

8.9: Linear Regression - Income and Assets (Worksheet)

Work in groups on these problems. You should try to answer the questions without referring to your notes. If you get stuck, try asking another group for help.

Student Learning Outcomes

- The student will be able to describe the relationship between two quantitative variables.
- The student will be able to compute the least-squares regression line and interpret the slope.
- The student will be able to calculate the coefficient of determination and comment on the fit of a linear model.

The Data

As an equity analyst who wants to determine how closely a firm's annual net income is related to the dollar value of the assets, you gather the data for the different companies listed on the Zimbabwe Stock Exchange (ZSE) and presented it as below:

African Financial Survey Data

Company	Assets (\$1000s)	Net Income (\$1000s)
A	60	20
B	60	25
C	75	25
D	80	20
E	100	30
F	145	35
G	175	40
H	190	45
I	190	55
J	200	50

The Model

You will fit a linear model to the data.

1. Create a scatter plot of the net income (y) against the assets (x) for each company.
2. Describe the relationship between net income and assets.
3. Compute the mean assets and the mean net income for the sample of companies.
4. Find the least-squares regression equation for the data and plot the line on the scatter plot you constructed.
5. Interpret the slope of the regression line you found in Question 4.
6. Calculate the residual sum of squares.
7. Calculate the coefficient of determination.
8. Comment on whether you think a linear model is appropriate for this data.

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