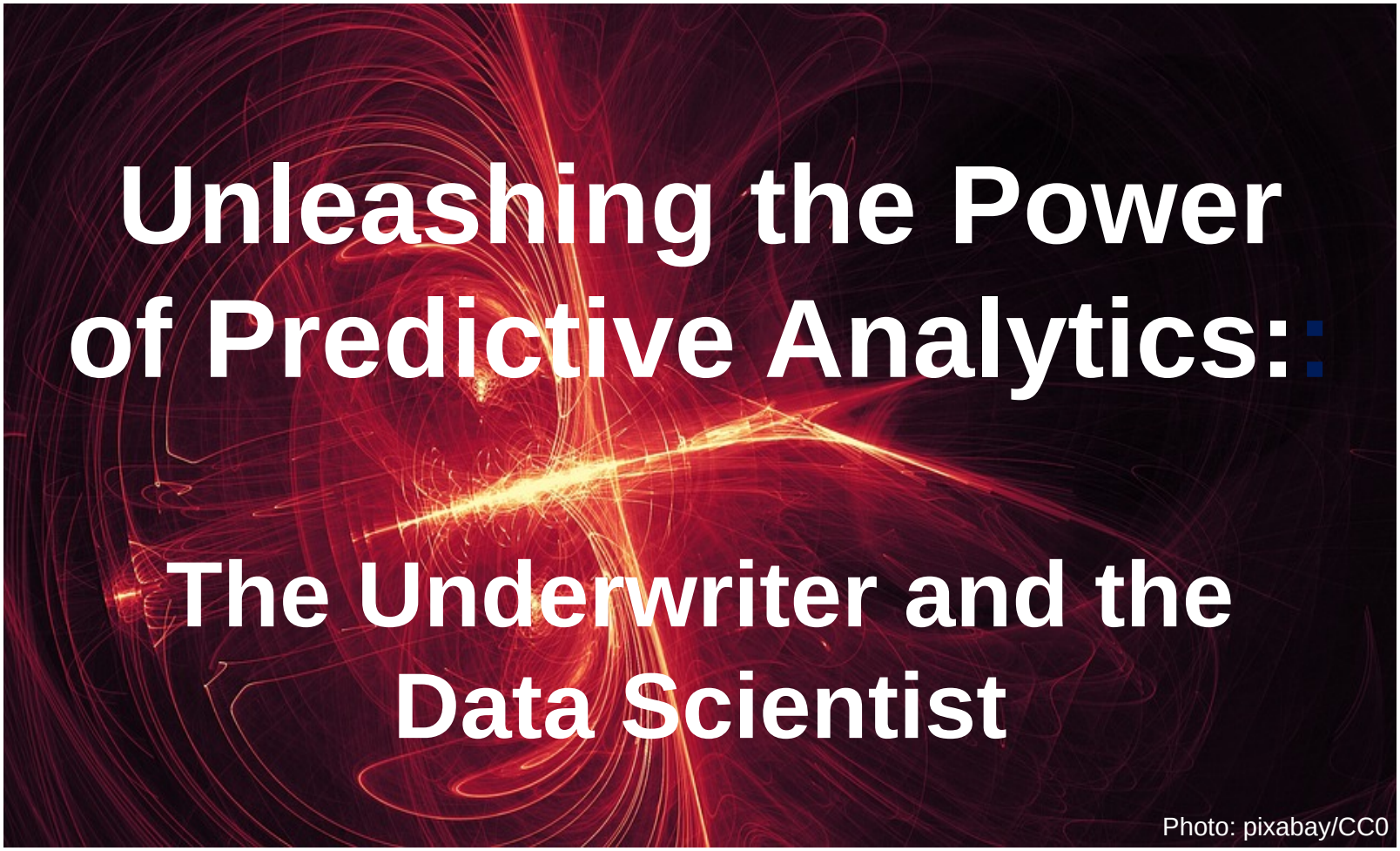


Susan Kearney, The Institutes
Christopher Monsour, CNA Insurance
March 6, 2017
Rosemont, Illinois

Disclaimers

- This does not necessarily represent the views of the speakers' employers
- All exhibits are illustrative only unless otherwise indicated. They do not contain real data and the speakers do not claim that the relationships among variables shown in the exhibits hold in the real world.

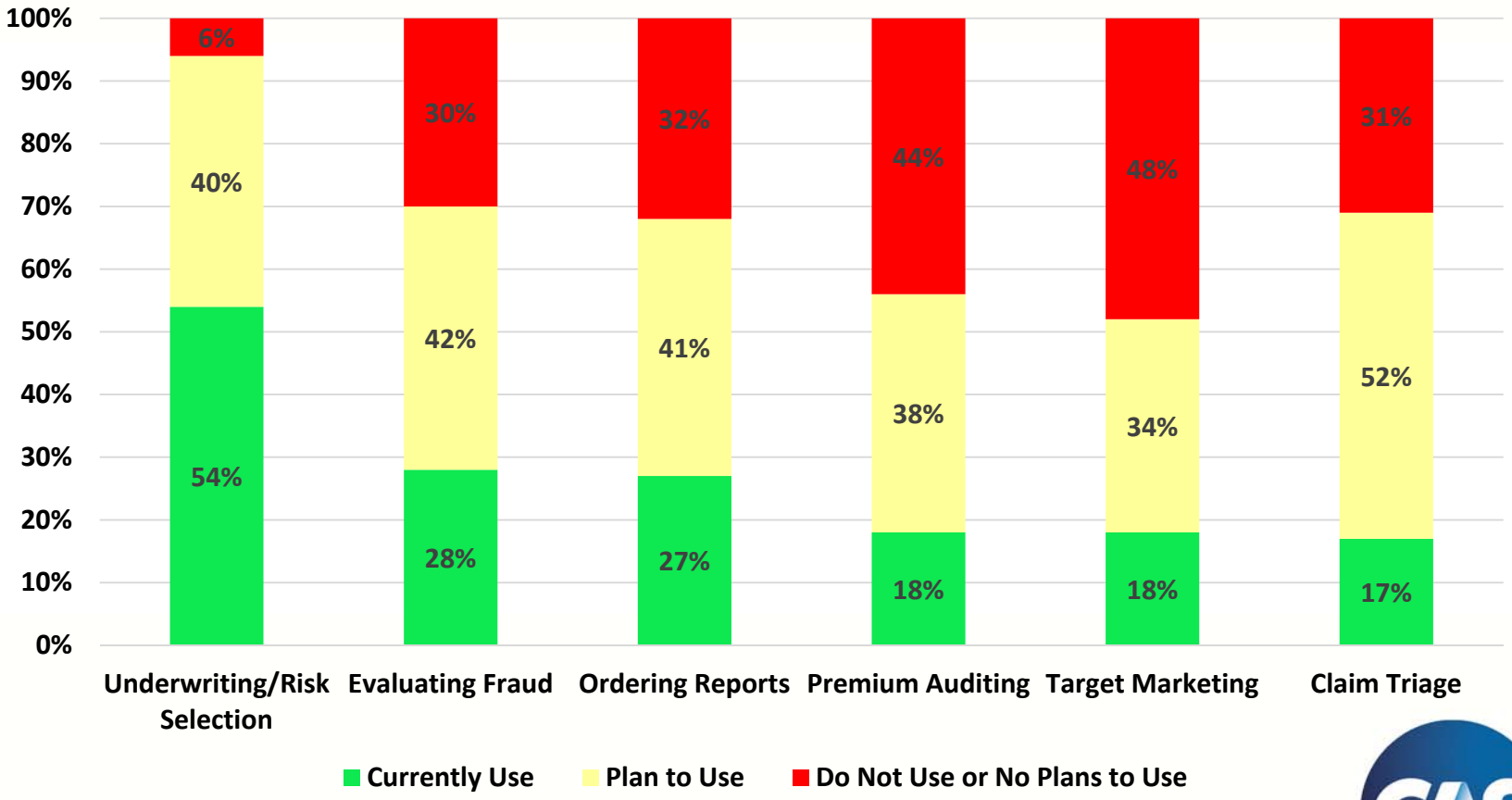
Anti-Trust Statement

- *As members of the Casualty Actuarial Society or CPCU Society or as participants in this event, please be mindful of the constraints of the antitrust laws. There shall be no discussions of agreements or concerted actions that may restrain competition. This prohibition includes the exchange of information concerning individual company rates, coverages, market practices or any other competitive aspect of an individual company's operation. Each member or participant is obligated to speak up immediately for the purpose of preventing any discussion falling outside the indicated bounds.*

Agenda

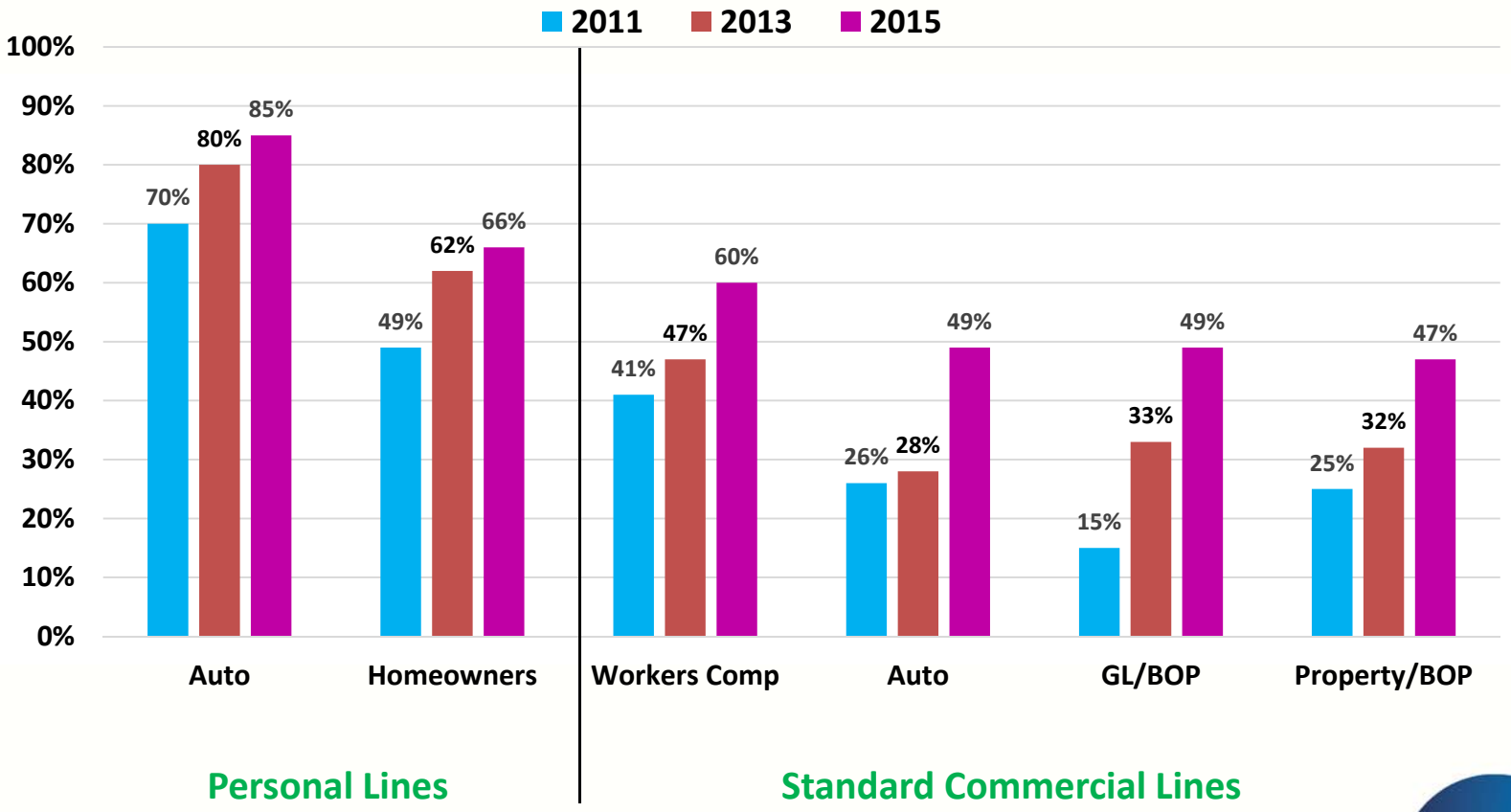
- Trends in usage of predictive analytics in insurance
- Questions the underwriter should ask the data scientist
- Questions the data scientist should ask the underwriter
- Collaboration beyond single projects
- Questions

Industry Usage of Predictive Modeling



Source: Adapted from Willis Towers Watson 2015 Predictive Modeling and Big Data Survey; participating companies comprised 11% of US personal lines carriers and 17% of commercial lines carriers (www.towerswatson.com).

Predictive Modeling for Risk Selection and Pricing



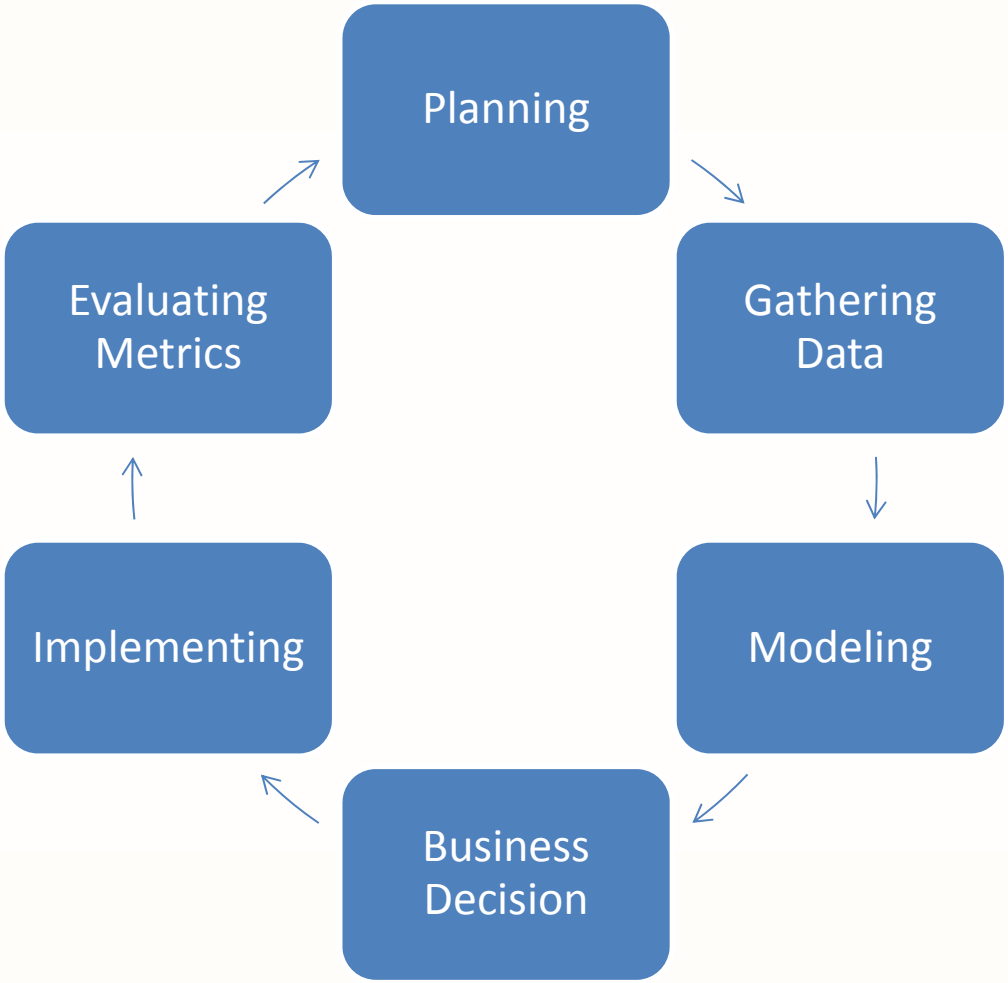
Source: Adapted from Willis Towers Watson 2011, 2013 and 2015 Predictive Modeling and Big Data Surveys (www.towerswatson.com).

"what's in your w[redacted]et?"
model
Photo: pixabay/CC0

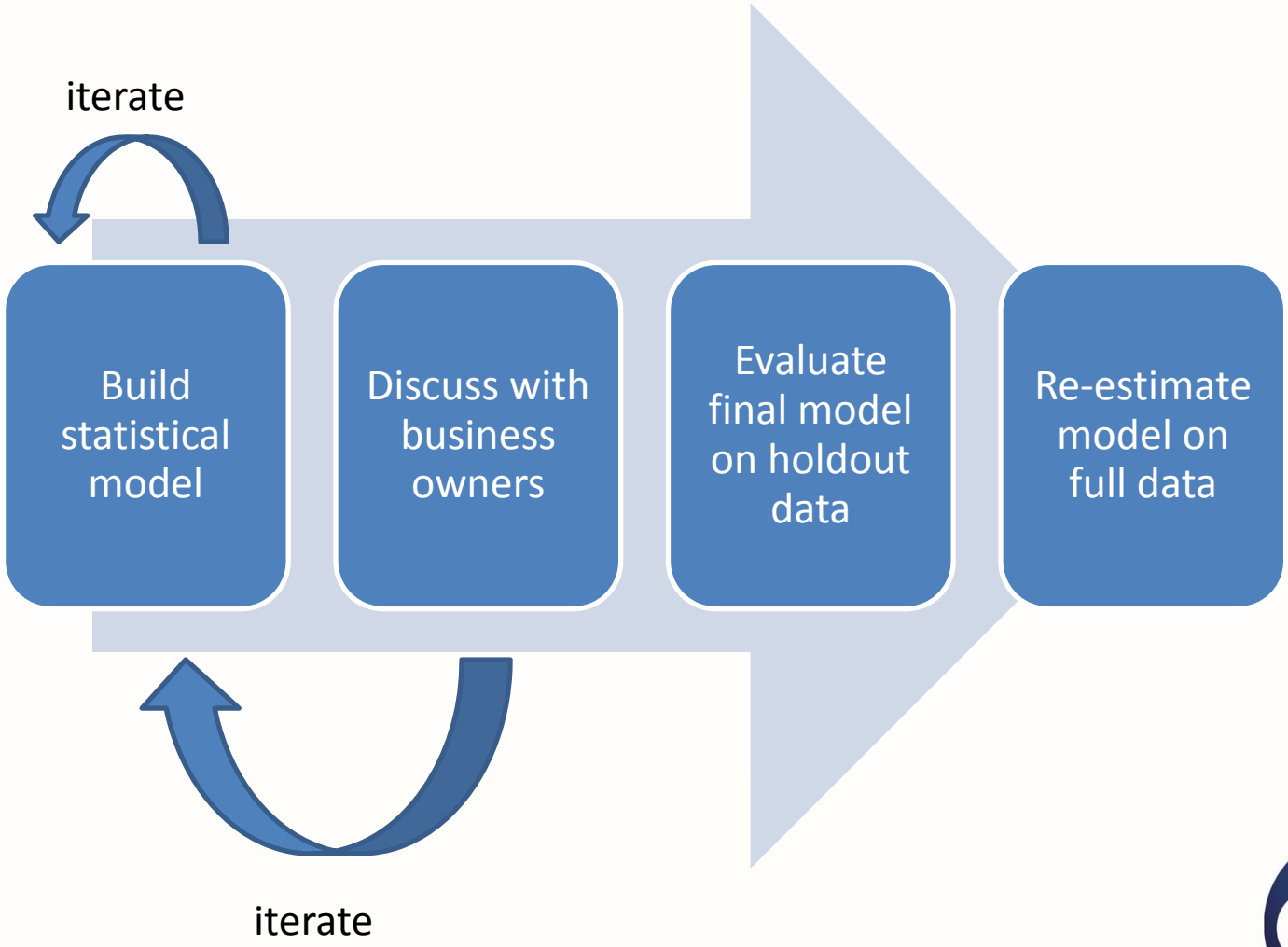
What Should the Underwriter Ask the Data Scientist?

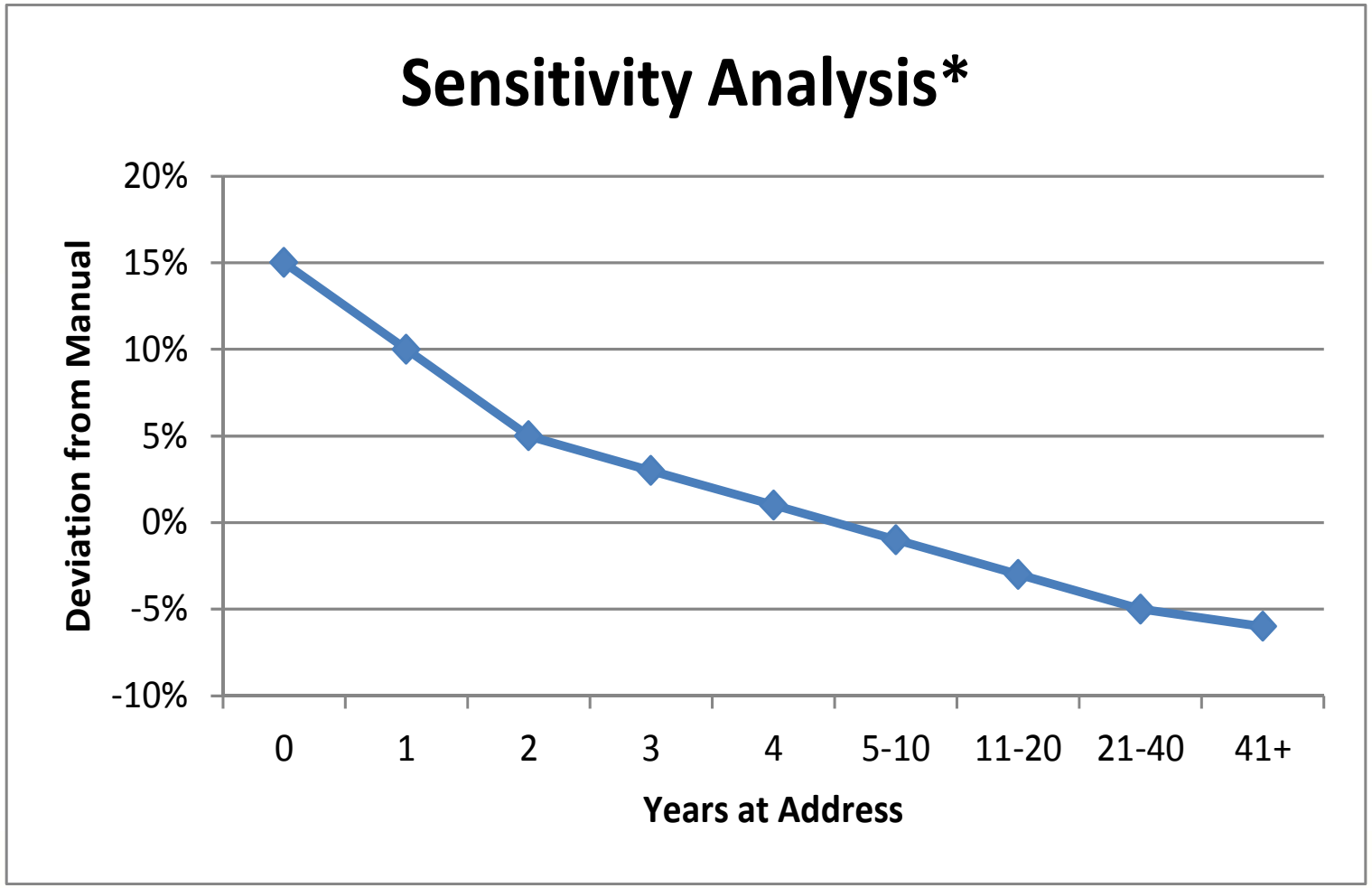
- What does the process look like?
- What does the model take into account?
- Can you prove to me the model actually works?
- What does the model do to my book of business?
- Miscellaneous?

Overall Process

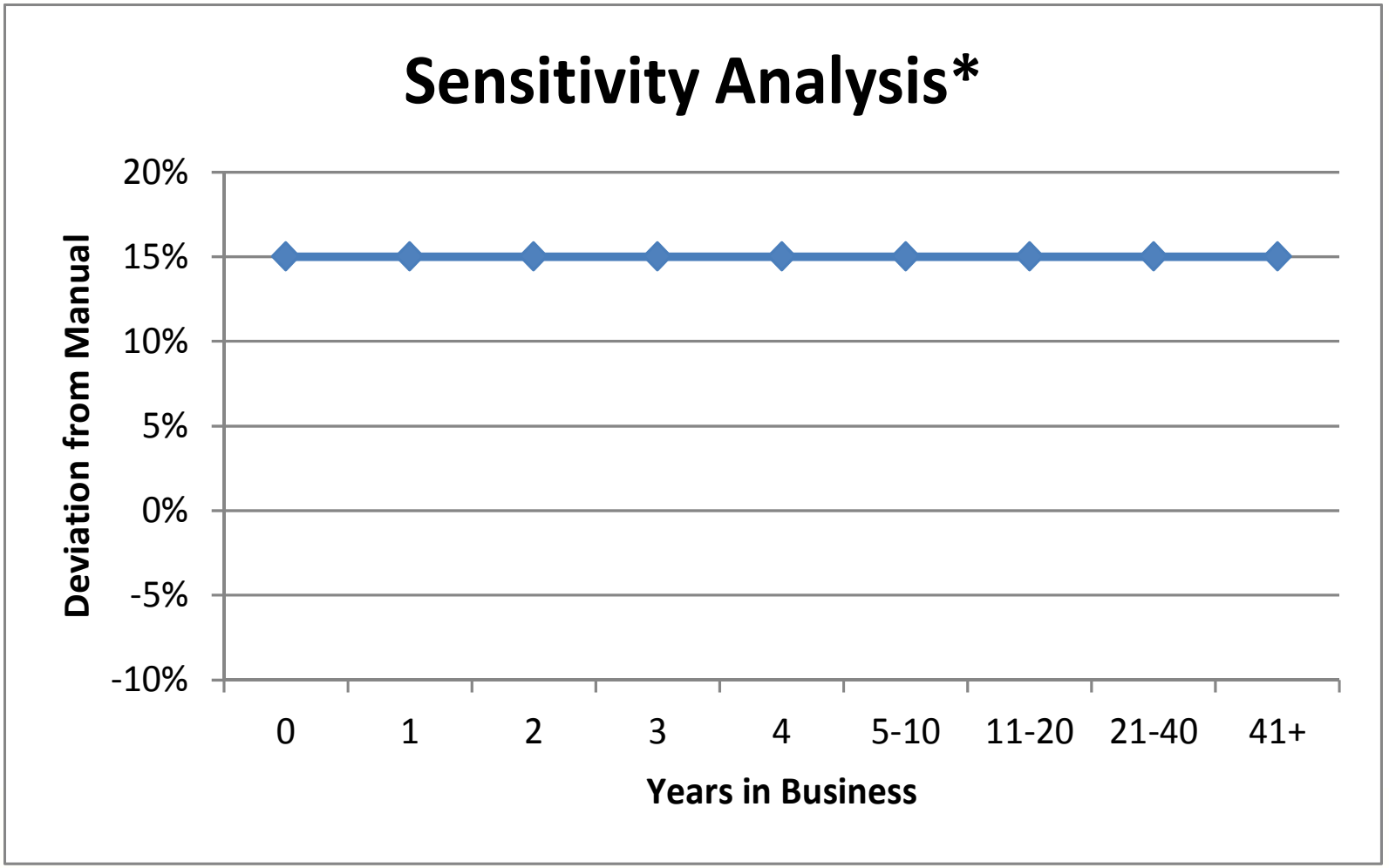


Modeling Process

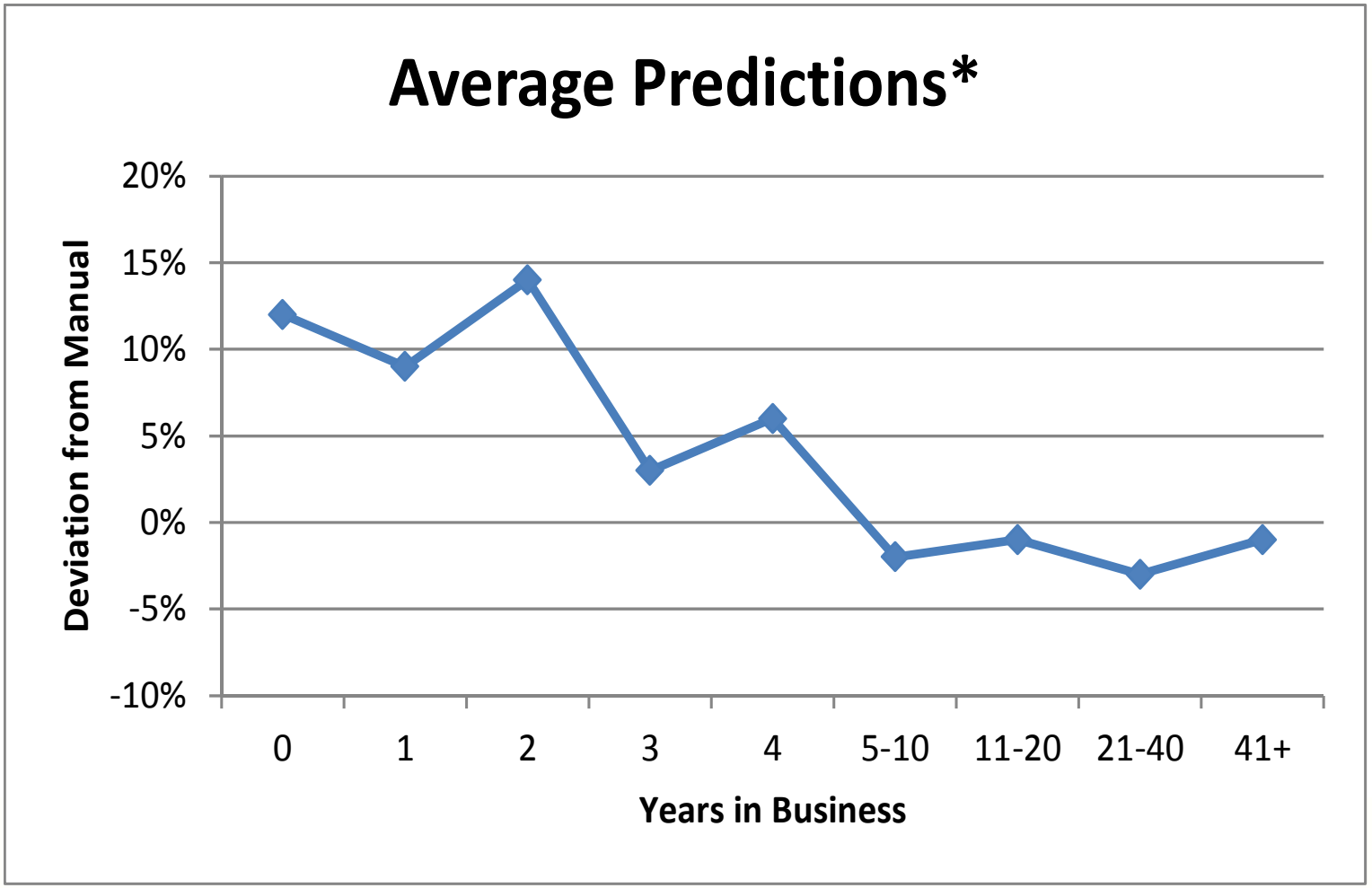




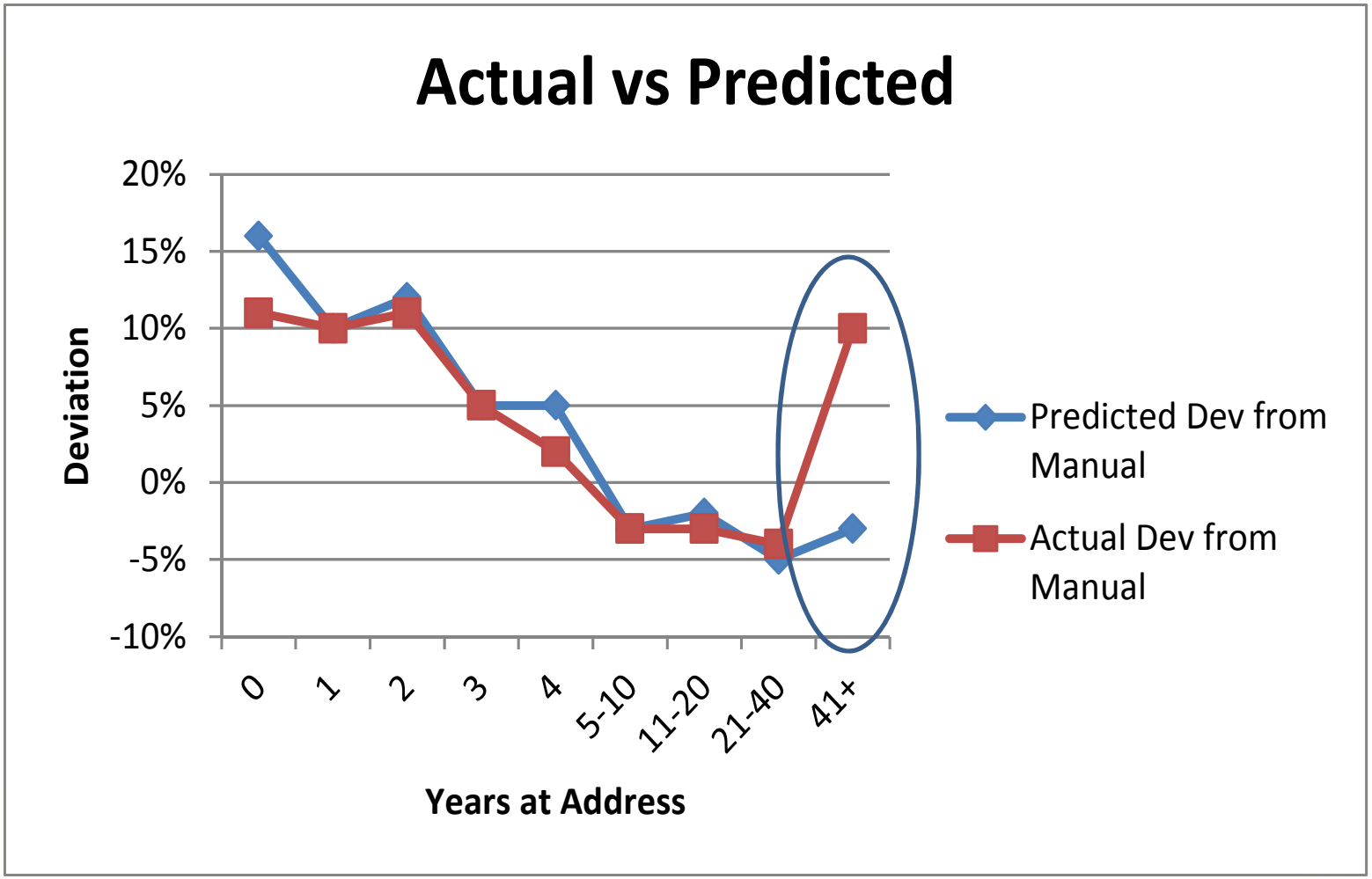
* For a Foundry with $10M annual revenue, no late payments, no recent claims…



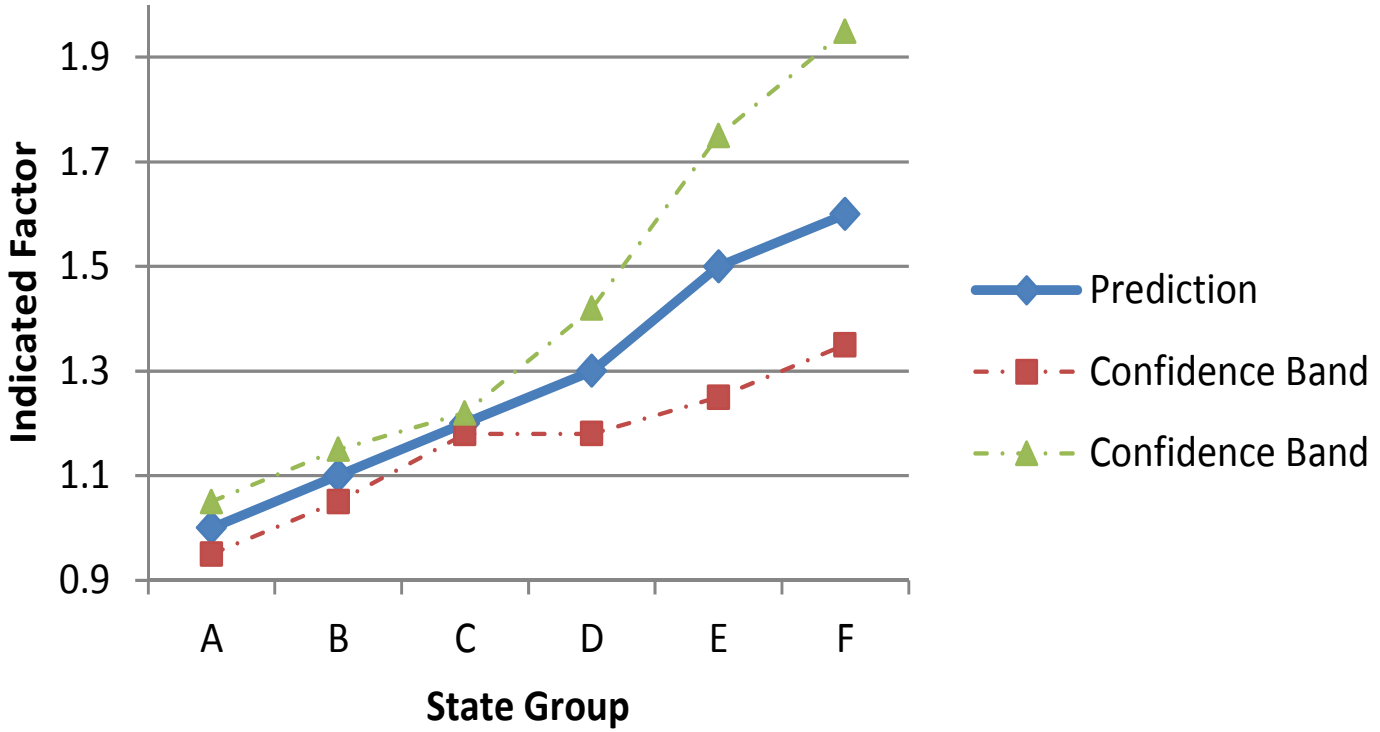
* For a foundry with $10M annual revenue, no late payments, no recent claims, **zero years at address…**

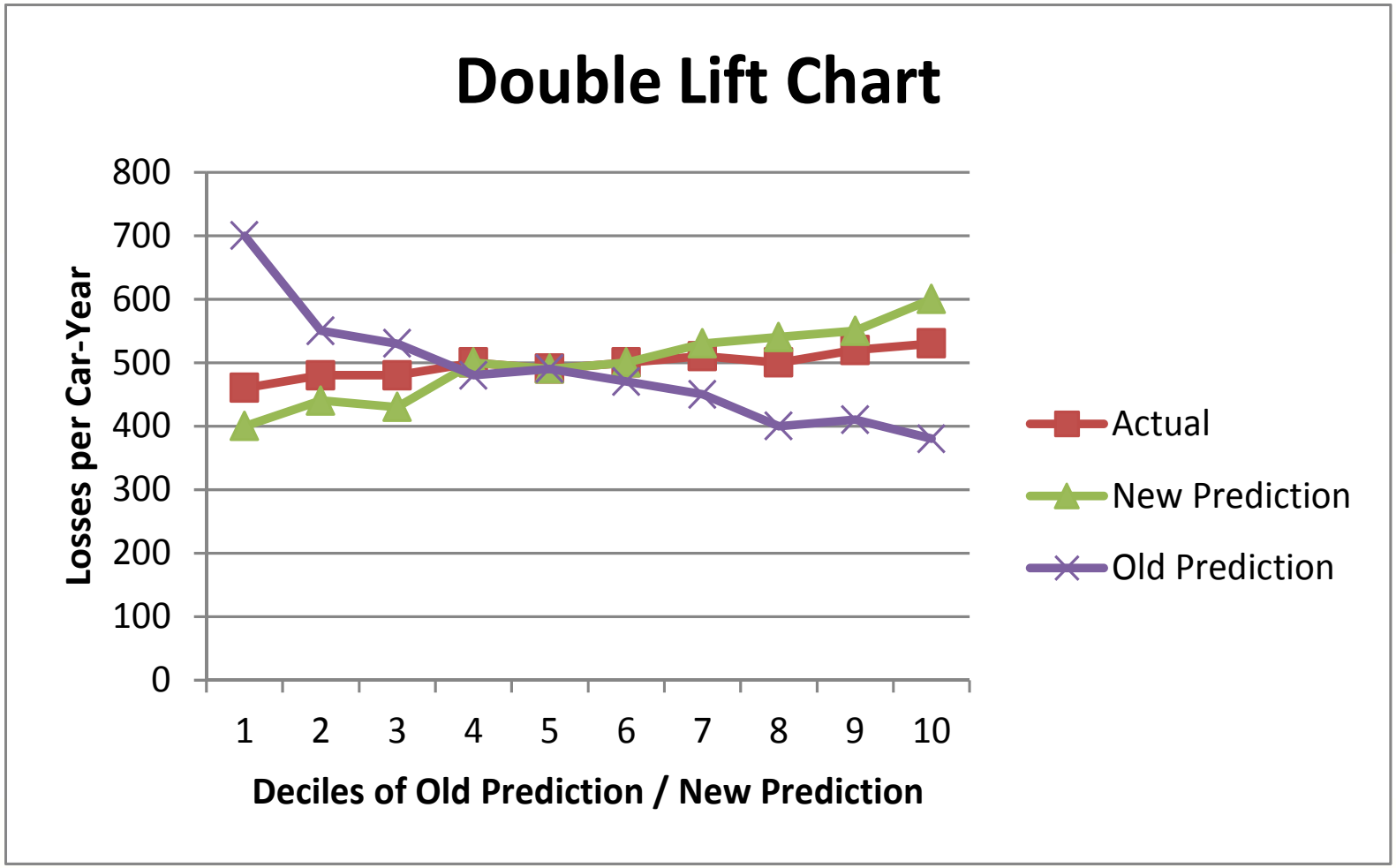


* Average across all risks on the book

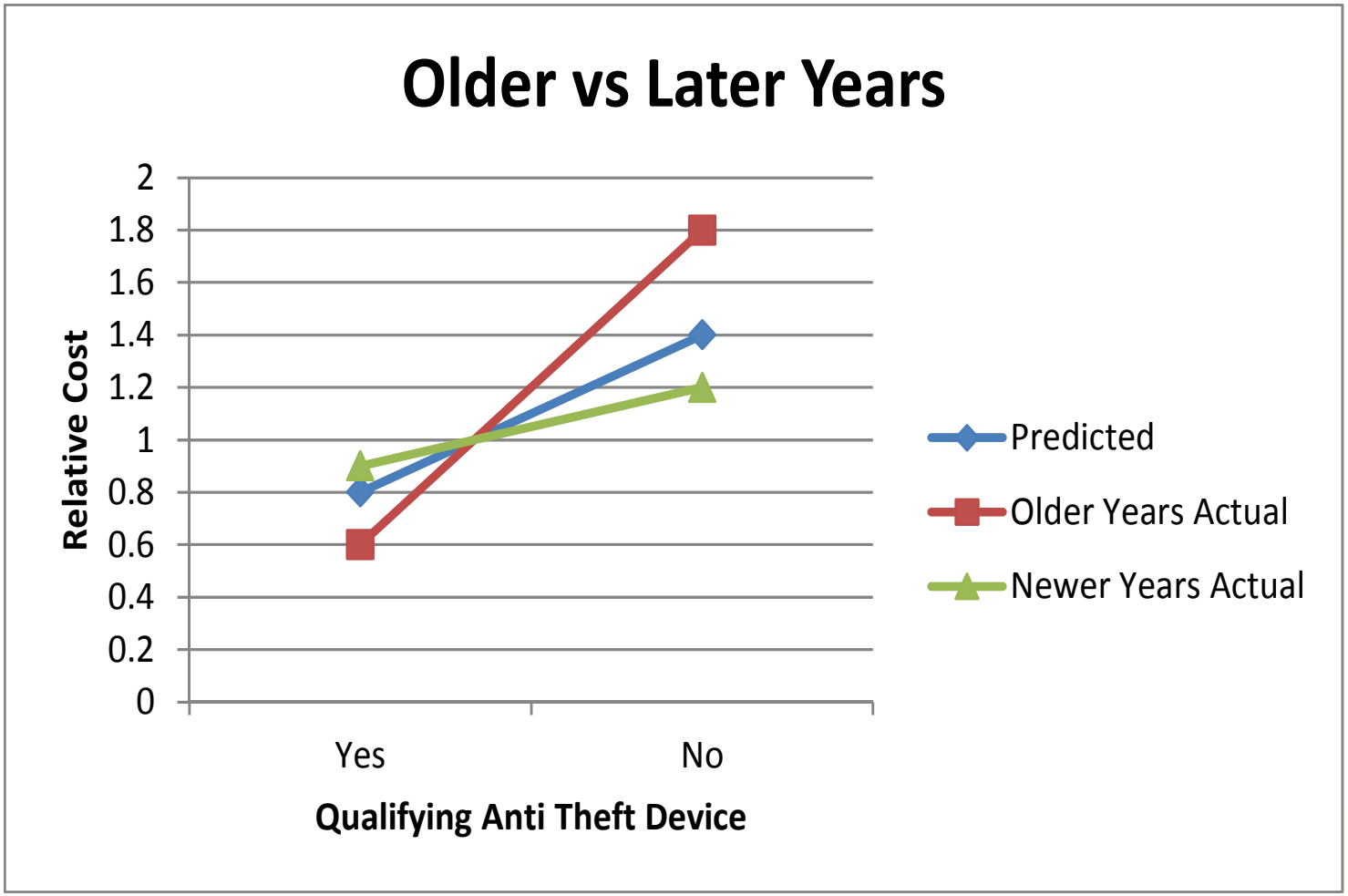

Actual vs Predicted
20%
15%
10%
5%
0%
-5%
-10%
Deviation
0
1
2
3
4
5-10
11-20
21-40
41+
Years at Address
Predicted Dev from Manual
Actual Dev from Manual

Confidence Bands for Factors





* For data not used in fitting either model


Older vs Later Years
Relative Cost
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Yes
No
Qualifying Anti Theft Device
Predicted
Older Years Actual
Newer Years Actual

Change in Mix

- Suppose we model on mature years 2007-2014
  - Identifies that accounts in SIC abcd are terrible…need a 100% surcharge
  - In 2015-2016, book was re-underwritten and SIC abcd, which used to be 10% of the book, is no longer represented.

Change in Mix

- If we off-balance to keep same rate level
  - Old rate level 500
  - New rate must average 500
  - No abcd left in book
  - So new rate for everything else is 500
- If we balance for the book we modeled
  - Old rate level 500
  - Should have been charging abcd 950 and everyone else 450
  - So new rate for everything else is 450

Disruption

Branch	Volume	% Change from Current Indicated	% Indicated Change from Charged
Boston	900	-30%	-15%
NYC	2,000	-10%	-10%
Philly	400	10%	5%
DC	600	5%	-5%
Charlotte	1,200	-10%	-15%
Atlanta	700	0%	40%
Miami	2,000	26%	5%
Total	7,800	0%	-2%

What Should the Data Scientist Ask the Underwriter?

- Which facts about customers matter?
- What third-party data is already in use by underwriters?
- What issues are they experiencing in the marketplace?

What Should the Data Scientist Ask the Underwriter?

- What should be provided to the tactical decision-maker?
  - Reason codes (color coded)
  - Comparison to similar risks
  - Soliciting feedback from the field

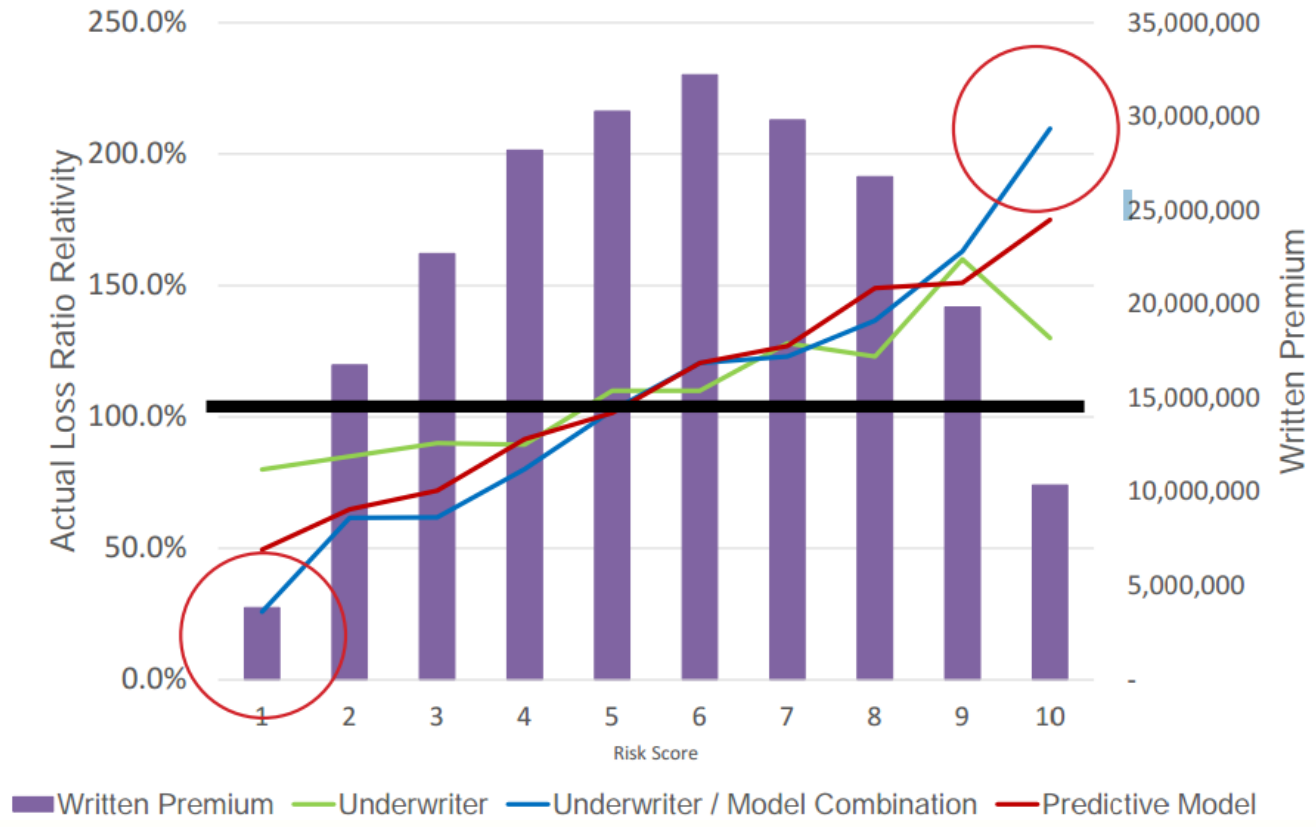
What Should the Data Scientist Ask the Underwriter?

- What does the new business transaction look like and are there challenges that may make collected data in the future different from the past?
  - What is known when in the underwriting process
  - Shifting of reporting of data elements
  - Technological advancements
  - Privacy and legal issues
  - Digital competitors and distribution

What Should the Data Scientist Ask the Underwriter?

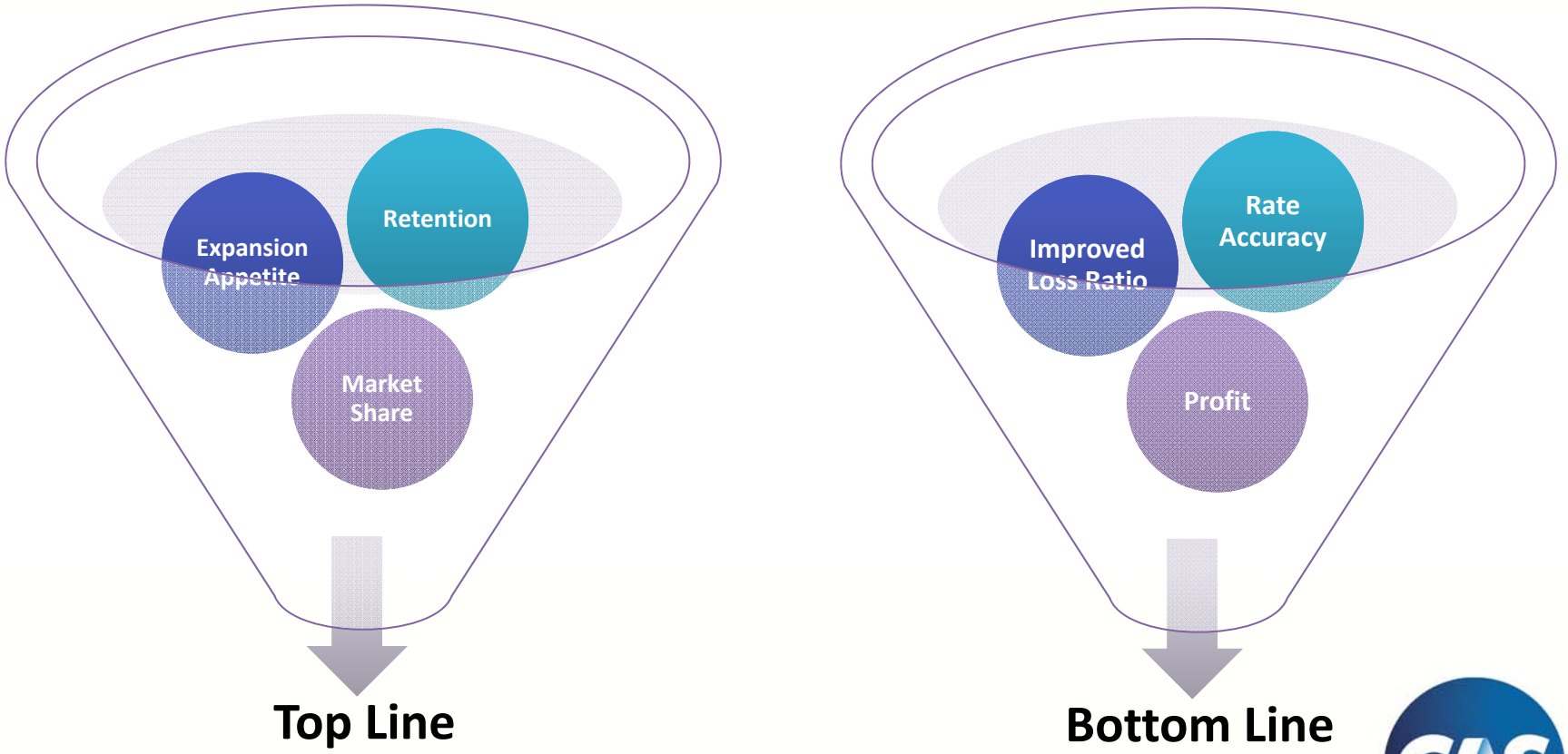
- What business is desired to be written in the future?
  - Broaden risk appetite
  - Launch new products
  - Offer differentiated coverages
  - Expand geographic reach

Predictive Power Comparison



Source: Valen Analytics 2016 Outlook Report (www.valen.com)

Impact of Predictive Modeling on Top and Bottom Lines



Source: Adapted from Willis Towers Watson 2015 Predictive Modeling and Big Data Survey; participating companies comprised 11% of US personal lines carriers and 17% of commercial lines carriers (www.towerswatson.com).

Collaboration Beyond Individual Projects

- Identifying niches in market where an information edge can be built over competitors
- Working together to build that edge

Questions?