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Final draft
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Saving Money on Renting an Apartment Near the University of Washington

Summary

Students are always trying to find ways to decrease their living expenses because they would like to save money for education, entertainment, or the future. No matter their reasons for saving money, students make an effort to find affordable housing. As a student, I am curious about finding cheaper housing. Therefore, I chose to investigate the factors that are most influential in housing prices. By calling the managers of local apartment buildings and asking a prescribed set of questions, I collected all the necessary data for this project. After running a least square regression on the collected data, the overall results of the project are useful and accurate within 138 dollars difference of the actual price. Also, there are a couple of interesting facts about variables. For example, the rent for apartments that include the parking is 68 dollars more than for those apartments that do not include parking. Another occurrence is that an additional square foot of the apartment increases the price of the rent by .50 dollars per square foot.

Introduction

As an out-of-state student, I am anxious about my living situation around the University of Washington. Many students have the same questions I have when they decide to move out of dormitories to live on their own. I would like to help those students as well as myself to help alleviate this worry. By investigating some factors that will affect the price of an apartment, students will be able to save money on renting housing around U-District. My goal is to determine what factors influence the price of rent and how.

Process

Since it is probably inefficient to personally explore and find every apartment around campus, I started collecting classified ads from the Daily newspaper because the managers would be likely to answer my questions and willing to tell me more about their apartments, yet it was still not easy. When I called, most of the time the managers did not answer the phone, were busy, or unwilling to talk to me on the phone. Even though I did have 150 potential managers, only 58 of them answered all of my questions on the phone. Although there should be many factors that would influence the price of rent, I decided to narrow my process down to searching for the following factors: number of people sharing the kitchen; number of bathrooms in the apartment; number of bedrooms in the apartment; parking availability; year of the building's construction; the last time between carpet changes (as a gauge for overall cleanliness); and square feet of the whole living space. Due to the lack of consistency in the managers' interpretation of the meaning of "inclusion of utilities", I decided not to include this variable. For example, some managers defined water, sewer, and garbage as the included utilities, while other managers defined water, electricity, and cable as the included utilities.

Regarding location and distance, after talking to all the managers on the phone, I went online and used MapQuest to get the cross streets for each apartment. Afterwards, I used ruler to measure the straight line distance in CM from the apartment to the middle of Red Square on a Seattle map by Rand McNally with a scale of 2 cm = .25 mile, because I was unable to use the local address of any other spot on campus on a computer (since most campus buildings don't have local addresses). After collecting all the necessary data, I ran a least square regression on my data (Appendix).

I also tried excluding studio apartments because I guessed that determining the price of studio apartments would be different from standard apartments.

In addition, I also excluded kitchens where more than 10 users shared it, because I was afraid I would gather incorrect data for apartments that have more than 10 people sharing one kitchen.

The error of this equation was minimized to almost 130 dollars with almost 95 % chance of being correct, which was a happy result. However, the final regression only is valid when kitchen users are less than 10 and when the apartment is not a studio.

Result

I have three different estimator equations. The first equation describes the overall result of the test, which means it also works for studio renting. This equation works 94% of the time and is always within 138 dollars difference from the actual price.

From first equation, I gleaned some interesting facts about the apartment prices around the school. First, for every additional bedroom in your apartment, rent increases by 114 dollars, so a studio is about 114 dollars cheaper than a one bedroom apartment in most cases.

Second, the number of bathrooms and the number of people sharing a kitchen do not have much impact on determining the price of the rent, with the implication that trying to save money by renting an apartment with only one bathroom will be a bad choice. When there are more than three people sharing an apartment, a one bathroom apartment will be almost the same price as a two bathroom apartment.

In general, for every square foot of space, your rent will increase by 50 cents. In other words, your 300 square foot apartment will be 50 dollars cheaper compared to a 400 square foot apartment.

As for distance from campus, for every additional .25 miles away from Red Square your apartment is, your rent will decrease by almost 10 dollars.

If your rent includes private parking fees, it will increase your rent by 62 dollars, so the best suggestion is street parking if possible instead of an indoor private parking apartment.

In addition, if the owner has changed the carpet a year before you move in, your rent is 6 dollars cheaper than an apartment with a new carpet, which is a funny result because normally you won't consider the age of your carpet as a factor when renting an apartment. However, this carpet issue seems to be a good determinant in how much the manager cares about the environment and overall cleanliness of your apartment complex, such as stairs and other public areas.

The second equation is just an intermediate step in attempting to refine my results, and the third equation represents the final and most accurate stage. In the third equation, I eliminate studios because studios do not share the similarities that other apartments do, and therefore evade accurate price estimation with these equations; kitchen users where more than ten people share were also eliminated due to a concern of gathering incorrect data. This equation turns out to be the best estimator of the apartment prices around campus because the accuracy increases 1 % compared to the first equation and decreases the maximum possible difference between actual price and predicted price to 130 dollars. This equation indicates that for every additional bedroom, your rent will increase 133 dollars. Rent that includes parking is 50 dollars more than others, which is also what I found out people pay for extra parking in other apartments' cases. The reason why it drops 12 dollars for parking and adds 19 dollars for an additional bedroom when compared to the previous equation is because studio parking might be more expensive than for standard apartments, which pushed the overall price up.

Using my equation for a specific apartment, 4315 9th Street NE my predicted price was 873 dollars from third equation and 895 dollars from first equation, whereas the actual price is 880 dollars. In both cases, the price difference is within 15 dollars.

For another example, I applied my equation into an apartment, 929 98th Street, the predicted price is 774 dollars by using the third equation, and 778 dollars by using the first equation; the actual price is 775 dollars. This is only within 5 dollars difference; my equation is a good predictor for the price of the apartment.

The reason that I provide both equations is because the first equation can be used in regular apartments, studios, and some exceptional shared housing situations. On the other hand, the third equation is only useful for a smaller set of regular apartments with no more than 10 people sharing a kitchen, but the accuracy is higher than the first equation.

Conclusion

When you get tired of dormitory life and decide to begin looking for an apartment, acquiring some background information about the apartments will help you to save money. This project provides benefits to students looking for apartments, especially those looking to reduce costs. For instance, if you want a smaller room instead of a bigger room because you are trying to save money, you will know how much you are saving by each square foot. At the same time, it gives those apartment owners who have no idea about marking up prices at apartments a general idea about how to price your apartment.

Overall, this project proved successful in estimating apartment prices. It identifies which features are significant in determining rent and which features are less important. By utilizing the findings of this study, students can live as comfortably as possible while paying a monthly rent they can afford.

Appendix:

All the gathering data result:

Dependent Variable: MONEY
 Method: Least Squares
 Date: 12/02/03 Time: 14:16
 Sample: 1 58
 Included observations: 58

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	312.7376	58.02089	5.390085	0.0000
BATHROOM	-18.14929	40.14674	-0.452074	0.6532
BEDROOM	114.0060	29.47828	3.867457	0.0003
CLEAN	-6.543141	5.865239	-1.115580	0.2700
DSTANCE	-4.902256	3.849650	-1.273429	0.2089
FOOTSQUARE	0.509271	0.072479	7.026459	0.0000
PARKING	62.04477	32.31601	1.919939	0.0607
PEOPLE_IN_KITCHE N	-0.291602	3.934431	-0.074116	0.9412
YEARS	0.410709	0.667399	0.615387	0.5411
R-squared	0.941094	Mean dependent var	914.1379	
Adjusted R-squared	0.931477	S.D. dependent var	527.2830	
S.E. of regression	138.0267	Akaike info criterion	12.83449	
Sum squared resid	933517.2	Schwarz criterion	13.15422	
Log likelihood	-363.2003	F-statistic	97.85411	
Durbin-Watson stat	2.140804	Prob(F-statistic)	0.000000	

Excluding the studio:

Dependent Variable: MONEY
 Method: Least Squares
 Date: 12/05/03 Time: 12:42
 Sample: 1 58 IF BEDROOM >0
 Included observations: 53

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	303.9695	60.60842	5.015303	0.0000
BEDROOM	148.0911	31.68228	4.674256	0.0000
CLEAN	-7.347702	6.074164	-1.209665	0.2329
DSTANCE	-3.605873	4.029395	-0.894892	0.3757
FOOTSQUARE	0.503097	0.071395	7.046645	0.0000
KITCHENUSER	-15.62491	8.914752	-1.752702	0.0866
PARKING	43.40849	32.29861	1.343974	0.1858
YEARS	0.680361	0.672762	1.011295	0.3174
BATHROOM	-47.68745	40.56805	-1.175493	0.2461
R-squared	0.946820	Mean dependent var	951.9811	
Adjusted R-squared	0.937151	S.D. dependent var	536.2300	
S.E. of regression	134.4309	Akaike info criterion	12.79350	
Sum squared resid	795153.6	Schwarz criterion	13.12808	
Log likelihood	-330.0277	F-statistic	97.92303	
Durbin-Watson stat	2.062179	Prob(F-statistic)	0.000000	

Except studio and kitchen user more than 10:

Dependent Variable: MONEY

Method: Least Squares

Date: 12/05/03 Time: 13:04

Sample: 1 58 IF BEDROOM>0 AND KITCHENUSER<10

Included observations: 52

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	299.5656	58.76346	5.097821	0.0000
BEDROOM	133.0140	31.63690	4.204395	0.0001
CLEAN	-9.100651	5.951999	-1.529008	0.1336
DSTANCE	-3.974172	3.908386	-1.016832	0.3149
FOOTSQUARE	0.511885	0.069316	7.384837	0.0000
KITCHENUSER	2.249514	12.53264	0.179492	0.8584
PARKING	51.09363	31.53536	1.620201	0.1125
YEARS	0.958654	0.666968	1.437331	0.1579
BATHROOM	-57.53092	39.62149	-1.452013	0.1538
R-squared	0.949872	Mean dependent var	964.0385	
Adjusted R-squared	0.940546	S.D. dependent var	534.1578	
S.E. of regression	130.2443	Akaike info criterion	12.73281	
Sum squared resid	729433.4	Schwarz criterion	13.07053	
Log likelihood	-322.0531	F-statistic	101.8515	
Durbin-Watson stat	2.045523	Prob(F-statistic)	0.000000	