

Adjusted R²

Example 1: Adjusted R² does not automatically increase when additional terms are added to the model.

Consider the moving company data where I added three terms to the model (Junk1, Junk2, Junk3) which are just random numbers between 0 and 100 (i.e. not related to LaborHrs).

LaborHrs	Rooms	CubicFt	Junk1	Junk2	Junk3
24.00	3.5	545	92.1155	89.5678	50.0149
13.50	2.0	400	17.5781	28.5586	36.7507
26.25	2.5	562	56.6897	53.3514	15.1645
...
15.00	2.5	275	87.7309	86.7393	38.6395

Regression Analysis: LaborHrs versus Rooms, CubicFt, Junk1, Junk2, Junk3

The regression equation is
LaborHrs = - 3.10 - 1.56 Rooms + 0.0557 CubicFt + 0.0362 Junk1 -
0.0037 Junk2 + 0.0271 Junk3

Predictor	Coef	SE Coef	T	P
Constant	-3.100	4.309	-0.72	0.477
Rooms	-1.564	2.144	-0.73	0.471
CubicFt	0.055740	0.008915	6.25	0.000
Junk1	0.03617	0.03818	0.95	0.351
Junk2	-0.00372	0.03918	-0.09	0.925
Junk3	0.02708	0.03052	0.89	0.382

S = 5.15627 R-Sq = 89.7% R-Sq(adj) = 88.0%

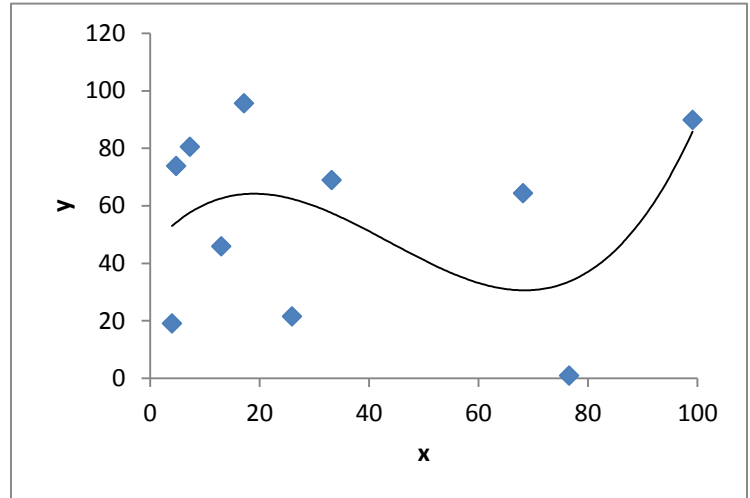
Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	6973.8	1394.8	52.46	0.000
Residual Error	30	797.6	26.6		
Total	35	7771.4			

Example 2: Adjusted R^2 and R^2 do not have a similar interpretations as our text implies. In fact, R_a^2 can be negative!

Consider the cubic model $y = \beta_0 + \beta_1x + \beta_2x^2 + \beta_3x^3 + \varepsilon$ fit to the data below.

y	x	x^2	x^3
19.1543	3.961363	15.6924	62.1633
95.67736	17.16144	294.5151	5054.304
80.61527	7.279178	52.98643	385.6977
45.98318	13.00814	169.2118	2201.131
68.98862	33.16445	1099.881	36476.94
64.41789	68.12935	4641.609	316229.8
73.97134	4.729545	22.3686	105.7933
1.037605	76.5382	5858.096	448368.1
21.61476	25.90846	671.248	17391
89.98236	99.12932	9826.621	974106.3



SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.479617
R Square	0.230033
Adjusted R Square	-0.15495
Standard Error	35.02313
Observations	10

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	3	2198.764	732.9213	0.597513	0.63961	
Residual	6	7359.718	1226.62			
Total	9	9558.482				

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	45.47404	30.96957	1.468346	0.192391	-30.3058	121.2538
x	2.173582	3.248797	0.669042	0.528357	-5.77594	10.1231
x^2	-0.07308	0.076517	-0.95514	0.376389	-0.26032	0.114146
x^3	0.000557	0.000498	1.119616	0.305685	-0.00066	0.001776