

Ithaca 2018 Abstract Submission

Title

Applying the IMPLAN Model to Economic Impact Analysis of Wine and Grape Regional Industries: The Napa Case

I want to submit an abstract for:

Conference Presentation

Corresponding Author

Barbara Insel

E-Mail

binsel@stonebridgeresearch.com

Affiliation

Stonebridge Research Group LLC

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Research Question

How applicable is the IMPLAN model to the economic impact analysis of the wine and grape industry, particularly in sub-national regions.

Methods

Researcher, in cooperation with IMPLAN staff, reviewed in detail the data and the assumptions underlying the IMPLAN model for wine and grape production for the Napa County, California and US.

Results

Investigation found that extensive, detailed revision to the IMPLAN models in question were required to accurately reflect actual industry in each region.

Abstract

IMPLAN models draw their data from the US Bureau of Economic Analysis (B.E.A.) national input-output benchmarks.

-The more detailed level of such benchmarks — such as alcohol beverages, including wine, within the ‘agriculture benchmark’ — were last updated in 2007. Local production practices since then have changed, given market, labor and input cost trends.

-IMPLAN then uses public information from B.E.A. and the 2012 National Agriculture Census to translate these national data to state-level data.

We at first assumed that, having developed state level data from a fairly thorough examination of relevant data bases, IMPLAN further adjusted these data to estimate county level data. Unfortunately, as described below, we found that national averages (in broad product categories) were generally used in the county level data as well.

There are two key data structures underlying IMPLAN’s models: “Study Area Data,” which estimate the total value of local production and employment by sector for each region, and “Trade Flows” which estimate how much of each product is locally consumed (RPC, or Regional Production Coefficient) or sourced elsewhere.

Napa County Model

Examination of these data for Napa County found multiple inaccuracies, including:

IMPLAN's Study Area Data estimated that the value of grapes produced within the county in 2016 totaled \$272 million, when the value of Napa Valley's grape harvest had not fallen below \$300 million since 2009. In fact, Napa Valley's 2016 grape harvest was valued at \$729 million in both the Napa County Crop Report and the California/NASS Grape Crush Report.

IMPLAN's Trade Flows estimated that only 22% of these grapes were used within the County. The total value of wine produced in Napa was similarly divergent from best estimates from both Napa Valley's reported grape values and the wine production volumes reported by TTB.

IMPLAN's data on key supplier industries, such as wood processing (important for barrel assembly and cork finishing), machinists and metal working, trucking and warehousing, among others) diverged widely from not only what was observable from local conditions but also from official state employment data, which we had previously assumed was source information for IMPLAN.

IMPLAN analysts were surprised to learn that grape values varied by region, as apparently most "agricultural commodities" are assumed to have a standard price across regions.

How then are IMPLAN's Study Area Data and Trade Flow data actually constructed?

Study Area Data, for each economic sector or product, is a combination of 1) Number of Employees, 2) Total Value Produced and 3) Value Added per Employee. If one variable changes, the others adjust, with value added per employee apparently the key exogenously derived value. "Value added per employee" is calculated from a formula that considers the share of the final product produced by the [national] average employee, [national] average labor compensation, taxes and the worker's profit contribution.

The anomalies in the IMPLAN data for wine in Napa County thus become clear.

The product used for these calculations in IMPLAN's Study Area Data for wine is not wine or wine grapes but "fruit," although wine grapes are the highest value fruit crop in the U.S., according to USDA data. And, within the wine sector, Napa Valley has the highest grape and wine values in the state and country.

The IMPLAN model's "average labor compensation" uses the national average compensation rate for workers in all fruit production, not the average compensation in Napa County or even in California, although both are available from both the California Employment Development Department (EDD) and the US Department of Labor's Bureau of Labor Statistics (BLS) — and Napa County's average wage for vineyard workers is well above average.

Thus, product values are underestimated for grapes and wine and the number of employees overestimated.

National averages, or "adjusted national average," is assumed for most sectors, creating similar problems.

Several sectors which apparently had not developed sufficiently to be included in the BEA 2007 data for Napa and neighboring regions are simply omitted or discounted, such as fabrication and machinists.

In parallel, apparently to fill the resulting shortfall in Total Regional Product, the values for other sectors, especially services, became inflated. For example, although Napa is home to a small number of community banks, with relatively small branches of some national banks and other financial operations, Napa's banks are assumed to generate some \$800 million in credit each year.

To correct these inaccuracies, as recommended by the IMPLAN staff and the staff of IHS-Markit, the independent reviewers, we did the following:

- In Study Area Data, where we had actual, official data, or specific local data from producer interviews, from which the IMPLAN data widely diverged, we corrected the IMPLAN data.

- In Trade Flow data, based on advice from IMPLAN's staff, we "zeroed out" the Local Use Coefficient, and thus the IMPLAN model's indirect impact calculations, for the variables for which we had more accurate actual data,

including wine, grapes and several key supplier categories, to ensure none of these variables would be double-counted. We then input the actual data for these categories as “Direct Impacts,” After these adjustments we allowed the IMPLAN model to calculate the indirect and induced impacts, to complete the Napa County analysis.

California and U.S. Models

We discovered similar accuracy issues, primarily but not solely with respect to wine and grape values, in the IMPLAN data for the State of California. The problem seems to derive from IMPLAN’s assumptions that California vineyard labor was paid the national average farmworker wage, although vineyard wages tend to be higher than for most other farm work. Wine grapes also are priced in line with national average farm gate prices for fruit.

Similar problems were found with a small number of other variables.

Rather than attempt to correct IMPLAN’s Study Area Data for its California or US models, we “zero out” vineyard values and these other variables in the Trade Flows data for these models, so that we could input more accurate actual data. We then:

- Separately ran the IMPLAN model for “California,” based on actual data for direct impacts in non-Napa-California.
- We then added the non-Napa County-California IMPLAN results and the Napa County IMPLAN results together to produce the Total California Impact cited above.

We realize that this approach may undercount the broader state impacts of some Napa County spending but the alternative, running a ‘total California’ model would have converted Napa County’s wages and prices to California average wages and prices, which would have been a significantly more inaccurate undercount.

We calculated US Total impact in the same way: running the IMPLAN US model using non-California-US actual data and adding the result to the ‘Total California’ results, to avoid IMPLAN replacing California actual data with the problematic national averages built into the models.

Calculating Total Impact

The total Impact calculation that originated in MKF’s first California Economic Impact study in 2000 for the Wine Institute and that was used in previous studies for Napa adds together the revenue and wages impacts of the industry. This approach considered revenue and wages as concurrent ‘economic flows’ into the economy. While an argument can be made for this point of view, as IHS (the independent reviewers for this study) and many other economists have noted, wages are paid out of revenue and thus cannot be added to revenue. This is also true of some elements of taxes and charitable contributions, previously included.

Stonebridge maintained this original structure, to which the industry had grown comfortable, while presenting both totals so that readers with such questions could themselves judge the appropriate data to apply. For this report, we are correcting the presentation to the more accurate assumption, excluding from Total Impact the amounts paid out of revenue.

Total Economic Impact in each region is thus defined as the sum of:

- Total Wine Industry Revenue (Wholesale, Export and Direct to Consumer);
- Plus, the Indirect Impacts of wine and grape production, including actual wine grape, supplier and professional services revenues directly input into the IMPLAN model by Stonebridge, and
- Other indirect impacts generated by the IMPLAN model;
- Plus, the induced Impacts generated by the IMPLAN model;
- Plus, selected charitable contributions (those not paid out of winery revenue);
- Plus, selected taxes, not paid out of winery revenue.

This more accurate and complete methodology for economic impact analysis of the industry requires the analyst to conduct a comprehensive analysis of the industry’s actual spending, employment and revenues of the industry in each region in order to correct the broad assumptions underlying the IMPLAN model. Available public data tends to be either too broad, outdated or anecdotal. Although time-consuming and expensive, such research provides

unequaled insight into the economics of this industry.

The full report on the Economic Impact of Napa County Wine and Grapes, 2016, is available. The report assesses the impact of the industry on the economies of Napa County, the State of California and the U.S.