



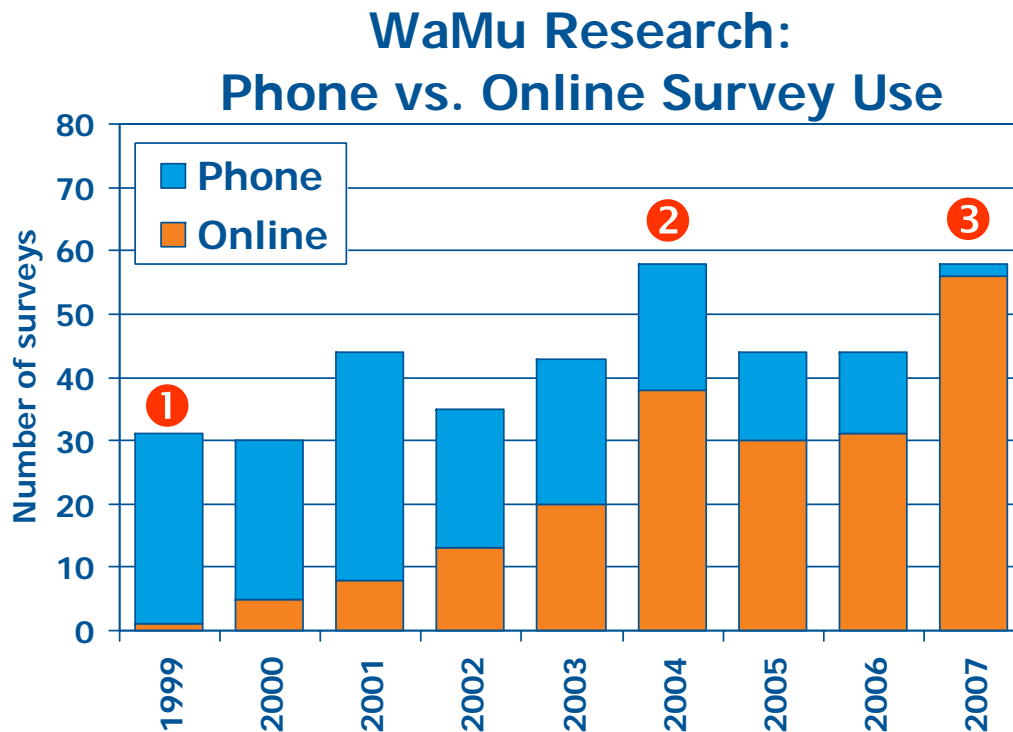
Research & *Customer* Insight

Sample factors that influence data quality

September 16, 2008

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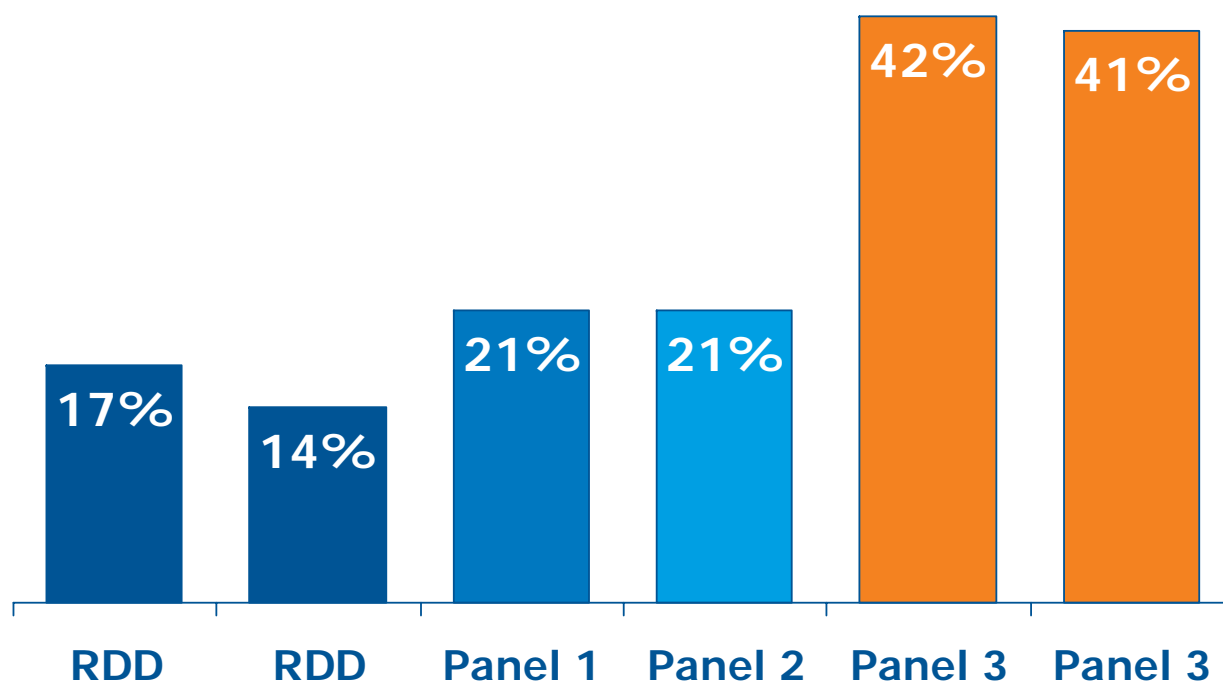
Online surveys became WaMu's standard in 2004



- 1 Began using online surveys in 1999
- 2 By 2004, most were online (66% vs. 34% phone)
- 3 In 2007 nearly all our surveys were online

Unusual survey results have caused alarm

Demand for the same product
using different samples



- All of these surveys were done in 2006
- Panel 3 gave consistently higher demand

WaMu's journey of research on research

Three annual research efforts:

2006 Hypothesis: Demographics are causing the variations

- False: Weighting by demographics and attitudes doesn't fix the problem

2007 Hypothesis: Disengaged or fraudulent respondents are causing the variations

- False: These caused random variation error, which we reduced significantly

2008 Hypothesis: Panel tenure/survey frequency is causing the variations

2008 Sample Factors That Influence Data Quality

- Worked with two major sample providers
- Examined 29 studies from 2006 and 2007

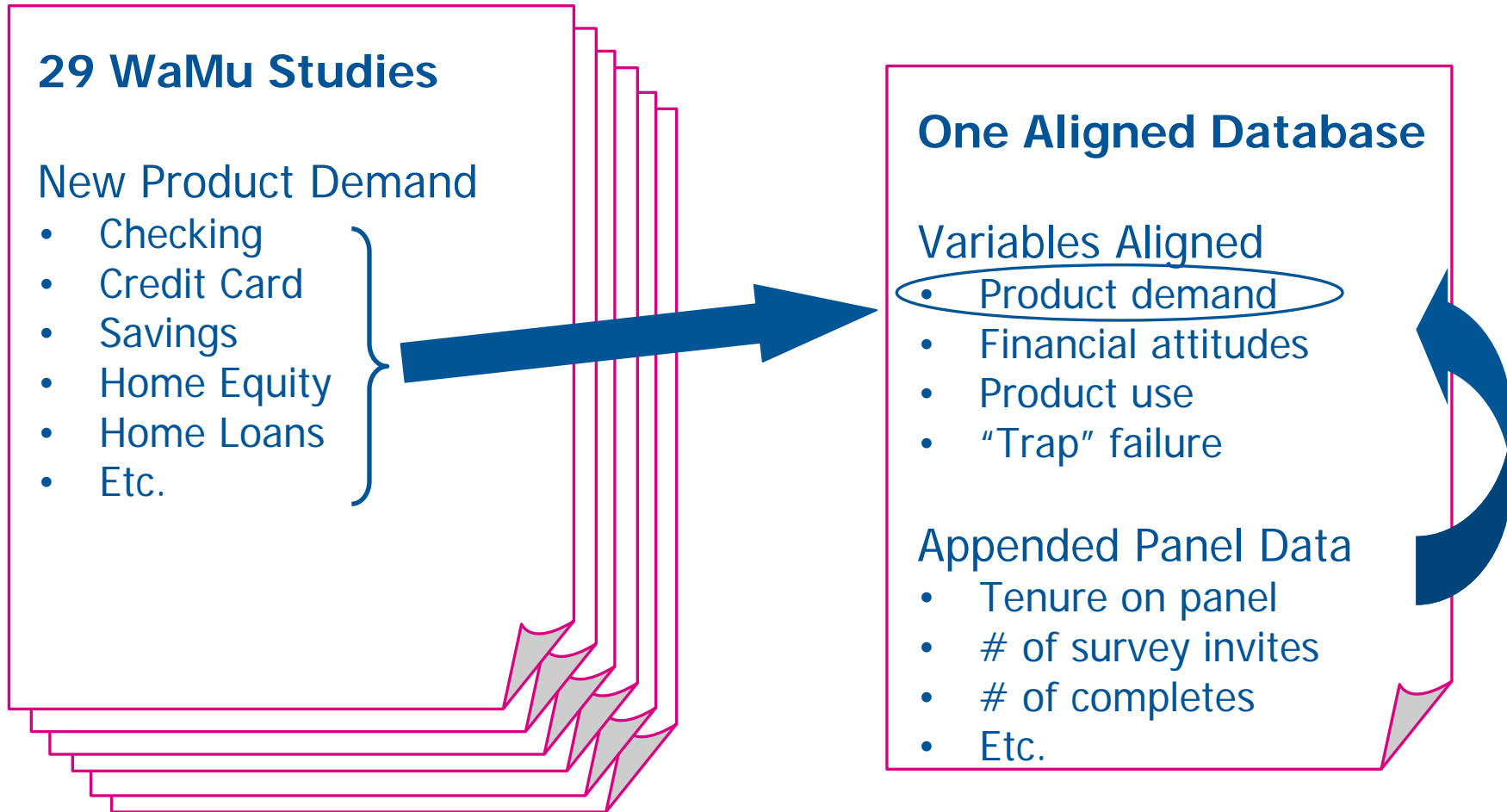
Survey variables examined

- Demand for new products
- Financial product use
- Attitudes
- “Trap” question failure

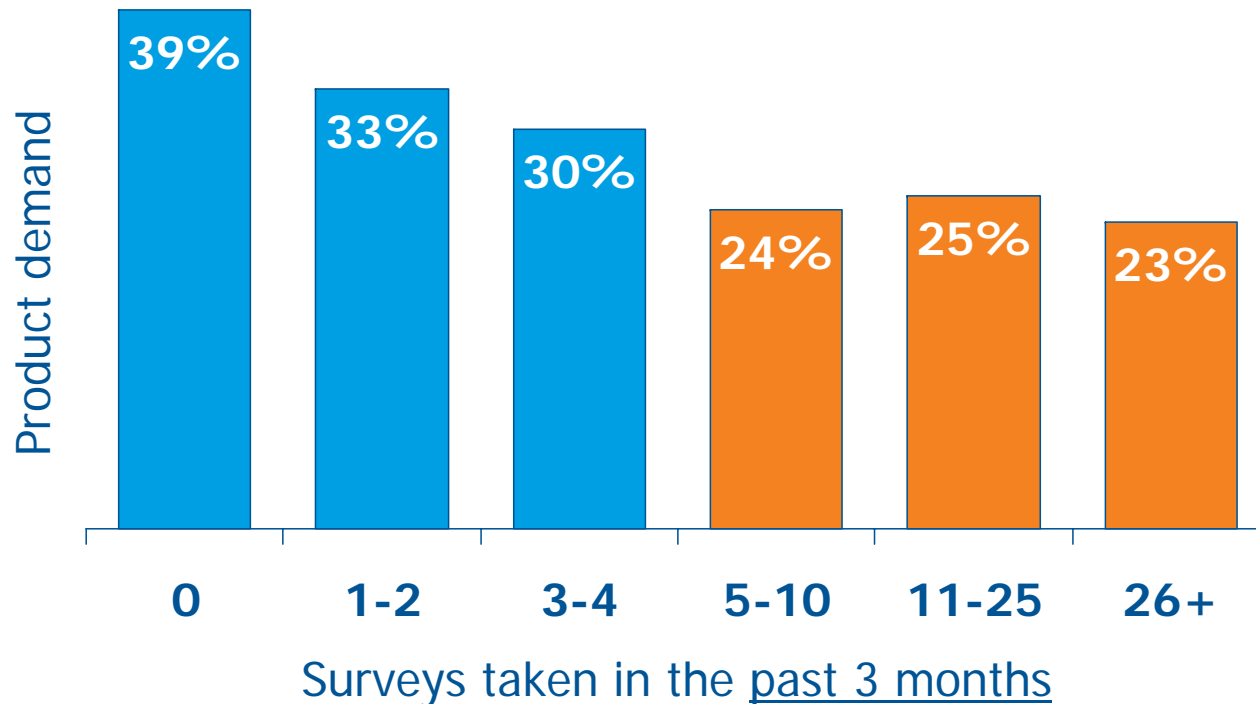
Data appended from panel companies

- Panel tenure (in months)
- Survey invitations
 - Past month, 3 months, ever
- Completed surveys
 - Past month, 3 months, ever
- Recruiting source
- Panel demographics

Created one large data file with WaMu survey and appended panel data – 40,000 respondents



People who take more surveys give lower demand ratings for products and services

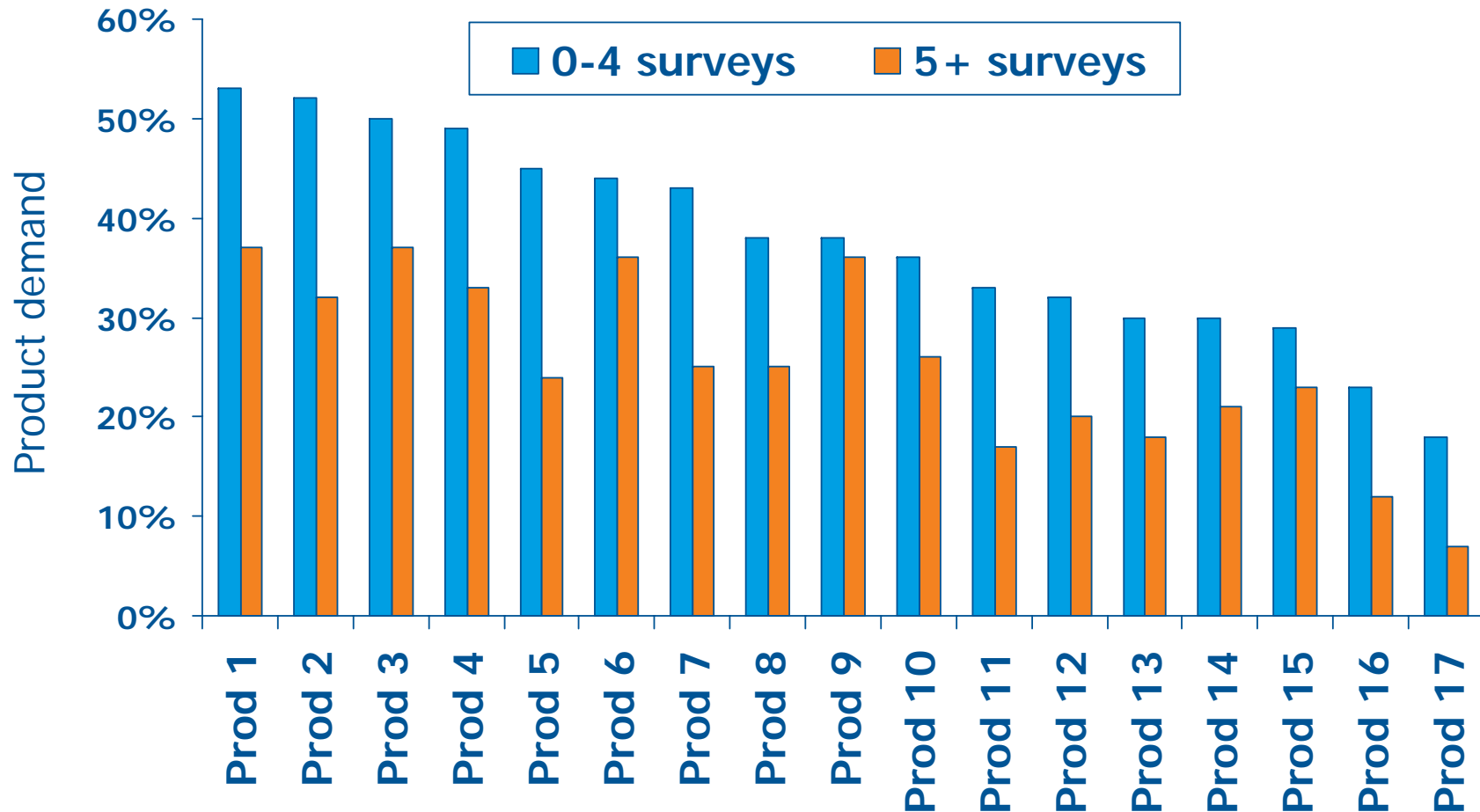


- Demand was about half as much for the most frequent survey takers

19% 12% 9% 21% 28% 11%
WaMu Sample Distribution - Surveys taken in the past 3 months

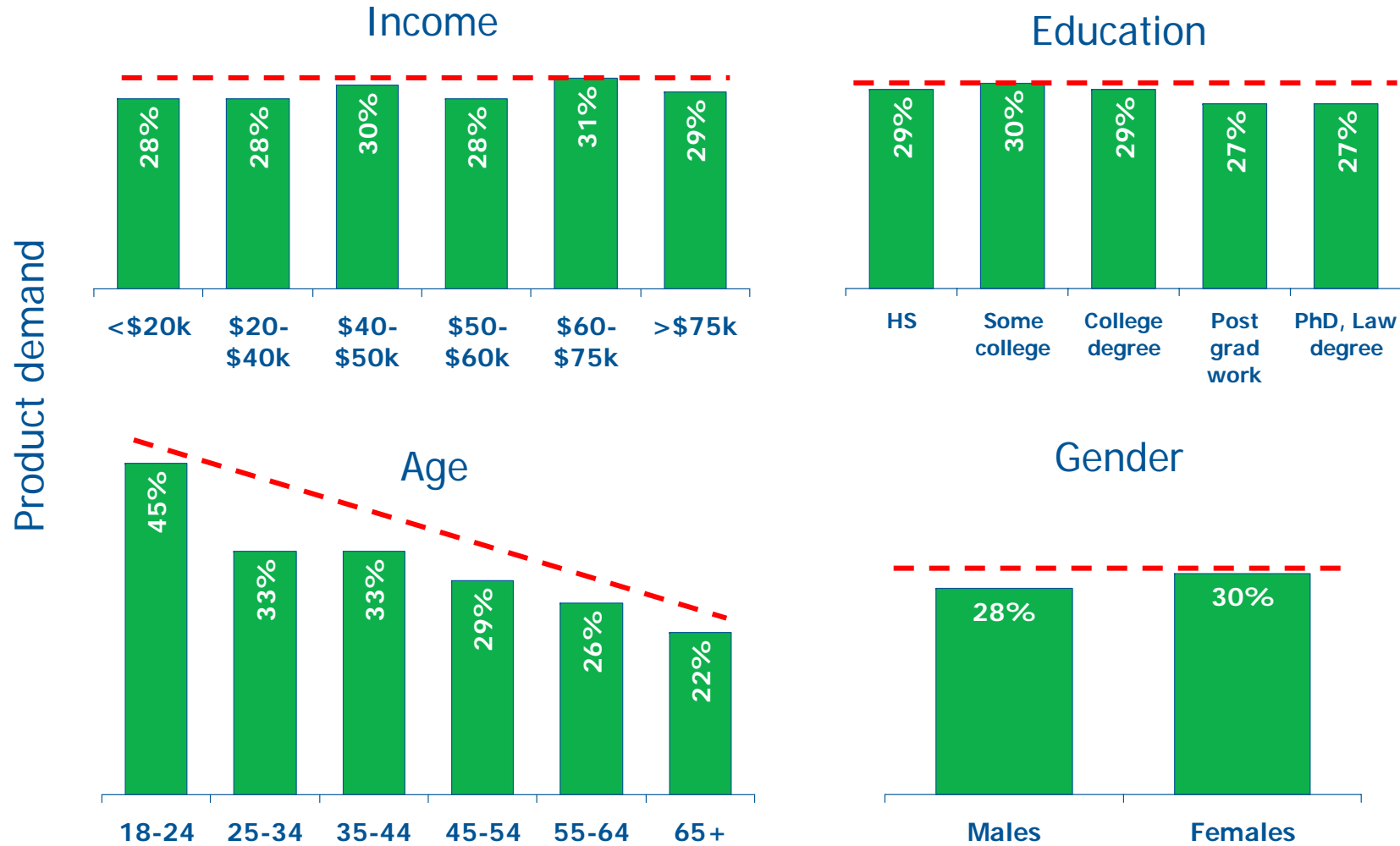
Demand response consistently varied by surveys taken

Product demand by surveys taken in the past 3 months

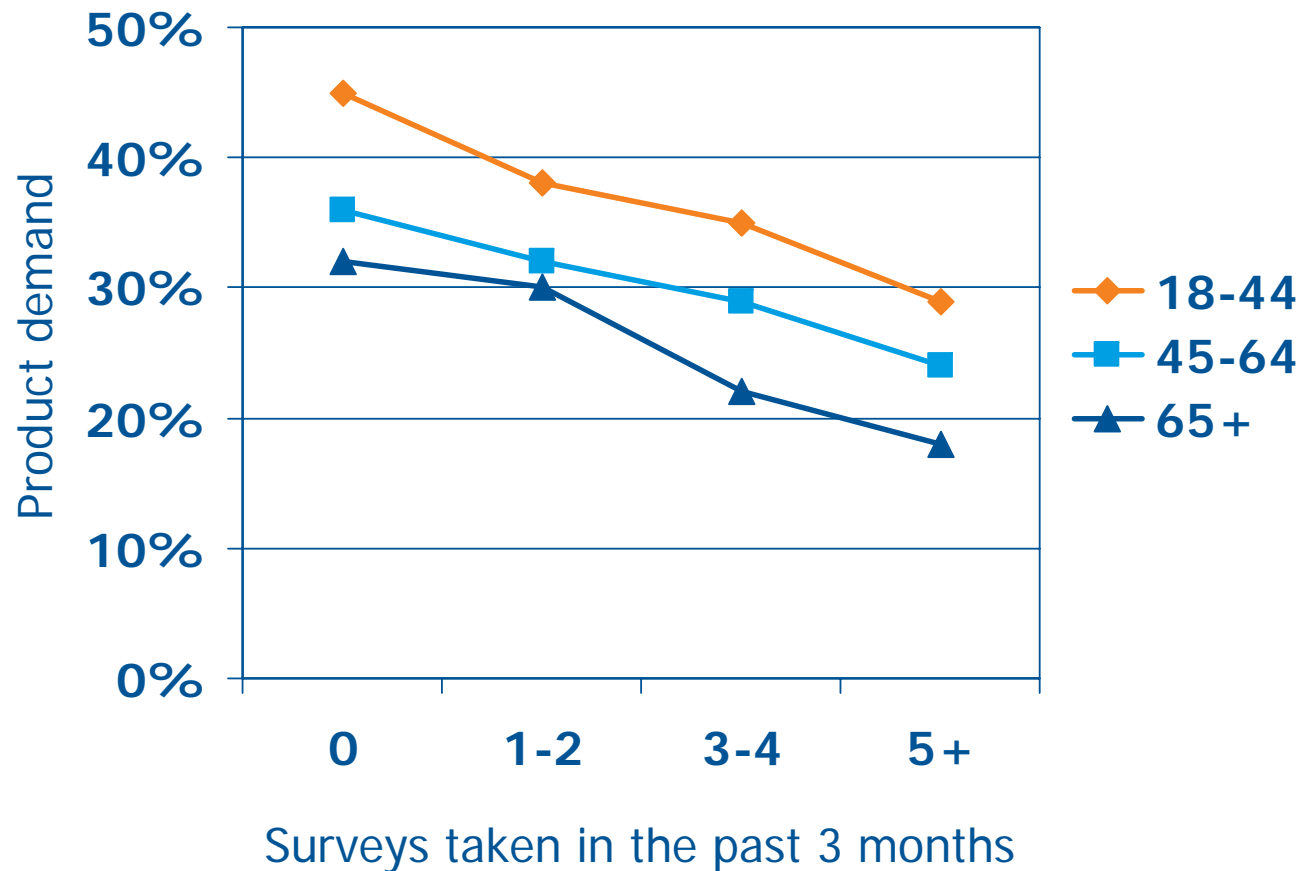


Age was the only demographic that could possibly explain the demand variation

Appended Panel Demographics

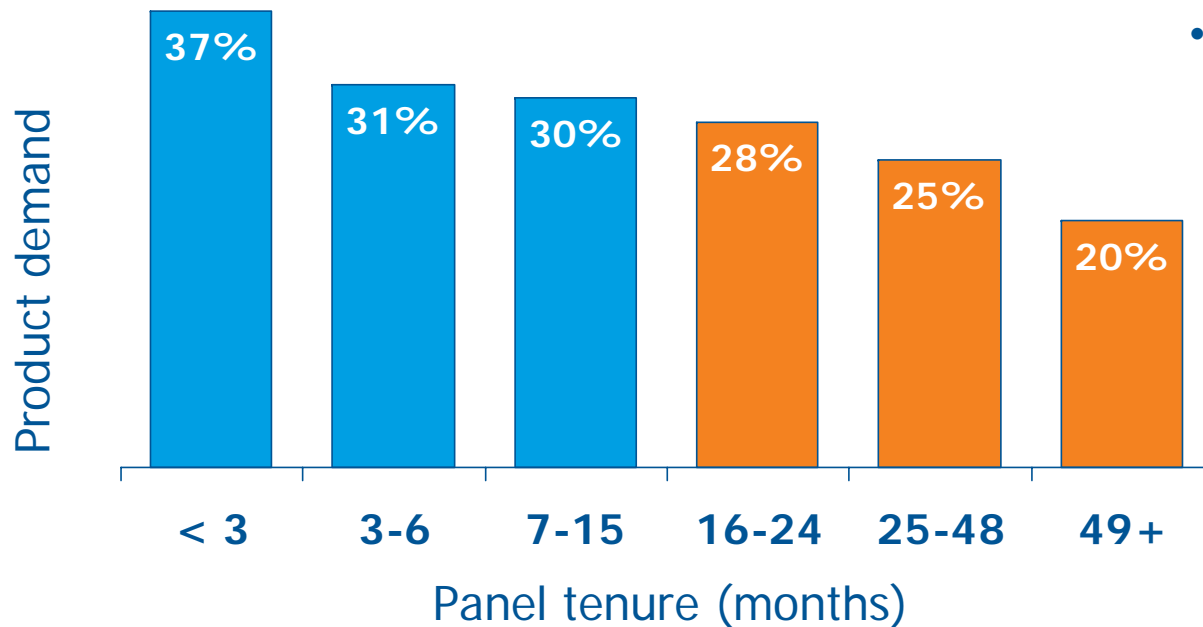


Across age groups, demand still dropped as survey taking increased

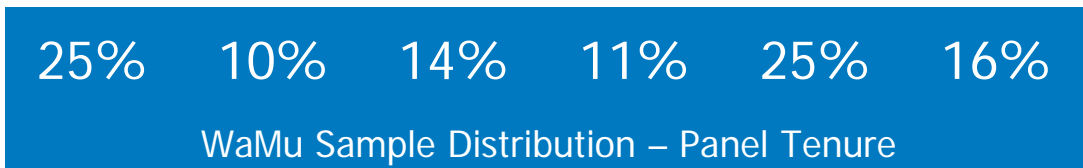


- Age wasn't causing the problem
- Good reminder that samples need to have a proper age mix, since younger people give higher demand

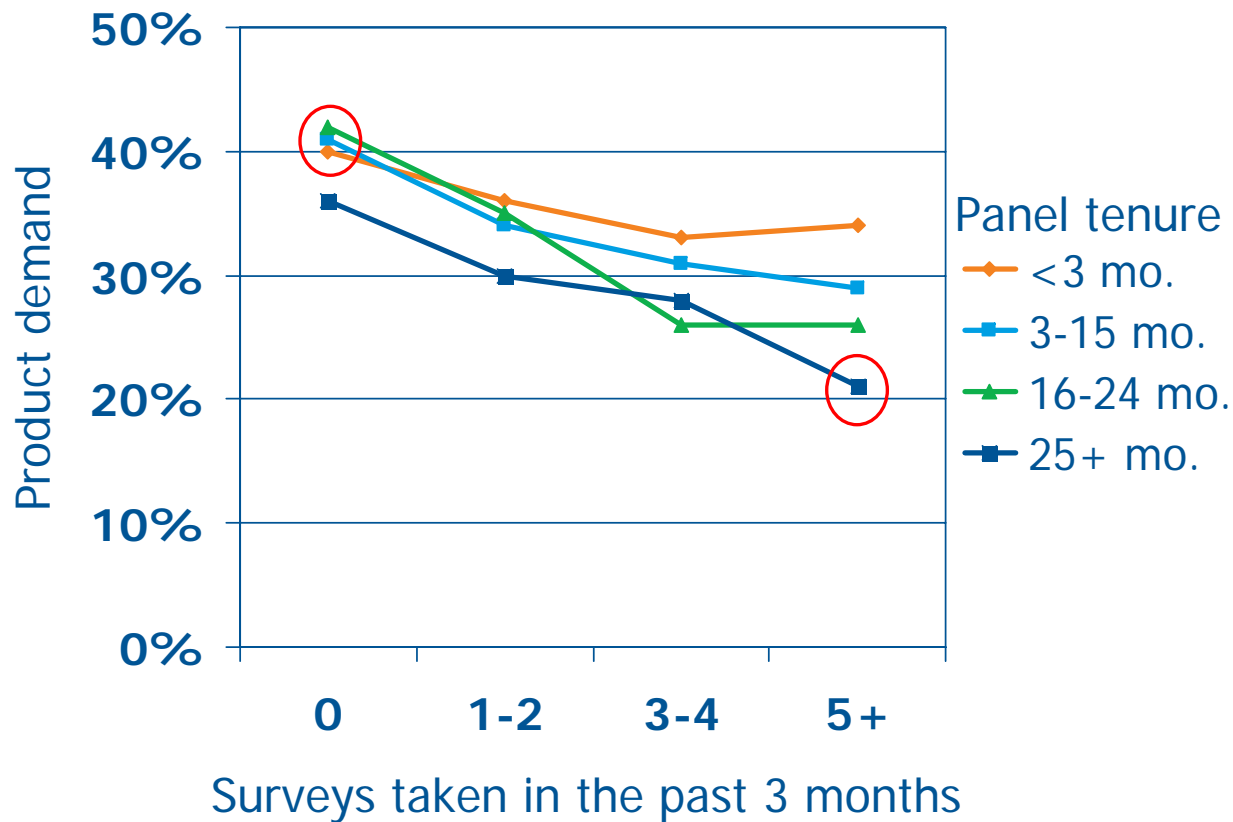
Not only did the number of surveys people take impact demand, panel tenure did as well



- In every study examined, people with more panel tenure gave lower demand



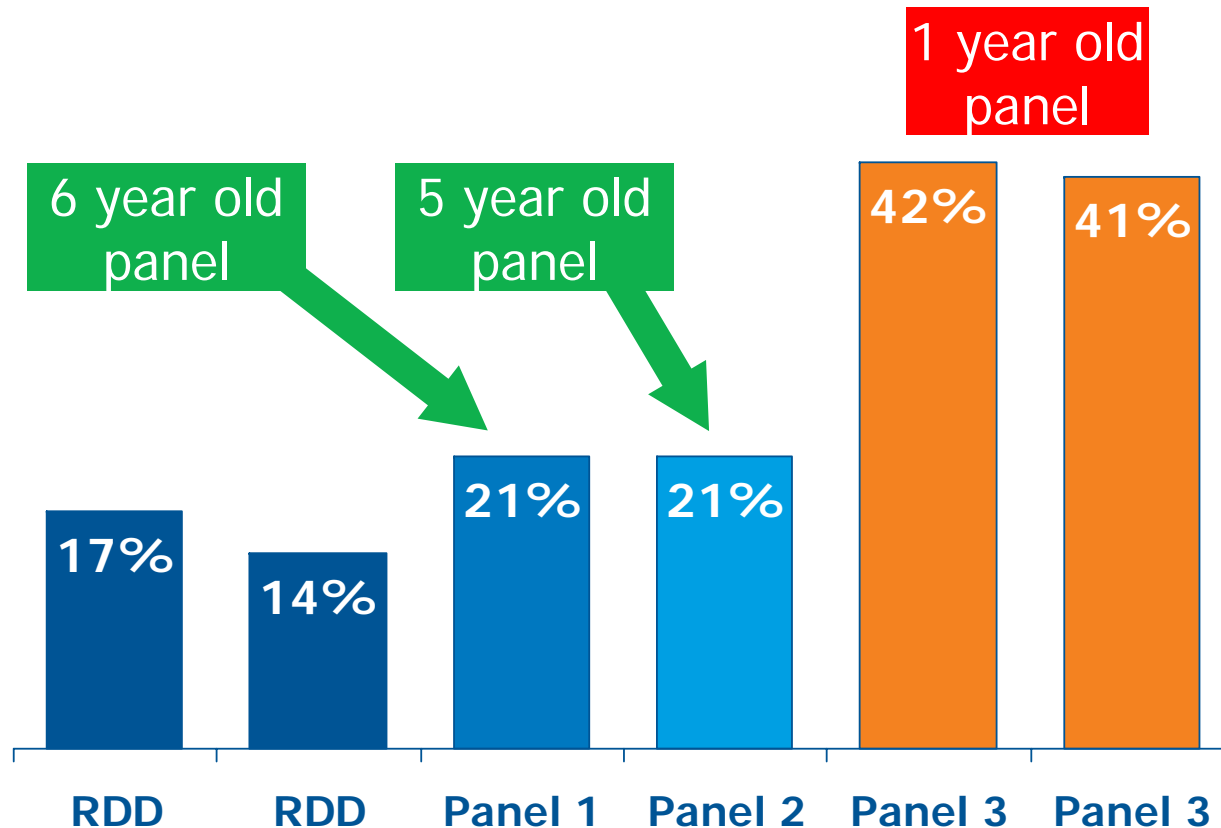
Survey experience and panel tenure work together to impact product demand in online surveys



- Demand was 50% lower for the most experienced survey takers
- Newer panelists (<3 months) show consistently higher demand
- The slope of the demand response lines increases with panel tenure
- The most tenured panelists give lower demand across the board

Thinking back to the original problem...

Demand for the same product
using different samples



- At the time data was collected, Panels 1 and 2 were seasoned
- Panel 3 was new and didn't have tenured panelists
- We quit using Panel 3. If we had continued our demand results would have consistently declined as the panel matured

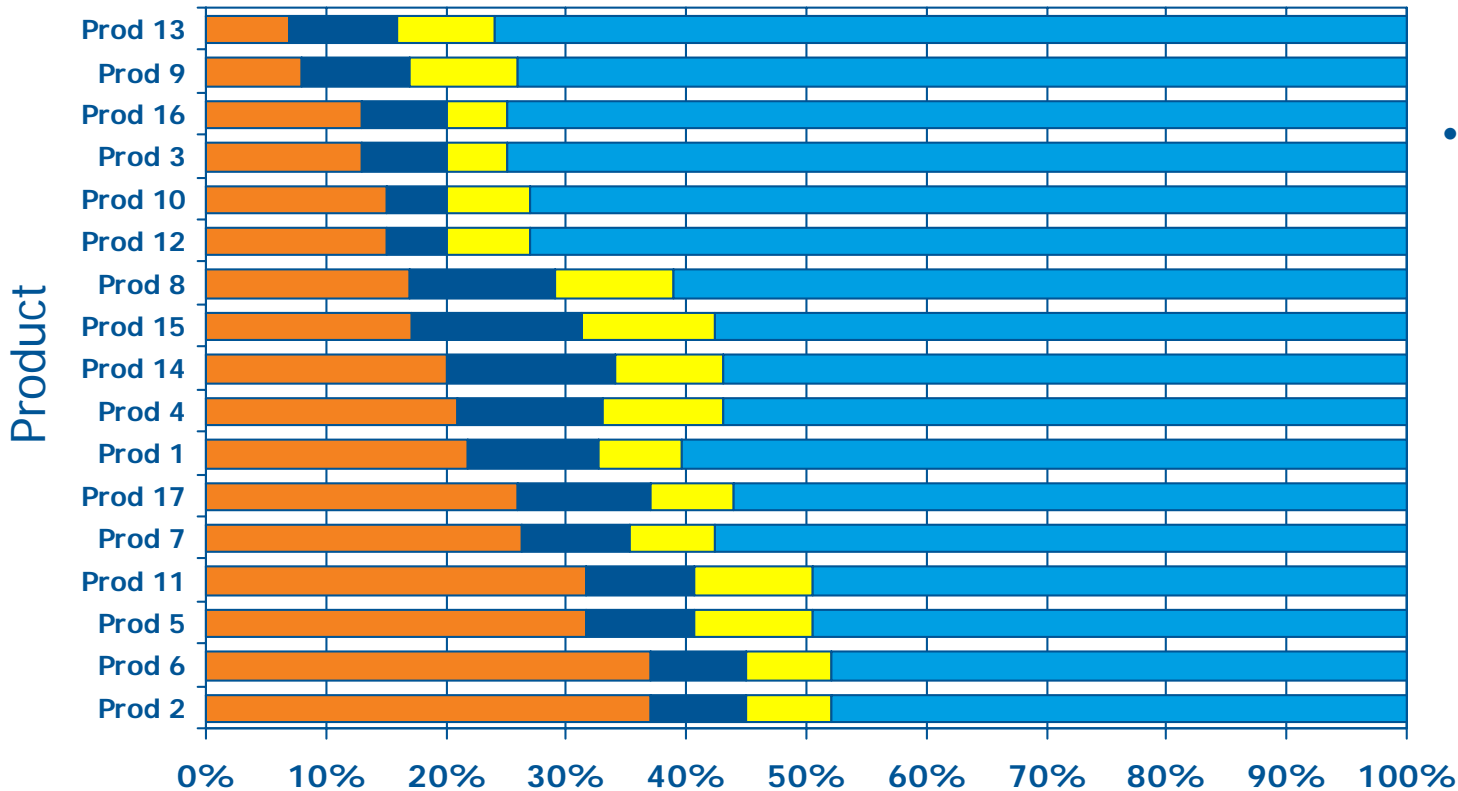
- Fact: Demand differs by # of surveys taken
- Fact: Demand differs by tenure

- Question: Are our samples consistent in the distribution of surveys taken and tenure when using the same panel?



Survey experience among respondents varied dramatically across our studies from the same panel

Number of surveys taken by respondents 3 months before each project

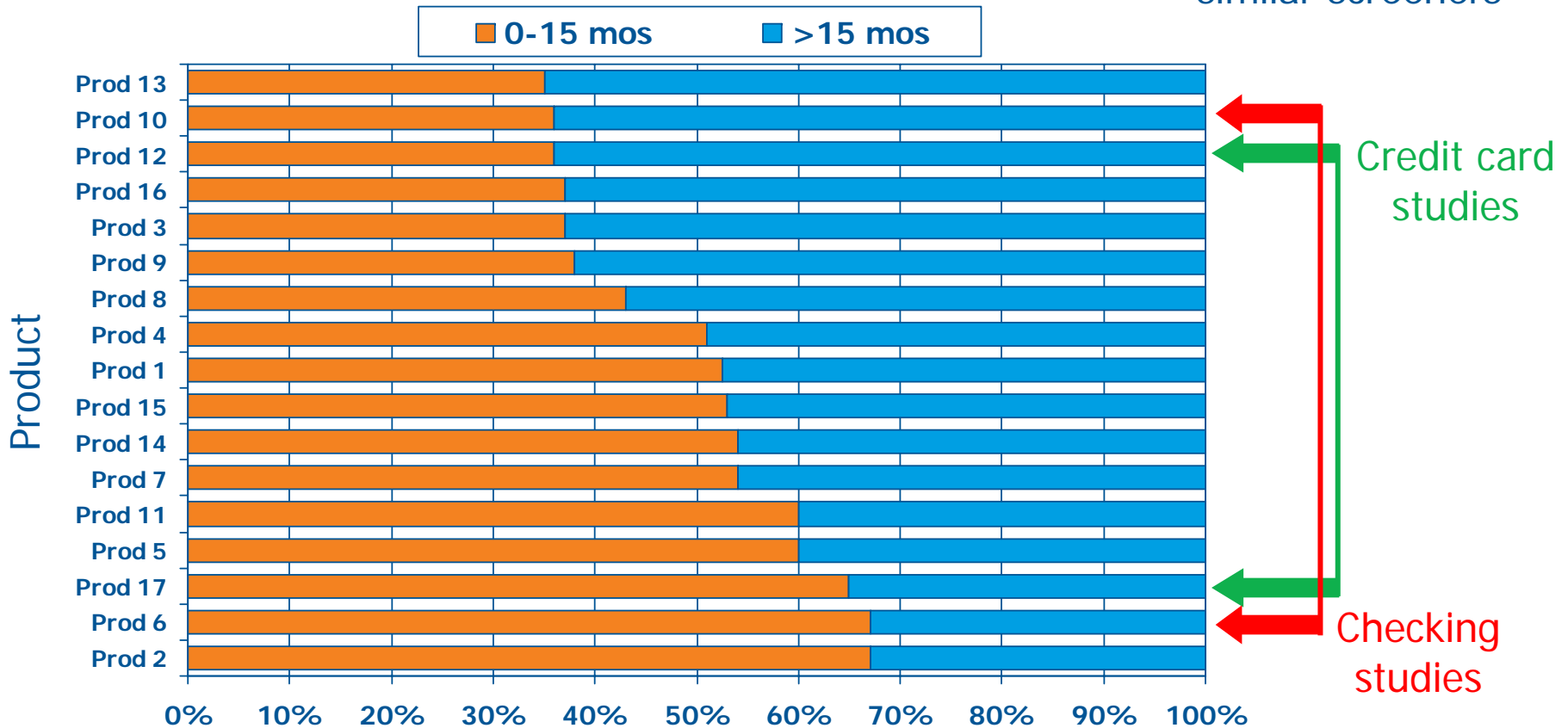


- These were all “GP” samples
- Infrequent survey takers (0 in the past 3 months) ranged from 7-37% of our sample mix

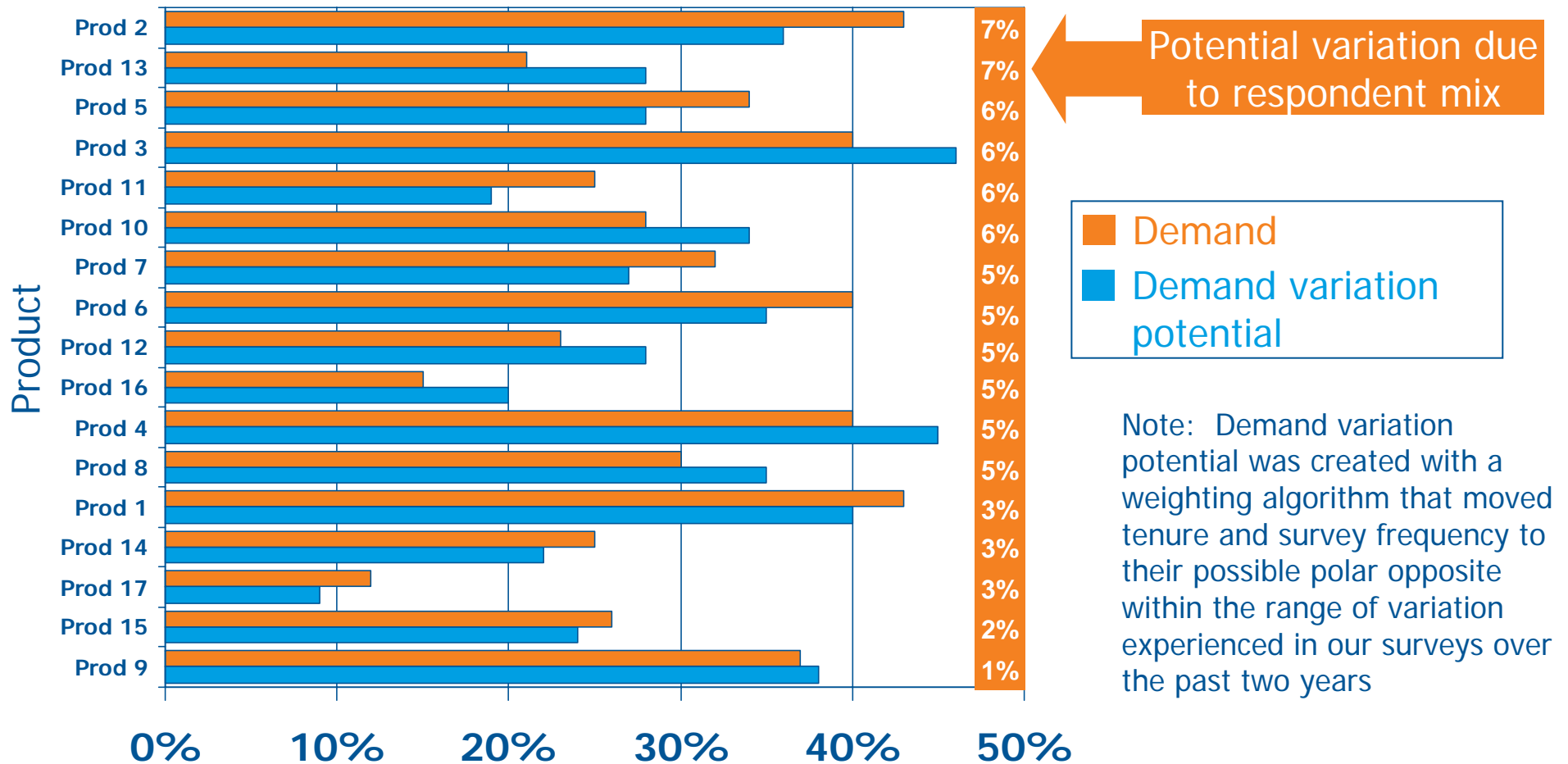
Panel tenure also varied widely

- Respondent tenure differed even across similar product tests
- These differences happened despite similar screeners

Panel tenure of respondents by study



Demand figures could have varied significantly with a different mix of survey taking experience



Now what?



How to address the uncovered problems

Who gives the “right” demand, new or experienced survey takers?

Approach 1

Find the “right” sample and only survey them

- Difficult for sample providers
- May have unintended consequences

Approach 2

Create consistent “balanced” samples and weight to a balance

- Easier to manage and control
- Less likelihood of unintended outcomes

The WaMu Research plan for addressing the issue

- ✓ Check sample makeup before fielding surveys
- ✓ Append respondent-level panel data for all surveys
- ✓ Control for survey experience – like a new demographic



Sample scorecards will help spot problems early

Representative Demographics?

		Norms	Sample	
Demographics	Age	18-34	19%	20%
		35-44	22%	21%
		45-54	23%	25%
		55-64	15%	14%
		65+	21%	20%
Income	<\$35k	32%	30%	
	\$35-\$49k	18%	20%	
	\$50-\$74k	22%	21%	
	\$75-99k	14%	15%	
	\$100+	14%	14%	

Consistent survey history?

Survey Experience	Completed surveys - past 3 months	0	19%	18%
		1-4	21%	23%
		5-10	21%	20%
		11-25	28%	30%
		26+	11%	9%
Panel tenure (months)	< 3	25%	23%	
	3-6	10%	12%	
	7-15	14%	15%	
	16-24	11%	10%	
	25-48	25%	26%	
	49+	16%	15%	

Selection bias?

Percent of panel that qualifies for the study	82%	81%
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Case Study: Value of Sample Scorecards

- WaMu executed a survey recently and saw very unusual results
 - Panel provider outsourced half of the sample
 - Results from the two samples varied greatly
 - One panel had higher demand, the other had lower
 - One panel skewed old, the other skewed young

- Why? Skew was due to sample selection bias
 - A “primary bank” variable on the panel was used to select “non-WaMu” sample
 - “Primary bank” was only populated for 3% of their panel, which eliminated 97% of the panel during sample selection (which caused the need for the second panel)

Case Study: Value of Sample Scorecards

A sample scorecard would have revealed the problem before fielding

Costs of not having a scorecard:

- 1 week tracking down problem
- 1 week re-collecting new data
- Wasted time for respondents

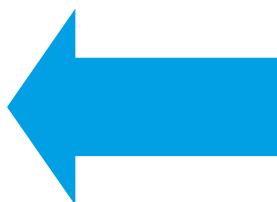
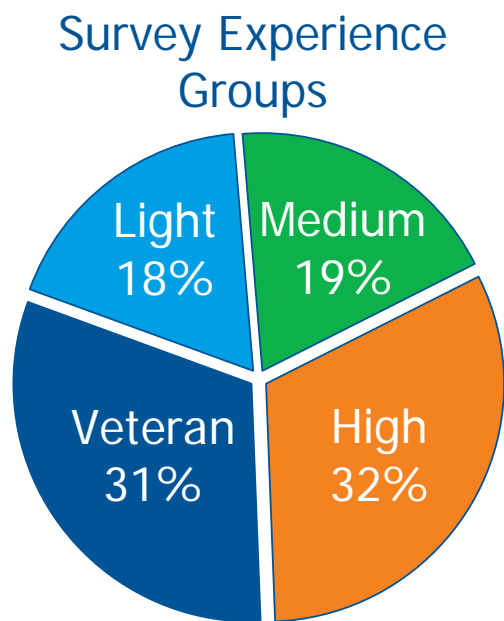
Norms Sample

Age	18-34	19%	14%
	35-44	22%	15%
	45-54	23%	20%
	55-64	15%	28%
	65+	21%	23%

Panel tenure (months)	< 3	25%	0%
	3-6	10%	0%
	7-15	14%	15%
	16-24	11%	20%
	25-48	25%	36%
	49+	16%	28%

Percent of panel that qualifies for the study	82%	3%
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Survey Experience Groups simplify proper balancing of respondents

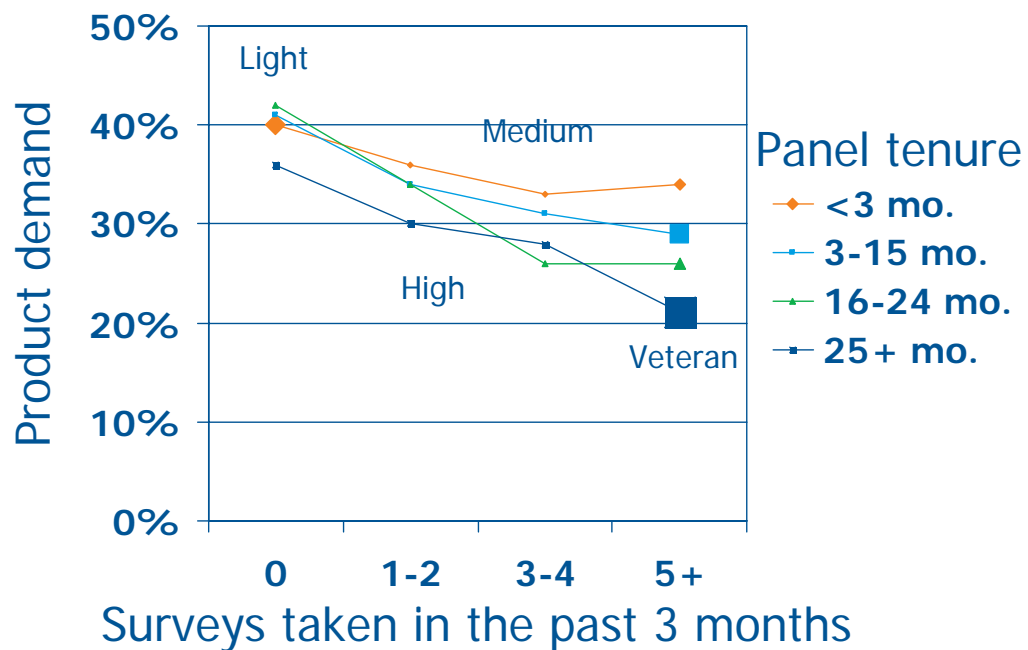


Create 4 groups based on:

- Panel tenure
- Surveys taken in the past 3 months
- Demand similarity
- Respondents per group

Survey Experience Groups can be used to weight properly or request a balanced sample pull

How Respondents are Grouped



Progress Update

- ✓ Vendors are classifying their panels into our survey experience groups
 - Will update quarterly
- ✓ Receive sample disposition reports to check for issues prior to fielding
- ✓ Survey experience variable is appended for all surveys



Issues for further exploration

- How participation in multiple panels affect results?
- The role panel recruiting method plays in differences we've seen?
- How these findings differ . . .
 - Across various industries
 - For frequent or infrequent purchases
 - For brand and advertising consideration / awareness
 - Etc.
- The cause of the biases we have detected?
 - Is it seasoning (Movie critic mentality)?
 - Have long-term respondents always responded differently?
 - Is our survey design causing some of the variation?

Implications for online panels

- Beyond age, income, and regional distribution, panels must now assure consistent tenure/survey frequency
- Panels must be managed as carefully controlled ecosystems
 - Growing the panel creates upward demand bias
 - Excessive use of the sample creates downward demand bias



WaMu Research's Perspective on Data Quality

- We're accountable
 - We are responsible for our own data quality
- Challenge and explore
 - When we encounter an anomaly, don't justify it or explain it away. Learn. Quality will only improve when we do
- Partner with others
 - Partnerships are key. Our suppliers and sample providers have partnered with the right type of effort, often with minimal cost (senior-level support was vital)
- Plan to learn
 - Build research on research into your plans to minimize costs and continue learning
- Create solutions
 - Go far beyond problem detection and strive for solutions that work

Thank you