Dachinii Lee-Hewitt

The comparison between the percentage of ethnic students and the average rent per week in British universities.

Introduction

An investigation to clarify whether when the average rent rate is higher at a British university the percentage of Ethnic students becomes higher. The selection of British universities occurred by taking 30 successive universities, from a random starting point (with aid from a random number generator) with the Average Rent per week and Percentage of Ethnic students recorded. This selection process has made the investigation more valid by giving a real spectrum of university standards. Due to the fact that increasingly more ethnic students apply to university and that many immigrants will usually invest more in education, including monetary investments, therefore it is logical the hypothesis adhere to this. A correlation between the average rent rate and the percentage of ethnic students is high. In order to discover the relationship between ethnic students and universities with different rates of rent all the data must show a strong link to each other, performing tests is an effective method for determining this.

Plan

To begin with, to find data suitable for statistical testing, Push.com is seen to have a realistic view of universities due to the involvement of more student input and a wider spectrum of university life is considered[1]. The choice of the first university for the data will be using the random number generator on a Graphical calculator, and following on to select the successive universities from an alphabetically organised list. The universities will be included on condition that they had the percentage of ethnic students and the average rent per week recorded on the statistics table.

A Hypothesis will be deciphered from the data. Due to the definition of Ethnic, which is "*belonging to or deriving from the cultural, racial, religious, or linguistic traditions of a people or country"*[2], the ethnic students will be coming from backgrounds based externally of the UK and will more than likely be wealthy amongst their own culture to be able to either travel to or access the higher level of teaching to enable them to study in UK universities. In conclusion the alternative hypothesis is (H^1) the higher the average rent per week, the higher the percentage of ethnic students studying at university will be. The null hypothesis (H^o) is the percentage of ethnic students at a British university will have no relation to average rent per week at a British university.

Initially anomalies will show any extremes in both sets of data thus giving a basis to mathematical calculation using the data and giving a basic idea of which hypothesis the results will prove true. Measures of central tendency will be used for characterising the data obtained; therefore the mean and mid-range of both variables will be calculated and compared. A regression line is a visual representation of the relationship between two quantitive variables. A linear line of best fit exactly between the two variables is plotted and is a visual representation of the correlation of the two variables. The Pearson product- moment correlation co-efficient is useful when trying to determine the strength of a relationship between two sets of data. The formula for this is,

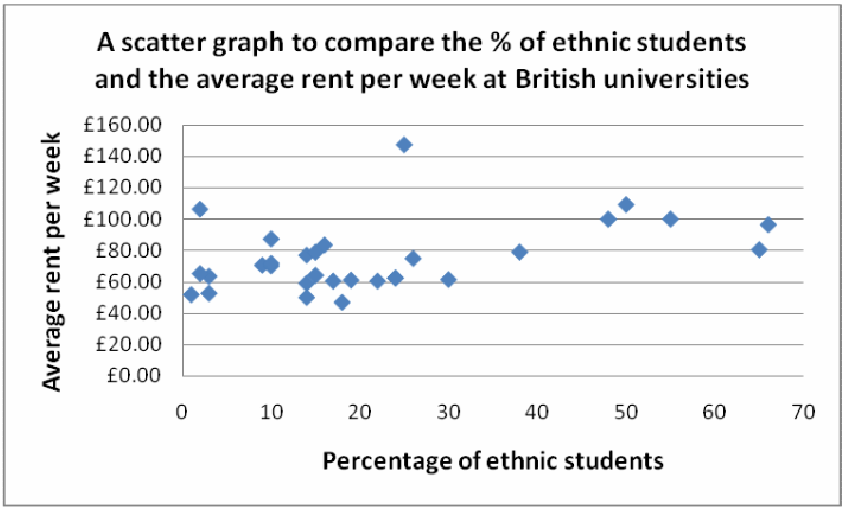
[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic

Dachinii Lee-Hewitt

$r = \frac{S_{xy}}{S_x S_y}$ in which S_{xy} is the Covariance and S_x and S_y are the standard deviations of X and Y respectively. This will be followed by the Spearman's Rank Correlation, a test which the strength of a relationship between two continuous variables. It will be tested using a 5% significance level as this should give an accurate representation of the correlation and therefore accept either the alternative (H^1) or the null (H^o) hypothesis.

Mathematical process

Anomalies viewed on the scatter graph will visually show how, if there are extreme examples of data support either H^1 or H^o. The independent variable is plotted on the horizontal axis where as the dependant variable is on the vertical axis.



There are two particular anomalies, the highest average rent per week was at the Royal Academy of Music in which 25% of it students are ethnic. This could be explained by the fact that ethnic students studying in Britain have more interest in business and economics courses, this is seen in the LSE statistic which shows 50% of its students are ethnic and its average rent per week is £108.99. In the same way the other anomaly from the Royal Agricultural College could be due to the lack of interest in agricultural studies. Only 2% of its students are ethnic and it has the second highest average rent per week at £106.10. It is also vital to consider the fact that the majority of ethnic individuals do not reach graduate level and so the ones who have enabled themselves to go to university usually will have similar interests and aspirations, therefore affecting the percentage of ethnic students at certain universities. This suggests that H^o is true.

[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic

Dachinii Lee-Hewitt

A moderately strong positive correlation is shown on the diagram. This means that there is a moderate/strong chance that more ethnic students are studying at a university where the rent is higher. Another clear observation is that many British universities have between 10 – 20 percent of ethnic students, with an average rent rate of between £50 and £100 yet the percentage of ethnic students studying soars the Rent rate does increase to approximately £100 but does not follow the same extreme. This difference may be more due to the fact that the average Rent rate for most universities is between £50 and £120, therefore H[1] remains true: the higher the average rent per week, the higher the percentage of ethnic students studying at university will be.

The measures of central tendency calculated were the Mean and Mid-range. The mean of the *percentage of ethnic students* = 22.16667% and the mean of the *average rent per week* = £75.02 These two values are the average value that would be expected from the data studied anything above them could be viewed as higher than normal, and the same if any value is lower. This also shows that the percentage of ethnic student's averages quite low therefore as the data is further analysed higher percentages of ethnic students could be found at universities with a higher than normal average rent per week, thus it could prove H[1] to be accepted.

Mid-range was then calculated for the *percentage of ethnic students,*

$$\frac{2(\text{Royal Agricultural College}) + 66\ (\text{Queen Mary, University of London})}{2} = 34\%$$

Also shows a low percentage of ethnic students attending university but is substantially higher than the value calculated from the mean. This shows that more tests and analysing will need to be done before a conclusive result is given. In the same way the mid-range of the *average rent per week* was higher than the mean value,

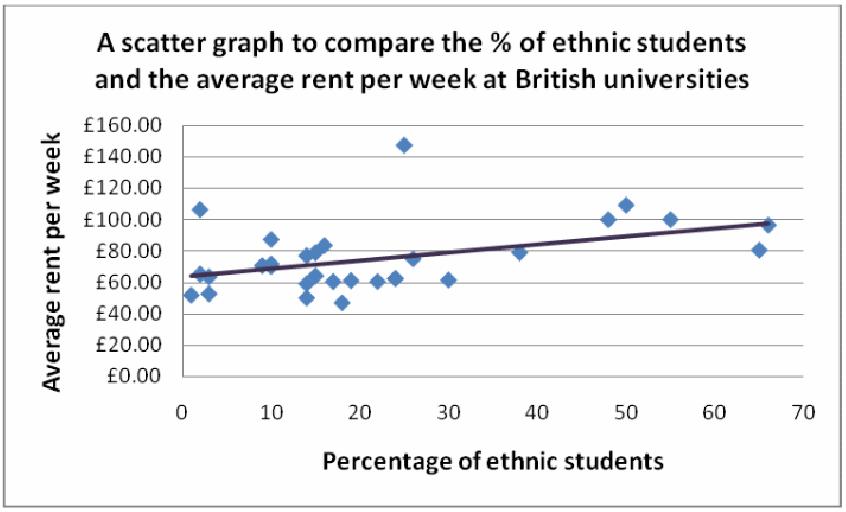
$$\frac{46.86(\text{University of Northampton}) + 147.07(\text{Royal Academy Of Music})}{2} = £96.97$$

The increase in both value is because the mid-range uses the two extremes of a set of data, therefore anomalies usually are used in the calculation. In this case the anomalies have caused both mid-ranges to be higher than their calculated mean. The mean is a more accurate calculation as it includes more of the data within it even though it is still affected by the anomalies. Generally the mid-range supports the calculations of the mean, showing that a low percentage of ethnic students attend British universities and that there is a possibility that more ethnic student's attend universities with higher than normal average rent per week.

[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic

Dachinii Lee-Hewitt

A regression line is an accurate line of best fit due to the fact it is not drawn by eye it is calculated by the sum of the squares of the distance from the line being minimum.

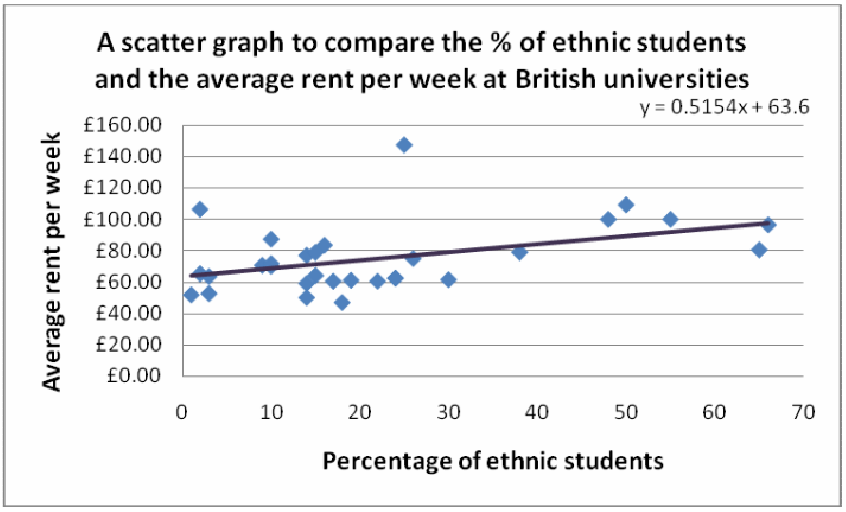


The regression line can also predict trends, in this example H[1] is supported, the higher the rent the more ethnic students will attend a university. It is probable that most of the ethnic students have travelled from abroad or had the cultural upbringing which could suggest that the student has had a higher level of education. Another possibility for the correlation is that the majority of ethnic students that are attending the British universities have been raised in a densely urbanised area such as London, this would mean that they are accustomed to the high living costs and also it will enable them to live near their family home. There are many reasons why ethnic students are attending universities with higher average rent rates.

[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic

Dachinii Lee-Hewitt

Pearson's product moment correlation coefficient is a test that will show how near to perfect positive correlation the two sets of data are.



Correlation Co-efficient= 0. 0.434777

If R=1 there is perfect positive correlation, if R=0 there is zero (no) correlation and a perfectly negative correltaion is when R=-1. So when R=0.43 there is a strong positive correlation but it does not show that there is a perfect correlation. Basically it gives an inconclusive answer as R is near to mid way between proving H^1 and H^o, yet it actually supports H^o as the figure is nearer to 0 than 1.

[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic

Dachinii Lee-Hewitt

Finally a Spearman's Rank hypothesis test will determine whether we finally accept either H^1 or H^o. The process was completed in the table below.

% Ethnic Students	Rank of %ethnic students	Rank (ties)	Average Rent Per week	Rank of average rent/week	Rank difference (d)	d^2
1	1	1	£46.86	1	0	0
2	2	2	£50.00	2	0	0
2	3	2	£51.76	3	1	1
3	4	1.5	£52.59	4	2.5	6.25
3	5	1.5	£58.97	5	3.5	12.25
9	6	6	£60.39	6	0	0
10	7	8.5	£60.44	7	-1.5	2.25
10	8	8.5	£61.03	8	-0.5	0.25
10	9	8.5	£61.37	9	0.5	0.5
14	10	11	£62.30	10	-1	1
14	11	11	£62.34	11	0	0
14	12	11	£63.42	12	1	1
15	13	13.5	£64.02	13	-0.5	0.25
15	14	13.5	£65.14	14	0.5	0.25
16	15	15	£70.00	15	0	0
17	16	16	£70.50	16	0	0
18	17	17	£71.64	17	0	0
19	18	18	£74.79	18	0	0
22	19	19	£76.84	19	0	0
24	20	20	£78.69	20	0	0
24	21	21	£78.80	21	0	0
25	22	22	£80.36	22	0	0
26	23	23	£83.32	23	0	0
30	24	24	£87.16	24	0	0
38	25	24	£96.28	25	1	1
48	26	26	£99.72	26	0	0
50	27	27	£99.84	27	0	0
55	28	28	£106.10	28	0	0
65	29	29	£108.99	29	0	0
66	30	30	£147.07	30	0	0
					total of d^2 =	
					26	

$R_s = 1 - ((6*26)/(10*(34^2-1)))$
$= 1-(156/11550)$
$= 1- 0.013506493506...$
$= 0.98649350649350...$

The significance level was at 5% and so the critical value is 0.364. In this case R_s is larger than the critical value and so there is a significant positive correlation. H^1 can now be accepted as the correct hypothesis.

[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic

Dachinii Lee-Hewitt

Conclusion

One important observation is that most universities have lower percentages of ethnic students although the original hypothesis is correct, a higher percentage of ethnic students will attend British universities with a higher average rent rate, less ethnic students are attending full stop. The most probable reason for this is because many schools and higher education institutes with a high percentage of ethnic students have lower achievement than their fellow institutes. The idea that the educational system still does not fully adapt to an ethnic individual's learning and that it has not included many different methods of educating young people is controversial but is believed by some. This could be another reason why there is a low percentage of ethnic students studying at university.

On the whole the correlation of the H[1] was quite strong and this was clear from the form of the regression line. Although there is a clear and significant correlation this does not prove a causal relationship between the two variables. In real life there are many different reasons behind a higher percentage of ethnic students at universities with a higher average rent per week yet it is a new theory in which there is scope for further investigation.

[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic

Dachinii Lee-Hewitt

Institution	% Ethnic Students	Average Rent Per week
Leeds Metropolitan University	24	£62.30
Leicester University	9	£70.50
University of Lincoln	3	£63.42
Liverpool Hope University	10	£70.00
University of Liverpool	19	£61.03
London Metropolitan	55	£99.84
London South Bank University	48	£99.72
Loughborough University	10	£87.16
LSE	50	£108.99
Manchester Metropolitan	24	£62.34
University Of Manchester	17	£60.39
Middlesex University	65	£80.36
Napier University	14	£76.84
Newcastle University	15	£64.02
North East Wales Institute	1	£51.76
University of Northampton	18	£46.86
Northumbria University	14	£58.97
University of Nottingham	10	£71.64
Nottingham Trent University	22	£60.44
Oxford Brookes University	15	£78.69
University of Oxford	14	£50.00
School of Pharmacy, University of London	30	£61.37
University of Plymouth	2	£65.14
University of Portsmouth	26	£74.79
Queen Mary, University of London	66	£96.28
Queens University Of Belfast	3	£52.59
University Of Reading	16	£83.32
Roehampton University	38	£78.80
Royal Academy Of Music	25	£147.07
Royal Agricultural College	2	£106.10

[1]http://push.co.uk/document.aspx?id=c023692d-2a00-460c-b753-97eb1155a6e4
[2] http://dictionary.reference.com/browse/ethnic