

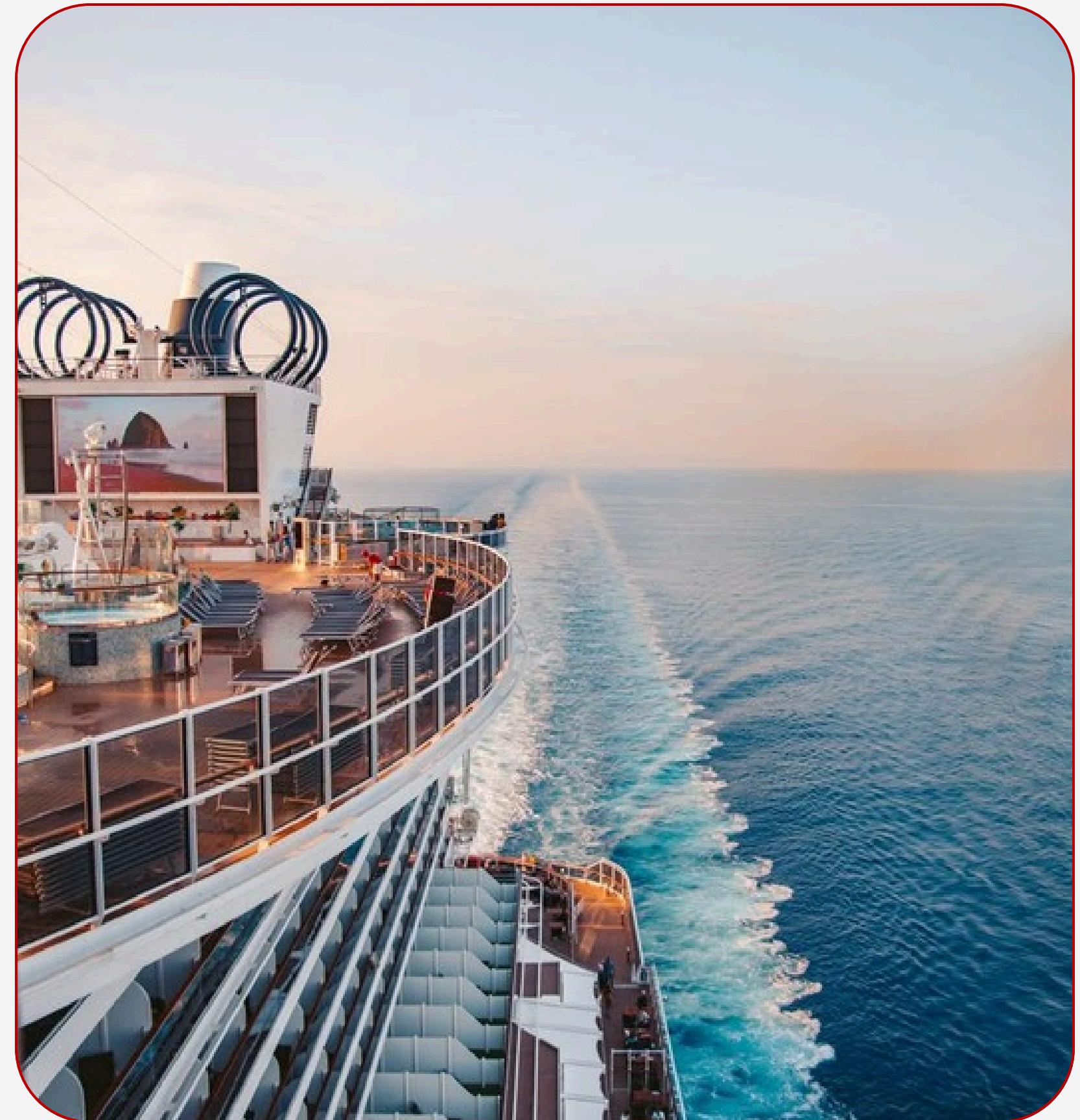
LOBSTER LAND



The Lobster Coast Voyage

AD654 Marketing Analytics

Andrey, Annie, Hiten, Jean, Jitvan, Leo



BUSINESS OBJECTIVES

LOBSTER LAND'S FIRST CRUISE LINE

Identify high-potential customer segments

- Find customers with interests that aligns with the park experience

Find experiences that meets segment needs

- Match ports, excursions, and activities within the segment's budget

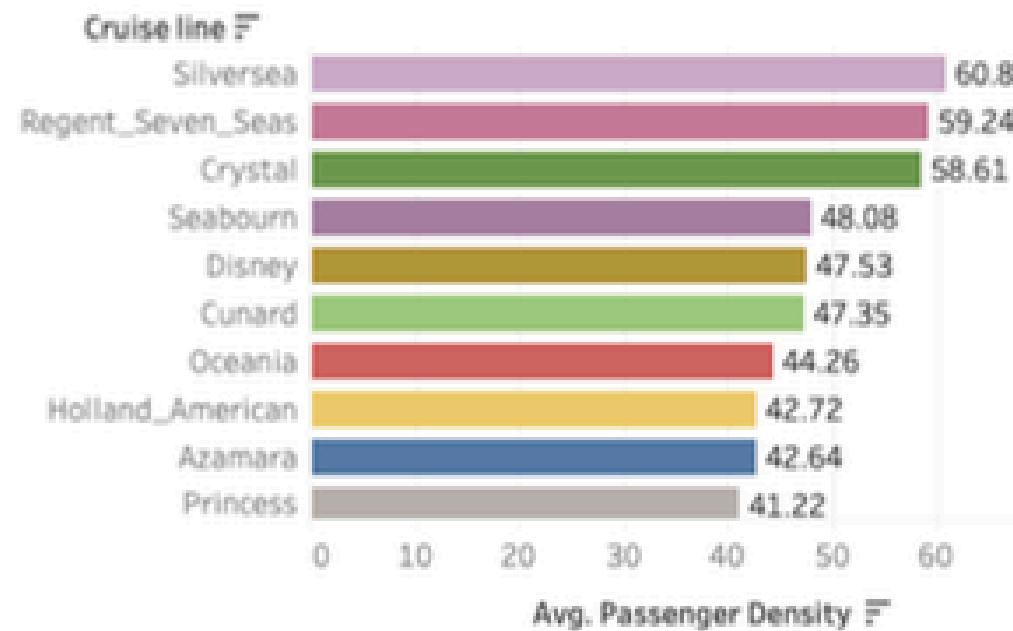
Optimize market positioning

- Gauge market competition and plan for positioning

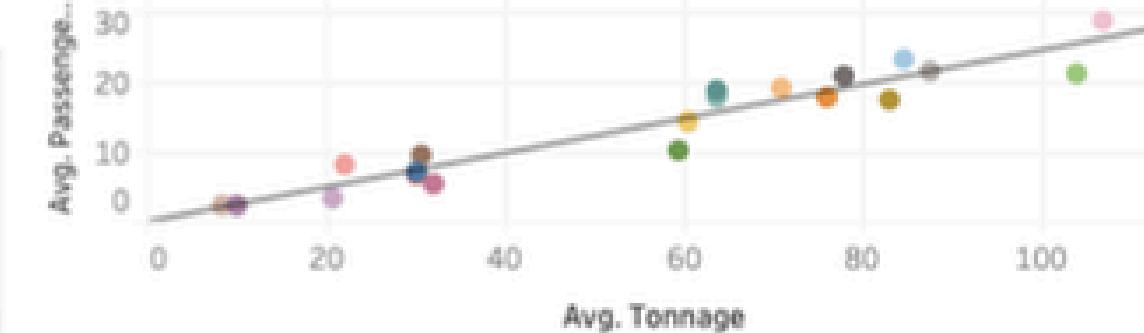


CRUISE SHIP ANALYSIS DASHBOARD

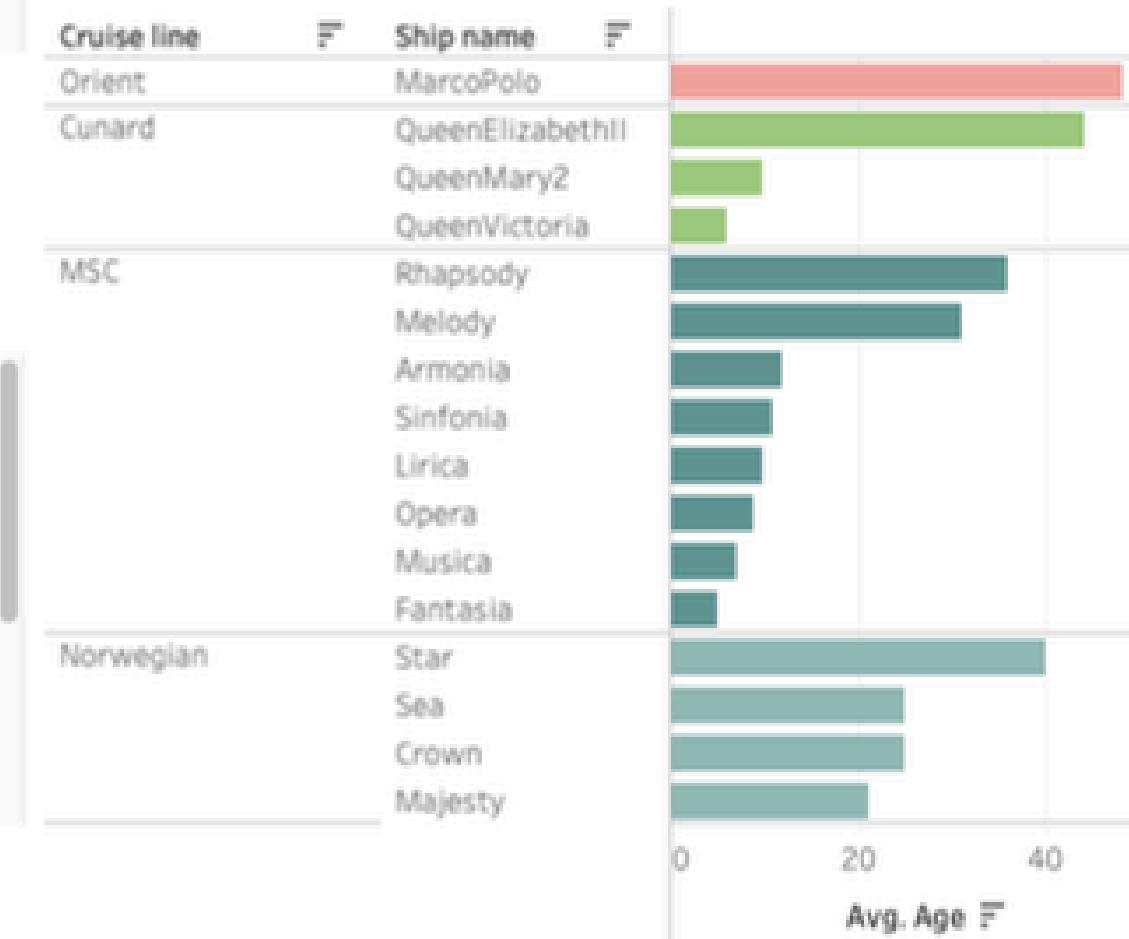
Passenger Density by Cruise Line



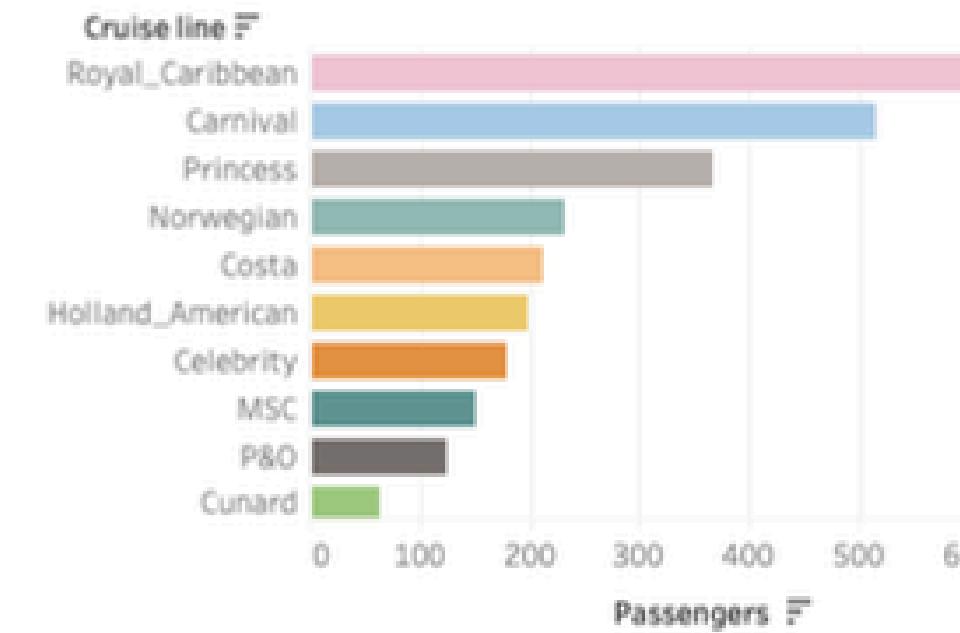
Tonnage vs. Passenger Capacity



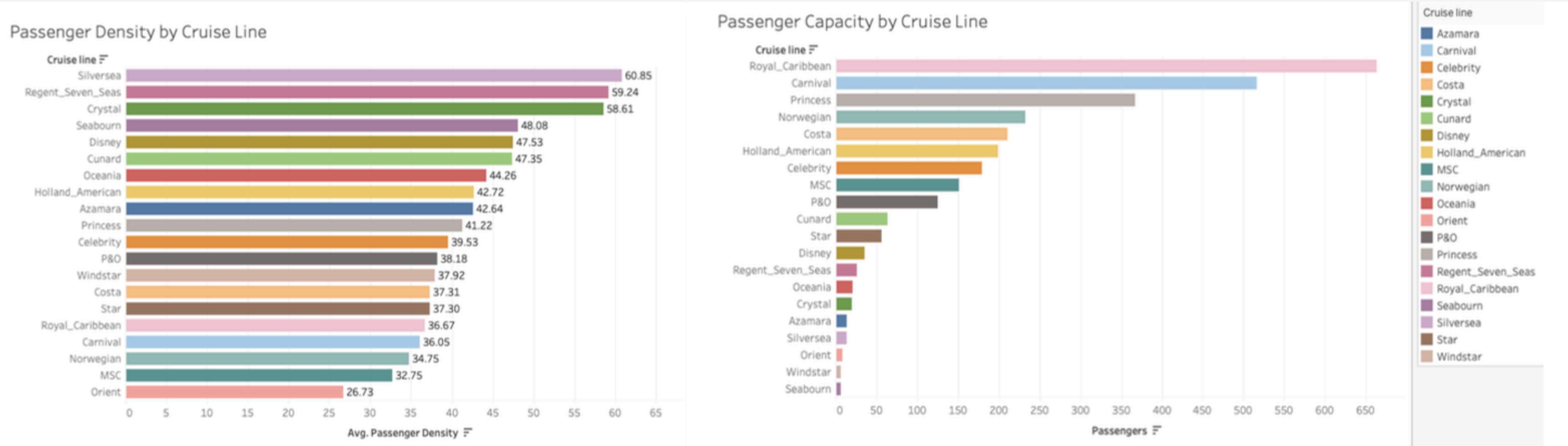
Average Age By Cruise Line (Top 5)



Passenger Capacity by Cruise Line

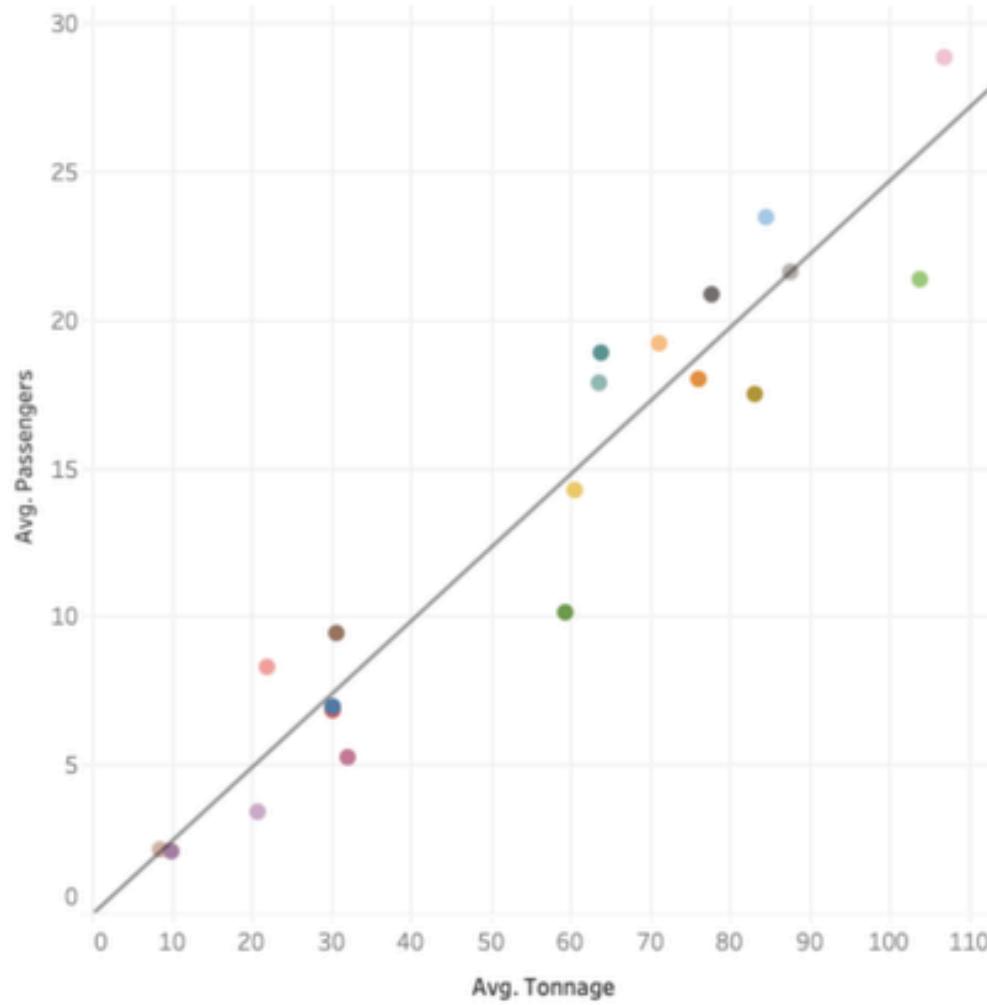


CRUISE SHIP ANALYSIS DASHBOARD



CRUISE SHIP ANALYSIS DASHBOARD

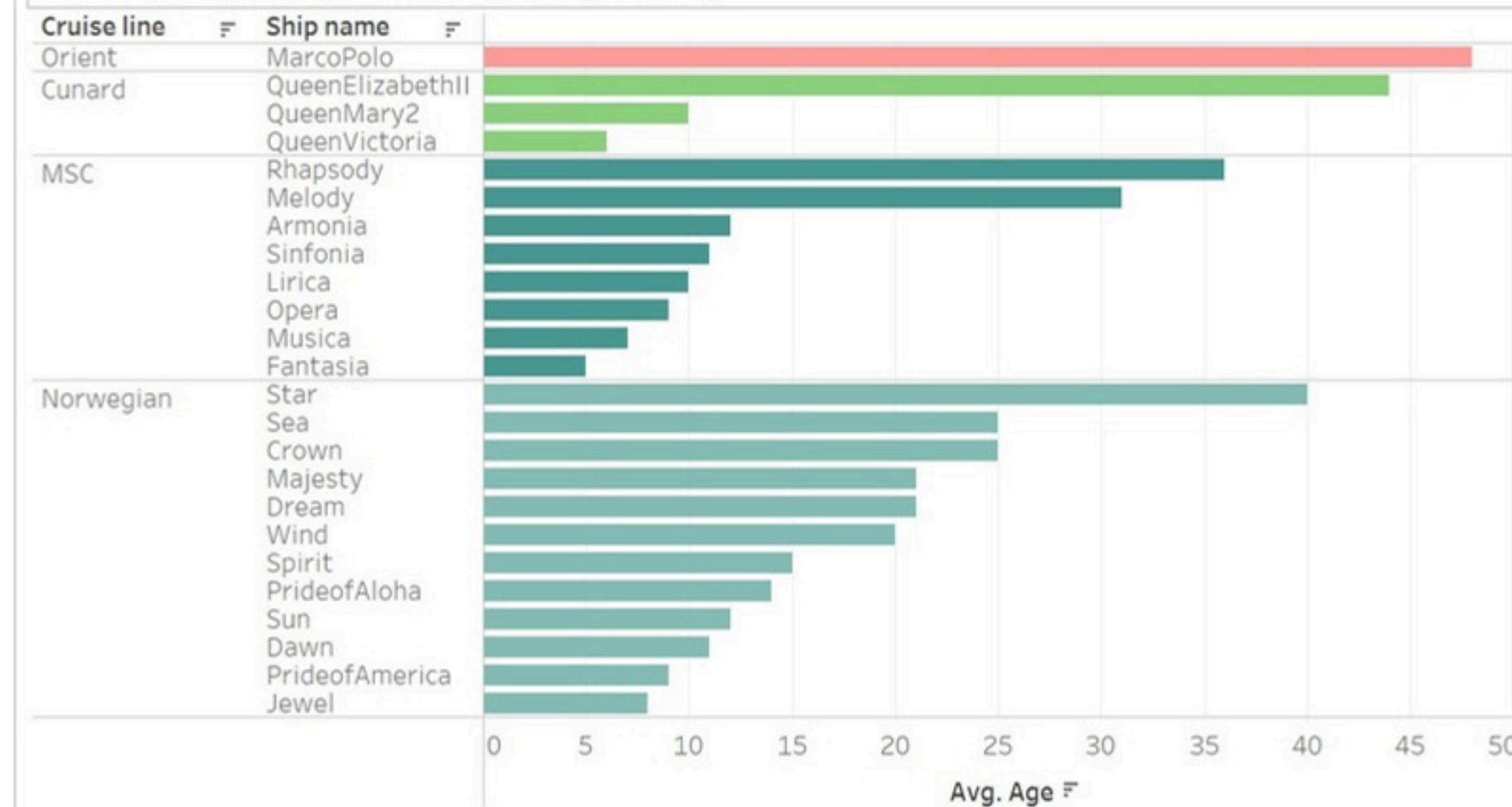
Tonnage vs. Passenger Capacity



Cruise line

- Azamara
- Carnival
- Celebrity
- Costa
- Crystal
- Cunard
- Disney
- Holland_American
- MSC
- Norwegian
- Oceania
- Orient
- P&O
- Princess
- Regent_Seven_Seas
- Royal_Caribbean
- Seabourn
- Silversea
- Star
- Windstar

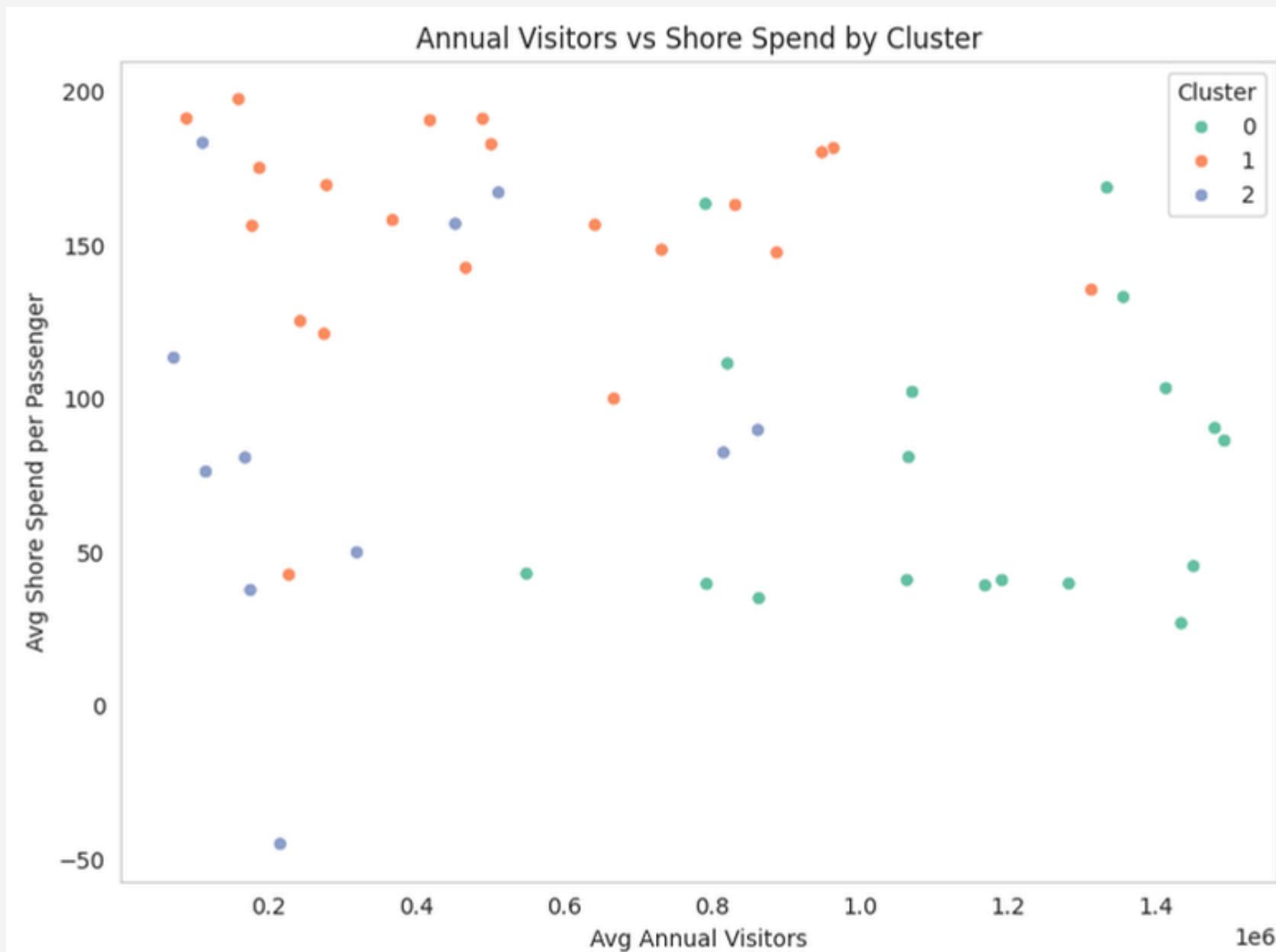
Average Age By Cruise Line (Top 4)



PORT DATA

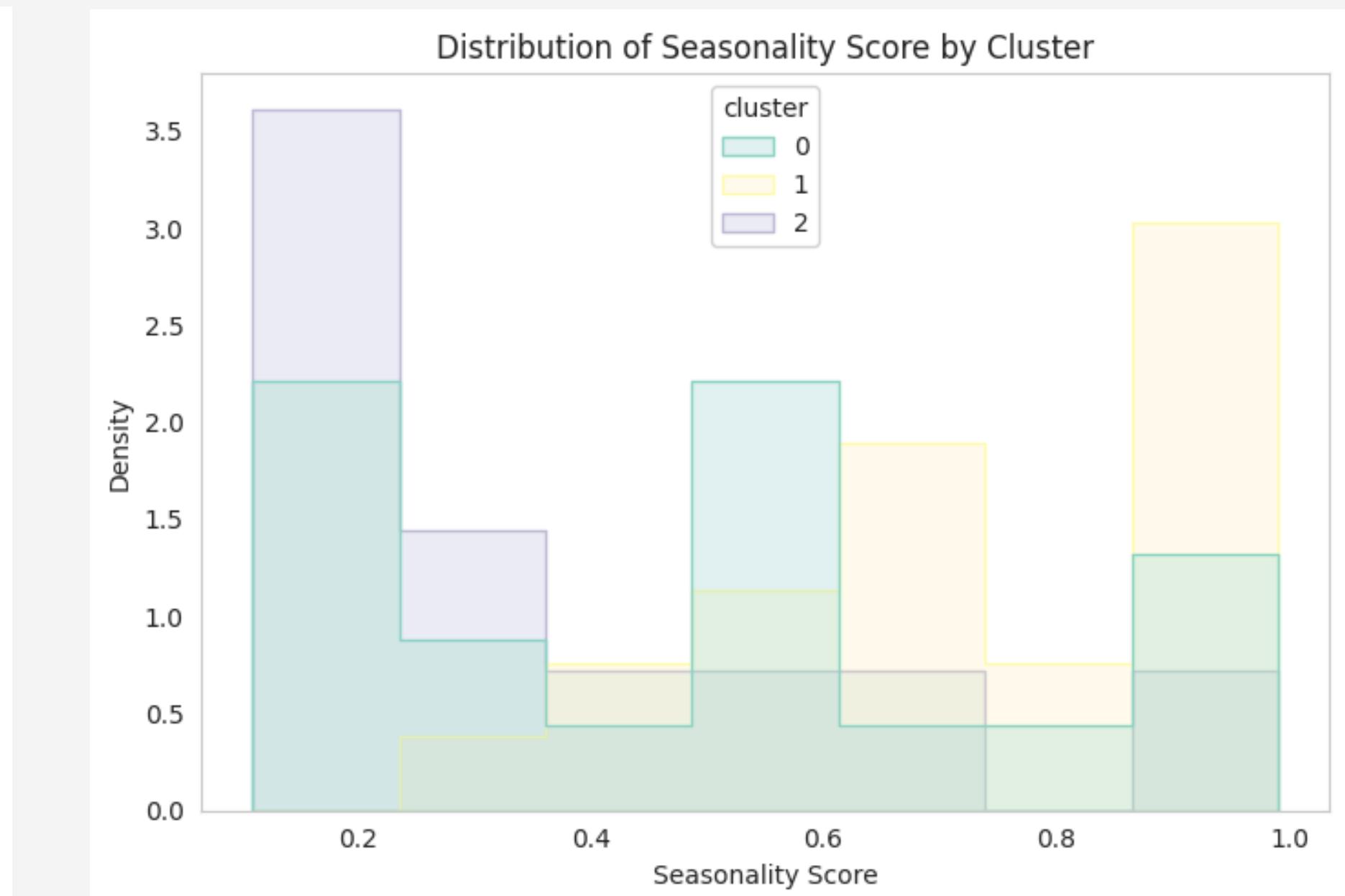
Key factors:

Seasonality, Shore spend, Annual visitors, Customer satisfaction



No linear relationship between volume of visitors and spending, but ports can be differentiated into two main types

- High volume, low spending
- Low volume, high spending



Focus on seasonality for business continuity throughout the year. Some ports have high seasonality while some see visitors more constantly in every season.

SEGMENTATION

Summary Stats: Eastern Caribbean ports have the highest visitor volume and customer satisfaction. Major and boutique ports have the highest spending potential

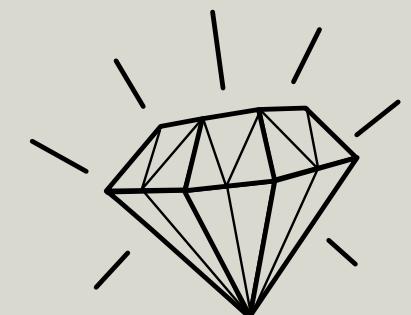
Popular Tourist Ports



- High volume
- Range of spending
- High seasonality
- Private and major ports
- Western Caribbean

Ideal for high-volume, family-friendly itineraries

Premium Experience Ports



- High spending
- High satisfaction
- High port fee
- Various port types
- Eastern Caribbean

Ideal for high quality and immersive experiences for affluent travelers

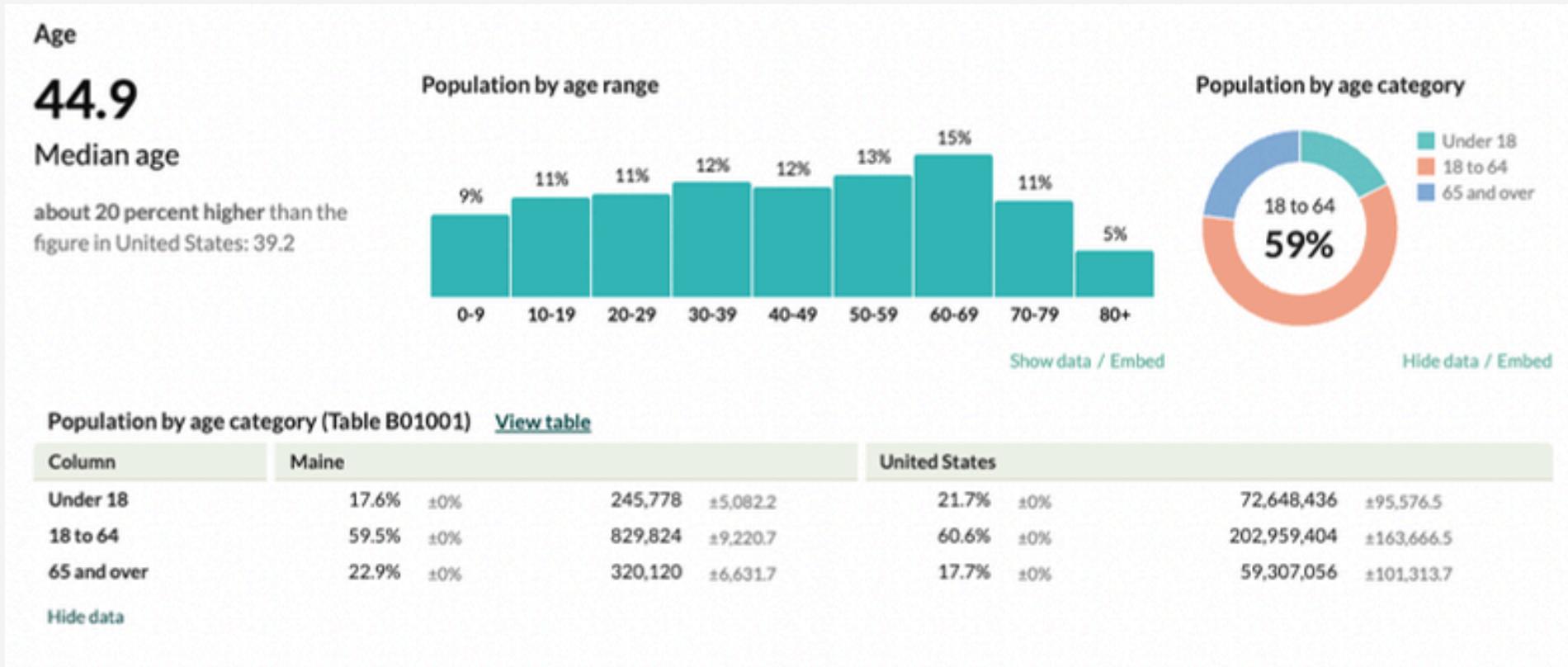
Niche Interest Ports



- High satisfaction
- Low seasonality
- Low volume
- Various port types
- Range of locations

Ideal for adventurers looking for variety and unique excursions

CUSTOMERS SEGMENTS



Climate Portland - Maine

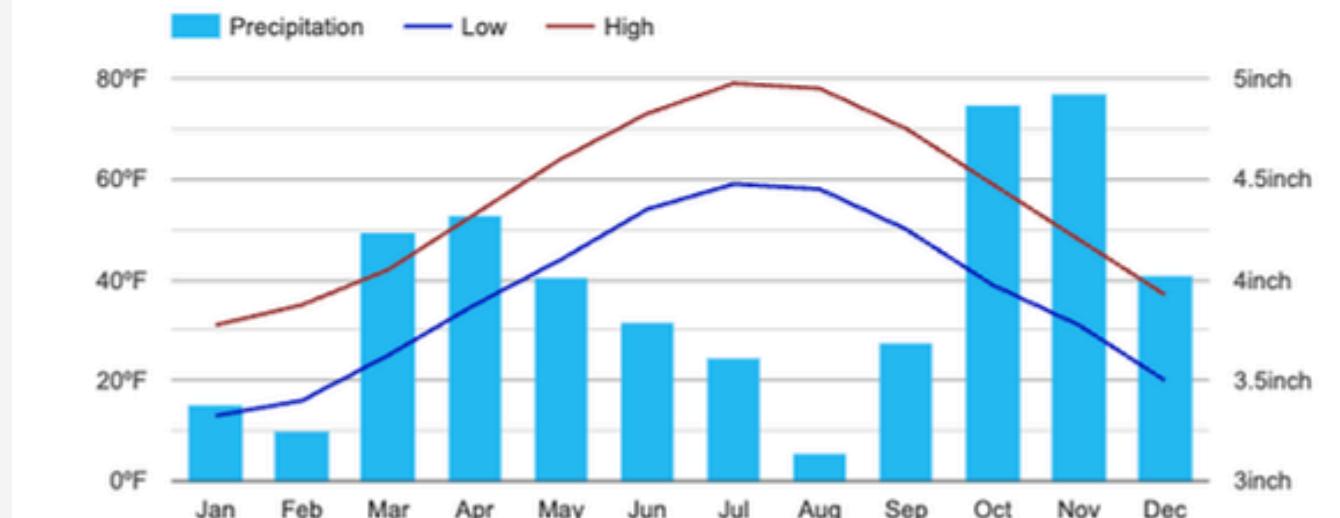
	Jan	Feb	Mar	Apr	May	Jun
Average high in °F	31	35	42	53	64	73
Average low in °F	13	16	25	35	44	54
Av. precipitation in inch	3.38	3.25	4.24	4.32	4.01	3.79
Av. snowfall in inch	19	12	13	3	0	0
	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F	79	78	70	59	48	37
Average low in °F	59	58	50	39	31	20
Av. precipitation in inch	3.61	3.14	3.69	4.87	4.93	4.02
Av. snowfall in inch	0	0	0	0	2	13

Retired Couples

Families with children

Young Professionals

Portland Climate Graph - Maine Climate Chart



Weather

Bureau, U. C. (2020, September 17). American Community Survey 1-Year Data (2005-2019). The United States Census Bureau.
<https://www.census.gov/data/developers/data-sets/acs-1year.html>

U.S. Climate Data. (2023). Climate Portland – Maine.
Retrieved from: <https://www.usclimatedata.com/climate/portland/maine/united-states/usme0321>

Census Reporter. (2024). Maine Profile. Retrieved from: <https://censusreporter.org/profiles/04000US23-maine/>

VELANERA



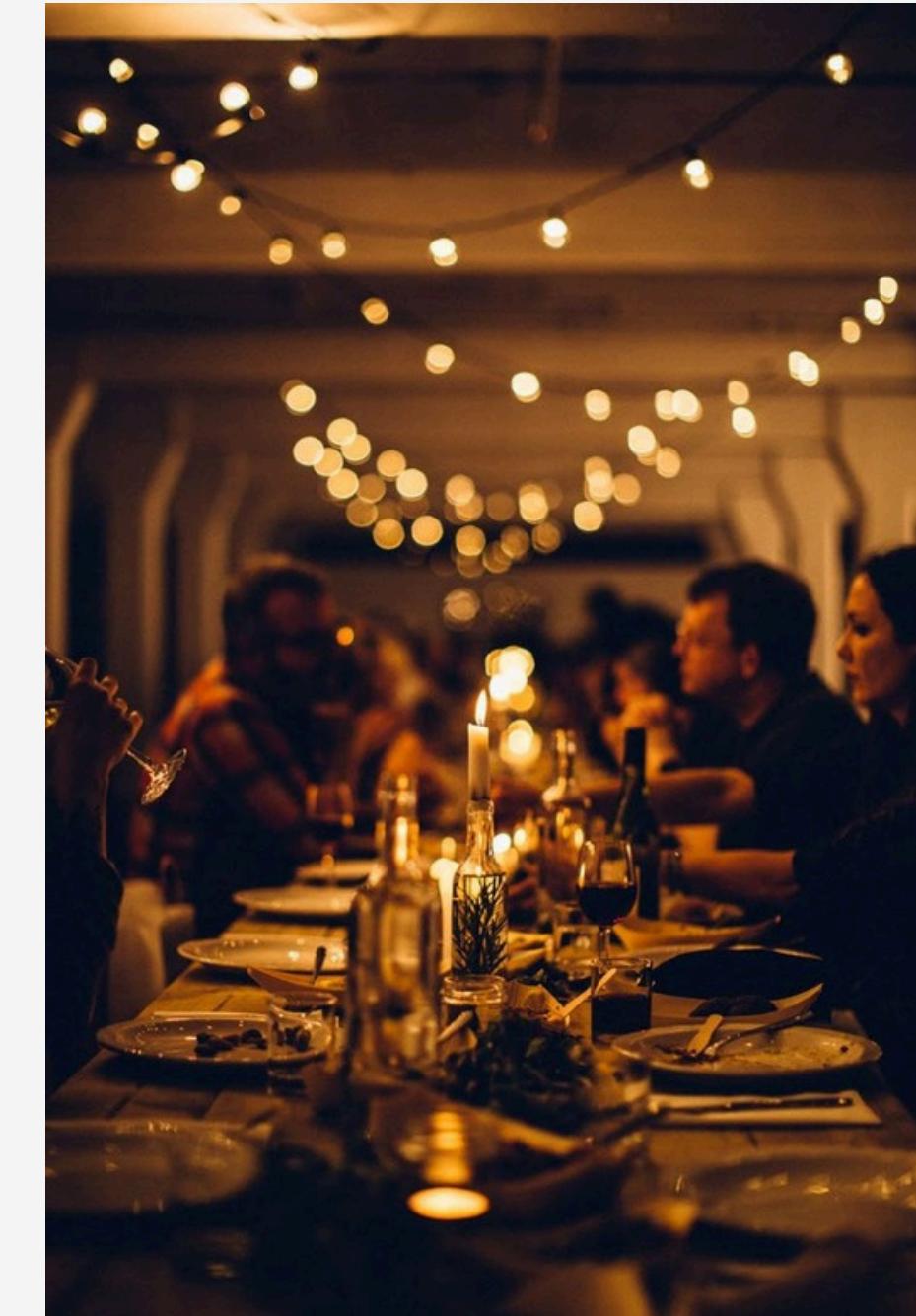
Vela

A constellation in the southern sky



Nera

Meaning of darkness



Candlelight Dinner



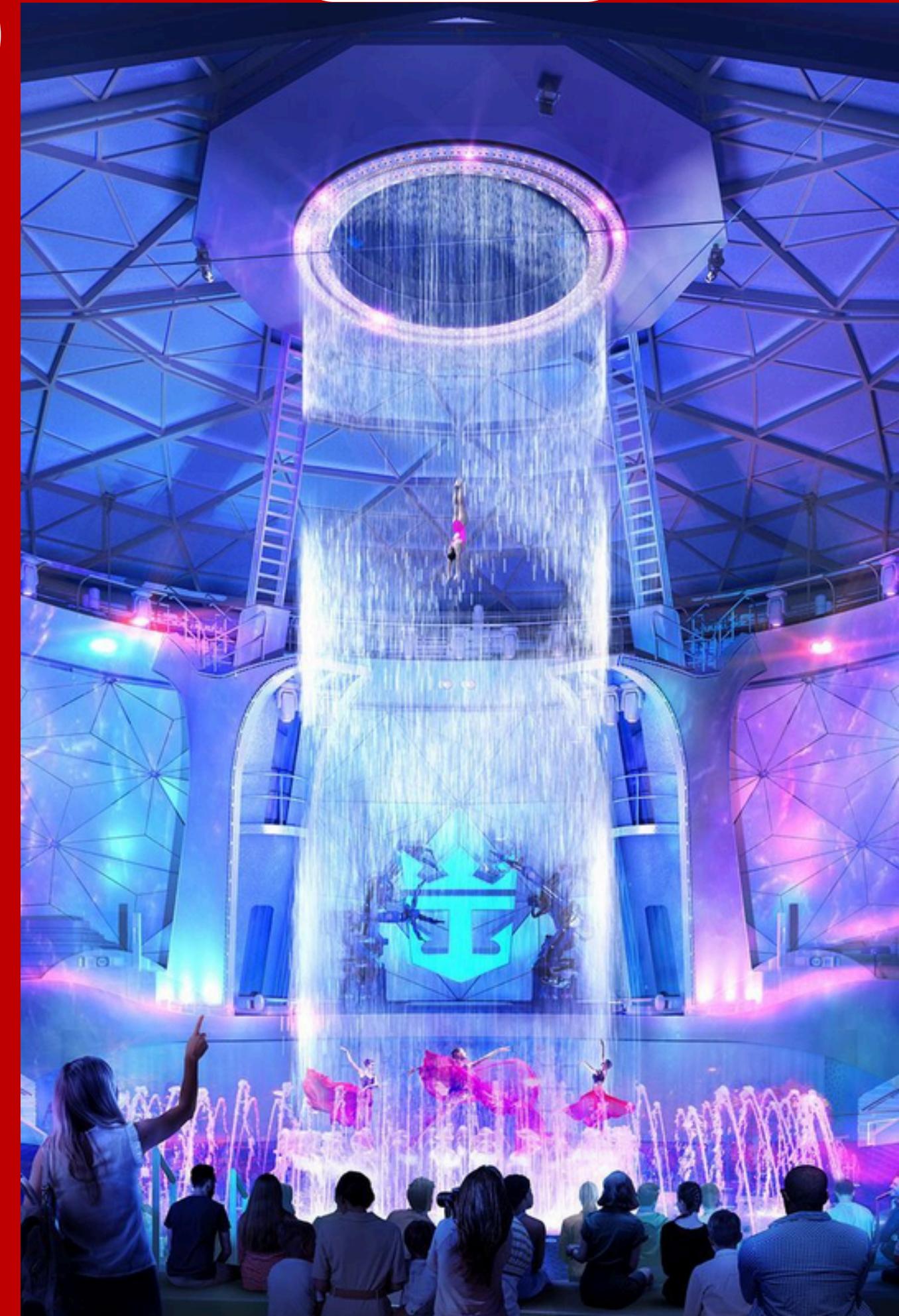
LUXURIOUS REVENUE: VELA NERA

Aqua Show

360 View



Unique and Luxurious
Experience



CLASSIFICATION

Cruise Booking Cancellation Prediction

Model Used: Logistic Regression (trained on 1,500 bookings, tested on 500)

Model Purpose: Helps prioritize high-risk bookings early for intervention.

Accuracy Rate: 71% (test set)

Significant Predictors ($p < 0.05$):

Longer Lead Time (↓) - Decreases likelihood of cancellation

Paid in Full (↓) - Fully paid passengers are much less likely to cancel

Higher Customer Income (↓) - Decreases likelihood of cancellation

Gift Certificate Used (↑) - Increases likelihood of cancellation

No Loyalty Status (↑) - No loyalty status strongly increases cancellation risk

Model Testing

Test Passenger #1



Low-risk profile

→ 10.8% probability of cancellation

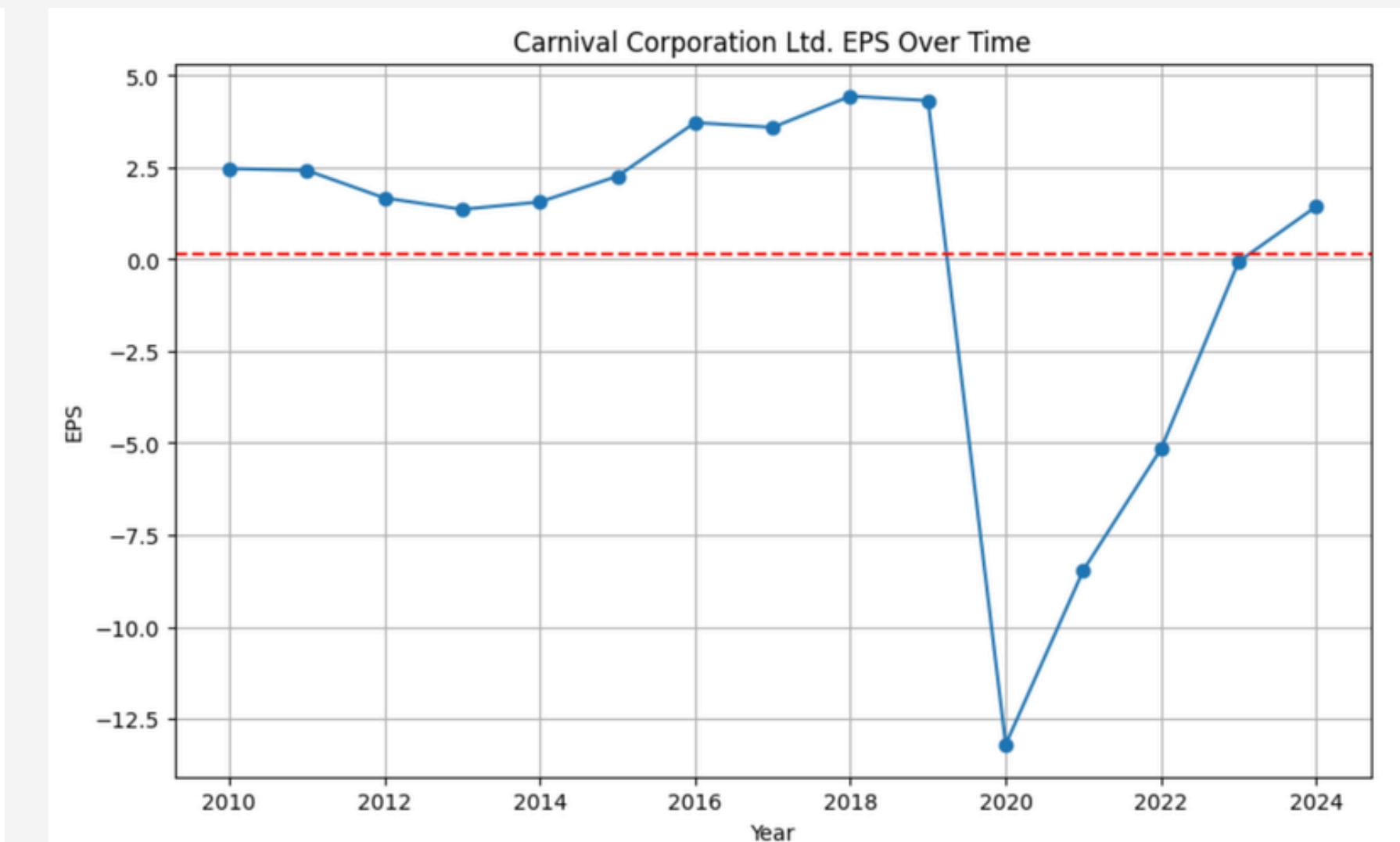
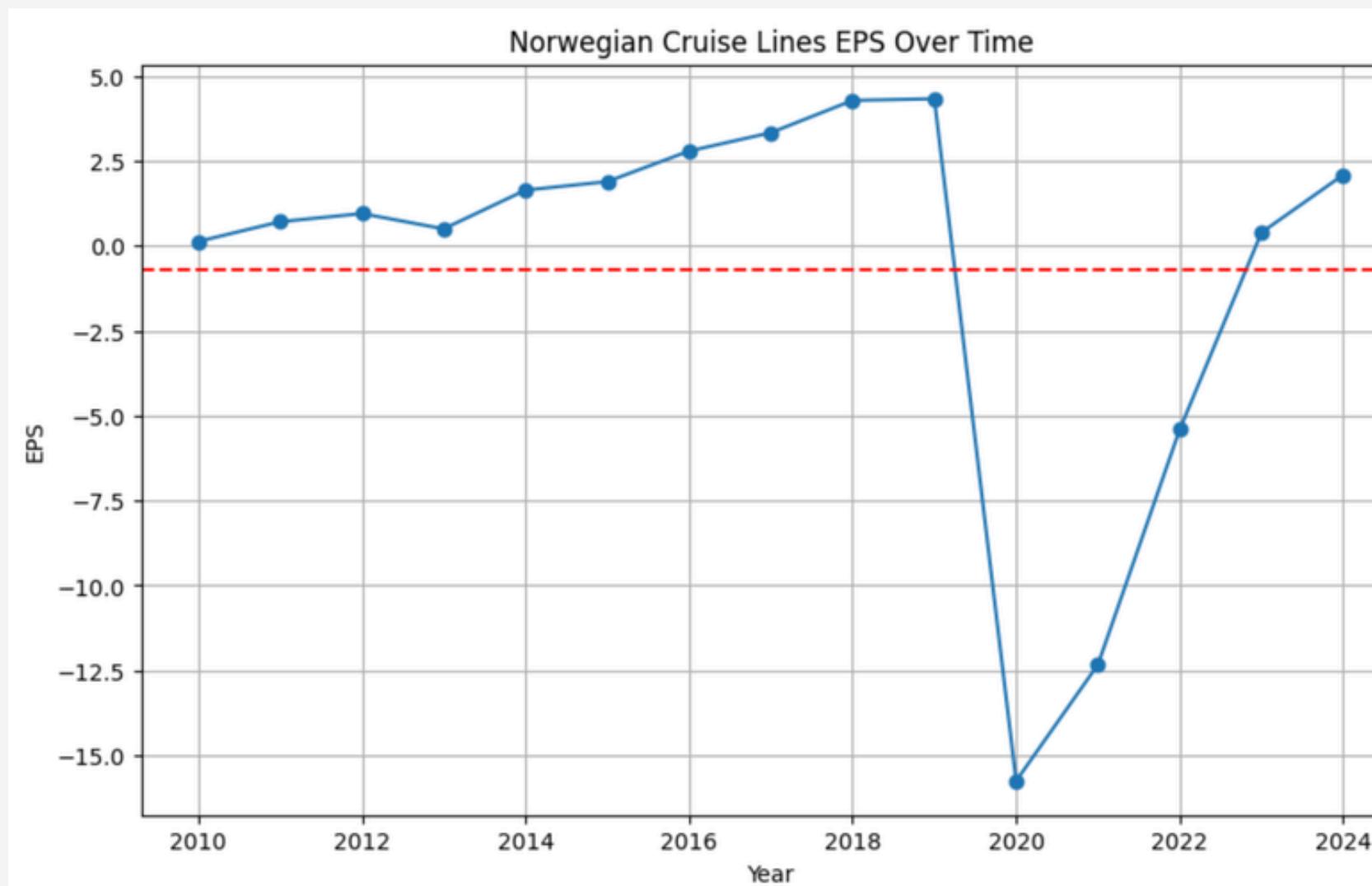
Test Passenger #2



High-risk profile

→ 51.8% probability of cancellation

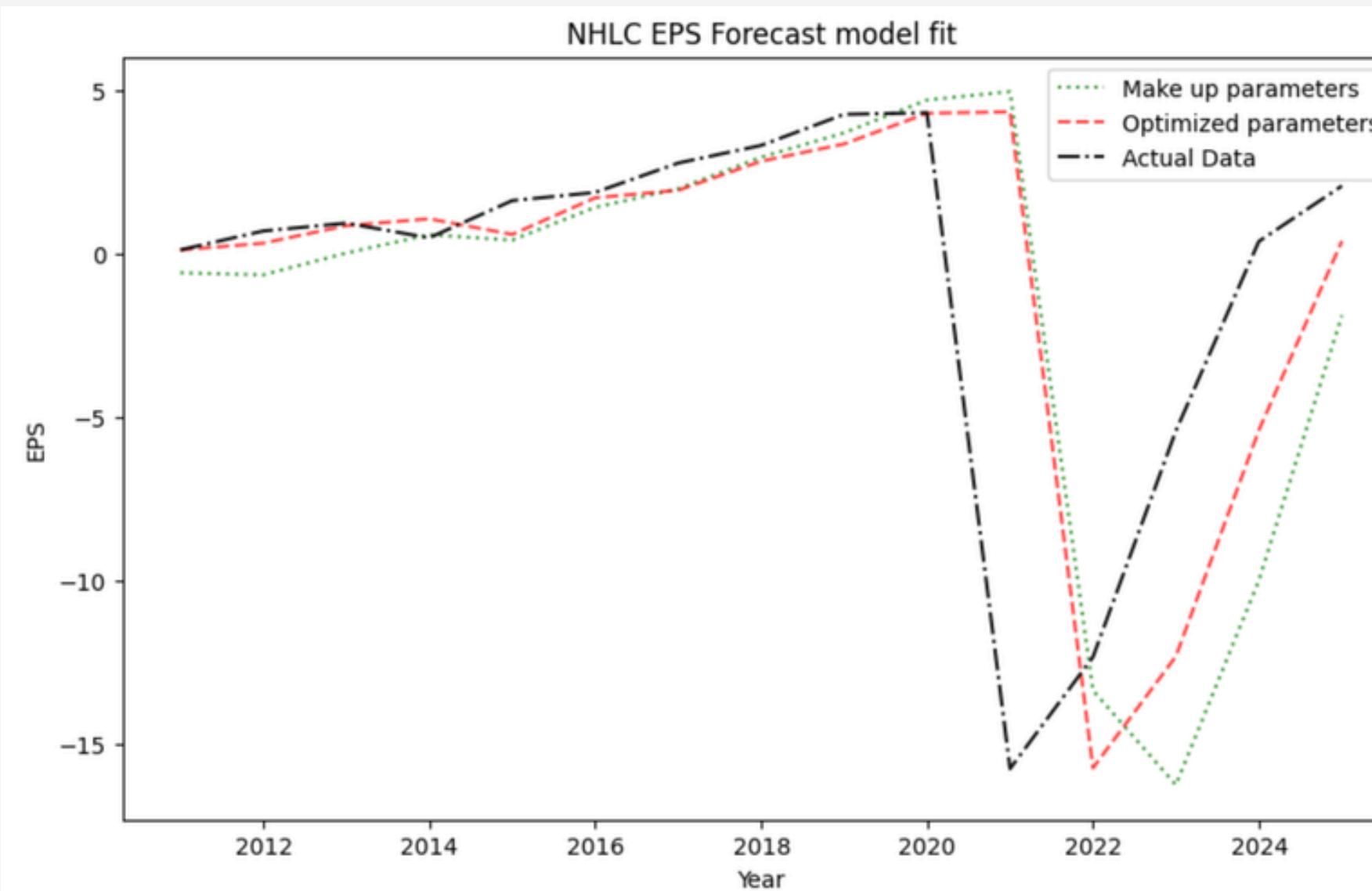
FORECASTING



- Structural break in the trend in 2020
- Rebound is exponential - strategic plans, infrastructure development.

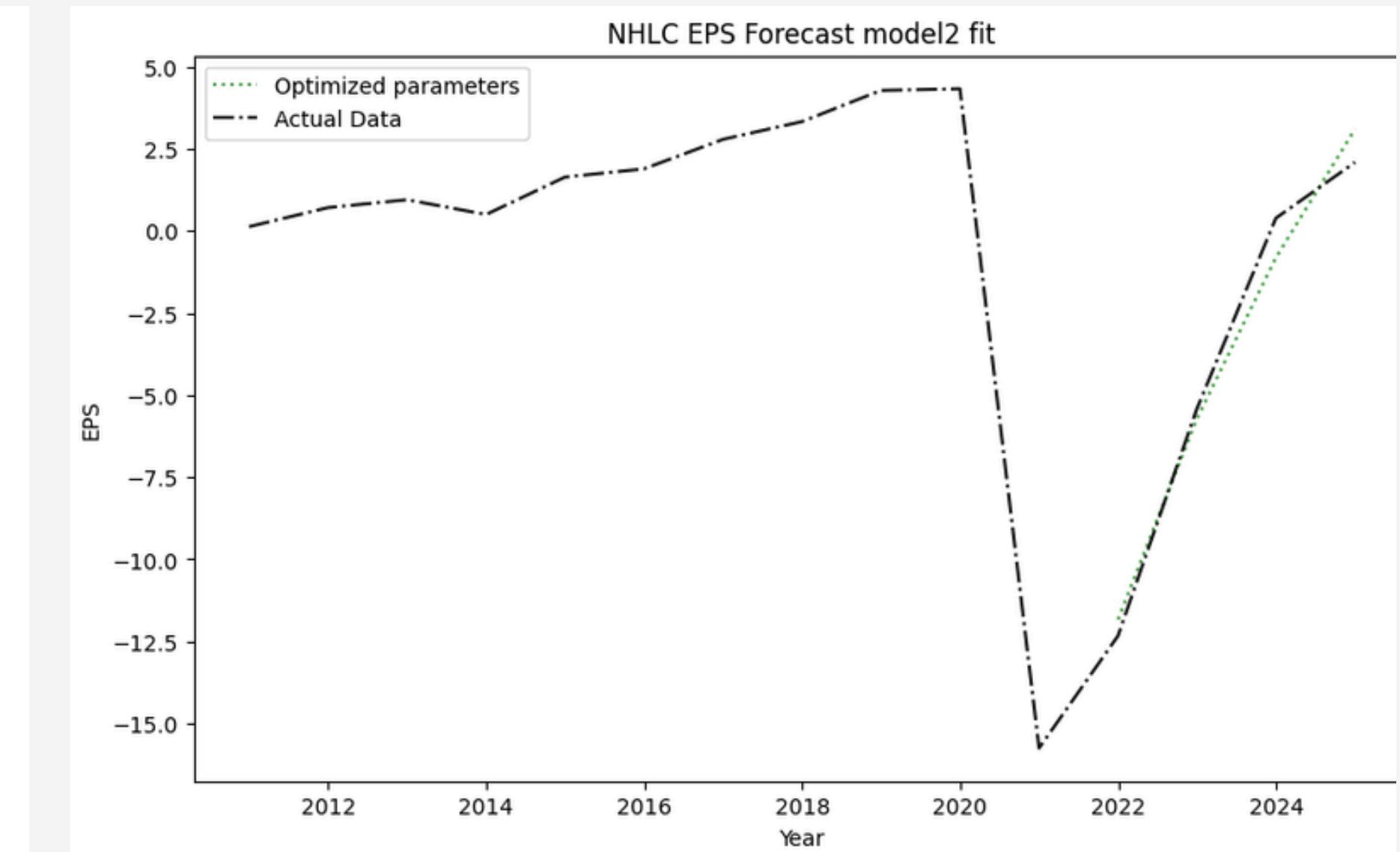
- Similar rebound as Norwegian post-covid
- Fleet optimization and expansion, brand consolidation efforts.

NHLC - FORECASTING



Model fit with full data

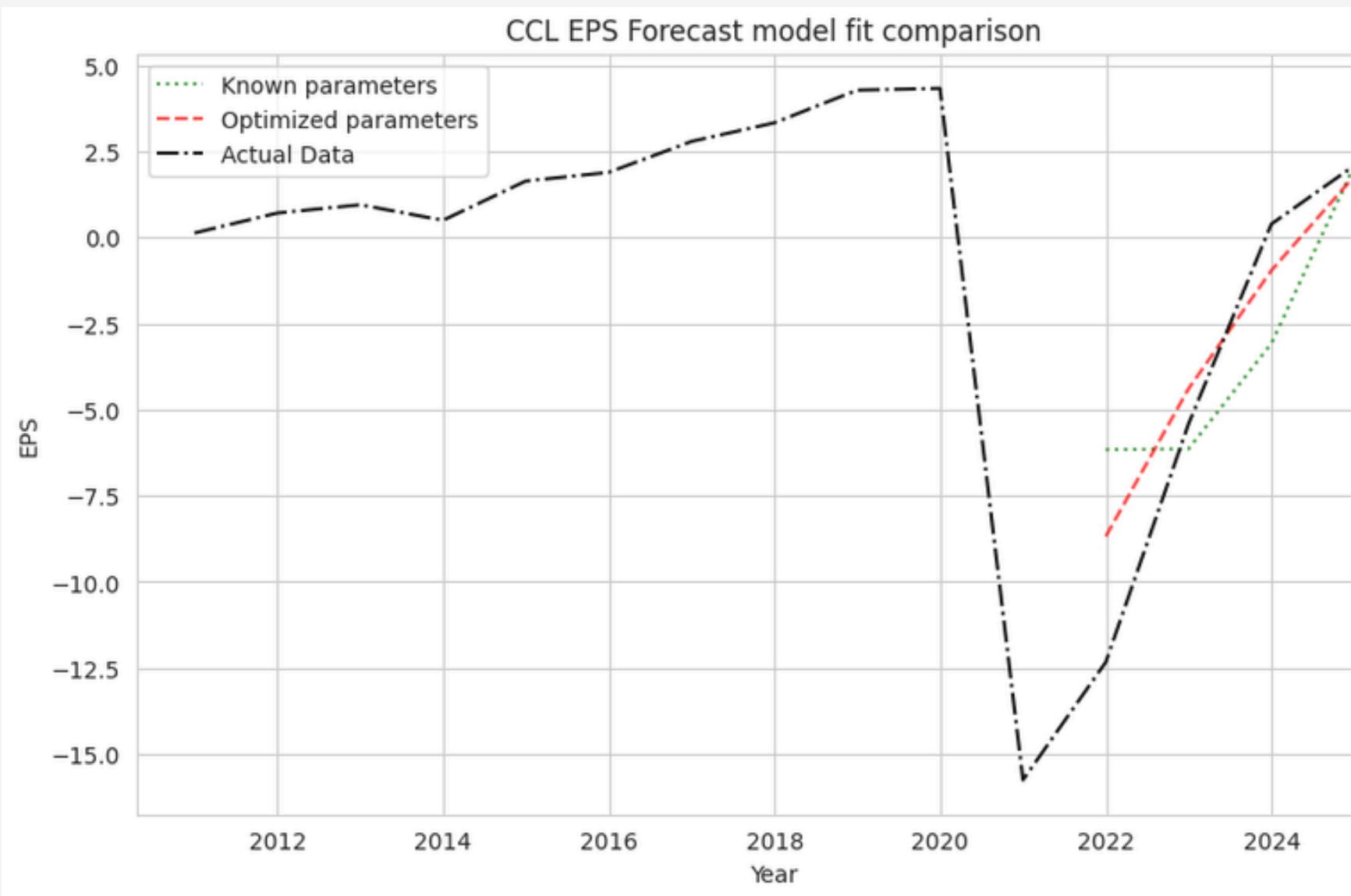
- Double exponential - Holt's Linear method
- Exaggerated negative slope carried in 2021
- Underestimates the rebound trend.



Model with post-covid data

- Reduced data of 3 years - better model fit
- Explains the rebound well
- Much better AIC score achieved with optimized parameters

CCL - FORECASTING & PREDICTIONS



Holt's model fit - post covid data

- Optimized parameters by model are better than manual
- Exaggerates the rebound from 2021 compared to actual values
- ARIMA AR(3, 1, 2) could be arguably better but predictions might not have too much difference.

```
NHLC_model2_result.forecast(steps = 1)
```

0

```
2025-12-31 6.237737
```

```
CCL_model2_result.forecast(steps = 1)
```

0

```
2025-12-31 3.983178
```

Predictions for NHLC & CCL

- EPS for NHLC might look an inflated forecast
- But there business efforts are strong - "Charting the course" strategy, adding 8 new vessels, 25K berths across 3 brands
- EPS for CCL is more in line with 2024 (1.44 in 2024)
- Qualitative analysis - Introduced Carnival Jubilee, additional excel-class vessels, record revenue of \$25 billion in 2024

CONJOINT

	Variable	Coefficient	Cost Per Passenger (Dollars)
0	entertainment dj dance	-0.697778	9.0
1	entertainment east coast folk	0.444300	25.0
2	entertainment jazz blues	0.355375	19.0
3	dining coastal tapas & tasting stations	0.292936	16.5
4	dining formal multi-course plated	-0.768749	31.0
5	dining maine lobster nova scotia seafood buffet	1.497222	24.0
6	cabin modern minimalist	-0.449679	8.0
7	cabin nautical chic	0.312436	15.0
8	cabin romantic escape	0.032533	12.0
9	amenities top deck hot tubs	0.902993	13.5
10	amenities winter wellness spa	0.077683	7.5
11	cocktail credits 2 cocktail tickets per passenger	0.425807	8.0
12	cocktail credits 3 cocktail tickets per passenger	-0.533080	12.0

Recommended Cruise Experience

Based on guest preference ratings and cost optimization, the recommended experience includes:

- Maine Lobster and Nova Scotia Seafood Buffet - \$24
- Jazz Blues live entertainment - \$19
- Romantic Escape cabins - \$12
- Top Deck Hot Tubs - \$13.5
- 1 free cocktail credit per pax - \$4

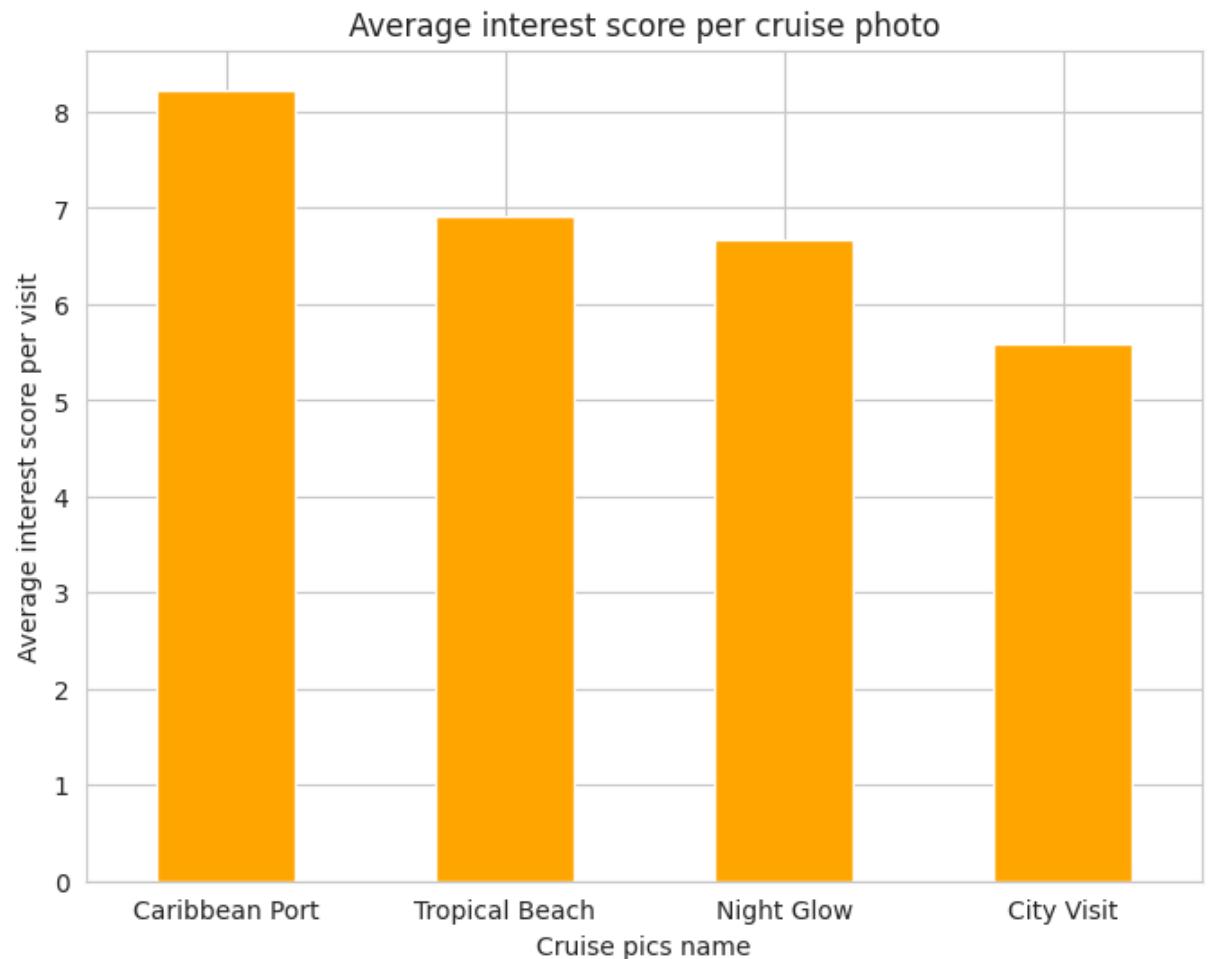
Total = \$72.5 per guest

→ staying under the \$75 target budget

- Priority to the most valued components while balancing guest satisfaction with operational costs.

A/B TESTING

Average Interest_score ~ Engagement



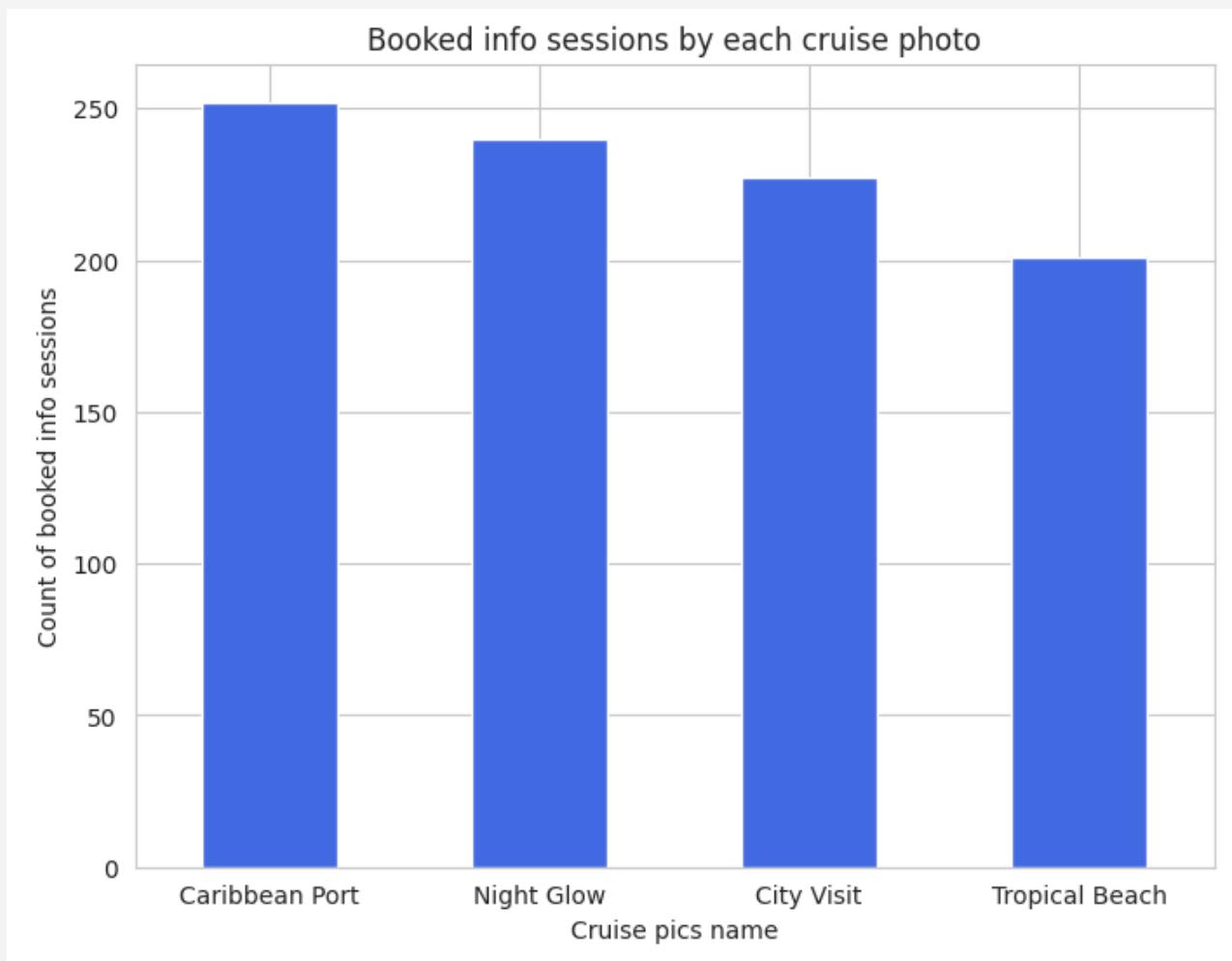
- Average Interest_score hierarchy based on data: Caribbean port > Tropical beach > Night glow > City visit
- Night glow ~ Tropical beach (lack of significance)
- Interest_score > 15 were removed from the dataset as outliers
- Clear conclusions cannot be made about the hierarchy

1-tailed T-test for Cruise Pics

Hypothesis	Results	Conclusion
(H0)Night glow <= Caribbean port; (H1) Night glow > Caribbean port	T-statistic: -8.9398 One-tailed p-value: 1.0	Caribbean port > Night glow; result insignificant
(H0)Night glow <= City visit; (H1) Night glow > City visit	T-statistic: 10.6114 One-tailed p-value: 5.274e-24	Reject null hypothesis, result significant
(H0)Night glow <= Tropical beach; (H1) Night glow > Tropical beach	T-statistic: -2.5557 One-tailed p-value: 0.9945	Tropical beach > Night glow, however result is insignificant
(H0)Caribbean port <= City visit; (H1) Caribbean port > City visit	T-statistic: 13.9824 One-tailed p-value: 8.8770e-38	Reject null hypothesis, result significant
(H0)Caribbean port <= Tropical beach; (H1) Caribbean port > Tropical beach	T-statistic: 6.779 One-tailed p-value: 1.8994e-11	Reject null hypothesis, result significant
(H0)City visit <= Tropical beach; (H1) City visit > Tropical beach	T-statistic: -11.1625 One-tailed p-value: 1.0	Tropical beach > City visit, however result is insignificant

A/B TESTING

Lead to Conversion



- Similar hierarchy as interest_score.
- Cruise pic has no effect on the leads or conversions
- Statiscally the conclusion cannot be made on cruise pic
- With this sample - go -to -choice - Caribbean port
- Else recommendation to management to collect more data to generalise the conclusion

Chi-square Goodness of Fit

```
contingency_table = pd.crosstab(cruise_pics['photo'], cruise_pics['booked_info_session'])

chi2, p_value, dof, expected = stats.chi2_contingency(contingency_table)

print("Chi-square statistic:", chi2)
print("P-value:", p_value)
print("Degrees of freedom:", dof)

Chi-square statistic: 5.940401911123831
P-value: 0.1145460790212076
Degrees of freedom: 3
```

- Null Hypothesis (H0): The cruise photo has no effect on the number of info session bookings.
- Alternate Hypothesis (H1): The cruise photo has an effect on the number of info session bookings.
- chi-square statistic suggests there is a significant difference between observed and expected values of the info session bookings, however this might more be due to random chance as the p-value is higher.

STRATEGIC OUTCOME

The Lobster Coast Voyage should be a **premium mid-market experience**, blending strong guest satisfaction with data-backed activites and excursions to ensure high chance of profitability.



Location: (summary stats)

- Eastern Caribbean and Bahamas ports

Port segment: (clustering)

- Premium experience port journey

Customer segment: (strategic memo)

- Target couples and families with unique luxury experiences

Customer Type: (classification)

- Identify and proactively target high-risk customers

Market Predictions: (forecasting)

- Instability after COVID drop, low ability to predict future signals

Experience Package: (conjoint)

- Customer preferences balanced within a \$75 budget per pax

Marketing Materials: (a/b testing)

- Conversion is prioritized in the marketing funnel

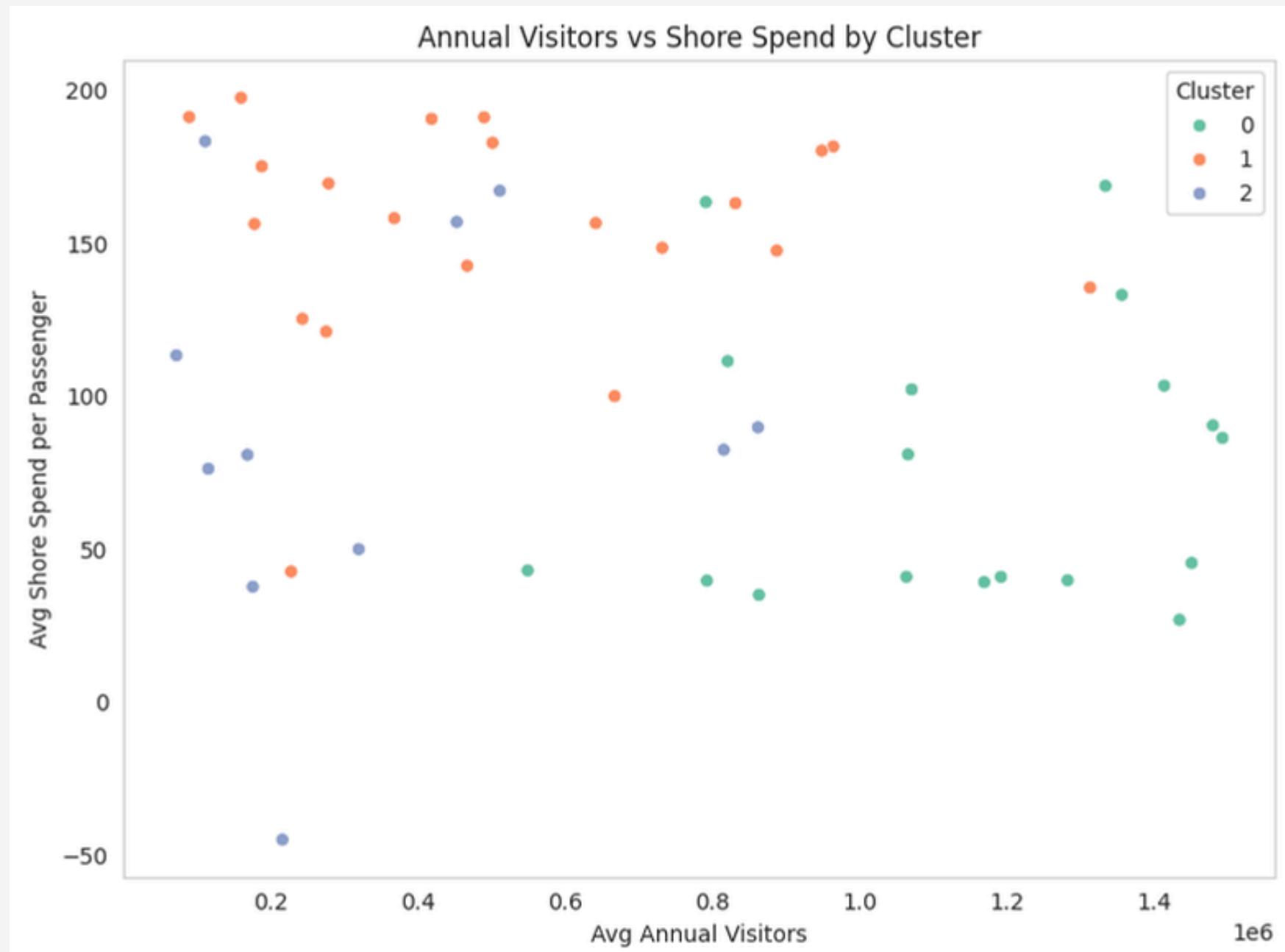
THANK YOU



APPENDIX



SEGMENTATION

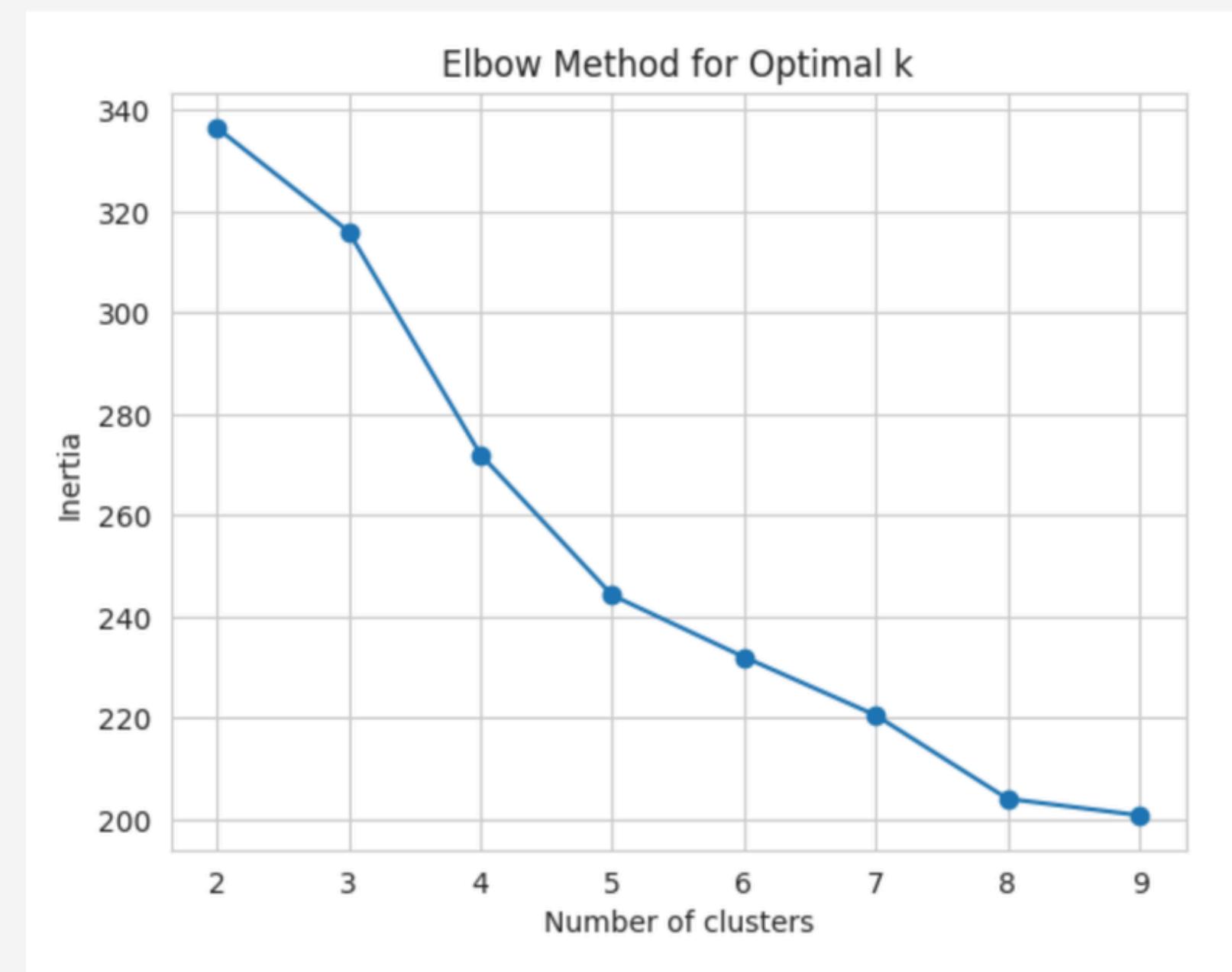


3 clusters



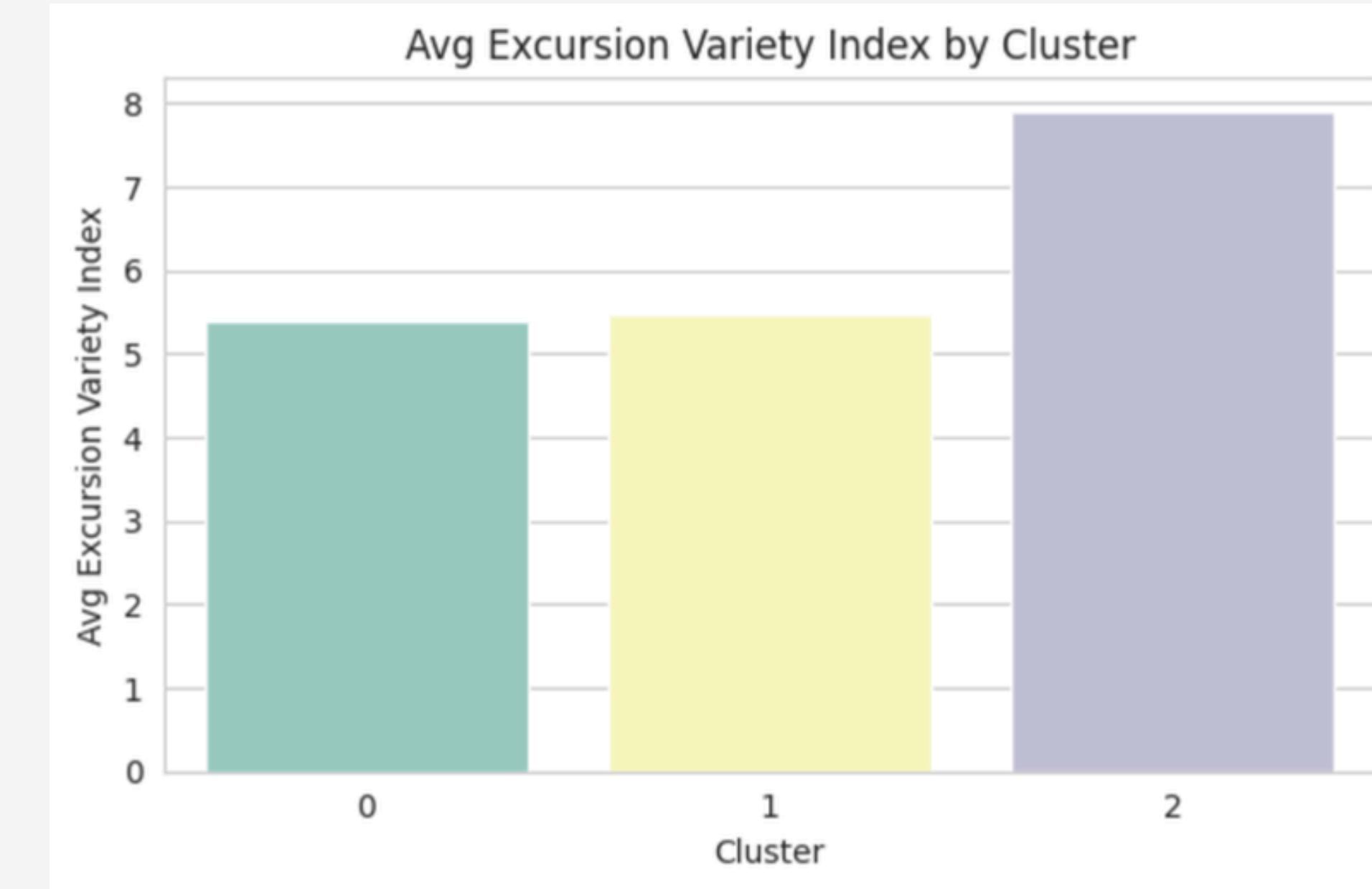
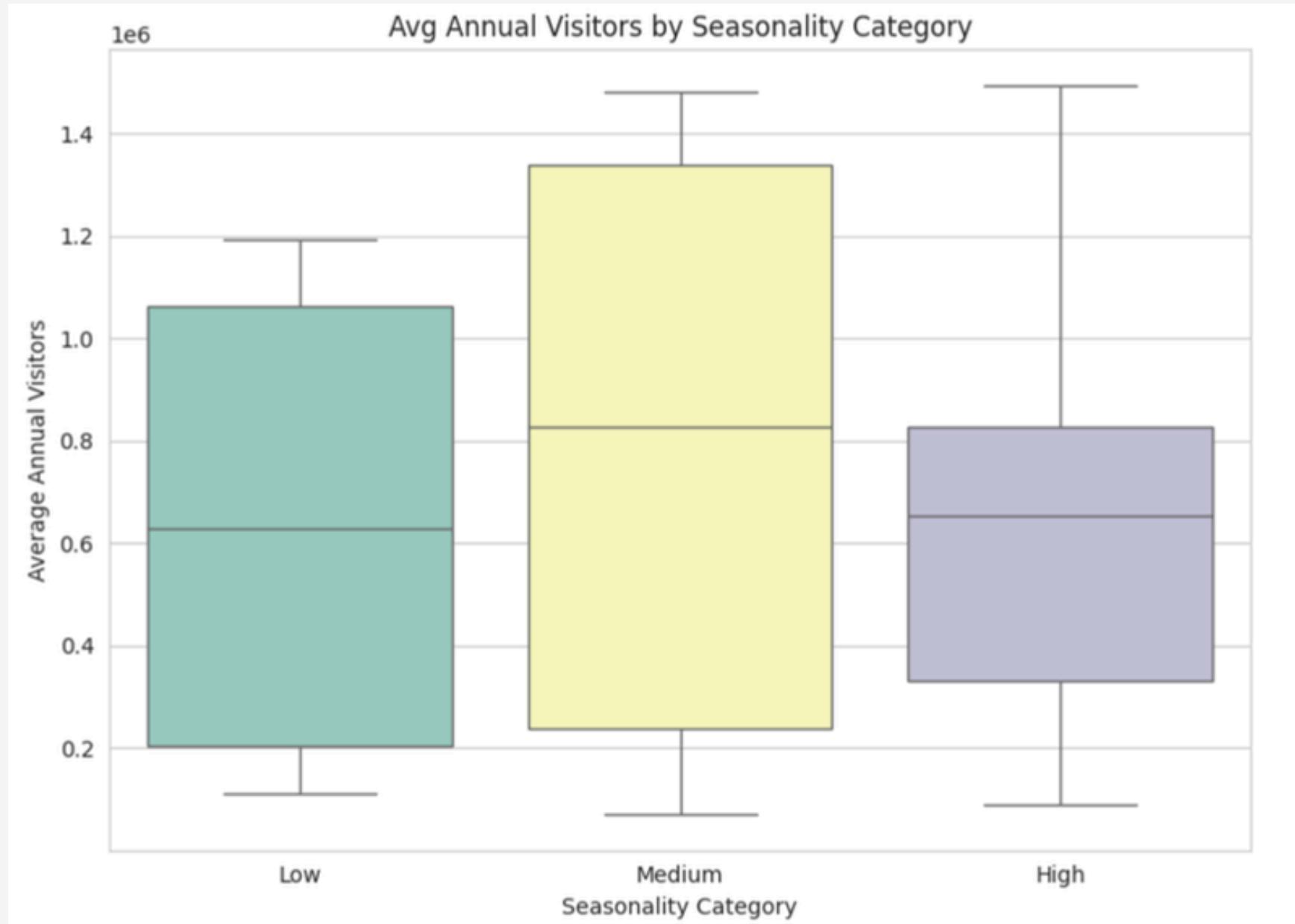
8 clusters

SEGMENTATION

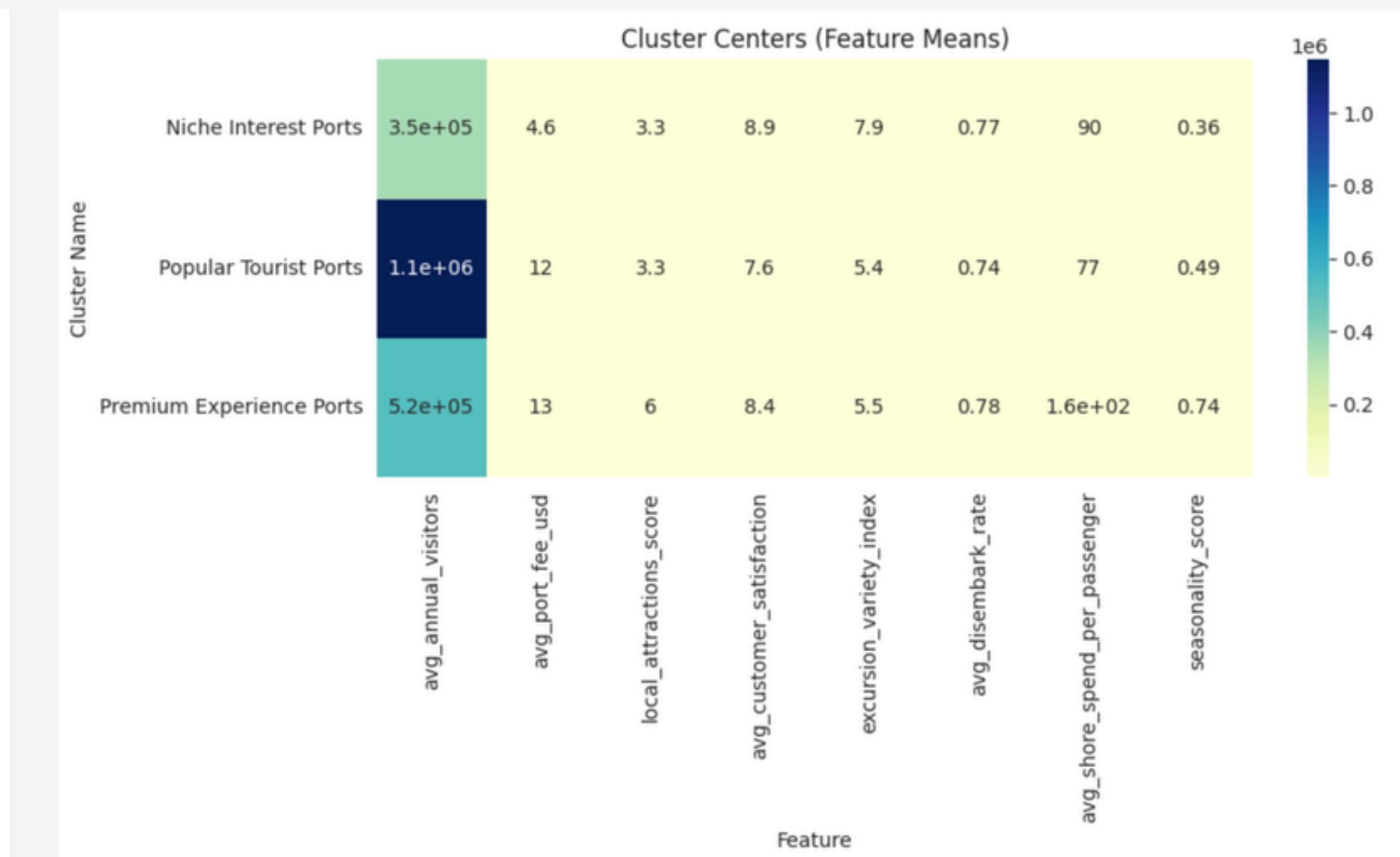
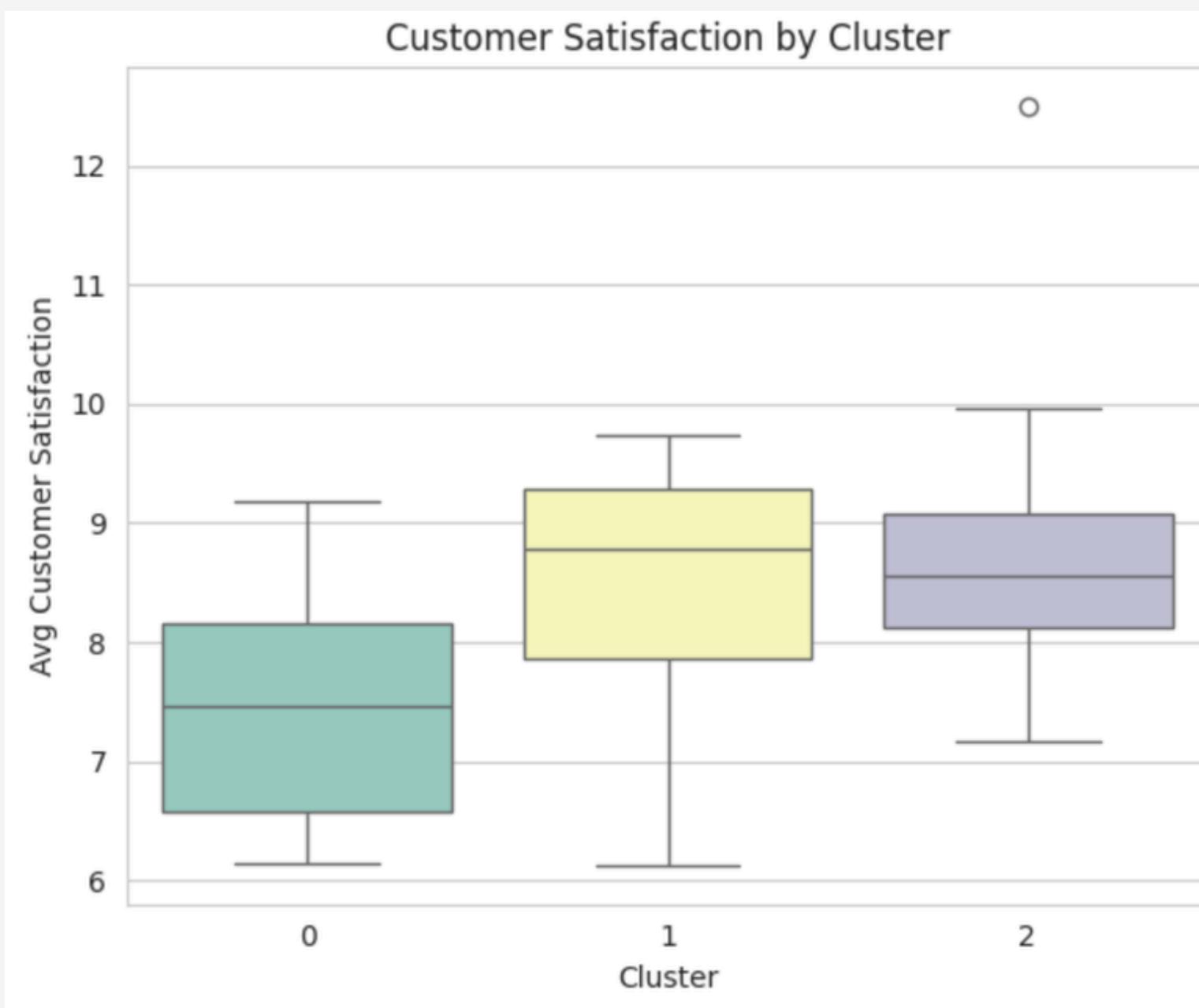


Elbow chart

SEGMENTATION



SEGMENTATION



FORECASTING MODELS - NHLC

Model with full EPS data - known parameters

```
Holt Model Results

Dep. Variable: EPS      No. Observations: 15
Model: Holt            SSE: 677.629
Optimized: False        AIC: 65.158
Trend: Additive        BIC: 67.990
Seasonal: None          AICC: 75.658
Seasonal Periods: None  Date: Mon, 28 Apr 2025
Box-Cox: False          Time: 12:36:23
Box-Cox Coeff.: None

                  coeff    code optimized
smoothing_level 0.7000000 alpha False
smoothing_trend 0.3000000 beta  False
initial_level    0.1300000 l.0   False
initial_trend    -0.7000000 b.0  False
```

Model with full EPS data - Optimized parameters

Holt Model Results

Dep. Variable: EPS No. Observations: 15

Model: Holt SSE 503.166

Optimized: True AIC 62.693

Trend: Additive BIC 66.233

Seasonal: None AICC 78.693

Seasonal Periods: None Date: Mon, 28 Apr 2025

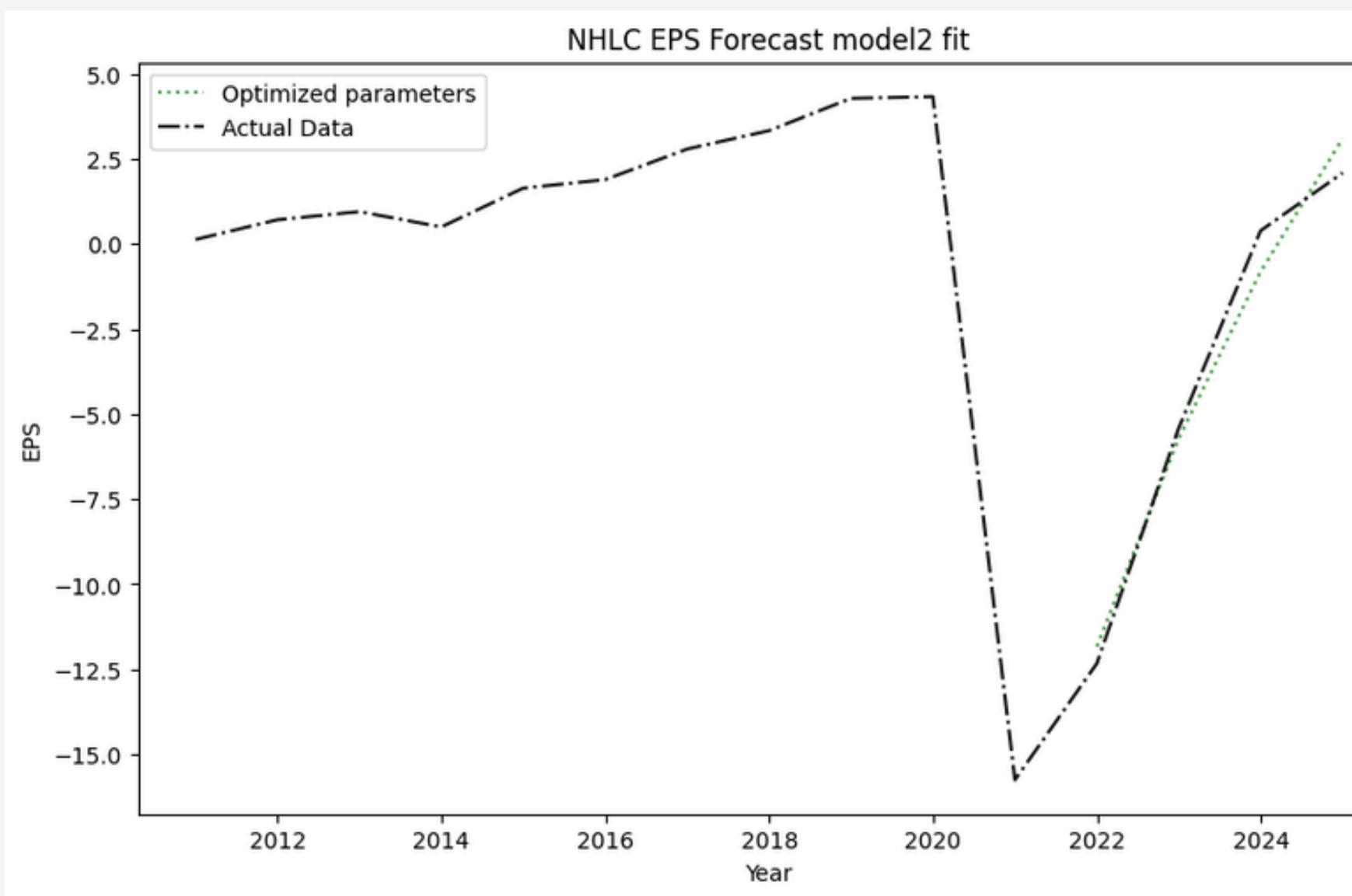
Box-Cox: False Time: 12:36:28

Box-Cox Coeff.: None

	coeff	code	optimized
smoothing_level	1.0000000	alpha	True
smoothing_trend	0.0000000	beta	True
initial_level	-0.1283881	l.0	True
initial_trend	0.2582996	b.0	True
damping_trend	0.8000000	phi	True

FORECASTING MODELS - NHLC

Model fit with post-covid EPS data



Model with post-covid EPS data - Optimized parameters

Holt Model Results			
Dep. Variable:	EPS	No. Observations:	4
Model:	Holt	SSE	2.815
Optimized:	True	AIC	8.595
Trend:	Additive	BIC	5.527
Seasonal:	None	AICC	inf
Seasonal Periods:	None	Date:	Mon, 28 Apr 2025
Box-Cox:	False	Time:	12:36:45
Box-Cox Coeff.:	None		
		coeff	code optimized
smoothing_level	1.4901e-08	alpha	True
smoothing_trend	3.7902e-09	beta	True
initial_level	-19.487964	i_0	True
initial_trend	7.6528145	b_0	True
damping_trend	0.8000000	phi	True

FORECASTING MODELS - CCL

Model with post-covid EPS
data - known parameters

Holt Model Results			
Dep. Variable:	EPS	No. Observations:	4
Model:	Holt	SSE	15.769
Optimized:	False	AIC	13.487
Trend:	Additive	BIC	11.032
Seasonal:	None	AICC	inf
Seasonal Periods:	None	Date:	Mon, 28 Apr 2025
Box-Cox:	False	Time:	03:09:47
Box-Cox Coeff.:	None	coeff	code optimized
smoothing_level	0.9000000	alpha	False
smoothing_trend	0.1000000	beta	False
initial_level	-8.4600000	l.0	False
initial_trend	2.3000000	b.0	False

Model with post-covid EPS
data - Optimized parameters

Holt Model Results			
Dep. Variable:	EPS	No. Observations:	4
Model:	Holt	SSE	1.569
Optimized:	True	AIC	6.255
Trend:	Additive	BIC	3.187
Seasonal:	None	AICC	inf
Seasonal Periods:	None	Date:	Mon, 28 Apr 2025
Box-Cox:	False	Time:	03:09:47
Box-Cox Coeff.:	None	coeff	code optimized
smoothing_level	1.4901e-08	alpha	True
smoothing_trend	9.4321e-09	beta	True
initial_level	-14.040933	l.0	True
initial_trend	5.3617653	b.0	True
damping_trend	0.8000000	phi	True

CLASSIFICATION

ITERATION #1

Optimization terminated successfully.						
Current function value: 0.497151						
Iterations 6						
Logit Regression Results						
Dep. Variable:	canceled	No. Observations:	1500			
Model:	Logit	Df Residuals:	1472			
Method:	MLE	Df Model:	27			
Date:	Sun, 27 Apr 2025	Pseudo R-squ.:	0.1571			
Time:	19:01:53	Log-Likelihood:	-745.73			
converged:	True	LL-Null:	-884.67			
Covariance Type:	nonrobust	LLR p-value:	1.787e-43			
	coef	std err	z	P> z	[0.025	0.975]
const	0.0275	0.596	0.046	0.963	-1.142	1.197
age	-0.0005	0.004	-0.148	0.882	-0.008	0.007
booking_lead_time	-0.0027	0.001	-4.321	0.000	-0.004	-0.001
trip_length	-0.0338	0.021	-1.640	0.101	-0.074	0.007
group_size	0.0070	0.044	0.158	0.874	-0.080	0.094
paid_in_full	-1.2288	0.139	-8.863	0.000	-1.501	-0.957
prior_cruises	-0.0884	0.054	-1.627	0.104	-0.195	0.018
customer_income	-6.481e-06	2.23e-06	-2.912	0.004	-1.08e-05	-2.12e-06
email_engagement_score	-0.3032	0.440	-0.689	0.491	-1.165	0.559
phone_verified	0.1442	0.182	0.791	0.429	-0.213	0.502
has_insurance	0.0868	0.131	0.662	0.508	-0.170	0.344
on_mailing_list	-0.1939	0.133	-1.452	0.146	-0.455	0.068
website_visits_last_month	0.0463	0.038	1.207	0.227	-0.029	0.121
travel_history_score	0.0032	0.004	0.746	0.456	-0.005	0.012
gift_certificate_used	0.5509	0.210	2.622	0.009	0.139	0.963
cabin_type_Interior	0.4347	0.162	2.677	0.007	0.116	0.753
cabin_type_Oceanview	-0.1157	0.171	-0.678	0.498	-0.450	0.219
cabin_type_Suite	0.0034	0.241	0.014	0.989	-0.468	0.475
loyalty_status_None	1.6945	0.219	7.750	0.000	1.266	2.123
loyalty_status_Platinum	-0.2042	0.328	-0.623	0.533	-0.847	0.438
loyalty_status_Silver	0.1812	0.246	0.738	0.461	-0.300	0.663
survey_participation_Partial	0.1398	0.168	0.833	0.405	-0.189	0.469
survey_participation_Yes	0.0262	0.150	0.175	0.861	-0.267	0.320
preferred_contact_method_Phone	0.0364	0.155	0.234	0.815	-0.268	0.340
preferred_contact_method_Text	-0.1715	0.160	-1.069	0.285	-0.486	0.143
referral_source_Friend	-0.0344	0.184	-0.187	0.852	-0.395	0.326
referral_source_Search Engine	-0.2873	0.187	-1.536	0.125	-0.654	0.079
referral_source_Social Media	-0.0669	0.180	-0.371	0.710	-0.420	0.286

ITERATION #2

Optimization terminated successfully.						
Current function value: 0.507632						
Iterations 6						
Logit Regression Results						
Dep. Variable:	canceled	No. Observations:	1500			
Model:	Logit	Df Residuals:	1495			
Method:	MLE	Df Model:	4			
Date:	Sun, 27 Apr 2025	Pseudo R-squ.:	0.1393			
Time:	19:01:56	Log-Likelihood:	-761.45			
converged:	True	LL-Null:	-884.67			
Covariance Type:	nonrobust	LLR p-value:	3.813e-52			
	coef	std err	z	P> z	[0.025	0.975]
booking_lead_time	-0.0028	0.001	-5.091	0.000	-0.004	-0.002
paid_in_full	-1.1794	0.127	-9.276	0.000	-1.429	-0.930
customer_income	-7.101e-06	1.45e-06	-4.884	0.000	-9.95e-06	-4.25e-06
gift_certificate_used	0.5182	0.206	2.521	0.012	0.115	0.921
loyalty_status_None	1.5447	0.131	11.749	0.000	1.287	1.802
	precision	recall	f1-score	support		
	0	0.76	0.89	0.82	362	
	1	0.45	0.25	0.32	138	
accuracy				0.71	500	
macro avg	0.60	0.57	0.57	500		
weighted avg	0.67	0.71	0.68	500		
	[[321 41]					
	[104 34]]					

STRATEGIC OUTCOME

The Lobster Coast Voyage should be a **premium mid-market experience**, blending strong guest satisfaction with data-backed activites and excursions to ensure high chance of profitability.



Location: (summary stats)

- Eastern Caribbean and Bahamas ports
- Major and boutique ports

Offer the highest potential for profitability and operationality.



Port segment: (clustering)

- We recommend a premium experience port journey
- Capture high spending and customer satisfaction

Customer segment: (strategic memo)

- Target couples and families looking for a restful retreat
- Create unique luxury experiences with flexible design

STRATEGIC OUTCOME

Customer Type: (classification)

- Integrate passenger cancellation risk modeling
- Identify and proactively target high-risk customers



Market Predictions: (forecasting)

- The cruise industry restructured after the harsh drop (COVID)
- Instability causes low ability to predict future signals



Experience Package: (conjoint)

- Customer preferences balanced within a \$75 budget per pax
- Calculated tradeoff between drinks and entertainment
- Full package on the next page

Marketing Materials: (a/b testing)

- Conversion is prioritized in the marketing funnel
- Image selected on lead impact rather than top of funnel

EXPERIENCE PACKAGE

Final Combination



Dining: Maine Lobster Nova Scotia Seafood Buffet (\$24)

Entertainment: Jazz Blues (\$19)

Cabin: Romantic Escape (\$12)

Amenities: Top Deck Hot Tubs (\$13.5)

Cocktail Credit: 1 Free Drink (\$4)

• **Total Cost per Passenger:** \$72.5

