# AW9e Confidence interval estimate for slope β1

An alternative to using the F-test or t-test to test whether a significant relationship exists, is to find a confidence interval and see if the H0: β1 = 0 is included within the confidence interval. The confidence interval for the slope is given by re-arranging equation (1) to make β1 the subject of the equation as given by equation (2).

(1)

(2)

This equation implies two border values for β1 with the confidence interval lying between these two values.

**Example**

Re-consider textbook Example 8.1 and calculate a 95% confidence interval for the slope coefficient of the predictor variable. Figure 1 illustrates the Excel solution.

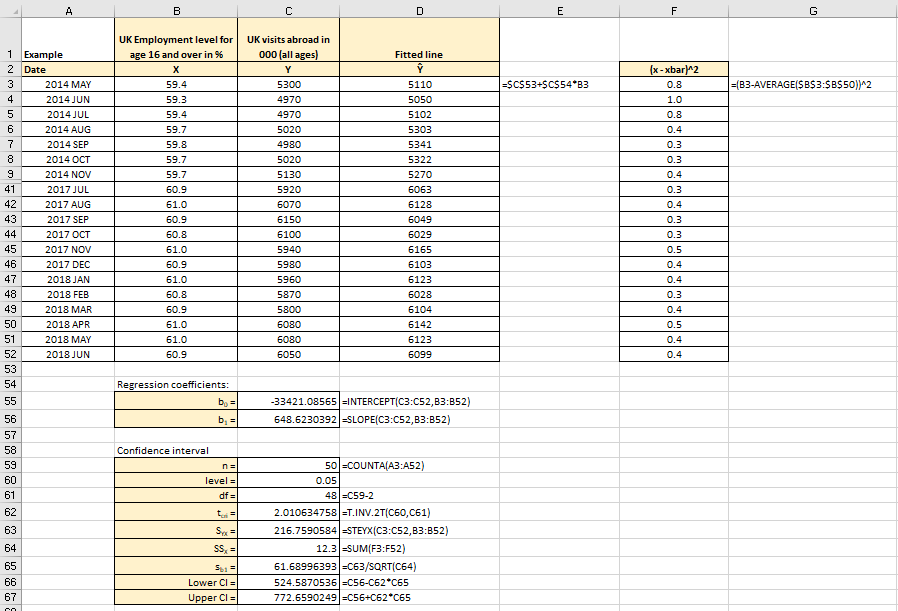


Figure 1

**Excel solution**

x: Cells B3:B50 Values

y: Cells C3:C50 Values

b0 = Cell C53 Formula:=INTERCEPT(C3:C52,B3:B52)

b1 = Cell C54 Formula:=SLOPE (C3:C52,B3:B52)

ŷ= CellsD3 Formula:=$C$53+$C$54\*B3

Copy formula down D4:D52

(x – xbar)^2= Cell F3 Formula:=(B3-AVERAGE($B$3:$B$52))^2

Copy formula down F4:F52

n = Cell C57 Formula:= COUNTA (A3:A52)

level = Cell C58 Value

df = Cell C59 Formula:=C57-2

tcri = Cell C60 Formula: =T.INV.2T(C58, C59)

SYX = Cell C61 Formula:=STEYX(C3:C52,B3:B52)

SSX = Cell C62 Formula:=SUM(F3:F52)

sb1 = Cell C63 Formula:=C61/SQRT(C62)

Lower CI = Cell C64 Formula:=C54-C60\*C63

Upper CI = Cell C65 Formula:=C54+C60\*C63

From Excel, the 95 % confidence interval is between 524.58 and 772.65. We can say that the confidence interval states that for a one percent increase in the employment level in the UK, the number of UK visits abroad is estimated to increase by 648.62, with 95% certainty that it will be at least 524.58 but no more than 772.65 per the percentage point.