Raise a Glass to NAPCS

Introducing the North American Product Classification System

By Jennifer C. Boettcher

One of the best-kept secrets about the U.S. Economic Census involves NAPCS, the North American Product Classification System, which is the coding system used for two types of reports: Product by Industry and Industry by Product (census.gov/naics/napcs). Before 2017, depending on the sector, these data had numerous names. Starting in 2017, it has all been called Product Statistics. The reports give insight into products and services available across industries.

My introduction to the coding system, the reports, and creating your own reports uses the U.S. wine business, from wineries, wholesaling, retailing, and catering to pouring wine in bars and restaurants, as its main example. Vineyards and grape harvesting are outside the scope of the Economic Census and thus are not included.

NAPCS identifies, defines, and classifies the final outputs, regardless of their designation as intermediate or final demand, produced and transacted (sold, transferred, or placed in inventory) by the reporting units/establishments within each industry. A relationship exists between NAPCS and NAICS, but the two are not identical. NAICS defines the industry activity of a business establishment, while NAPCS facilitates and improves the collection of product-oriented economic output. Thus, they are complementary.

A product produced by multiple industries carries the same title, definition, and code in NAPCS, regardless of its industry of origin. As with NAICS, the product classification is trilateral, encompassing the U.S., Canada, and Mexico. However, the incremental creation and deployment of Trilateral NAPCS meant that a U.S.-specific system had to be developed, resulting in two NAPCS classification codes: the Trilateral- and NAPCS–based collection codes. For example, retail sales of wine have a NAICS code of 445310, a Trilateral NAPCS Code of 11103010112, and a NAPCS Collection Code of 5000300006. To break down the
value chain of wine from suppliers to buyers requires knowing all three codes.

**DRINKING IN NAPCS CODES**

NAICS codes group establishments undertaking similar activities using similar resources but do not necessarily group all similar products or outputs. NAPCS classifies the outputs of the establishments—their products or transactions—within a demand-based conceptual framework. For example, wine can be provided in a bar, restaurant, or catering event. Because these three types of establishments/units are classified into three different NAICS industries, data users who want information about wine service provided must identify the individual products coming out of each unit, which is what NAPCS is designed to do.

NAPCS takes into account the marketing and recordkeeping practices of firms in the industry. The value for products (goods and services) generated by the establishments is represented by sales, value of shipments, or revenue, hence, it is a market- or demand-based collection. The first digit of the NAPCS-based collection code for the product relates to the NAICS sector with which the product is primarily associated.

The NAPCS collection product codes are 10 digits long. Those ending in 0 are Broad Lines, and those ending in 1–9 are Detail Lines. Broad Lines are aggregations of the Detail Lines and sometimes are the only level of measurement collected. They are mapped across all NAICS industries and also map directly to one trilateral product in the official NAPCS structure. In 2017, there were 3,534 Broad Lines.

The Detail Lines classify more detailed products within Broad Lines. These tend to be used within a specific NAICS sector and are particularly useful when looking at the Industry by Product tables. In 2017, there were 4,703 Detail Lines. Not all Broad Lines have detailed lines, so try not to duplicate totals by combining the Broad Lines and Detail Lines, such as drinking at bars, or, as the government calls this service, “Alcoholic beverages prepared and served or dispensed for immediate consumption” (NAPCS 7000050000), with the Detail Line “Wine and wine drinks, prepared and served or dispensed for immediate consumption” (NAPCS 7000050003). When using Broad Lines, look at their definitions to see what detailed industries they include; this might surprise you. For example, “Alcoholic beverages prepared for catered events” (7000060015) is only one Detail Line out of five Detail Lines in “Meals, snacks, other food items, and beverages ... prepared for catered events” (7000060000).

**UNDERSTANDING PRODUCT LINE STATISTICS**

To retrieve product statistics, go to data.census.gov/… Each table has headers that describe the data; some are clear, and some
need explaining. Plus, some data are unique to either Industry by Product or Product by Industry, and some data are imputed. As an example, check the report for U.S. Wineries (NAICS 312130) by Product sales, Value of shipments, or Revenue (data.census.gov/table?n=312130&napcs=S0000.00&tid=ECNNAPCSPRD2017.EC1700NAPCSPRDIND).

You can sort any column to see which product line brings in the most revenue or which product has a better potential to increase an establishment’s bottom line. For example, wines made with 14% or less alcohol content have a better sales value than wines made for dessert, effervescent, or wine coolers. Renting out your winery might generate more revenue than selling your wine to wholesalers, but who wants to clean up after the party?

Product by Industry is one industry (NAICS) to all products (NAPCS). It has the number and total revenue of establishments by product line, product line revenue, and industry contribution to total product line revenue for all sectors. These are the products, across one industry, that one establishment type produces or sells to meet the demand of their buyers. In this case, wineries manufacture different wines but also sell to wholesalers, provide a service of alcohol for immediate consumption, and rent their space for weddings and other short-term events. We are assuming that these establishments are serving wine because the data is only given for Broad Lines. There are three Broad Lines of wine manufacturing. But to understand the manufacturing of each type of wine, you will have to look at Industry by Product.

Of all the wineries in the U.S., only 741 sell their product to wine wholesalers, bringing in $621,397,000 and making up 0.6% of all their revenue. Having an (s) in the sales column means the number is an estimate that does not meet publication standards. Remember that, for wholesaling of wine, 60%–70% of the reported data had to be imputed, implying that only 30% of the establishments returned forms with data on them. The last column is the relative standard error (RSE), representing the standard errors related to the survey: The smaller the number, the more accurate the data. You might notice the percentage of all products that contribute to a winery is well more than 100% which is because most wineries have more than one product line used as a source of revenue.

You cannot have government data without symbols for footnotes. The most common symbol you will see in tables is “D.” The “D” symbol in any column means that data have been withheld to avoid disclosing information that may be associated with individual companies, but these data are still included in higher-level totals. Having an “(s)” next to a sales number is a major red flag and indicates that the RSE exceeds 40%. The U.S. Census is giving you that number as a favor, but I would not bet your business on that sales data. The “S” symbol in the other columns means there is some activity, but the number is an estimate that does not meet publication standards because of high sampling variability, poor response quality, or other concerns about the estimated quality and should not be attributed to the U.S. Census Bureau. At least it’s not an “A.” An “A” in the sales line means the RSE is 100% or more, and the U.S. Census doesn’t even want to estimate the number.

### CREATING A TABLE

Now that you understand how to read the tables, how do you create a Products by Industry table? Go into Advanced Search in data.census.gov. Basic filter searching does not work for 2017 Economic Census tables beyond what is shown on the webpage.

---

#### Detail: 2017 U.S. Manufacturing by types of wine

<table>
<thead>
<tr>
<th>Meaning of NAICS code</th>
<th>2017 NAPCS collection code</th>
<th>Meaning of NAPCS collection code</th>
<th>Number of establishments</th>
<th>Sales of NAPCS ($1,000)</th>
<th>NAPCS revenue as % of industry sales (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wineries 2004225003</td>
<td>Manufacturing of wines, white grape, 14 percent or less alcohol content</td>
<td>3,365.00</td>
<td>8,260,998.00</td>
<td>39.80</td>
<td></td>
</tr>
<tr>
<td>Wineries 2004225006</td>
<td>Manufacturing of wines, red grape, 14 percent or less alcohol content</td>
<td>2,925.00</td>
<td>8,564,846.00</td>
<td>41.30</td>
<td></td>
</tr>
<tr>
<td>Wineries 2004250006</td>
<td>Manufacturing of wines, effervescent, including sparkling (naturally and artificially carbonated), wine coolers</td>
<td>560.00</td>
<td>190,501 (s)</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Wineries 2004250003</td>
<td>Manufacturing of wines, dessert, excluding specialties</td>
<td>1,010.00</td>
<td>679,096 (s)</td>
<td>3.30</td>
<td></td>
</tr>
<tr>
<td>Wineries 2004275006</td>
<td>Manufacturing of all other wines, brandy, and brandy spirits, including vermouth, nonalcoholic wines, other specialty wines, and applejack</td>
<td>354.00</td>
<td>933,827 (s)</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>Wineries 2004275003</td>
<td>Manufacturing of brandy, beverage, and neutral, including neutral fruit spirits, excluding neutral citrus residue brandy</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

U.S. Manufacturing by Type of Wine (created by Jennifer C. Boettcher)
Click on Industry Codes (NAICS), and drill down to the industry you are interested in, for example, manufacturing 312130 – Wineries. You will have to use the longest NAICS codes to get the Product Line data for this table. It will appear in the filter column. Then go back to the Codes, select NAPCS Collection, and then at the top, click on All NAPCS Collection Codes (to be comprehensive). Under results, select All Products by Industry for the U.S. 2017. Your file name will be EC1700NAPCSPRDIND. Note that if your NAICS code is from manufacturing, you will have the option to choose from the “Annual Survey of Manufacturing.” Do not choose this—the sample is much smaller than for the Economic Census and may not be as accurate. Click on the << symbol at the top of the results to see the full data.

Download your results. Since this is U.S.-level data only, the mapping feature will not tell you anything. When I did this, I reduced the number of lines of products from wineries; there were originally 32 different NAPCS Broad Lines presented. I also sorted the NAPCS rows by revenue, for easy reading. Many repetitive columns can be incorporated into a table title, such as “2017 U.S. Wineries (NAICS 312130) Showing Product Line by NAPCS.” Thus, you may condense the results from 15 columns to five to seven columns, depending on whether you want to include imputation and RSE. Be aware that when creating data visualizations, you choose one column to represent your visualization.

This is one product (NAPCS) to all industries (NAICS). The Industries by Products data are the number and total revenue of establishments with the product line, product line revenue, product line revenue as a percent of the total revenue of establishments with the product line and of all establishments, and quantity produced and shipped in the U.S. and states. The Industry by Product tables have the greatest potential to give insight into your business. These are the industries that sell your product, so any sales force will know on what type of establishments to focus.

Looking at food services and drinking places (industry) sales of wine and wine drinks, prepared and served or dispensed for immediate consumption (product) in the U.S. as collected by the 2017 Economic Census, I edited the table to only show the relevant columns and sorted it by wine service (NAPCS) revenue as percent of (NAICS) sales revenue. Most of the wine was sold in 34,253 drinking places/bars for a national total of $2,793,262,000, which represented 11.7% of bar sales. To find out what else is sold in that bar you would have to run a Product by Industry table. Although 60%–70% of these numbers had to be imputed, the RSE is very low. I calculated an additional column showing revenue per establishment based on the data available. There is an “A” in the sales line for mobile food, which indicates an RSE of 100% or more. There is an “s” for cafeteria sales and across the mobile food row. Having a (s) in the revenue cell is a red flag.

Based on these data, if you wanted to sell wine outside of a bar, a full-service restaurant might sell more, but food service contractors have an even bigger ROI. Mobile food services sell some wine, but not much.

Going back to the question of what kind of wine is manufactured (only from the Detail Line) in a winery, I selected all the detailed NAPCS codes for wine and found that only wineries manufacture wine. However, when I searched for the three Broad Lines for the kind of wine, I discovered that distilleries were also in the business of manufacturing wine, which would lead me to investigate further. With all the symbols, you know there is activity but no data.

Before I show you how to get into the Industry by Product data, let me tell you that you can view all products sold by an industry by choosing NAPCS 0000000000 – Total. You get the same numbers if you had pulled them from the “2017: ECN Core Statistics Summary Statistics for the U.S., States, and Selected Geographies.” There are also hidden columns; view these by using the column button on the right of the table. For example, the NAPCS collection code (%) (LINE_PCT) shows the percentage of establishments carrying a product, which could tell you the percentage of distilleries instead of wineries (industries) that manufacture red wine (product). Another wonderful feature of the Industry by Product tables is the ability to get state-level Detail Lines for consumer-facing sectors. Data for all other NAICS codes are only available at the national level, which is still great for business-to-consumer (B2C) marketers. Business-to-business (B2B) sales have to work at the national level only.

To get the data, go to data.census.gov, Advanced Search, Codes, and NAPCS Collection. I recommend that you start at the most detailed level you can, such as retail sales of wine (NAPCS 5000300006). Note that this code starts with “5,” so it is in the retail sector, meaning that we can get state-level data if desired. Click on Codes and select NAPCS Collection. Then drill down to the product code of interest; you can type in 50003 to narrow down your search, but you cannot search for full codes or words beyond what is displayed. Click next to “Retail sales of alcoholic beverages,” find “Retail sales of wine,” and click next to 7000300006. This will appear in the Filter column. Next, click on the Search button (lower right), and click on the table listed. You will only have one table to choose from: EC1700NAPCSINDPRD | All Sectors: Industry by Products for the U.S. and States: 2017. The table shows only six-digit NAICS codes. All other digit options do not work in Industry by Product. If you use a Broad Line, you will have to choose between other options. Click on the << symbol at the top of the results to see the full data table.

To see state-level data, the next steps are to add a geographic filter by choosing Geography. Select one or more states, and click “All States within the United States, Puerto Rico, and the Island Areas.” Choose EC1700NAPCSINDPRD | All Sectors: Industry by Products for the U.S. and States: 2017. Click on the << symbol at the top of the results to see the full data. If the table is too big, you might have to download the file to look at it. To make a map, limit your industry to one NAICS code. For example, drill down to “Beer, wine, and liquor retailers” (445310). This selects one product and one industry, but many states. Above the table shown, click on Maps. Use your operating system’s software to capture the image of any maps you create.

WHAT MAPS TELL US ABOUT THE WINE BUSINESS IN LIQUOR STORES

With one map, you can see 10 different sets of data by using the pull-down menu to the right of the map title. I changed maps to show “6” classes by using the classes icon. Arizona sells about the
same percentage (25.9%) of wine in liquor stores as the liquor stores in California (27%), but the latter revenue from wine is much larger, at $1,123,216,000. People in Michigan don’t buy their wine in liquor stores, but 93% of the stores sold some wine in 2017.

If you know the wine retail business, you recognize that these data are low numbers. Why? The data do not reflect retail sales in government-run stores. Seven states own alcoholic beverage control (ABC) stores to control the retail sales of alcohol. It’s important to have business, industry, and product experts review any data before you publish to avoid embarrassing yourself due to misinterpretation of the data.

As with any good story, the data are not the end but augment what you are trying to convey. Sometimes, the data bring up more questions. After reviewing the maps, I used Industry by Product results to discover that in Maine and North Carolina, most wine is sold in supermarkets, and from the Product by Industry table, I gleaned that in 2017, the 66 liquor stores in South Dakota sold more household paper and plastic products than wine.

**PRODUCT LINE DATA NOT IN DATA.CENSUS.GOV**

Not all product data is included in the reports. If the data were not collected by the Economics Census, then there will be no NAPCS. The Economic Census does not gather data from non-employer establishments, such as gig workers, so approach delivery services with caveats. Industries not included in the Economic Census are households, rail transport, postal services, political organizations, funds, trusts, and other financial vehicles, as well as labor unions and similar labor organizations. Also excluded are data for establishments primarily producing agricultural products, such as vineyards, as well as products and services of government-owned operations, such as state-run alcoholic beverage control stores.

One Product Line data table that was captured by the Economic Census but is not in data.census.gov is for NAICS industries that are tax-exempt. You can still get this dataset. It includes only national-level counts of establishments exempt from federal income tax. Wine is not mentioned because all the data are at the broad level; however, it might be worthwhile to look at where “Alcoholic beverages, prepared and served or dispensed for immediate consumption” are being sold and add that to your sales contacts. You can download the data in Excel: Search for “EC1700NAPCSINDPRDTAX.” The link is at the bottom.

I have been informed that the Economic Census and other business survey data are not available via the Microdata Access Tool (MDAT). As far as the U.S. Census is aware, most Economic Census microdata are only accessible via Federal Statistical Research Data Centers. You can get the data through its API. The API affiliated with the NAPCS Collection data does not offer any new or additional data fields beyond what you can get in data.census.gov. However, if you want to play around with the dataset in a flat file, go to www.census.gov/data/developers/data-sets/economic-census.html.

To obtain the NAPCS-based collection codes and their definitions, you will have to go to the Economic Census website to download an Excel file to search for the right code; the most current data files are only for the 2017 U.S. Census. There will be new NAICS and NAPCS codes in the 2022 Economic Census, which has a planned release date of September 2025. The U.S. Census does not have, nor does it plan to have, a searchable website for the NAPCS collection codes, as it does for the NAICS codes. Also be aware that the Economic Census only uses NAPCS collection codes, not the NAPCS trilateral codes.

**CATCHING ERRORS AND IMPUTATIONS**

Knowledge of the industry is a key part of seeing “flaws” in the data, which should lead to questions. The Economic Management Division of the U.S. Census Bureau does a lot of work collecting, analyzing, and managing the Economic Census. With the Center for Enterprise Dissemination Services and Consumer Innovation (CEDSCI), it provides the infrastructure to get the data into our hands. Data users who create their own estimates using data from these files should cite the U.S. Census Bureau as the source of the original data.

For imputation of NAPCS collection code sales, the value of shipments, or revenue that was based on historical data, the U.S. Census generally uses the Hot Deck Imputation (HDI) as its main method. The U.S. Census Bureau takes confidentiality very seriously, much more than commercial companies do. It avoids disclosing data for individual companies. To comply with disclosure avoidance guidelines, data rows with fewer than three contributing establishments are not presented. Additionally, establishment counts are suppressed when other select statistics in the same row are suppressed or because the estimate does not meet publication standards for quality. The resulting files contain sampling and/or non-sampling errors. Sampling errors that are tied to specific industries make some data more reliable than others.

**TAKEAWAYS**

- Brainstorm the business you are interested in. Create a value chain of suppliers and buyers.
- Identify the industry using NAICS codes and the product using NAPCS collection-based codes.
- Use data.census.gov to retrieve statistics for Product by Industry—one industry (NAICS) to all Products (NAPCS) and for Industry by Product—one product (NAPCS) to all industries (NAICS).
- Industry by Product data will provide state-level data for most consumer-based industries.
- Examine the data and start looking for stories that will put the data in context or provide more questions for your research.

**Author’s note:**

I would like to thank Bobray Bordelon and Kenneth W. Fishbein for reviewing this article and Fay Dorsett and others in the U.S. Census Bureau for their insights.

Jennifer C. Boettcher (boettcher@georgetown.edu) is the business information consultant at Lauinger Library, Georgetown University.

Comments? Email Marydee Ojala (marydee@xmission.com), editor, Online Searcher.