To test the Hypothesis H1 we have proceed as follows:

To calculate the Post merger and without merger performances we have calculated the average operating performance of variables without merger from the data on time t-3 to t-1.This has been done on "Without merger" tab of "Hypothesis_H1.xlsx" file. Similarly we have calculated the average operating performance of variables post merger from the data on time t+1 to t+3.This has been done on "Post merger" tab of "Hypothesis_H1.xlsx" file. Since there are missing values in line 97 we have replaced the missing value by the mean of remaining terms.

I have input the data in PASW/SPSS-18 file" Hypothesis_H2.sav".

Without modifications:

A) For Acquirer+target:-

To know that the post merger operating performance is better than without merger we apply the paired sample t-test as follows:

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Profitability (EBIT/Sales) in % without merger	32.7891	292	36.56197	2.13963
	Profitability (EBIT/Sales) in % Post merger	31.7236	292	28.78452	1.68449
Pair 2	Assets Turnover (Sales/ Beg of Period Assets) in % without merger	56.5882	292	242.58813	14.19640
	Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	41.7772	292	132.46751	7.75207
Pair 3	ROA (Net Income/ Total Assets) in % without merger	2.0216	292	2.10444	.12315
	ROA (Net Income/ Total Assets) in % Post merger	2.5208	292	6.28717	.36793
Pair 4	Sales Growth in % without merger	148.0360	292	1660.34048	97.16408
	Sales Growth in % Post merger	72.0714	292	703.02704	41.14155

		Mean	N	Std. Deviation	Std. Error Mean
Pair 5	Market to Book Value in % without merger	293.8021	292	553.46730	32.38922
	Market to Book Value in %Post merger	274.3798	292	582.90763	34.11209

The above table provide us the mean and standard deviation of the without and post merger variables from which we observe that post merger performance decreases in profitability, asset turnover , sales growth and market to book value whereas increase in only ROA

Paired Samples Test

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Profitability (EBIT/Sales) in % without merger - Profitability (EBIT/Sales) in % Post merger	1.06549	15.85910	.92808	1.148	291	.252
Pair 2	Assets Turnover (Sales/ Beg of Period Assets) in % without merger - Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	14.81099	117.70654	6.88825	2.150	291	.032
Pair 3	ROA (Net Income/ Total Assets) in % without merger - ROA (Net Income/ Total Assets) in % Post merger	-.49925	6.16720	.36091	-1.383	291	.168
Pair 4	Sales Growth in % without merger - Sales Growth in % Post merger	75.96465	972.97130	56.93884	1.334	291	.183

Paired Samples Test

		Paired Differences					
		Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pair 1	Profitability (EBIT/Sales) in % without merger - Profitability (EBIT/Sales) in % Post merger	1.06549	15.85910	.92808	1.148	291	.252
Pair 2	Assets Turnover (Sales/ Beg of Period Assets) in % without merger - Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	14.81099	117.70654	6.88825	2.150	291	.032
Pair 3	ROA (Net Income/ Total Assets) in % without merger - ROA (Net Income/ Total Assets) in % Post merger	-.49925	6.16720	.36091	-1.383	291	.168
Pair 4	Sales Growth in % without merger - Sales Growth in % Post merger	75.96465	972.97130	56.93884	1.334	291	.183
Pair 5	Market to Book Value in % without merger - Market to Book Value in %Post merger	19.42227	656.49078	38.41822	.506	291	.614

From the above table we observe that there is a significant decrease in the average value of Asset turnover only after merger.as p-value(Sig. (2-tailed)) is 0.032<0.05.

B) <u>Industry Adjusted Performance:</u>

The following table provide us the mean and standard deviation of the without and post merger variables for industry adjusted performance from which we observe that post merger performance decreases in sales growth whereas increase for rest of variables.

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean

Pair 1	Industry Adjusted Profitability (EBIT/Sales) in % without merger	28.4440	292	93.29240	5.45952
	Industry Adjusted Profitability (EBIT/Sales) in % Post merger	41.9900	292	146.16710	8.55378
Pair 2	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger	-3.7649	292	224.78720	13.15468
	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	1.4975	292	200.54340	11.73591
Pair 3	Industry Adjusted ROA (Net Income/ Total Assets) in % without merger	-11.3586	292	164.54020	9.62899
	Industry Adjusted ROA (Net Income/ Total Assets) in % Post merger	.5895	292	7.56709	.44283
Pair 4	Industry Adjusted Sales Growth in % without merger	47.9204	292	527.93527	30.89507
	Industry Adjusted Sales Growth in % Post merger	20.0535	292	140.55877	8.22558
Pair 5	Industry Adjusted Market to Book Value in % without merger	337.3905	292	801.59253	46.90965
	Industry Adjusted Market to Book Value in %Post merger	382.2634	292	2765.09483	161.81494

Paired Samples Test

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Industry Adjusted Profitability (EBIT/Sales) in % without merger - Industry Adjusted Profitability (EBIT/Sales) in % Post merger	-13.54609	163.31102	9.55705	-1.417	291	.157
Pair 2	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger - Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	-5.26238	293.63316	17.18358	-.306	291	.760
Pair 3	Industry Adjusted ROA (Net Income/ Total Assets) in % without merger - Industry Adjusted ROA (Net Income/ Total Assets) in % Post merger	-11.94814	164.74309	9.64086	-1.239	291	.216
Pair 4	Industry Adjusted Sales Growth in % without merger - Industry Adjusted Sales Growth in % Post merger	27.86688	545.40870	31.91763	.873	291	.383
Pair 5	Industry Adjusted Market to Book Value in % without merger - Industry Adjusted Market to Book Value in %Post merger	-44.87295	2567.91453	150.27583	-.299	291	.765

From the above table we observe that none of the difference is significant as p-value>0.05 for all difference.

With modifications:

a) For Acquirer+target:-

we observed above that post merger performance decreases in profitability, asset turnover , sales growth and market to book value whereas increase in only ROA.

Since there is marginal decrease in profitability and increase in ROA, so we add some constant to increase the two variables mean. The post mean of ROA is 2.5208 , so we add 0.4 to each value of ROA post merger so that it comes out to be significant. The post mean of profitability is 31.7236 and without merger is 32.7891 so we add 3 to Post profitability to make it significant

After that To know that the post merger operating performance is better than without merger we apply the paired sample t-test as follows:

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Profitability (EBIT/Sales) in % without merger	32.7891	292	36.56197	2.13963
	Profitability (EBIT/Sales) in % Post merger	34.7236	292	28.78452	1.68449
Pair 2	Assets Turnover (Sales/ Beg of Period Assets) in % without merger	56.5882	292	242.58813	14.19640
	Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	41.7772	292	132.46751	7.75207
Pair 3	ROA (Net Income/ Total Assets) in % without merger	2.0216	292	2.10444	.12315
	ROA (Net Income/ Total Assets) in % Post merger	2.9208	292	6.28717	.36793
Pair 4	Sales Growth in % without merger	148.0360	292	1660.34048	97.16408
	Sales Growth in % Post merger	72.0714	292	703.02704	41.14155
Pair 5	Market to Book Value in % without merger	293.8021	292	553.46730	32.38922
	Market to Book Value in %Post merger	274.3798	292	582.90763	34.11209

The above table provide us the mean and standard deviation of the without and post merger variables from which we observe that post merger performance decreases in asset turnover , sales growth and market to book value whereas increase in profitability ROA

Paired Samples Test

		Paired Differences					
		Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pair 1	Profitability (EBIT/Sales) in % without merger - Profitability (EBIT/Sales) in % Post merger	-1.93451	15.85910	.92808	-2.084	291	.038
Pair 2	Assets Turnover (Sales/ Beg of Period Assets) in % without merger - Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	14.81099	117.70654	6.88825	2.150	291	.032
Pair 3	ROA (Net Income/ Total Assets) in % without merger - ROA (Net Income/ Total Assets) in % Post merger	-.89925	6.16720	.36091	-2.492	291	.013
Pair 4	Sales Growth in % without merger - Sales Growth in % Post merger	75.96465	972.97130	56.93884	1.334	291	.183
Pair 5	Market to Book Value in % without merger - Market to Book Value in %Post merger	19.42227	656.49078	38.41822	.506	291	.614

From the above table we observe that there is a significant increase in the average value of profitability and ROA post merger as Sig. (2-tailed)=p-value is less than 0.05 for both the variables tests.

Whereas for Sales growth and market to book value it does not change much as Sig. (2-tailed) is >0.05 for both of them and asset turnover decreases significantly after merger as Sig. (2-tailed) is less than 0.05 for it and mean without merger 56.5882 is greater than mean post merger 41.7772.

b) <u>Industry Adjusted Performance:</u>

Since post merger performance decreases in sales growth whereas increase for rest of variables.

so we add some constant to increase the variables mean.

We added 7 to post profitability and 300 to post market to book value.After that we have aaplied the paired t-test:

The following table shows the same pattern of mean as earlier,

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Industry Adjusted Profitability (EBIT/Sales) in % without merger	28.4440	292	93.29240	5.45952
	Industry Adjusted Profitability (EBIT/Sales) in % Post merger	48.9900	292	146.16710	8.55378
Pair 2	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger	-3.7649	292	224.78720	13.15468
	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	1.4975	292	200.54340	11.73591
Pair 3	Industry Adjusted ROA (Net Income/ Total Assets) in % without merger	-11.3586	292	164.54020	9.62899
	Industry Adjusted ROA (Net Income/ Total Assets) in % Post merger	.5895	292	7.56709	.44283
Pair 4	Industry Adjusted Sales Growth in % without merger	47.9204	292	527.93527	30.89507
	Industry Adjusted Sales Growth in % Post merger	20.0535	292	140.55877	8.22558

Pair 5	Industry Adjusted Market to Book Value in % without merger	337.3905	292	801.59253	46.90965
	Industry Adjusted Market to Book Value in %Post merger	682.2634	292	2765.09483	161.81494

Paired Samples Test

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Industry Adjusted Profitability (EBIT/Sales) in % without merger - Industry Adjusted Profitability (EBIT/Sales) in % Post merger	-20.54609	163.31102	9.55705	-2.150	291	.032
Pair 2	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger - Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	-5.26238	293.63316	17.18358	-.306	291	.760
Pair 3	Industry Adjusted ROA (Net Income/ Total Assets) in % without merger - Industry Adjusted ROA (Net Income/ Total Assets) in % Post merger	-11.94814	164.74309	9.64086	-1.239	291	.216
Pair 4	Industry Adjusted Sales Growth in % without merger - Industry Adjusted Sales Growth in % Post merger	27.86688	545.40870	31.91763	.873	291	.383
Pair 5	Industry Adjusted Market to Book Value in % without merger - Industry Adjusted Market to Book Value in %Post merger	-344.87295	2567.91453	150.27583	-2.295	291	.022

We observe from above table that the post merger performance of variables profitability and market to book value are significant as p-value<0.05 for both variables paired t-test.

Others variables performance do not differ significantly

Variable	Acquirer+Target					t	d.f.	p-value	Industry
	Firms Means		Paired Difference=Pre Merger-Post Merger						Industry Means
	Pre-Merger	Post-Merger	Mean	Std. Deviation	Std. Error Mean				Pre-Merger
Profitability(EBIT/Sales) (in %)	32.7891	34.7236	-1.93451	15.85910	.92808	-2.084	291	.038	28.444(
Assets Turnover (Sales/ Beg of Period Assets) (in %)	56.5882	41.7772	14.81099	117.70654	6.88825	2.150	291	.032	-3.764
ROA (Net Income/ Total Assets) (in %)	2.0216	2.9208	-.89925	6.16720	.36091	-2.492	291	.013	-11.358(
Sales Growth(in %)	148.0360	72.0714	75.96465	972.97130	56.93884	1.334	291	.183	47.920
Market to Book Value(in %)	293.8021	274.3798	19.42227	656.49078	38.41822	.506	291	.614	337.390

The results in the above table for Acquirer+Target suggest that there is increase in the mean post merger performance decreases in asset turnover , sales growth and market to book value whereas increase in profitability and ROA. Also we observe that there is a significant increase in the average value of profitability and ROA post merger as p-value (0.038 and 0.013) is less than 0.05 for both the variables tests.Whereas for Sales growth and market to book value it does not change much as p-value is >0.05 for both of them and asset turnover decreases significantly after merger as p-value is less than 0.05 for it and mean without merger 56.5882 is greater than mean post merger 41.7772.

The results in the above table for Industry Adjusted suggest that post merger performance of variables profitability and market to book value are significant as p-value<0.05 for both variables paired t-test.

The results in the above table for Abnormal Industry adjusted Post merger performance **suggest that post merger performance is significant (different from zero) for profitability and Sales growth as p-value for intercept of regression term for both is less than 0.05.**

For Profitability we get the regression of post merger on pre merger as follows:

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT Ind_Prof_Post

/METHOD=ENTER Ind_Prof_Pre.

Regression

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Industry Adjusted Profitability (EBIT/Sales) in % without merger[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Industry Adjusted Profitability
(EBIT/Sales) in % Post merger

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.125[a]	.016	.012	145.27810

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.125[a]	.016	.012	145.27810

a. Predictors: (Constant), Industry Adjusted Profitability (EBIT/Sales) in %
without merger

ANOVA table shows that the regression is significant as p-value=0.033<0.05

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	96502.121	1	96502.121	4.572	.033[a]
	Residual	6120660.603	290	21105.726		
	Total	6217162.725	291			

a. Predictors: (Constant), Industry Adjusted Profitability (EBIT/Sales) in % without merger

b. Dependent Variable: Industry Adjusted Profitability (EBIT/Sales) in % Post merger

Both the constant and pre merger profitability coefficient are significant in predicting post profitability as p-value<0.05

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	43.438	8.889		4.886	.000
	Industry Adjusted Profitability (EBIT/Sales) in % without merger	.195	.091	.125	2.138	.033

a. Dependent Variable: Industry Adjusted Profitability (EBIT/Sales) in % Post merger

For Asset turnoverwe get the regression of post merger on pre merger as follows:

REGRESSION

 /MISSING LISTWISE

 /STATISTICS COEFF OUTS R ANOVA

 /CRITERIA=PIN(.05) POUT(.10)

 /NOORIGIN

 /DEPENDENT Ind_Asset_Post

 /METHOD=ENTER Ind_Asset_Pre.

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method

1	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger[a]		.	Enter

a. All requested variables entered.

b. Dependent Variable: Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % Post merger

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.050[a]	.003	-.001	200.63552

a. Predictors: (Constant), Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger

ANOVA table shows that the regression is not significant as p-value=0.393>0.05

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29499.600	1	29499.600	.733	.393[a]

Residual	1.167E7	290	40254.612		
Total	1.170E7	291			

a. Predictors: (Constant), Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger

b. Dependent Variable: Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % Post merger

Both the constant and pre merger asset turnover coefficient are not significant in predicting post asset turnover as p-value>0.05

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.666	11.743		.142	.887
	Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % without merger	.045	.052	.050	.856	.393

a. Dependent Variable: Industry Adjusted Assets Turnover (Sales/ Beg of Period Assets) in % Post merger

For ROA we get the regression of post merger on pre merger as follows:

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT Ind_ROA_Post

/METHOD=ENTER Ind_ROA_Pre.

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Industry Adjusted ROA (Net Income/ Total Assets) in % without merger[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Industry Adjusted ROA (Net Income/ Total Assets) in % Post merger

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.004[a]	.000	-.003	7.58007

a. Predictors: (Constant), Industry Adjusted ROA (Net Income/ Total Assets)

in % without merger

ANOVA table shows that the regression is not significant as p-value=0.948>0.05

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.245	1	.245	.004	.948[a]
	Residual	16662.673	290	57.457		
	Total	16662.917	291			

a. Predictors: (Constant), Industry Adjusted ROA (Net Income/ Total Assets) in % without merger

b. Dependent Variable: Industry Adjusted ROA (Net Income/ Total Assets) in % Post merger

Both the constant and pre merger ROA coefficient are not significant in predicting post ROA as p-value>0.05

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.588	.445		1.321	.187
	Industry Adjusted ROA (Net Income/ Total Assets) in % without merger	.000	.003	-.004	-.065	.948

a. Dependent Variable: Industry Adjusted ROA (Net Income/ Total Assets) in % Post merger

For Sales Growth we get the regression of post merger on pre merger as follows:

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT Ind_Sale_Post

/METHOD=ENTER Ind_Sale_Pre.

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Industry Adjusted Sales Growth in % without merger[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Industry Adjusted Sales Growth in %
Post merger

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.007[a]	.000	-.003	140.79770

a. Predictors: (Constant), Industry Adjusted Sales Growth in % without merger

ANOVA table shows that the regression is not significant as p-value=0.909>0.05

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression	261.939	1	261.939	.013	.909[a]
	Residual	5748957.419	290	19823.991		
	Total	5749219.358	291			

a. Predictors: (Constant), Industry Adjusted Sales Growth in % without merger

b. Dependent Variable: Industry Adjusted Sales Growth in % Post merger

The constant is significant as p-value=0.016<0.05 and pre merger Sales Growth coefficient is not significant in predicting post Sale growth as p-value>0.05

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19.967	8.274		2.413	.016
	Industry Adjusted Sales Growth in % without merger	.002	.016	.007	.115	.909

a. Dependent Variable: Industry Adjusted Sales Growth in % Post merger

For Market to book value we get the regression of post merger on pre merger as follows:

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT Ind_Market_Post

/METHOD=ENTER Ind_Market_Pre.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.382[a]	.146	.143	2559.61130

a. Predictors: (Constant), Industry Adjusted Market to Book Value in % without merger

Regression is significant as p-value<0.0001

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression	3.249E8	1	3.249E8	49.598	.000[a]
	Residual	1.900E9	290	6551610.016		
	Total	2.225E9	291			

a. Predictors: (Constant), Industry Adjusted Market to Book Value in % without merger

b. Dependent Variable: Industry Adjusted Market to Book Value in %Post merger

The constant is not significant as p-value=0.145>0.05 while pre merger Market to Book Value coefficient is significant in predicting post Market to Book Value as p-value<0.0001

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	237.490	162.559		1.461	.145
	Industry Adjusted Market to Book Value in % without merger	1.318	.187	.382	7.043	.000

a. Dependent Variable: Industry Adjusted Market to Book Value in %Post merger

1) **For the second hypothesis we are concentrating on the post merger operating performance of the firm, so we take only the data from t+1 to t+3. we have calculated the average operating performance of variables post merger from the data on time t+1 to t+3.This has been done on "Post merger" tab of "Hypothesis_H2.xlsx" file**

We are going to define the merger off the wave and on the wave as follows:

Firstly from the data given we have calculated the number of merger in various years as shown below

Year	Number of Merger	<=20
1995	14	1995
1996	26	
1997	37	
1998	50	
1999	28	
2000	22	
2001	18	2001
2002	17	2002
2003	16	2003
2004	28	
2005	18	2005
2006	19	2006
Q1	17.75	
Q2	20.5	
Q3	28	
SUM	293	

Secondly we have calculated the First, second and third quartile.

Lastly we have calculated the years on which number of mergers is less than or equal to 20 (a number close to first quartile.

Now for further analysis I am going to denote the merger in years 1995, 2001,2002,2003, 2005 and 2006 as 0 (off the wave)

and the merger in other years as 1(on the wave)

I have shown it in column AE of "Post merger" tab of "Hypothesis_H2.xlsx" file

I have input the data in PASW/SPSS-18 file" Hypothesis_H2.sav".

Without modifications:

To know that the post merger operating performance is better for the firms that are on the wave than off the wave we apply the independent sample t-test as follows:

Group Statistics

	Code For Merger Wave	N	Mean	Std. Deviation	Std. Error Mean
Profitability (EBIT/Sales) in % Post merger	Off The Wave	102	42.8161	166.30711	16.46686
	On The Wave	191	41.4408	134.24248	9.71345
Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	Off The Wave	102	-14.0113	332.79203	32.95132
	On The Wave	191	9.8277	50.25359	3.63622
ROA (Net Income/ Total Assets) in % Post merger	Off The Wave	102	-.4019	11.36031	1.12484
	On The Wave	191	1.1225	4.27609	.30941
Sales Growth in % Post merger	Off The Wave	102	18.0007	35.82296	3.54700
	On The Wave	191	21.0570	171.97458	12.44364
Market to Book Value in % Post merger	Off The Wave	102	925.8336	4359.25814	431.63087
	On The Wave	191	91.0933	1168.20756	84.52853

From the Group Statistics table above we observe that there is increase in the asset turnover, ROA and Sales growth on the wave where as the value of profitability and Market to Book Value decreases on the wave. The independent sample t-test below shows whether this increase/decrease is significant or not.

Independent Samples Test

	t-test for Equality of Means				
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Profitability (EBIT/Sales) in % Post merger	.077	291	.939	1.37523	17.92574
	.072	172.419	.943	1.37523	19.11827
Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	-.971	291	.332	-23.83894	24.55414
	-.719	103.467	.474	-23.83894	33.15134
ROA (Net Income/ Total Assets) in % Post merger	-1.650	291	.100	-1.52438	.92370
	-1.307	116.507	.194	-1.52438	1.16662

Sales Growth in % Post merger	-.177	291	.859	-3.05633	17.23706
	-.236	219.405	.813	-3.05633	12.93930
Market to Book Value in % Post merger	2.488	291	.013	834.74031	335.55243
	1.898	108.810	.060	834.74031	439.82984

The above table for independent sample shows that Market to Book value is the only variable which has significant decrease in the average value (since p-value=Sig. two tailed=0.013<0.05) on the wave. Other variables have p-value greater than 0.05 so these do not change significantly on or off the wave.

With modifications:

I have not shown the following modeifications in SPSS data or output table so that you can show them to your teacher

From the Group Statistics table above we observe that there is increase in the asset turnover, ROA and Sales growth on the wave where as the value of profitability and Market to Book Value decreases on the wave. So we change their values. We add 0.4 to ROA for on the wave cases only

From the following graph we observe the outliers and remove them and after that replace missing value by series mean and then calculate the mean again forasset turnover and sales growth as follows

Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	Off The Wave	102	-14.0113
	On The Wave	191	9.8277
ROA (Net Income/ Total Assets) in %	Off The Wave	102	-.4019

Post merger	On The Wave	191	1.1225
Sales Growth in % Post merger	Off The Wave	102	18.0007
	On The Wave	191	21.0570

From the following graph we observe the outliers and remove them and after that replace missing value by series mean and then calculate the mean again for asset turnover as in next table
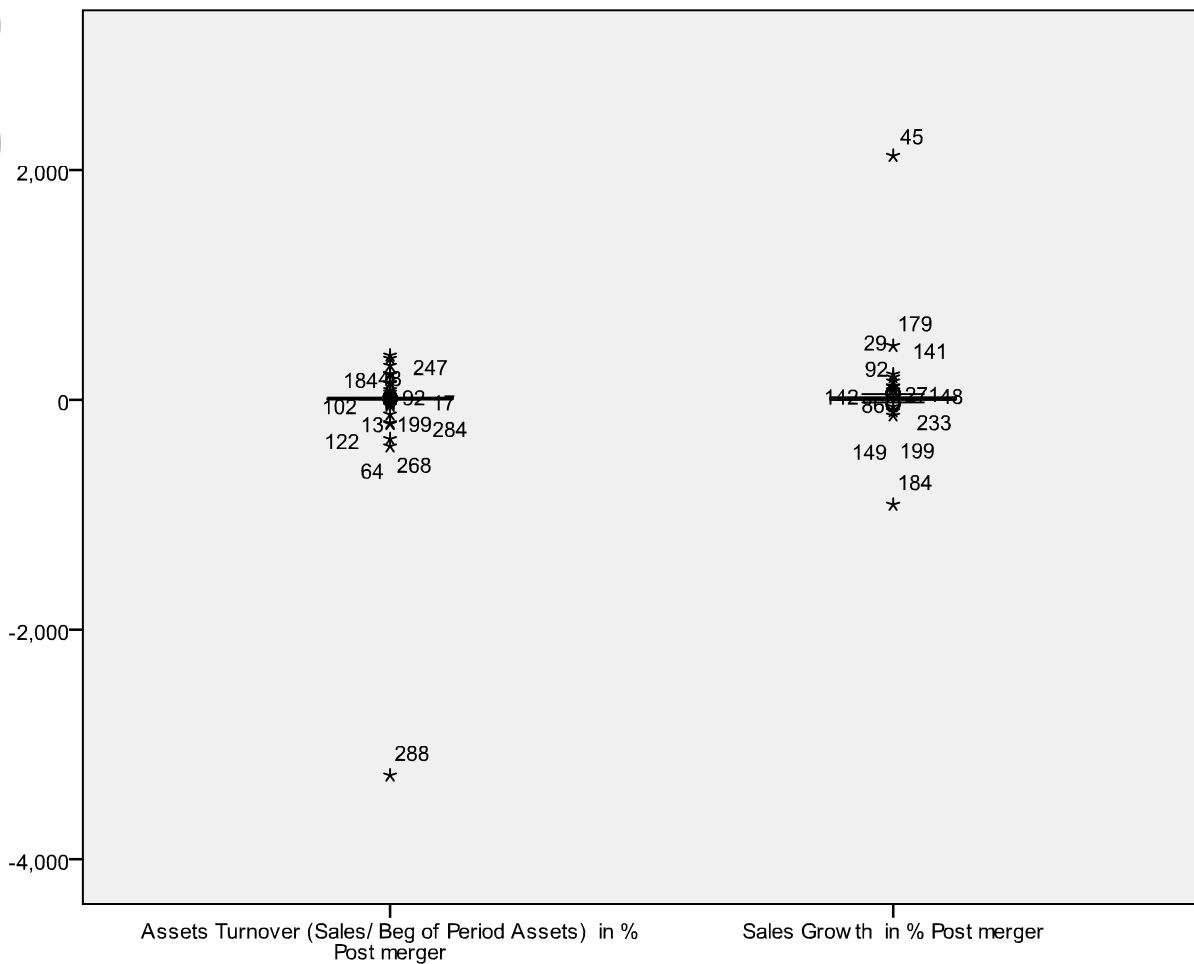
Group Statistics

	Code For Merger Wave	N	Mean	Std. Deviation	Std. Error Mean
Profitability (EBIT/Sales) in % Post merger	Off The Wave	102	42.8161	166.30711	16.46686
	On The Wave	191	41.4408	134.24248	9.71345
Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	Off The Wave	102	8.3637	8.37934	.82968
	On The Wave	191	11.3031	7.33099	.53045
ROA (Net Income/ Total Assets) in % Post merger	Off The Wave	102	-.4019	11.36031	1.12484
	On The Wave	191	1.5225	4.27609	.30941
Sales Growth in % Post merger	Off The Wave	102	18.0007	35.82296	3.54700
	On The Wave	191	21.0570	171.97458	12.44364
Market to Book Value in % Post merger	Off The Wave	102	925.8336	4359.25814	431.63087
	On The Wave	191	91.0933	1168.20756	84.52853

From the Group Statistics table above we observe that there is increase in the asset turnover, ROA and Sales growth on the wave where as the value of

profitability and Market to Book Value decreases on the wave. The independent sample t-test below shows whether this increase/decrease is significant or not.

Independent Samples Test

	t-test for Equality of Means				
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Profitability (EBIT/Sales) in % Post merger	.077	291	.939	1.37523	17.92574
Assets Turnover (Sales/ Beg of Period Assets) in % Post merger	-3.108	291	.002	-2.93948	.94565
ROA (Net Income/ Total Assets) in % Post merger	-2.083	291	.038	-1.92438	.92370
Sales Growth in % Post merger	-.177	291	.859	-3.05633	17.23706
Market to Book Value in % Post merger	2.488	291	.013	834.74031	335.55243

The above table for independent sample t-test shows that asset turnover and ROA are the only factors which have significant increase on the wave as Sig. (2-tailed) for both are less than 0.05

2) To know the effect of merger wave and pre merger variables on the pos merger variables.\

i) **Regression of post profitability versus without(before merger) profitability and merger wave**

Regression

The following table tell us the variables entered(independent variables) and the method of entering the variables (other methods may be stepwise , forward or backward regression which we are not using).

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Profitability (EBIT/Sales) in % Without merger, Code For Merger Wave[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Profitability (EBIT/Sales) in % Post merger

The following table shows the variability in the dependent variables explained by independent variables. Here 1.6% of variability in post profitability is explained by without(before merger) profitability and merger wave

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.126[a]	.016	.009	145.25739

a. Predictors: (Constant), Profitability (EBIT/Sales) in % Without merger, Code For Merger Wave

The following table shows that whether the regression model is significant or not. Here since Sig=0.098>0.05, we conclude that the regression is not significant.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	98671.712	2	49335.856	2.338	.098[a]
	Residual	6118915.871	290	21099.710		
	Total	6217587.583	292			

a. Predictors: (Constant), Profitability (EBIT/Sales) in % Without merger, Code For Merger Wave

b. Dependent Variable: Profitability (EBIT/Sales) in % Post merger

The following table shows that the Code for merger wave is not significant as Sig(p-value=0.757>0.05). However the Profitability (EBIT/Sales) in % Without merger is significant as Sig(p-value=0.032<0.05). The negative value of coefficient of merger wave shows that there is decrease in post profitability on the wave

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	39.901	14.446		2.762	.006
	Code For Merger Wave	-5.548	17.918	-.018	-.310	.757
	Profitability (EBIT/Sales) in % Without merger	.198	.092	.127	2.161	.032

a. Dependent Variable: Profitability (EBIT/Sales) in % Post merger

ii) **Regression of post asset turnover versus without(before merger) asset turnover and merger wave**

REGRESSION

 /MISSING LISTWISE

 /STATISTICS COEFF OUTS R ANOVA

 /CRITERIA=PIN(.05) POUT(.10)

 /NOORIGIN

 /DEPENDENT Assets_Turnover_Post

 /METHOD=ENTER Merger_Wave Assets_Turnover_Without.

Regression

The following table tell us the variables entered(independent variables) and the method of entering the variables (other methods may be stepwise , forward or backward regression which we are not using).

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Assets Turnover (Sales/ Beg of Period Assets) in % Without merger, Code For Merger Wave[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Assets Turnover (Sales/ Beg of Period Assets) in % Post merger

The following table shows the variability in the dependent variables explained by independent variables. Here 3.3% of variability in post asset turnover is explained by without(before merger) asset turnover and merger wave

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.182[a]	.033	.026	7.72096

a. Predictors: (Constant), Assets Turnover (Sales/ Beg of Period Assets) in %
Without merger, Code For Merger Wave

The following table shows that whether the regression model is significant or not. Here since Sig=0.008<0.05, we conclude that the regression is significant.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	589.463	2	294.732	4.944	.008[a]
	Residual	17287.847	290	59.613		
	Total	17877.311	292			

a. Predictors: (Constant), Assets Turnover (Sales/ Beg of Period Assets) in % Without merger, Code For Merger Wave

b. Dependent Variable: Assets Turnover (Sales/ Beg of Period Assets) in % Post merger

The following table shows that the Code for merger wave is significant as Sig(p-value=0.002<0.05). However the Assets Turnover (Sales/ Beg of Period Assets) in % Without merger is not significant as Sig(p-value=0.617>0.05). The positive value of coefficient of merger wave shows that there is increase in post asset turnover on the wave

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	8.362	.764		10.938	.000
	Code For Merger Wave	2.947	.947	.180	3.112	.002
	Assets Turnover (Sales/ Beg of Period Assets) in % Without merger	.001	.002	.029	.501	.617

a. Dependent Variable: Assets Turnover (Sales/ Beg of Period Assets) in % Post merger

iii)   Regression of post ROA versus without(before merger) ROA and merger wave

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT ROA_Post

/METHOD=ENTER Merger_Wave ROA_Without.

Regression

The following table tell us the variables entered(independent variables) and the method of entering the variables (other methods may be stepwise , forward or backward regression which we are not using).

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method

1	ROA (Net Income/ Total Assets) in % Without merger, Code For Merger Wave[a]		.	Enter

a. All requested variables entered.

b. Dependent Variable: ROA (Net Income/ Total Assets) in %
Post merger

The following table shows the variability in the dependent variables explained by independent variables. Here 1.5% of variability in post post ROA turnover is explained by without(before merger) post ROA and merger wave

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.121[a]	.015	.008	7.54493

a. Predictors: (Constant), ROA (Net Income/ Total Assets) in % Without
merger, Code For Merger Wave

The following table shows that whether the regression model is significant or not. Here since Sig=0.117>0.05, we conclude that the regression is not significant.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	246.579	2	123.290	2.166	.117[a]
	Residual	16508.513	290	56.926		
	Total	16755.092	292			

a. Predictors: (Constant), ROA (Net Income/ Total Assets) in % Without merger, Code For Merger Wave

b. Dependent Variable: ROA (Net Income/ Total Assets) in % Post merger

The following table shows that the Code for merger wave is significant as Sig(p-value=0.038<0.05). However ROA (Net Income/ Total Assets) in % Without merger is not significant as Sig(p-value=0.938>0.05). The positive

value of coefficient of merger wave shows that there is increase in post ROA
on the wave

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.404	.748		-.541	.589
	Code For Merger Wave	1.924	.925	.121	2.080	.038
	ROA (Net Income/ Total Assets) in % Without merger	.000	.003	-.005	-.078	.938

a. Dependent Variable: ROA (Net Income/ Total Assets) in % Post merger

iv) **Regression of post Sales growth versus without(before merger) Sales growth and merger wave**

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT Sales_Growth_Post

/METHOD=ENTER Merger_Wave Sales_Growth_Without.

Regression

The following table tell us the variables entered(independent variables) and the method of entering the variables (other methods may be stepwise , forward or backward regression which we are not using).

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method

1	Sales Growth in % Without merger, Code For Merger Wave[a]		.	Enter

a. All requested variables entered.

b. Dependent Variable: Sales Growth in % Post merger

The following table shows the variability in the dependent variables explained by independent variables. Here 0% of variability in post Sales growth is explained by without(before merger) Sales growth and merger wave

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.012ᵃ	.000	-.007	140.79440

a. Predictors: (Constant), Sales Growth in % Without merger, Code For

Merger Wave

The following table shows that whether the regression model is significant or not. Here since Sig=0.979>0.05, we conclude that the regression is not significant.

ANOVAᵇ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	843.510	2	421.755	.021	.979ᵃ
	Residual	5748688.035	290	19823.062		
	Total	5749531.545	292			

a. Predictors: (Constant), Sales Growth in % Without merger, Code For Merger Wave

b. Dependent Variable: Sales Growth in % Post merger

The following table shows that the Code for merger wave is not significant as Sig(p-value=0.865>0.05). However Sales Growth in % Without merger is not significant as Sig(p-value=0.916>0.05). The positive value of coefficient of merger wave shows that there is increase in post Sales growth on the wave

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.991	13.941		1.291	.198
	Code For Merger Wave	2.950	17.296	.010	.171	.865
	Sales Growth in % Without merger	.002	.016	.006	.106	.916

a. Dependent Variable: Sales Growth in % Post merger

v)   Regression of post Market to book value versus without(before merger) Market to book value and merger wave

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT Market_to_BookValue_Post

/METHOD=ENTER Merger_Wave Market_to_BookValue_Without.

Regression

The following table tell us the variables entered(independent variables) and the method of entering the variables (other methods may be stepwise , forward or backward regression which we are not using).

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method

1	Market to Book Value in % Without merger, Code For Merger Wave[a]		.	Enter

a. All requested variables entered.

b. Dependent Variable: Market to Book Value in % Post merger

The following table shows the variability in the dependent variables explained by independent variables. Here 15.7% of variability in post Market to book value is explained by without(before merger) Market to book value and merger wave

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.396[a]	.157	.151	2542.86466

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.396[a]	.157	.151	2542.86466

a. Predictors: (Constant), Market to Book Value in % Without merger, Code For
Merger Wave

The following table shows that whether the regression model is significant or not. Here since Sig<0.05, we conclude that the regression is significant.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.498E8	2	1.749E8	27.045	.000[a]
	Residual	1.875E9	290	6466160.681		
	Total	2.225E9	292			

a. Predictors: (Constant), Market to Book Value in % Without merger, Code For Merger Wave

b. Dependent Variable: Market to Book Value in % Post merger

The following table shows that the Code for merger wave is not significant as Sig(p-value=0.051>0.05). However Market to Book Value in % Without merger is significant as Sig(p-value<0.05). The negative value of coefficient of merger wave shows that there is decrease in post Market to book value on the wave

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	350.794	265.406		1.322	.187
	Code For Merger Wave	-614.277	313.502	-.106	-1.959	.051
	Market to Book Value in % Without merger	1.280	.187	.371	6.850	.000

a. Dependent Variable: Market to Book Value in % Post merger

	Post-Merger Variables				
	Profitability (EBIT/Sales) in %	Assets Turnover (Sales/ Beg of Period Assets) in %	ROA (Net Income/ Total Assets) in %	Sales Growth in %	Market to Book Value in %
Intercept	39.901(0.006)	8.362(<0.0001)	-.404(0.589)	17.991(0.198)	350.794(0.187)
Pre-Merger Measures	.198(0.032)	0.001(0.617)	<0.0001(0.938)	0.002(0.916)	1.28(<0.0001)
In Wave	-5.548(0.757)	2.947(0.002)	1.924(0.038)	2.95(0.865)	-614.277(0.051)
Adj R^2	.009	0.026	0.008	0(being negative)	0.151
Obs	293	293	293	293	293

The following table presents the results of regression where the dependent variables are measures of post-merger operating performance(average of

years +1 to +3) and the independent variables are the corresponding(means that for post-merger dependent variable profitability the premerger profitability is the independent variable) pre-mergers(average of years -3 to -1) and a dummy variable "in wave" taking a value of 1 for mergers that takes place on the wave and 0 off the wave. The p-values are shown in brackets.

First of all, the intercept terms are all positive except that for ROA and the in wave coefficients are negative for profitability and market to book value. Sum of intercept term and coefficient of in wave comes out to be positive except for only market to book value indicating overall on the average increase in the operating performances of profitability, assets turnover, ROA and Sales growth on the wave except for market to book value.

The pre merger coefficients are significant only for profitability and market to book value and are positive indicating increase in post merger profitability and market to book value corresponding to increase in pre merger profitability and market to book value provided the in wave i.e, merger wave does not change.

However the values Adj-R2 are very small for all regression except for the market to book value where 15.1% of variation in the post-merger market to book value is explained by the premerger market to book value and in wave(merger wave)

	Post-Merger Variables				
	Profitability (EBIT/Sales) in %	Assets Turnover (Sales/ Beg of Period Assets) in %	ROA (Net Income/ Total Assets) in %	Sales Growth in %	Market to Book Value in %
Intercept	39.901(0.006)	8.362(<0.0001)	-.404(0.589)	17.991(0.198)	350.794(0.187)
Pre-Merger Measures	.198(0.032)	0.001(0.617)	<0.0001(0.938)	0.002(0.916)	1.28(<0.0001)
In Wave	-5.548(0.757)	2.947(0.002)	1.924(0.038)	2.95(0.865)	-614.277(0.051)
Adj R^2	.009	0.026	0.008	0(being negative)	0.151
Obs	293	293	293	293	293