

# Using Response Rates and Other Quality Metrics to Assess the Effects of the Multi-Mode Collection for Business Surveys: A Case Study

Katherine (Jenny) Thompson

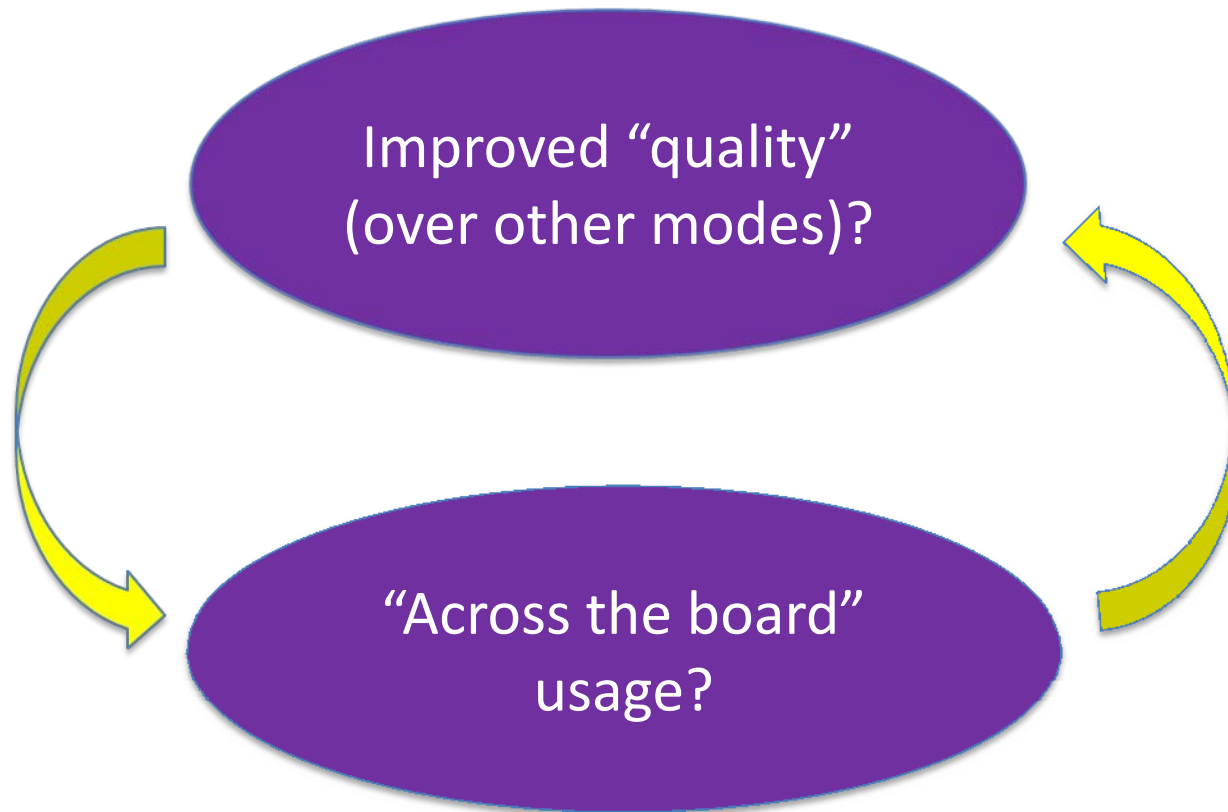
Broderick Oliver

Jennifer Beck

# Context

- Business Surveys conducted by the U.S. Census Bureau
- Multi-mode collection
  - Internet (Web), Mail, Fax, Telephone
  - Selection of mode made by respondent
- Increase Web collection (Strategic Plan)
  - Contact strategies “push” towards Web
  - Availability of paper form decreasing

# Web Collection Questions



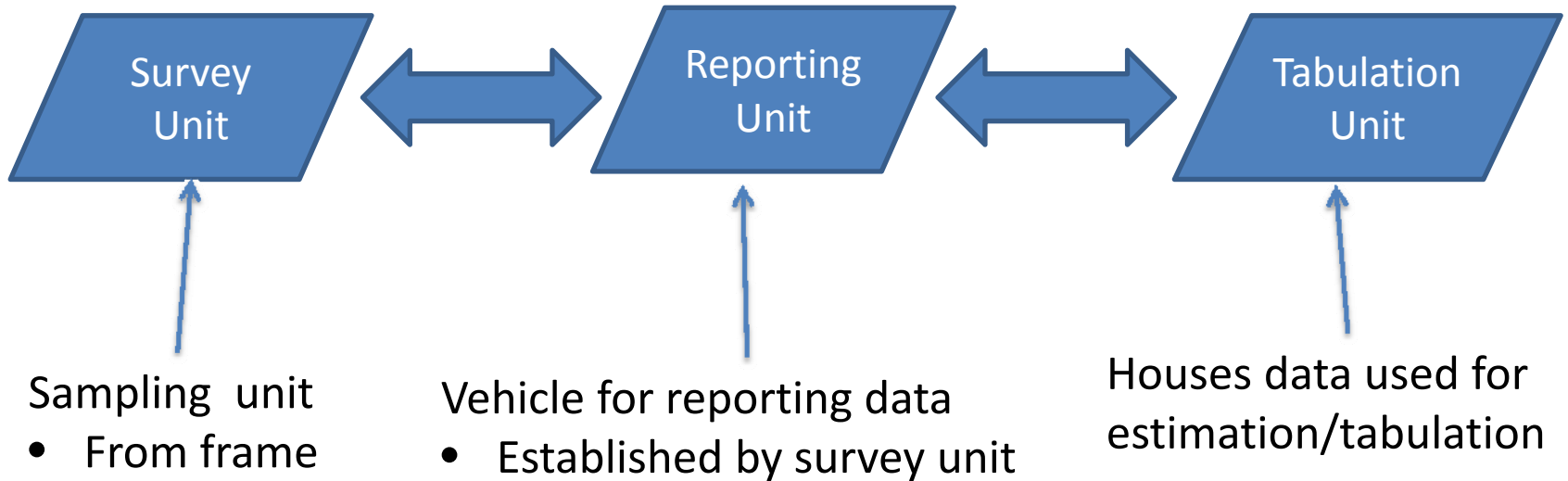
# Web Collection Questions

Improved “quality”  
(over other modes)?

Quality = Reporting Accuracy

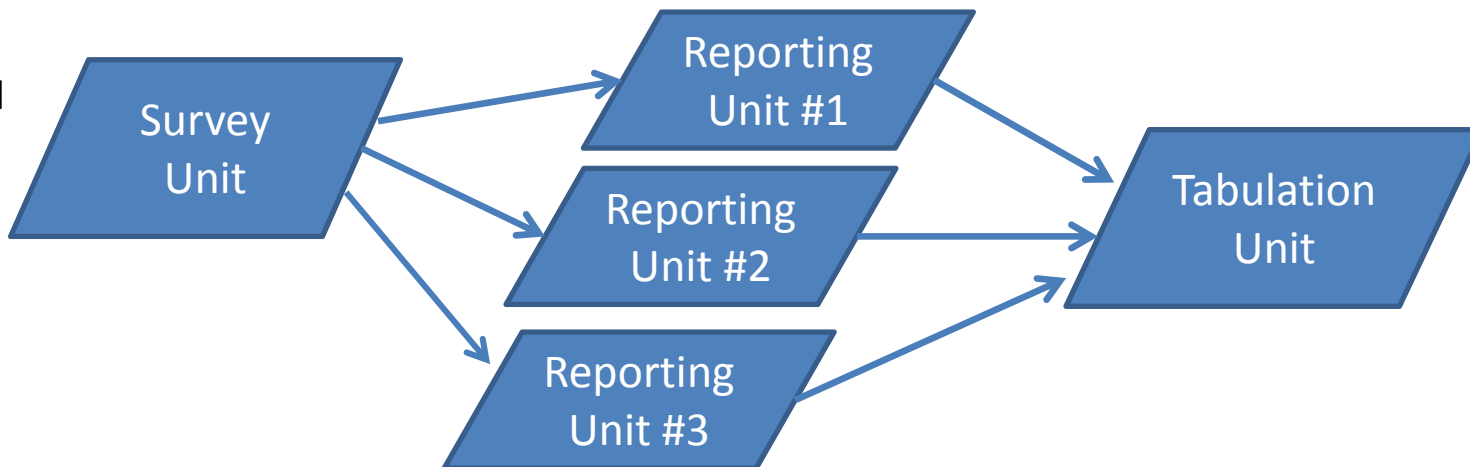
- Is collection mode eliciting accurate data?
- Measure “retained” reported data
  - After analyst review and machine editing
- Considerations
  - Auxiliary data availability (impact on analyst review)
  - Unit type

# Unit Type

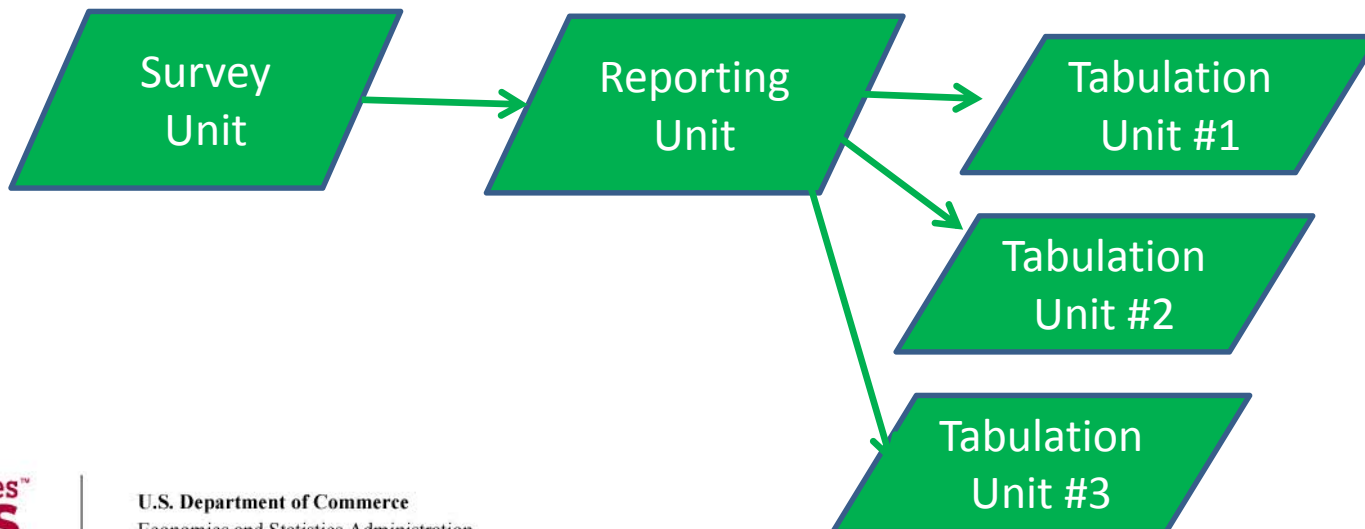


# Unit Type

At statistical period  $t$



At statistical period  $t$



# Web Collection Questions

- Unit Size = “importance”
  - Skewed populations
  - Totals as key statistics
- At the U.S. Census Bureau, follow-up and outreach tend to focus on large businesses

“Across the board”  
usage?

# Multi-mode Collection

## Advantages

- “Provide access to different types of businesses”\*
- “Attract different types of respondents”
- “Elicit different responses”

\*Jäckle, Roberts, and Lynn 2010

## Disadvantages

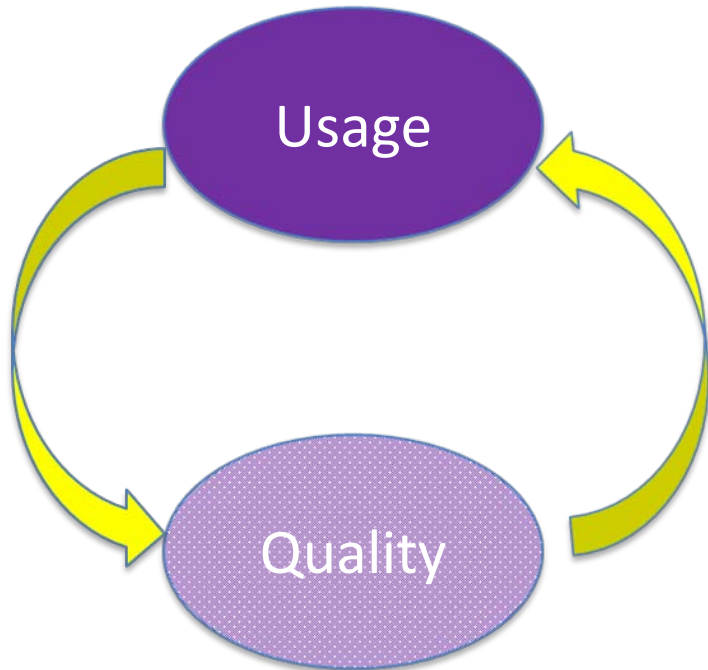
- Mode effects
- Differential review procedures
  - Web allows for self-validation
  - Other modes require post-collection data checks
- Need to develop several different (quality) instruments



# The Myth of “Paperless” Collection With Business Surveys

- Often used to preview all questions
- Paper version of form often used to gather information
  - Single contact for company/consolidated data entry
  - Different offices/persons may be responsible for different parts of form
- Record-keeping tool (printout and pdf)

# Metric 1: Unit Response Rate (URR)



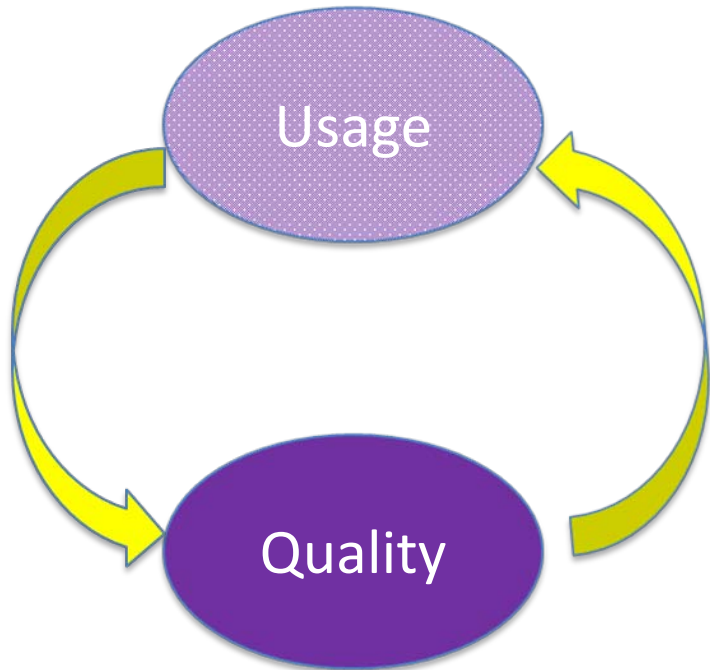
Unweighted proportion of responding units

- Reporting unit
- One rate per survey
- Can be computed by subdomain

*Would like to see:*

- Constant or increasing survey-level URR
- Increasing contribution to URR from **WEB** collection
- Increasing **WEB** URR for Large and Small Businesses

# Metric 2: Quantity Response Rate (QRR)



- Weighted proportion of an estimate obtained from directly reported data
  - Tabulation unit
  - One rate per **item**
  - Can be computed by subdomain

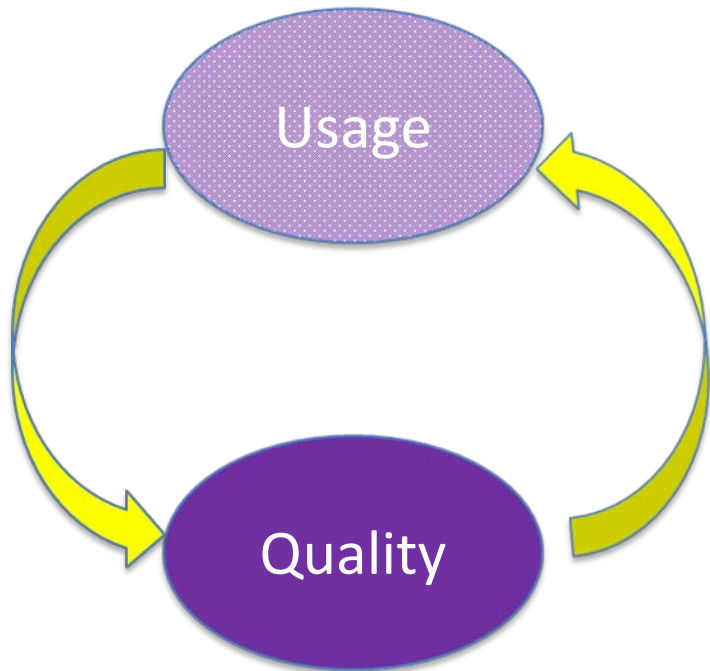
### *Would like to see:*

- Constant or increasing survey-level QRR (item)
- Increasing contribution to QRR from **WEB** collection
- Increasing **WEB** QRR for Large and Small Businesses

### *Would hope to see:*

- $QRR > URR$  for key item(s)
- Web QRR  $\rightarrow$  100%

# Metric 3: Source of Data Item (SDI)



- Unweighted proportion of responding units that retain reported data for an item
  - Tabulation unit
  - One rate per **item**
  - Can be computed by subdomain

A mode that solicits accurate data should have an SDI for all key items approaching 100%.

# Analysis Procedure

- Level
  - Survey level (URR and QRR)
  - Subdomain levels (URR, QRR, SDI)
    - Mode of Collection - Web, Mail, Fax, Other
    - Unit size - Certainty (Large) and Noncertainty (Not Large)
- Usage (Uptake), then Quality

# Case Studies

## Quarterly Services Survey (QSS)

- Company or EIN
- Stratified SRS-WOR design
  - New sample selected every five years
- One key variable (revenue)
  - Few reported zeros
  - Available administrative data
- Simple questionnaire

## Annual Capital Expenditures Survey (ACES)

- Company
- Stratified SRS-WOR design
  - New sample selected annually
- Nine key variables (capital expenditures)
  - Legitimate reported zeros (especially small businesses)
  - No administrative data
- Complex questionnaire

# QSS Form

## 5 SALES, RECEIPTS, OR REVENUE

### **Include:**

- Receipts from guest rooms or unit rentals for all establishments owned by this firm
- Receipts from rentals of public rooms such as ballrooms, conference rooms, etc.
- Sales of meals, alcoholic beverages, and other merchandise
- Sales of gaming operations
- Site rental and equipment usage fees
- Receipts from valet, laundry, parking, and other guest services provided by this firm
- For casino hotels, report sales net of promotional allowances
- Credit and cash net sales of merchandise
- Franchise or royalty fees
- Management fees
- Cost reimbursables from managed hotels

### **Exclude:**

- Revenue from casinos without accommodations
- Revenue from timeshares or vacation ownership
- Occupancy taxes
- Carrying or other finance charges
- Commissions (such as vending machine operators, government lottery tickets, or other stores)
- Non-operating receipts (such as interest income, income from investments, and receipts from the rental or sale of real estate)
- Sales made by departments and concessions operated by other firms in this firm's accommodation establishment(s)

### **Deduct:**

- The actual value of rebates and discounts granted to the purchaser, even if granted as an increase in trade-in allowances

\$ Bil.	Mil.	Thou.	Dol.

A. What was this firm's total revenue

# ACES Form

## ITEM 6

Complete Item 6 for each industry in which the company had operations and made capital expenditures in 2005. (Refer to page 5 of the instructions.) The list of industry category codes printed on page 1 of the survey are the industries in which we believe your company operates. If the industries are incorrect or incomplete, please refer to the complete list of possible industry codes and descriptions beginning on page 6 of the instructions, Definitions, and Codes List manual. Correct the list on page 1 of this form and use these updated industry codes to complete Item 6.

**NOTE:** If only one industry code is printed on page 1 and this is the only industry in which you operated in 2005, check the box to the right and skip to page 8. 8010  Check here  
 If you operated in more than one industry or;  
 If you made a correction to any printed industry on page 1. complete Item 6.

		STRUCTURES + EQUIPMENT + OTHER = TOTAL													
Row	Industry Category Code	Structures (Include major additions, alterations and capitalized repairs to existing structures as new structures)				Equipment				Other				TOTAL CAPITAL EXPENDITURES	
		New (2)		Used (3)		New (5)		Used (6)		New (8)		Used (9)		Total (10)	
		Mil	Thou	Mil	Thou	Mil	Thou	Mil	Thou	Mil	Thou	Mil	Thou	Mil	Thou
61															
61															
61															
61															
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61															
61															
61															
61															

69	COLUMN TOTALS														
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Should equal Item 2, Row 20, Column 1  
 Should equal Item 2, Row 21, Column 1  
 Should equal Item 2, Row 20, Column 2  
 Should equal Item 2, Row 21, Column 2  
 Should equal Item 2, Row 20, Column 3  
 Should equal Item 2, Row 21, Column 3  
 Should equal Item 2, Row 22, Column 4

Thou.

1 2 6

1+2+3

Thou.

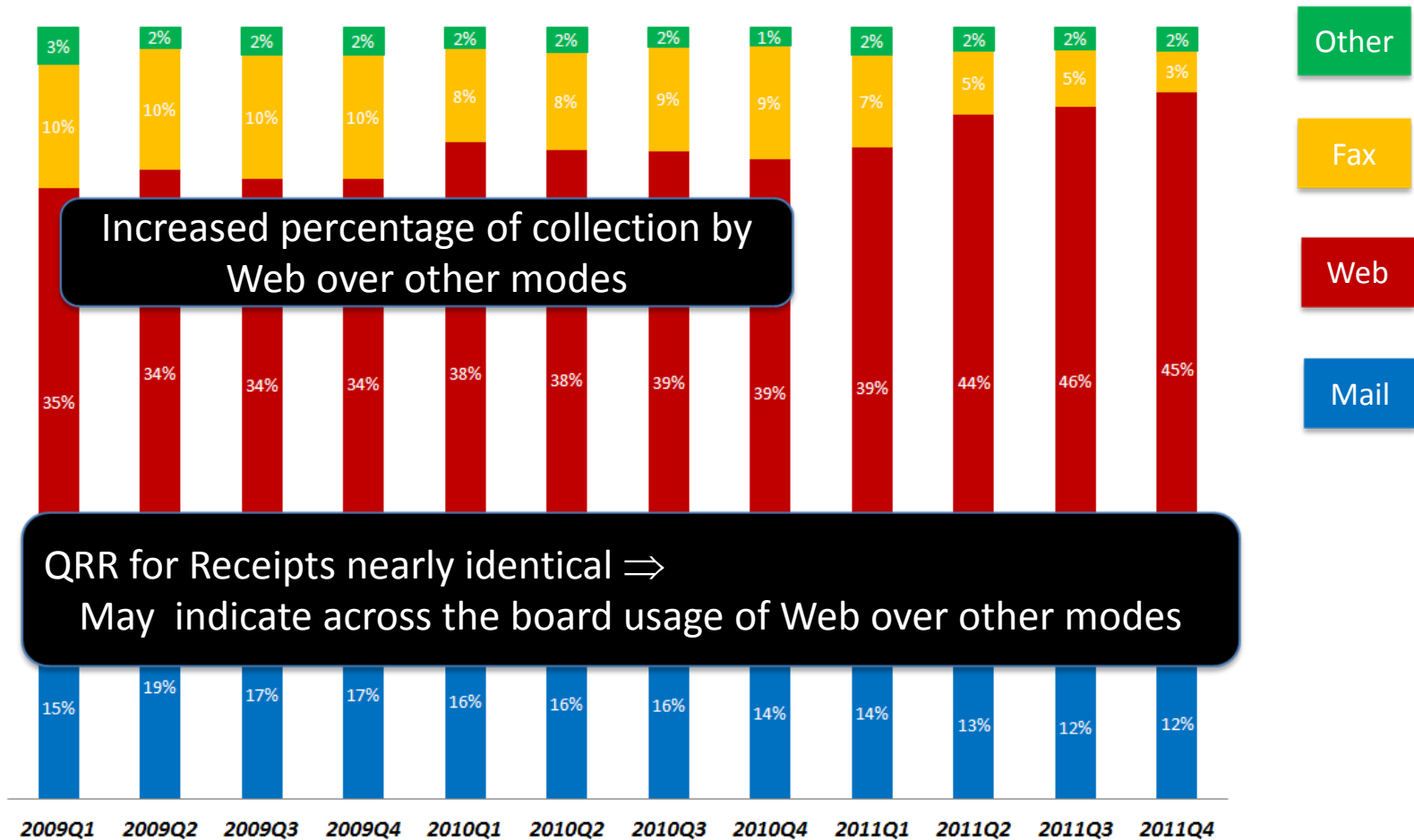
11



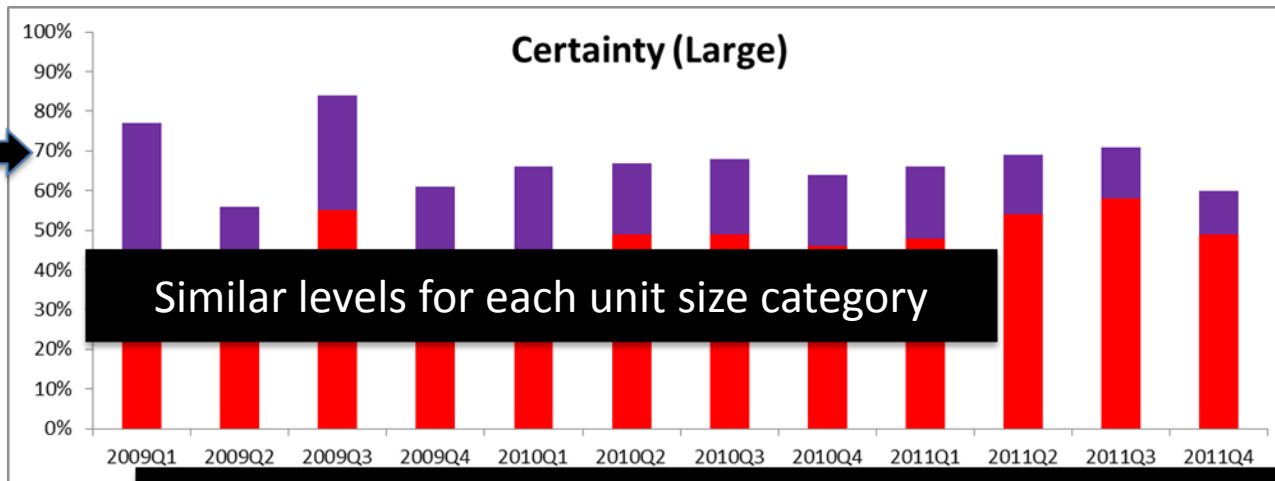
# 1<sup>st</sup> Study Question

- Is Web collection increasing?
- If yes,
  - Is it an across-the-board phenomenon or
  - Is it confined to the larger businesses?
- Metrics studied
  - URR
  - QRR

# QSS Unit Response Rates



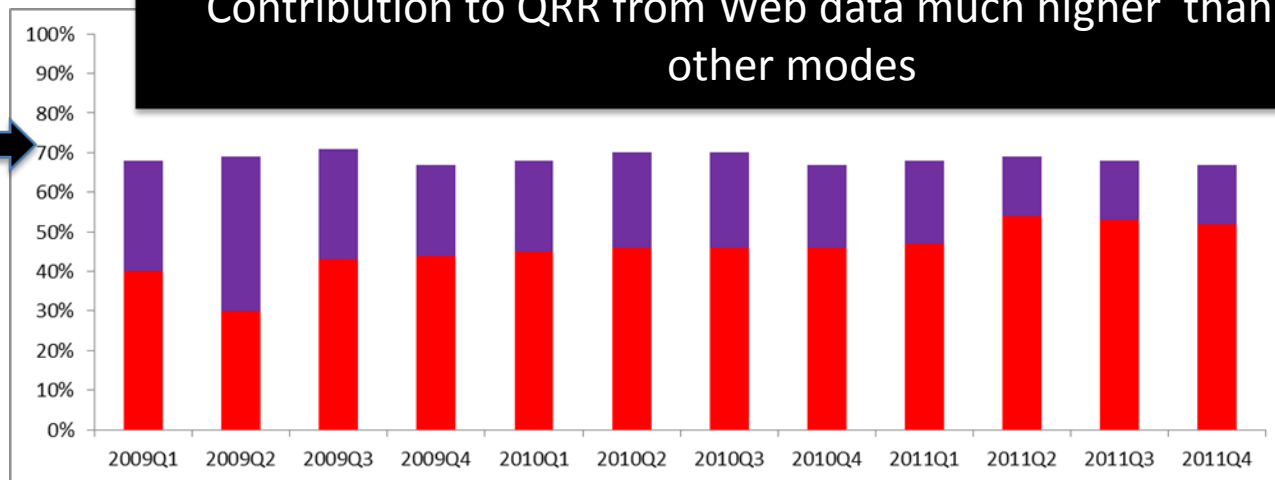
# QSS QRR Revenue By Unit Size and Collection Mode



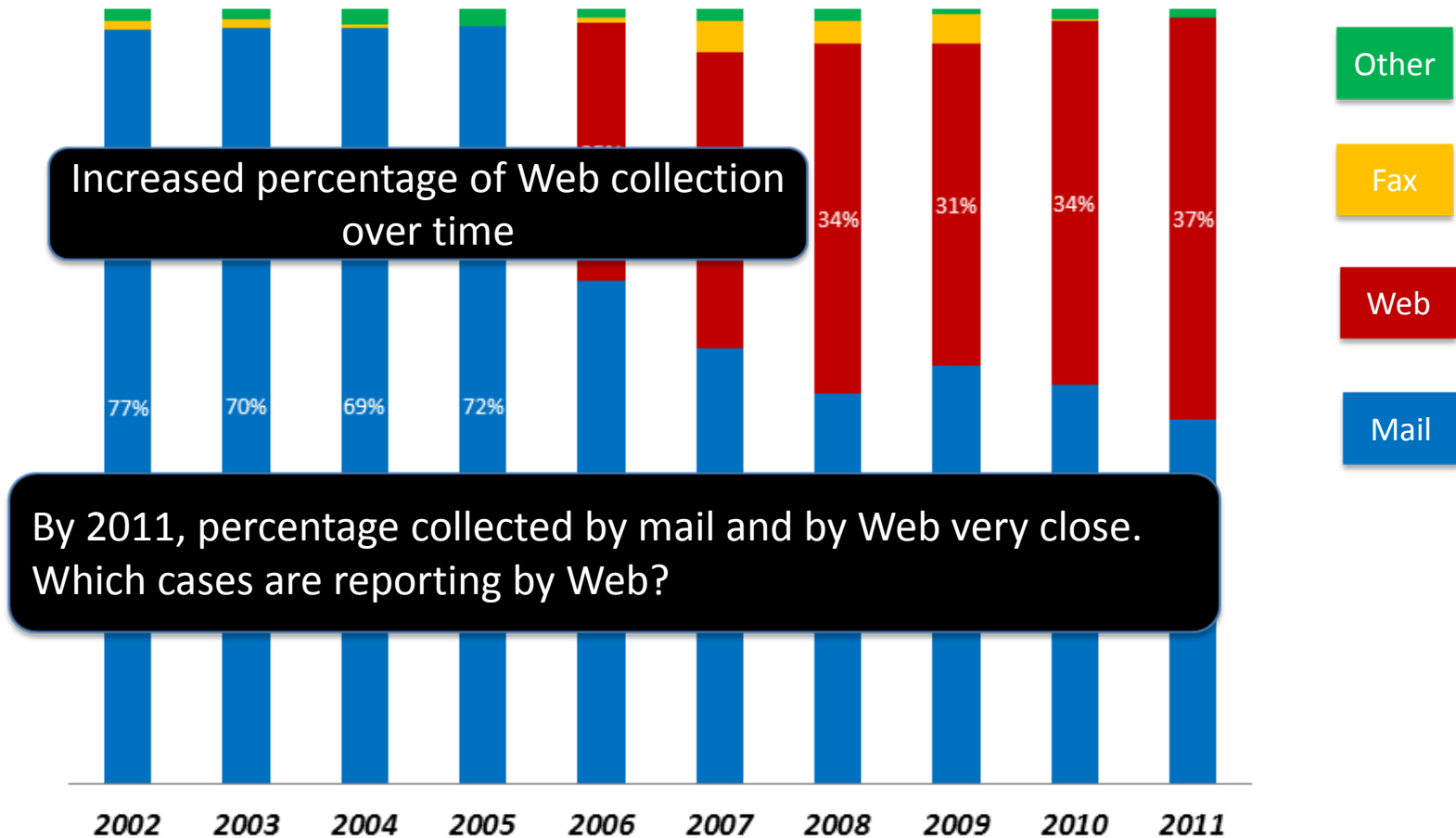
Web

Not Web

Contribution to QRR from Web data much higher than from other modes

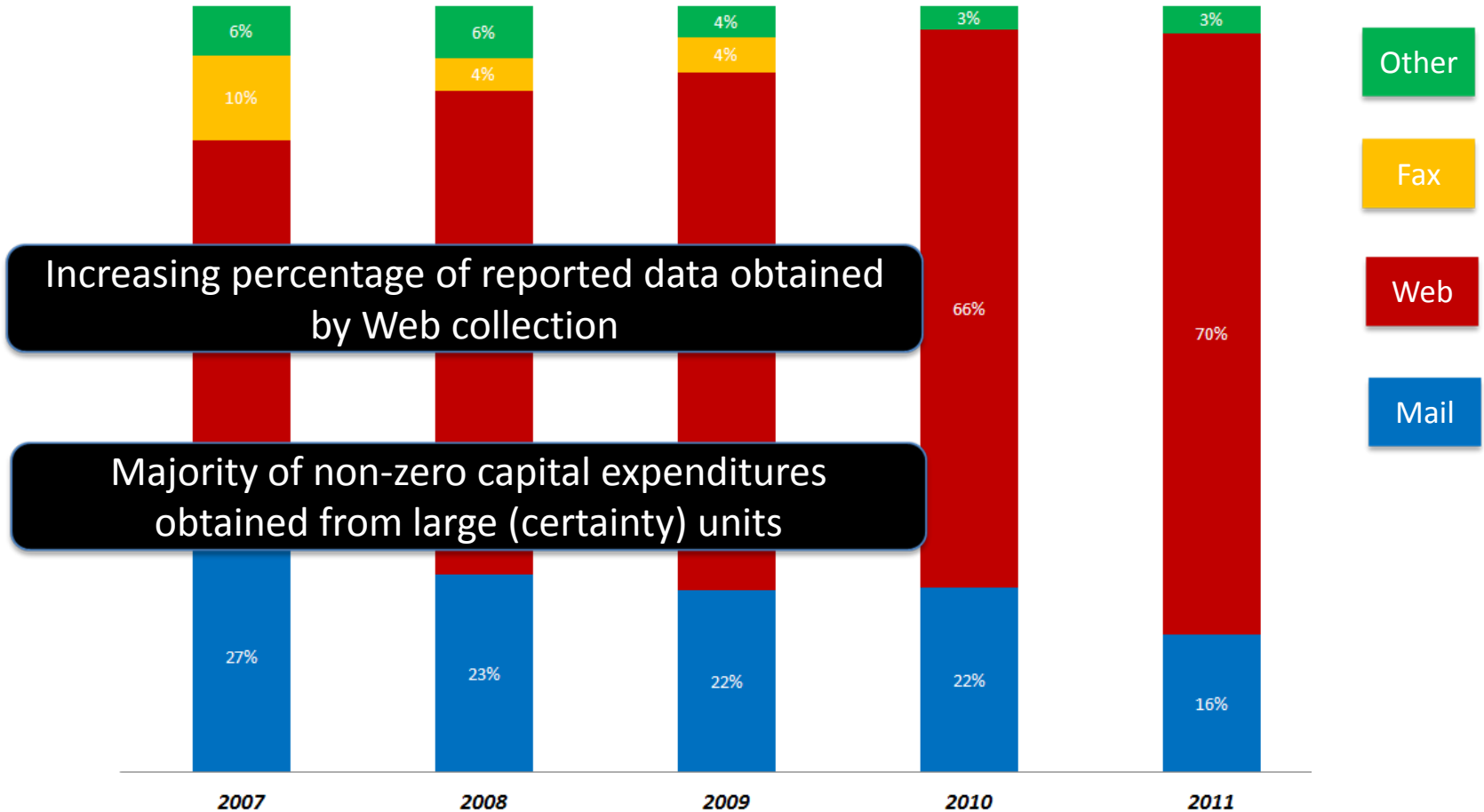


# ACES Unit Response Rates

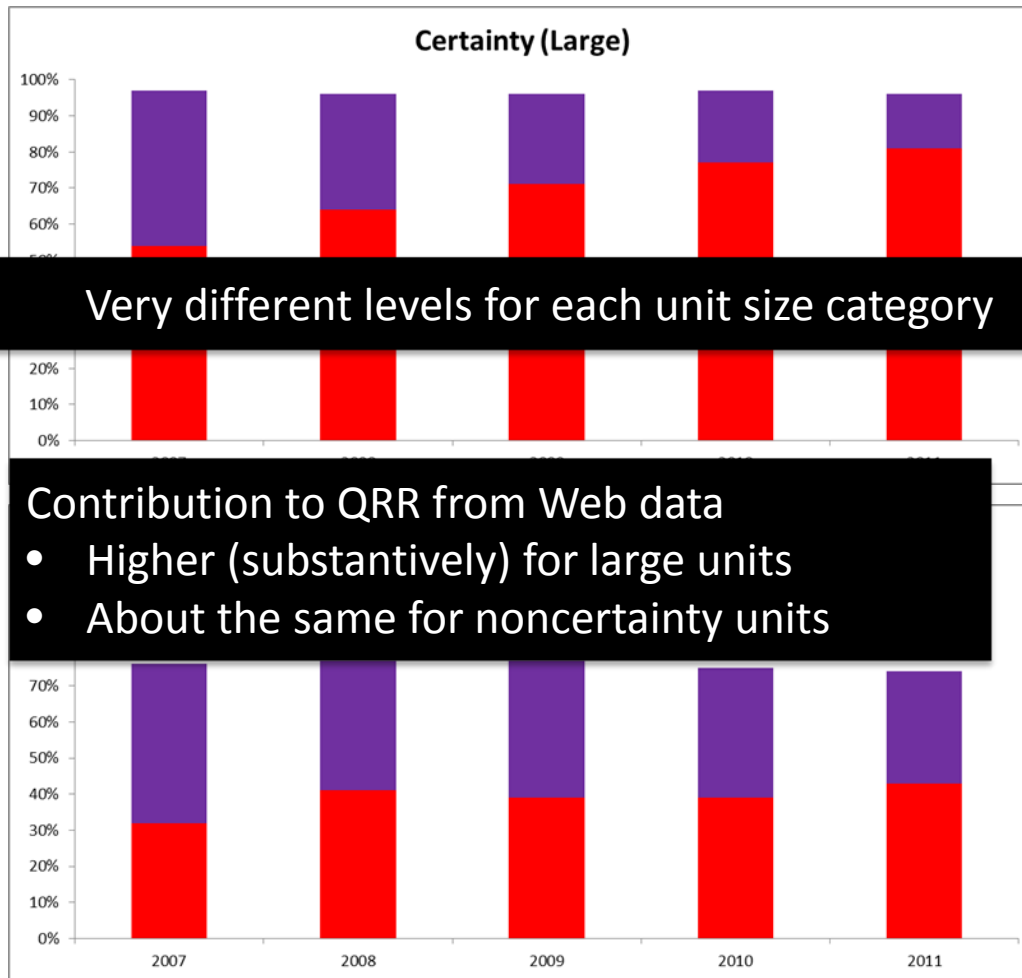


# ACES QRR

## (Total Capital Expenditures)



# ACES QRR Total Capital Expenditures By Unit Size and Collection Mode



Very different levels for each unit size category

Contribution to QRR from Web data

- Higher (substantively) for large units
- About the same for noncertainty units

Web

Not Web

# 2<sup>nd</sup> Study Question

- Are there differences in data quality by mode of data collection?
- Are there interactions between unit size and mode of data collection in terms of quality?
- Metric used: SDI

# QSS SDI for Revenue

## Certainty

100%

### 5 SALES, RECEIPTS, OR REVENUE

#### Include:

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- Receipts from rentals of public rooms such as ballrooms, conference rooms, etc.
- Sales of meals, alcoholic beverages, and other merchandise
- Sales of gaming operations
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- Credit and cash net sales of merchandise
- Franchise or royalty fees
- Management fees
- Cost reimbursables from managed hotels

#### Exclude:

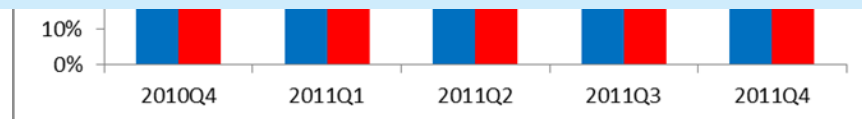
- Revenue from casinos without accommodations
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- Non-operating receipts (such as interest income, income from investments, and receipts from the rental or sale of real estate)
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#### Deduct:

- The actual value of rebates and discounts granted to the purchaser, even if granted as an increase in trade-in allowances

	\$ Bil.	Mil.	Thou.	Dol.
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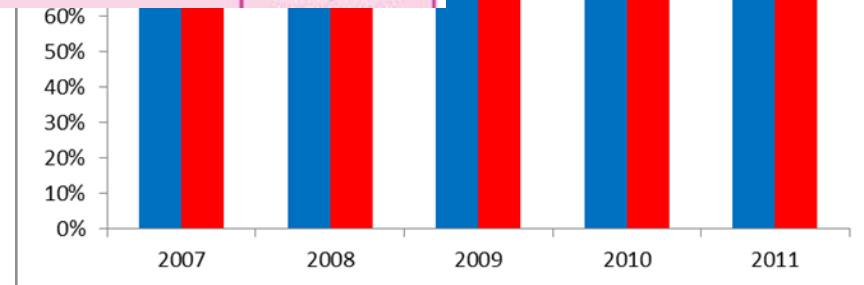
# ACES SDI for Total Capital Expenditures

Certainty

retained with collection

ITEM 2 CAPITAL EXPENDITURES													BL	ML	Thou.
Report the following domestic capital expenditures data for the entire company. (Refer to page 4 of instructions)													Example: if figure is \$1,179,125,020.00 report →		
													1	179	126
Row	CAPITAL EXPENDITURES (Refer to Page 2 of instructions)	Structures (1)			Equipment (2)			Other (Describe in Item 3) (3)			Total (Add columns 1+2+3) (4)				
		BL	ML	Thou.	BL	ML	Thou.	BL	ML	Thou.	BL	ML	Thou.		
20	Capital expenditures for NEW structures and equipment (Include major additions, alterations, and capitalized repairs to existing structures)														
21	Capital expenditures for USED structures and equipment														
22	<b>TOTAL capital expenditures</b> (Add Rows 20+ 21)														
											Total should equal Item 1A, Row 11				

ertainty



# Discussion

- Three simple metrics
  - Examined consistency (URR)
  - Provided insights into accuracy (QRR and SDI)
- Found differences in (voluntary) uptake
  - Across-the-board usage for QSS
  - Primarily confined to large businesses for ACES

# Discussion

- Identified interaction between mode and difficulty of questionnaire
  - Simple – minimal differences in quality by mode
  - Complex – higher proportion of retained reported data with Web collection

# Missed Opportunity?

- Demonstrated
  - Web collection in these survey yields quality data
  - Uptake of Web is not necessarily equally used voluntarily
- Contention
  - The collection instrument that *minimizes* the probability of response error for all units *maximizes* a major component of quality
- Need to learn **how** to bridge the gap in uptake

# Thank you!

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