Statistics coursework 2

There are many ways of comparing the birth rates of countries compared to other countries, and one way may be to look at the life expectancies of the countries. I believe that there is will be a correlation between the two variables: Average birth rate of a country per 1, 000 and Life expectancy of a country.

I think that the higher the life expectancy, the lower the birth rate, and vice versa. If there is a correlation, then it will be a negative one, and it also means that by looking at the life expectancy of a country, you may be able to estimate the birth rate of that country. Data CollectionI found my data for both, life expectancy and birth rate of 196 countries, from a website, www. globastat.

com. The data for each was collected from the same year, 2001, and so is fairly up-to-date reliable, and accurate. My ' population' is of countries in the world. There were a total of 196 countries for both life expectancy and birth rate, and the same countries were found in both lists, therefore making my selection a little easier. I needed to choose a sample from the total, and I chose to use 60 countries for their data.

I chose these 60 by a random process: by typing Ran#196 in my calculator, my calculator gave me a random selection between 001 and 196, therefore enabling me to choose my 60 countries with ease. As the process is completely random, assuming that the random number generator was functioning properly, then the sample should be completely random, and every country is as likely to be picked as the other. Here are my final 60

countries after choosing them randomly: -Life ExpectancyBirth RateAlgeria69. 95Algeria22.

76Argentina75. 26Argentina18. 41Australia79. 87Australia12. 86Belgium77.

96Belgium10. 74Belize71. 19Belize31. 69Bolivia64. 06Bolivia27. 27Bosnia and Herzegovina71.

75Bosnia and Herzegovina12. 86Botswana37. 13Botswana28. 85British Virgin Islands75. 64British Virgin Islands15.

18Burma55. 16Burma20. 13Burundi46. 06Burundi40. 13Canada79. 56Canada11.

21Chile75. 94Chile16. 8China71. 62China15.

95Colombia70. 57Colombia22. 41Comoros60. 41Comoros39. 52Costa Rica76.

02Costa Rica20. 27Croatia73. 9Croatia12. 82Czech Republic74. 73Czech Republic9.

11Denmark76. 72Denmark11. 96Dominica73. 6Dominica17. 81France78.

9France12. 1Gabon49. 59Gabon27. 42Greece78. 59Greece9. 83Grenada64.

52Grenada23. 12Guyana63. 31Guyana17. 92Haiti49. 38Haiti31. 68Indonesia68.

27Indonesia22. 26Iraq66. 95Iraq34. 64Italy79.

14Italy9. 05Japan80. 8Japan10. 04Lesotho48.

84Lesotho31. 24Liechtenstein78. 95Liechtenstein11. 53Malaysia71. 11Malaysia24. 75Mali47.

02Mali48. 79Mauritania51. 14Mauritania42. 95Mauritius71.

25Mauritius16. 5Mongolia64. 26Mongolia21. 8Morocco69. 43Morocco24. 16Nauru61.

2Nauru27. 22New Zealand77. 99New Zealand14. 28Nicaragua69. 05Nicaragua27. 64Norway78.

79Norway12. 6Philippines67. 8Philippines27. 37Puerto Rico75.

76Puerto Rico15. 26Qatar72. 62Qatar15. 91Romania70. 16Romania10.

8Saint Kitts And Nevis71. 01Saint Kitts and Nevis18. 78Samoa69. 5Samoa15. 59Sao Tome and Principe65.

59Sao Tome and Principe42. 74Senegal62. 56Senegal37. 46Singapore80.

17Singapore12. 8Sudan56. 94Sudan37. 89Suriname71.

63Suriname20. 53Sweden79. 71Sweden9. 91Switzerland79.

73Switzerland10. 12Tanzania51. 98Tanzania39. 65Uruguay75. 44Uruguay17.

36Vanuatu60. 95Vanuatu25. 4Zimbabwe37. 13Zimbabwe24. 68Modelling ProceduresI used a spreadsheet to show my data.

The software I used (Microsoft Excel) also enabled me to draw a scatter graph to show my data. I put Life Expectancy on the x-axis (horizontal) and Birth Rate on the y-axis (vertical), as these were my independent and

dependent variables, respectively. The graph shows a slight elliptical profile, but as a lot of the points are densely populating one area of the graph, this cannot be said. A clear negative correlation is shown.

AnalysisAs there is not a very clear elliptical profile, my distribution will not be a normal distribution; therefore I shall use Spearman's rank correlation coefficient to work out a value for r. The hypothesis test for this situation would be: H0: There is no correlation between life expectancy and birth rate of a country. H1: There is a negative correlation between life expectancy and birth rate of a country. After ranking my data (as shown on page), I worked out the difference between the ranks of a particular country for each of life expectancy and birth rate, I found the difference2(d2), which enabled me to calculate the value of r, according to my data, using the following formula: -r = 1 – 6? d2n2(n-1) where n= the number of the sampleI used the spreadsheet to do this calculation, which I worked out as: r = -0.

8823. Using a data book, I looked in the statistics tables to find the critical value for r, when n= 60, and rcritical= 0. 2144 where my significance level is 5%. As |-0. 8823| is greater than 0.

2144, which is what I was looking for to satisfy H1 and to reject H0, therefore I shall accept H1. This means that there is a correlation. However, the nearer r is to +1, the nearer the data is to a perfectly positive correlation. The nearer r is to -1, the nearer the data is to a perfectly negative correlation.

My value is very close to being -1 and so shows a very strong negative correlation. In conclusion, my prediction was correct, and there is a trend between birth rate and life expectancy of a country: as the life expectancy

increases, the birth decreases, and vice versa. InterpretationThe results show that there is a relationship between life expectancy and birth rate. It shows there is a negative correlation, which shows that the higher the life expectancy of a country, generally, the lower the country's birth rate is.

From the above results, it is clear to see that, when focusing on developed countries, life expectancy and birth rate are very strongly negatively correlated. This means, relating these results to the original aim, that, one way of measuring the average birth rate in a particular country relative to another is to look at the life expectancies of these countries. This is important, as life expectancy in a developed country can be measured very accurately by censuses, and problems related to obtaining the average birth rate, can be ignored. However, it would have been more useful if the above facts were true for the whole population. On the graph, you can see a densely populated right hand side, and a less densely populated left hand side.

The right hand side is that of developed countries, as their life expectancies are generally higher than less developed countries, whose birth rate are very high. It is a larger problem of getting figures for birth rate in third world countries, as the data gained from these countries is often not the whole picture; many births and deaths are not accounted for due to vast numbers of people who have not been accounted for, for example tribal families, living in deserted parts of a country, and therefore are very inaccurate. Accuracy and RefinementsMy data was collected from a website, www. globastat. com, which is an " an award-winning web site with a wealth of geographic information".

The site contains lots of data about various geographical aspects of a wide variety of countries, for example birth rate and life expectancy. Therefore, the data will not be biased and is fairly accurate. My data and results may be accurate, but they are not representing every single country. The results are only true for the countries, which are specified above, i. e.

fairly common and well known. This is because for smaller countries, the information is hard to obtain and so was not found by the makers of the website. I found 196 countries' data, which would have taken a very long time to interpret and show graphically; therefore I took a completely random and non-biased sample of 60 countries from it, which was a more manageable size. From these 60 countries, I was able to show their results graphically, draw a line of best-fit showing a rough and general trend, and calculate a correlation coefficient. Anomalies are likely to occur because data does not indicate the environment and for example, political stability of a country; I assume that conditions are equal for each of the countries. But this is false, because many countries have been struck by natural disasters, for example, which influence birth rates and life expectancy.

A lot of poorer countries undergo starvation, leading to famine, which also affects the birth rate and life expectancy of countries. Migration may also have an affect: many healthy people may come into a country and boost the life expectancy, or many women may leave a country, therefore reducing the birth rate of a particular country.