SUPPORTING STATEMENT FOR REQUEST FOR EMERGENCY ACTION–PART B
UNITED STATES INTERNATIONAL TRADE COMMISSION QUESTIONNAIRE

Remanufactured Goods: An Overview of the U.S. and Global Industries, Markets, and Trade

B. Collection of Information Employing Statistical Methods

1. Response universe, sample sources, and sampling strata

The potential respondent universe includes all companies that conduct business in the United States and have primary NAICS codes corresponding to industries that USITC staff identified as "remanufacturing-intensive" (i.e., likely to include a relatively greater degree of remanufacturing activities than other industry sectors).[1] The potential respondent universe represents the sum of firms, net of duplicative records, identified in the sources described below.

Several sources were used to compile a universe of U.S. firms likely engaged in remanufacturing activities. These include the following:

1. USITC analyst research to identify remanufacturers
2. A database of remanufacturing firms obtained from the Rochester Institute of Technology (RIT)
3. A keyword search of likely remanufacturers using the ORBIS database[2]
4. A keyword search of likely importers of remanufactured goods using the PIERS database[3]
5. All firms with 20 or more employees belonging to remanufacturing-intensive industry sectors, as noted above, obtained from the ORBIS database.
6. Wholesaler firms from the ORBIS database corresponding to certain remanufacturing-intensive industry sectors that may import or export remanufactured goods

Sources 1 and 2 are lists of firms obtained by experts at the USITC and RIT, respectively. Sources 3 and 4 are lists of likely remanufacturers and likely importers of remanufactured goods obtained via a keyword search on company and product descriptions from the ORBIS and PIERS databases. Sources 5 and 6 are additional sources used to augment the likelihood of capturing firms likely engaged in remanufacturing activities.

The firms in sources 5 and 6 are thought to be less likely engaged in remanufacturing activities than firms identified in sources 1–4, but will nevertheless enable the USITC to capture responses from a greater number of firms potentially engaged in remanufacturing activities to estimate more accurately U.S. production and trade of remanufactured goods. USITC analysts identified wholesaler NAICS categories that are thought to likely engage in trade in remanufactured goods, including tires, motor vehicle parts, information technology (IT) equipment, and consumer electronics.

[1] USITC staff identified 14 remanufacturing-intensive sectors, which are: aerospace, motor vehicles, heavy-duty construction equipment, consumer electronics, information technology (IT) equipment, imaging products, consumer household appliances, machinery, electrical apparatus, medical equipment, furniture, locomotives, tires, and restaurant equipment.

[2] ORBIS is a proprietary global database containing information on all known firms.

[3] PIERS is a proprietary database containing information on ocean-going import and export trade.

Firms identified in sources 5 and 6 are stratified according to their belonging to either one of 14 remanufacturing-intensive industry sectors, or the wholesale sector. Firms are further divided by size, with SMEs (20 to 499 employees) distinct from large firms (500 or more employees). The large firm strata are each sampled at 100 percent due to the small size of these strata and the projected importance of these firms in terms of revenue and international activity. The number of firms in each stratum and the sample size is provided in Table 1.

The sample size of 7,000 is the number of surveys that will be sent out and is based on what is needed for a statistically significant response, given historical response rates. Based on results of similar past surveys, we expect the response rate to range from 25–50 percent. Given a response rate in this range, the number of surveys received from the sampled companies ranges from 1,750 to 3,500.

2. Collection of information

a. Statistical methodology for stratification and sample selection

A stratified sample based on a simple stratification process is being implemented for this project. The goal of the stratification scheme is to develop a set of strata such that the variance of responses (such as level of employment, types of remanufacturing activities, and likelihood of remanufacturing) within each stratum is minimized to the extent possible. Because no pro-forma reliable data exist on the size and scope of the remanufacturing sector, the stratification scheme was based on the best judgment of industry and USITC experts. Three attributes were deemed potentially indicative of the similarity of firms. These are (1) the likelihood of a firm being a remanufacturer, (2) the industry in which the firm operated, and (3) the size of the firm. In sum there will be 34 strata.

The set of firms identified as extremely likely to engage in remanufacturing activities is based on research conducted by USITC staff and industry experts. USITC staff believes that the 100 percent sampling of these firms would yield valuable information on U.S. remanufacturing activities. Firms identified in sources 1–4 noted above are considered extremely likely to be engaged in remanufacturing activities and as such, will be sampled with 100 percent certainty.

The firms identified in sources 5–6 are considered to be less likely to be engaged in remanufacturing activities, and as such, will be sampled at random within their respective strata.

The sample of 7,000 will most likely provide a response needed to differentiate answers across industries with statistical significance. There are 19 certainty strata: 4 based on source, and 15 non-certainty strata among the large industries.

The methodology for allocating the remaining selections is based on the Neyman method, which is designed to provide the optimal mix for the sample allocation when using a stratified random approach. The Neyman allocation is driven by the product of each stratum's remaining population and standard deviation of the number of employees. Strata with larger variance in employment (i.e. the more heterogeneous strata) will therefore be oversampled in order to improve the overall precision of the analysis.

b. Estimation Procedure

In order to produce population estimates and precision statistics about the estimate, the following equations will be used:

The formula used to estimate the population attribute of interest is found in Equation 1. The precision statistics about the estimate are found in Equations 2-3. Per standard notation, the total estimate from a stratified random sample τ_{st} is shown in Equation 1:

Equation 1

$$\tau_{st} = \sum_{h=1}^{L} N_h \bar{y}_h$$

where *h* equals an individual stratum, N_h equals the population of stratum *h*, $\bar{y}_h$ equals the average of the attribute of interest of the sampled items in stratum *h*. For example, $\bar{y}_h$ would represent the average amount of revenue loss within each stratum.

Its variance estimate is per Equation 2:

Equation 2

$$var\ (\tau_{st}) = \sum_{h=1}^{L} N_h (N_h - n_h) \frac{s^2}{n_h}$$

where s^2 equals the standard deviation of the attribute of interest within stratum *h*.
Its standard error is per Equation 3:

Equation 3

Standard error=$\sqrt{var\ (\tau_{st})}$

c. Degree of accuracy needed for the purpose described in the justification

The sample size for this survey is constrained by USITC resources for processing the completed questionnaires. Given that constraint, it is expected that it will be feasible to produce statistically significant results for the majority of survey items at the aggregate level at a 90 percent confidence level, both for the binary questions and for questions requiring responses in U.S. dollars. Given the sample size per stratum, it is assumed that it will be feasible, in most cases, to distinguish the responses across the largest industries within a 90 percent confidence interval. This degree of confidence is sufficient for the purposes described in the justification.

d. Unusual problems requiring specialized sampling procedures

No unusual problems were encountered.

e. Any use of periodic (less frequent than annual) data collection cycles to reduce burden.

This data collection is currently only intended to occur once, and therefore will not be repeated on a periodic basis.

3. Response rates

Commission staff will employ several techniques to increase the response rates of questionnaire recipient firms. Selected recipients will receive up to 4 notices. Firms will first receive a letter notifying them that their firm was selected to fill out the Commission survey and that it will arrive shortly. Firms will then receive a letter directing them to complete the Commission survey. Prior to the response deadline, firms that have not responded will receive a reminder post card of the

impending submission deadline. Once the submission deadline has passed, firms that still have not responded will receive an additional letter directing them to fill out the questionnaire and submit it. Each of these communications will include a phone number and email address of a person that can help firms with filling out the questionnaire or answer their questions regarding the survey and/or study. Commission staff may also contact firms directly, via phone or email, to urge them to complete the survey and to answer any questions they may have regarding this information collection or study in general. Commission staff may also contact firms, via phone or email, to correct information or fill in incomplete responses, or solicit additional information about a response. The burden associated with follow up calls or emails is included in the total response burden amount.

Once the survey response period has been closed, the USITC will conduct an analysis of survey responses in order to detect and correct for any non-response bias contained in the survey results. Analysis for non-response bias seeks to answer two questions: Do the characteristics of those who answer the survey differ from those that do not answer the survey? And, are those characteristics associated with the survey's outcomes of interest?

In order to examine the impact on non-response bias, the team will first examine conditional response rates for groups of firms based on characteristics available in the data frame that are hypothesized to impact outcomes of interest. These may include variables such as firm size; share of remanufacturing sales; industry, primary product or service; NAICS code; or other variables. Any differences in response rates (whether statistically significant or nominal differences of a large magnitude) can be further investigated through logistic regression analysis, using firm characteristics as predictors, and whether or not a recipient responded to the survey as a binary outcome. If the results of the regression show that none of the characteristics influences the propensity of a survey recipient to respond to the survey in a statistically significant way, then the team will make the assumption that non-responses are randomly distributed in the population, and that no correction for non-response bias is required.

However, if the results of the logistic regression indicate that one or more of the characteristics investigated above affects the propensity of a survey recipient to respond to the survey, then those characteristics should be examined to determine whether they are associated with differences in the outcome variables under study across the dataset of survey responses collected. This could be investigated using various multivariate methods, using firm characteristics as predictors and the survey variable of interest as the outcome. If any sources of non-response bias are found, they can be controlled for by the development of weights, which can then be used in concert with weighting based on population stratification, in the extrapolation of results to the entire population.

4. Test for procedures or methods

Once the samples within each of the strata described above have been completed, the Commission will conduct several diagnostic tests of the sample including comparing means and variances between the sample and the population for each of the strata in order to identify any potential biases or problems with the sampling technique. These diagnostic tests will not require any communication with potential respondents.

Aside from previously discussed field testing with firms, the questionnaire has been extensively reviewed within the Commission. Industry analysts and economists who will prepare the report have reviewed the document and made recommendations to improve the content of the questionnaire so that it will include the information needed to adequately answer questions addressed in this study while imposing a minimum burden on the responding businesses.

5. Contact information

Collection and analysis of the data will be the responsibility of the Office of Economics and the Office of Industries within the Commission. Project leader, Alan Treat, of the Office of Industries, can be contacted at 202-205-3426, deputy project leader, Jeremy Wise, of the Office of Industries, can be contacted at 202-205-3190, and lead economist for this study, Tani Fukui, can be contacted at 202-205-3220. In addition to numerous Commission staff consulted on the statistical aspects of the questionnaire, Commission staff also worked with Boris Rachev and his colleagues at Summit Consulting, a survey design and data analysis consulting firm. Mr. Rachev may be contacted at 202-407-8300 or at boris.rachev@summitllc.us.

TABLE 1 Population and Sample Count in Considered Industries

Orbis	NAICS codes	Population	Sampled	Projected Response	
				Low (25%)	High (50%)
Aerospace	336411, 336412, 336413, 488190	1,403	292	73	146
Motor Vehicles	333618, 3361, 3363	1,885	520	130	260
Consumer Electronics	3331 except 333112, 333995	1,753	325	81	163
Consumer Household Appliances	3342 except 334290 (IT), 3343, 339920, 339932	168	49	12	25
Electrical Apparatus	333313, 3341, 334290, 3344, 811213	938	183	46	92
Furniture	325910, 325992, 333293, 333315, 811212	546	92	23	46
Heavy Duty Equipment	3352	1,275	200	50	100
IT Equipment	332911, 332991, 3332 except 333293 (imaging), 333311, 333312, 3334 except 333415 (restaurant equipment), 333512, 333513, 333516, 333518, 3336 except 333618 (motor vehicles), 3339 except 333995 (heavy duty)	3,684	777	194	389
Imaging products	3353	718	101	25	51
Locomotive	325413, 334510, 334517, 339112 - 339115	79	22	6	11
Machinery	3372 excluding 337212.	4,689	764	191	382
Medical Equipment	336510	2,332	501	125	251
Restaurant Equipment	326211, 326212	3,749	381	95	191
Tires	333319, 333415	157	25	6	13
Wholesaler	423130, 423140, 423430, 423620, 423690, 423930	8,621	923	231	462
			-	-	-
Other sources			-	-	-
Analyst list		1,082	1,082	271	541
RIT		339	339	85	170
Keyword Search		178	178	45	89
PIERS		246	246	62	123
Total		**33,842**	**7,000**	**1,750**	**3,500**