**SECTION 1 – INTRO:**

We were tasked with providing a data driven recommendation to a first time Airbnb host. Our targeted host was Sarah, an oncology nurse with a 2 bedroom home in Allston, MA. Sarah is now undergoing a graduate Nursing program in Buffalo, NY and is looking for a recommendation of whether she should rent her home to short-term travelers or longer term tenants. We were tasked with using data from Insideairbnb.com specific to the Boston area, incorporating outside data sources of some kind, and utilizing PowerBI to provide visualizations to support our final recommendation.

**SECTION 2 – BACKGROUND:**

In order to provide this recommendation to Sarah in a digestible format, we focused on two questions to investigate:

1. Do short-term Airbnb rentals or long-term lease agreements provide a better ROI within the Boston market?
2. With that better option in mind, what steps can we recommend taking to maximize the ROI?

As we began aggregating and cleaning the data, and taking into account what we already new about rentals and Airbnb, we hypothesized that Airbnb would provide a much more profitable return on investment as opposed to a longer term lease. We figured that the higher nightly price charged for short term rentals would outweigh the additional expenses associated with furnishing the home and preparing it for regular changeover of guests.

In order to design this investigation, we took first began cleaning the data (process described in the next section), and pulling in data from outside sources. Because we needed to return the ROI for both short term and long-term options, we compiled a list of expenses that would be subtracted from the revenues to provide a net profit. Once we had the list of necessary expenses, we set out compiling statistics and citations for each one. The framework for the presentation of our findings was as follows:

* **Short Term vs Long Term Options**
  + *Find data on average lease price for 2bd homes in Boston*
  + *Analyze data to find average revenue for Airbnb listings in Boston with certain Amenities*
  + *Compile list of expenses for each option*
  + *Compare net revenues for each*
* **Maximizing the cost of a long term lease**
  + *Which amenities correlate to higher prices?*
  + *Leasing to BU Students*

**SECTION 3 – TECHNICAL DETAILS**

*Data Cleaning Process:*

Beginning with the raw data set of Airbnb listings in Boston, we analyzed the columns to see which would be needed, and which we could remove to focus our analysis. We removed about 50 columns that provided irrelevant data, specifically some of the redundant data points on review scores, length of allowed stays, listing urls, and host information. We then created a copy of the data and filtered for only private homes (as opposed to private or shared room listings, which would have different price points), and remove the data that did not fit the criteria.

*Additional Columns:*

We wanted to be able to filter by different amenities, which were contained as a long string within a single column for each listing. To search for these individual amenities, we first created a column for the amenity in question, and used a FIND function nested with other spellings of the amenity, wrapped in an IFERROR to display “No xyz Amenity” if the amenity was not found within that particular string. We then created a second column for the specific amenity in question, using the naming convention amenity\_yes\_no, and used a nested if statement to fill in either “Yes Amenity” or “No Amenity.” We did this for WiFi, Laundry, Parking, and AC. This would allow us to use filter for amenities within PivotTables later on.

Columns ceated:

* Wifi (FIND & IFERROR)
* Wifi\_Yes\_No (Nested IF)
* Laundry (FIND & IFERROR)
* Laundry\_Yes\_No (Nested IF)
* Parking (FIND & IFERROR)
* Parking\_Yes\_No (Nested IF)
* Air\_Conditioning (FIND & IFERROR)
* AC\_Yes\_No (Nested IF)

The other column creation was to classify the listing as either allowing long-term stays or not. The maximum\_nights column lists the maximimum allowed stay in days for each listing, so we created a column titled Potential\_lease that used an if statement to determine whether or not the maximum nights was above or below 365 days. If they allowed stays that surpassed 365 days, it made sense to compare the data to leasing options, since a typical lease would be a minimum of 365 days.

Columns Created:

* Potential\_lease (If Statement)

PowerBI:

In order to visualize the expenses that go into the long term leasing option and the short term Airbnb rentals – we created two waterfall charts. The first one shows the expenses associated with a short term Airbnb rental and the second one shows the potential expenses associated with a longer term lease. Both charts are laid similarly - the far left teal column shows the total revenue brought in, and each cascading orange column to the right visualizes another expense removed from the revenue, leaving you with the net total in teal on the far right under “Total.”

The second visualization we built is located on the slide titled “BU Off-Campus Housing,” which demonstrates the discrepancy between BU off-campus housing lease prices and

BU Lease vs Boston Lease. We plotted a line graph for both the median monthly price of a 2 bedroom home in Boston and the median monthly price of a 2 bedroom Boston University off campus home over the past ~5 years. The results demonstrate that in this time frame, the price charged for BU off-campus housing has outpaced the price for typical Boston housing. This is demonstrated by the red section of the graph, which represents the missed revenue of renting to standard tenants vs BU students if this investment had taken place in 2015.

**SECTION 4 – IMPLEMENTATION:**

We designed the process as described in the background section, beginning with an investigation of whether it provided a better ROI to lease short-term through Airbnb or long term via a lease agreement. We then investigated the intangible costs and benefits associated with each to best align with Sarah’s goals. Once we had decided on an option, we used the data at our disposal to figure out how we could maximize the ROI for her.

**SECTION 5 – RESULTS:**

**Short Term vs Long Term Options**

* *Find data on average lease price for 2bd homes in Boston*

According to the sources we found, the median price for a 2 bedroom lease in Boston was $3,200/month (Supplemental Lease Data 3,4).

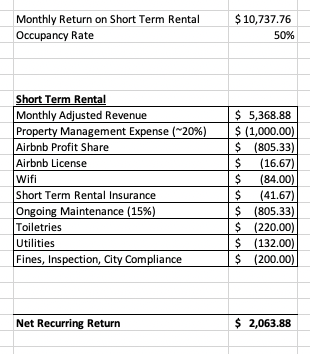
* *Analyze data to find average revenue for Airbnb listings in Boston with certain Amenities*

Accounting for Airbnb listings that had the amenities we were looking for (wifi, laundry), that were in the Boston city limits and were private home listings, we created a pivot table to find the median cost was $10,737.76/mo. While that sounds fantastic, we could not assume the home would be rented 100% of the nights in a month. After researching Airbnb occupancy rates in Boston, we settled upon assuming a 50% occupancy rate – out of every 30 nights, we assume the home would be rented 15. This left us with a monthly adjusted revenue of $5,368.88.

* *Compile list of expenses for each option*

Here were the expenses we accounted for each and their costs:

*SHORT TERM RENTAL LONG TERM RENTAL*

*Table

Description automatically generated*

The difference in net return is a $204/month benefit in favor of short term leasing. That being said, we believe that the $204 difference is more than made up for by the intangible benefits of going the long-term leasing route. There are several benefits we can discuss below:

**Time investment** - The long term option requires so many fewer moving pieces to account for, that Sarah would have an exponentially easier time handling that while maintaining a full course load in her nursing program.

**Vacancy Risk** - going the long-term route also removes the risk of vacancy – the 50% occupancy rate we assumed is a big if, and there are many factors (macroeconomic conditions, weather, city regulations, etc) that could affect this outside of Sarah’s control. She could easily be stuck with a property that’s only renting a few days a month, whereas the long term option locks tenants in for 365 days/year.

In addition to the previous two considerations, there are a number of smaller ones, including how the home would be treated as an Airbnb vs someone’s full time home, less regulation from the city of Boston and none from Airbnb, etc.

**Maximizing the cost of a long term lease**

* *Which amenities correlate to higher prices?*

Having settled on a long term lease as our recommendation, we looked to what actions we could recommend Sarah take to maximize the cost of that lease. The first thing that came to mind that we could investigate with the data at hand was the effect of certain amenities on price. Because we had data from Airbnb with both short and long term rentals, we first had to filter for Airbnb listings that allowed for stays of over 365 days, because those are the listings that could really be compared to leasing. We then compared the effect of specific amenities on the nightly price of the listings in that group. What we found was relatively surprising, an associated decrease of $27/night for including A/C, a $22/night increase with the addition of parking, a $50/night increase with the inclusion of WIFI, and a modest $4/night increase with in-unit laundry.

We included the correlation of these amenities with higher/lower nightly listing prices not to say that they will directly lead to the described per night cost increase, but rather as a *general guideline that listings with the specific amenity tend to see a higher price*. Our goal is to use these as recommendations for which amenities are the “easy wins” for Sarah to include to be able to charge a slightly higher price per month within her lease. Therefore, the biggest takeaway here would be that the inclusion of WIFI and parking should more than cover the additional cost to include them.

* *Leasing to BU Students*

Our final investigation revolved around the proximity of Sarah’s home in Boston’s Allston neighborhood to Boston University’s campus. One of our group members proposed investigating the cost of Boston University off-campus housing to see if that made a difference. As previously mentioned, the median cost of a 2 bedroom apartment in Boston is $3,200. The median cost for a 2 bedroom BU off-campus apartment is $3,500. Therefore, there is a potential $300/month increase by leasing to college students. Given that the difference in net recurring return of the short term and long term options was only $204/month, this added bump would more than make up that difference. Furthermore, evaluation of the historical data demonstrated in the “BU Off Campus Housing” graphic demonstrates that standard 2 bedroom listings have historically trailed BU off campus housing – making this a solid recommendation.

**SECTION 6 – CONCLUSION:**

The main goal of our project was to analyze the Airbnb data, as well as outside sources, in order to provide Sarah with a data-supported recommendation of how to maximize the ROI of her home investment. Here is the recommendation we provided:

*We recommend picking a long term lease agreement over short term Airbnb rentals in order to minimize the time investment while still maintaining a similar ROI. On top of that, we recommend renting to Boston University students to be able to charge a higher price compared to standard Boston tenants, and providing WIFI and parking, as both have been shown to increase the lease price you can charge.*

Questions for further investigation:

* What are the risks associated with renting to BU students?
* What is the University’s involvement in off-campus housing?
* What is difference in rental prices between Allston 2 bedroom homes rented to private tenants vs BU students? (Don’t have enough data on this as is)

**WORKS CITED**

*Inside AirBnB Dataset:*

1. <http://insideairbnb.com/get-the-data/>

*Supplemental Lease Data:*

1. <https://www.zumper.com/rent-research/boston-ma>
2. <https://www.zumper.com/rent-research/near-boston-university-ma>
3. <https://www.zillow.com/rental-manager/market-trends/boston-ma/>
4. <https://www.boston.com/real-estate/renting/2022/09/09/an-in-depth-look-at-the-massachusetts-rental-market-september-edition/>

*Boston City Legislation*

1. <https://www.boston.gov/sites/default/files/document-file-08-2018/short-term_rental_ordinance.pdf>

*Expense Costs:*

1. <https://www.mass.gov/info-details/tenant-rights>
2. <https://www.airdna.co/vacation-rental-data/app/us/massachusetts/boston/overview>
3. <https://www.7hillspropertymanagement.com/pricing/>
4. <https://www.mysmartmove.com/SmartMove/blog/5-biggest-landlord-mistakes-kill-profit.page>
5. <https://www.cnbc.com/2019/07/03/is-running-an-airbnb-profitable-heres-what-you-need-to-know.html>
6. Wifi - Conner’s Boston Xfinity Bill