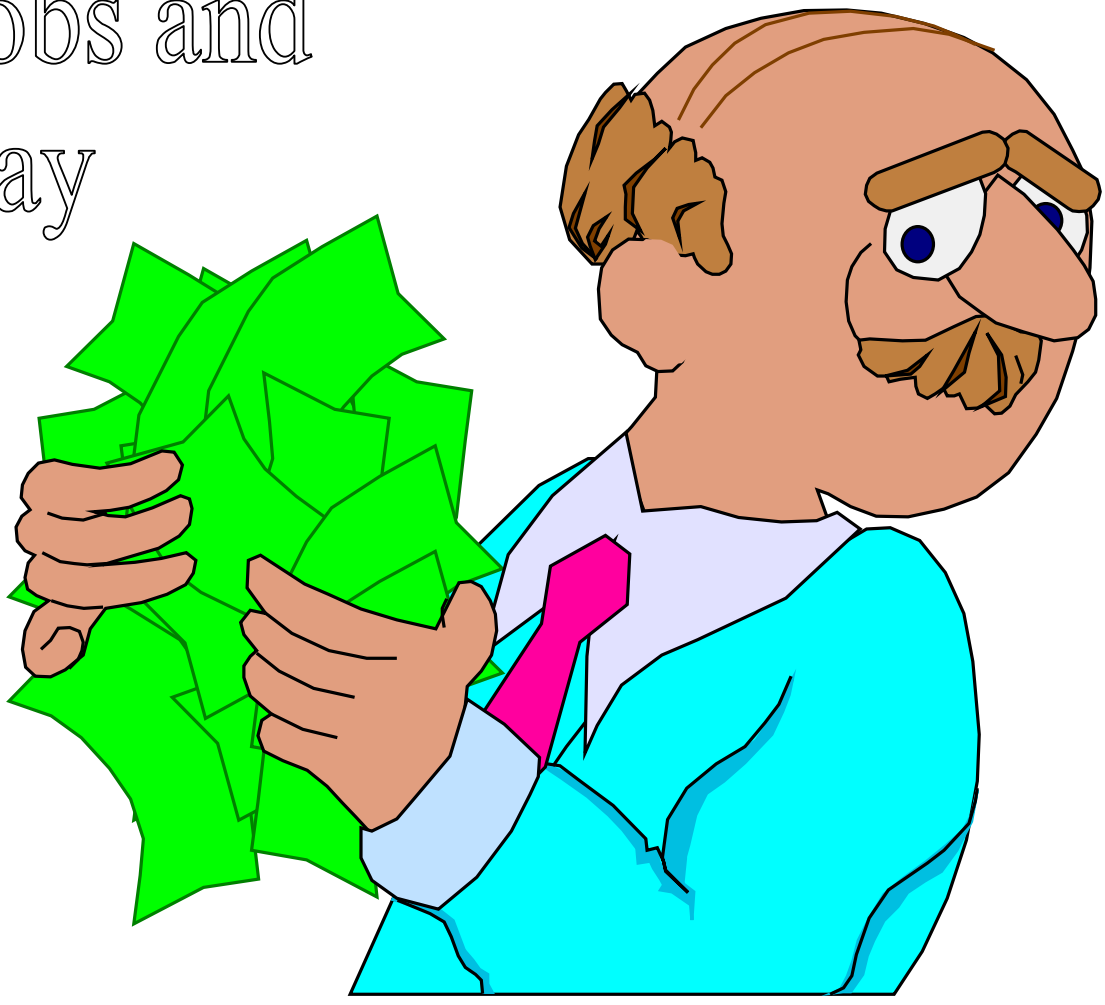
GCSE

STATISTICS

Coursework

Jobs and Pay



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Main Introduction

In this piece of coursework, I will be looking at the similarities and differences between jobs and pay that effect the young and old, and between men and women. I will also be looking at other aspects which could affect people's Work and Pay, or might be caused by it.

To do this, I will be looking at both Primary and Secondary information, separately and together, to make as complete a comparison between them as I possibly can.

I obtained the information for my Secondary data from within "Fact File 1998", which gave me the opportunity to choose several different types of data for comparison. This is a publication produced every year by the Government. It provides statistical data on a wide range of categories, including jobs and pay, by gender and age. It also includes data on car and house ownership, holidays and a wide range of other information which was outside the scope of my coursework investigation.

I obtained my Primary data from members of the public, who were using "The Galleries" shopping arcade in Wigan. I collected the data by means of a sample questionnaire, which was carried out on the afternoon of Wednesday 29th September 1999.

I will present my Secondary Data by means of line graphs, bar charts, pie charts, box and whisker diagrams and scatter diagrams. I will obtain Spearman's Correlation Coefficients and Mean and Standard Deviations. My Primary Data will be represented using the same methods, together with data tables of my questionnaire results.

After completing the individual sections on the Secondary and Primary Data, I will include a section where I will compare my findings, to see if there are any connections between the results I obtained in the Primary Data, and the results I found from data published by the government.

Secondary Data

Aims

My aims in this project, are to explore the relationship between the average gross weekly earnings for full time adult employees, by comparing them on gender and occupation basis. I will compare nine different occupational groups, and base my investigation on statistics prepared for April 1997, for Great Britain as a whole.

Method

I will compare managerial, professional, clerical, service, sales, factory, and other occupations. I will compare male workers of all ages, with female workers of all ages.

Hypotheses

I will use data for full time employees only, because that is the data provide by the table. I will only use data for employees on full adult rates. I will not break down the data for different age groups, or consider other countries. I will use data provided from "Labour Market Trends" for August 1997.

Prediction

I predict that for all occupational groups, men will earn more than women. I also predict that women will generally earn only about two - thirds of the amount that men do, apart from in Secretarial occupations, where the gap should be much closer.

Data

I chose this set of data to work with, from "Fact File 1998". I chose to use this data, because it allowed me to use several different Statistical formats, to present my results. This is the table of data I used to find

OCCUPATION	WOMEN	MEN
Managers and Administrators	£408.60	£594.90
Professional Occupations	£441.90	£544.10
Associate Professional & Technical Occupations	£367.20	£484.40
Clerical and Secretarial Occupations	£250.90	£287.30
Craft and Related Occupations	£208.10	£344.10
Personal and Protective Service Occupations	£217.00	£330.80
Sales Occupations	£218.80	£336.40
Plant and Machine operatives	£217.10	£315.20
Other Occupations	£181.40	£263.10

Presentation of Data

I will present this Data in the following formats, using separate diagrams for male and female, where appropriate. These formats will be:

- **A Multiple Bar Chart,**
- **A Component Bar Chart,**
- **A Multiple Percentage Bar Chart,**
- **A Percentage Bar Chart,**
- **A Comparative Pie Chart,**
- **A Box & Whisker Diagram,**
- **A Scatter Diagram,**
- **Spearman's Correlation Coefficient,**
- **Mean & Standard Deviation**

There is no Data on the number of people in each occupational category. If there was, I would also be able to use the following Diagrams:

- **Cumulative Frequency Diagram,**
- **Line Diagram,**
- **Stem and Leaf Diagram,**
- **Histograms and Frequency Polygons,**
- **Frequency Density,**

Analysis of Data

The ***Multiple Bar Chart*** shows that men earn most as Managers and Administrators followed by Professional and Associate Professional Occupations. All other male occupations earn similar amounts; approximately £300 per week. Women earn most in Professional Occupations, followed by Managers and Associated Professionals. All other female occupations earn about the same amount; approximately £200 per week. On average women earn less than men in all occupational groups.

The ***Component Bar Chart*** shows the same information as the multiple bar chart, but with the data for men and w omen overlaid on each other. The size of the bars show the relative size of men's weekly earnings compared to women's and makes the differences between them more obvious.

The ***Multiple Percentage Bar Chart*** shows that women generally earn between 60% and 70% of the amount earned by men in similar occupations. This applies for both low paid jobs, and for managers. Women in professions earn approximately 80% of male earnings. Women in Clerical and Secretarial occupations, are the closest to men's salaries for the same job; even though I know there are far fewer men doing this work. Even so, women still only earn 87% of men's earnings.

The ***Percentage Bar Chart*** shows how much more or less than the average that men and women earn. Men are shown to earn in excess of the average for each occupational group.

The ***Comparative Pie Chart*** shows exactly the same information as the Multiple Bar chart, but presents it in a different way. In this form it is not possible to directly compare male and female earnings for the s ame occupation. It is not possible to easily work out the wages for each individual occupation with this method of presentation.

The ***Box & Whisker Diagram*** shows that men earn consistently more than women. For male earnings, the Range is greater, the Uppe r and Lower Quartiles are greater, and the Inter-Quartile Range is greater as well. For both men and women, the median is only slightly greater that the Lower Quartile; and this is particularly noticeable for women's earnings. The figures used are not comp letely accurate as I do not know how many people there are in each group. From the diagram, I can find these different Averages:

Averages	**Men**	**Women**
Range	£ 331.80	£ 260.50
Upper Quartile	£ 484.40	£ 367.20
Lower Quartile	£ 315.20	£ 217.00
Interquartile Range	£ 139.20	£ 150.20
Semi-Interquartile Range	£ 69.60	£ 75.10
Median	£ 336.40	£ 218.80
Occupation of Median Group	Sales	Sales

I don't know if it is a coincidence that the Median for both men and women is "Sales". However, there are another two categories for both men and women, where the Average weekly earnings are almost identical.

The ***Scatter Diagram*** shows that men and women earn progressively more as they do better jobs. The 'line of best fit' shows an approximate relationship of Men's earnings = 1.2 x Women's earnings + £66.67p.

The ***Spearman's Correlation Coefficient*** calculation shows a good positive correlation of 0.7. This means that women consistently earn approximately 70% of the amount that men do.

The ***Mean Deviation*** gives mean earnings of £388.92p for men and £279.00p for women. The mean deviation for men is £101.47p, and for women is £84.60p. This shows that there is a greater range of earnings for men than for women.

The ***Standard Deviation*** for men is £113.21p and for women is £92.95p.
These figures are both greater than the mean deviations, which show that there is a greater spread of data, and it is not concentrated around the mean values.

Interpreting and Evaluation

From my investigation, I have found that women are general ly paid only 60% - 70% of the amount paid to men doing similar jobs. I have also found that pay for men and women is more equal in Clerical and Professional occupations.

On average, lower paid workers are paid approximately 50% of that paid to Managers and Administrators. This applies to both men and women equally.

Male Managers and Administrators are the best paid groups, followed by male Professional. The best paid women are in Professional occupations, followed by female Managers and Administrators. The worst paid men and women are in "Other" occupations, and from the data I had, the median earnings are for people in Sales occupations.

Because of the lack of information on the number people in every category, I have not been able to analyse the data in more ways.

I have found that my predictions of, "that men would earn more than women", that "Women would earn two - thirds of men's earnings", and that "the gap would be smallest for Secretarial work", were all correct.

Due to my findings, I now know that equality of pay, between men and women, is still a long way off. This is in spite of "Equal Pay Legislation" having been in place for about twenty years!

Development from Secondary Data into Primary Data

My Secondary Data related to National Statistics only and did not show if there were differences in the Regions, which I considered to be an important aspect of my evaluation. The age and employment structure may be different in Wigan to that found nationally, as Wigan has traditionally been a mining and manufacturing town. To find out if there were differences in Wigan I decided to carry out a sample questionnaire of thirty people to find out their ages, gender, occupational group, days worked, earnings and house size. I will then analyse my results to see how they compare with my findings from my Secondary Data.

Primary Data

Aims

My aims in this project, are to explore the relationship between the average gross weekly earnings for full time adult employees, by comparing them on gender and occupat ion basis. At the same time I will investigate the relationships between the size of people's houses with their incomes, ages and occupations. I will compare nine different occupational groups, and base my investigation on data collected by carrying out a survey asking people in Wigan.

Method

I will compare managerial, professional, clerical, service, sales, factory, and other occupations. I won't try to select the same number of people from each age group, because that wouldn't show the actual number of people who are in Wigan at the time when my survey will be carried out.

Theoretically, we should get the same number of people in Wigan in each age group, and of each gender, but this probably won't occur for the following reasons:

- We are standing in only one place, and therefore we can only ask people who walk past that point.
- The time we carry out our survey is when most people have gone back to work after their dinner hour, and
- Some people might not want to answer our survey, which could stop us from finding a pattern in the data we collect.

I will collect my data by asking thirty people questions from a prepared list to determine their age, gender, occupation, gross weekly wage and number of rooms in their house.

My data will be collected from peop le passing the lifts on the lower floor level of "The Galleries" shopping arcade. The survey will be carried out during the afternoon of Wednesday 29th September 1999, and will last about an hour. We will work in groups of three and share our results, to allow us to ask the right number of people in the allowed time.

People will be stopped politely and asked if they are willing to help with our survey. Those people that agree to help will have their gender noted down on our results sheet. They will then be asked these questions:

- What age group are you in?
- What employment group do you come in?
- How many days a week do you work?
- What is your gross weekly wage?
- How many rooms do you have in your house?

To help people answer in accordance with our pre-determined categories, we will show them 'prompt cards' detailing the possible answers they could give. This will speed up the questioning process and avoid the need to record every detail that they provide.

Prediction

I predict that for all occupational groups, men will earn more than women. I also predict that women will generally earn only about two-thirds of the amount that men do, apart from in Secretarial occupations, where the gap should be much closer.

I also predict that, because of the time of day and place that the survey will be carried out, we will find that most people in Wigan at that time are either non-working women or students. I think that people who are in full time employment will not generally be in a shopping arcade on a Wednesday afternoon. This will mean that our actual results will not be statistically accurate for the population of Wigan as a whole.

I predict that most people who are working will be in lower paid, part-time occupations, and will live in smaller houses. The results will not show many highly paid or professional people.

Data

The results I obtained are shown on the attached 'survey data sheet', which shows the thirty results that we recorded at the time.

Presentation of Data

I have presented this Data in the following formats, using separate diagrams for male and female, where appropriate. These formats are:

- **A Pie Chart to show the proportion of men and women surveyed,**
- **A Histogram of people's age groups,**
- **Comparative Pie Charts for the ages of men and women,**
- **A Cumulative Frequency Curve for all peoples ages,**
- **A Box and Whisker Diagram to show the distribution of men's and women's ages.**
- **A Bar Chart to show the number in each occupational group,**
- **A Comparative Pie Chart to show the distribution of occupations for men and women,**
- **A Histogram of number of days worked by each person,**
- **A Comparative Bar Chart to show the number of days worked each week by men and women,**
- **A Frequency Density Polygon to show gross weekly earnings,**
- **A Comparative Bar Chart to compare gross weekly e arnings for men and women,**
- **A Cumulative Frequency Graph for gross weekly earnings,**
- **A Frequency Density Polygon to show the number of rooms in peoples houses,**
- **A Cumulative Frequency Graph to show the number of rooms in peoples houses,**
- **A Scatter Diagram to compare people's equivalent earnings, for a five day week, with their occupation,**
- **A Scatter Diagram to compare people's equivalent earnings, for a five day week, with the number of rooms in their house,**
- **Calculation for Spearman's Correlation Coefficient,**
- **Mean & Standard Deviation Calculations for People's Earnings**
- **Grouped Mean & Standard Deviation Calculations for people's Age**

Attached to each chart is a calculation sheet showing how I have worked out the results from the original data recorded.

Analysis of Data

The first **Pie Chart** shows that there were 50% more women than men who answered the questions in our survey.

The **Histogram** of people's ages shows that half of the people interviewed were under twenty-two. There were the same number of people in each of the 22-30 and 31-45 age groups and less in both of the older age groups. We did not interview any woman who was over 50, or any man who was over 65 years old.

The **Comparative Pie Charts** show that the men we interviewed were more equally spread over the age ranges than were the women. Over 60% of women were aged 16 -18, and over 80% were under 22.

The **Cumulative Frequency Graph** shows the age ranges of men, women and combined in graphical form. The closeness of the lower quartile and median results indicate the concentration of young people in the data obtained, particularly for the women's data.

The concentration of women's ages in the 16-22 age groups is even more clearly demonstrated by the **Box and Whisker Diagram**, while the equivalent diagram for men shows a more uniform distribution of ages.

The **Bar Chart** of people's occupations show that most people were classified as "other". This category included students and those who had unusual occupations. Apart from this group there were more professio nal people than any other type.

The **Comparative Pie Charts** for men and women's occupations show that over 50% of women were classified as 'other', compared to 25% of men. Two-thirds of men were in managerial or professional occupations, compared to only under 25% of women. There were no men in clerical, personal services or sales occupations, and no women in craft occupations.

The **Histogram** showing the number of days people worked indicated that the majority of people worked for five days a week. Everybo dy worked for at least two days a week, but nobody worked all seven days. A third of all people worked for three days a week or less.

The **Comparative Bar Chart** of days worked shows that more than 80% of the men worked for five or six days, with under 20% working a shorter

week. Less than 50% of women worked five or six days, and exactly 50% only worked for two or three days.

The **Frequency Density Polygon** of peoples earnings shows that half of the people earn less than £100 per week. This compares to 25% o f people earning over £400 per week. A similar number of people earned between £100 and £400 per week.

The **Comparative Bar Chart** comparing people's gross weekly earnings shows the large number of women earning under £100 per week, and that no women earned over £400 per week. Most men earned between £400 and £500 per week

The **Cumulative Frequency Curve** shows that the median weekly earnings are only £100 per week. The lower quartile occurs at £35 per week and the upper quartile occurs at £340 per week. This suggests that people on the upper quartile earn ten times as much as those on the lower quartile. However as 50% of all people were in the £0 -100 range the figures may be artificially low as they are not likely to be spread equally throughout this range. There are likely to be more people earning over £50 than under £50.

The **Frequency Density Polygon** for the number of rooms in peoples houses shows a wide variation in the size of houses. Most people live in houses with between four and nine rooms, with onl y 20% of people living in larger houses. The overall shape of the graph follows the profile of a normal distribution curve, but not all points lie near the profile, due to the limited number of people surveyed.

The **Cumulative Frequency Graph** of house sizes reflects the approximately regular increase across the responses. It shows clearly that nobody lived in either very small houses of less than four rooms, or in very large houses of more than fourteen rooms. In between there was a regular increase.

The **Scatter Diagram** comparing people's equivalent earnings for five days with their occupation shows that Managerial and Professional people are paid more than any other groups. It also shows that men are paid more than women in all groups. The diagram also sho ws that decrease from managerial to sales occupations.

The **Scatter Diagram** comparing people's earnings with their house size does not show any particular correlation, although it does show the wide

diversity of house sizes. The data for men only does show more of a trend of larger house size with increasing earnings. The data for women is less meaningful as so many of them are in the lowest income group. The data points for the people living in houses with twelve or more rooms all came from 16-18 year olds in occupational group 9. My assessment of these is that they were all students living in 'houses in multiple occupation' or student accommodation.

The **Scatter Diagram** comparing people's equivalent five day earnings with their house size does not produce a significant trend either. For men there is generally an increase of house size with earnings, but this effect is far less obvious for women. This is due to the large number of women on low earnings.

The calculation of **Spearman's Correlation Coefficient** gives an answer of 0.07, which indicates almost no positive correlation. This result is mainly caused by the fact that there was no data for nine of the eighteen categories. There were only four values for men's earnings and five values for women's earnings. Of these only two categories had values for both men and women, while another two categories had no data at all. Because of the poor range of data it is not surprising that the results show no correlation.

The calculations for **Mean Deviation and Standard Deviation** of men's, women's and all peoples earnings show that the mean weekly earnings of the men we surveyed was £436-67p, compared to £108-33p for women. The mean deviation for men was £172-78 for men, compared to £75-31p for women. The standard deviation for men was £235-74p, but was £108-06p for women. These figures show that the women surveyed only earned about one quarter of the amount men earned. This is a far smaller amount than I expected and is probably due to the high proportion of students i n the sample. The values for the mean and standard deviations show that there is a wide range of earnings for both men and women. In particular the standard deviation for women's earnings is almost the same as the mean earnings.

The calculations for **Grouped Mean and Standard Deviations** of men's, women's and all peoples ages show that the mean ages were 37 for men, 21 for women, and 27 for everybody. The Mean Deviation for men was 11.5 and the Standard Deviation was 13.5. This shows that the age range for men was quite widely spread. The figures for women were 5.5, and 8.5 respectively, which shows that the ages were far closer together, and that most of the women I questioned were under thirty. The results for all

people were almost identical to those for men, which shows that the effect of a predominantly young group of women had little effect on the overall age ranges of the people I surveyed.

Conclusions

From my survey of eighteen women and twelve men, I have been able to compare gender, age, occupation, earnings, working week and house size in a variety of ways. From my results I have demonstrated that, from the people I surveyed, the people in Wigan on Wednesday 29th September were:

- Mainly women under 22 years old;
- Were mostly in Professional occupations if they were male ;
- Were mostly in Other occupations (often students) if female;
- Generally working for five days a week;
- More likely to be working full time if they were male;
- Most likely to be earning less than £100 per week if they were female;
- Most likely to be earning between £400-£500 per week if male;
- Most likely to be living in houses of 6 rooms;
- House sizes were independent of earnings

The results differ from my predictions in several ways. There was a higher proportion of young people than I expected. I think this was because of the number of students interviewed, and it may have been just after the end of their lectures for the day.

There were more people in full time employment than I expected. I think this was because most of the men we interviewed were in professional occupations, and many of the women also worked full time.

The range of people's house sizes was greater than I predicted, and was also not related to earnings. This could be because many young people live in large shared houses with other young people, and better off people also have larger houses, so that there was a wide variety of results.

The biggest difference to my predictions was the relatively low earnings of women compared to men. This was due to the high proportion of women students in the sample. The data for men showed a higher proportion of professional people and consequently higher earnings and more people in full time employment.

Generally my results were approximately in accordance with my predictions. The variations were mainly caused by the small sample size and the short time the survey was carried out over. If I was able to carry out a survey for a longer period, over several days, and at different locations, then my results would reflect more accurately t he type of people who use Wigan Town Centre, their occupations, earnings and house size.