Making a Quantitative Case for UBI

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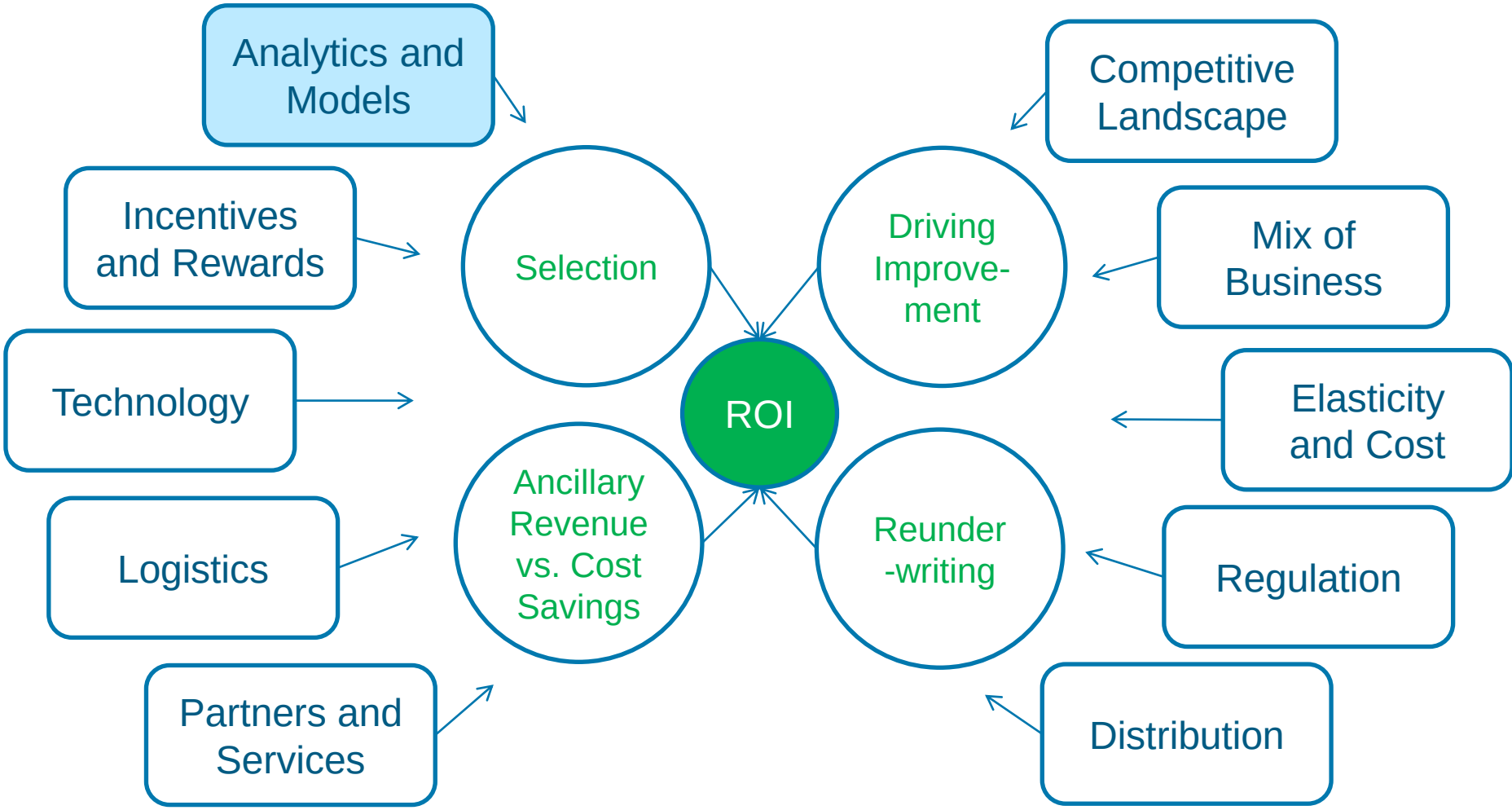
ROI and "the fallacy of planning"

Simulation: not just for actuaries

Recent examples:

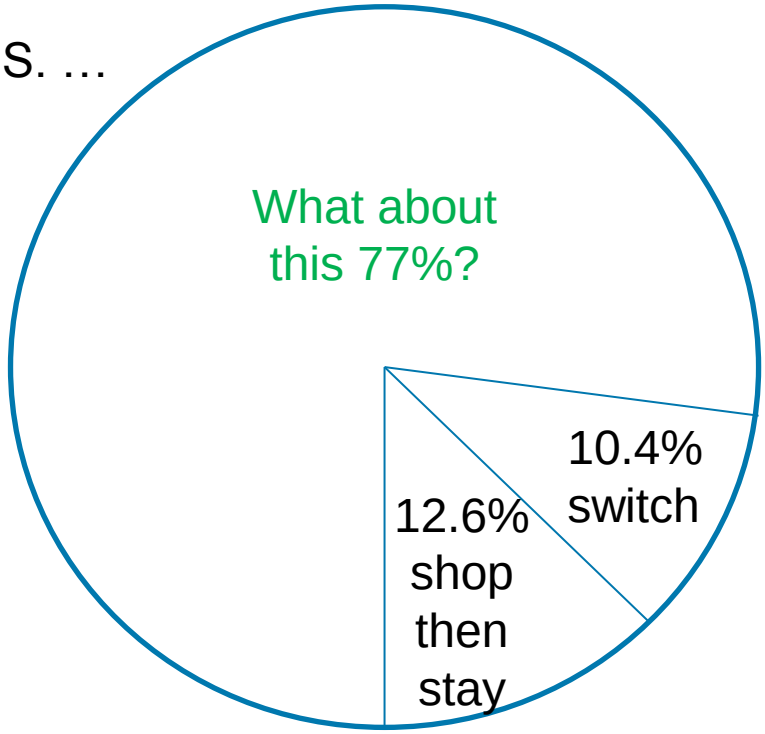
- Ridesharing route optimization
- Autonomous vehicle decision calibration
- Cyber attack preparedness
- Particle collision research
- Super bowl predictions

Simulating the ROI on UBI



Scoping the opportunity

Every year in the U.S. …



Source: "Fewer customers are shopping for auto insurance; however, nearly one-half of those who do switch auto insurers"

http://www.jdpower.com/sites/default/files/2013060_insurance_shopping_study.pdf

Estimating components of ROI

Example for policyholders enrolled in year 1 of UBI program:

$$\text{Positive Selection Benefits} = \sum_{i=1}^{\text{N = \# of UBI policyholders}} \sum_{j=1}^{\text{P = Predicted Lapse}} \frac{\text{Average New Business Pure Premium} - \text{UBI Replacement Pure Premium}_i}{(1 + \text{discount rate})^j}$$

Do benefits equal or exceed discounts awarded?

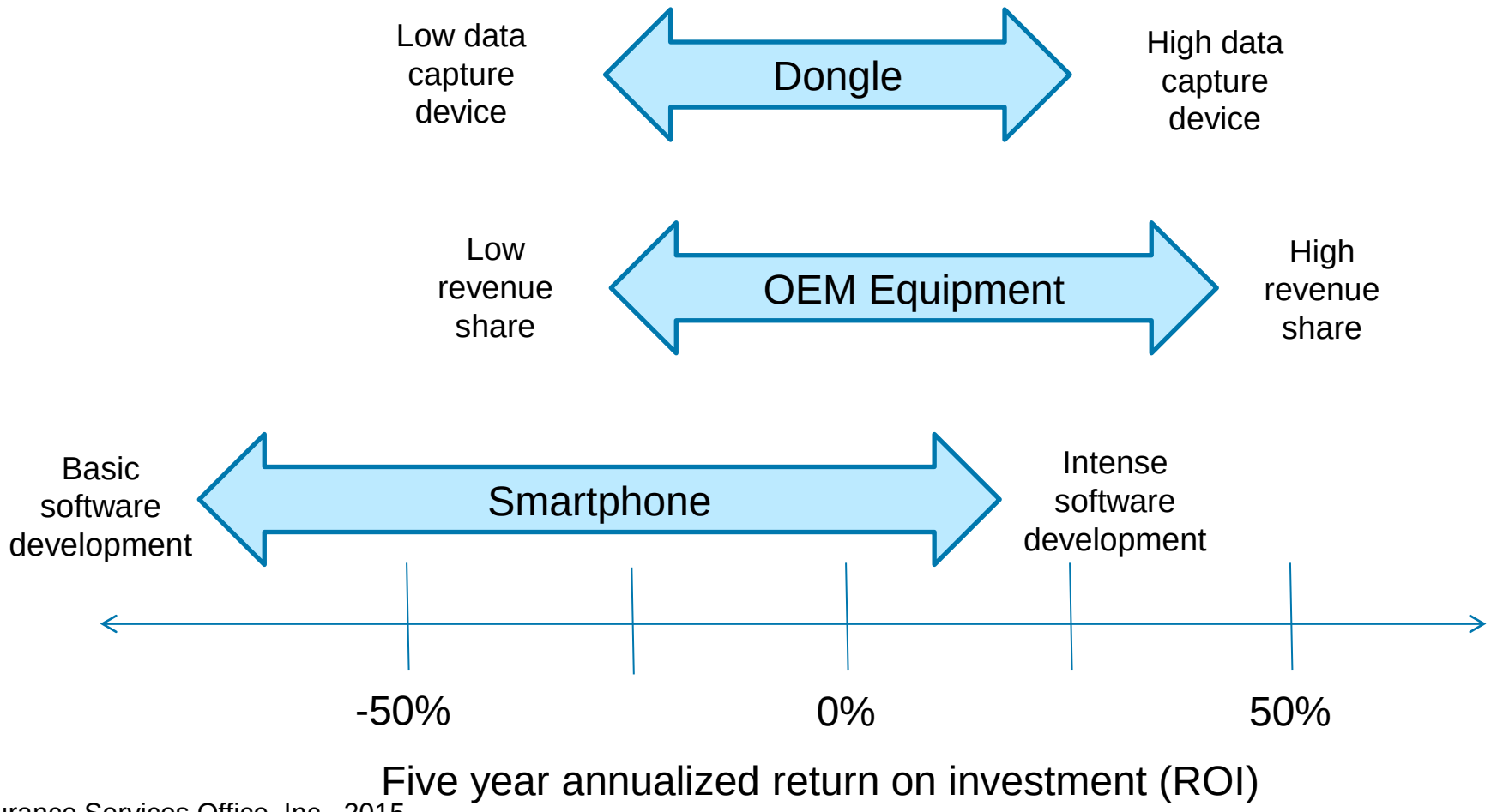
Simple anti-selection example

Year	Avg Rate	Danny	DJ	Michelle	Jesse	Joey	Pure Prem	Loss Ratio
1	800	228	423	520	618	813	520	65%
2	800	X	423	520	618	813	593	74%

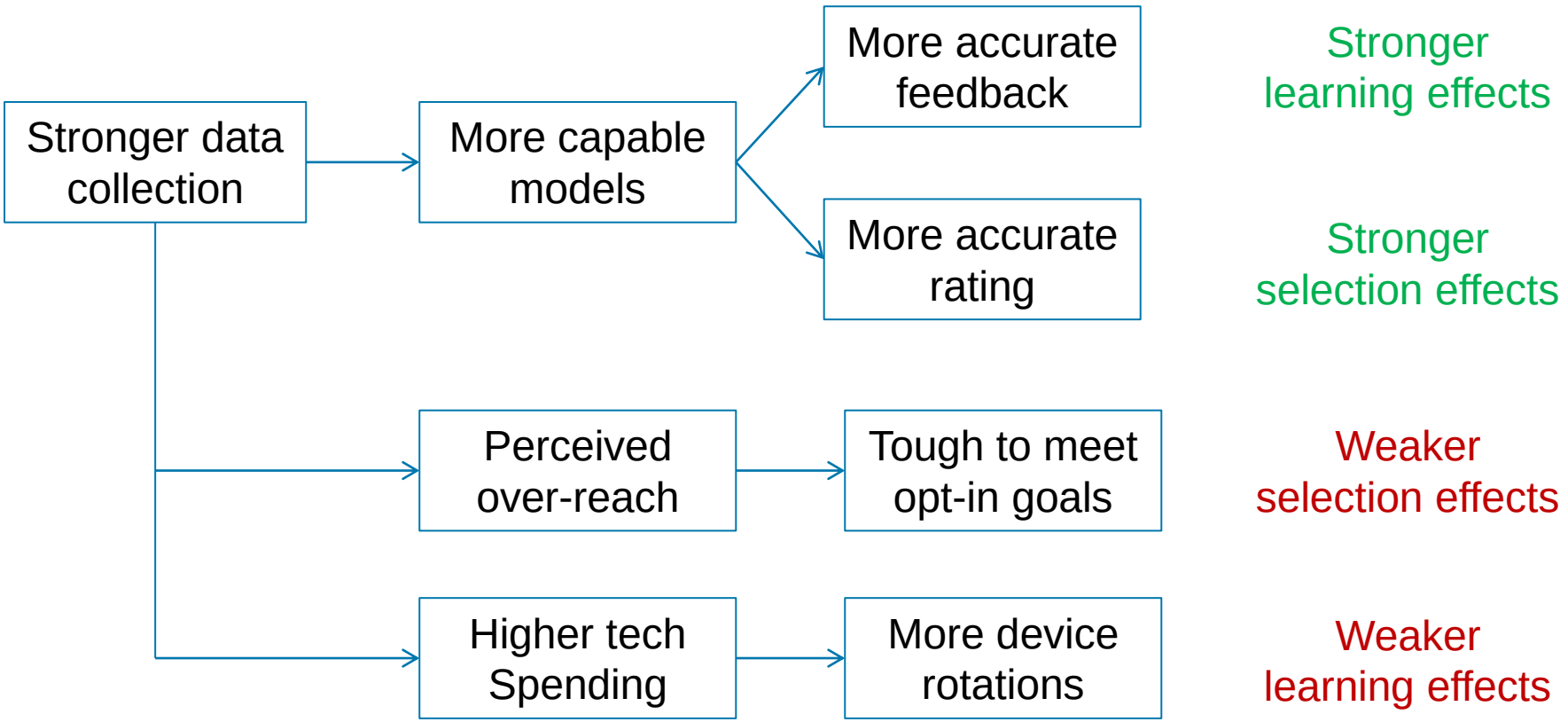
All values are hypothetical and illustrative. In the example, policyholders switch to insurers with UBI if they can find a rate 25% lower.

What more do we need to know?

Hypothetical max/min spend scenarios by supporting technology

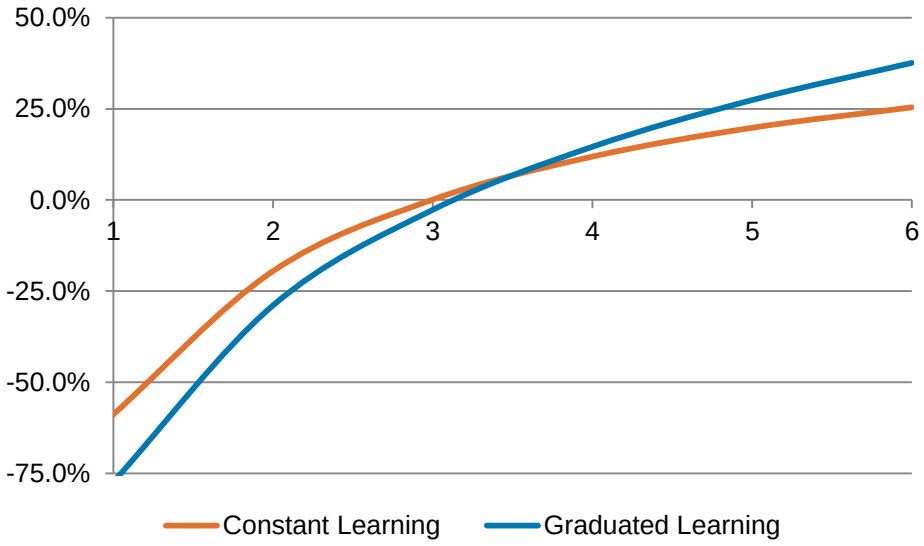


Example of inter-relationships



How much does the model matter

Hypothetical Five Year Annualized ROI



Model Power (High Tertile ÷ Lower Tertile)

"Common Dongle / Book of Business" Assumption Set

- Approximately industry average premiums / expenses
- $100 hardware, $5 monthly wireless
- Three year useful life
- Three vehicles per year
- 10% annual cost reductions

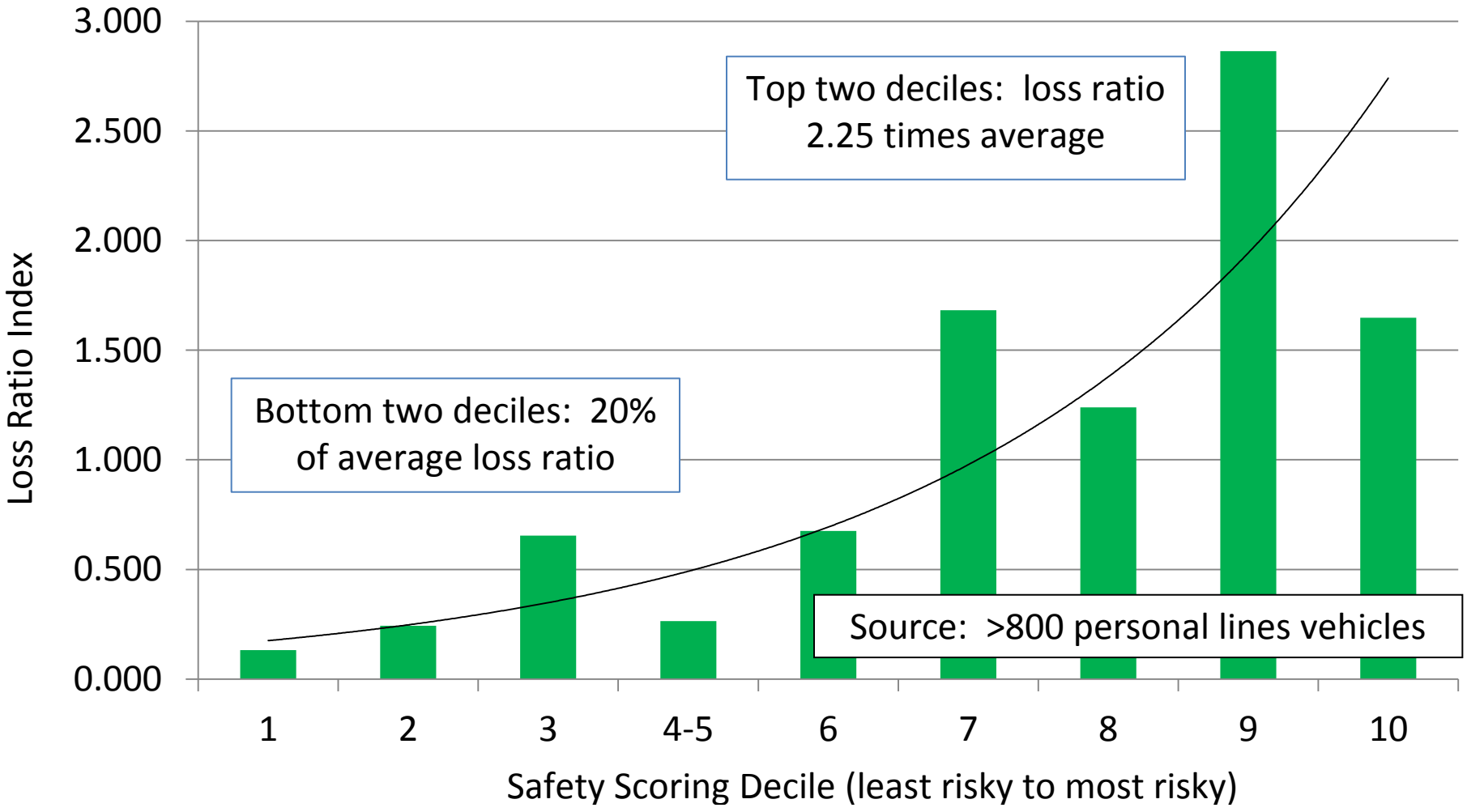
Differentiation by rating variable

Rating Variable	Max ÷ Min
Operator Age	3.36
Estimated Annual Mileage	1.90
Insurance Score	1.86
Number of Accidents at Fault	1.75
Vehicle Use	1.53

Many UBI rating plans today are in this range, in part because surcharges are uncommon

Combined Single Limit Liability (CSLL) rating factors derived from ISO Personal Vehicle Manual (PVM). Insurance Score factor estimate based on preliminary ISO research and subject to change before publication.

Sample UBI model performance



Validation performed on vehicles used in model derivation, but holdout driving period.

Potential communication breakdown

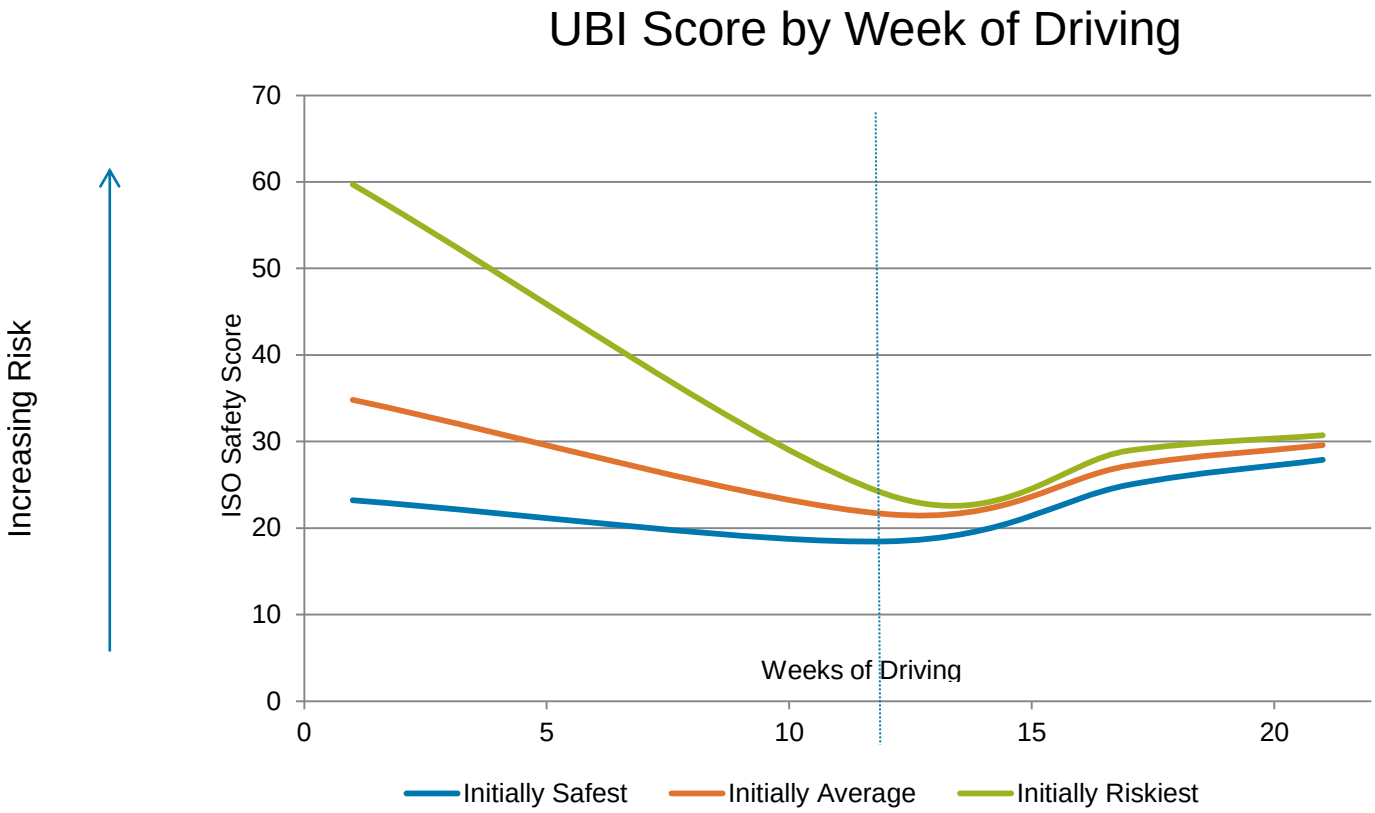
According to [Insurer] [Telematics Product], I am an A driver in my Jeep, and a C driver in my car. Ridiculous. Sent the [darn] things back. #epicfail - wildannie1969

How does this work @[Insurer] I pressed breaks early to avoid running a yellow light BUT your #[Telematics Product] beeped at me. Should I have ran it? -_ylimE

@[Insurer] [Telematics Product] is one of the worst devices ever invented. False hard brakes CONSTANTLY in icy weather while accelerating. Constantly - TimothyJohnWI

@[Insurer] I've used #[Telematics Product] for 6 mts. Evrytime I applied my brakes, or drv in traffic I was dinged. Its not calibrated for metro. -BuyfromKMJ

Example of learning

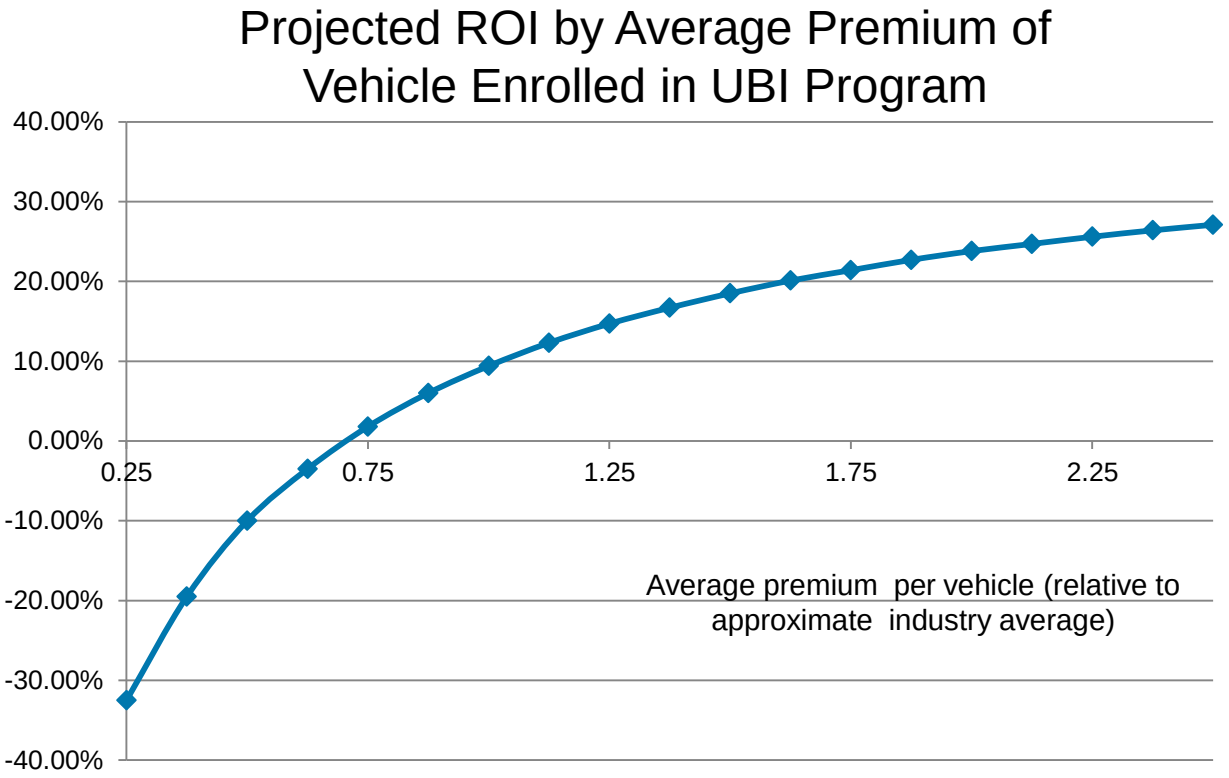


Source: Sample of over 1,000 private passenger vehicles observed in late 2014

Teaching considerations

- Time and distance halo effects
- Feedback loops and Garden Grove case
- Verbal vs. tonal vs. visual feedback
- Driving habits vs. thinking habits

The economics of teen driver programs

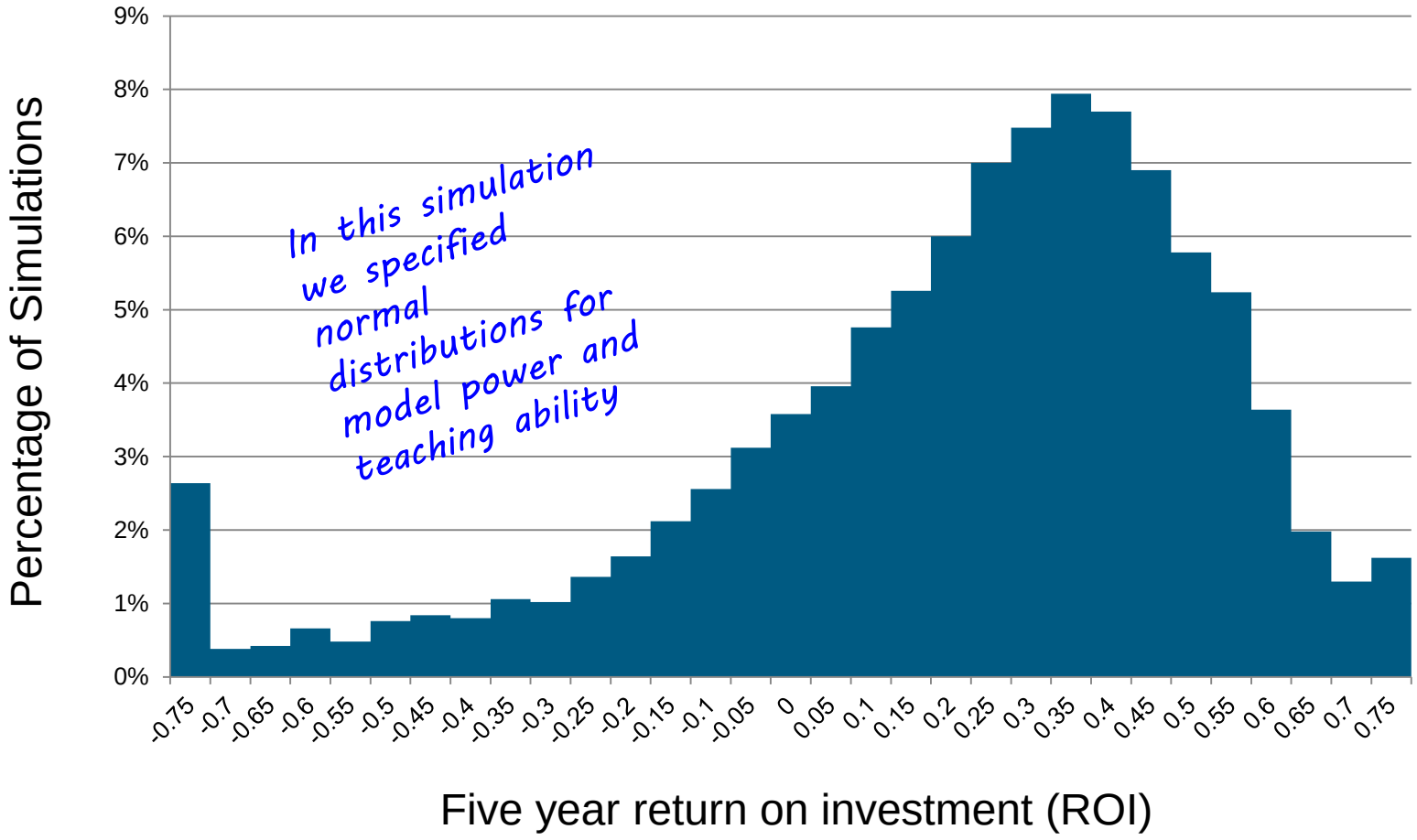


Assumes common dongle cost structure, device deployment to three vehicles per year, and 3x model power.

Ancillary benefits of teen driver UBI

- Strong desire for product among parents
- More teachable participants
- Higher lifetime value possibilities
- More likely to promote on social

Monte Carlo simulation



Assumes common dongle cost structure, device deployment to three vehicles per year in typical book, and 3x model power.

Decision time

- Decision-making shouldn't overlook costs of delay or inaction
- Different technologies offer different cost and revenue models
- Stronger predictions enable stronger selection and teaching effects
- Marketing strategy should consider relative technological costs

Questions?