



The Costco Effect

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Summary

Does the presence of hearing aid-selling Costco locations influence nearby private practices' hearing aid revenue and average sale price performance?¹ This study analyzed the relationship between the proximity of Costco locations and Audigy members' hearing aid sale performance. Results indicate nearby Costco locations have a neutral to weak positive impact on Audigy members' hearing aid revenue and average sale price.

Introduction

Costco is considered one of the fastest-growing global hearing aid retailers, and this trend is expected to continue. *The Hearing Review* (Jan 2015) estimates Costco's U.S. market share at around 11%, with annual unit growth at an estimated 20% to 25% pace during the past 5 to 7 years, which is three to five times faster than sales through independent practices. With the development of hearing aid technology, the entry-level hearing aids that Costco is dispensing are becoming more affordable and more reliable. It is natural for private practices to be concerned about their ability to continue providing excellent service to patients while making enough margin to continue running their businesses. However, is Costco actually hurting private practices' businesses?

Method

Data analyses were performed using data from various sources: Addresses of all Costco locations that sell hearing aids were collected from the Costco website using Web Scraper; addresses of Audigy member locations were pulled from Audigy's internal data pool; using MapPoint, the number of Costco locations near each Audigy member location was calculated, as were the driving distances between those nearby Costco locations and Audigy member locations; the sale performance information of Audigy members was pulled from Audigy's internal data pool.

¹ Private practice includes the following: audiology practices, hearing aid dispensing practices, otolaryngology practices, otology practices, and neurotology practices.

Results

Analysis 1: Correlation Analysis, 2016-17

Key Variables

Costco Density: Sum of weighted number of Costco locations (that sell hearing aids) within 30 minutes' driving distance of the Audigy member location. A nearer Costco is given more weight than a more distant Costco (see Appendix for details).

Revenue: 2016-17 privately paid hearing aid revenue of each Audigy member location.

ASP: 2016-17 privately paid hearing aid average sale price of each Audigy member location.

A correlation analysis reveals that **Costco Density** and **Revenue** are significantly positively correlated (correlation coefficient=0.238, number of observations=363, P-value<0.0001). This indicates that Audigy members with more Costco locations nearby are likely to have more revenue. There is also a weak positive correlation between **Costco Density** and **ASP** (correlation coefficient=0.081, number of observations=363, P-value=0.1256). In other words, Audigy members are likely to have a slightly higher average sale price if there are more Costco locations nearby, although this correlation is not statistically significant.

To better illustrate the Costco effect, Audigy member locations are grouped into four categories based on the variable **Costco Density** (see Appendix for details):

- No Costco (n=166)
- Low Density (n=124)
- Medium Density (n=58)
- High Density (n=15)

Note: The circle border represents the 30-minute driving boundary from Audigy members. In reality, the boundaries are in more irregular shapes.

Figure 1 only shows the typical Costco distribution for each group. In reality, there are many more variabilities in Costco distribution.

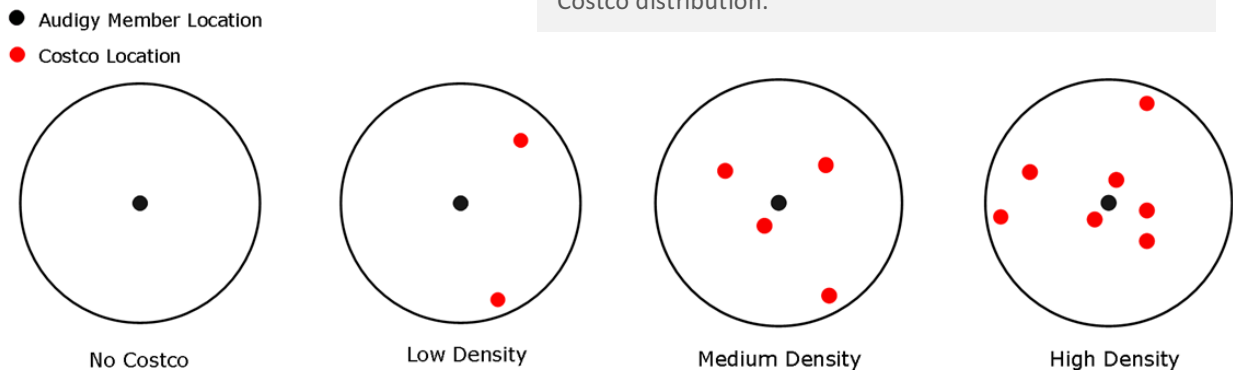


Figure 1. Representations of Costco Density Groups

The average **Revenue** and **ASP** for each group are calculated and demonstrated in Figure 2 and Figure 3 respectively.

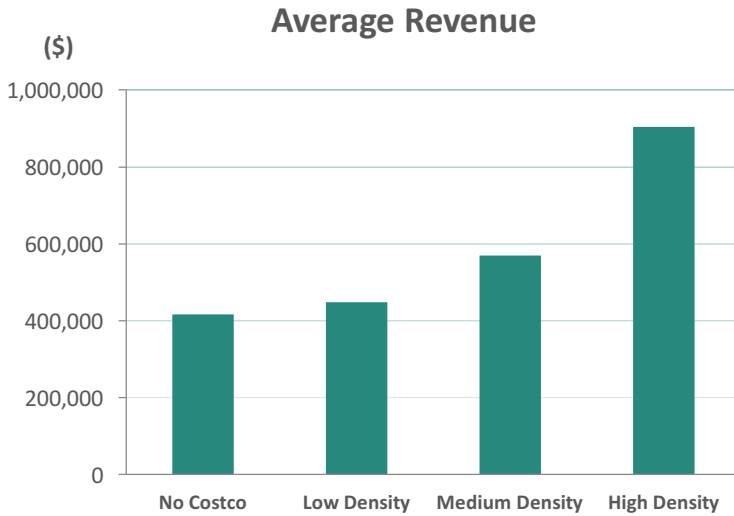


Figure 2 shows a clear pattern that member locations with higher **Costco Density** have higher average **Revenue**.

Figure 2. Average Revenue by Level of Costco Density

Figure 3 shows that member locations tend to have higher **ASP** when there are more Costco locations nearby.

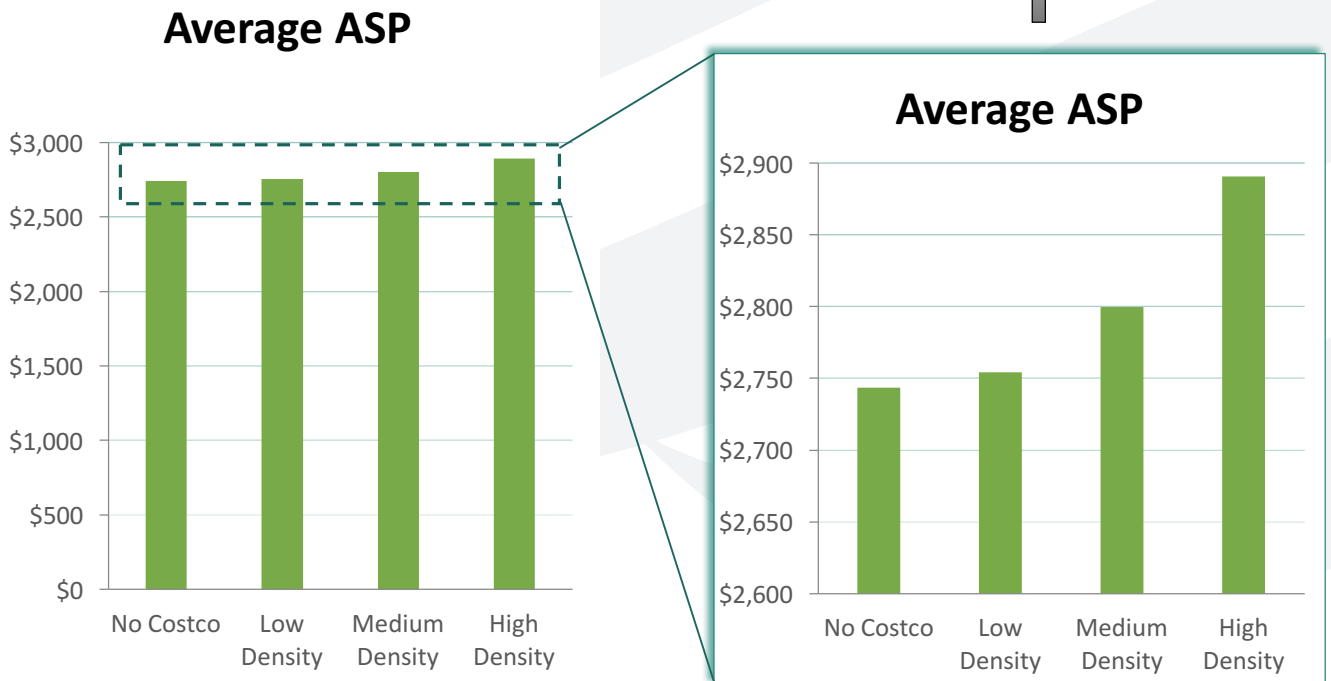


Figure 3. Average ASP by Level of Costco Density



The results indicate that, contrary to what might be expected, having Costco locations nearby did not have negative impacts on Audigy members' revenue or average sale price in 2016-17.

In the analysis on the previous page, only data from the most recent year was used. However, this may not show a full picture of the influence of Costco on Audigy members. To test Costco locations' influence on member locations across time, the compound annual growth rate of revenue and ASP are employed to run more analysis.



Analysis 2. Compound Annual Growth Rates, 2013-17

Key Variables

Revenue Growth Rate: 2013-17 compound annual growth rate of privately paid hearing aid revenue of each Audigy member location.

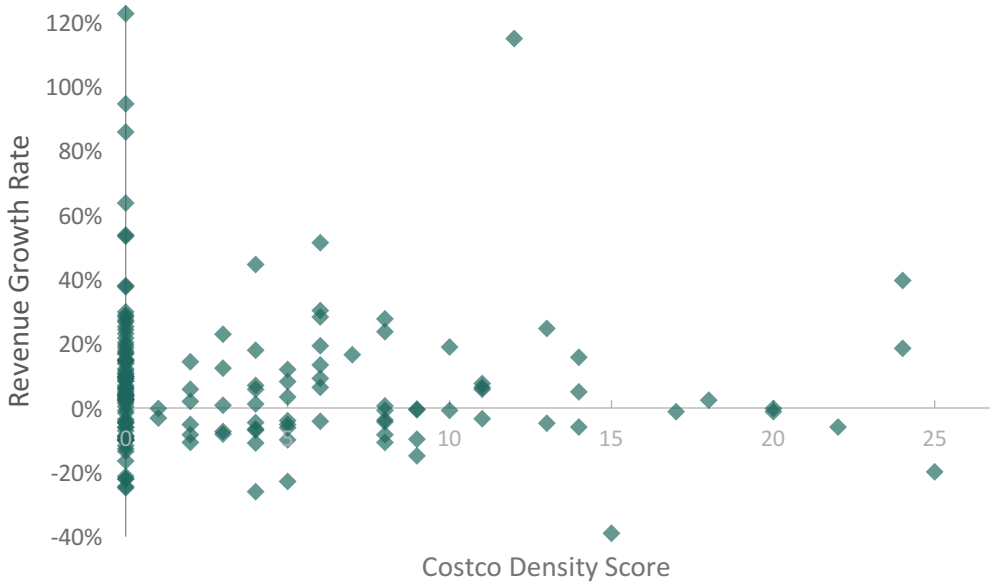
ASP Growth Rate: 2013-17 compound annual growth rate of privately paid hearing aid average sale price of each Audigy member location.

A correlation analysis reveals that **Costco Density** and **Revenue Growth Rate** have no significant correlation (correlation coefficient=-0.033, number of observations=158, P-value=0.677). That means Audigy members with more Costco locations nearby and those with fewer or no Costco locations nearby did not differ in terms of their revenue annual growth rate from 2013 to 2017. There is no significant correlation between **Costco Density** and **ASP Growth Rate** (correlation coefficient=-0.114, number of observations=158, P-value=0.155). That means Audigy members with more Costco locations nearby and those with fewer or no Costco locations nearby did not differ in terms of their ASP annual growth rate from 2013 to 2017.



As can be seen in Figure 4, the distribution of **Revenue Growth Rate** and **Costco Density** is very scattered, and no clear uphill or downhill pattern can be detected, which indicates that there is no strong correlation between **Costco Density** and **Revenue Growth Rate**.

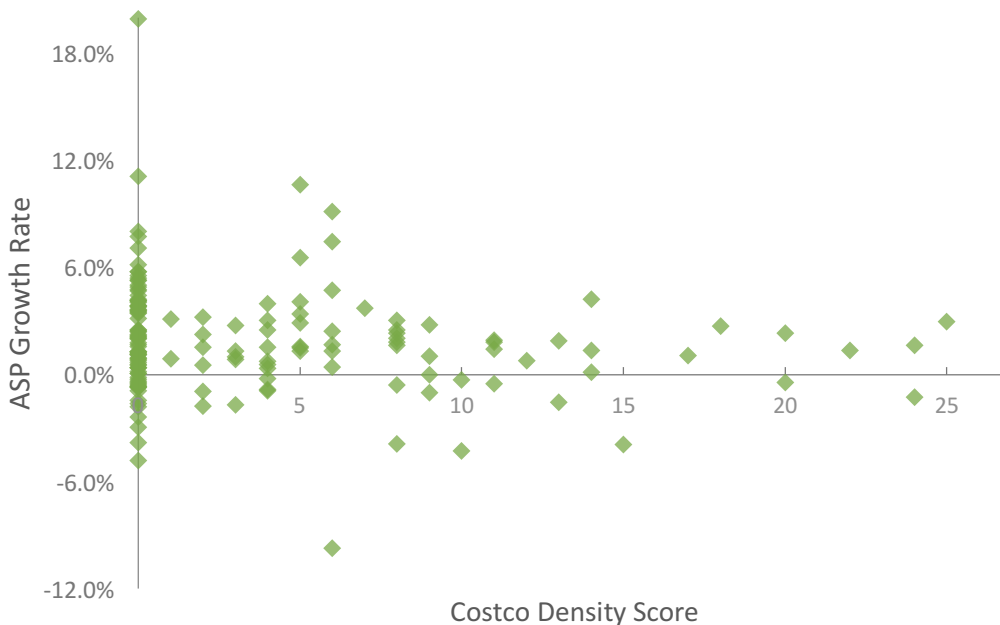
Figure 4. Distribution of **Revenue Growth Rate** and **Costco Density**





As can be seen in Figure 5, the distribution of **ASP Growth Rate** and **Costco Density** is very scattered, and no uphill or downhill pattern can be detected, which indicates that there is no strong correlation between **Costco Density** and **ASP Growth Rate**.

Figure 5. Distribution of **ASP Growth Rate** and **Costco Density**



However, can the possibility that Costco is hurting Audigy members' businesses be eliminated? Not yet. It is possible that Audigy members tend to have more revenue when more Costco locations are nearby because high Costco density is correlated with higher population density, and population density is positively correlated with more revenue. It is also possible that locations with high average sale price tend to be located in wealthier areas, and higher-income areas may have more Costco locations. Therefore, high average household income may be the reason Costco density and ASP are positively correlated. To address these potential biases, three more demographic variables were added in the analysis to take into account the effect of the potential confounding variables. This way, the "true" effect of Costco locations on Audigy members' revenue and ASP may be revealed.



Analysis 3. Regression Analysis, 2016-17

Additional Variables

65+ Population: Population that is 65 years old or older within the location's market boundary.

Median Household Income: Median household income within the location's market boundary.

HA Expenditure: Total privately paid hearing aid expenditure spent within the location's market boundary.

Using the key variables and the additional variables, regression analyses were generated to test the “true” effect that Costco locations have upon Audigy members’ sale performance.

Multiple regression analyses were conducted to examine the relationship between **Revenue** and various potential predictors. Table 1 summarizes the analyses’ results.

As can be seen in Regression 1, **Costco Density** had significant positive regression weights, indicating locations with high **Costco Density** were expected to have higher **Revenue**. However, as shown in Regressions 2 and 3, after controlling for **65+ Population** and **HA Expenditure**, **Costco Density** lost its significance in predicting **Revenue**.

Table 1. Regression Table for **Revenue**

Dependent Variable: Revenue ^a		Regression 1	Regression 2	Regression 3
Costco Density	Coefficient ^b	13122	5088	3787
	P-value ^c	<0.0001	0.1022	0.2420
65+ Population	Coefficient		2.733	
	P-value		<0.0001	
HA Expenditure	Coefficient			0.045
	P-value			<0.0001
Constant	Coefficient	284194	195831	203164
	P-value	<0.0001	<0.0001	<0.0001
Adj. R-square ^d		0.060	0.119	0.121
No. of observations ^e		365	365	365



Footnotes:

***Bolded** numbers are statistically significant coefficients at the 0.05 alpha level. **Red** numbers are highlighted statistically significant coefficients that will be discussed in the following paragraph.

a. This column shows the dependent variable (Revenue) with the predictor variables below it (Costco Density, 65+ Population, HA Expenditure, and Constant). The last variable (Constant) represents the constant or intercept.

b. Coefficient: These are the values for the regression equation for predicting the dependent variable from the independent variable.

c. P-value: The two-tailed P-values used in testing the null hypothesis that the coefficient is 0. If the P-value is equal or lower than 0.05, that means the corresponding coefficient is statistically significant. The lower the P-value is, the more significant the corresponding coefficient.

d. Adj. R-square: R-Square is the proportion of variance in the dependent variable which can be explained by the independent variables. This is an overall measure of the strength of association. Adj. R-square is an adjustment of the R-square that penalizes the addition of extraneous predictors to the model.

e. No. of observations: This is the number of observations used in the regression analysis.

After controlling for **65+ Population** and **HA Expenditure**, locations with higher **Costco Density** are not expected to have any significant difference in **Revenue** than locations with lower **Costco Density**; whether there are many Costco locations nearby or not does not have a significant impact on Audigy members' hearing aid revenue.

Regression analyses are conducted to examine the relationship between **ASP** and **Average Household Income**. Table 2 summarizes the analyses' results.



As can be seen in Regression 4, **Costco Density** is not a significant predictor for **ASP**, even when it is the only variable in the regression. Regression 5 showed that **Average Household Income** is a significant predictor for **ASP**; this effect still holds after controlling for **Costco Density**.

Table 2. Regression Table for **ASP**

Dependent Variable: ASP		Regression 4	Regression 5	Regression 6
Costco Density	Coefficient	4.839		0.197
	P-value	0.1321		0.9580
Average Household Income	Coefficient		0.004	0.003
	P-value		0.0055	0.0186
Constant	Coefficient	2742	2556	2558
	P-value	<0.0001	<0.0001	<0.0001
Adj. R-square		0.006	0.021	0.022
No. of observations		365	365	363

That means, whereas Audigy members located in higher-income markets generally tend to enjoy higher average sale prices, **the presence or concentration of Costco locations does not have a significant impact upon pricing.**

Conclusion

The results indicate that having Costco locations nearby does not have any significant impact on Audigy members' hearing aid revenue and average sale price. If anything, more Costco locations nearby may have a weak positive impact on the revenue and average sale price of Audigy members. This is the opposite pattern of what was expected. How do we make sense of these findings?

Approximately 35% of Americans over age 65 have a significant hearing loss sufficient to make them hearing aid candidates. Yet only about 20% of those older Americans who could benefit from hearing aids actually seek them out (Humes et al, 2017). That means roughly 80% of the addressable hearing aid market remains intact (represented by the gray area in Figure 5A), which is about 26 million hearing aid sale opportunities missed.

It is possible that Costco functions more like a market expander than a competitor to private hearing aid providers. As Costco makes hearing aids more accessible, more people with hearing loss would realize they need hearing aids, and more people would go to private-practice clinics to buy hearing aids for the better service, which may increase the hearing aid sales for Audigy members. As shown in Figure 5, Costco may help to expand the served available market for hearing aids from A to B.

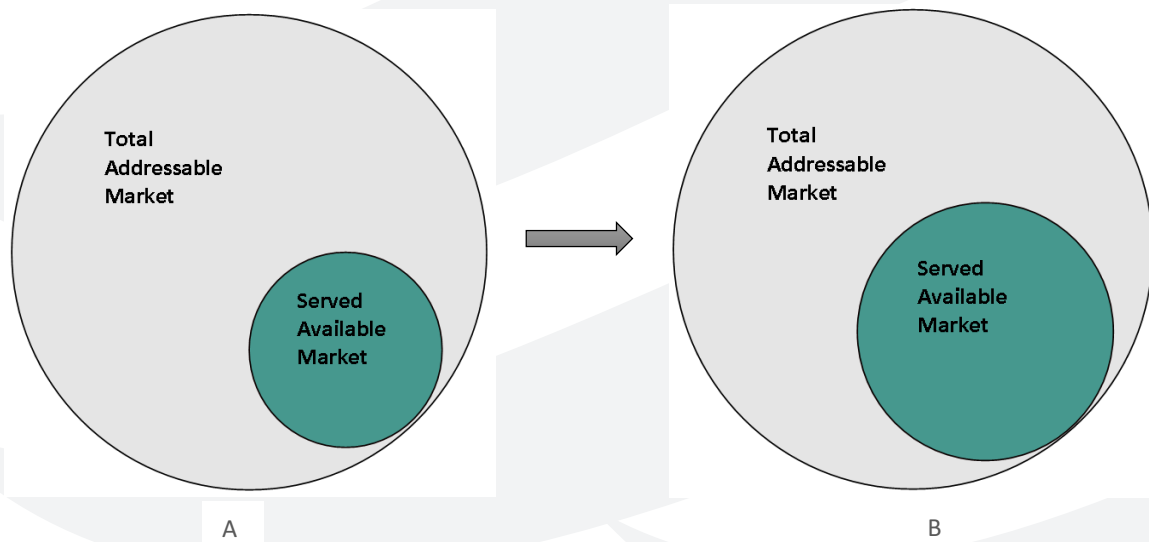


Figure 5. Illustration of Hearing Aid Total Addressable Market and Served Available Market



The pattern that Costco competitors increase sale prices as the result of being near Costco is not unique in the hearing aid industry. A study (Courtemanche & Carden, 2011) has shown that a Costco store increases competitors' grocery prices by 1.4% in the short run and 2.7% in the long run, whereas previous research shows that a new Walmart generally reduces prices by 1% to 1.7% in the short term and by about four times as much in the long run. This is because while incumbent grocers try to match Walmart on price, they figure it's simply not worth it to go toe to toe with a warehouse club like Costco. While Walmart has made its stores more physically appealing over the years, Costco's remain drab and utilitarian; pallets of bulk items sitting on concrete floors remain the dominant aesthetic. As a result, the only competitive advantage incumbent grocers see worth pursuing is experience and convenience, choosing, as the study's authors point out, to cede "price-sensitive consumers who are willing to drive longer distances for a less pleasant shopping experience in order to obtain deep discounts." By focusing on less price-sensitive customers, incumbents are able to increase the compensation of their service offering without affecting sales (Philips, 2011, "The Costco Effect: Why Does the Wholesaler Cause Inflation?" para. 3). The same idea may apply to hearing aids; Audigy members may focus more on less price-sensitive customers. Instead of trying to compete with Costco stores nearby on price, Audigy members may put more effort into adding value by giving unique services to customers. As a result, they may be able to achieve compensation for the true value of their service offering with no sales loss.



Operational Strategy

We suggest treating Costco as an ally and potential referral source, not as a direct competitor. A provider from your practice should conduct regular visits with the provider at your local Costco in order to:

- Introduce your practice as a resource to help them take care of their patient population when it comes to:
 - Custom-fit products
 - Asymmetrical hearing loss
 - Tinnitus testing and treatment options
 - Balance and vestibular testing and treatment options
 - Patients who are having a difficult time finding a solution that meets their needs
- Ask the Costco provider what their pain points are and how you can be of assistance

It is also worth considering Costco locations in your expansion analysis and planning for future locations. With the right exposure and marketing strategy, being within close proximity of a Costco could prove to be an effective strategy for capturing competitive and new users alike.



Company Overview of Audigy

Audigy provides business management services to private-practice audiologists, otolaryngologists, otologists, neurotologists, hearing care professionals and university programs in the United States and Canada. It offers its services in areas such as strategic business units, business development, finance, human resources, innovation and technology, marketing, member integration, operations, and professional development.

Appendix

Calculation of Costco Density

Costco Density is calculated by adding the weighted number of the Costco within 30 minutes' driving distance. Each Costco is weighted based on the distance between the Costco and the member location. For example, a Costco that is 5 minutes' driving distance away is assigned a weight of 6, and a Costco that is 10 minutes away is assigned a weight of 5. The closer the Costco is, the higher the weight it has. Table 3 shows how the weight is assigned to each Costco.

Table 3. Weight Assigned to Costco

Location of Costco	Within 5 minutes	6-10 minutes	11-15 minutes	16-20 minutes	21-25 minutes	26-30 minutes
Assigned Weight	6	5	4	3	2	1

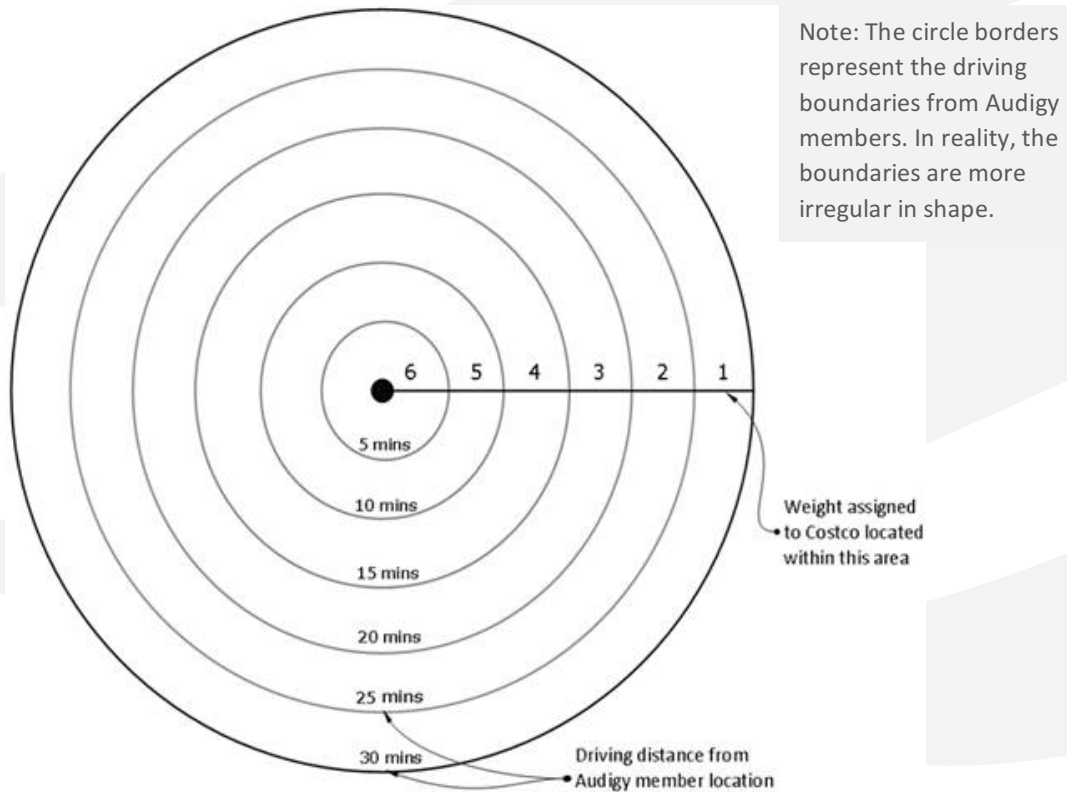


Figure 5. Illustration of Weight Assignment for Costco Density

Division of Locations Based on Costco Density

Locations are divided into four groups based on Costco Density. Figure 6 shows the cutting point between groups.

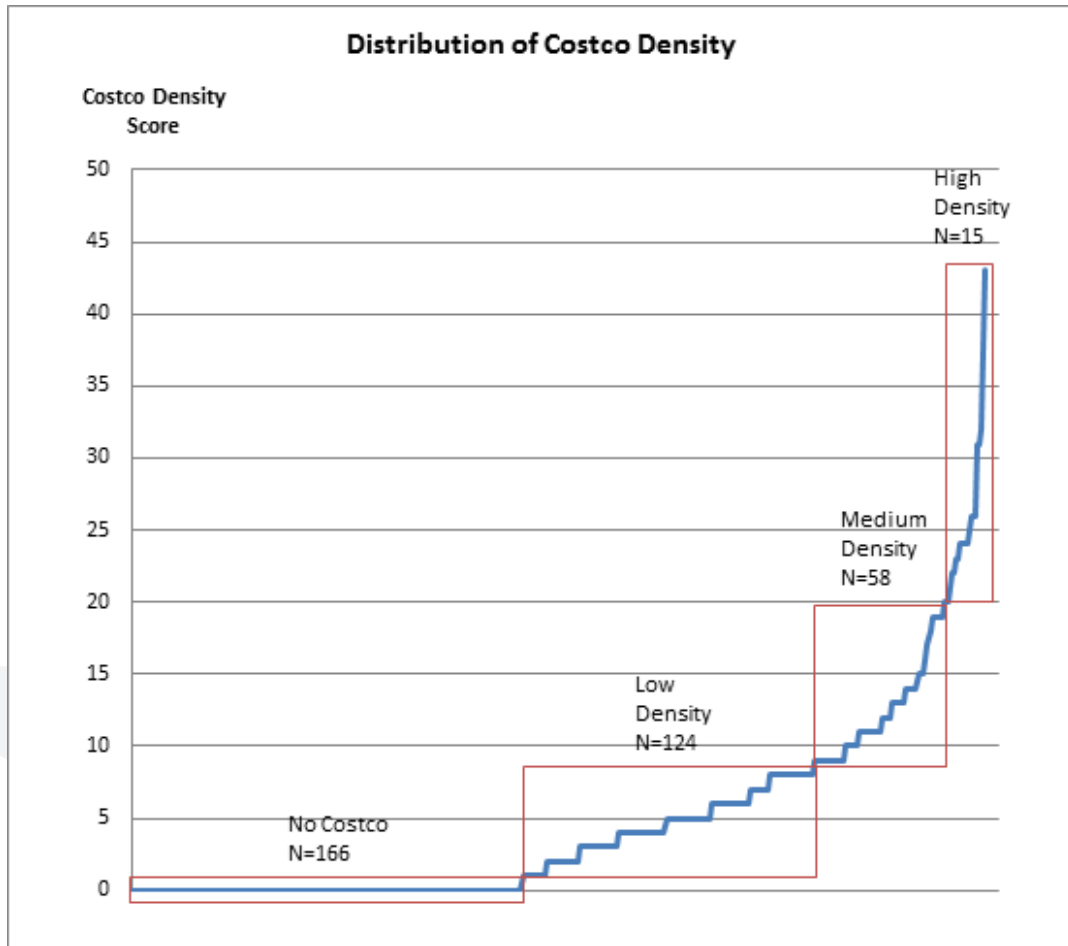


Figure 6. Division of Locations Based on Costco Density



Citations

The Hearing Review (2015, January 20). Hearing Aid Sales Increase by 4.8% in 2014. Retrieved July 25, 2017, from <http://www.hearingreview.com/2015/01/hearing-aid-sales-increase-4-8-2014-rics-continue-market-domination/>.

Philips, M. (2011, July 25). The Costco Effect: Why Does the Wholesaler Cause Inflation? Retrieved June 22, 2017, from <http://freakonomics.com/2011/07/25/the-costco-effect-why-does-the-wholesaler-cause-inflation/>.

Courtemanche, C., & Carden, A. (2011). Competing With Costco and Sam's Club: Warehouse Club Entry and Grocery Prices. doi:10.3386/w17220.

Humes, Larry E., et al. "The effects of service-delivery model and purchase price on hearing-aid outcomes in older adults: A randomized double-blind placebo-controlled clinical trial." *American Journal of Audiology* 26.1 (2017): 53-79.