M e m o r a n d u m

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Date: October 5, 2017

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Subject: Representative Period for Aircraft Assessment

Summary
Board of Equalization (BOE) staff requested CDTFA Research and Statistics[1] staff to research and propose a cost-effective method for BOE to determine a representative assessment period for aircraft operated by certified air carriers for purposes of property tax assessment. Based on analysis of monthly California jet fuel retail sales data, staff believes that October would be the most representative month from which to pick an average week.

Background
The law requires that the BOE annually designate the representative period to be used by all assessors in assessing the aircraft of each carrier for the forthcoming tax year. The purpose of a representative period is to obtain air carrier operational data, in a brief time span, that can reasonably be expected to reflect the carrier's average activity for the ensuing tax year. Although possible, using a full prior year's activity could prove too burdensome for air carriers with a high volume of air traffic. Additionally, using a full prior year may be undesirable if the air carrier's activity has undergone major change. For these reasons, the desirable representative period should be one that is short enough to mitigate the carriers' burden, yet long enough and current enough to reasonably represent the following year.

In 1997, the assessment lien date for locally-assessed property changed from March 1 to January 1. Since that time, the BOE has designated various weeks in January as the representative period for certificated air carriers and scheduled air taxi operators.

Issue
What weekly period should the Board of Equalization adopt as the representative period for the 2018 tax year for the assessment of aircraft operated by certificated air carriers?

Data
CDTFA Research and Statistics staff obtained monthly California jet fuel retail gallons sold from 1985 through 2016 from the Energy Information Administration, U.S. Department of Energy,
http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=A503650061&f=M

[1] Effective July 1, 2017, Assembly Bill 102, the Taxpayer Transparency and Fairness Act of 2017, restructured the BOE into three separate agencies: BOE, California Department of Tax and Fee Administration (CDTFA), and the Office of Tax Appeals. The Research and Statistics Division is part of CDTFA.

Ideally staff would use weekly data; however, since weekly data is not available, to our knowledge, monthly data was analyzed. With the exceptions of November and December (each with major holidays likely to affect travel), staff believes that choosing a week in the middle of the month would be representative of the entire month. For example, the week chosen could be the week that includes the 15th of the month, from Sunday through Saturday.

Assumptions

Staff made the following assumptions:

1. Jet fuel gallons are likely closely related to aircraft activity in California.
2. California jet fuel prices are closely related to worldwide crude oil prices.

While tax rates may vary among states and nations, unless there are major changes, staff believes that jet fuel gallons should remain closely related to total flight time. Airlines are likely to adjust their operations to changing conditions, which will be reflected in the gallons data. Over time, with enough historical data, staff believes that when changes occur, they will occur gradually as airlines adjust to changing supply and demand conditions and local tax rates. One-time events, such as the terrorist attacks of September 11, 2001, should average out over time with the number of months staff analyzed (a total of 384 months).

Analysis

An exactly average month would be 1/12 of the annual gallons data (8.33%). Percentages of gallons for each month of each calendar year were calculated and compared to this average. The difference between the average monthly percentage and the calculated monthly percentage indicates the degree to which a particular year/month data point is representative. The closer the difference is to zero, the more representative the month is to the average for the year. For example, March 1985 the number of gallons of jet fuel sold per day was 5,045,000, which accounted for 7.7% of the total calendar year gallons sold in 1985. When compared to the average of 8.3%, the delta (difference) is -0.6%, which is determined to be a negative (fewer gallons were sold when compared to the monthly average for 1985). For August 1985, the total gallons sold were 8.8% or 0.5% more than the average, which is a positive.

All 32 years of each month were grouped together (for example, all 32 Januarys from 1985 to 2016 were grouped together). The ideal month would have differences averaging close to zero for the 32 years, with approximately equal differences positive or negative (indicating a normal distribution is likely), and with little percentage variation among years relative to competing months. Additional criteria would be for the month to be close to the January 1 lien date.

No single month met this ideal. However, some months came much closer than others. Choosing the best months is subjective, taking into account the number of times in which differences were positive or negative (ideally they would be close to equal, 16 of the 32 years), average differences for the month for all years (closest to zero), and proximity to the lien date. Staff believes that May, December and November should be excluded because each has major holidays significantly impacting travel.

The chart on the next page summarizes how many times each month is above average in the 32 years of data. If a month were average, one would expect a normal distribution of 16 times above average and 16 times below average for the 32 years. Only 3 of 32 Januarys were above the annual average. This result seems reasonable; anecdotal evidence suggests that January is generally a month with less than average travel. February and March show similar patterns, at 6 and 5 months above average. At the opposite extreme, August had above average jet fuel sales in 31 of 32 years. June, July, and September were also much higher than average, 26, 30, and 25 years.

October had above average sales 15 years of the 32, very close to the norm. Of all the months, October was closest to the expected average of 16.

Recommendation

Based on analysis of these data, staff believes that October or April would be the two best candidate months to pick an average week. The 32 Octobers had 15 years above average, 17 years below average, and a difference of 0.1% below average. April showed 10 above average and 22 below average, and a difference of 0.1% below average. Of these two months, October would seem preferable; the differences are much closer to being equal (16). In addition, October is closer to the lien date than April.

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