survey areas were combined using equal weights.

2.6 Step 5: Analyzing Data and Computing Indexes

2.6.1 General Formulae

2.6.1.1 Indexes

Nonforeign area COLAS are derived from the living-cost indexes. These indexes are mathematical comparisons of living costs in the allowance areas compared with living costs in the Washington, DC, area.

At the most fundamental level, an index is a way to state the difference between two prices (or sets of prices). For example, if a can of green beans costs \$1.00 in the allowance area and 80 cents in the DC area, green beans are 25 percent more expensive in the allowance area than in DC. That difference can also be stated as a price index of 125.

2.6.1.2 Item Weights

JFA computed indexes for hundreds of items. To combine these indexes, JFA used weights derived from the CES. These weights reflected the relative amount consumers normally spend on different items. For example, the price of a can of green beans has a lower weight than the price of a pound of apples because, according to the CES, people generally spend less on green beans than on apples. The COLA model uses a fixed-weight indexing methodology. This means that the same expenditure weights are used in the reference area (i.e., the DC area) and in the allowance areas. The weights used are based on the expenditure patterns of consumers nationwide as reported by the CES. This is the only source, of which OPM is aware, that provides expenditure information by income level.

2.6.1.3 Category and Component Weights

As described in section 2.3.2, JFA also computed income sensitive category and component weights. This allowed the combination of item prices in a manner that reflected the different spending patterns of people at different income levels. How this was accomplished differed among the components.

For the Goods and Services and Miscellaneous Expense components, JFA simply combined indexes within each category using the CES weights to derive an overall index for the category. The category indexes were then combined into an overall component index using the income-sensitive category weights described above.

For the Transportation and Housing Components, JFA used the above approach in combination with a costbuild-up approach. For example, for each area the annual cost of owning and operating an automobile was computed by taking individual prices (e.g., automobile financing, insurance, gas and oil, and maintenance) and computing an overall dollar cost for each area. These costs were compared with those in the DC area to compute the Private Transportation Category index. This index was then combined with the Other Transportation Category index using income sensitive category weights to compute an overall Transportation Component index for each area.

2.6.2 Computing the Overall Index

The item, category, and component indexes were combined using the process prescribed in Section 591.205(c), title 5, Code of Federal Regulations. That is a five-step process that involves converting the indexes to dollar values and weighting these, combining them, and comparing them to compute a final weighted average index. The process is described below.

First, JFA used the CES data and the income ranges described in section 2.2.1 to determine the amount of money consumers typically spend on each component at each income level. These amounts appear in the table below and in Appendix 20. They were derived by taking the component weights shown in Table 2–1 times the representative income levels described in section 2.2.1.

TABLE 2–2.—TYPICAL CONSUMER EXPENDITURES BY INCOME LEVEL AND COMPONENT

Income level	Goods and services	Own/rent	Transpor- tation	Misc.	Total
Lower	\$8,341	\$5,202	\$3,938	\$3,320	\$20,800
Middle	12,433	7,555	5,879	5,634	31,500
Upper	18,775	11,114	8,892	9,520	48,300

(Note: Values may not total because of rounding.)

Second, for each allowance area, JFA multiplied the dollar values above by the component indexes for the allowance area. Because the housing component consisted of two indexes (one for owners and another for renters), two sets of total relative costs were produced—one for owners and another for renters.

Third, for each allowance area and income level, JFA combined the total relative costs for owners and renters using as weights the proportion of owners and renters as identified in the CES. (See section 4.2.1.) This produced an overall expenditure dollar amount for each income level in each allowance area.

Fourth, JFA computed a single overall average expenditure for each allowance area by combining the income level expenditures and using the allowance area General Schedule employment distribution as weights. This produced a single overall dollar expenditure value for the allowance area. Using the same General Schedule employment weights, JFA also computed a single overall dollar expenditure value for the DC area.

The final step was to divide the overall average dollar expenditure for the allowance area by the overall average dollar expenditure for the DC area to compute a final index. These indexes are shown in the last section of this report and in Appendix 20.

3. Consumption Goods and Services

3.1 Categories and Category Weights

Based on the CES data, JFA identified ten categories of expenses within the Goods and Services Component. Using linear regression analyses and the CES data, JFA identified the portion of total Goods and Services expenditures that the typical consumer spends in each category at various income levels. The categories and the relative expenditures are shown in the table below: