Quito Residential House Market Report

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Introduction

The purpose of this report is to analyze the real estate market in Quito in order to look for good investment opportunities. Specifically, the residential house[1] market in Quito is analyzed based on different characteristics like sector, bedrooms, built square meters, price, etc., in order to find out which houses are the most profitable ones between October 2021 and March 2022.

Profitability:
To measure a house profitability, this report uses a common ratio in the real estate world: the gross rent multiplier (GRM). This ratio calculates the years it would take for the property to pay itself, using gross income. This is, the property's price divided by its annual rent. Therefore, the lower the GRM is, the better.

Why GRM?
When looking at multiple properties, calculating metrics such as net operative income, taxes, sales, cap rates and many other can be a very slow and arduous job. GRM is a common indicator when looking at investment properties because it is one of the most quick and simple indicators to calculate, giving the investor a filter to use at an initial glance to identify possible investment opportunities.

Method:
It is not common to have both, renting price and selling price for a residential house. To achieve this, a model is created to predict renting prices on a dataset of listed houses for sale. This is done with the help of a second dataset containing listed houses for rent. After comparing characteristics of each house and using econometric models, a linear regression model is run to obtain the relative influence of each characteristic (such as, sector, bedrooms, area, etc.) in the renting price of houses, and then, this same model is used to predict the hypothetical renting price of each house in the listed houses for sale dataset. Having both, sale and renting price, GRM is calculated, and data is analyzed in order to find out the best investment residential houses in Quito.

Data

The data used to analyze the market comes from a popular real estate website and can be found here:
https://www.kaggle.com/datasets/aleespinosa/housingquito?resource=download.

Because data comes from a website listing. Many values will be modified or altered. Bedrooms in listing may not be the actual number bedrooms in the house, square meters may be inflated, price may not accurately represent the market price of that home, etc. So, data should be taken with caution when looking at different values.

Cleaning:
This project will only focus on houses with certain specifications:

- Monthly rent less than $2,000 USD.

[1] Only houses will be looked at. Not apartments.

    - Price less than $500,000 USD.
    - Area between 10 and 500 m².
    - Bedrooms between 1 and 5
    - Bathrooms between 1 and 4
    - Parking Spaces between 1 and 5

This is done both to look at ordinary or more representative houses one would typically find in the market, keeping outliers out, and to give a conservative filter in the data so that we can try and leave out most fake or inaccurate data.

The renting dataset contained 2,361 observations initially. The selling dataset contained 1,0234.

Both tables contained the same columns originally:

- **nombre (name):** contains the title of the listing, placed by the seller/renter. No changes were made to this column.
- **sector**: contains the sector in which the house is located. E.g., “Bellavista, Quito”. The data was cleaned by removing “, Quito” from each value.
- **precio (price):** Price of the listing in USD, corresponding to monthly rent or selling price respectively. It originally contained a dot to show the thousands or millions, which made the data a character type. The point was removed, and the data type was changed to integer.
    - For the renting dataset, this column name was also changed to “arriendo” (rent) to differentiate from selling price.
- **area**: Built square meters. 2817 values contained a “m²” in them. This was removed in order to change the data type to integer.
- **habitaciones (bedrooms):** contained the number of bedrooms. Some values contained the number of bathrooms or parking spaces instead of bedrooms in the following format: “4estac.” (4 parking spaces) or “3banos” (3 bathrooms). When this happened, the column which was represented in this cell was either 0, or in the case of bathrooms, it could also contain the same format for the parking field. For example, some rows contained “3banos” (3 bathrooms) in the bedroom column, and at the same time, the bathroom column contained “2estac.” (2 parking spaces) in it, then the parking column contained a zero. For this column, each time this type of data appeared, the number in front of the text was taken to replace the field it was referencing to. E.g., if “2banos” (2 bathrooms) appeared, the 2 was taken from this and placed into the bathroom field, which usually contained a 0, or a parking reference. After the change, the bedroom data was removed and replaced with the median of the sample. Finally, data type was changed to integer.
- **Banos (bathrooms):** Contained the number of bathrooms. As with the bedroom column, when a “4estac.” (4 parking spaces) data type appeared here, the number was taken and put into the respective field (parking). Then, the bathroom data was replaced by either the number of bathrooms (if the bedroom field contained a “1bano” (1 bathroom) data format), or with the median of the sample if there was no other information on it. Data type was finally changed to integer.
- **Parqueadero (parking):** Number of parking spaces in the house. Some values contained a “.0” on it which caused the data type to be a character. This was removed and data type was changed to integer.
- **Fecha (Date):** Contained the date of the listing, from October 2021 to March 2022. No changes were made to this column.

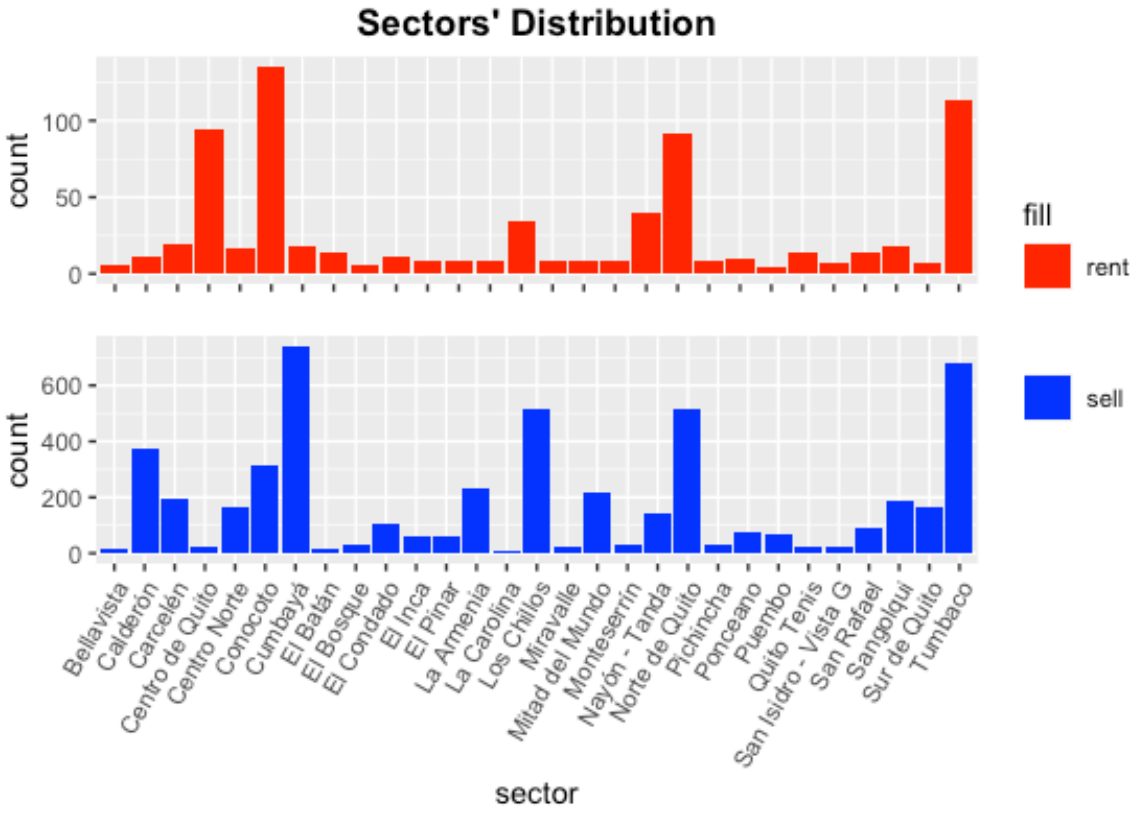
Extra created columns:

- **piscina (pool):** Boolean representing if the house has a pool. It is TRUE if the name of the listing has the word “piscina” (pool) with any capitalization. False otherwise.
- **amoblado (furnished):** Boolean representing whether the house was furnished or not. It is TRUE if the name of the listing contained “amoblado” or “amoblada” in it. FALSE otherwise.

Other changes:

- Removed rows which contained invalid data. 130 rows contained dates in the name column and no other data, 25contained a “NN” in their fields.
- Remove duplicates: some people listed their house twice, with different price on them. Observations with the same name, area, sector, bedrooms, bathrooms and parking spaces were taken as a duplicate, and the listing with the lower price was kept. 655 duplicates were found in the renting dataset and 1534 in the selling dataset.
- Removed sectors with less than 10 observations in them. 85 rows were deleted in renting dataset and 28 in selling dataset.
- Only kept observations with sectors in both datasets. 638 observations were deleted from the selling dataset.
- Houses were filtered to include only those with the following specifications:
    - Rent less than $2,000 USD.
    - Price less than $500,000 USD.
    - Area between 10 and 500 m².
    - Bedrooms between 1 and 5
    - Bathrooms between 1 and 4
    - Parking Spaces between 1 and 5

Data Exploration:



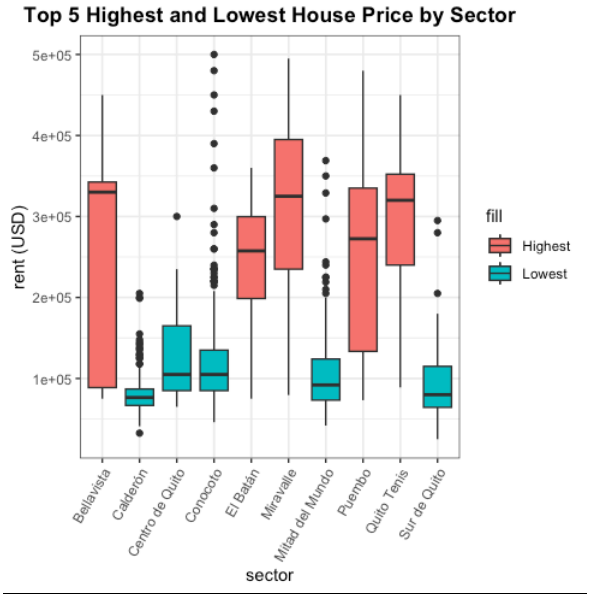
There are 29 different sectors in this sample. The sectors are unbalanced, with the most common ones being Cumbayá and Tumbaco. The number of observations could be an indicator on the quality of the market on the supply zone. With agglomerations of offers in some sectors, sellers may need to compete on prices, resulting in lower price and better opportunities for investors. At the same time, too high of a supply may indicate bad things for these sectors, like for example, many people wanting to sell, and no one wanting to buy. A deeper investigation should be done to check why there is so much supply here, like looking at demand in order to get the full picture of the market in these sectors.

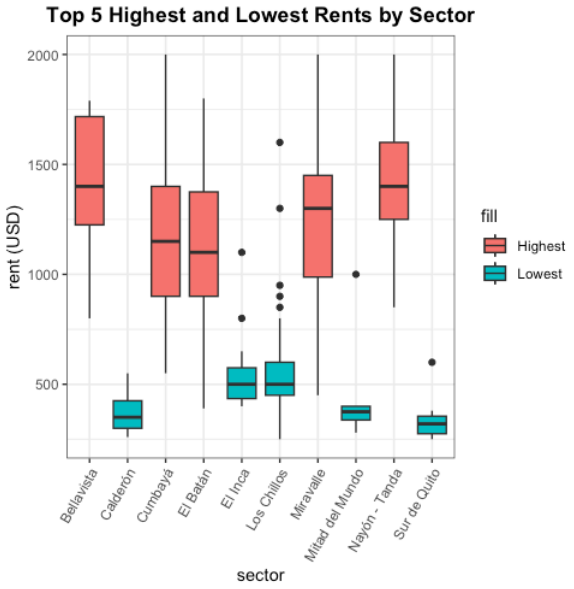
On the other hand, markets with low listings may derive in high prices, whether this increase results in higher selling or renting prices is the main thing to considerate. Some sectors with low listings could indicate residential sectors with expensive mansions, for example. Or they could also indicate slow markets such as distressed neighborhoods, which are usually better to stay away from as investors. Nonetheless, low supply may also indicate a strong desire from landowners to keep their house. For example, Centro de Quito has high renting supply despite having low selling supply. This could indicate that this area is a very good investment area, hence why landowners are deciding to rent instead of selling.

Investors may want to buy in places with high or low supply zone depending on their strategies as well as other assumptions, such as the ones mentioned above.

Rent and Price by Sector:

Looking at the most and least expensive sectors in Quito, a relationship is seen between rental and purchase prices, with sectors in the highest rent also having the most expensive houses to buy like Bellavista and Miravalle, and the same remains for the least expensive ones: Calderón, Mitad del Mundo and Sur de Quito.





Most of the low-supply sectors do in fact present expensive prices as said before. One main exception to this would be Cumbayá, which despite being in the top 5 of most expensive rents, still manages to have a large amount of supply, indicating high demand in this area. This should be an area with lot of pressure and worth to have on the look; if the large supply ends up not being met by a large demand, prices will plunge, and great opportunities may arise. On the contrary, if demand is high, then most probably the sector is already saturated, and is better to look somewhere else, depending on the investors strategy.

Sectors like Los Chillos and Calderón fit the description anticipated; sectors with high supply that end up with lower prices. These could be good sectors to search for opportunities. Other sectors such as Sur de Quito and El Inca are also good places to search for opportunities, as they have a normal (moderate) amount of supply, and low prices.

One last sector to notice is Centro de Quito. It was previously shown that this sector has high renting supply, which may be a good indicator as it indicates that landowners want to keep their house for renting. On top of that, despite having low selling supply, their prices are still very low. Therefore, properties here should be a good investment opportunity if the assumption stated are true.

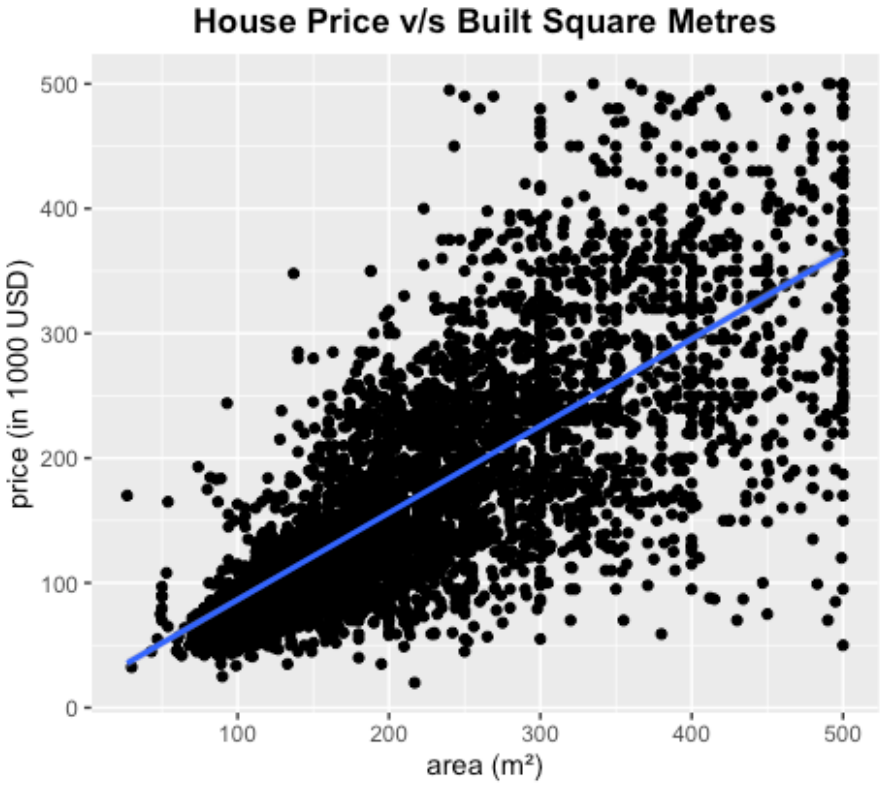
Further investigation should be done to look for other important market characteristics.

Average Price:

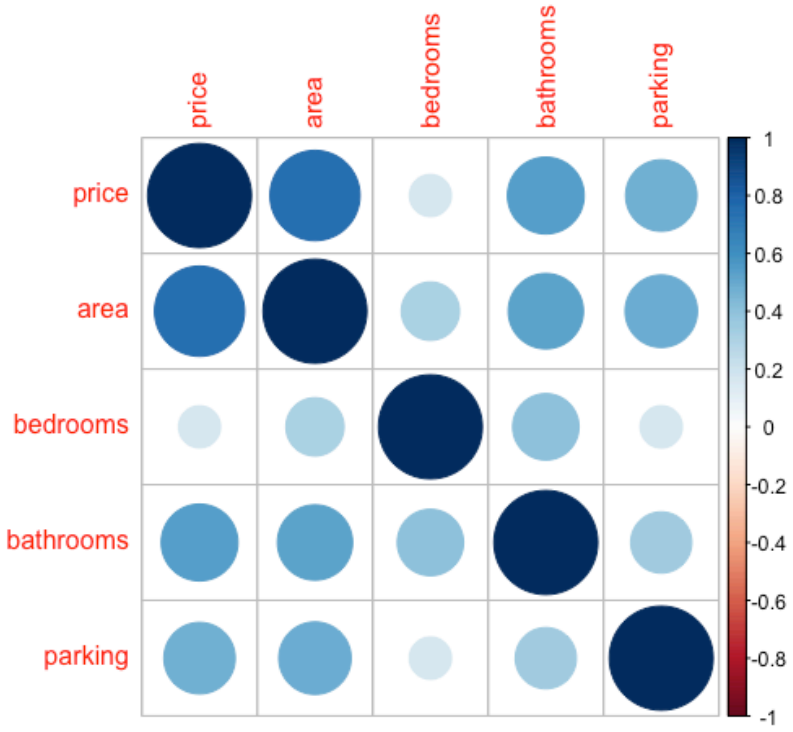
N° of bedrooms:	Avg. Price (USD)
1	$ 112,778
2	$ 130,943
3	$ 166,771
4	$ 200,121
5	$ 197,278

Although there does seem to be a correlation between number of bedrooms and house price, it appears to be rather low. The number of bedrooms does not seem to be a good indicator on price. This may be because the data is manually listed by each seller, which means there is an incentive to inflate the number of rooms (e.g., putting a bed in the dining room and calling it a bedroom). A better and more accurate representation of rooms could be bathrooms, as this is a more objective classification, as well as square meters.

N° of bathrooms:	Avg. Price (USD)
1	$ 87,322
2	$ 136,486
3	$ 218,098
4	$ 269,432



Both the number of bathrooms, as well as the square meters seem to give a stronger estimation of house prices in Quito than bedrooms. These findings can be confirmed by looking at the correlation heatmap below:



The best indicator of price based on this plot would be area, followed by bathrooms. It is interesting to notice that parking spaces has more correlation to price than bedrooms. This supports the idea that bedroom number is in fact inflated and not the correct number.

Descriptive price statistics:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
20000	98000	146500	173344	230000	500000

Rent statistics:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.0	547.5	800.0	910.1	1200.0	2000.0

With a median of $146,500 USD and an average price of $173,344 USD, we can confirm the data is right-skewed, and the same applies with rent data. The house prices have a standard deviation of 94,186.91, which is relatively high considering the mean, and house rent have a standard deviation of 450.96.

Model:

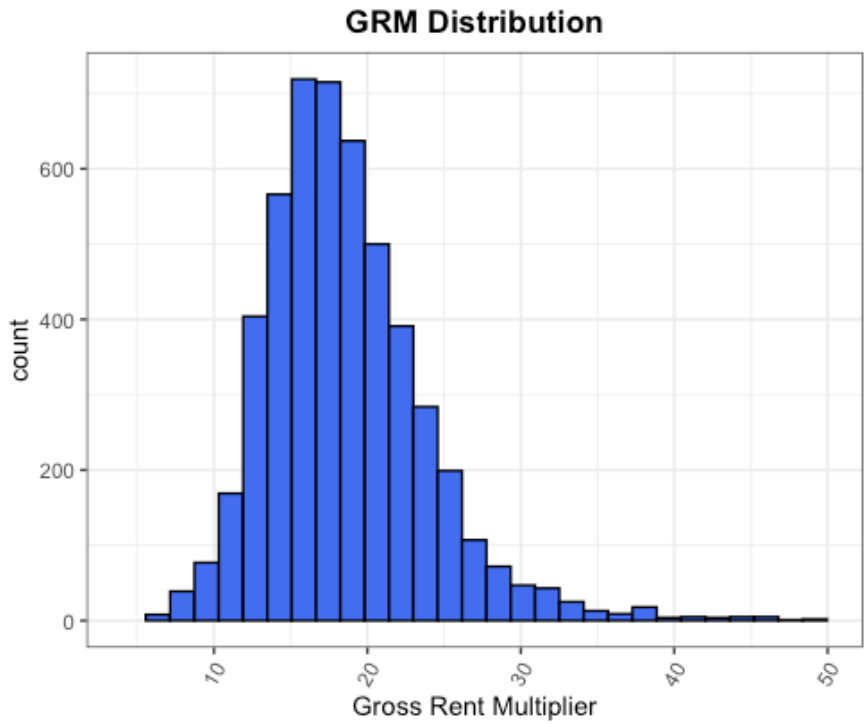
To represent the house renting prices based on the data provided, the model used will be a Linear Regression Model (LRM)[2]. This is a simple way of representing the relative impact of each characteristic and predicting the rental price of each house in the listing.

Results:
Annex 1 presents each coefficient given by the model. It gave an adjusted R-squared of 0.6289 and a RMSE 274.7. Considering the mean of 910.1, the RMSE is relatively high. This could be because of the quality of the information. As said before, because this information comes from listings, there is no regulation that checks the veracity of the information listed, many values could be inaccurate even after filtering most outliers.

The model predicted a 2.0117 price increase in monthly rent for each square meter, 185.1779 increase for having a pool, and 93.0337 for each bathroom. The results also make sense when looking at each sector. Typically, expensive sectors tend to have big coefficients, and vice versa. What is interesting to notice is that the model shows that the number of bedrooms lowers the rent of the price. Although this coefficient is not significant, it further supports the idea that the number of bedrooms listed is not an accurate depiction of real bedrooms, and therefore, the number of bathrooms is a more accurate measure.

GRM Results:
After using the model to predict house rents in each of the house sales listed, the gross rent multiplier was constructed as a measure of profitability for each house as an investment.
Because of outliers in the model, some houses gave too high of a GRM, while other even gave a negative one. To filter for this, observations with more than 50 and with less than 4 were deleted.

[2] Although an amoblado (furnished) category was calculated, it did not give a significant difference in renting prices. It was decided to keep this characteristic out of the model.

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  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 9.123  15.195  17.927  19.197  21.424 461.297
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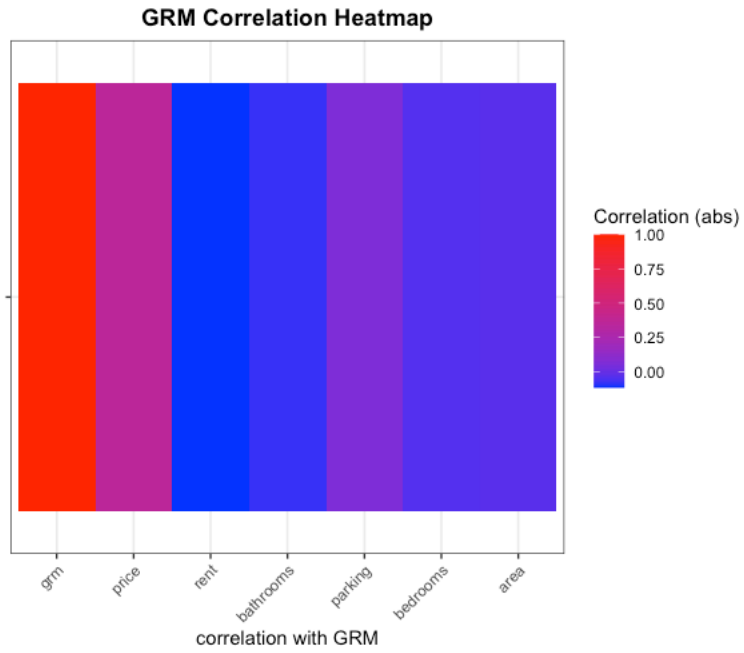
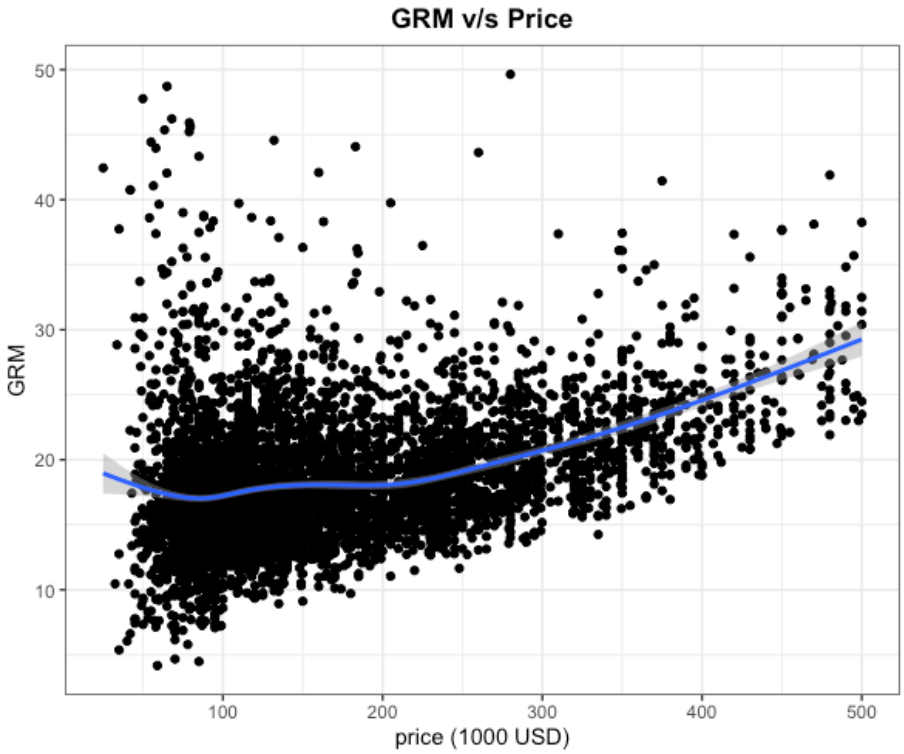
The GRM appears to be slightly right skewed, but it distributes relatively normally, with a reasonable average of 19.2.

Analyzing House Profitability:

An initial glance at the correlation heatmap below shows that GRM is more correlated with the house price, while rent, bedrooms, bathroom, parking or area, does not seem to impact much. The only driving factor here seems to be price.

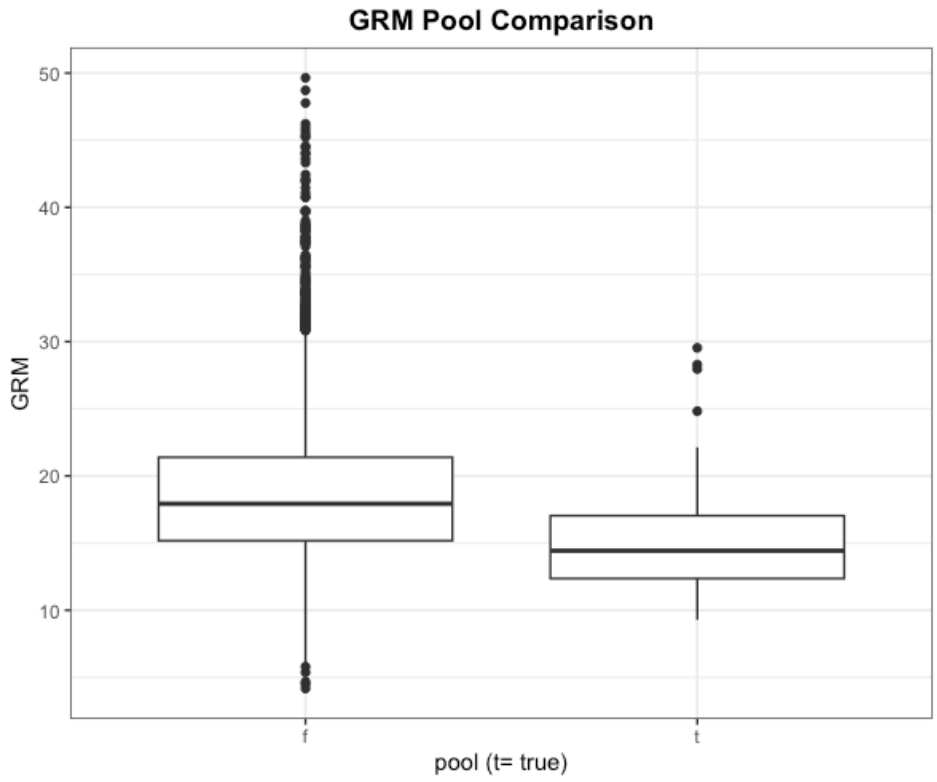


Taking a closer look at the GRM and price relationship, houses with a high price tend to pack more closely together while driving the GRM up, supporting the idea that expensive houses tend not to be good investment properties. On the other side, cheaper houses have a much more disperse distribution. This means that expensive houses probably have a high GRM, but cheap houses may have either low or high.

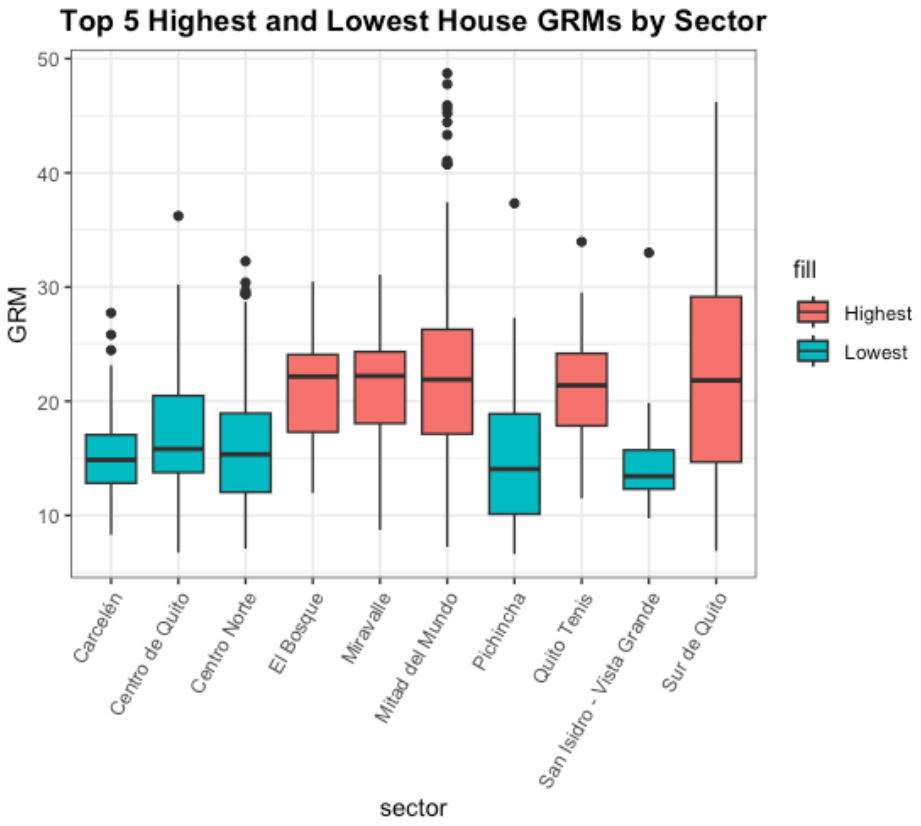


Annexes 2 and 3 show the relationship between GRM and rent, and GRM and square meters. While it is true that there is no significant correlation between them, it is worth to notice that both, houses with extremely low rents, and houses with extremely low square meters, have very high GRM, so it is better for the investor to stay within more ordinary numbers ($500-$2,000 USD monthly rent and 100 to 500m²). There appear to be no significant relationship between GRM and bathrooms (Annex 4)

Looking at the pool field, houses with a pool do seem to have a lower GRM. This may be because a pool is valued proportionally higher when renting than when buying the whole house, though it is not a very significant difference, it is a worthy insight to keep in mind when looking for residential investment properties.



Location, location, location…
Arguably the most important factor when looking for an investment property, the model shows that the sector in which the house is located can be the biggest price influencer, and when looking at the property profitableness, it seems to still take the crown. The following graph shows the difference in GRM between the top 5 highest and lowest sectors in this indicator:



Differences in sectors can drive a difference of up to 8 years in median GRM. This is why location should be one of the main focuses of an investment property. Sectors with the highest GRM tend to be sectors with extreme values when looking at rent or price in previous graphs. For example, sectors like Miravalle and Quito Tenis both appeared as one of the most expensive areas to live and have one of the highest GRMs. But at the same time, places like Sur de Quito and Mitad del Mundo had one of the lowest, if not the lowest prices and rents, and now they also appear to have one of the highest GRMs. Extreme values tend to be guided by extreme or uncommon situations such as, very wealthy people wanting to live in a sector, or on the other hand, distressed neighborhoods with lots of problems. These situations are possibly why GRMs in these sectors are so high.

When looking at the lowest sectors regarding their GRM, none of these appear in the top 5 most expensive houses, and only one, Centro de Quito, appear in the top 5 lowest prices. This goes in line with the idea that prices are positively correlated with GRMs, but extreme values are never a good indicator. Hence why, it is more probable to find a lower GRM in a low-price sector than in a high-price one, but just up until a point. Passed that point, it is also not good for investments to keep going cheaper and cheaper, and that is why the top 5 lowest GRM sectors are not full of the cheapest sectors.

Focusing on the supply graph presented at the beginning, 2 of the top 5 lowest GRM sectors have a normal or moderate amount of supply. Sectors like Pichincha, San Isidro-Vista Grande and Centro de Quito have low amount of supply. This could be an indicator of these areas having high living (renting) demand (while staying on the low side of supply); rents are pushed up and GRM decreases. These could be the most interesting areas to look for investment opportunities, especially in Centro the Quito, were renting supply remains high

and house prices low. Conservative investors may still stick to more stable sector like the ones mentioned before and still find great investment opportunities.

Investment Opportunities (Final Recommendation)

With rent predictions made, top houses can be filtered based on their GRM to have an initial approach into which houses will be the best investment vehicles. The following list contains the top 20 sales listings with lowest predicted GRM. Some of the houses listed here belong in sectors with extreme price values which were advised not to invest into before, such as Bellavista, Sur de Quito and Mitad del Mundo, hence why it is recommended to use this list only as an initial approach for looking at residential investment properties, but more in-depth analysis of each house should be done.

	description	sector	price	predicted rent	area	bathrooms	grm
1	Vendo Casa en El Comité del Pueblo	Norte de Quito	59000	1178.1006	380	4	4.173384
2	Casa en Venta – Bellavista Carretas	Bellavista	85000	1579.3509	495	2	4.484965
3	Venta Casa 190 m² – Sector Loma de Puengasi	Conocoto	70000	1247.6089	490	3	4.675610
4	Vendo de Oportunidad Casa – Terreno de 195 m² Sector El Condado	El Condado	35000	542.8398	195	2	5.372979
5	Venta Casa en Sector Bellavista	Bellavista	78000	1121.5775	271	2	5.795409
6	Colinas del Norte, Casa, 180 m², 2 Departamentos, 2 Pisos, 2 Parqueaderos	Norte de Quito	40000	550.5975	180	2	6.054029
7	Venta Amplia Casa Conjunto Monte Real	Norte de Quito	70000	946.5642	320	3	6.162639
8	Casa – Quito	Pichincha	42000	528.7446	78	1	6.619453
9	Vendo Casa Para Re Modelar en La La Loma Centro Histórico	Centro de Quito	70000	865.8459	355	2	6.737149
10	Casa en Venta – Norte de Quito – Cotocollao	Bellavista	75000	908.6224	151	2	6.878545
11	Vendo Casa Independiente 430 m de Construcción Barrio San Martin, Sur de Quito	Sur de Quito	70000	847.3943	430	2	6.883848
12	Vendo Casa Independiente Carcelen Colegio Einstein 4 Habitaciones	Centro Norte	95000	1118.2281	323	3	7.079653
13	Re/max Futuro Vende Casa Peaje Autopista General Rumiñahui, 214 m²	Los Chillos	58000	676.9592	214	3	7.139770
14	Oportunidad en Venta Amplia Casa de 360 m Sector Parque Ingles / Santiago Muñoz	Norte de Quito	98000	1131.5467	371	4	7.217260
15	Venta de Casa Independiente de 2 Departamentos Sin Acabados Mitad del Mundo	Mitad del Mundo	99000	1139.9137	483	3	7.237390
16	Vendo Casa Conjunto Bosques del Chamizal	Conocoto	68000	782.4521	275	2	7.242190
17	Casa de Venta, Monjas Orquídeas	Centro de Quito	87000	997.1955	415	2	7.270390
18	Se Vende Casa Sector Comite del Pueblo	Centro Norte	70000	799.8315	140	3	7.293203
19	En Venta Casa de 185 m, San Luis de Chillogallo	Sur de Quito	87000	991.7644	434	4	7.310204
20	Venta Casa Rentera 3 Plantas, Oportunidad, Sector Norte, Carapungo	Centro Norte	50000	568.2552	72	2	7.332387

Final Comments

This report analyzed the residential housing market in Quito between October 2021 and March 2022 by predicting rent prices in houses listed for sale, and measuring profitability based on their gross rental multiplier.

The work found that location tends to be one of the most important indicators when looking for an investment residential property. It also advised on general guidelines for choosing the right property, such as preferring to stay on the low or moderate side of prices, instead of high. With this information, and after looking at supply for each sector, it concludes that sectors with moderate supply tend to be a reasonable choice for residential investment properties, but sectors with low supply may sometimes indicate great investment opportunities, with GRM going far below the average. Investors that want to stay on top of the curve should watch for these sectors, which include Pichincha, San Isidro – Vista Grande, and the most interesting of them all, Centro de Quito, with high renting supply, low selling supply, low prices and a very good predicted median GRM.
One last sector to have on the look is Cumbayá, with high prices and high supply, this could be a heated market that may end up with a plunge in prices, which if it occurs, great opportunities may arise.

Demand should be analyzed in each of these sectors, and each house should be analyzed individually, as many characteristics are not represented in the dataset used for this analysis.

Annex 1: Model Results

```
Coefficients:
                                Estimate Std. Error t value Pr(>|t|)
(Intercept)                      456.1379   126.7553   3.599 0.000342 ***
sectorCalderón                  -488.7178   141.3047  -3.459 0.000575 ***
sectorCarcelén                  -344.7786   129.3444  -2.666 0.007860 **
sectorCentro de Quito           -431.8674   167.1133  -2.584 0.009957 **
sectorCentro Norte              -179.6959   116.1630  -1.547 0.122326
sectorConocoto                  -375.6208   131.7398  -2.851 0.004481 **
sectorCumbayá                     -3.6784   115.0653  -0.032 0.974506
sectorEl Batán                  -232.0717   129.5491  -1.791 0.073658 .
sectorEl Bosque                 -297.9625   135.5364  -2.198 0.028243 *
sectorEl Condado                -486.2404   158.8396  -3.061 0.002288 **
sectorEl Inca                   -460.1221   140.5547  -3.274 0.001113 **
sectorEl Pinar                  -405.4082   149.6206  -2.710 0.006899 **
sectorLa Armenia                -471.8679   145.2921  -3.248 0.001218 **
sectorLa Carolina               -202.9723   145.2766  -1.397 0.162807
sectorLos Chillos               -451.4338   122.8505  -3.675 0.000256 ***
sectorMiravalle                 -144.8899   148.6037  -0.975 0.329888
sectorMitad del Mundo           -550.9213   149.8911  -3.675 0.000255 ***
sectorMonteserrín               -233.0411   149.3511  -1.560 0.119121
sectorNayón - Tanda               69.5466   120.4292   0.577 0.563792
sectorNorte de Quito            -375.5206   116.8278  -3.214 0.001367 **
sectorPichincha                 -138.2430   149.1461  -0.927 0.354295
sectorPonceano                  -411.5910   142.9009  -2.880 0.004093 **
sectorPuembo                    -153.3002   168.0636  -0.912 0.361996
sectorQuito Tenis               -197.3454   135.0105  -1.462 0.144265
sectorSan Isidro - Vista Grande -252.1516   153.7241  -1.640 0.101388
sectorSan Rafael                -453.8897   134.8017  -3.367 0.000801 ***
sectorSangolqui                 -407.0603   130.8612  -3.111 0.001942 **
sectorSur de Quito              -622.4917   154.0658  -4.040 5.92e-05 ***
sectorTumbaco                   -190.4348   116.4581  -1.635 0.102446
area                               2.0117     0.1258  15.988  < 2e-16 ***
habitaciones                     -19.5482    17.7023  -1.104 0.269848
banos                             93.0337    16.4056   5.671 2.07e-08 ***
parqueadero                       10.6477    11.9332   0.892 0.372546
piscinat                         185.1779    67.9908   2.724 0.006617 **
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 274.7 on 710 degrees of freedom
Multiple R-squared:  0.6454,    Adjusted R-squared:  0.6289
F-statistic: 39.15 on 33 and 710 DF,  p-value: < 2.2e-16
```
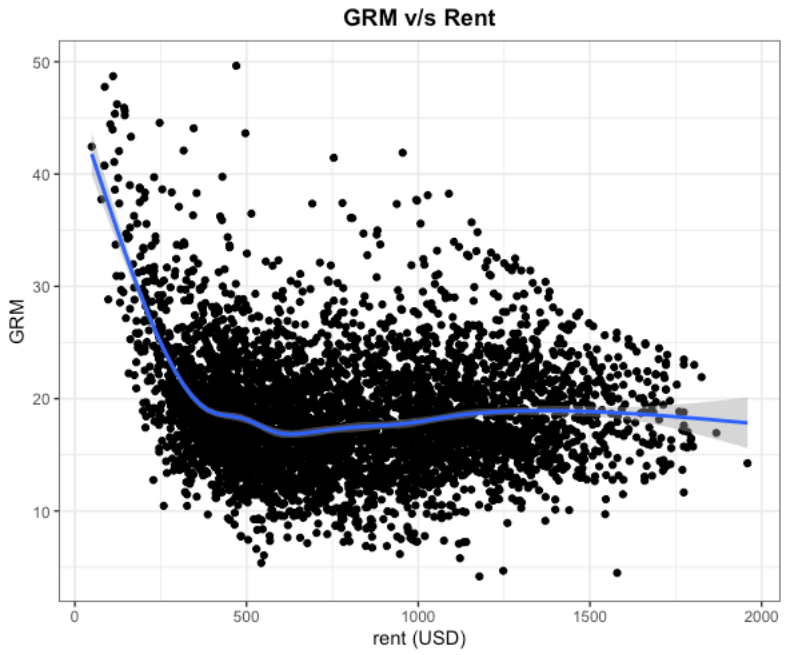
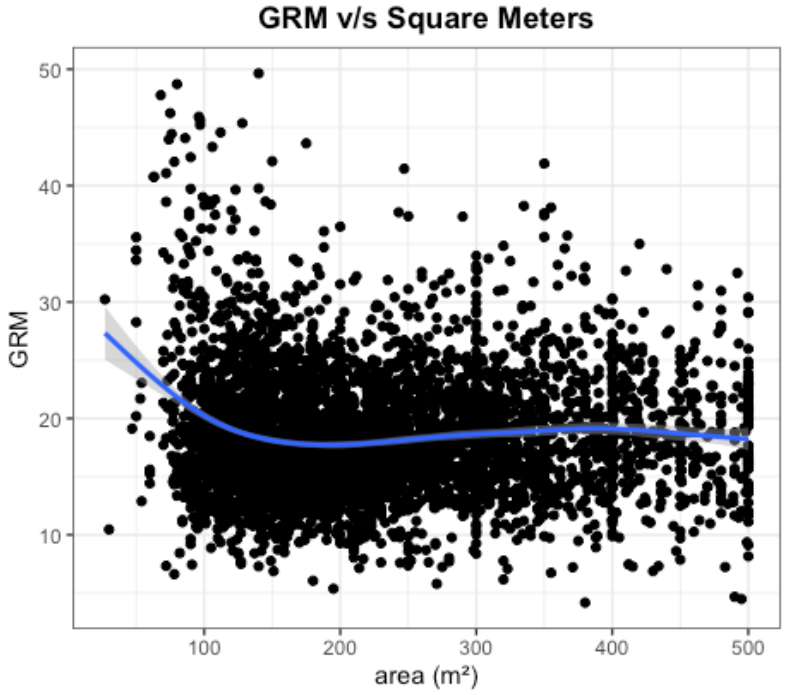
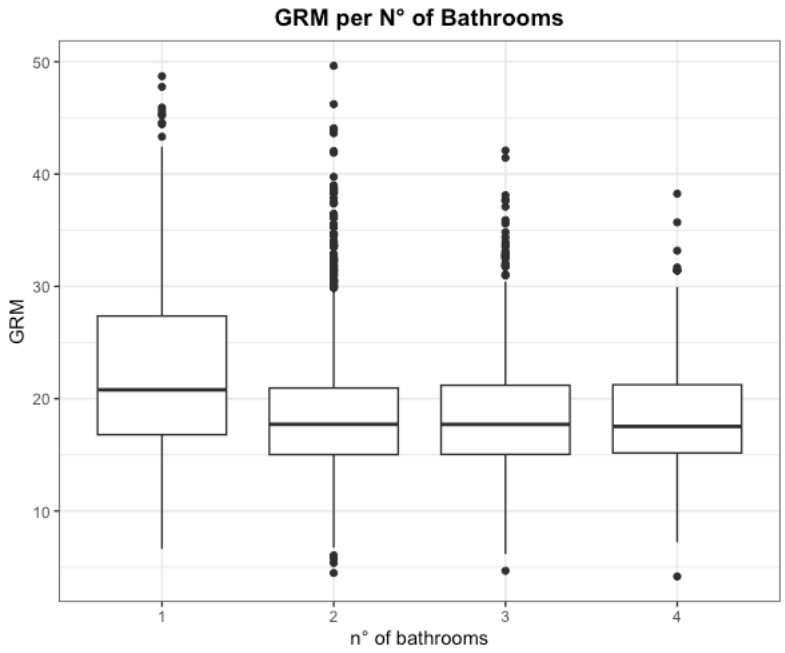

Annex 2: GRM and price relationship



Annex 3: GRM and square meters relationship



Annex 4: GRM per number of bathrooms


GRM per N° of Bathrooms
GRM
50
40
30
20
10
1
2
3
4
n° of bathrooms