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Findings for the 2018 Agricultural Labor Base Wage Question Experiments

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1. INTRODUCTION

The U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) has initiated a study to evaluate the impact that proposed changes in the questionnaire for the Agricultural Labor Survey will have on data quality and usability. Randomized experiments were conducted during the April and October 2018 administrations of the Agricultural Labor Survey to evaluate two survey versions of the questionnaire: (1) the original survey with a measure for gross wages, and (2) a modified version with measures on gross wages, base wages, incentive/bonuses and overtime wages. The two questionnaires are to be compared using the following measures:

- Unit response rates
- Sample size to meet NASS's coefficient of variation (CV) targets
- Item nonresponse rates on gross wages
- Item nonresponse rates on base wages

For base wages, the three forms of weighted item nonresponse rates considered are based on: (1) the sampling weight, (2) the nonresponse adjusted weight, and (3) the imputation rate.

For the changes from the original questionnaire to the modified questionnaire, the following meaningful differences/levels of each of the measures were determined before fielding the experiment:

- Unit response rates reduction of 10% or more
- Sample size increase of 10% or more
- Item nonresponse rate on gross wages of 10% or more
- Item nonresponse rate on base wages of 40% or more
- Weighted item nonresponse rates on base wages of 25% or more

The presence of meaningful differences/levels in these measures would support the continued use of the original survey.

This report analyzes both the April and October experiments. In Section 2, general information about the purpose, sample design, and data collection methods of the Agricultural Labor Survey is provided. The design of the experiment is in Section 3. The methodology used to analyze the data from the experiment is discussed in Section 4. The findings are presented in Section 5. The final section (6) concludes the report with overall findings and limitations.

2. AGRICULTURAL LABOR SURVEY

NASS conducts the Agricultural Labor Survey semiannually in April and October. The purpose of the survey is to determine the types and number of farmworkers employed and the wages they are paid.

Farm employment and wage statistics are used by federal, state and local government agencies, farm organizations, and employers for many purposes, including planning, recruitment and placement of workers, and policymaking. The agricultural wage rate is a component of the Parity Index and is used in the establishment of minimum wage rates for domestic and foreign agricultural workers.

The survey results are published in the semiannual Farm Labor release, issued on or around the 21st of May and November. Both semiannual releases include regional and U.S. level estimates for the number of hired workers, hours worked weekly, and wage rates by type of worker. The November release also includes annual average estimates at the regional and U.S. levels.

2.1. Sample Design

The target population for the Agricultural Labor Survey includes all U.S. farms, where a farm is any place that "produced and sold or would normally produce and sell at least $1,000 worth of agricultural products during the year."

The Labor Survey is a multiple frame survey, drawing from both the NASS List Frame and the June Area Frame. The list is an efficient sampling frame because it contains most of the farms with hired labor. The area frame provides the completeness missing from the list.

The Labor Survey has a single stage stratified sample design. The Labor Survey has a state-based design with strata within states based on peak number of hired workers, presence of labor-intensive commodities, and farm value of sales. The sample is drawn using simple random sampling within state-stratum combinations.

A new sample is drawn prior to the October data collection. The sample is split into eight replicates, each of which is representative of the population. Six of the eight replicates are randomly selected to become the sample for the October data collection. The two replicates that are not in the October data collection and four of the six replicates from the October data collection comprise the sample for the following April data collection. Approximately, 14,000 operations are in the sample for each round of data collection.

NASS targets a coefficient of variation (CV) of the estimated quarterly gross wage rates of 1.0% at the national level and of 5.0%[2] at the agricultural labor region level. The sample is allocated to meet or exceed these targets.

[2] CA and HI have a 2.0% target and FL has a target of 4.0%

2.2. Data Collection

Self-administered paper questionnaires and computer assisted telephone interviews (CATI) are the primary data collection methods for the Agricultural Labor Survey, although survey respondents may report using the NASS Agcounts website. A limited number of field interviews are also conducted. All states use the same version of the Agricultural Labor questionnaire, except California. Data for two quarters are collected during each administration of the survey. Information from January and April is gathered during the April data collection; information from July and October is gathered during the October data collection.

The survey reference weeks are the weeks containing the 12th day of the survey month (January, April, July, and October). Questionnaires are mailed the first day of the Reference Week in April and October. Phone and field enumeration begin the Sunday after the reference week and continue for approximately 2½ weeks.

2.2.1. California

The California Employment Development Department (EDD) conducts a monthly California Agricultural Labor Survey by mail. NASS has a joint cooperative agreement with EDD during the months that the national survey is conducted (October and April). In the other months where the national survey is not conducted, California's entire list sample (supplied by NASS) is used only by EDD.

In addition to the definition of the target population described above (section 2.1), California also collects data from Agricultural Service firms. California maintains a separate list frame of these firms. California EDD prints and mails a questionnaire to a sample from this list each month. During the October and April data collections, NASS conducts phone follow-up for nonrespondents in the California sample that is used for the Agricultural Labor Survey estimates.

3. EXPERIMANTAL DESIGN

To evaluate the effects of modifying the survey instruments to include questions about base wages and incentive/overtime wages, NASS conducted a randomized experiment evaluating two versions of the April 2018 administration of the Agricultural Labor Survey:

Version 1: The original questionnaire with questions about gross wages.

Version 2: A modified questionnaire with questions designed about gross wages, base wages, and incentive/overtime wages.

Version 1 is the control and version 2 is the treatment. Based on cognitive testing results, version 2 was revised between the April and October surveys. For this study, in addition to the six replicates that are typically used in April, one of the two remaining replicates from the October 2017 administration was included, resulting in the April 2018 sample being comprised of seven replicates. The additional replicate from the October sample and a random selection of one of the original six replicates for the April sample were assigned to

version 2. The remaining five April replicates were assigned to version 1. A similar design was utilized for the October 2018 experiment.

Data for both versions were collected simultaneously using the same data collection modes and strategies. In April, the phone follow-up for version 2 was conducted by the Oklahoma Data Collection Center (DCC), whereas the phone follow-up for version 1 was conducted by the other four DCCs (Arkansas, Missouri, Montana, and Wyoming). In October, all DCCs conducted phone follow-up for both versions.

Since version 2 of the California questionnaire was not available in time for the January administration of the Agricultural Labor Survey in California, version 2 was only collected for April, July, and October in California. Additionally, the Wyoming DCC conducted phone follow-up for both versions for the California sample.

3.1. Differences between April and October

In April 2018, respondents receiving version 2 were asked to report "total base wages" and "total incentive and overtime wages." The definition for base wages was: *Base wages include the minimum amount paid regardless of method of pay (salaried, hourly, piece rate, etc.) but exclude incentive pay*. The definition for incentive pay was: *Incentive pay includes bonuses, performance pay, hazard pay, overtime pay, etc. that is paid in addition to the base wages*.

WorkerCode (shown on page 5)	Number of Paid Workers That Week	Total Hours Worked That Week	Total Gross Wages Paid That Week (Dollars)	Total Base Wages Paid That Week (Dollars)	Total Incentive & Overtime Wages Paid That Week (Dollars)
Example: 611 12	612 60	613 3000	614 $ 42,000	620 $ 36,000	621 $ 6,000

In October 2018, the term incentive was replaced with bonus – and bonus and overtime wages were separated into two questions (i.e., "total bonus wages," and "total overtime wages"). The definition for base wages was: *Base wages include the minimum amount paid regardless of method of pay (salaried, hourly, piece rate, etc.) but exclude bonus and overtime pay*. The definition for bonus pay was: *Bonus pay includes performance pay, hazard pay, and other regularly paid bonuses, etc. that are paid in addition to the base wages*.

Enter the Worker Code from Page 5	Number of Paid Workers that week	Total Hours Worked that week	Total Gross Wages Paid that week (Dollars)	How much of the Total Gross Wages Paid that week were….		
				Total Base Wages (Dollars)	Total Bonus Wages (Dollars)	Total Overtime Wages (Dollars)
Example: 12	60	3000	$42,000	$36,000	$6,000	$0

During the October 2018 data collection, a new CATI script was fielded for both versions. The new script was designed to improve flow of the questionnaire and to encourage interviewers to ask questions in their entirety. Interviewers were also retrained to ask the questions as worded. The most notable changes to the CATI script were: (1) Verification

questions added to ensure respondents were including and excluding the appropriate types of workers (e.g., excluding contract labor, including family members); (2) Respondents were asked the total number of workers for the reference week before workers were broken down into specific categories; (3) Instead of asking about the work the workers were hired to do and then presenting the worker categories as a list in the response options, respondents were asked how many workers were hired for each category, with each category being asked as a separate question; and (4) Edit checks were added to make sure all workers were accounted for and not double counted.

Although bonus and overtime wages were separated on paper, they were only asked as separate questions in CATI if the respondent indicated that the base wages were less than gross wages. That is, if base wages equalled gross wages, respondents were asked "Did you pay any bonus wages or overtime pay?" If they answered yes, the interviewer had to backtrack, revise base wages, and then ask the bonus and overtime questions. If the respondent indicated that he or she did not pay bonus or overtime, the interviewer moved on to the next series of questions.

4. METHODOLOGY

The experiments were evaluated using the following criteria:

- Unit response rates
- Sample size to meet NASS's coefficient of variation (CV) targets
- Item nonresponse rates on gross wages
- Item nonresponse rates on base wages

The three forms of a weighted item nonresponse rates on base wages are based on: (1) the sampling weight, (2) the nonresponse adjusted weight, and (3) the imputation rate.

Meaningful differences/levels for each of the metrics above were determined before fielding the experiment as follows:

- Unit response rate reduction of 10% or more
- Sample size increase of 10% or more
- Unweighted item nonresponse rate on gross wages of 10% or more
- Unweighted item nonresponse rate on base wages of 40% or more
- Weighted item nonresponse rates on base wages of 25% or more

Since the differences in unit response rates and item nonresponse rates on gross wages are comparisons between the two questionnaires, logistic regression was used to assess whether the differences in the rates between the two versions were statistically significant.

The sample size measure are based on the observed CVs and response rates for each version. These are used to estimate the minimum sample that would be needed to meet each CV target.

The results for the April administration of the Agricultural Labor Survey in California have been withheld from this analysis. This was done since evidence suggests that the difference in the unit response rates were heavily influenced by how the experiment was conducted and/or how the data were captured and processed. This also was supported by the July and October administrations that showed more reasonable differences in unit response rates. Results for the April administration in California can be found in the Preliminary Labor Report released in the fall of 2018 (Reist et. al, 2018).

4.1. Unit Nonresponse

For unit nonresponse rates, a logistic model was used to evaluate the statistical significance of the differences between responses at the regional and national levels. This model was fit on the operation level data from all four months for which data were collected. The response variable was an indicator of a valid response. The model predictors were version, region, and month. The two-way and three-way interactions were included in the model.

4.2. Item Nonresponse Rates on Gross Wages

The model of item nonresponse rates for gross wages was similar to the models used in section 4.1 with the following differences: (1) the response indicator was a measure of an unusable item and (2) gross wages were collected for each worker class. In addition, an observation was recorded for each operation and reported worker class combination.

5. FINDINGS

This section reports the findings of the 2018 Labor Survey Experiments and is organized around five metrics.

- Unit response rates
- Sample size to meet NASS's coefficient of variation (CV) targets
- Item nonresponse rates on gross wages
- Item nonresponse rates on base wages
- Weighted item nonresponse rates on base wages

5.1. Unit Response Rates

The table below shows the p-values for the nonresponse models described in section 4.1.

Table 1: Unit Nonresponse Model	
Predictor	p-value
Version	0.1984
Region	<0.0001
Month	0.0210
Version*Region	<0.0001
Region*Month	<0.0001
Version*Month	0.9987
Version*Region*Month	0.5673

The p-values in red signify the effects that were statistically significant at the 5% level. The significant interaction between region and month corroborates the known regional differences in response rates seen historically and based on the changes described in the data collections between the April and October administrations described in section 3.1. Interestingly, the interaction between version and month was not significant indicating that the changes described, which exclusively affected version 2 (see section 3.1), did not have an effect on unit response rates.

The interaction between version and region was significant, indicating that the response rate differences in versions varied significantly across regions. However, none of the 2018 regional responses were above the meaningful level of a reduction of 10% or more (see Table A1). The lack of significance between version, region, and month indicated that the response rate differences in versions do not vary significantly across region-month combinations.

5.2. Item Nonresponse Rates for Gross Wages

The *p*-values for the item nonresponse models described in section 4.3 are displayed in the table below.

Table 2: Gross Wage Item Nonresponse (Unusable Reports) Model.

Predictor	p-value
Version	0.9432
Region	<0.0001
Month	<0.0001
Version*Region	0.0603
Region*Month	<0.0001
Version*Month	0.8837
Version*Region*Month	<0.0001

The *p*-values in red signify the effects that are statistically significant at the 5% level. In contrast to the unit nonresponse, the three-factor interaction of version, region, and month is significant for the item nonresponse in gross wages. This indicates that the difference in the gross wage nonresponse (unusable report) rates between the two versions depended on the month and region as illustrated in figures 1 and 2.

Figure 1: Version 1 Percentage Unusable Reports by Region.

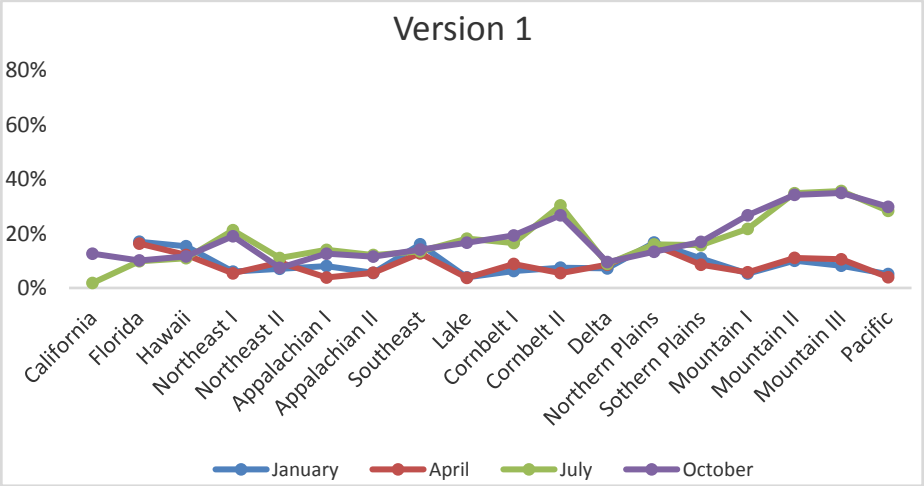
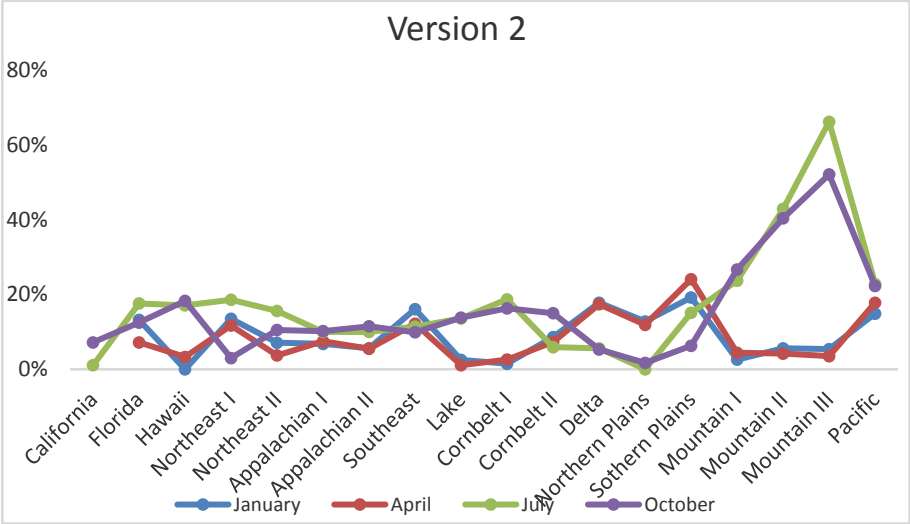


Figure 2: Version 2 Percentage Unusable Reports by Region.



This three-factor interaction is largely due to the major differences in item nonresponse rates between versions for the region/data collection period (January/April versus July/October) combinations in the Cornbelt II region, the Mountain III region, and the Pacific region. For the Cornbelt II region, the differences in versions was significant in the January/April data collection, but not for the July/October data collection. In contrast, for the Mountain III and the Pacific regions, the differences were not significant in the January/April data collection, but were significant for the July/October data collection.

In January, one region had an increase in the gross wages item nonresponse rates above the 10% threshold (Delta 10.6%; see Table 2A). In April, two regions (Sothern Plains 15.6% and Pacific 13.8%) had an increase in the gross wages item nonresponse rates above the 10% threshold. In July and October, only Mountain III had an increase in the gross wages item nonresponse rate above the 10% threshold (July 30.6% and October 17.1%). It should be noted that in some regions decreases in the gross wages item nonresponse rate are significant, specially, one region in April and July and four regions in October.

5.3. Sample Size Increase

The sample sizes needed to meet NASS's CV targets for gross wages at the regional and national levels, based on the version 2 response rates, are shown in Tables A3 (appendix).

The national sample size would not need to be increased by more than 10% in any of the four months of the survey. However, examining the average percent change in sample size needed over 4 quarters, both the Appalachian I and Southern Plains would need approximately 15% and 21% increases, respectively. For additional percentage change by region for each month, see Table A3.

5.4. Base Wage Item Nonresponse

Four measures of base wage item nonresponse were considered, which are:

1. Unweighted item nonresponse rates
2. Weighted item nonresponse rates using sampling weights
3. Weighted item nonresponse rates using nonresponse adjusted weights
4. Imputation rate (i.e. the proportion of the estimate of total base wages imputed)

The definition of each of these rates are given in Table A8 (appendix). One issue with using traditional weighted item nonresponse rates (i.e., 2 and 3), for populations with a highly skewed outcome variable, is that the sampling weight is usually inversely related to the estimate. To reduce sampling errors, which have higher likelihood of having large values (i.e., base wages), they are tested at a higher rate than units that do not. Traditional weighted item nonresponse rates give more weight to missing values with higher weights, which in general have lower base wages. For more information about this issue in business and establishment surveys and some alternative measures, see Thompson and Oliver (2012).

The U.S. Census Bureau uses imputation rates for business and establishment surveys as an alternative to a weighted item nonresponse rate. This rate is the proportion of the estimate; in this case it is total base wages, which is imputed (see appendix D3-B, U.S. Census Bureau Statistical Quality Standards, 2013). The imputation rate takes into consideration both weight and the amount of base wages either reported or imputed for the operation.

At the national level, none of the four measures had a meaningful level of item nonresponse for base wages for July and October (Tables A4-A7). Only the imputation rate in April had a meaningful level of item nonresponse at the national level (without California). However, some regions did attain a meaningful level of base wages item nonresponse. For each measure, the percentage of the regions that had a meaningful level of item nonresponse in base wages is displayed in Table 3.

Table 3: Number of Regions For Which Item Nonresponse Rates for Base Wages Above Threshold

Month	Unweighted	Sampling Weight	Nonresponse Weight	Imputation Rate
January	3 (17.6%)	5 (29.4%)	4 (23.5%)	2 (11.8%)
April	2 (11.8%)	7 (41.2%)	6 (35.3%)	3 (22.2%)
May	3 (16.7%)	5 (27.8%)	5 (27.8%)	2 (11.1%)
June	3 (16.7%)	5 (27.8%)	5 (27.8%)	3 (16.7%)

In three of the four measures observed in April, the issue of item nonresponse on base wages was substantially higher when compared to the three other months. In addition, all months (January, April, May, and June) identified by the imputation rate indicated that item nonresponse may be an issue for operations that have (1) high weights and (2) lower base wages. Only one region-month combination (Pacific, April) had all four measures rise to a meaningful level. Finally, only one region (Pacific) was above the threshold of any of the measures (unweighted item nonresponse rate) in all four months.

6. CONCLUSION

The current Agricultural Labor Survey collects gross wages. It has been proposed that the base wage (i.e., base pay) and incentives (e.g., overtime pay) also be collected. To assess the potential impact of such a change, a new version of the questionnaire was developed to acquire this additional information and was then compared to the current version. Based on the metrics evaluated, few differences exist between the two versions. However, more qualitative research is needed to determine how best to ask operators about both base and incentive pay.

6.1. Limitations

In the April administration of the survey, the treatment sample was administered in one DCC, whereas the control sample was distributed between the remaining four DCCs. Thus, interviewer effects are confounded within version, which could explain some of the differences or lack of differences found in response rates and usable data. For the October administration, all the DCCs were used to administer both versions.

Evidence from recent behavior coding research on interviewers, during the January and April data collection processes, indicates a consistent lack of adherence to reading the base wage and incentive/overtime questions. Some interviewers reverted to the original questionnaire and did not read the new questions. Based on the behavior coding and prior cognitive testing, the CATI instrument has been redesigned to address some of the issues interviewers were having administering this survey over the phone and separating overtime wages and incentives (see section 3.1). Finally, interviewer training was updated to provide clearer guidance on how to administer the questionnaire. Behavior coding is currently being performed for the October data collection, so these results are currently unavailable.

California conducts the Agricultural Labor Survey differently than other regions or states. In California, the survey is administered monthly by the California Employment Development Division. Response is encouraged by mail or fax, although some interviews are conducted by telephone from Wyoming and questions are read from a paper version. In addition, the new questionnaire was not tested in January and there is evidence that differences in the unit response rates were probably caused by how the experiment was conducted or how the data were captured. Because January was not tested, there is not a full year of data to evaluate in California.

6.2. Final Summary

The results of the 2018 Agricultural Labor Survey Experiment on the inclusion of the new wage questions are:

- No significant impact in response rates between survey versions at the national level.
- No significant impact in item nonresponse for gross wages at the national level.
- Some significant and meaningful negative impacts for some region-month combinations but significant positive impacts were observed as well.

- Based on the four study months, no meaningful increases in sample size are needed at the national level to meet CV targets on gross wages.
- Four of the 18 regions require a meaningful increase in sample size for at least one month.
- For only one month, the imputation rate shows a meaningful level of item nonresponse for base wages at the national level (April without California).
- None of the other three item nonresponse rates rise to a meaningful level at the national level for any month.
- Measures of item nonresponse show a consistent meaningful level of item nonresponse for base wage in the Pacific region.

In conclusion, little evidence (two measures with meaningful difference at the national level for any month) was found that suggests a negative impact of using an alternative questionnaire. However, some areas warrant additional research and evaluation. Two of the measures showed a meaningful difference at the national level for any month. The imputation rate in April might not have been at a meaningful level at the national level if data from California could be incorporated. This leaves the sample size increases needed to meet CV targets on gross wages as the only measure that has a meaningful difference at the national level.

Some significant and meaningful differences were observed at the regional level. However, the Pacific region is the only region that had a consistent meaningful difference for any of the measures across all months.

References

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U.S. Census Bureau (2013) *U.S. Census Bureau Statistical Quality Standards*. Washington, DC. available at https://www.census.gov/content/dam/Census/about/about-the-bureau/policies_and_notices/quality/statistical-quality-standards/Quality_Standards.pdf (accessed 9/27/2018)

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Appendix

Table A1: Unit Response Rate Differences

Region	January		April		July		October		2018	
	Diff	p-value	Diff	p-value	Diff	p-value	Diff	p-value	Diff	p-value
California					1.2	0.8126	-0.7	0.7399	0.2	0.9560
Florida	2.9	0.9450	2.9	0.9434	3.2	0.4763	4.6	0.3295	3.5	0.4579
Hawaii	-1.3	0.7808	-1.6	0.7405	-0.8	0.6589	-0.8	0.6589	-1.2	0.0120
Northeast I	3.5	0.9220	3.5	0.922	-9.4	0.0080	-9.4	0.0080	-3.3	0.1756
Northeast II	-0.8	0.8991	0.5	0.6981	-7.8	0.0878	-7.4	0.1056	-4.2	0.3365
Appalachian I	0.5	0.9439	1.2	0.8134	-5.2	0.1865	-3.8	0.3292	-1.9	0.4230
Appalachian II	2.9	0.8413	1.5	0.8816	2.9	0.3251	1.4	0.5456	2.2	0.0027
Southeast	7.5	0.1398	7.7	0.1295	6.9	0.1812	8.3	0.0942	7.2	0.0270
Lake	-4.7	0.0845	-4.7	0.0845	-3.2	0.6506	-3.2	0.6484	-3.9	0.4299
Cornbelt I	5.5	0.1027	6.0	0.0769	-3.1	0.2991	-2.6	0.3672	1.3	0.1191
Cornbelt II	2	0.8762	1.2	0.9746	6.3	0.1095	5.7	0.1446	3.9	<.0001
Delta	-3.7	0.2882	-4.0	0.2544	-13.0	0.0006	-14.0	0.0002	-8.8	0.1066
Northern Plains	1.3	0.6216	1.6	0.553	3.5	0.2726	3.4	0.2872	2.5	0.0499
Southern Plains	0.6	0.9900	0.0	0.8913	6.5	0.0443	6.4	0.0477	3.7	0.4593
Mountain I	7.6	0.4334	7.9	0.4044	0.3	0.9316	-0.3	0.9316	3.6	0.4276
Mountain II	-8.3	0.0680	-8.3	0.0680	2.7	0.3732	4.4	0.2458	-2.3	0.0918
Mountain III	-7.9	0.1293	-7.5	0.1446	1.5	0.8038	2.2	0.8924	-3.0	0.4897
Pacific	-1.3	0.4097	0.1	0.6198	-2.9	0.9450	-2.5	0.9865	-1.7	0.4586
US without CA	0.7	0.4496	0.0	0.5069	0.0	0.4798	0.0	0.6295	-0.1	0.194
United States					-0.6	0.0388	-0.6	0.0387	-1.0	0.1984

Table A2: Item Nonresponse Rate Differences for Gross Wages

Region	January		April		July		October	
	Diff	p-value	Diff	p-value	Diff	p-value	Diff	p-value
California					-0.6	0.3991	-5.4	0.0006
Florida	-3.7	0.4648	-9.1	0.0673	7.9	0.0916	2.4	0.6252
Hawaii	-15.3	0.9752	-8.8	0.1819	6.2	0.1445	6.7	0.1308
Northeast I	7.4	0.0650	6.3	0.0522	-2.5	0.5350	-15.9	0.0007
Northeast II	0.1	0.9789	-5.7	0.1907	4.6	0.2721	3.1	0.3688
Appalachian I	-1.2	0.7828	3.6	0.2061	-4	0.2235	-2.4	0.4341
Appalachian II	0.1	0.9935	-0.1	0.9771	-2.1	0.5384	0.1	0.9214
Southeast	0.1	0.9836	-0.5	0.901	-2	0.591	-4.2	0.3113
Lake	-1.4	0.5744	-2.7	0.226	-4.5	0.465	-2.8	0.6028
Cornbelt I	-4.7	0.1601	-6.2	0.0911	2.2	0.8605	-3	0.355
Cornbelt II	1.1	0.8248	1.9	0.6522	-24.4	0.0069	-11.7	0.0863
Delta	10.6	0.0085	8.9	0.0165	-3.3	0.3253	-4.2	0.1894
Northern Plains	-3.8	0.5466	-3.8	0.522	-16	0.9646	-11.6	0.0342
Southern Plains	8.4	0.2276	15.6	0.0163	-0.6	0.7561	-10.6	0.0124
Mountain I	-2.7	0.4875	-1.3	0.7329	2	0.679	0	0.7517
Mountain II	-4.4	0.5534	-6.9	0.3218	8.1	0.503	6.2	0.6145
Mountain III	-2.8	0.4943	-7	0.1232	30.6	<.0001	17.1	<.0001
Pacific	9.8	0.0079	13.8	<.0001	-5.5	0.2990	-7.5	0.1636
US without CA	0.2	0.9742	0.2	0.9628	0.2	0.2751	-2.3	0.0020
United States					-0.7	0.9617	-3.0	0.0008

Table A3: Percent Increase in Sample Size Needed

Region	January	April	July	October	4 Quarter Percent Average Change
California			0%	0%	0
Florida	0%	0%	71%	26%	0
Hawaii	-56%	-20%	-47%	-13%	-38
Northeast I	0%	0%	0%	0%	0
Northeast II	0%	0%	0%	-38%	0
Appalachian I	87%	0%	9%	0%	15
Appalachian II	0%	0%	0%	0%	0
Southeast	0%	0%	0%	0%	0
Lake	0%	0%	0%	0%	0
Cornbelt I	-35%	0%	0%	0%	0
Cornbelt II	0%	0%	0%	0%	0
Delta	0%	0%	0%	0%	0
Northern Plains	0%	0%	0%	0%	0
Southern Plains	230%	166%	0%	0%	21
Mountain I	0%	0%	0%	0%	0
Mountain II	-25%	0%	0%	0%	0
Mountain III	-57%	-60%	26%	0%	-27
Pacific	0%	0%	0%	0%	0
United States	9%	8%	-4%	-3%	-3

Table A4: Unweighted Item Nonresponse Rate for Base Wages

Region	January	April	July	October
California			28.0	36.2
Florida	20.3	18.6	29.4	27.5
Hawaii	20.7	30.0	29.3	29.3
Northeast I	19.2	22.1	23.5	8.8
Northeast II	41.5	34.0	20.2	13.2
Appalachian I	15.9	22.4	23.6	25.0
Appalachian II	11.1	9.1	23.8	25.6
Southeast	51.6	48.6	12.3	11.1
Lake	26.3	24.2	21.3	19.5
Cornbelt I	29.2	21.6	22.7	22.8
Cornbelt II	34.3	29.3	32.4	20.5
Delta	27.8	25.6	12.2	9.5
Northern Plains	33.3	28.6	3.2	3.4
Southern Plains	15.4	17.2	16.3	9.7
Mountain I	30.8	28.9	30.9	34.5
Mountain II	5.6	0.0	47.6	48.1
Mountain III	3.6	1.8	67.6	51.5
Pacific	46.3	56.7	44.7	41.9
US without CA	27.1	26.6	35.1	33.6
United States			26.8	26.1

Table A5: Weighted Item Nonrespose Rate for Base Wages (Sample Weight)

Region	January	April	July	October
California			27.4	33.1
Florida	10.1	8.9	24.3	16.6
Hawaii	15.9	40.7	35.9	32.3
Northeast I	14.4	13.1	16.2	7.2
Northeast II	35.3	31.9	16.1	13.4
Appalachian I	5.2	14.7	33.9	27.3
Appalachian II	27.3	25.8	17.2	21.3
Southeast	32.3	25.7	21.3	15.8
Lake	22.0	22.3	16.2	15.2
Cornbelt I	14.5	13.3	21.4	9.1
Cornbelt II	31.7	29.5	6.1	5.7
Delta	21.7	23.4	19.2	18.6
Northern Plains	13.8	11.9	0.8	0.8
Southern Plains	23.0	18.2	10.2	19.5
Mountain I	34.1	44.4	7.2	8.8
Mountain II	16.0	0.0	20.0	34.4
Mountain III	2.9	0.6	75.5	58.5
Pacific	16.2	27.0	33.4	21.0
US without CA	20.4	19.8	23.1	20.6
United States			20.6	18.6

Table A6: Weighted Item Nonrespose Rate for Base Wages (Nonresponse Weight)

Region	January	April	July	October
California			27.3	32.9
Florida	12.1	10.4	23.8	17.3
Hawaii	15.1	42.1	37.6	33.4
Northeast I	11.8	11.8	18.4	7.4
Northeast II	37.3	32.1	9.0	7.9
Appalachian I	5.7	14.9	34.1	27.0
Appalachian II	24.3	22.5	20.3	23.8
Southeast	34.2	27.1	13.7	12.0
Lake	22.1	21.9	20.0	19.5
Cornbelt I	16.5	15.0	20.2	8.4
Cornbelt II	30.7	30.2	12.8	6.9
Delta	23.1	24.5	16.8	17.4
Northern Plains	13.7	11.7	1.5	1.5
Southern Plains	22.3	18.0	10.2	18.9
Mountain I	40.9	50.3	8.3	9.9
Mountain II	11.5	0.0	20.1	36.3
Mountain III	2.5	0.7	74.3	56.7
Pacific	23.0	33.3	32.8	24.4
US without CA	20.7	20.3	21.6	19.4
United States			19.8	17.7

Table A7: Imputation Rate for Base Wages

Region	January	April	July	October
California			24.7	35.7
Florida	0.0	0.0	22.1	20.5
Hawaii	7.8	13.7	44.7	27.1
Northeast I	10.5	13.5	0.0	0.0
Northeast II	4.7	4.3	0.1	0.4
Appalachian I	5.1	5.2	16.0	20.6
Appalachian II	14.3	14.2	12.7	12.8
Southeast	0.0	0.0	9.5	6.6
Lake	2.6	6.6	0.2	0.1
Cornbelt I	18.9	11.8	0.0	0.0
Cornbelt II	12.7	14.3	11.5	1.7
Delta	0.0	0.6	0.0	0.0
Northern Plains	47.3	45.1	0.0	0.0
Southern Plains	9.0	8.7	0.0	1.8
Mountain I	21.5	29.8	47.6	34.2
Mountain II	8.0	7.3	12.1	6.3
Mountain III	8.9	3.8	24.2	10.7
Pacific	44.8	58.2	4.9	8.3
US without CA	13.4	26.6	9.8	8.5
United States			13.7	15.7

Table A8: Item Nonresponse Formulas

Type	Definition
Unweighted	$\frac{\sum_{i \epsilon F} \sum_{j \epsilon R_i} u_{ij}}{r}$
Sampling Weight	$\frac{\sum_{i \epsilon F} \sum_{j \epsilon R_i} w_i^S u_{ij}}{\sum_{i \epsilon F} \sum_{j \epsilon R_i} w_i^S}$
Nonresponse Adjusted Weight	$\frac{\sum_{i \epsilon F} \sum_{j \epsilon R_i} w_i^A u_{ij}}{\sum_{i \epsilon F} \sum_{j \epsilon R_i} w_i^A}$
Imputation Rate	$\frac{\sum_{i \epsilon F} \sum_{j \epsilon R_i} w_i^A u_{ij} t_{ij}}{\sum_{i \epsilon F} \sum_{j \epsilon R_i} w_i^A t_{ij}}$

F = the set of farms who responded
R_i = the set of rows for farm i
u_{ij} = the indicator that value of the given item is unusable in row j for farm i
r = the total number of rows across all responding farms
w_i^S = the sampling weight for farm i
w_i^A = the sampling weight for farm i
t_{ij} = the value of the given item given item in row j for farm i (Note: this could be imputed)