Using Establishment Characteristics to Predict Respondent Mode Preferences in the Occupational Employment Statistics Survey

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Abstract
The Occupational Employment Statistics (OES) Survey, conducted by U.S. Bureau of Labor Statistics and State partners, is a voluntary establishment survey that produces occupational employment and wage estimates by industry and geographic area. Solicitation is conducted primarily via mail. Respondents are given several data submission options including mail, telephone, facsimile, email, and internet. Previous research indicates that establishment characteristics influence whether a firm responds to the survey. In this analysis we examine characteristics such as size, location, industry, or multi-unit employer as predictors of response mode preferences. Identifying the preferred mode may lead to a tailored collection strategy that could increase response rates and lower survey costs. This paper identifies characteristics most likely to influence mode preference.

1. Background

The Occupational Employment Statistics (OES) survey is an establishment that is mostly voluntary. As of 2009, it is mandatory in five states. It is primarily a mail survey. Data are collected by the State Workforce agencies, in cooperation with the Bureau of Labor Statistics, US Department of Labor. OES data are collected and processed by analysts in State government offices. For survey administration purposes the State OES offices are grouped into six regions. Each region has a BLS office, and BLS personnel are assigned to guide, monitor, and assist the State OES offices.

Respondents report the number of employees by occupation and wage ranges. The occupational employment and wage data from sampled establishments are used to calculate employment estimates for nearly 800 occupations annually for the 50 States, the District of Columbia, Puerto Rico, the US Virgin Islands, and Guam as well as the nation as a whole. OES also produces employment and wage estimates for Metropolitan Statistical Areas (MSAs) as well as specific industries. Occupations are classified using the Standard Occupational Classification (SOC) system while industries are classified using the North American Industry Classification System (NAICS).

The survey is conducted over a rolling 6-panel semi-annual (or 3-year) cycle. Each panel's sample contains approximately 200,000 establishments. Over the course of a 6-panel cycle, approximately 1.2 million establishments are sampled. When possible, non-government establishments are only

sampled once every six panels. A census of Federal government, executive branch only, is taken for every panel. A census of State government units is taken every November.

The sample is drawn from a universe of about 6.5 million establishments across all non-farm industries. The sample is stratified by geography, industry, and employment size. The sample frame comes from Unemployment Insurance (UI) reports filed by almost all establishments. Only establishments in Guam as well as the railroad industry are exempt from mandatory UI filing; the frame for those units is obtained elsewhere.

The OES survey is initially mailed out to almost all establishments in the sample. The initial mailing is done by a central mail facility and occurs as close to the survey reference date as possible; either November 12th or May 12th. Three follow-up mailings are sent to non-respondents at approximately three to four week intervals. The initial mailing as well as the first two follow-up mailings use a mix of industry-specific survey forms with occupations already printed on them for the larger firms as well as an open-ended form for the smaller establishments. The last mailing uses only the open-ended survey form regardless of establishment size. Telephone follow-up calls are made to non-respondents. Other modes of collection include email, phone-in, facsimile, web, and electronic media such as disc or tape. The percentage of total responses returned via each collection mode for the May 2009 panel is shown in Table 1.

1.1. Data Collection Modes

There are 8 collection modes used to collect OES survey data: paper form, web, hardcopy record print out from the establishment, telephone, personal visit, disk or CD, email, and fax.

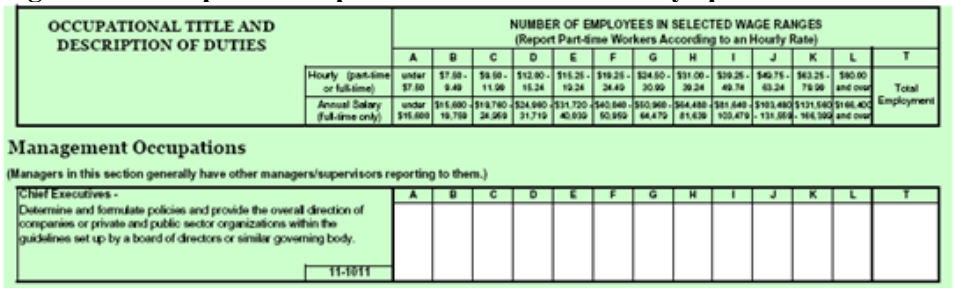
Table 1. Respondent Collection Mode, May 2009

Collection Mode	Percent	Collection Mode	Percent
Paper form via mail	71.9%	Personal visit	0.2%
Web	3.6%	Diskette, CD, DVD	0.6%
Hard copy printout	0.9%	E-mail	7.1%
Phone Call	11.8%	Fax	3.9%

Paper form

The OES survey paper instrument consists of 97 industry-specific survey forms used for medium and large sized firms and one open-ended survey form used for smaller firms. A paper survey form is sent to all units in the sample. Respondents report employment data by occupation across 12 wage bands, using a matrix format. The industry-specific forms with occupations printed on the form range in length from 16 to 24 pages, as shown in Figure 1. In addition, there is one 32-page form for colleges and universities and a 44-page form for government units. The occupations on each form are selected based on industry staffing patterns derived from previously collected data. Most survey forms cover a three-digit NAICS industry. However, there are some forms that, due to heterogeneous staffing patterns, cover only a four-digit NAICS industry. The four-page open-ended form, in Exhibit 2, has space for respondents to write-in the occupations found in their establishments. This form is used primarily for small size establishments, and each state defines their own values for “small”; the top value ranges from 9 to 99 employees, depending on state.

Figure 1. Example of occupation found on an industry-specific form



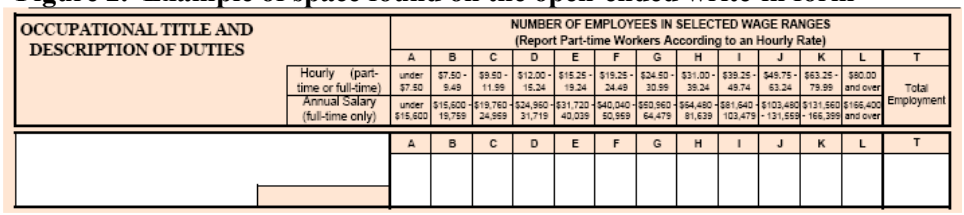
OCCUPATIONAL TITLE AND DESCRIPTION OF DUTIES		NUMBER OF EMPLOYEES IN SELECTED WAGE RANGES (Report Part-time Workers According to an Hourly Rate)												
		A	B	C	D	E	F	G	H	I	J	K	L	T
	Hourly (part-time or full-time)	under $7.50	$7.50 - 9.49	$9.50 - 11.99	$12.00 - 15.24	$15.25 - 19.24	$19.25 - 24.49	$24.50 - 30.99	$31.00 - 39.24	$39.25 - 49.74	$49.75 - 63.24	$63.25 - 79.99	$80.00 and over	Total Employment
	Annual Salary (full-time only)	under $15,600	$15,600 - 19,759	$19,760 - 24,959	$24,960 - 31,719	$31,720 - 40,039	$40,040 - 50,959	$50,960 - 64,479	$64,480 - 81,639	$81,640 - 103,479	$103,480 - 131,559	$131,560 - 166,399	$166,400 and over	

Management Occupations

(Managers in this section generally have other managers/supervisors reporting to them.)

Chief Executives - Determine and formulate policies and provide the overall direction of companies or private and public sector organizations within the guidelines set up by a board of directors or similar governing body. 11-1011	A	B	C	D	E	F	G	H	I	J	K	L	T

Figure 2. Example of space found on the open-ended write-in form

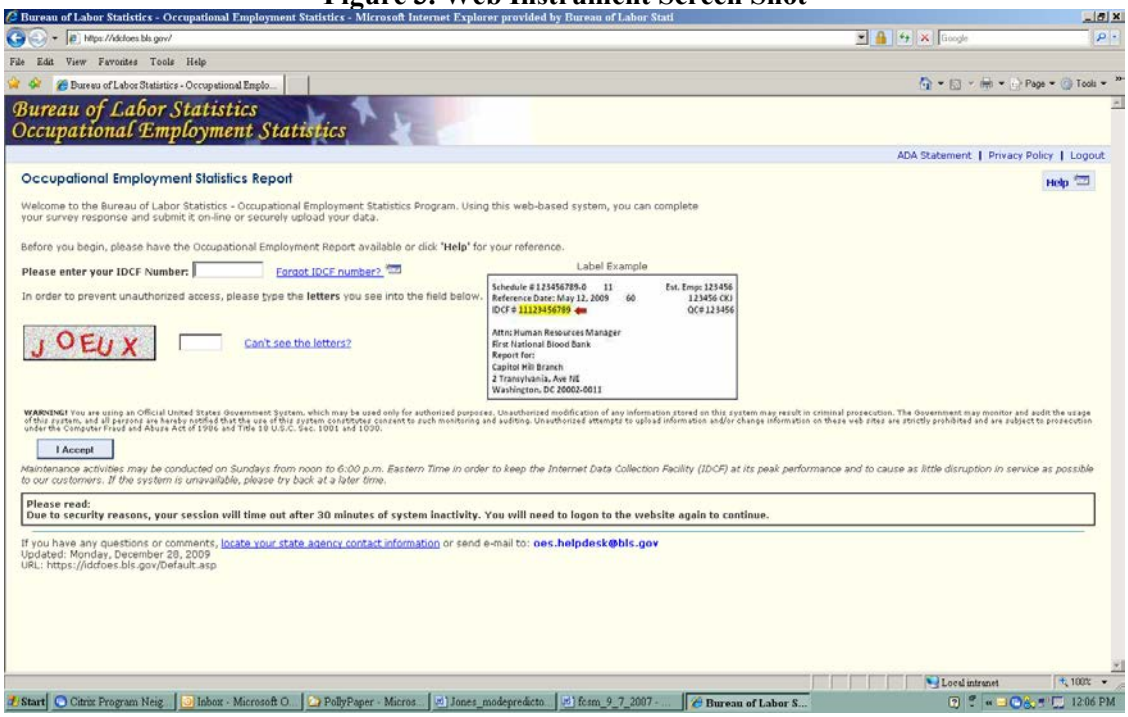


OCCUPATIONAL TITLE AND DESCRIPTION OF DUTIES		NUMBER OF EMPLOYEES IN SELECTED WAGE RANGES (Report Part-time Workers According to an Hourly Rate)												
		A	B	C	D	E	F	G	H	I	J	K	L	T
	Hourly (part-time or full-time)	under $7.50	$7.50 - 9.49	$9.50 - 11.99	$12.00 - 15.24	$15.25 - 19.24	$19.25 - 24.49	$24.50 - 30.99	$31.00 - 39.24	$39.25 - 49.74	$49.75 - 63.24	$63.25 - 79.99	$80.00 and over	Total Employment
	Annual Salary (full-time only)	under $15,600	$15,600 - 19,759	$19,760 - 24,959	$24,960 - 31,719	$31,720 - 40,039	$40,040 - 50,959	$50,960 - 64,479	$64,480 - 81,639	$81,640 - 103,479	$103,480 - 131,559	$131,560 - 166,399	$166,400 and over	
		A	B	C	D	E	F	G	H	I	J	K	L	T

Web – On-line Data Submission

Respondents have the option of submitting data on-line via a secure data collection site hosted by BLS (see Figure 3). The Internet Data Collection Facility (IDCF) allows for secure file uploads as well as data entry. This is a fairly new option for reporting data for OES that began in November 2008. The individual States are responsible for advertising the option. Some States have been reluctant to advertise the option to respondents while others have chosen to promote the option.

Figure 3. Web Instrument Screen Shot



Hardcopy Printout
Hardcopy print out are printouts the respondent mails to the State collecting the OES data. The print outs are usually from the respondent's payroll records. Most printouts have a variety of information on them, usually more than just the employment and wages OES collects.

Telephone
All responses that are received via the telephone are coded as a telephone response. This includes respondents that phone in their responses and State initiated phone calls during nonresponse follow-up. States often focus on calling smaller establishments because it is easier to collect those establishments over the phone.

Personal Visits
Personal visits are reserved for large establishments and establishments that are critical to generating valid estimates. Personal visits are very costly and time-consuming.

CD or Disk
Some establishments choose to send in their data by burning it to a CD. This used to be more common but now rarely happens.

Email
OES Email data collection began in November 2004. It began slowly due to State reluctance to advertise the option. However email usage has continued to grow and in the spring 2009 panel 10,000 establishments used email to submit their data.

Facsimile
Some establishments send in their data via facsimile transmission. We are unsure as to why a respondent would prefer to fax such a lengthy form but we offer the option nonetheless.

1.2. State Survey Administration

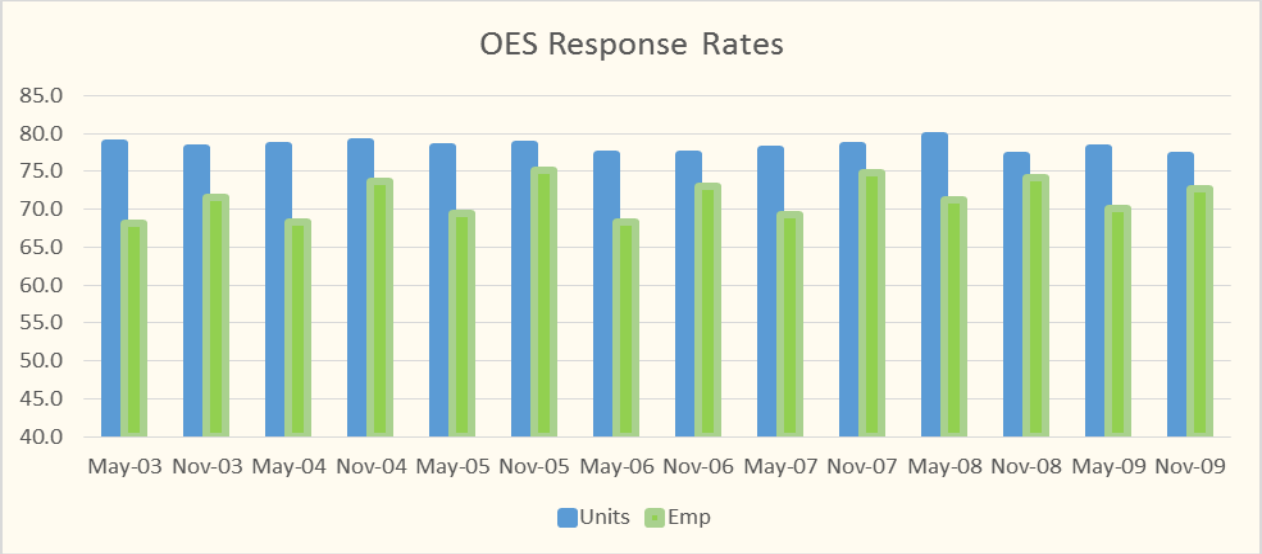
State agencies follow general federal guidelines in conducting the OES survey, but states are allowed flexibility and in turn, utilize different practices and procedures. In addition, state sample sizes vary dramatically. For example, Wyoming, with a sample of 743 establishments accounts for .4 percent of the OES sample, while California, with 15,691 establishments in the sample, accounts for 8.8 percent.

States can utilize different survey procedures. For example, the timing of telephone nonresponse varies by states. Based on a questionnaire administered in 2006, approximately 58 percent of states begin telephone follow-up calls after the first survey mailing, 24 percent after the second mailing, and 20 percent after the third or fourth mailing. Over 40 percent of states mail a nonresponse follow up letter to potential respondents at some point in survey administration – about 18 percent of states mail it to all non-respondents, while 25 percent of states target specific firms or industries for the letter.

1.3 Historical OES Response Rates

OES response rates are quite high and fairly consistent over time, as shown in Figure 4. Response rates for the May panels show a small decline from 78.4 to 76.5 percent from 2003 to 2009.

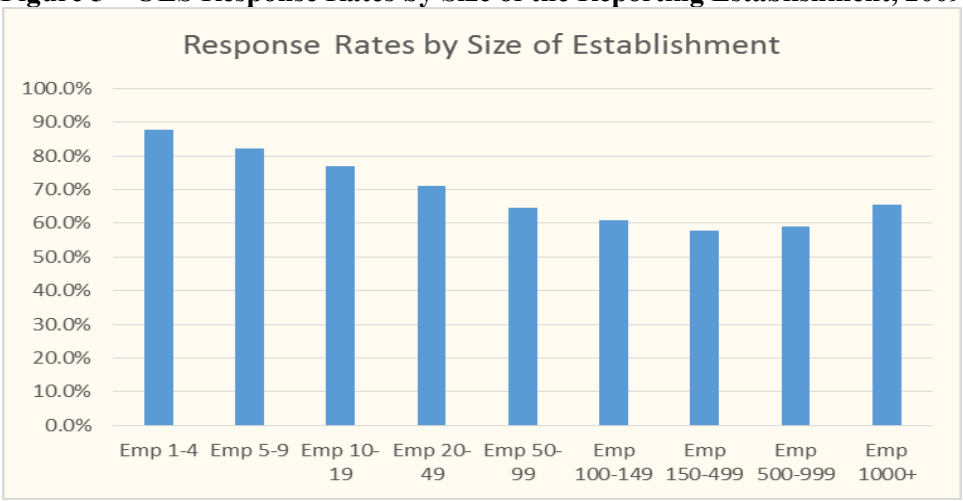
Figure 4 – OES Response Rates, Units and Employment 2003 - 2009



Response Rates by Employment Size

Response rates grouped by the size of the establishments show that small establishments have much higher rates than large establishments, up to 30 percentage points difference. Figure 6 also shows small declines in the response rates over time in establishments with five to 49 employees, but a less consistent trend in larger firms. In fact, firms with 250 to over 1,000 employees show some increases in the response rates over time. It is assumed that larger firms are more likely to have the technology to provide data by means of electronic filing and they are more likely to use it for completing the OES survey. In addition, many of the establishments in the larger size classes have staff dedicated to completing government forms and surveys. Also, many State offices have diligent analysts who seek out a contact person in large establishments and work at creating and maintaining a cooperative relationship and rapport with the contact in order to facilitate the collection of the data. Identifying a mode preference for the harder to collect units may lead to higher response rates and lower costs.

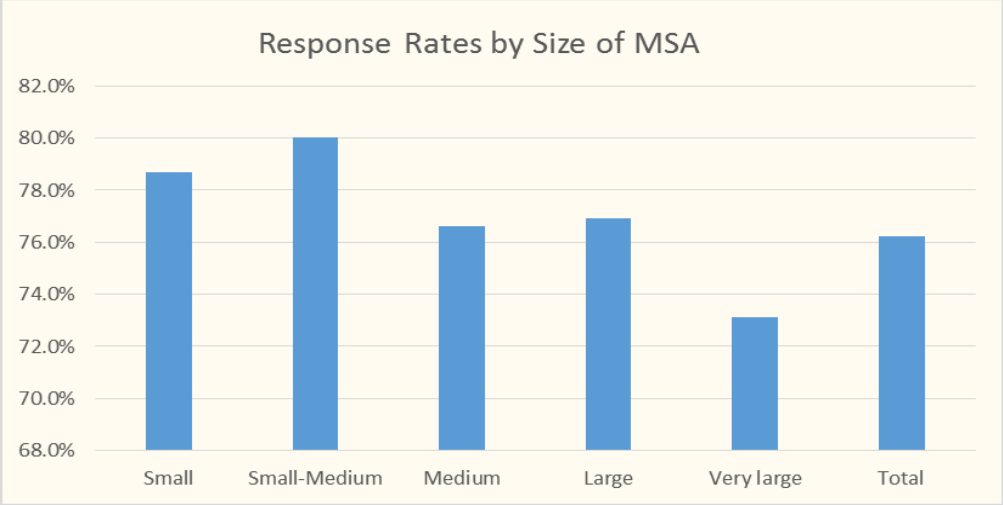
Figure 5 – OES Response Rates by Size of the Reporting Establishment, 2009



Response Rates by Metropolitan Statistical Area (MSA)
State analysts suggest that the larger the Metropolitan Statistical Area (MSA), the harder it is to collect data. They indicate that establishments in larger MSA's are less likely to respond by mail and are also difficult to reach during telephone follow-ups. Response rates by MSA shown in Figure 6 indicate this to be true, and only 73 percent of respondents in MSAs of one million or more population size reported by mail in the May 2009 panel, compared to 76.2 percent of all respondents. Response rates for non- and smaller MSAs are in the 79- 80 range, while the larger MSAs are in the lower 70s.

State analysts report that contacts in firms in the larger MSAs often complain that they are too busy to respond. The cultural environment of firms found in larger MSAs or perhaps the cultural environment of the larger MSAs themselves seems to influence the decision of whether or not a firm participates in the survey. State analysts report that it takes many phones calls and lots of persuasion to collect data from these firms. If we can pinpoint a mode preference for firms in larger MSAs we might be able to collect data faster and cheaper.

Figure 6 – Response Rates by the Size of the MSA Where the Establishment is Located, 2009



2. Methodology

The data for this study is taken from the May 2009 OES Survey which began in spring 2009 with the first mailing commencing in May 2009. There were mailings in May, June, July, and August. The States sent in their interim and final databases in November 2009 and January 2010. Normal OES survey operations were used; the State offices were not aware that the administrative data from the survey would be used to conduct this particular study. This research is a bi-product of the normal OES Survey.

The microdata from the OES Survey was screened to remove Central Office Clearinghouse (COC) units. These are large multi-unit firms that have a relationship with the BLS to provide data on a routine basis. Due to the close nature of the firms with BLS and their already assured participation, we chose to exclude these units from the study.
This study examines the OES establishment data by aggregating the data by establishment characteristics in a series of tables. The characteristics that show the most promise are

establishment size, where they are located, and whether or not they are a multi-unit firm. The size of the establishment was determined by looking at the number of employees. Location was assigned by looking at the size of the metropolitan statistical area (MSA) and grouping the MSAs into size categories (rural to very large). Multi-unit firm status was determined by looking to see if the firm had more than one unit under the same Employer Identification Number (EIN). Other characteristics were also examined such as industry but did not appear to have as much influence on mode selection.

3. Findings

The following characteristics were examined to see if they have an impact on response mode: establishment size, size of the metropolitan statistical area (MSA), industry, and multi-unit status.

Table 2 shows responses received after the initial mailing by collection mode and establishment size class. We can see that the smallest sized firms, those with the fewest employees send nearly all of their responses by mail using a paper form. Email responses are dominated by the larger establishments, those with the largest number of employees.

Table 2 – Mode Response Rates by Size of the Establishment, 2009 (N=47706)

Estab Size	Mail	Web	hardcopy	Phone	Email	Fax	person	disk
1	91.8%	0.1%	0.3%	4.3%	1.5%	2.0%	0.0%	0.0%
2	91.7%	0.0%	0.3%	2.9%	2.5%	2.6%	0.0%	0.0%
3	89.2%	0.4%	0.6%	2.0%	4.9%	3.0%	0.0%	0.0%
4	87.6%	0.6%	1.0%	1.5%	7.6%	1.6%	0.0%	0.0%
5	81.6%	1.0%	1.8%	0.9%	13.4%	1.3%	0.0%	0.0%
6	74.1%	1.6%	2.0%	0.8%	20.0%	1.5%	0.0%	0.1%
7	61.6%	1.9%	3.6%	0.3%	31.4%	1.1%	0.0%	0.0%
8	51.1%	3.1%	4.7%	0.0%	40.5%	0.6%	0.0%	0.0%
9	23.7%	7.2%	2.6%	0.0%	66.5%	0.0%	0.0%	0.0%

Table 3 below shows responses received after the initials mailing by collection mode and size of the MSA. Size of the MSA is determined by population. As the size of the MSA goes up the responses sent in via mailed form decrease. Similarly email responses increase as the size of the MSA increases.

Table 3 – Mode Response Rates by Size of the MSA of Establishment Location, 2009 (N=47706)

MSA Size	Mail	Web	hardcopy	Phone	Email	Fax	person	disk
1	90.9%	0.2%	0.5%	2.6%	3.7%	2.1%	0.0%	0.0%
2	90.2%	0.4%	0.3%	3.4%	3.7%	2.0%	0.0%	0.0%
3	89.9%	0.4%	0.3%	2.2%	4.8%	2.4%	0.0%	0.0%
4	88.4%	0.3%	0.6%	2.7%	6.0%	1.9%	0.0%	0.0%
5	83.3%	0.7%	1.5%	2.1%	10.2%	2.2%	0.0%	0.0%

Response rates stratified by both size of the establishment and size of the MSA show the trend in more detail. In Table 4 we can see that the trend more pronounced once we examine the responses by collection mode and stratified by establishment size and MSA size.

Table 4 – Mode Response Rates Stratified by Establishment Size and Size of MSA, 2009 (N=47706)

Estab Size	MSA Size	Mail	Web	hardcopy	Phone	Email	Fax	person	disk
1	1	92.4%	0.1%	0.2%	4.2%	0.9%	2.2%	0.0%	0.0%
1	2	92.0%	0.1%	0.1%	5.2%	1.1%	1.5%	0.0%	0.0%
1	3	93.4%	0.0%	0.0%	3.2%	1.2%	2.2%	0.0%	0.0%
1	4	91.5%	0.1%	0.1%	4.6%	2.0%	1.8%	0.0%	0.0%
1	5	89.8%	0.1%	0.9%	4.5%	2.4%	2.2%	0.0%	0.0%
2	1	92.9%	0.0%	0.0%	2.9%	1.8%	2.3%	0.0%	0.0%
2	2	92.4%	0.0%	0.0%	3.7%	1.7%	2.3%	0.0%	0.0%
2	3	91.5%	0.0%	0.0%	3.3%	2.3%	2.9%	0.0%	0.0%
2	4	91.3%	0.0%	0.2%	3.3%	2.6%	2.6%	0.0%	0.0%
2	5	90.5%	0.0%	1.0%	2.0%	3.9%	2.7%	0.0%	0.0%
3	1	91.9%	0.2%	0.3%	1.9%	3.2%	2.5%	0.0%	0.0%
3	2	89.9%	0.4%	0.2%	2.2%	4.5%	2.7%	0.0%	0.0%
3	3	89.9%	0.5%	0.3%	1.3%	5.0%	3.0%	0.0%	0.0%
3	4	90.3%	0.3%	0.5%	2.0%	4.3%	2.6%	0.0%	0.0%
3	5	85.3%	0.4%	1.2%	2.2%	7.0%	3.8%	0.0%	0.0%
4	1	90.5%	0.5%	0.7%	1.6%	5.3%	1.4%	0.0%	0.1%
4	2	88.8%	0.7%	0.6%	1.8%	6.0%	2.1%	0.0%	0.0%
4	3	88.4%	0.7%	0.7%	1.2%	6.9%	2.1%	0.0%	0.0%
4	4	88.0%	0.5%	1.0%	2.0%	7.3%	1.3%	0.0%	0.0%
4	5	85.0%	0.8%	1.4%	1.3%	9.8%	1.7%	0.0%	0.0%
5	1	87.1%	0.6%	1.8%	0.4%	8.5%	1.5%	0.0%	0.1%
5	2	86.4%	0.8%	1.6%	1.2%	8.9%	1.2%	0.0%	0.0%
5	3	84.2%	1.3%	0.5%	0.5%	11.7%	1.8%	0.0%	0.0%
5	4	83.2%	0.2%	1.8%	0.6%	12.9%	1.2%	0.0%	0.0%
5	5	77.0%	1.4%	2.2%	1.3%	17.0%	1.1%	0.0%	0.0%
6	1	80.9%	0.4%	2.0%	0.2%	14.3%	2.2%	0.0%	0.0%
6	2	78.6%	1.6%	3.2%	0.0%	14.3%	2.4%	0.0%	0.0%
6	3	80.2%	2.9%	1.7%	0.0%	14.9%	0.4%	0.0%	0.0%
6	4	73.9%	1.4%	0.8%	1.0%	21.7%	1.2%	0.0%	0.0%
6	5	69.8%	1.9%	2.4%	1.2%	23.1%	1.4%	0.0%	0.2%
7	1	69.7%	1.5%	5.5%	0.0%	20.4%	3.0%	0.0%	0.0%
7	2	67.3%	1.9%	1.9%	0.0%	28.8%	0.0%	0.0%	0.0%
7	3	69.0%	0.0%	0.0%	0.0%	31.0%	0.0%	0.0%	0.0%
7	4	63.2%	0.0%	4.4%	1.1%	30.2%	1.1%	0.0%	0.0%
7	5	55.2%	3.2%	3.0%	0.2%	37.9%	0.5%	0.0%	0.0%
8	1	58.6%	1.7%	1.7%	0.0%	36.2%	1.7%	0.0%	0.0%
8	2	50.0%	6.3%	6.3%	0.0%	37.5%	0.0%	0.0%	0.0%
8	3	46.4%	3.6%	3.6%	0.0%	46.4%	0.0%	0.0%	0.0%

8	4	54.0%	1.6%	4.8%	0.0%	39.7%	0.0%	0.0%	0.0%
8	5	48.1%	3.8%	5.8%	0.0%	41.7%	0.6%	0.0%	0.0%
9	1	52.4%	4.8%	0.0%	0.0%	42.9%	0.0%	0.0%	0.0%
9	2	8.3%	16.7%	8.3%	0.0%	66.7%	0.0%	0.0%	0.0%
9	3	19.2%	7.7%	0.0%	0.0%	73.1%	0.0%	0.0%	0.0%
9	4	34.2%	10.5%	2.6%	0.0%	52.6%	0.0%	0.0%	0.0%
9	5	16.5%	5.2%	3.1%	0.0%	75.3%	0.0%	0.0%	0.0%

Table 5 – Mode Response Rates Stratified by industry, 2009 (N=47706)

Industry	Mail	Web	hardcopy	Phone	Email	Fax	person	Disk
11	80.1%	0.1%	0.3%	15.3%	2.4%	1.8%	0.0%	0.0%
21	71.8%	0.1%	1.0%	13.4%	8.5%	5.0%	0.1%	0.0%
22	63.8%	1.4%	1.1%	8.9%	21.4%	3.2%	0.1%	0.0%
23	77.9%	0.7%	0.7%	13.7%	3.1%	3.9%	0.0%	0.0%
31	75.2%	0.8%	1.0%	11.3%	7.9%	3.7%	0.0%	0.0%
32	78.8%	1.0%	0.9%	7.9%	7.3%	4.0%	0.0%	0.0%
33	77.0%	0.8%	1.2%	9.2%	7.9%	3.8%	0.0%	0.0%
42	74.9%	0.9%	0.8%	13.5%	6.2%	3.7%	0.0%	0.0%
44	73.5%	1.1%	0.5%	15.5%	6.1%	3.3%	0.0%	0.0%
45	71.4%	2.2%	0.3%	16.1%	6.7%	3.0%	0.1%	0.0%
48	76.3%	1.1%	0.4%	13.0%	5.1%	4.1%	0.0%	0.0%
49	72.6%	2.1%	0.3%	11.6%	9.3%	4.0%	0.0%	0.0%
51	71.5%	0.8%	1.0%	13.1%	10.2%	3.4%	0.0%	0.0%
52	71.9%	1.1%	1.1%	11.8%	10.3%	3.7%	0.0%	0.0%
53	73.5%	0.3%	0.5%	15.6%	6.2%	3.9%	0.0%	0.0%
54	75.8%	0.8%	0.4%	11.6%	7.8%	3.5%	0.0%	0.0%
55	63.7%	1.7%	1.6%	7.3%	21.9%	3.9%	0.0%	0.1%
56	74.8%	0.8%	0.8%	14.5%	5.6%	3.4%	0.0%	0.0%
61	64.9%	4.6%	1.5%	6.9%	18.4%	2.7%	0.0%	0.9%
62	74.5%	1.3%	0.7%	9.6%	10.1%	3.8%	0.0%	0.0%
71	79.2%	1.2%	0.5%	11.2%	4.7%	3.2%	0.1%	0.0%
72	73.9%	1.0%	0.5%	16.2%	4.7%	3.6%	0.1%	0.0%
81	78.5%	0.7%	0.5%	13.9%	3.3%	3.2%	0.0%	0.0%
99	69.2%	1.8%	2.3%	4.0%	19.1%	3.6%	0.0%	0.0%

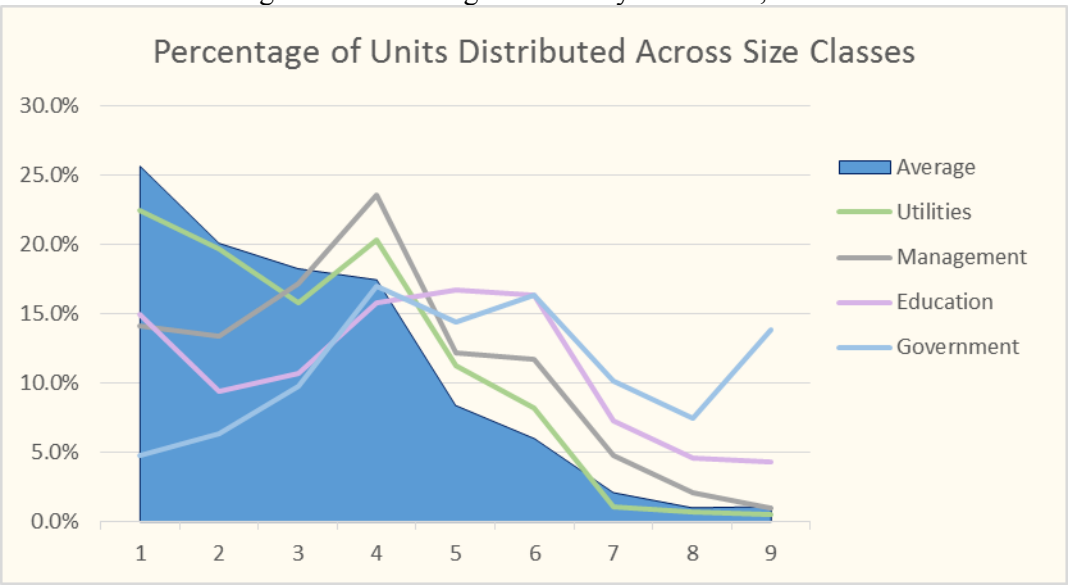
Table 5 above shows industry response rates for each mode. There are a few industries that stand out as heavy users of email. These are:

- NAICS 22 - Utilities
- NAICS 55 – Management of companies and enterprises
- NAICS 61 – Education Services
- NAICS 99 – Local and State government

However, an examination of the 2008-2009 sample and the size class make-up of these industries shows that they have a size distribution skewed towards larger establishments when compared to the average. Figure 7 below shows the distribution graphed. So the prevalence of email in these

industries could just be the influence of having larger establishments in those industries rather than the industries themselves.

Figure 7 – Percentage of Units by Size Class, 2009



Multi-unit status also plays a role in mode selection. Multi-units are units that are owned and operated by the same company. Table 5 shows that multi-units report using Electronic means and Email much more than regular singular units. In Table 6 we can see this trend even more pronounced when stratified by establishment size class. Indeed, as the size of the establishment increases so does the use of electronic modes and email. That is true of both multi-unit and single establishments. Despite this, there is still a noticeable increase in electronic data submission for multi-units.

Table 6 - Mode Response Rates by Multi-Unit Status (N=47706)

Multi	Mail	Web	hardcopy	Phone	Email	Fax	person	disk
Yes	60.2%	2.4%	1.8%	11.2%	21.2%	3.1%	0.0%	0.1%
No	76.5%	0.9%	0.6%	12.4%	5.8%	3.6%	0.0%	0.0%

Table 7 Mode Response Rates by Establishment Size and Multi-Unit Status (N=47706)

Estab Size	Multi	Mail	Web	hardcopy	Phone	Email	Fax	person	disk
1	Y	63.0%	1.5%	0.9%	20.2%	11.7%	2.7%	0.0%	0.0%
1	N	76.0%	0.4%	0.2%	19.7%	1.1%	2.4%	0.0%	0.0%
2	Y	64.7%	1.0%	1.0%	17.3%	12.2%	3.8%	0.0%	0.0%
2	N	78.6%	0.6%	0.2%	14.7%	2.0%	3.9%	0.0%	0.0%
3	Y	64.2%	1.5%	1.2%	12.3%	16.5%	4.3%	0.0%	0.0%
3	N	78.8%	0.7%	0.5%	11.3%	3.8%	4.8%	0.0%	0.0%
4	Y	64.6%	2.3%	1.6%	9.3%	19.2%	2.9%	0.0%	0.1%
4	N	79.8%	0.9%	0.9%	6.6%	7.2%	4.5%	0.0%	0.0%
5	Y	57.6%	3.0%	3.4%	4.7%	28.4%	2.7%	0.0%	0.2%
5	N	76.1%	1.8%	1.6%	3.8%	13.0%	3.8%	0.0%	0.0%
6	Y	51.5%	5.2%	3.6%	3.7%	33.9%	1.8%	0.0%	0.3%
6	N	69.5%	2.5%	1.7%	3.0%	19.9%	3.2%	0.0%	0.2%
7	Y	43.7%	5.2%	2.9%	2.3%	43.5%	1.7%	0.0%	0.6%
7	N	59.5%	3.4%	2.7%	2.5%	29.0%	2.7%	0.0%	0.2%
8	Y	36.5%	5.7%	2.0%	4.4%	50.3%	0.7%	0.0%	0.3%
8	N	45.3%	5.3%	3.8%	2.8%	40.9%	1.6%	0.0%	0.3%
9	Y	16.7%	5.9%	2.7%	2.3%	70.3%	1.8%	0.0%	0.5%
9	N	28.4%	7.5%	2.0%	2.1%	58.0%	1.1%	0.0%	0.9%

4. Statistical Analysis

Tables 8 and 9 below show the calculated odds ratios for two scenarios. In Table 8 the odds ratios are calculated to show the likelihood that a particular group will use paper compared to other groups. We used the largest classifications to compare. Looking at establishment location, specifically the size of the MSA, we see that the smaller MSAs have a higher chance of replying using a paper form than the larger establishments. Table 8 also shows the likelihood that a particular sized establishment will respond by paper versus other establishment sizes. Here we see that the smallest establishments are much more likely to use paper forms.

In Table 9 we calculated the odds ratios of particular groups using electronic modes versus the likelihood of other groups. We see that units located in the smaller MSAs are less likely to report using electronic means than those units in the largest MSA. Comparing size class of the establishment, we see that smaller establishments are much less likely to use email than the largest establishments.

The results show two trends. The larger the establishment and the larger the MSA it is located in, the more likely it is to choose electronic modes (email and web). The smaller the establishment and the smaller the MSA, the more likely it is to choose a paper option. A possible explanation for larger firms preferring electronic options is that they have the technological ability to create files electronically and the means to submit them electronically as well. Access to the internet is probably more likely in larger MSAs as opposed to smaller MSAs.

Table 8 - Odds Ratios for the Use of Paper/Mailed Survey - Size of the Metropolitan Statistical Area and Establishment size.

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
MSA_Size 1 vs 5	1.653	1.535	1.78
MSA_Size 2 vs 5	1.444	1.309	1.594
MSA_Size 3 vs 5	1.468	1.343	1.605
MSA_Size 4 vs 5	1.337	1.244	1.437
Estab_Size 1 vs 9	32.212	22.984	45.145
Estab_Size 2 vs 9	30.937	22.056	43.394
Estab_Size 3 vs 9	24.745	17.654	34.685
Estab_Size 4 vs 9	21.782	15.541	30.53
Estab_Size 5 vs 9	14.106	10.026	19.848
Estab_Size 6 vs 9	9.213	6.535	12.988
Estab_Size 7 vs 9	5.083	3.551	7.276
Estab_Size 8 vs 9	3.348	2.248	4.986

Table 9 - Odds Ratios for the Use of Email - Size of the Metropolitan Statistical Area and Establishment size.

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
MSA_Size 1 vs 5	0.474	0.426	0.528
MSA_ Size 2 vs 5	0.557	0.479	0.648
MSA_ Size 3 vs 5	0.661	0.583	0.748
MSA_ Size 4 vs 5	0.723	0.657	0.796
Estab_ Size 1 vs 9	0.009	0.006	0.012
Estab_ Size 2 vs 9	0.015	0.011	0.02
Estab_ Size 3 vs 9	0.029	0.021	0.039
Estab_ Size 4 vs 9	0.044	0.032	0.06
Estab_ Size 5 vs 9	0.079	0.058	0.109
Estab_ Size 6 vs 9	0.126	0.092	0.172
Estab_ Size 7 vs 9	0.238	0.171	0.332
Estab_ Size 8 vs 9	0.346	0.238	0.503

5. Conclusions and Recommendations

The driving force in predicting mode preference is the size of an establishment (based on the number of employees). However, other characteristics also show significance. Larger establishments are more likely to choose electronic collection options, both email and web, than smaller establishments. Smaller establishments are more likely to choose a paper form returned via mail. Establishments in larger MSAs are more likely to choose electronic collection while establishments in smaller MSAs are likely to choose paper. The effect of establishment size on the selection of using electronic modes of data submission remains strong and statistically significant when controlling for MSA size and the interaction of MSA and establishment size. Establishments that are part of a larger company are more likely to choose electronic options. When looking at email, the greatest percentages of users come from mid-sized establishments, keeping it a viable option for data collection especially for follow-up solicitation.

The next step is to test a data collection strategy based on the finding of this study. Larger establishments and those in larger MSAs tend toward electronic modes. In addition, there is research already documented that suggests that offering multiple mode options is detrimental to response rates. Therefore we suggest using tailored solicitation materials that direct the respondents to the predicted preferred mode.

It would also be beneficial to investigate cultural issues associated with being a larger establishment and operating in larger MSAs.

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7. References

Dillman, D, J. Smyth, and L. Christian. 2009. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method.* New Jersey: John Wiley & Sons.

Groves, R.M., D. Dillman, J.L. Eltinge, and R. Little (Eds.). 2002. *Survey Nonresponse*. New York: Wiley.

Jones, Carrie K. 1999 "Response Rates Analysis: An Analysis of the 1996/1997 Occupational Employment Statistics Survey Response Rates." Bureau of Labor Statistics.

Phipps, P. and Jones, C. 2007. Factors affecting response to the occupational employment statistics survey. In *Proceedings of the 2007 Federal Committee on Statistical Methodology Research Conference* https://fcsm.sites.usa.gov/files/2014/05/2007FCSM_Phipps-II-A.pdf.