Example 1 : Fit a multiple linear regression (MLR) equation to Y as a function of the other 5 variables in the following data table (SALES.xlsx) -

Sales	Time	MktPoten	Adver	MktShare	Change
3669.88	43.1	74065.1	4582.9	2.51	0.34
3473.95	108.13	58117.3	5539.8	5.51	0.15
2295.1	13.82	21118.5	2950.4	10.91	-0.72
4675.56	186.18	68521.3	2243.1	8.27	0.17
6125.96	161.79	57805.1	7747.1	9.15	0.5
2134.94	8.94	37806.9	402.4	5.51	0.15
5031.66	365.04	50935.3	3140.6	8.54	0.55
3367.45	220.32	35602.1	2086.2	7.07	-0.49
6519.45	127.64	46176.8	8846.3	12.54	1.24
4876.37	105.69	42053.2	5673.1	8.85	0.31
2468.27	57.72	36829.7	2761.8	5.38	0.37
2533.31	23.58	33612.7	1991.9	5.43	-0.65
2408.11	13.82	21412.8	1971.5	8.48	0.64
2337.38	13.82	20416.9	1737.4	7.8	1.01
4586.95	86.99	36272	10694.2	10.34	0.11
2729.24	165.85	23093.3	8618.6	5.15	0.04
3289.4	116.26	26878.6	7747.9	6.64	0.68
2800.78	42.28	39572	4565.8	5.45	0.66
3264.2	52.84	51866.2	6022.7	6.31	-0.1
3453.62	165.04	58749.8	3721.1	6.35	-0.03
1741.45	10.57	23990.8	861	7.37	-1.63
2035.75	13.82	25694.9	3571.5	8.39	-0.43
1578	8.13	23736.4	2845.5	5.15	0.04
4167.44	58.54	34314.3	5060.1	12.88	0.22
2799.97	21.14	22809.5	3552	9.14	-0.74

Y = Sales		y = sales figures for a sales rep
X1	Time	x_1=time the sales rep has been with the company
X2	MktPoten	x_2=market potential = produce sales in the sales territory
X3	Adver	x_3= $ advertising expense in the sales territory
X4	MktShare	x_4=weighted average market share of company over last 4 years
X5	Change	x_5 =change in market share of company over last 4 years

Open the data file SALES.xlsx in SPSS, then click on

Analyze/Regression/Linear then select Sales as Dependent variable, and Time – Change as the Independent(s) (Figure 1a),

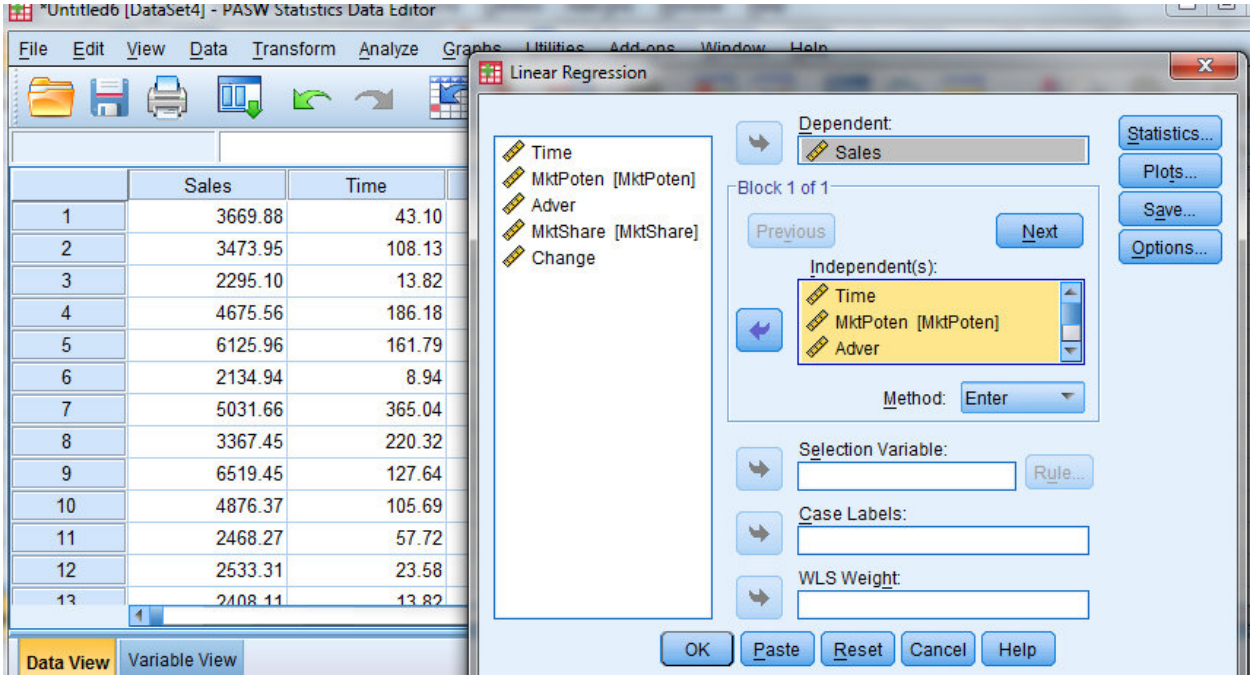

Figure 1a: Select the response and the predictors in SPSS

Click on Statistics, and check the Estimates, Model Fit, and Collinearity Diagnostics boxes (Fig. 1b).

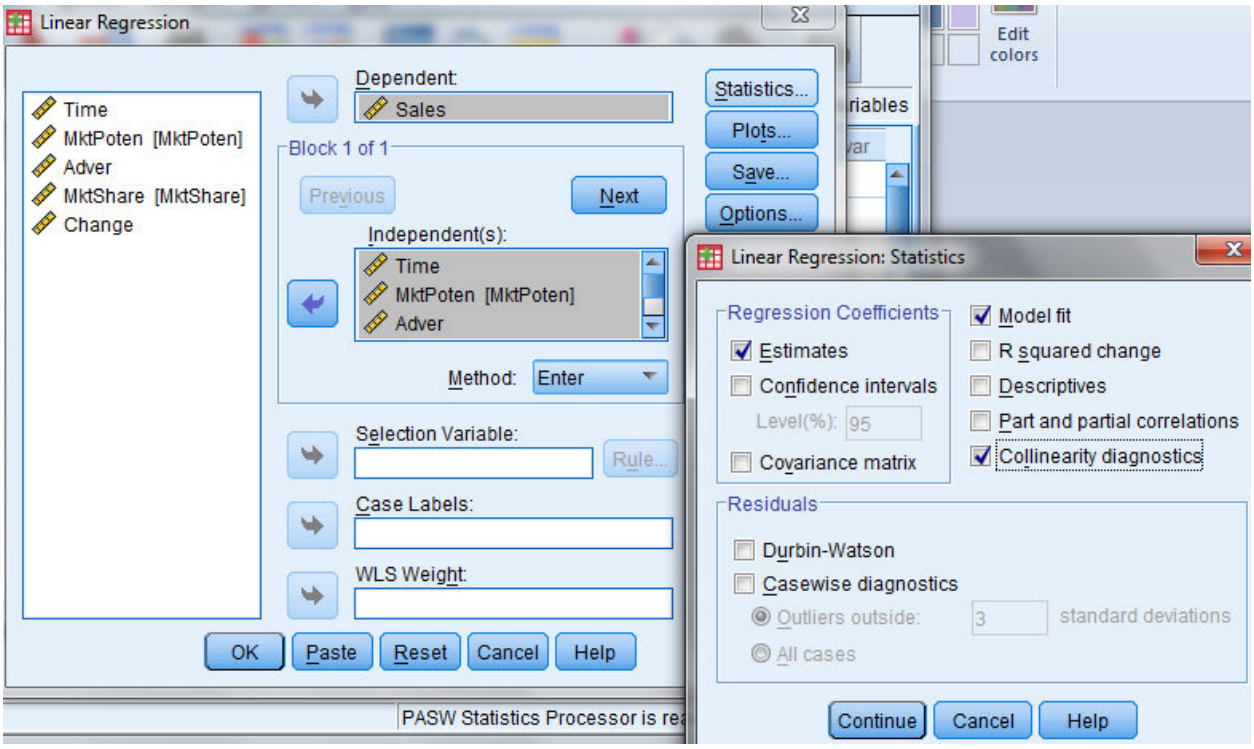

Figure 1b: Running Multiple Linear Regression in SPSS

The output from SPSS is shown below:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.957[a]	.915	.893	430.23115

a. Predictors: (Constant), Change, MktShare , Time, Adver, MktPoten

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.786E7	5	7572534.189	40.911	.000[a]
	Residual	3516877.982	19	185098.841		
	Total	4.138E7	24			

a. Predictors: (Constant), Change, MktShare , Time, Adver, MktPoten

b. Dependent Variable: Sales

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-1113.788	419.886		-2.653	.016		
	Time	3.612	1.182	.239	3.057	.006	.733	1.364
	MktPoten	.042	.007	.504	6.253	.000	.689	1.451
	Adver	.129	.037	.264	3.479	.003	.778	1.286
	MktShare	256.955	39.136	.481	6.566	.000	.832	1.202
	Change	324.533	157.283	.153	2.063	.053	.808	1.237

a. Dependent Variable: Sales

Note that

(1) R^2 = 91.5% is high,

(2) all VIF values are close to 1 hence multicollinearity is not present (VIF values > 10 indicate serious multicollinearity among predictors),

(3) all variables (except Change) are highly significant,

(4) Residual plots do not indicate any problems, and residuals appear to be normally distributed (Figure 1d),

hence the fitted model is reasonable.

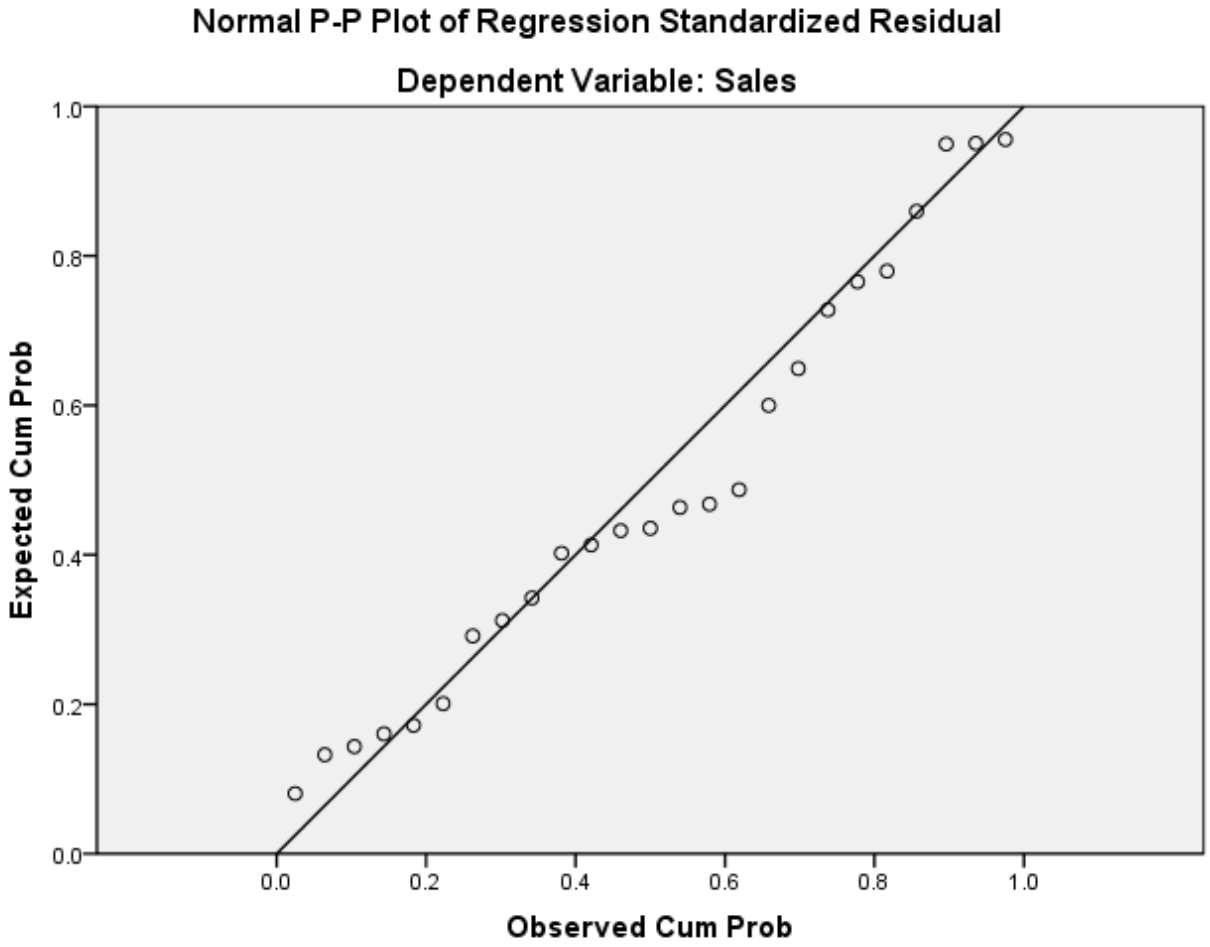

Figure 1c: Probability plot of standardized residuals