A Study of Imputation Alternatives for the Quarterly Financial Report

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Abstract

The Quarterly Financial Report (QFR) collects income and balance sheet data for most manufacturing corporations and for large mining, wholesale trade and retail trade corporations. Historically, imputation for non-respondent certainty cases in the QFR sample consisted of carrying forward prior quarter data, and adjustments were made for non-respondent non-certainty cases by re-weighting respondent data. Two problems with these methods are: a failure to adequately account for market changes, and inconsistent adjustment across companies for unit non-response. We conducted a simulation to test an alternative imputation method that uses cell means and ratios of current to prior quarter respondent data. This paper describes the design and implementation of this simulation and presents an analysis of the results. The proposed method yields estimates with smaller bias and comparable standard errors.

Key Words: imputation, bias, standard error

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1.0 Background

The universe of the Quarterly Financial Report (QFR) is stratified by industry classification and assets size class at the time of sampling. All corporations whose operations are within scope of the QFR having assets of $250 million and over are included in the sample with certainty. Simple random samples are selected from the remaining corporations. The sample in each industry-by-asset size cell is systemically divided into four panels that are introduced over the next year. Each non-certainty panel is in the survey for eight consecutive quarters. Each quarter a non-certainty panel is rotated out and a new panel is rotated into the sample.1 Certainty companies are included in the survey indefinitely. The asset size class has historically been referred to as "stratum size". Table A demonstrates the relationship between asset-size and stratum.

[1] Investigation of Alternative Estimators for the Quarterly Financial Report, pp 1-2: C Caldwell, D Luery, M Sands, K Thompson.

Corporations classified in stratum 03, 07, 08, or 14 receive the short questionnaire form while corporations classified as stratum 16 or 18 are mailed the long form. Each form is divided into three sections: (1) income and retained earnings; (2) assets; and (3) liabilities and stockholders equity.

Table A: Correspondence of Asset Size with Asset-Stratum

Stratum Size	Assets
03	$250,000-$999,999
07	$1,000,000-$4,999,999
08	$5,000,000-$9,999,999
14	$10,000,000-$49,999,999
16	$50,000,000-$249,999,999
18	$250,000,000 and higher

Estimates are published by a three-digit industry code based on the North American Industry Classification System (NAICS). We will refer to the three-digit industry code as "naics_pub" and a two-digit industry code as "sector". We refer to a corporation at one physical location as an "ID". The ID variable is a ten-digit code in the data file that uniquely identifies the corporation. For the purposes of our research, we created a variable "IDNUM" that is a composite of two-digit year, two-digit month, and ID. For the purpose of the discussion, let us agree to use IDNUM and case interchangeably.

1.1 Introduction

Historically, we imputed certainty non-respondent corporations by carrying forward the prior quarter data values. If prior quarter data did not exist, as is the case with newly sampled certainty non-respondents, we imputed using a weighted mean based on industry and stratum. Non-certainty non-respondents were handled by re-weighting the non-certainty respondents.

The characteristics of each of the questionnaire items differ greatly. There are three sections to the questionnaire: income, assets, and liabilities. Some items in the income section are strictly positive while other items can be either negative or positive. Some items from the income section have a large proportion of reported zeros. Some items from the liabilities section have a large proportion of reported zeros while other items from liabilities have few cases of reported zero. The distribution of values by item over stratum 18 differs greatly. In general, the ranges of values for stratum 18 cases are quite large. As a result, imputes using weighted means are influenced greatly by one or two huge companies. Please refer to column four of Table F in the appendix for further details regarding the characteristics of the data.

1.2 The Preliminary Study

For the simulation study, we created historical files containing QFR data from year 2002 quarter four through year 2005 quarter three. Each of these files retained only cases with current quarter data values as well as data for the five previous quarters for each QFR item. From these files, we created a complete 'respondent file' that contained four quarters of complete respondent data.

Our major objective was to find an approach that would create optimal imputed values as a result of unit non-response for QFR. Initially, we considered a number of possible approaches for imputing for non-respondents. We reduced the number of options as we proceeded with our preliminary investigation. Some imputation options we considered included ratio, regression, weighted means and zero imputation.

Ratio imputation

Ratio imputation utilizes an auxiliary variable that is readily available for most observations in the database. As shown in the formula below, the imputed value is obtained by multiplying an un-weighted auxiliary item (Y_i) by the ratio of the weighted sum of all reported and edited respondents for the item divided by the corresponding weighted sum of the auxiliary respondents.

$$X_i = \frac{\sum_{i=1}^{n} W_i X_i}{\sum_{i=1}^{n} W_i Y_i} * Y_i$$

We considered choosing a unique auxiliary quantity for each of the three parts of the questionnaire. We also considered choosing a common auxiliary item for all items on the questionnaire. Another possibility for the auxiliary Y_i was to utilize a prior quarter data value for that item if available.

We performed some correlation analysis to investigate the linear association between IRS assets and selected asset-related items from the questionnaire. Generally, we found that there were relatively strong correlations between IRS assets and most of the selected QFR asset-related items. Some of the income-related items did not show strong correlations with IRS receipts. Based on the correlation analyses we discarded the option of using a common auxiliary for all QFR items.

We also performed regression studies to measure the strength of the linear association between current and prior quarter values for a selected number of QFR items. After some residual analysis, it was evident that the data relationships showed increasing variances with increasing value of the predictors. As a result, we performed an iteratively re-weighted least squares regression[2] with the first iteration yielding a set of residuals that were subsequently regressed against the fitted values to obtain a standard error function. We ultimately obtained a set of weights to use in a final least squares regression to stabilize the error variance. We fit regression lines for each stratum by naics_pub combination for selected items. Generally, we found that there were strong linear associations between prior and current quarter values when performing a regression using a no intercept model. The results led us to further explore ratio imputation using prior quarter data.

Regression Imputation

For items in the income section that contained negative and positive values we considered regression imputation using IRS assets as a variable of size to stabilize the error variance. Since regression imputation was more difficult to implement in our processing system than weighted means, we eventually chose not to utilize regression imputation in favor of weighted means imputation.

Weighted Means

We considered using a weighted means of the current available cases in a cell. For some items that had a good mixture of reported zeros along with moderately large reported positive values, weighted means imputation worked well. Some strictly positive valued items had too much skew-ness in the certainty strata resulting in unrealistically large impute. Weighted means imputes had the potential of being greatly influenced by a single large value within a small cell.

Zero Imputation

Some items in the income section and an item in the liabilities section contained a very large proportion of reported zeros. For these, we considered imputing zero.

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[2] Neter J., Kutner M., Wasserman W. Applied Linear Statistical Models page 404-407

1.3 Our Method of Sampling

From among the quarterly historical QFR files, we selected one quarterly ("template") file that provided us with the distribution of the number of sampled cases in each stratum by naics_pub cell. We created simulation input files by sampling with replacement from the respondent file, as referenced in section 1.2, so that each stratum by naics_pub cell would have the same number of cases as the template file. The following three examples illustrate sampling as shown in table C. The template file had 38 cases in the stratum= '18'*naics_pub='312' cell. We selected a simple random sample (SRS) from the available 78 cases in the respondent file, choosing 38 cases for our simulation input file for the cell (18, 312). For the cell stratum= '18' * naics_pub= '313', we selected a SRS of 28 cases from the 58 available cases in the respondent file. From stratum='18'*naics_pub='315', we selected a SRS of 30 cases from the 70 cases in the respondent file. When we finished sampling, our input simulation file contained 7,904 cases with the same composition in terms of stratum *naics_pub characteristics as the template file.

Table C: Illustration of Sampling for a Few Groups

Stratum	Naics_pub	Sample Selected	Our Population
18	312	38	78
18	313	28	59
18	315	30	70

2.0 The Approach of the Simulation

2.1 Modeling the Response Patterns

Our objective was to reproduce the response patterns in the simulation that are found in the QFR survey data. Consequently, we observed and defined twelve patterns of response for up to six quarters of data: current quarter (lag 0), prior quarter (lag 1), two quarters back (lag 2), and so on, up to five quarters back (lag 5). Table G in the appendix displays the observed response patterns.

A company that does not have data for lags1 through 5 was assigned to response pattern F. Response pattern F cases that were respondents in the current quarter would be assigned to response pattern F1, however non-respondent cases for the current quarter would be assigned as F2. Respondent and non-respondent patterns are defined as follows.

Respondents: A1, B1, C1, D1, E1, and F1

Non-respondents: A2, B2, C2, D2, E2, and F2.

We utilized a logistic regression model to obtain the probabilities of getting each of the response patterns. The response patterns were modeled as a function of stratum*naics_pub based on the counts observed in the QFR data. The results of the logistic regression provided us with probabilities of each response pattern by cell. The probabilities of the response patterns were utilized to make an assignment to each IDNUM in the input file by generating a uniform (0,1) random variable. The (0, 1) interval was partitioned based on the probabilities. Using the group stratum= '18'*naics_pub= '312' as an example, P(F1)=0.12 and P(F2)=0.183. A random number in the partitioned interval (0.697, 0.817) will generate an assignment of F1 for the response pattern whereas a random number in the partitioned interval (0.817, 1.00) will generate an assignment of F2. Table D below shows the response patterns, probabilities, and associated intervals for stratum=18* naics_pub=312.

Table D: Assigned Probabilities of Response Patterns for Stratum=18 and Naics_pub=312

Response Pattern	Probability of Response	Interval
A1	0.49	(0, 0.49)
A2	0.08	(0.49, 0.57)
B1	0.04	(0.57, 0.61)
B2	0.03	(0.61, 0.64)
C1	0.01	(0.64,0.65)
C2	0.02	(0.65,0.67)
D1	0.005	(0.670,0.675)
D2	0.01	(0.675,0.685)
E1	0.002	(0.685,0.687)
E2	0.01	(0.687,0.697)
F1	0.12	(0.697,0.817)
F2	0.183	(0.817,1.0)

2.2 Simulation, Imputing Non-respondents, and Defining "Subpa"

Five independent samples were selected from the completed respondent data so that the results would not depend on only one simulated sample. For each sample non-response was replicated 1000 times. A replicate included defining the response patterns, imputing for non-respondents, computing actual cell totals, and computing cell totals for each of three imputation methods. For a given sample, each replicate run assigned respondent cases (A1-F1) and non-respondent cases (A2-F2) by stratum*naics_pub. The cases that were assigned A2, B2, C2, D2, E2, and F2 were treated as missing and were imputed. The simulation program assumes unit non-response; that is, when one of the previously mentioned response patterns A2-F2 was observed for a case, all QFR items were imputed for that case.

Because of the wide range of data values contained within the asset strata 16 and 18 groups, we further stratified based on a percentile cutoff ('PCT') of IRS assets. This new stratification variable, a subclass of IRS present assets, was named 'subpa'. Table E displays how subpa and IRS assets relate.

Table E: Example of Stratum*Subpa grouping

Stratum	Subpa	Percentile
16	1	PCT LT 50
16	2	PCT GE 50
18	1	PCT LT 25
18	2	25 LE PCT LE 50
18	3	50 LT PCT LE 75
18	4	PCT GT 75

In order to determine the number of subpa levels for stratum 16 and 18, we considered the asset strata ranges as shown in table A as well as the monotonic increasing of item totals to subpa within the stratum*naics_pub groups. For Stratum 18, we found that four levels of subpa resulted in fairly strong correlations between the item aggregate totals and subpa. Splitting subpa into more than four levels did not effectively yield better results. We found that splitting subpa into two levels for the stratum 16 cases yielded better imputes for the stratum 16 cases than not splitting.

2.3 Testing the Derived Items

Eight survey items are derived from other items. We had a choice to either impute these directly or to derive these from other imputes. We tested the eight items to determine which method was better (derived or imputed). We calculated a difference between the derived and the actual for each case based on a 1000 replications. We also calculated a difference between the directly imputed and the actual for 1000 replications. We compared the respective differences (derived-actual versus imputed-actual). We set up a tolerance for which we considered the two respective differences to be equal if they were within the tolerance. Last, we counted the number of cases for which the derived was closer to the actual as compared to the number of cases for which the imputed was closer to the actual. We based our decision as to whether to use a derived or imputed value for the item tested based on the respective counts.

2.4 Imputation Formulas

For the purpose of imputation, cells were defined as stratum*naics_pub*subpa. When the cell counts were less than eight, the industry was collapsed into a broader category created as "naics3". Naics3 differed from naics_pub in that a few similar industries were combined. For example, foods and beverages were combined into a single classification. Cell at the second level is defined as stratum*naics3*subpa. For those cases with cell counts less than eight at level two, we collapsed to stratum*naics3 and proceeded with the imputation using the available cell count.

Let us denote the un-weighted item to be imputed by X. The weighted item denoted by WX is the product of the sample weight and the item. The current quarter shall be represented by t=0. The prior quarter shall be represented by t=1. The data values two, three, four, and five quarters prior shall be denoted by t=2,3,4, and 5 respectively.

Ratio Imputation

$$X=\frac{\sum_{i=1}^{n} W_i X_{i0}}{\sum_{i=1}^{n} W_i X_{it}} * X_{it}$$

"Ratio imputation" is really a hybrid in that it was performed for the non-response codes assigned A2, B2, C2, D2, and E2 subject to the absolute ratios falling within acceptable bounds. If the absolute ratio was too small or large, the weighted means formula is performed instead of ratio imputation. Cases with non-response code F2 were imputed using weighted means in both ratio imputation and weighted means. This is because there was no response within the prior five quarters. As a result, when comparing ratio imputation with weighted means imputation, the imputation for F2 would be the same and not contribute to the difference.

Weighted Means

$$X=\frac{\sum_{i=1}^{n} W_i \; X_{i0}}{\sum_{i=1}^{n} W_{i0}}$$

For some items, we found that weighted means imputation was optimal. For these items, all non-respondents were imputed based on the weighted means formula above.

2.5 Summarizing the Results of the Simulation

We aggregated the totals by sector and computed the summary statistics below. Note that the summary statistics that follow are composed of imputes along with reported values. Let A denote the actual weighted totals for a given cell within a sample. We computed our actual cell totals for all five samples by: $A=\frac{1}{5}\sum_{s=1}^{5} A_s$

Within Sample Means

The within sample means were computed as follows:

$$\overline{X}_s = \frac{\sum_{r=1}^{1000} X_{rs}}{1000}$$

where the X_{rs} are the cell totals based on the current method of imputation for each S=1-5.

Grand Means

The grand mean for the current method of imputation (X) was computed as follows:

$$\overline{X} = \frac{\sum_{s=1}^{5}\sum_{r=1}^{1000} X_{rs}}{5000}$$

Bias

The respective Bias for current method of imputation were computed as follows:

$$Bias_c = \overline{X} - A$$

Imputation Variances

The imputation variances were computed for the current method of imputation as follows:

$$S_c^{\,2} = \frac{1}{5}\sum_{s=1}^{5} \frac{\sum_{r=1}^{1000}\left(X_{rs} - \overline{X}_s\right)^2}{999}$$

The respective formulas for the within sample means, grand means, variance, and bias for the ratio method of imputation (Y) and the weighted means method (Z) follow by replacing X with Y and Z. Evaluation of the results consisted of testing the respective bias for the current versus the proposed ($Bias_r$ or $Bias_w$) by item and sector.

2.6 Review of Graphs and Balancing

Table F in the appendix provides a list of key codes and corresponding descriptions found on the long form. Key codes 101 through 123 correspond to the Income section of the questionnaire. Key codes 201 through 223 and 301 through 328 correspond to the Assets Section and the Liabilities Section respectively.

Ratio imputation performed well for those income items that were strictly positive. We performed weighted means imputation for the remaining items from the Income Section containing negative data. The four derived income-related items shown in Table F are income-loss from operations (104), income-loss before income taxes (111), income-loss before extraordinary items (115), and income-loss for quarter (118). Deriving these four from other items would eliminate the need to balance and adjust the detailed imputed results. For three of these, we compared the precision of the imputed versus derived. We found that the derived was at least as good as the imputed for these three items. Since the extraordinary items (116 and 117) were nearly always zero, we decided to derive income-loss from quarter (118) based on the results of 115 and imputed items 116 and 117 to be zero.

Since the asset-related items were all positive valued, we had a choice between imputing these items using weighted means or using ratio imputation. We compared graphs of the actual aggregate totals (A), the ratio imputation aggregate totals ($\overline{Y}$), the weighted means aggregate totals ($\overline{Z}$), and the current method aggregate totals ($\overline{X}$). We compared the three imputation methods, by producing and reviewing graphs of respective bias as represented by the formulas in section 2.4; $Bias_c$, $Bias_r$, and $Bias_w$. Using these comparisons, we were able to find an optimal method of imputation for each asset item. We considered directly imputing total assets (223) and Net Plant, Property, and Equipment (219) versus deriving these items from other imputes. After testing based on the methods outlined in section 2.3, we made the decision to directly impute 223 and to derive 219. As a result of our decision to impute 223, we investigated balancing the detailed items to 223. We found that 95% of the detail asset-related imputes would need to be adjusted by at most 20% in order to balance the detail items to 223. Moreover, about 88.65% of the imputed detail items needed to be adjusted by at most 10% in order to achieve balance to 223. Consequently, we were confident that the adjustment due to balancing would not greatly change the imputed detail asset items.

We sought to find an optimum method of imputation for each of the items from the Liabilities Section. Again, we reviewed the graphs of respective sector totals, A, $\overline{X}$, $\overline{Y}$, and $\overline{Z}$ along with the respective bias in order to come up with an optimal method of imputation for each item. We imputed the seven real valued items from this section using weighted means. After investigating the two items stockholders equity (327) and total liabilities and stockholders equity (328), we decided to derive these from other imputed items.

2.7 Testing for Statistical Significance

In order to test to compare the proposed method of imputation to the current method we utilized a 0.05 level of significance for testing. We based the significance testing on 1000 replicate runs for five independent samples. The Z test statistic was formulated as follows:

$$Z = \{Bias_p - Bias_c\} \div \sqrt{\frac{S_p^{\,2} + S_c^{\,2}}{5000}}$$

Where $S_P^{\,2}$ and $S_c^{\,2}$ are the respective imputation variances based on the proposed and current methods of imputation respectively. A test statistic less than –1.96 resulted in a conclusion that the proposed method of imputation was significantly better than the current method of imputation for the item and sector tested. Conversely, we concluded that the current method of imputation was significantly better than the proposed when the test statistic was greater than 1.96. Values of the test statistic greater than –1.96 and less than 1.96 showed that there was no significant difference between the proposed and current methods of imputation. Table B summarizes the results of the statistical testing by sector indicating that for most items; the proposed method of imputation was significantly better than the current method. Seven of the possible 71 items on the short and long forms were not included in our testing. Of these seven, three of the items had more than 99.5% of the cases with reported zeros. We decided to impute zero for these items.

3.0 Conclusions

Table F presents counts that compare the number of items that tested in favor of the proposed method of imputation compared to the number of items testing in favor of the current method. The durables sector shows roughly a 3 to 2 split in favor of the proposed method. The remaining sectors show roughly a 2 to 1 split in favor of the proposed method. The proposed method of imputation that consists of weighted means for some items and a combination of ratio imputation and weighted means imputation for other items, provide a better alternative to handle unit non-response. When the test statistics indicated statistical significance, usually the test statistics indicated that the respective differences between the current and proposed methods were highly significant.

Generally, we found that the respective estimates of imputation standard error comparing the current to the proposed imputation method were comparable. With a few unusual exceptions, the respective imputation standard errors, current to proposed, by item and sector were within 30%. For somewhat more than one-third of the items, the proposed method showed imputation standard errors somewhat less than the respective standard errors for the current method for all sectors. For somewhat less than a one-third of the items, the imputation standard errors based on the current method were slightly lower by sector than the proposed method. For the remaining items neither of the respective measures of imputation standard errors were consistently better for all sectors.

QFR items containing a large proportion of reported zeros with consistency between current and prior quarter performed better with the current method of imputation. Examples of two of these include: Deposits (202) and Short Term Loans (302). It is difficult to improve on carrying forward zero for items such as these. The items containing a high proportion of strictly positive data performed much better using the proposed method of imputation compared to the current method. Generally, for most survey items, the proposed method of imputation performed better than the current method of imputation of carrying forward values for certainty stratum and re-weighting non-certainties as shown by our significance testing.

Table B: Summary of Tests for Significance by Sector

Sector	New Imputation Significantly Better	Old Imputation Significantly Better	No significant Difference
All Manufacturing	36	20	8
Durable Manufacturing	30	21	13
Non-durable Manufacturing	34	19	11
Mining	24	11	8
Retail	29	16	11
Wholesale	38	14	5

Appendix

Table F: Key Codes and Descriptions for the QFR Long Form

Key Code Income	Short Description	Data Characteristics	Imputation method Proposed
101	Income and Receipts	Strictly positive	Ratio imputation
102	Depreciation Expenses	Strictly positive	Ratio imputation
103	All Other Operating Expenses and Costs	Strictly positive	Weighted means
104	Income-Loss from Operations 101- (102+103)	Some negative, mostly positive	Derived
105	Interest Expense	Mostly positive, some zero	Ratio imputation
106	Dividend Income	Mostly zero, some positive	Weighted means
107	Other recurring non-operating income	Some negative, some zero, some positive	Weighted means
108	Nonrecurring items	Some negative, some zero, some positive	Weighted means
109	Income-Loss of Foreign Branches	Some negative, some zero, some positive	Weighted means
111	Income-Loss before Income taxes 104+106+106+107+108+109-(105)	Some negative, some zero, some positive	Derived
112	Provision for Current and deferred income taxes	Some zero, some positive	Weighted means
113	State and Local Taxes	Some zero, some positive	Weighted means
115	Income (loss) before Extraordinary items 111-(112+113)	Some negative, mostly positive	Derived
116	Extraordinary gains (losses) net of taxes	Nearly always zero	Zero imputation
117	Cumulative Effect of Accounting changes	Nearly always zero	Zero imputation
118	Net Income Loss for quarter (115+116+117)	Some negative, mostly positive	Derived
119	Retained Earnings at Beginning of quarter	Some negative, mostly positive	Weighted means
120	Cash dividends declared this quarter		Weighted means
121	Other direct credits (charges) to retained Earnings		Weighted means
123	Retained Earnings at end of quarter	Some negative, mostly positive	Weighted means
Assets			
201	Cash and Demand Deposits	Some zero, mostly positive	Ratio imputation
202	Time Deposits	Mostly zero, some positive	Ratio imputation
203	Deposits outside the U.S.	Mostly zero, some positive	Ratio imputation
204	Time Deposits in the US include negotiable cert.	Mostly zero, some positive	Weighted means
205	U.S Treasury and Foreign securities-1 year	Mostly zero, some positive	Ratio Imputation
206	Commercial and Finance Paper of US issuers	Mostly zero, some positive	Weighted means
207	State and Local Govt. Securities due in 1 year	Mostly zero, some positive	Ratio imputation
208	Foreign Securities due in one year or less	Mostly zero, few positive	Ratio imputation
209	Other Short-term Financial Investments	Mostly zero, few positive	Weighted means
211	Trade Accounts and Trade Notes Receivable	Mostly zeros, some positive	Ratio imputation
212	Other trade accounts and Trade Notes Receivable	Few zeros, mostly positive	Ratio imputation
214	Inventories	Few zeros, mostly positive	Ratio imputation
215	All Other Assets	Some zero, mostly positive	Ratio imputation
216	Plant and Equipment	Strictly positive	Ratio imputation
217	Land and Mineral Rights	Some zero, some positive	Ratio imputation
218	Accumulated Depreciation	Strictly positive	Ratio imputation
219	Net Plant, Property, and Equipment	Strictly positive	Derived
220	US Treasury and Federal Securities	Mostly zero, A few Positive	Ratio Imputation
221	All other Non-current Assets	Some zero, mostly positive	Ratio Imputation
223	Total Assets (201+202+203+204+205+206+207+208+ 209+211+212+214+215+219+220+221)	Strictly positive	Ratio Imputation

Key Code	Short Description	Data Characteristics	Imputation Method Proposed
Liabilities			
301	Short Term Loans From Banks (1 year or less)	Some zero, some positive	Weighted means
302	Short Term Loans (Commercial Paper)	Mostly zero, some positive	Ratio imputation
303	Other Short Term Loans	Mostly zero, some positive	Ratio imputation
305	Advances and prepayments from the US govt.	Nearly all zero	Zero imputation
312	Other Long-term Loans	Mostly zero, some positive	Weighted means
314	All other Current Liabilities	Strictly positive	Ratio imputation
316	Loans From Banks	About half zero, half positive	Weighted means
317	Bonds	Mostly zero, some positive	Ratio imputation
318	Other Long term Loans	Some zero, some positive	Weighted means
320	Other Concurrent Liabilities	About half zero, half positive	Ratio imputation
321	Capital Stock	Few zero, Mostly positive	Ratio imputation
322	Retained Earnings	Some negative, mostly positive	Weighted means
323	Cumulative foreign Currency Adjustment	Some negative, mostly zero, some positive	Weighted means
324	Other Stockholders Equity Items	Some negative, mostly zero, some positive	Weighted means
325	Treasury Stock at cost	Mostly zero, some positive	Weighted means
327	Stockholders Equity (321+322+323+324)-325	Some negative, mostly positive	Derived
328	Total Liabilities and Stockholders Equity (301+302+303+306 +307+308+310+311+312+14+316+317+318+320+327)	Strictly positive	Derived

Table G: Definitions of Response Patterns

Response Pattern	Current Quarter	Previous quarter	Lag2	Lag3	Lag4	Lag5
A1	Respondent	Respondent	--	--	--	-
A2	Non-respondent	Respondent	--	--	--	--
B1	Respondent	Non-respondent	Respondent	--	--	--
B2	Non-Respondent	Non-respondent	Respondent	--	--	--
C1	Respondent	Non-respondent	Non-respondent	Respondent	--	--
C2	Non-Respondent	Non-respondent	Non-respondent	Respondent	--	--
D1	Respondent	Non-respondent	Non-respondent	Non-respondent	Respondent	--
D2	Non-respondent	Non-respondent	Non-respondent	Non-respondent	Respondent	--
E1	Respondent	Non-respondent	Non-respondent	Non-respondent	Non-respondent	Respondent
E2	Non-respondent	Non-respondent	Non-respondent	Non-respondent	Non-respondent	Respondent
F1	Respondent	Non-respondent	Non-respondent	Non-respondent	Non-respondent	Non-respondent
F2	Non-respondent	Non-respondent	Non-respondent	Non-respondent	Non-respondent	Non-respondent