

# Improving the Collapsing Criteria and Nonresponse Adjustment of the Consumer Expenditures Survey

Stephen Ash

Price Statistical Methods Division  
Office of Prices and Living Conditions

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# Consumer Expenditure Surveys

Provides data and estimates on expenditures, income, and demographic characteristics of consumers in the United States.

For our research, we focus on the estimates of household expenditures.



# Consumer Expenditure Surveys

- ▶ Includes two surveys:
  - **Interview Survey** collects large or recurring expenditures such as refrigerators and utility bills.
  - **Diary Survey** collects data on smaller day-to-day expenditures such as bread and milk.
- ▶ Today's presentation will only address the Interview Survey.

# Interview Survey

- ▶ Rotating panel survey.
- ▶ 4 quarters, one interview every 3 months.
- ▶ The sample includes about 12,500 addresses each quarter.



# Current Nonresponse Adjustment

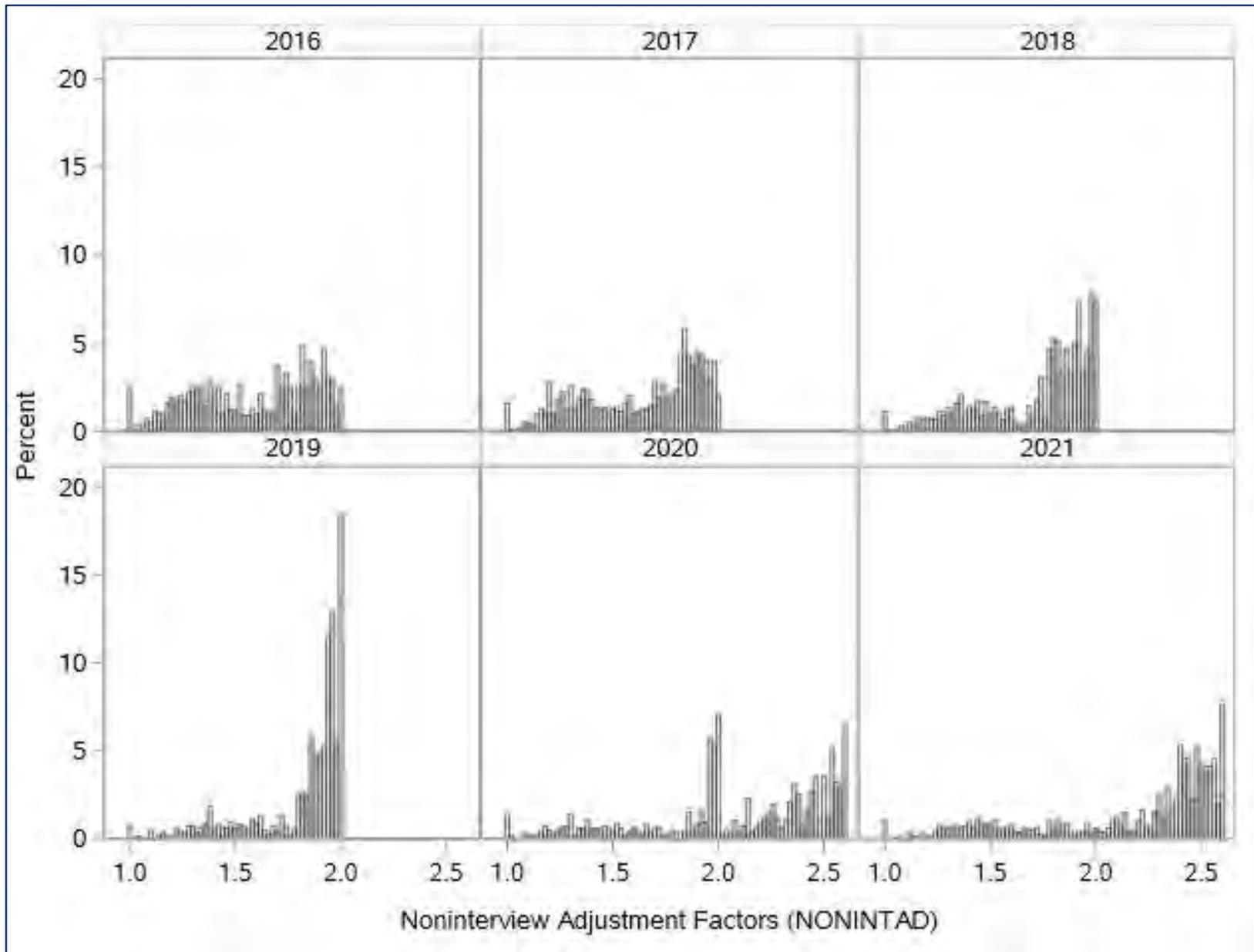
- Weighting cells approach.
- Partition the sample (both respondents and nonrespondents) into cells.
- Calculate the response rates (probability of response) within cells.
- The nonresponse adjustment is the inverse of the response rate within cells.

# Collapsing Cells

A cell needs to be collapsed when it has at least one nonrespondent and it meets any of the following criteria:

1. The cell contains no respondents.
2. The cell contains at least one respondent and it has:
  - 2a. a total of 1-10 sample units and a nonresponse adjustment factor greater than 2.15;
  - 2b. or a total of 11-20 sample units and a nonresponse adjustment factor greater than 2.35;
  - 2c. or more than 20 sample units and a nonresponse adjustment factor greater than 2.6.

# Interview Survey – Distributions of the Historical Nonresponse Adjustments



# Research Question

- What values should we use with the collapsing criteria?
  - ▶ Minimum sample size within a cell?
  - ▶ Maximum value of the nonresponse adjustment?
- We considered a single combination of minimum sample size and maximum value of the nonresponse adjustment.
- Constrained by not changing anything else with the nonresponse adjustment.

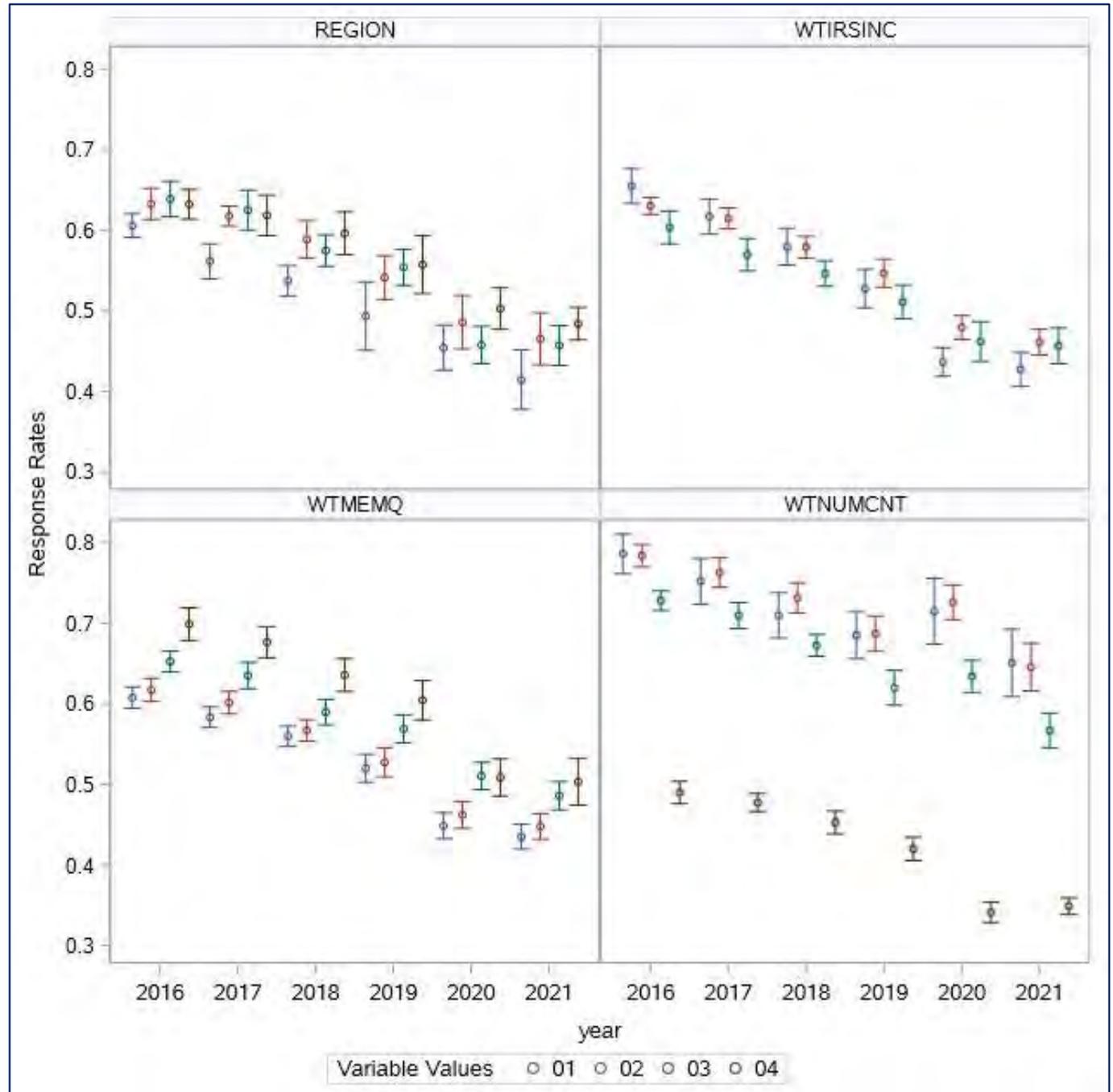
# Cells of Nonresponse Adjustment

Variable Name	Description of Variable	Number of values	Values
<i>MONTH</i>	Month of interview	12	01 to 12
<i>REGION</i>	Census Region	4	Northeast, Midwest, South, West
<i>WTIRSINC</i>	ZIP-code level IRS income of selected quintiles	3	Top 10 percent, Middle 80 percent, Bottom 10 percent
<i>WTNUMCNT</i>	Number of contacts made during interviewing	4	1, 2, 3-4, and 5+ contacts
<i>WTMEMQ</i>	Number of Persons in Consumer Unit	4	1, 2, 3-4, and 5+ persons

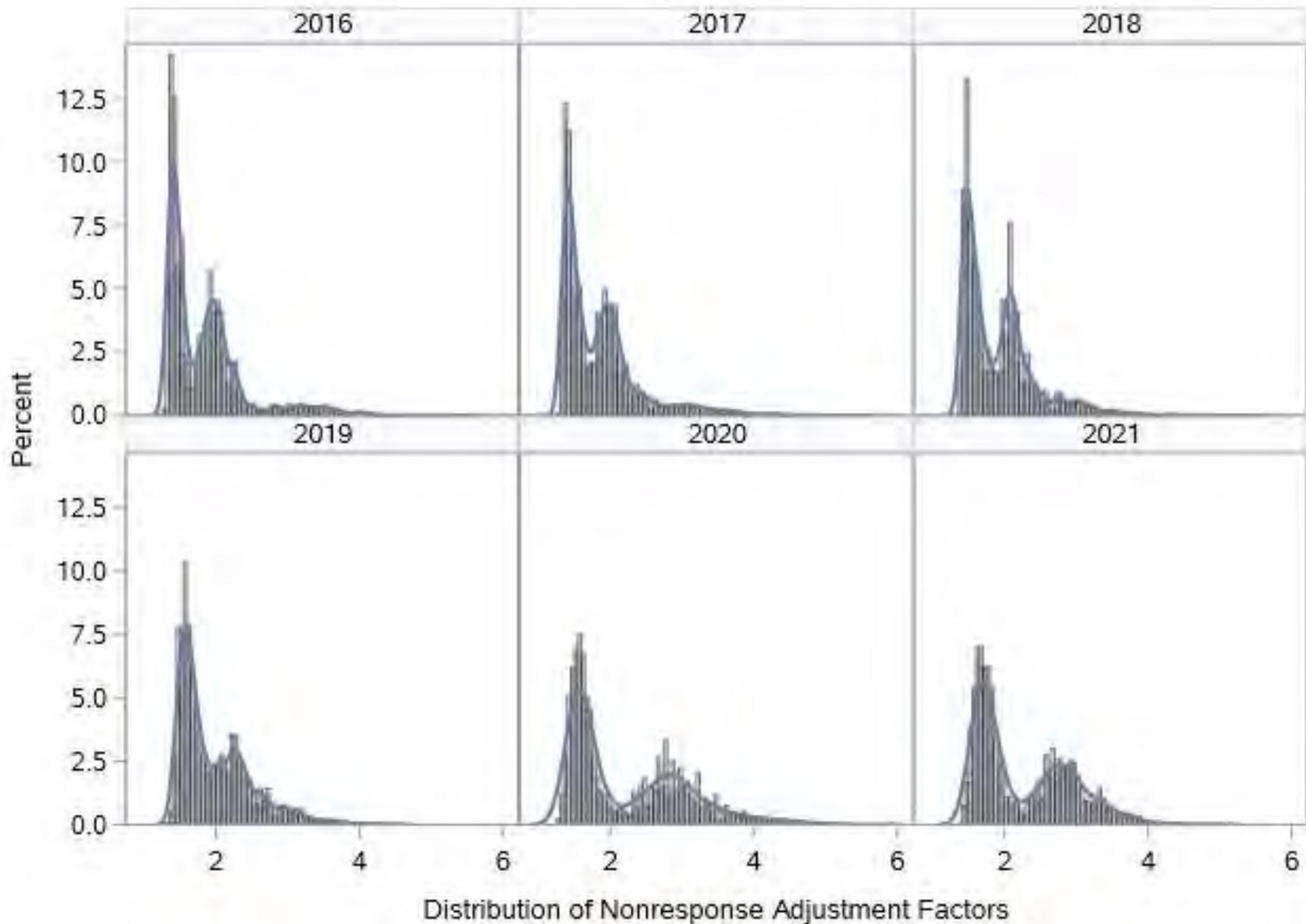
$12 \times 4 \times 3 \times 4 \times 4 = 2,304$  possible cells



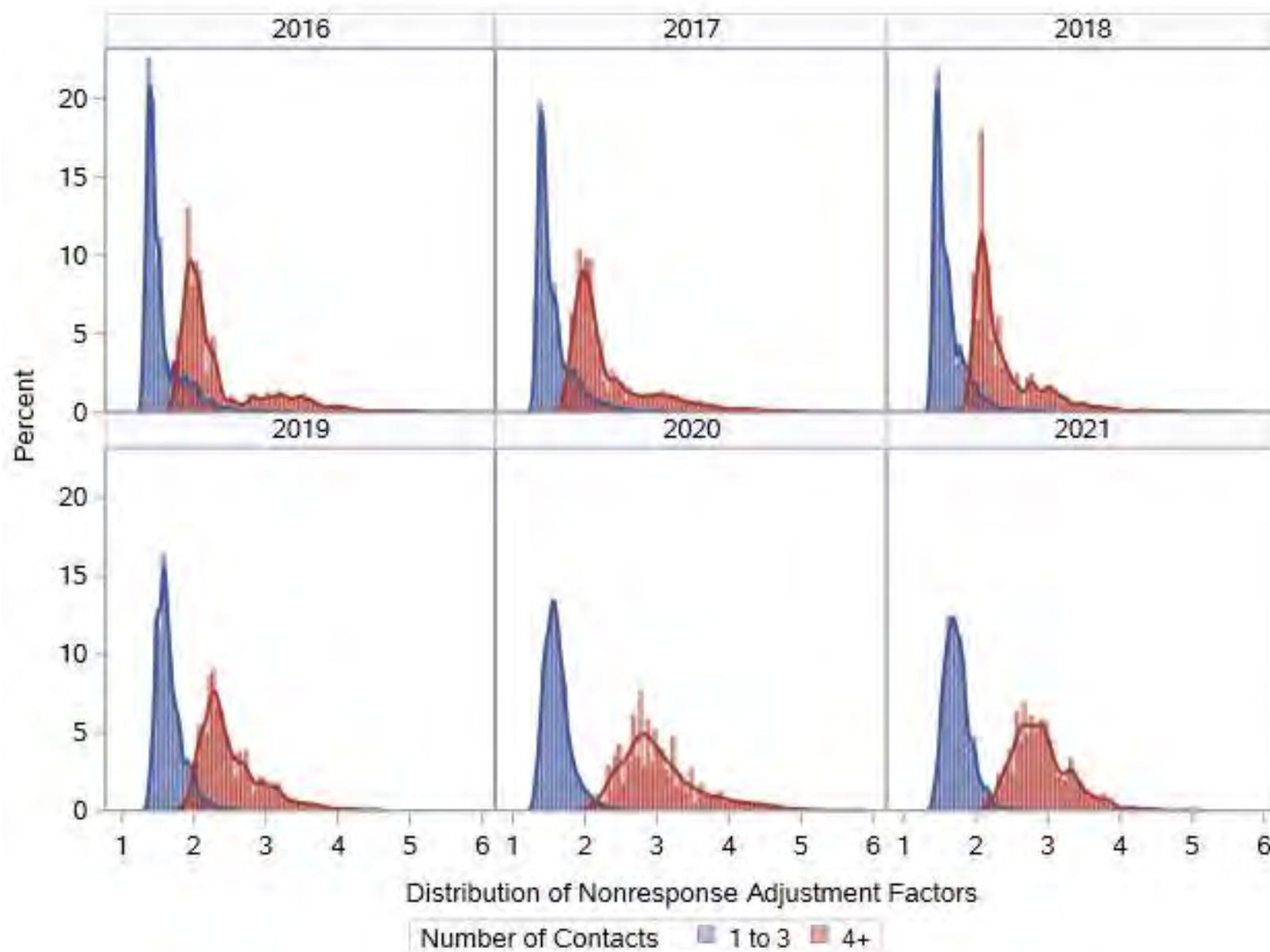
# 90% Confidence Intervals for Response Rates by Variables used in the Nonresponse Adjustment



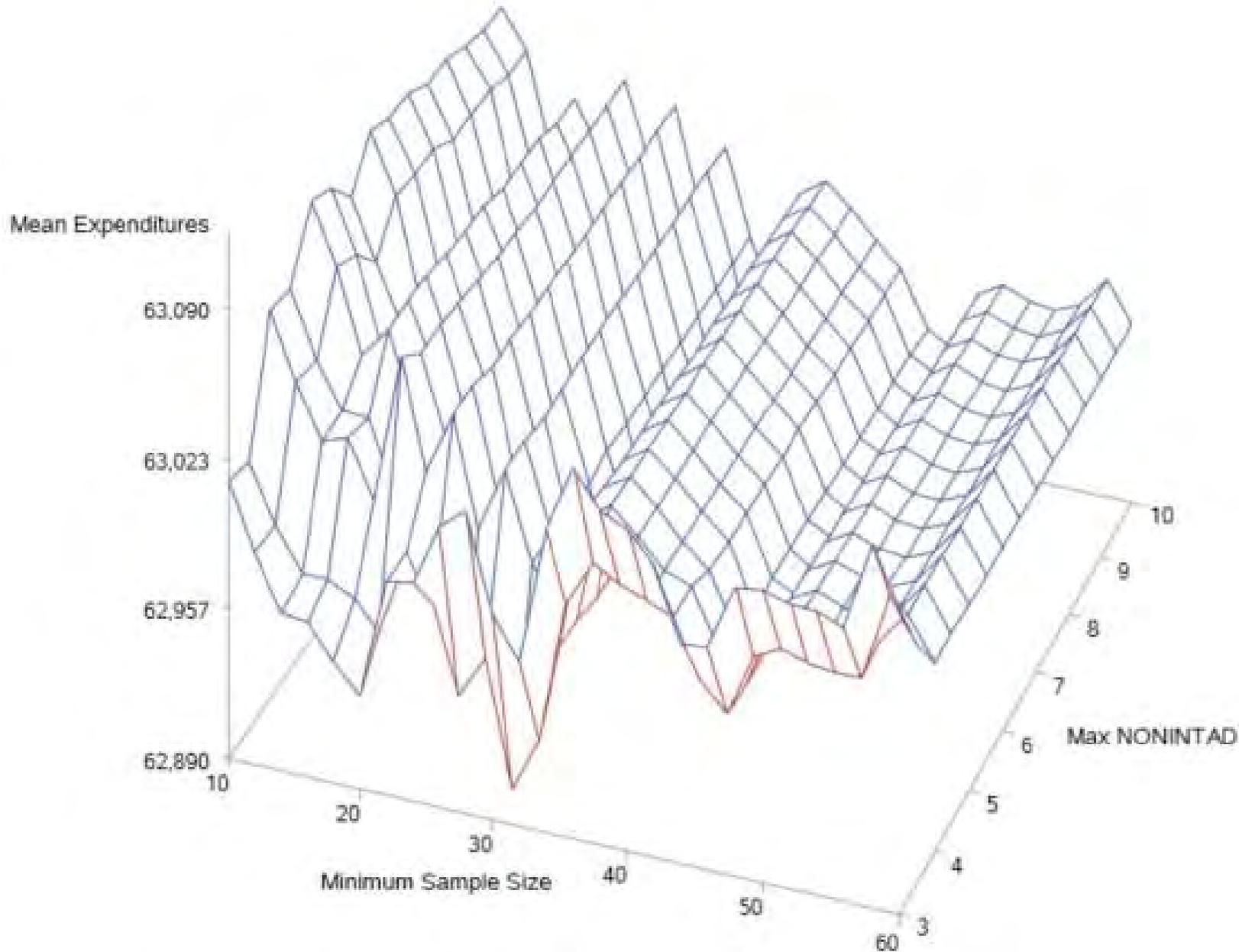
# Distribution of Nonresponse Adjustment based on a Logistic Regression Model



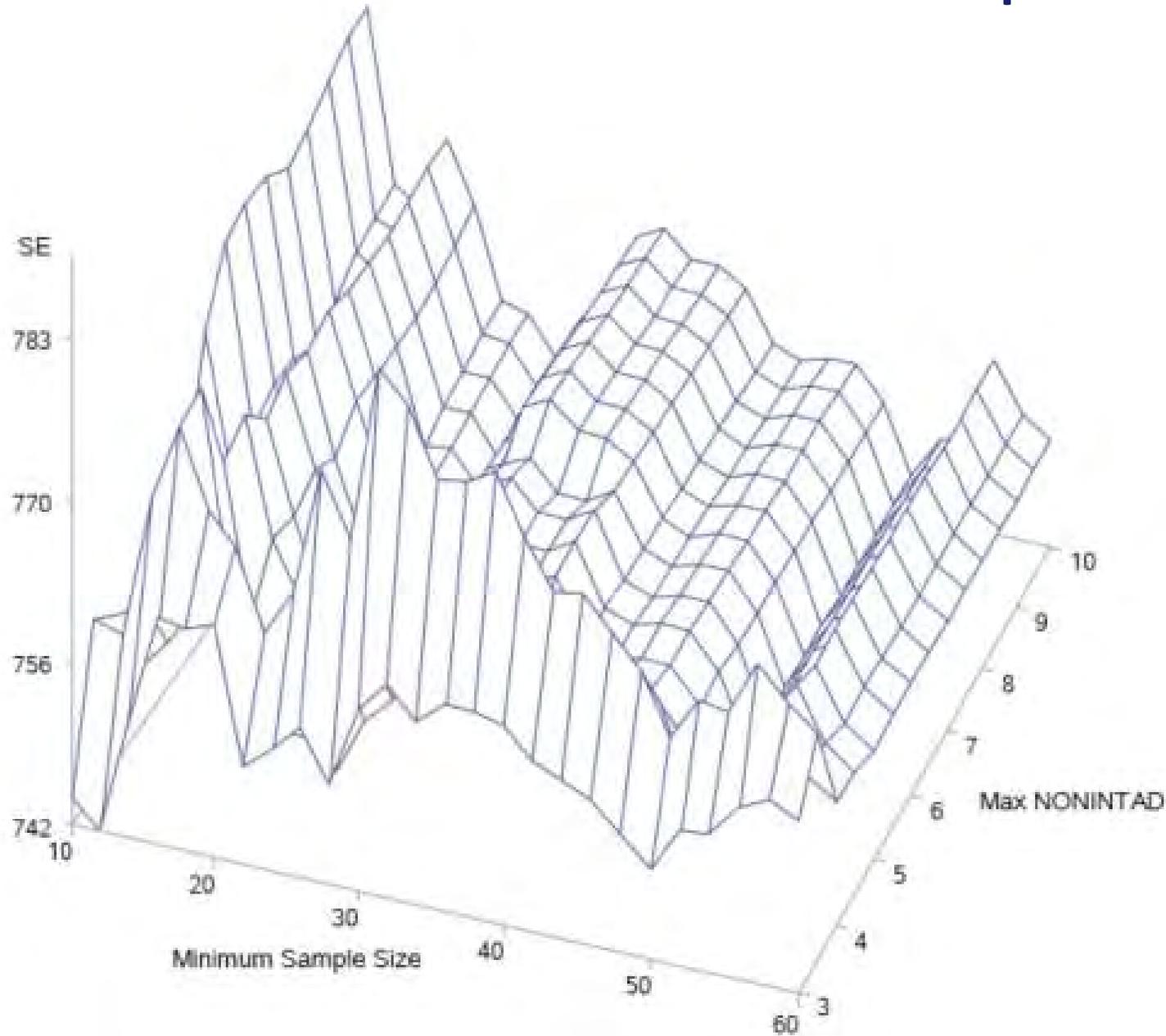
# Distribution of Nonresponse Adjustment by Number of Contacts

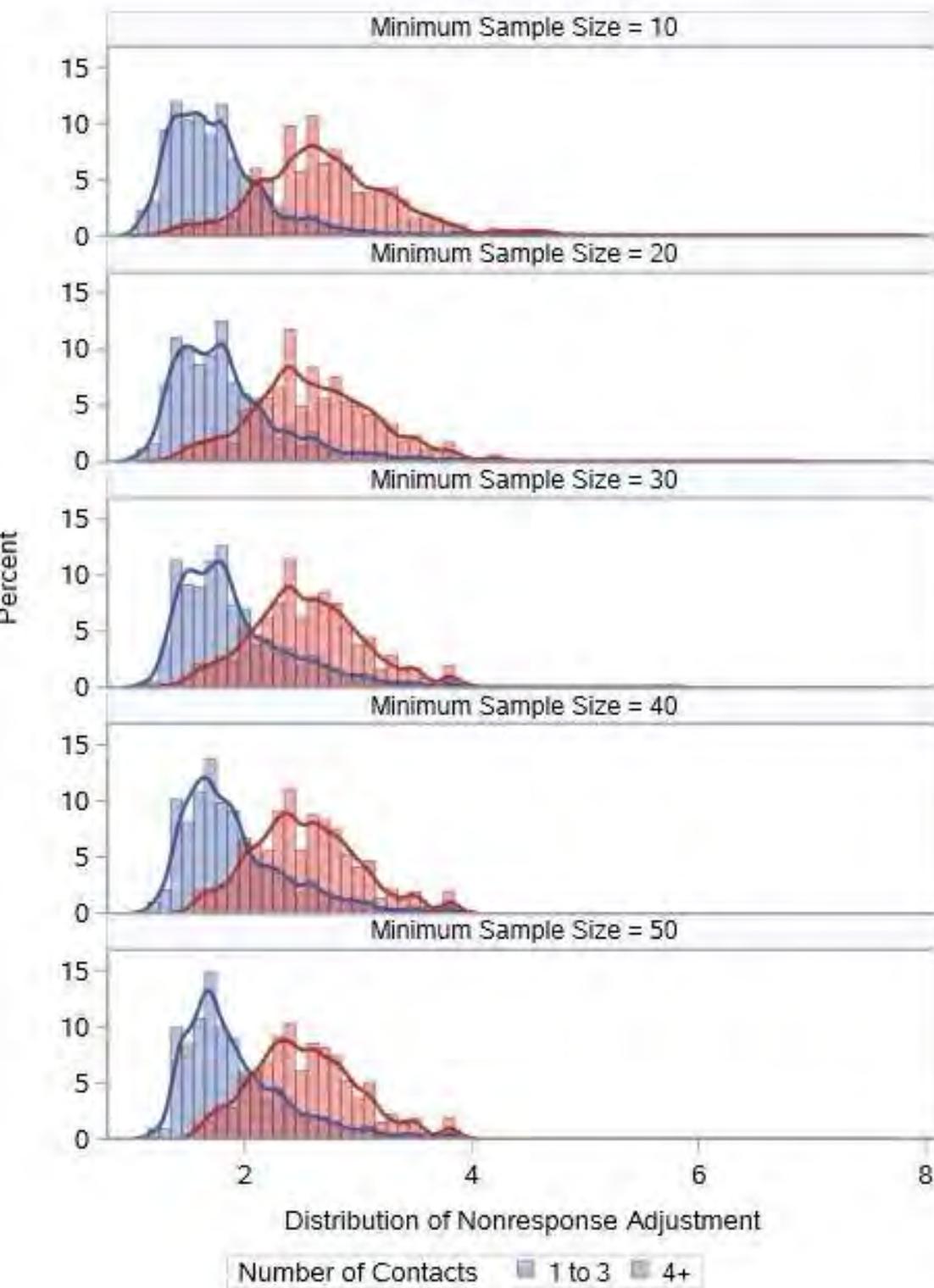


# 2021 Estimates of Mean Total Expenditures by Minimum Sample Size and Maximum Value of the Nonresponse



# 2021 Standard Errors of Mean Total Expenditures by Minimum Sample Size and Maximum Value of the Nonresponse Adjustment





## 2021 Interview Survey

*Maximum Value of the  
Nonresponse Adjustment = 8*  
and  
**Varying Values of Minimum  
Sample Size**



## 2021 Interview Survey – Comparison of the Production and Alternative Nonresponse Adjustments with Maximum Value of the Nonresponse Adjustment = 8

Production Estimate	Minimum Sample Size	Alternative Estimate	Difference (Alternative-Production)	p-value
63,181 (722)	10	63,072 (773)	-110 (184)	0.551
	15	63,017 (757)	-164 (174)	0.347
	20	63,039 (751)	-143 (183)	0.436
	25	62,991 (753)	-190 (182)	0.296
	30	62,977 (762)	-205 (189)	0.278
	35	63,005 (759)	-176 (185)	0.341

## 2019 Interview Survey – Comparison of the Production and Alternative Nonresponse Adjustments with Maximum Value of the Nonresponse Adjustment = 8

Production Estimate	Minimum Sample Size	Alternative Estimate	Difference (Alternative-Production)	p-value
58,629 (572)	10	58,827 (596)	198 (144)	0.168
	15	58,834 (627)	205 (202)	0.311
	20	58,731 (602)	102 (163)	0.531
	25	58,714 (596)	85 (157)	0.589
	30	58,644 (590)	15 (125)	0.905
	35	58,633 (592)	4 (130)	0.976

# Recommendations

- Minimum sample size per cell of 10 to 20.
- Maximum value of the nonresponse adjustment per cell to 8 to 10.
- Consider alternative methods of nonresponse adjustments.



# Contact Information

**Stephen Ash**

**Price Statistical Methods Division  
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[ash.stephen@bls.gov](mailto:ash.stephen@bls.gov)

