

**B. DESCRIPTIONS OF INFORMATION COLLECTION EMPLOYING STATISTICAL METHODS**

The following paragraphs summarize the primary features of the sampling and statistical methods used to collect data and produce estimates for the IPP Export (Import) series. Additional technical details are provided in Chapter 15 of the BLS Handbook of Methods and the Sampling and Index Construction Concepts papers, which are internal BLS reports and are available upon request.

To meet the demanding requirements of the IPP in the environment of the constantly changing composition of international trade requires complex statistical procedures. The potential respondent universe consists of the total set of export prices. The universe of individuals and establishments exporting products or services from the United States is estimated at approximately 580,000. In 2006, the overall sample for ongoing repricing of exports for the IPP is approximately 2,700 exporters with 17,010 annual exporter responses. Approximately 7 quotation prices are sampled within each exporter with a resultant average of 4.104 prices collected from each responding exporter. There are approximately 150 product category strata in the export sample design.

1. The actual response rate achieved during the last two export samples initiated was 80% excluding out-of-scope and out-of-business units. Approximately 28% of the units sampled are either out-of-scope or out-of-business. In addition, approximately 10% of the exporters are lost each year due to going out-of-business, further refusals, or the changing nature of the export business. The following table presents response rates for exporters for IPP initiation. See attachment 15 for the details of how these rates are calculated.

Universe Error Rate	
In Scope Rate	72%
Out-of-Scope/Out-of-Business Rate	28%
Response Rate	
Cooperation Rate	80%
Refusal Rate	20%

2a. Description of Sampling Methodology

The IPP divides export products into two groupings, or panels. Every other year the IPP resamples each panel and retains the products initiated during the resampling for four years. With each resampling, the IPP removes from its active database all products in the panel which were added four years previously. Therefore, the IPP continually replenishes its database with products which truly represent international trade in each major product area.

For exports, the two panels consist of the following major product groupings, as defined by the Harmonized System:

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Export Product Area A: Food and beverages  
Minerals, chemicals, and rubber  
Crude materials; related goods  
Miscellaneous manufactures

Export Product Area B: Machinery  
Vehicles and transportation equipment

This sampling methodology is intended to provide a database for IPP indexes which represents actual U.S. export activity at any point in time and to facilitate product replenishment in highly volatile trade categories.

For each export panel, the IPP uses a multi-stage sampling process. The three stages of selection are: (1) the sampling of exporters, (2) the sampling of item groups (ELI's) to be priced in the exporters, and (3) the sampling of items from each ELI in each exporter.

The export sampling frame is constructed from export documents filed during a reference period, usually one calendar year. Exports to countries other than Canada are filed on Shipper Export Declarations on file at the U.S. Census Bureau. Since exporters to Canada are no longer required to file export documentation, IPP uses the Canadian import documents provided to the U.S. Census Bureau by the Canada Border Services Agency, to construct the portion of the sampling frame that corresponds to exports to Canada. The sample of exporters is selected from the combined sampling frame using a systematic procedure with each exporter having a probability of selection proportional to the value of its trade within the product stratum.

The export sampling frame is also used to construct a record of each exporter's trade in each ELI. Within a selected exporter, a sample of ELI's is selected using a systematic selection procedure where the expected number of items selected for an ELI is proportional to the value of trade within the stratum of the ELI.

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2b. Description of Estimation Methodology

IPP indexes are defined as fixed quantity price indexes. The fixed weights are updated annually with a two-year lag. (The IPP survey is currently using 2004 fixed weights). Export indexes are the ratio of the value of a set of export items of constant quality and constant quantity in two different time periods. The index  $I_{t,o}$  between time  $t$  and reference period time  $o$  is given by

$$I_{t,o} = \frac{\sum_c P_{c,t} Q_{c,o}}{\sum_c P_{c,o} Q_{c,o}} \times 100 ,$$

where  $P_{c,t}$  = price of item  $c$  at time  $t$ ,  
 $P_{c,o}$  = price of item  $c$  at time  $o$ ,  
 and  $Q_{c,o}$  = quantity of item  $c$  at time  $o$ .

If  $V_t$  is the total value of base period quantities of items at prices observed at time  $t$ , that is,

$$V_t = \sum_c P_{c,t} Q_{c,o} ,$$

then an estimator ( $I_{t,o}$ ) of the index can be written as

$$I_{t,o} = \frac{V_t}{V_o} \times 100 = \frac{V_t}{V_{t-1}} \times I_{t-1,o} .$$

The indexes of the IPP are computed by a chaining process, as indicated in the above equation, in which the index for the last time period is multiplied by the relative change in value from the previous time period to the current time period rather than by using a constant quantity. The indexes are the product of the relative changes from the base period. The ratio of the value at the current time period to the previous time period is the most recent relative change in value and is used to update the previous time period's index to the current time period. The total value for any aggregate is computed as the sum of the base period value updated by a product stratum or service group index relative, that is,

$$V_t = \sum_{h=1}^H V_{h,o} R_{h,t,o} ,$$

where  $R_{h,t,o}$  = the index relative from the base period to the current time period for a product stratum or service group  $h$ .

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and  $V_{h,0} = \sum_c P_{c,0} Q_{c,0}$  = the total value at the base period of all items in a product stratum or service group h.

The index relative for the IPP product stratum or service group is estimated by

$$R_{h,t,0} = \frac{\sum_c W_c R_{c,t}}{\sum_c W_c R_{c,t-1}} R_{h,t-1,0} .$$

where  $W_c$  = the weight for each commodity based on the value of the company's trade within the stratum and its probability of selection.

The product stratum or service group index relatives are the lowest levels at which indexes are produced and are used to compute aggregate indexes. The summation is of the weighted price series of each item specification c collected, that is

$$R_{c,t} = \frac{P_{c,t}}{P_{c,t-1}} R_{c,t-1} .$$

The relative for each price series is computed by multiplying the previous time period relative by the ratio of the current reported price to the previous time period's price of the item specification.

3. Several techniques are used to ensure maintenance of adequate sample sizes for estimating IPP indexes. Initial sample sizes are sufficiently larger than desired sample sizes to allow for non-response, that is, out-of-business, out-of-scope, and refusal. Extensive analysis has been conducted to identify the causes of non-response and out-of-scope response, which resulted in a few of the following methodology changes. For additional details, see the Out-of-Scope Export Analysis report which is an internal BLS report available upon request. A paneling approach was implemented whereby a new sample is introduced each year across half the product categories, re-establishing the distribution of the sample and incorporating changes in the distribution of exports/imports. Frequency of trade of exporters/importers in products is measured from the sampling frame and incorporated in the sample design to reduce the out-of-scope rate. For exports, IPP has started to receive name and address information for each export shipment from a company and is revising its matching process for determining the correct name and address of each sampled unit. IPP is also determining the feasibility of linking the Employer Identification Number (EIN) to additional data sources and using the linked information for identifying the correct name, address, and other pertinent

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information of each sampled unit. Additionally, other variables on the sampling frame are being examined for aid in identifying out-of-scope trade.

To improve the response rate of reporters, the IPP is devising strategies to reduce respondent burden while increasing or at least maintaining their level of participation. The strategies which the IPP has implemented or is considering include capping the burden for a reporter within a sample, a refinement process that gives Industry Analysts more freedom to reduce the burden for a respondent when needed, and potentially repricing current items for a longer period of time rather than initiating new items.

4. In FY2003, the IPP developed a new web-based collection system designed to permit respondents to update their data directly via the internet. An advantage of Web repricing is system-generated edits alerting respondents of any anomalies in the data they are providing before they are submitted. This reduces the number of follow-up phone calls required by analysts. In addition, response rates could improve as well.
5. The responsibility for the statistical aspects of the International Price Program as well as collection and processing of price information resides with William Alterman, Assistant Commissioner for International Prices, Office of Prices and Living Conditions, Bureau of Labor Statistics.