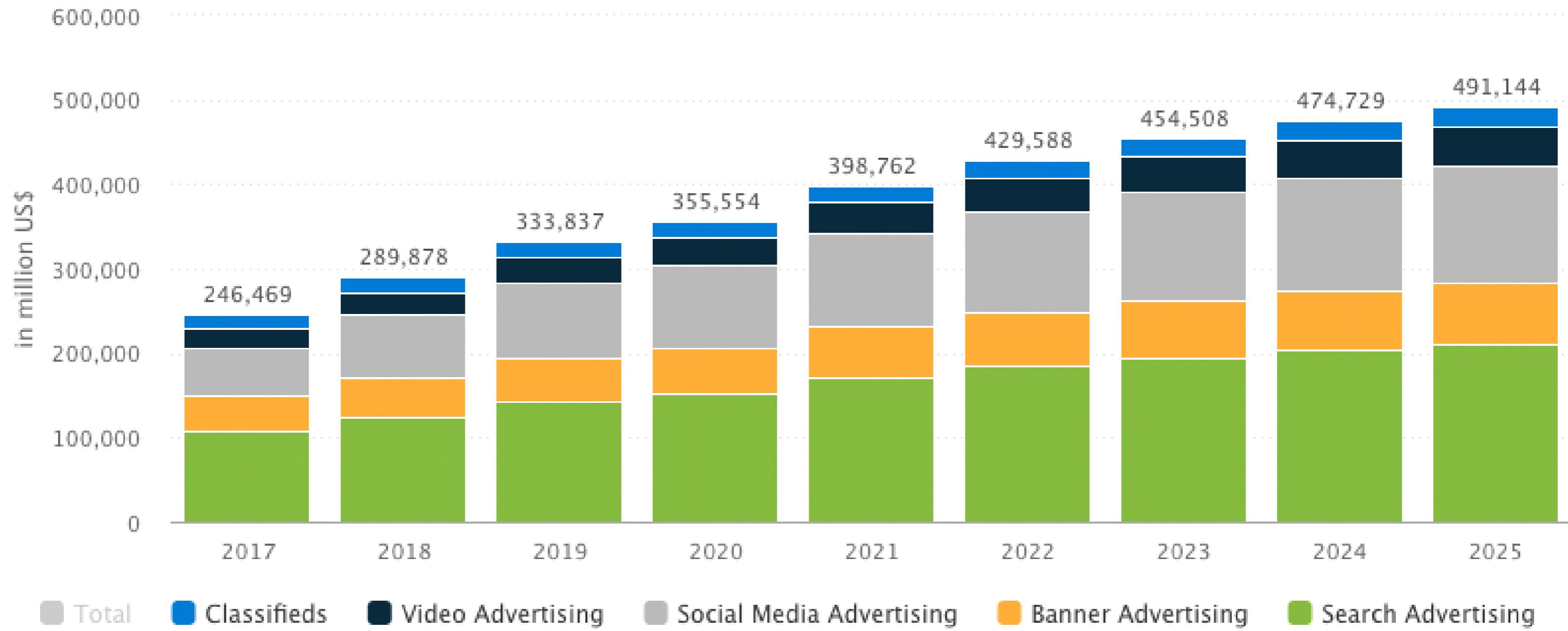
The simultaneous buying and selling of securities, currency, or commodities in different markets to take advantage of differing prices for the same asset.



Arbitrage example



Digital ads is a growing market



¹ <https://www.statista.com/outlook/216/100/digital-advertising/worldwide>

How does ad arbitrage work?

- Place ads on website to generate revenue
 - Ad revenue: \$1 per 1000 visitors
 - Cost: pay \$1 to get 1000 visitors
- Ad arbitrage: cost < ad revenue



Pay for incoming traffic



Get paid for your traffic



It's not that easy



Machine learning to the rescue



Ultimately, it's a human decision

- Human in the loop
 - People interpret model outputs
 - People perform the action rather than an automatic model decision



Human interpretation

ID	Description	Cost Per Impression	Amount of Traffic	Sponsorship Revenue per traffic
1	From Social Site A to webpage A	.10	100	.05
2	From Social Site B to webpage A	.08	200	.09
3	From Social Site A to webpage B	.12	75	.11

- Cost: $200 * 0.08 = \$16$
- Revenue: $200 * 0.09 = \$18$
- Arbitrage profit: $\$18 - \$16 = \$2$

Let's practice!

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Data-driven product forecasting

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Not always simple



Products on products on products

The number of new products sold dictate the number of customer service phone calls received



Growth model example

BASS model: early adopters curve and late adopter curve combine over time for the total market



Innovation vs. imitation

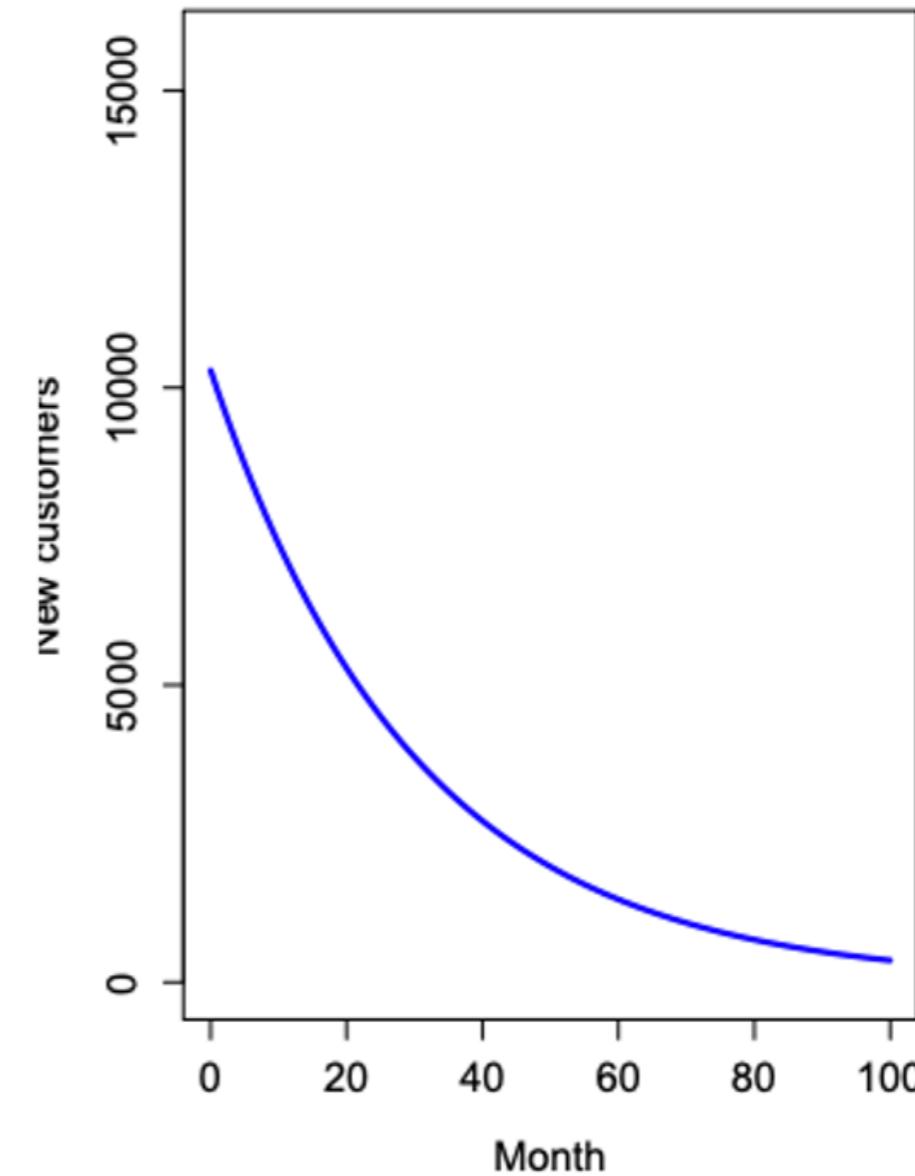
- m : Total market capacity
- p : Rate of innovation
- q : Rate of imitation

At any given point in time, the forecast is the sum of p and q rates along reaching towards the total market capacity



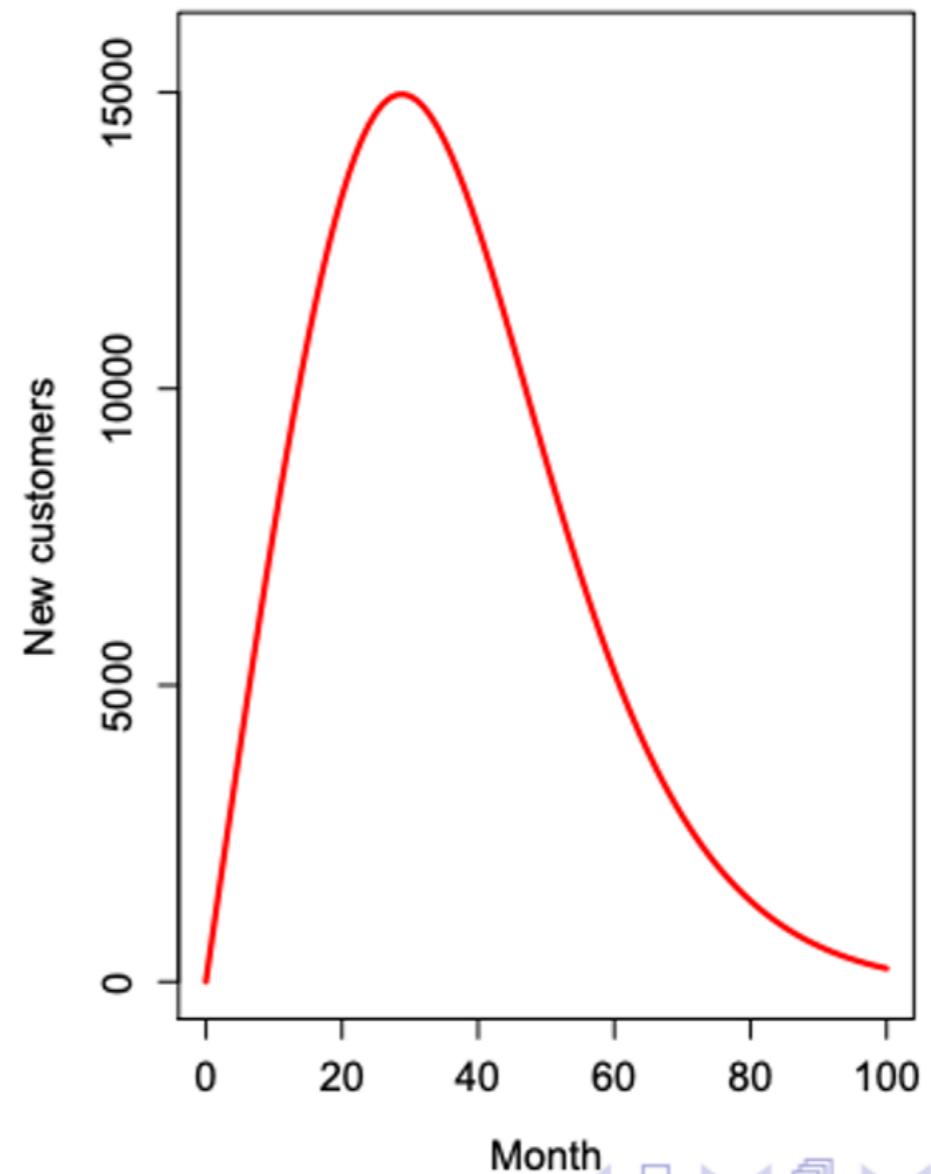
P: Innovation behavior

- Steep decline
- "People enticed and willing to take a chance"
- Smaller total number



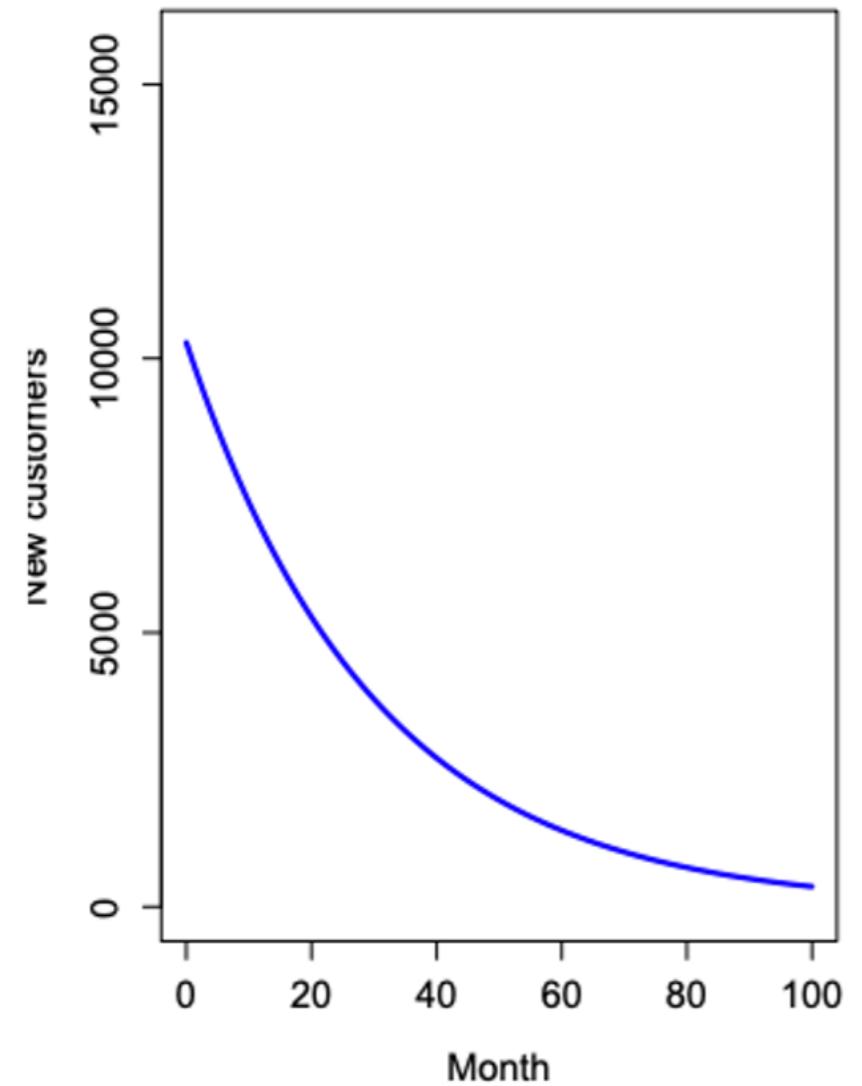
Q: Imitation behavior

- Larger total number
- Steep incline as they learn from innovators
- "People eventually won over"

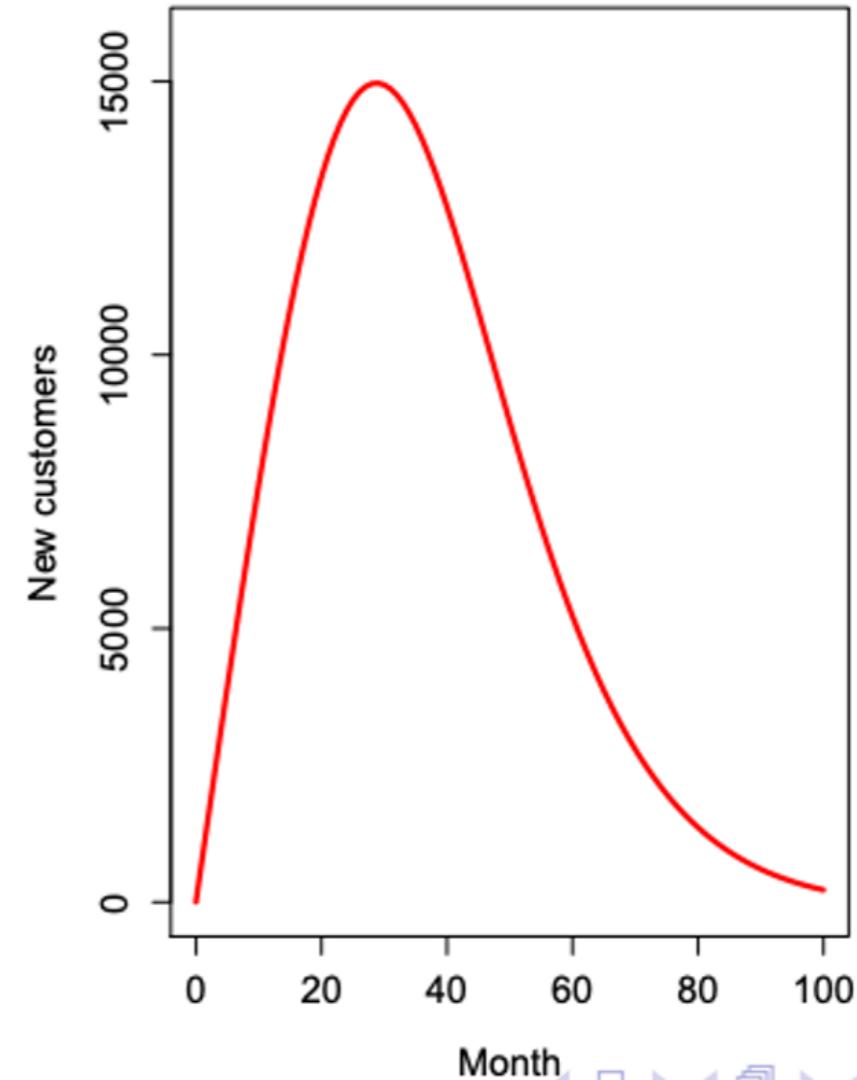


P & Q side by side

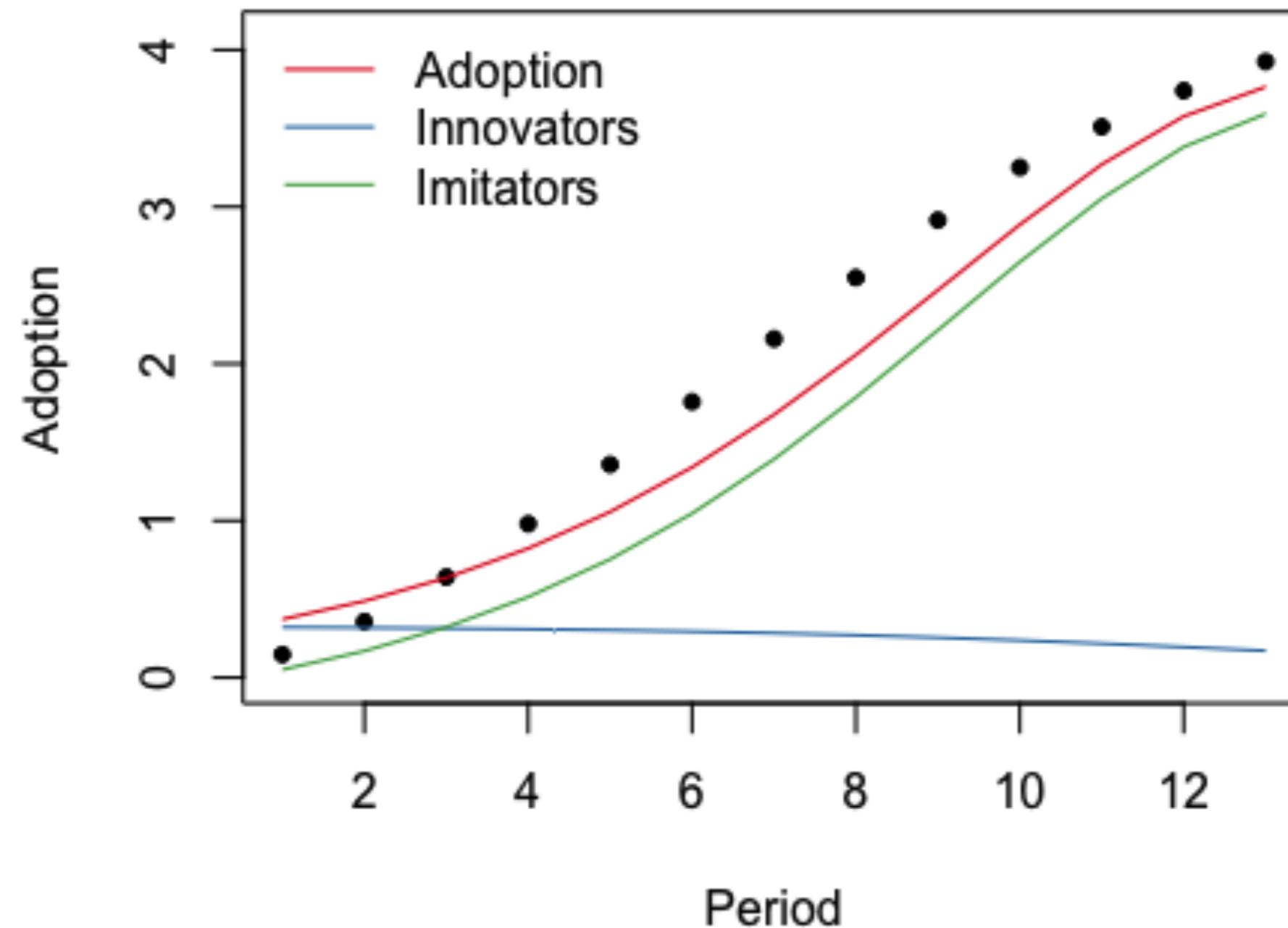
P: Innovation



Q: Imitation



Altogether now



Historical P & Q

Product	P-Inno	Q - Imit
B/W TV	.108	.231
Color TV	.059	.146
Room Air Con.	.006	.185
Dryers	.009	.143
CD Player	.055	.378
Cell Phones	.008	.421
Steam Iron	.031	.128
Microwave	.002	.357
Hybrid Corn	.000	.797
Home PC	.101	.281

Averages:

- P = 0.03
- Q = 0.38

¹ <https://slideplayer.com/slide/1423750/>

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