

**Claritas
Consumer Buying
Power™ Methodology**



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Executive Summary

The Consumer Buying Power™ (CBP) database incorporates geography-based estimates of potential annual consumer expenditures for more than 350 household expenditure items. CBP data allows you to identify the potential demand of consumers for products and services by geographic area regardless of where the consumers make their purchase.

The database was developed using the Consumer Expenditure (CE) surveys conducted by the Bureau of Labor Statistics. Current-year (CY) estimates and five-year (5Y) projections of potential consumer expenditures are available for all standard census, postal, and marketing geographies. For a complete listing, see the “Expenditure Graphic Coverage” section.

Line item categories for CBP are listed in the table below.

CBP Line Item Categories	
Alcoholic Beverages	Jewelry
Automotive Maintenance/Repair	Medical Expenses and Healthcare
Contributions	Miscellaneous Household Equipment
Daycare	Personal Care Products and Services
Domestic Services	Pet Expenses
Drugs	Photographic Equipment
Education	Reading Materials
Food and Beverages at Home	Small Appliances and Housewares
Food and Beverages Outside the Home	Smoking Products
Health Care	Sports and Recreation
Home Electronics	Total Apparel
Household Furnishings	Transportation
Household Services	Travel
Housekeeping Supplies	TV, Radio, and Sound Equipment
Housewares and Home Appliances	Total Specified Consumer Expenses
Housing Expenses	

Development of the CBP household expenditure estimates required standardizing the two CE survey components:

- Interview Survey, which collects monthly expenditures for households over a 15-month period (five consecutive quarters).
- Diary Survey, tracks expenditures for households over a 2-week period.

Both the interview and diary data must be annualized to correspond with household expenditures in a 12-month period for model estimation. Claritas maintains a CE survey archive. CBP model coefficients are updated using CE surveys administered during the previous five years. For example, the current CBP data uses CE survey administered between 1999 and 2003. This five-year survey dataset provides information about household spending that is used to build CBP regression models.

The annualized CE survey data was then used to estimate multivariate linear regression models that relate household characteristics to reported expenditures. The modeling process required developing over 350 individual regression models. Careful attention was made in the modeling process so that similar types of expenditures in each CBP category shared common regression model inputs. This process ensured that the final estimated values were consistent across each category. The models estimate the dollar-value of annual expenditures made by households.

Using the estimated regression models and Claritas' annual Update of Census demographics, the geographic database of expenditures was generated.

By applying the block group's current-year demographic characteristics to the estimated regression models, the current-year potential expenditures for a block group are generated. Five-year estimates are calculated by applying the block group's five-year projected demographics to the regression models. Block groups with households present may exhibit demographic characteristics, which according to CBP models reflect zero expenditure capacity for a CBP item. In such a case, the estimated zero expenditure value is reflected in the CBP database.

For 2008, Claritas used models based on the Claritas GRID for Appliances and Household Repairs category expenditures. GRID models estimate block group expenditures by applying LOGIT models developed from the CE Survey to block group GRID counts of households to estimate purchasing households. The purchasing households are then related to average expenditure values developed in a separate GRID-based model from the CES to render total annual expenditures in each block group across the nation.

Claritas enhances the CBP geographic estimates by controlling them to independent national forecasted values. Global Insight (DRI-WEFA), the leading expert in macroeconomic forecasting, produces these national forecasts. Global Insight generates current-year and five-year estimated expenditure figures for each CBP category using industry sales information, Claritas demographic data, and economic information as inputs into the time series models. The estimated geographic expenditures created by the Claritas models are then aligned with the Global Insight national forecasts to produce expenditure estimates based on household-level demographic characteristics that vary across geographies, and sum to industry-recognized national values that reflect both economic and demographics trends. Some categories from the CE surveys have been found to under-represent expenditures when projected from individual households to annual aggregate consumer spending levels. Claritas' unique method of controlling expenditures to national benchmarks corrects this issue.

Additionally, Claritas developed a cross-reference mechanism that leverages the CBP database to estimate potential consumer expenditures in any geography by store types for 38 distinct retail store types, including bookstores, eating places, hardware

stores, shoe stores, gasoline service stations, etc. For a complete listing, see the “Consumer Expenditures by Retail Store Type” section. CBP line item expenditures for geography are assigned to each type of store by the proportion of total expenditures typically spent in each store type. The CBP by retail store-types proportions are calculated from Merchandise Line Sales data from the 1997 Economic (Census of Retail Trade) data. They gather information on the dollar-amount spent on various merchandise items at various types of retail stores. Claritas then uses this data to allocate the CBP consumer spending figures to various retail stores by calculating the proportion of the total expenditures that apply to each retail store type. Claritas then links the merchandise items from the census to individual CBP items. The CBP items are then finally allocated to different store types.

A similar procedure is applied to estimate consumer expenditures in establishments categorized by more than 50 Yellow Pages category. Each Yellow Pages category is assigned a proportion of total purchases for each CBP category according to the proportion of sales each attracts for the category. For a complete listing, see the “Consumer Expenditures by Yellow Pages Categories” section.

Survey Data

The Consumer Buying Power models are developed using the Consumer Expenditure (CE) Interview and Diary surveys. These surveys collect actual expenditure information at the Consumer Unit (e.g., household) level. The CE surveys are administered and maintained by the U.S. Department of Labor, Bureau of Labor Statistics (BLS). According to BLS, these surveys “provide a continuous and comprehensive flow of data on the buying habits of American consumers. This data is widely used in economic research and analysis, and in support of revisions of the Consumer Price Index.” For additional information, see the “Additional Reading” section.

Consumer Expenditure Surveys

The Consumer Expenditure (CE) Interview survey collects monthly retail expenditure information in one-on-one interview survey sessions that are conducted at the respondent’s residence by trained professional survey administrators. Survey-participants are included for up to five consecutive quarters, reporting spending and demographic information in each survey session. The CE Interview survey is designed to collect expenditure data on major items that respondents can be expected to recall for three months or longer, like automotive repairs, home improvements, and clothing. Individual expenditures are aggregated to their corresponding Universal Classification Codes (UCCs) for each household record. The survey is compiled and released on an annual basis for approximately 7,000 households.

The CE Diary survey collects expenditure information on a weekly basis using a mail-in diary survey format. It is designed to collect data on frequently purchased items such as grocery store items, food consumed away from home, personal care products, and gasoline. Each residence participates in the CE Diary survey for two consecutive weeks. Individual expenditures are aggregated to their corresponding UCCs on each household record. The CE Dairy survey information is compiled and released annually for approximately 5,000 households.

Consumer Expenditure Survey Sampling

New respondent households are added to both surveys on a rolling basis throughout each calendar year. Households are selected using national probability samples of U.S. households that are designed to be representative of the total U.S. civilian population.

The sample of households is first gathered from the 1990 Census of Population 100-percent-detail file using four categories of geographic areas based on urban/rural and population characteristics. The household sample is then selected using demographic information gathered from the 1990 U.S. Census. The data is enhanced by using new construction permits and techniques to eliminate recognized deficiencies in census coverage.

Household Expenditure Coverage

The household expenditures collected by the CE surveys do not include all household expenditures. The CE Interview survey is estimated to collect detailed

expenditure data on approximately 60 to 70 percent of total household expenditures, while the CE Diary survey is estimated to collect approximately 5 to 15 percent of total household expenditures. Thus, not all household expenditures are captured by these surveys. Moreover, not all items collected by the surveys are included in the Consumer Buying Power database. Therefore, an aggregation of all CBP variables should **not** be considered a complete measure of total annual household expenditures.

College Dorm Population

The Claritas CBP database estimates have become more accurate with the introduction of college dorm population expenditures. The CBP estimates are both household and college population based in areas where college dorms are present. The college dorm population represents a large portion of the market that, until now, has not been captured in the typical household expenditure estimate model. In 2002, spending by the college dorm population affects 4,029 block groups across the nation, where more than 2 million college students reside in college dorm group quarters.

College dorm population expenditures are estimated using information from the Consumer Expenditure surveys. CE surveys collect spending information for households, as well as for people who reside in college dorm group quarters. Claritas collects the survey respondent information from the college dorm population as a separate sub-sample of the CE surveys. Spending amounts are then calculated for college dorm populations. These figures are applied at the block group level to the college dorm population demographic that Claritas gathers from the U.S. Census and updates each year. The result is annual college dorm population expenditures estimated for the block group level. The college dorm population expenditures are aggregated into the CBP database to create an accurate estimate of consumer expenditures by geography. In areas where there are no college dorms, the CBP estimates are purely household-based. In areas where college dorms reside, the CBP estimates are both household and college population based.

Data Development

Claritas developed a comprehensive methodology to select survey respondent households to develop the most accurate models possible. The CE Interview survey information is first loaded by Claritas as monthly expenditure and income information to capture and retain the number of months reported for the household. Monthly respondent records are aggregated to complete survey records for each respondent household. The records across survey periods are then aggregated to one record for each respondent. In cases where demographic characteristics change between surveys for a given respondent household, the differing survey records are not combined. The separate records stand alone through the record filtering process.

CE survey respondents do not always begin reporting information on the first day of each calendar year and do not complete the survey process on the last day of each calendar year. This creates the need to develop a method of generating annual figures that efficiently utilizes known information.

Household expenditures in the CE Interview survey are reported as dollar values spent each month over the five-quarter survey cycle. The typical method used by Claritas to annualize expenditures is to apply the following calculation:

Equation 1:

$$(Annual\ Expenditure)_i = \sum (monthly\ expenditures)_i * [12\ months/j]$$

For expenditure category *i* over *j* months in the target calendar year.

Some expenditures covered in the CE Interview survey occur less frequently than every month in the average household. Any reported expenditure in these categories could represent the total value spent on the item for the calendar year, and thus the above procedure is not applied to estimate an annual expenditure. Such expenditures are included, but are not limited to, the following categories: auto maintenance, transportation, appliances, household repairs, furniture, sports, and electronics. The annual expenditures for these items are generated by summing the reported monthly expenditures.

Respondent household expenditures in the CE Diary survey are reported as dollar values spent during the survey period. Claritas aggregates expenditures to annual values by applying the following calculation:

Equation 2

$$(Annual\ Expenditure)_i = \sum (weekly\ expenditures)_i * [52\ weeks/j]$$

For expenditure category *i* over *j* weeks reported.

One expenditure item covered in the CE Diary survey, “Lawn and Garden Supplies” purchases, are considered to occur less frequently than every week in the average household. Thus, Equation (2.2) is not applied here. The annual expenditure for this item is generated by summing the reported weekly expenditures.

Model Specification

CBP Regression Models

Most CBP items are modeled using multivariate linear regression analysis techniques. Potential model inputs are chosen from a comprehensive list of household-level information mined from the CE surveys, including household demographics and geography-based variables. This exhaustive list of model inputs provides expenditure precision never before available in a geo-demographic consumer expenditure estimation database. These data elements are also maintained in the Claritas Demographic Update at numerous levels of geography. The list of model inputs include:

Model Item	Definition
Household Income	Introduces household budgetary constraints to CBP models.
Age of Head of Household	Introduces the consumer lifecycle dimension to the CBP consumer demand models; affects spending on Education, Household Repairs, Travel, Apparel, Personal Expenses, Contributions, etc.
Number of Infants, Boys, Girls, Men, Women, and Seniors in Household	Highly detailed predictor of spending on Apparel, Medical Expenses and Healthcare, prescription drugs, infant items, Daycare, Education, Sports & Recreation, electronics, etc.
Household Size (total number of members in household)	Significant determinant of expenditures on Grocery, Personal Care Products and Services, etc.
Number Of Vehicles	Powerful determinant of household spending on Automotive Supplies, as well as purchases of all types of autos, etc.
Family Type	Useful predictor of expenditures on Furniture & Furnishings, Housewares and Home Appliances, Apparel Services, Pet Expenses, Food & Alcohol Away from Home, Photo, etc.
Race and Ethnicity (Hispanic/non-Hispanic)	Significant estimator of expenditure levels on Grocery, Food & Alcohol away from Home, Household Expenses, Sports & Recreation, Personal Care Products & Services, Smoking Products, etc.
Educational Attainment	Useful predictor of expenditure levels on Contributions, School Expenses, Reading Material, etc.
Housing Tenure (Own/Rent)	Important estimator of spending on Household Repairs, Household Expenses, Furniture & Furnishings, Domestic Services, Pet Expenses, Contributions, etc.

Model Item	Definition
Census Region	Significant determinant of spending on Transportation, Apparel Services, Grocery, House Expense, Domestic Services, Apparel, Reading Materials, Food at Home, household durables, Smoking Products, etc.
Urban/Rural	Geographic determinant of spending on Household Repairs, Transportation, House Expense, Domestic Service, Travel, Medical Expense, Smoking Products, etc.
MSA Size	Estimates by size of city the spending per household on Transportation, Apparel Services, Domestic Services, Auto Maintenance, Grocery, Food & Alcohol Away from Home, Travel, Sports & Recreation, etc.

The final regression model specification for each CBP category is determined in a three-step process:

1. Stepwise regression analysis is applied to a selection of CBP items in each retail category to determine which inputs explain household spending habits for the category.
2. Those inputs determine the initial model specification for the category.
3. The model for each CBP item is then further developed to maximize R. For more information, see the “Additional Reading” section.

The model methodology was expanded in the 2001 CBP release to include group quarters expenditure estimates for college housing group quarters along with the traditional household-level expenditure estimates. However, it is not possible to estimate expenditures for military group quarters, since the CE surveys are not administered to military group quarter’ populations.

CBP Grid Models

For 2008, Claritas is using demographically defined grid cells for estimates of Appliances and Household Repairs category expenditures. GRID models estimate block group expenditures in a multi-step process. First, LOGIT models are estimated from the CE survey based on a categorization of respondents into household ownership, household income, and household age GRID cell dimensions. These models determine the propensity of a household in each GRID cell to purchase a product. The resulting purchasing propensities are applied to the Claritas GRID block group database to determine the number of household expected to purchase the product “on the ground.” The purchasing households are then related to average expenditure values developed in a separate GRID-based model from the CES to render total annual expenditures in each block group across the nation.

In keeping with the established CBP methodology, college dorm population expenditures are also included in the CBP GRID model estimates. College dorm population contributes a significant amount of spending on Refrigerators and Cut Flowers & Potted Plans, among other CBP items in the GRID models.

Geo-Demographic Estimation Technique

The unsurpassed precision of Claritas demographics is then leveraged to generate the most accurate consumer expenditure database possible. Household demographic and geographic data from the Claritas Demographic Update are coupled with the model coefficients, or the spending propensity exhibited by each of the CBP model inputs to build the CBP tri-level block group database of consumer expenditures. Tri-level block groups include block groups that are split when they cross Census Place or MCD boundaries. Expenditure estimates for all higher levels of geography are simply aggregated from block groups.

Current-year estimated household expenditures are generated for all block groups using Claritas' current-year estimated demographic variables by applying the geo-demographic estimation technique method. Five-year projected household expenditures are then generated for all block groups using Claritas' five-year projected demographic variables as inputs into the models.

Geographies with no households present reflect zero expenditures. Geographies where, according to the CBP model, household demographic characteristics exhibit no expenditure capacity for an item exhibit zero expenditures for that item. For information on how these databases are benchmarked and adjusted, see the "Data Verification" section that follows this section.

Data Verification

Recent studies have shown that when the CE survey data was projected to the national level to estimate aggregate annual expenditures for some product categories, the estimated values underrepresented actual annual expenditures for the category². This issue introduces the need to link any CE survey-based national estimates of consumer spending to a reliable, industry-accepted source of benchmark spending estimates. Claritas uses the CE surveys to discern between household-level expenditure propensities at low levels of geography. The geography expenditure estimates are then linked to aggregate industry sales data produced by Global Insight (formerly DRI-WEFA).

Claritas, Inc. Geo-Demographics Expertise

Claritas is the leading expert in developing marketing information and applications based on geo-demographic and business information. Each year, Claritas generates the Demographic Update—the industry benchmark for demographic estimation. The Update includes current-year household and population counts for numerous demographic variables, including distinct household characteristics and population information. Claritas demographers and statisticians are among the industry leaders, and represent decades of experience in the field of geography-based demographic estimation.

Claritas leverages its renowned Demographic Update in the CBP production process by applying block-group level data elements to each household model developed from the CE surveys. The result is an accurate database of estimated household expenditures aggregated to the block group level of geography. These estimates are then aggregated to larger census, postal, and marketing geographies using proven, proprietary Claritas methodologies.

Global Insight Macroeconomic Modeling Expertise

DRI-WEFA—now known collectively as Global Insight—creates national expenditure models for Consumer Buying Power items from Personal Consumption Expenditures (PCE) data generated from the National Income and Product Accounts (NIPA). NIPA is developed by the Department of Commerce, Bureau of Economic Analysis. PCE measures the market value of goods purchased by the personal sector of the U.S. economy each year. Source data for the PCE includes data from the Census of Manufacturers, Census of Retail Trade, and Census of Services Industries, as well as publications from other government agencies and trade organizations.

Global Insight then leverages its expertise in developing time series macroeconomic models to create current-year estimates and five-year projections of national CBP category expenditures. Global Insight uses PCE annual data along with Claritas demographic data, and proprietary Global Insight economic time series data to forecast national sales figures. The resulting Global Insight current-year and five-year annual aggregate sales values are used by Claritas, Inc. as benchmark figures to validate the current-year and five-year projected Consumer Buying Power expenditures.

About Global Insight

Global Insight was created with the purpose of combining the two world leading economic and financial forecasting companies—DRI (formerly Data Resources Inc.) and WEFA (formerly Wharton Econometric Forecasting Associates)—to form the world's preeminent financial forecasting company, DRI-WEFA (Global Insight). On October 28, 2002, with all client products and services fully integrated, the company changed its name to Global Insight.

Expenditure Geographic Coverage

CBP databases of current-year estimated expenditures and five-year projected expenditures are maintained for all listed geographies. The benchmark-validated block group expenditures are aggregated to custom industry boundaries and to standard census, postal, and marketing geographies, including:

- Block Group
- Census Tract
- Consolidated Metropolitan Statistical Area (CMSA)
- Congressional District (CNG)
- County
- Designated Marketing Area (DMA)
- Metropolitan Statistical Area (MSA)
- Minor Civil Division (MCD)
- National (USA)
- Place
- State
- Yellow Page Boundaries (YPD)
- ZIP Code

Relational tables are available for all listed geographies, which are updated in conjunction with geography updates in Claritas, Inc software and e-commerce products.

Consumer Expenditures by Retail Store Type

Consumer Buying Power expenditure estimates are organized by retail store types to enhance the usability of the data for retailers. The table below lists the retail store descriptions:

NAICS Code	Retail Store Description
44-45	All Retail Stores
4411+4412	Auto Dealers
4413	Automotive Part, Accessories, & Tire Stores
4421	Furniture Stores
4422	Other Home Furnishing Stores
443111	Household Appliance Stores
443112	Radio/TV/Other Electronics Stores
44312	Computer & Software Stores
44313	Camera/Photographic Supply Stores
444	Building Material & Garden Equipment and Supplies Dlr's
44411	Home Centers
44413	Hardware Stores
4442	Lawn and Garden Equipment and Supplies Stores
44422	Nursery and Garden Centers
4451	Grocery Stores
44512	Convenience Stores
446	Health and Personal Care Stores
44711	Gasoline Stations with Convenience Stores
44719	Gasoline Stations without Convenience Stores
448	Clothing and Clothing Accessory Stores
44815	Clothing Accessory Stores
4482	Shoe Stores
44831	Jewelry Stores
44832	Luggage and Leather Goods Stores
45111	Sporting Goods Stores
45112	Hobby, Toy, and Game Shops
45113	Sew/Needlework/Piece Goods Strs
451211	Book Stores
452	General Merchandise Stores
4521	Department Strs (excl. Leased)
45291	Warehouse Clubs and Superstores
4531	Florists

NAICS Code	Retail Store Description
45322	Gift, Novelty, and Souvenir Shops
4541	Electronic Shopping & Mail Order
72	Total Accommodation and Food Services Industry
7221	Full-Service Restaurants
7221+7222	Eating Places
7222	Limited-Service Restaurants
7224	Drinking Places

Each retail store type is assigned a proportion of purchases for each CBP category according to the proportion of sales each store type attracts for each category. Claritas, Inc. gathers this information from Merchandise Line Data from the Census of Retail Trade, which is published by the U.S. Department of Commerce. Purchases by store type are presented in Consumer Buying Power reports that are available in Claritas, Inc software and e-commerce products.

Consumer Expenditures by Yellow Pages Categories

Consumer Buying Power expenditure estimates are also organized by Yellow Pages categories to enhance the usability of the data for the telecommunications industry and Yellow Pages advertisers. These categories are listed in the table below.

Yellow Page Categories	
Total Expenditures	Heating Contractors
Airline Companies	Home Improvements
Appliances-Household-Major Dealers	Hospitals
Appliances-Household-Major Services & Repair	Landscape Contractors
Attorneys/Lawyers	Lawn Maintenance
Automobile Body Repairing & Painting	Lumber-Retail
Automobile Dealers (New & Used)	Motels-Hotels
Automobile Parts (new & Used)	Motorcycles & Motor Scooter Dealers
Automobile Renting & Leasing	Movers
Automobile Repairing & Service	Nursing Homes
Beauty Salons	Optometrists/Optometrists O.D.
Book Dealers/Retail	Pest Control Service/Exterminators
Building Materials	Pet Grooming
Carpet & rug Dealers	Pet Shops
Child Care/Day Care Centers	Pharmacies & Drugstores
Cleaners-Dry	Physicians & Surgeons
Computer Dealers	Plumbing Contractors
Contractors-General	Rental Service-Stores-Yards
Dentists	Restaurants (Fast Food, Other & Non-Spec)
Departments Stores	Roofing Contractors
Electrical Contractors	Schools-Academics-Colleges &

Yellow Page Categories	
	Universities
Electronic Equipments & Supplies-Dealers	Schools-Academics-Secondary & Elementary
Florists-Retail	Sporting Goods-Retail
Furniture (Retail & Non-Specific)	Television-Cable, CATV & Satellite
Golf Courses-Public	Theaters
Grocers-Retail	Tires Dealers
Hardware-Retail	Veterinarians

Each Yellow Pages category is assigned purchases for each CBP category. Purchases by Yellow Pages category are presented in Consumer Buying Power reports that are available in Claritas, Inc software and e-commerce products.

Additional Reading

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