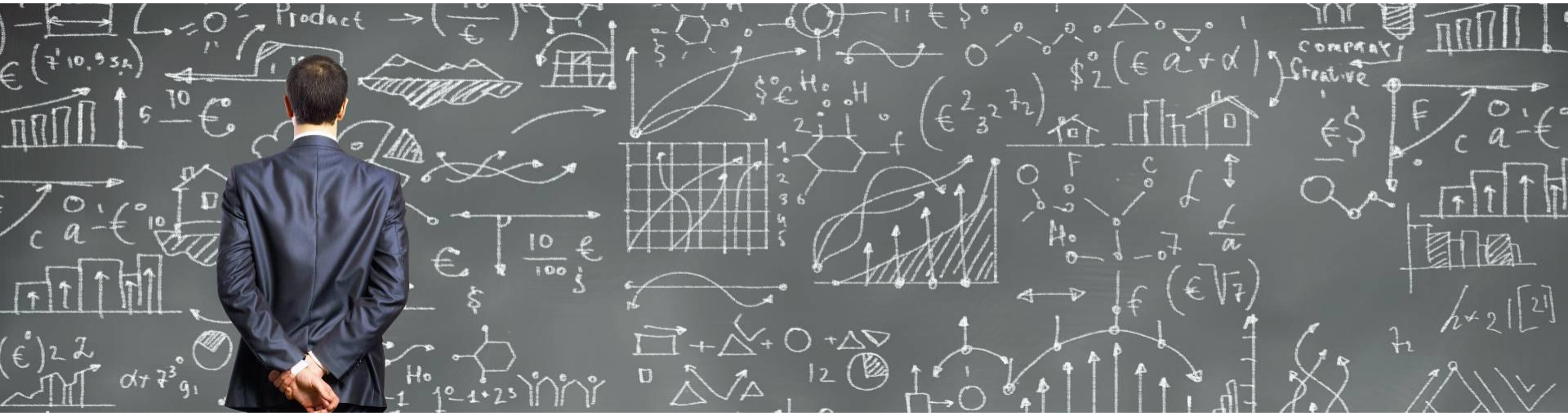
Sanal Kondayath



Capstone Data Science Project

Increasing Real Estate Management Profits

30/09/2021

Agenda

Increasing Real Estate Management Profits

Business Problem

Should Watershed Properties enter the short-term rental market ?

Situation	▪ Watershed Properties is a residential property management company. It manages several thousand properties in more than 60 different neighborhoods around the United States. ▪ The Company has a overall property occupancy rates at a very attractive 97.3%. ▪ Watershed has thus far exclusively managed long-term leases. However, given the structural shift in the US real estate industry toward short-term rentals, Watershed wants to explore a time-sensitive opportunity to explore the short-term rental market. ▪ One of its top property owners has expressed interest in working with Watershed to convert some of its long-term rental properties to short-term rental properties.
Approach	▪ Calculate how much it would cost to convert and maintain each of this client's properties as a short-term rental, and determine the nightly rental price that would maximize the profits from each of these properties, if they were converted to short-term rentals. ▪ Use the above information to calculate which properties would have increased profits as short-term rentals, and determine how profitable, overall, it would be if Watershed converted some of this client's properties into short-term rentals. ▪ Further, determine how much cash Watershed would need in order to realize any potential profits from converting the properties.

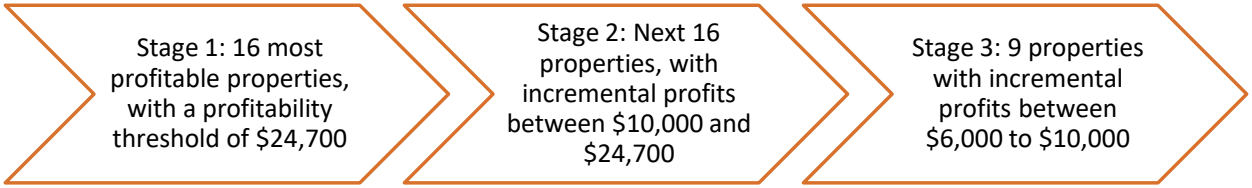
Key Takeaways

Approach & Solution

- I modeled (linear regression) the relationship between nightly rental price and occupancy rate for short-term rental properties based on four types of information from current short-term rentals managed by other companies and owners
    - Number of bedrooms
    - Apartment or house
    - Kitchen availability
    - Unshared property
- I used this model to predict the short-term rental price that would maximize profits of Watershed's client's 244 properties if it were managed as a short-term rental property.
- I have created a dashboard that illustrates the effects of changing assumptions on predicted profits and required capital investment that is available to anybody on the team by request.
- When the typical rental prices were expressed in terms of percentiles relative to properties of the same type and in the same location—but not when they were analyzed as raw dollar values—they correlated linearly with occupancy rates
- I used the parameters of the regression line and Excel's Solver optimization function to find the rental price and occupancy rate that would maximize the profits expected from each of Watershed's client's 244 properties.
- Any optimized price below the 10^{th} percentile rate was replaced with the 10^{th} percentile rate, and any optimized price above the 90^{th} percentile rate was replaced with the 90^{th} percentile rate, in order to account for lack of data outside of these ranges in the linear model.
- These optimized rental rates were entered into a financial cash flow and profit model that computed the expected revenue from each property based on its projected occupancy rate, and the expected costs.

Recommendation

- I recommend that Watershed should enter the short-term rental market. The Company could do this in three stages. Firstly, given the constraint of $500,000 in funding the short-term rental project, in the first stage it could convert the top 16 properties with a profitability threshold of $24,700.
- In the second stage, it could target properties, with incremental profits between $10,000 and $24,700.
- Finally, it could look at properties with incremental profits between $6,000 to $10,000. The analysis that serves as the basis of my recommendation indicates that Watershed and its client would benefit from $885,378 of increased profits during the first year, and yearly profits of $789,378 every year thereafter if my recommendation (stage 1) is enacted.



Stage 1:Payback Period of 1 YR Looks Attractive

Stage 1: Converting 16 properties			
$ '000	Current scenario	Bear case	% downside
Cash Flow conversion yr	501	280	-44.2%
Cash flow post conversion	885	472	-46.7%
Profit conversion yr	885	472	-46.7%
Profit post conversion	789	424	-46.3%

Assuming the same profitability threshold of $24,700

Bear case assumes transaction fee+regulatory fee of 40% vs 30% in base case

$ '000	
Stage 1-profitability threshold of 24,700	
Total cash outlay for 16 properties	480
Incremental Cash Flow Conversion yr-base case	501
Incremental Cash Flow Conversion yr-bear case	280
Payback period-base case	1.0
Payback period-bear case	1.7

Individual profitable properties(Total:16)
Total cash outlay:$480,000

Watershed property ..	Zipcode	State	City	property type (Apart..	Profit Post Conv
W156	33137	FL	Miami	R14	124,604
W155	33137	FL	Miami	R10	104,018
W164	33149	FL	Miami	R14	78,372
W163	33149	FL	Miami	R10	64,398
W107	78705	TX	Austin	R10	54,983
W120	78746	TX	Austin	R14	46,570
W108	78705	TX	Austin	R14	44,516
W67	94301	CA	Palo Alto	R14	40,184
W190	91950	CA	San Diego	R6	39,015
W152	33122	FL	Miami	R14	30,530
W66	94301	CA	Palo Alto	R10	29,987
W110	78723	TX	Austin	R6	27,089
W160	33146	FL	Miami	R14	26,942
W46	10019	NY	New York	R10	26,927
W192	91950	CA	San Diego	R14	26,517
W114	78744	TX	Austin	R6	24,728

Tableau Dashboard-Sensitivity Analysis

Profitable threshold: 24,700	Transation fee: 0.2	Regulatory fee: 0.1
Capex: 30,000	Average Length of Guest Stay (days): 3	Utilities (every year): 3,600
Variable Costs (per guest visit): 100	Repairs (post conversion yr): 6,000	Depreciation years: 5

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Jittered Map

Data Set Characteristics

Dataset Information

Elicitation Interviews:

I had to list by roles, three stakeholders, inside or outside the Watershed company and ask them for inputs on the properties.

Some of the other inputs given by the project manager:

(1) initial furnishing costs
(2) upkeep costs
(3) internet service fees
(4) regulatory fees
(5) hospitality charges (including key service and cleaning)
(6) typical duration of stay
(7) Utilities

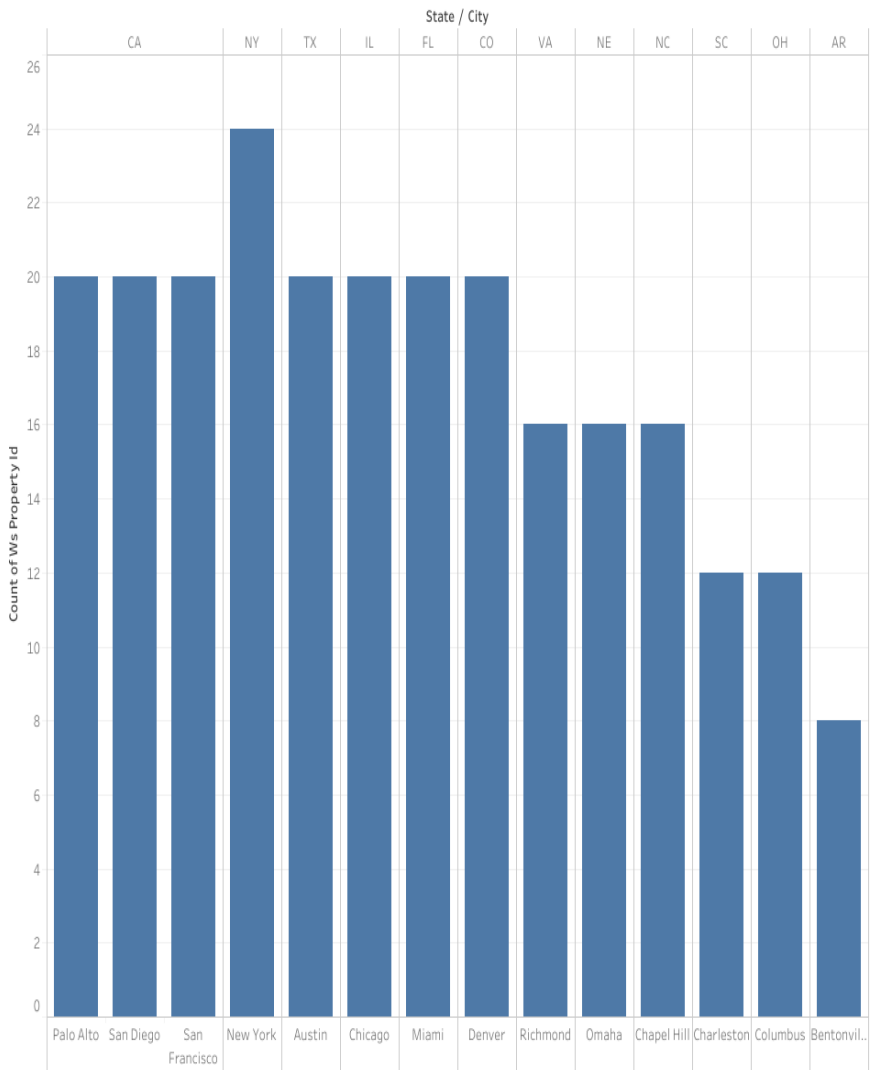
Retrieving Data

SQL Query to retrieve data:

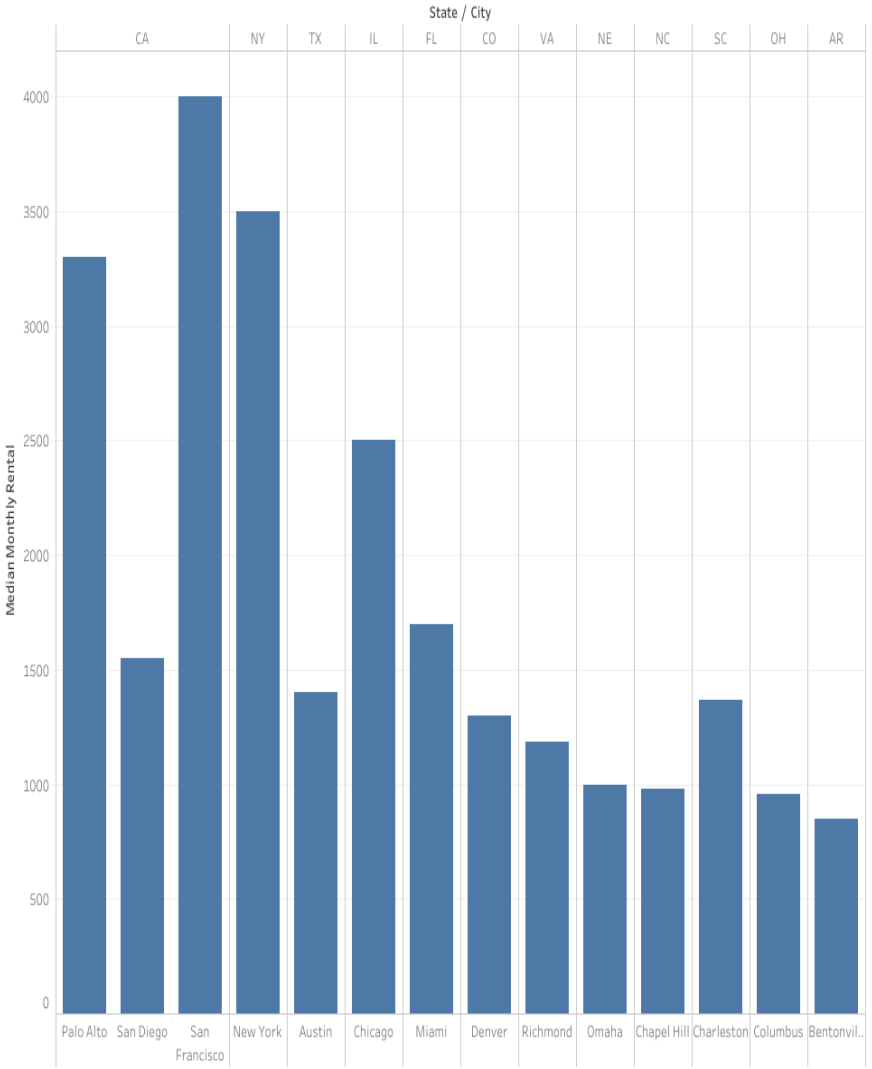
- Watershed property information is stored in MySQL database. I had figure determine how the database is organized and analyze the relational schema.
- Then I had to figure out which data was required for the analysis project about Watershed's client's 244 properties, as well as the corresponding short-term rental information for comparable properties in the same location and of the same type.
- Finally, extract it from the database

EDA Using Tableau

Watershed Property Count

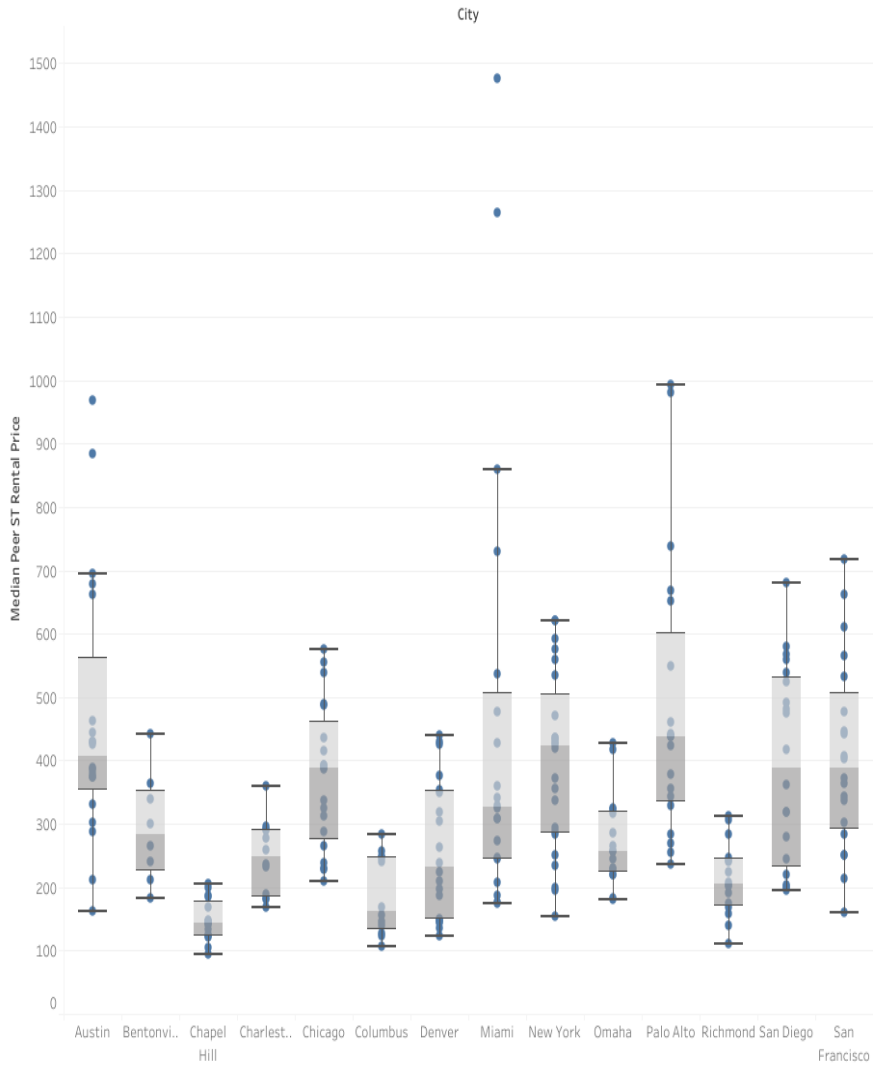


Watershed Property Median Monthly Rental

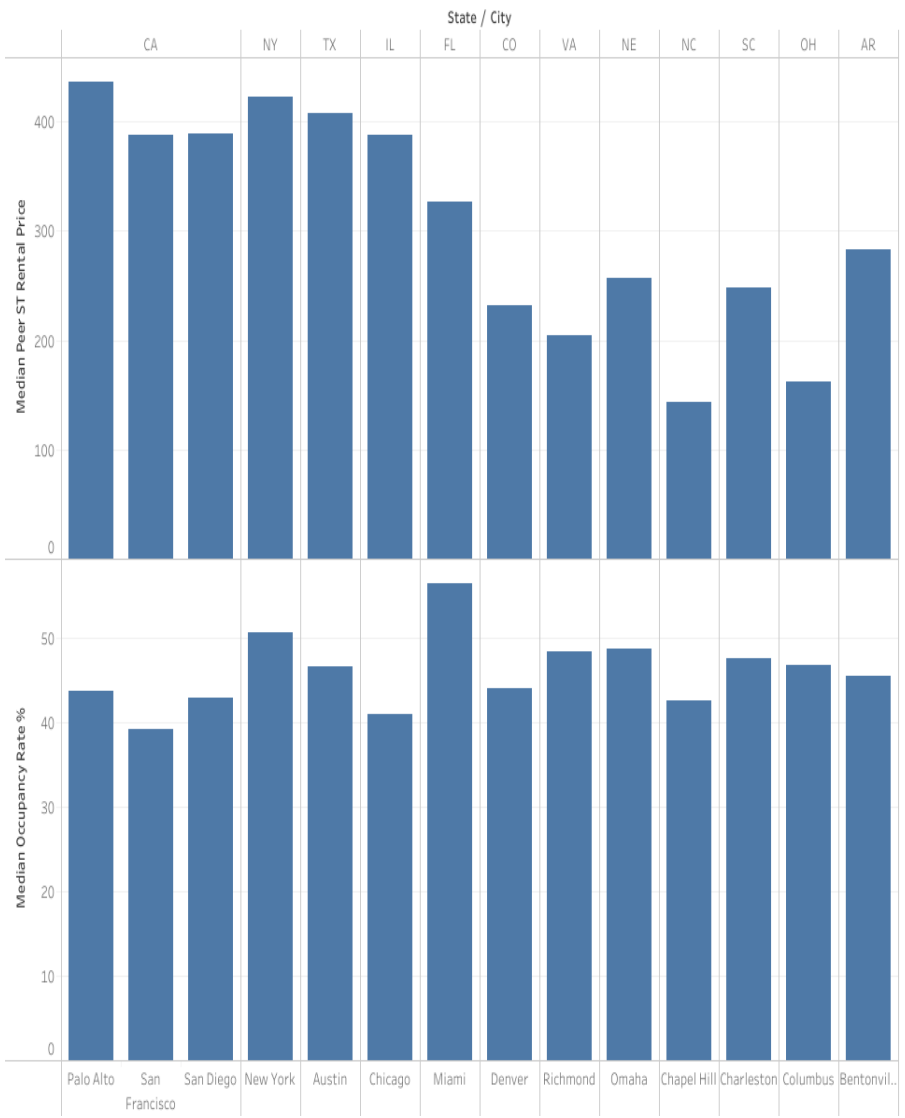


EDA Using Tableau

Peer ST Rental Price



Peer ST Rental Price & Occupancy Rate



Data Cleansing & Pre-processing

Issue With Raw Data

- Before I could optimize rental revenues, I need to have a mathematical formula that relates a rental rate to an expected occupancy rate.
- Watershed provided pairs of 244 rental rates with occupancy rates in the comparable data.
- However, when I used a simple best fit line to model this relationship by using the raw dollar rents and trying to relate them to occupancy rates, it does not work for forecasting.
- The above linear model was less than 2% more accurate, than forecasting an occupancy rate of 45.6% (average occupancy rate) for every single one of the 244 short term rental properties.
- So here individual forecasts are no better than forecasting the base rate, and we have zero information gain. This model is not reducing uncertainty at all.

Normalization

- Hence, in order to develop a best fit line that has a high enough predictive value to actually be useful for forecasting, I had to put the rental rate data through a transformation called normalization.
- Normalization in this case converts raw dollar rents into percentile rents. In the raw data with 244 properties, the non-normalized x axis does not correspond yet to a measure of relative price when compared to comparable or competitive properties.
- We normalized rent because we essentially wanted to calculate a scaling factor, based on the rent of the sample property relative to other similar properties, to compare the nightly cost of a property with its occupancy rate

Predictive Modeling Details

- I used the parameters of the regression line and Excel's Solver optimization function to find the rental price and occupancy rate that would maximize the profits expected from each of Watershed's client's 244 properties.
- Any optimized price below the 10th percentile rate was replaced with the 10th percentile rate, and any optimized price above the 90th percentile rate was replaced with the 90th percentile rate, in order to account for lack of data outside of these ranges in the linear model.
- These optimized rental rates were entered into a financial cash flow and profit model that computed the expected revenue from each property based on its projected occupancy rate, and the expected costs according to the financial assumptions described above.

Model Performance Results

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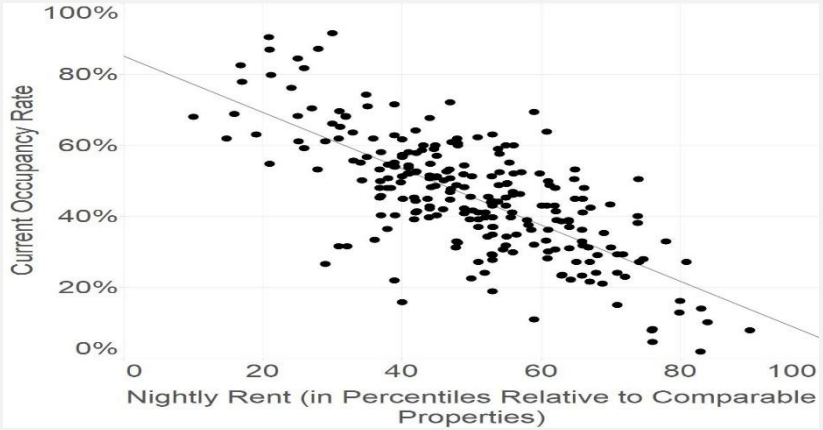

Linear Regression Line:

$y = -0.79x + 0.85$
$R^2 = 0.52$

Analysis Assumptions and Sensitivity Analysis Ranges

Consideration	Assumed Value	Source of Original Assumed Value	Minimum Value Tested	Maximum Value Tested	Rationale for Range of Values Tested
Additional profit needed for a property to be considered "more profitable as a short-term rental"	$6,000	Watershed Financial Department	-$50,000	$1,50,000	Wanted to stress test the bull case and bear case scenario
Cost to convert property to short-term rental (includes furnishing and decorating)	$30,000	Watershed Marketing Department	$20,000	$40,000	More likely to have an upside scenario here
Years to depreciate capital expenditures	5	Watershed Financial Department	3	10	Depends on the company policies, don't expect material changes here
Yearly upkeep	$6,000	Watershed Marketing Department	$4,000	$10,000	Factored in some inflation here
Service fees to short-term stay website (e.g. Airbnb)	20%	Watershed Marketing Department	15%	30%	There could be a potential increase here
Regulatory fees (taxes and potential legal fees)	10%	Watershed Financial Department	5%	30%	There is regulatory bottlenecks withing the ST rental market, with respect to taxes. Hence, this parameter has a higher chance of an increase
Hospitality charges (key service, cleaning, re-stocking)	$100	Watershed Financial Department	$80	$250	Factored in some inflation here
Typical stay duration (days)	3	Watershed Marketing Department	2	14	In post Covid world the average duration of stays has increased
Monthly utilities per property	$300	Watershed Financial Department	$200	$450	Factored in some inflation here

Cash Flow And Profit Outlook: Stage 1-3

Conversion yr cash flows	Current scenario	Bear case	% downside
Stage 1-profitability threshold of 24,700	501	280	-44%
Stage 2-profitability threshold of 10,000 to 24,700	-20	-20	nm
Stage 3-profitability threshold of 6,000 to 10,000	-92	-56	nm
Total	**389**	**204**	-48%

Post Conversion yr cash flows	Current scenario	Bear case	% downside
Stage 1-profitability threshold of 24,700	885	472	-47%
Stage 2-profitability threshold of 10,000 to 24,700	364	268	-26%
Stage 3-profitability threshold of 6,000 to 10,000	124	88	-29%
Total	**1,373**	**828**	-40%

Bear case assumes transaction fee+regulatory fee of 40% vs 30% in base case

Conversion yr profits	Current scenario	Bear case	% downside
Stage 1-profitability threshold of 24,700	885	472	-47%
Stage 2-profitability threshold of 10,000 to 24,700	364	268	-26%
Stage 3-profitability threshold of 6,000 to 10,000	124	88	-29%
Total	**1,373**	**828**	-40%

Post Conversion yr profits	Current scenario	Bear case	% downside
Stage 1-profitability threshold of 24,700	789	424	-46%
Stage 2-profitability threshold of 10,000 to 24,700	268	316	18%
Stage 3-profitability threshold of 6,000 to 10,000	70	-68	nm
Total	**1,127**	**672**	-40%

Bear case assumes transaction fee+regulatory fee of 40% vs 30% in base case

Cash Flow And Profit Outlook: Stage 1-3

$ '000-Base Case	Y0	Y1	Y2	Y3
Net Cash flow	501	865	1,157	1,373
Y/Y %		*73%*	*34%*	*19%*
Cumulative Cash Flow post capex				3,897

Properties converted	16	16	9	
Capex	480	480	270	
Cumulative Capex				1,230

$ '000-Bear Case	Y0	Y1	Y2	Y3
Net Cash flow	280	452	684	828
Y/Y %		*62%*	*51%*	*21%*
Cumulative Cash Flow post capex				2,244

Bear case assumes transaction fee+regulatory fee of 40% vs 30% in base case

$ '000-Base Case	Y0	Y1	Y2	Y3
Net profit	885	1,153	1,181	1,127
Y/Y %		*30%*	*2%*	*-5%*
Conversion ratio %	*57%*	*75%*	*98%*	*122%*

Properties converted	16	16	9	

$ '000-Bear Case	Y0	Y1	Y2	Y3
Net profit	472	692	709	672
Y/Y %		*47%*	*2%*	*-5%*
Conversion ratio %	*59%*	*65%*	*96%*	*123%*

Conversion ratio is Cash Flow/Net Profit