

October 11, 2013

**Employer Survey Weighting Procedures Summary**  
**Georgia**  
**October 11, 2013**

## Table of Contents

1	Survey Design Overview.....	1
2	Data Collection Outcomes .....	2
3	Weighting Overview .....	2
4	Weighting Process Files .....	3
4.1	Revisions to Input Data File .....	3
4.2	Final Output File from Weighting Process .....	4
5	Weight Calculations .....	6
5.1	Basic Stratum Weight .....	6
5.1.1	Stratum Response Adjustment .....	7
5.1.2	Adjustment of Basic Stratum Weights for Unknown Eligibility .....	9
5.1.3	Adjustment of Basic Stratum Weights for Non-participation .....	10
5.2	Final Stratum Firm Weight.....	10
6	Response Rate .....	12
7	Weighted Firm Counts .....	14

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## 1 Survey Design Overview

The Georgia Employer Survey target population comprises all non-government enterprise workplaces in the capital and urban regions of Georgia. The sampling objective was to obtain interviews from 400 non-government enterprise workplaces in the capital and urban regions of Georgia.

### Exclusions

Conflict regions: Abkhazia and South Ossetia are excluded from the target population.

### Sample Frame

The sample frame for the Georgia Employer Survey is the file '[Sampling\\_frame\\_09282012](#)', which is a list of 3735 firms.

Note: The survey results reveal that the sample frame appears to be out-of-date; 200 of the 783 activated sampled firms, i.e., approximately 26% of the activated sampled firms, are categorized as 'Closed companies/Could not be found/ Not eligible'. Refer to Table 3 on page 3 for the detailed count of interview results.

### Stratification

Georgia used a stratified sample design.

#### Explicit Stratification

The sample is stratified by size (i.e., Large: >100 workers, Medium: 20-100 workers, Small: < 20 workers) and geographic area (i.e., Capital, Other Urban).

#### Implicit Stratification

The sample frame was sorted by Geographic quadrant (North-East, North-West, South-East and South-West) and by sector (Tourism, Construction and IT). This resulted in an implicit stratification by geographic quadrant and sector in the 'Other Urban' strata, and by only sector in the 'Capital' strata as there is no further geographical division within the 'Capital' area.

### Sample Allocation

Table 1 provides the sample allocation of the number of firms by stratum.

**Table 1: Georgia Employer Survey Sample Allocation**

Stratum	Number of Firms			Total Sample
	Sample Frame Target Population	Initial Sample	Reserve Sample	
Capital-Large Firms	246	67	140	207
Capital-Medium Firms	79	67	126	193
Capital-Small Firms	308	67	99	166
Other Urban-Large Firms	132	66	13	79
Other Urban -Medium Firms	1780	66	66	132
Other Urban -Small Firms	1190	67	45	112
<b>Total</b>	<b>3735</b>	<b>400</b>	<b>430</b>	<b>889</b>

## 2 Data Collection Outcomes

The final survey weights depend on the outcome from the attempt to obtain an interview at each selected firm. The treatment of each sampled firm in the weighting process depends on the final result code assigned to the sampled firm. The interview result codes used in the Georgia Employer Survey are listed in Table 2; a final ‘**interview\_result**’ code was assigned to each sampled case.

Note: During the weighting process the final interview result code ‘7- Non-activated Reserve Sampled Firm’ was added to the list of final result codes for the Georgia final data file.

**Table 2: Final Result Codes for Sampled Firms**

Code	Code Description
1	Complete Interview
2	Firm Closed, i.e., no longer in business
3	Firm address could not be found
4	Refusal
5	Not eligible
6	Other
7	Non-activated Reserve Sampled Firm

## 3 Weighting Overview

The Georgia stratified design resulted in differential probabilities of selection for the selected firms. Consequently, each selected firm in the survey does not necessarily represent the same number of firms in the target population. To account for differential probabilities of selection due to the nature of the design and to ensure accurate survey estimates, the Georgia Employer Survey requires a sampling weight for each participating firm within each stratum.

In general, the objectives of the Georgia Employer Survey weighting are to construct a set of survey weights to,

- 1) compensate for unequal probabilities of selection;
- 2) compensate for firm-level non-response.

The general weighting procedure for the Georgia Employer Survey required the following tasks.

- 1) Preparation of a data file to input into the weighting process;
- 2) Weight Calculation:
  - a) Calculation of a Firm weight for each sampled Firm;
    - i) Calculation of a Firm-level non-response adjustment independently for each stratum.
- 3) The required output from the weighting process is a final Georgia data file with the survey weights (i.e., for each sampled Firm) appended to each data record.

## 4 Weighting Process Files

The key file for the weighting process is the STATA file '[wb\\_employers\\_16 Apr 2013.dta](#)' provided by the WB core team. An SPSS version of this file was created for the weighting process.

### 4.1 Revisions to Input Data File

The following revisions were made to the Georgia data file '[wb\\_employers\\_16 Apr 2013.dta](#)':

- 1) Revised the interview result code, i.e., variable 'interview\_result', as follows:
  - a) Added interview\_result = 7, Non-activated Reserve Sampled Firm.
  - b) Missing Values: Replaced missing 'interview\_result' values with interview\_result = 7.
- 2) **SPSS Output File: '[wb\\_employers\\_16\\_apr\\_2013-OP1](#)'**
  - a) This file includes all 889 sampled cases; each case includes a 'interview\_result'.
    - i) Table 3 provides the breakdown of the 889 sample cases by 'interview\_result' and by Stratum.
    - ii) This file is the primary file for the process of creating the survey weights.

Table 3: Georgia Final Sample – Number of Firms by Stratum and by Interview Result Code								
Stratum	Result Code of the interview							Total
	1	2	3	4	5	6	7	
	Completed	Closed	Could not be found	Refused	Not eligible	Other	Not Activated Reserve Sample	
1-Large-Capital	59	19	15	73	1	1	39	207
2-Large-Other Urban	53	12	4	9	1	0	0	79
3-Medium-Capital	60	21	16	65	1	1	29	193
4-Medium-Other Urban	68	9	8	7	3	0	37	132
5-Small-Capital	51	33	25	56	1	0	0	166
6-Small-Other Urban	63	18	9	17	4	0	1	112
<b>Total</b>	<b>354</b>	<b>112</b>	<b>77</b>	<b>227</b>	<b>11</b>	<b>2</b>	<b>106</b>	<b>889</b>

## 4.2 Final Output File from Weighting Process

The output file from the weighting process is,

### 1) GEO-W01 Employer Survey-Final Firm Weights (20-Apr-2013)

- a) This file contains the original data variables from the Georgia data file 'wb\_employers\_16\_apr\_2013' plus the applicable firm weights, and other variables that were created during the weighting process.
- b) The file contains 889 data records, of which there are 354 participating firms with a final firm weight. The breakdown of the count of participating firms by stratum is shown below in Table 4. Note that the 'Weighted Number of Firms' provides the survey estimate of the number of firms by stratum in the target population.

Table 4: Georgia Count of Eligible Participating Firms by Stratum	
City- Wealth Stratum	Participating Eligible Sample Firms
1-Large-Capital	59
2-Large-Other Urban	53
3-Medium-Capital	60
4-Medium-Other Urban	68
5-Small-Capital	51
6-Small-Other Urban	63
Total	354

- c) In addition to the Georgia data file variables, the weighted data file includes additional variables that were created during the weighting process. The essential variables that are needed for estimation of survey results are included in the final weighted data file.
  - i) Table 5 provides the list of variables, created or revised during the weighting process, which are included in the final weighted data file.
  - ii) Table 6 provides the list of other available variables from the weighting process that are not included in the final weighted data file.

Table 5: Variables Created or Revised During Weighting Process - Added to Georgia Data File		
Variable Name	Description	Values
Interview_result	Result Code of Interview – Revised	1-Complete Interview 2-Firm Closed, i.e., no longer in business 3-Firm address could not be found 4-Refusal 5-Not eligible 6-Other 7-Non-activated Reserve Sampled Firm
Fin_RespCat	Final Response Category-Firms	1-Participant Firm 2-Ineligible Firm 3-Non-participant Firm: Eligible 4-Non-participant Firm; Unknown Eligibility
W_Finwt	Final Firm Weight Use for estimation of Firm/Workplace characteristics	n/a

**Table 6: Variables Created During Weighting Process – Not Added to Georgia Data File**

<b>Variable Name</b>	<b>Description</b>	<b>Values</b>
<b>StratPopn</b>	Stratum Population Size - # of Firms	n/a
<b>StratSmp</b>	Stratum Sample Size - # of Sampled Firms	n/a
<b>StratFIN</b>	Count of 'Fin_RespCat' in Stratum	n/a
<b>F_k</b>	# of participant Firms in Stratum	n/a
<b>F_x</b>	# of Ineligible Firms in Stratum	n/a
<b>F_z</b>	# of Non-participant Eligible Firms in Stratum	n/a
<b>F_u</b>	# of Non-participant Unknown Eligible Firms in Stratum	n/a
<b>W1h</b>	Basic Initial Stratum Weight	n/a
<b>Elig_Prop</b>	Proportion of Eligible Firms - known eligibility	n/a
<b>R_adj</b>	Response adjustment ratio for Firms	n/a



## 5 Weight Calculations

The input file for the process of calculating the weights is 'wb\_employers\_16\_apr\_2013-OP1', which was created from the WB provided file 'wb\_employers\_16\_apr\_2013'.

### 5.1 Basic Stratum Weight

The basic stratum weight, calculated independently for each stratum, is based on the probability of selection for each of the Firms.

For the Georgia Employer Survey, the probability of selection of the  $j^{\text{th}}$  firm in stratum 'h', say  $p_{hj}$ , may be represented as,

$$1) \quad \frac{1}{n_h}$$

where,

$n_h$  - the number of sampled firms in stratum h,

$N_h$  - the total number of target population firms in stratum 'h', based on the sample frame information, is represented by

Table 7 provides the sample frame count of the number of firms by stratum and the sample allocation of the number of firms by stratum.

**Table 7: Georgia Employer Survey Sample Allocation**

Stratum	Number of Firms			
	Frame Count	Initial Sample	Reserve Sample	Total Sample
	( $N_h$ )	( $n_{h1}$ )	( $n_{h2}$ )	( $n_h$ )
1-Capital-Large Firms	246	67	140	207
2-Capital-Medium Firms	308	67	126	193
3-Capital-Small Firms	1780	67	99	166
4-Other Urban-Large Firms	79	66	13	79
5-Other Urban -Medium Firms	132	66	66	132
6-Other Urban -Small Firms	1190	67	45	112
Total	3735	400	430	889

The basic initial stratum weight,  $W_{1hj}$ , for the  $j^{\text{th}}$  firm in stratum 'h' is calculated as the inverse of its probability of selection:

2) — —

#### **Example 1: Basic Initial Stratum Weight**

The basic stratum stage weight for each sampled firm in the stratum 'Capital-Large Firms', which contains 246 sample frame firms, is calculated as follows:

— — —

The basic stratum weight was similarly calculated for each of the sampled firms.

### **5.1.1 Stratum Response Adjustment**

For treatment in the weighting process the data collection outcomes for the sampled firms may be summarized in four possible categories: participant, ineligible, non-participant with known eligibility, non-participant with unknown eligibility.

**Participant** - A participating firm 'k' is an eligible sampled firm that provides sufficient data to be considered a participant in the survey. The sampled firms 'k' with result code '1' satisfy the requirement for classification of the firm as a survey participant.

Participant Firm	Code	Code Description
	1	Complete Interview

**Ineligible** – A sampled firm 'x' is categorized as ineligible if the sampled firm has closed or the firm has less than 5 workers. The result codes for ineligible sampled firms 'x' are as follows:

Ineligible Firm	Code	Code Description
	2	Firm Closed, i.e., no longer in business
	5	Not eligible

**Non-participant - Eligibility Known:** A non-participating firm 'z' results when an eligible firm does not participate due to refusal or unusual circumstance. The result codes for sampled firms 'z' with known eligibility are as follows:

Non-Participant Firm, Eligible	Code	Code Description
	4	Refusal
	6	Other

**Non-participant - Eligibility Unknown:** A non-participating firm 'u' results when a firm does not participate due to non-contact with the sampled firm, inconclusive information about the eligibility status of the sampled firm, or a reserve sample case was not activated. The result codes for non-participating firms 'u' with unknown eligibility are as follows:

Non-Participant Firm, Unknown Eligibility	Code	Code Description
	3	Firm address could not be found
	7	Non-activated Reserve Sampled Firm

The total number of sampled firms in stratum 'h' may be represented by the following equation.

3)

where,

$n_h$  - the number of firms sampled in stratum 'h',

$n_{hk}$  - the number of firms 'k' in stratum 'h' that participate,

$n_{hx}$  - the number of ineligible firms 'x' in stratum 'h',

$n_{hz}$  - the number of non-participating firms 'z' with known eligibility in stratum 'h',  $n_{hu}$

- the number of non-participating firms 'u' with unknown eligibility in stratum 'h'.

Table 8 provides the stratum counts from the Georgia Employer Survey data file for the outcome categories described above.

**Table 8: Georgia Sample Count of Firms by Final Response Category by Stratum**

Stratum (h)	Final Response Category - Firms				Total
	1-Participant ( $n_{hk}$ )	2-Ineligible ( $n_{hx}$ )	3-Non-participant Eligible ( $n_{hz}$ )	4-Non-participant Unknown Eligibility ( $n_{hu}$ )	
1-Capital-Large Firms	59	20	74	54	207
2-Capital-Medium Firms	53	13	9	4	79
3-Capital-Small Firms	60	22	66	45	193
4-Other Urban-Large Firms	68	12	7	45	132
5-Other Urban -Medium Firms	51	34	56	25	166
6-Other Urban -Small Firms	63	22	17	10	112
Total	354	123	229	183	889

## 5.1.2 Adjustment of Basic Stratum Weights for Unknown Eligibility

The Employer Survey assumes that the firms 'u' with unknown eligibility in stratum 'h' are comprised of some proportion, say  $h$ , that are eligible firms and the complementary proportion,  $1 - h$ , that are ineligible firms. Note that the calculation of  $h$  is carried out independently in each stratum.

Amongst the  $n_{hu}$  non-participating firms 'u' with unknown eligibility the proportion of firms with known eligibility is estimated to be

$$4) \quad \frac{\sum_{i=1}^{n_{hu}} \text{Eligible}_i}{n_{hu}}$$

**Note that the eligible proportion is the same for all eligible participating firms in stratum 'h'.**

### **Example 2: Eligible Proportion**

The counts in Table 8 provide input for calculation of the proportion of firms with known eligibility.

For the firms in stratum 1, 'Capital-Large Firms', the calculation of the eligibility proportion is as follows,

$$\frac{\sum_{i=1}^{n_{1u}} \text{Eligible}_i}{n_{1u}} = \frac{10}{100} = 0.1$$

### 5.1.3 Adjustment of Basic Stratum Weights for Non-participation

A firm-level response adjustment is necessary to compensate for firms that did not participate in the survey.

The total number of sampled firms in stratum 'h' may be represented by the following equation.

5)

where,

- $n_h$  - the number of firms sampled in stratum 'h',
- $n_{hk}$  - the number of firms 'k' that participate in stratum 'h',
- $n_{hx}$  - the number of ineligible firms 'x' in stratum 'h',
- $n_{hz}$  - the number of non-participating firms 'z' with known eligibility in stratum 'h',
- $n_{hu}$  - the number of non-participating firms 'u' with unknown eligibility in stratum 'h'.

The firm-level response adjustment for the  $h^{\text{th}}$  stratum,  $R_h$ , is calculated as follows:

$$6) \quad R_h = \frac{n_h}{n_{hk} + n_{hx} + n_{hz} + n_{hu}}$$

The response adjustment ratio,  $R_h$ , incorporates the adjustment for unknown eligibility,  $n_{hu}$ . The firms that are categorized as ineligible,  $n_{hx}$ , are excluded from the calculation of the firm-level response adjustment.

#### Example 3: Response Adjustment for sampled Firms

For example, the following results were obtained for Stratum 1

$n_h$	$n_{hk}$	$n_{hx}$	$n_{hz}$	$n_{hu}$
207	59	20	74	54

Therefore,

$$R_h = \frac{207}{59 + 20 + 74 + 54} = \frac{207}{207} = 1.0$$

The response adjustment ratio,  $R_h$ , is similarly calculated for each stratum.

### 5.2 Final Stratum Firm Weight

The final firm weight is the weight used for producing firm-level estimates, such as the proportion of firms with a specific attribute. This weight is appended to the Employer Survey data file.

The final firm weight is calculated as the product of the basic stratum weight and the response adjustment for the basic stratum weight. Therefore, for firm 'j' in stratum 'h', the final firm weight,  $WF_{hj}$ , is calculated as follows:

The final firm weight is appended to the EMPLOYER SURVEY data file.

**Example 4: Final Firm Weight**

For Stratum 1,

<sub>9 1</sub>

<<== >?=@?

The final firm weight is similarly calculated for all sampled firms.

## 6 Response Rate

The overall response rate for the Georgia Employer Survey, based on the activated eligible sampled firms, is calculated as follows:

$$8) \quad \frac{2ABC}{D 2 ! 23" 4 3} \quad / \quad \frac{\quad}{\quad} / G$$

The activated eligible sampled firms are those in the following categories:

### Final Result Codes for Activated Eligible Sampled Firms

Code	Code Description
1	Complete Interview
3	Firm address could not be found
4	Refusal
6	Other

Table 9 provides for each stratum the number of sample cases and the percentage of cases for each interview result code. Note that the interview result codes '2-Closed' and '5-Ineligible' and '7-Non-activated' are excluded from Table 9.

<b>Table 9: Case Summaries</b>			
<b>Stratum</b>	<b>Result Code of the interview</b>	<b>Number of Firms</b>	<b>% of Total Activated Firms</b>
1-Large-Capital	1-Completed	59	8.9%
	3-Could not be found	15	2.3%
	4-Refused	73	11.1%
	6-Other	1	0.2%
	<b>Total</b>	<b>148</b>	<b>22.4%</b>
2-Large-Other Urban	1-Completed	53	8.0%
	3-Could not be found	4	0.6%
	4-Refused	9	1.4%
	<b>Total</b>	<b>66</b>	<b>10.0%</b>
3-Medium-Capital	1-Completed	60	9.1%
	3-Could not be found	16	2.4%
	4-Refused	65	9.8%
	6-Other	1	0.2%
	<b>Total</b>	<b>142</b>	<b>21.5%</b>
4-Medium-Other Urban	1-Completed	68	10.3%
	3-Could not be found	8	1.2%
	4-Refused	7	1.1%
	<b>Total</b>	<b>83</b>	<b>12.6%</b>
5-Small-Capital	1-Completed	51	7.7%
	3-Could not be found	25	3.8%
	4-Refused	56	8.5%
	<b>Total</b>	<b>132</b>	<b>20.0%</b>
6-Small-Other Urban	1-Completed	63	9.5%
	3-Could not be found	9	1.4%
	4-Refused	17	2.6%
	<b>Total</b>	<b>89</b>	<b>13.5%</b>
<b>Total - Overall Response Rate</b>	<b>1-Completed</b>	<b>354</b>	<b>53.6%</b>
<b>Totals – Non-response Type</b>	<b>3-Could not be found</b>	<b>77</b>	<b>11.7%</b>
	<b>4-Refused</b>	<b>227</b>	<b>34.4%</b>
	<b>6-Other</b>	<b>2</b>	<b>0.3%</b>
<b>Grand Total</b>		<b>660</b>	<b>100.0%</b>



## 7 Weighted Firm Counts

The original sample frame '[Sampling\\_frame\\_09282012](#)' showed that there is a total of 3,735 firms in the target population. The numbers of firms on the sample frame includes firms that no longer existed at the time of the Employer Survey, e.g. closed firms, ineligible firms.

The total un-weighted number of firms and weighted number of firms by stratum is provided in Table 10.

<b>Table 10: Georgia Count of Eligible Participating Firms by Stratum</b>			
<b>Stratum</b>	<b>Sample Frame Number of Firms</b>	<b>Participating Eligible Sample Firms</b>	<b>Weighted Number of Firms</b>
	(1)	(2)	(3)
<b>1-Large-Capital</b>	246	59	<b>214</b>
<b>2-Large-Other Urban</b>	79	53	<b>65</b>
<b>3-Medium-Capital</b>	308	60	<b>262</b>
<b>4-Medium-Other Urban</b>	132	68	<b>114</b>
<b>5-Small-Capital</b>	1780	51	<b>1351</b>
<b>6-Small-Other Urban</b>	1190	63	<b>933</b>
<b>Total</b>	<b>3735</b>	<b>354</b>	<b>2939</b>

### Notes for Table 10

1. For column 1, the 'Number of Firms' is an un-weighted total; it is the actual total number of Firms for all strata in the sample frame. The counts in column 1 of Table 10 are un-weighted counts that have not been adjusted for ineligible firms found in the Employer Survey sample.
2. For column 3, the decrease in the weighted number of firms is attributable to the adjustment of the basic stratum firm weights for ineligible firms found in the Employer Survey sample.
3. *The 'Weighted Number of Firms' in column 3 provides the survey estimate of the number of firms by stratum in the target population.*