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2017

CY Full Forecasting

STANDARD OPERATING PROCEDURE FOR ALL TRADES

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A. Resource Requirements

1. Prior to beginning forecasting processes, refer to the “Regression Forecasts Overview” document for key definitions and important rules for verifying statistical significance.

2. You’ll need access to actuals numbers for the most recent month and updated volume forecast numbers for future months.

    1) These can be found by navigating to [redacted] Operations SharePoint site and following this sequence of hyperlinks:

        (1) Enter the Cost Control & Planning site > enter the Business Analysis & Planning page > enter the folder named “NAM cost analysis for GAINS-Trade PL” > Select the folder of the proper year > Select the folder of the proper month > Select the folder named “Gains Cost Reports”

            a. Files needed:

                a) Monthly_Cost_Summary

                (a) This report will contain the regular cost numbers that you need for each trade area, as well as the needed volume actuals.

                (b) Report also contains the updated volume forecast numbers for future months.

                b) CY Commission Cost Report

                (a) This report contains cost numbers associated to particular cost codes within the CY Full category.

                a. These numbers are needed to generate regression coefficients.

3. You will need the file named “Forecast Template.xlsm” to compute forecasts.

    1) You will only use worksheets “WC CY Full Forecasts” and “EC CY Full Forecasts”.

4. You will need a standard T-table and a standard F-table to check the reliability of forecasting equations.

    1) Each of these can be found in the “T-table & F-table” document provided.

B. CY Full Variables and Equation Set-Up

1. TPWC Dominant:

    1) First regression equation predicts CYLV cost (lift cost).

(1) Explanatory variable is Laden Lift Volume, expressed in TEU's.

2) Second regression equation predicts CY Full cost (regular cost only).

(1) Explanatory variable is CYLV (lift) cost.

3) Summary of computation steps for TPWC dominant CY Full forecasts:

(1) CYLV_Cost_Forecast = Intercept + (Volume_Forecast*X1)

(2) CY_Full_Cost_Forecast = Intercept + (CYLV_Cost_ Forecast*Z1)

2. TPWC non-dominant:

1) First regression equation predicts CYLV cost (lift cost).

(1) Explanatory variables are Laden Lift Volume (in TEU's) and a dummy variable to identify whether we are forecasting a 4-week or 5-week month (this dummy variable was given the name "Peak Month").

a. The Peak Month variable is equal to 1 when forecasting a 5-week month, and 0 in all other cases.

2) Second regression equation predicts CYXX cost (the sum of all other CY Full cost codes besides CYLV).

(1) Explanatory variable is Laden Lift Volume (in TEU's).

3) CYLV and CYXX forecasts are summed together to obtain CY Full regular cost forecasts.

4) Summary of computation steps for TPWC non-dominant CY Full forecasts:

(1) CYLV_Cost_Forecast = Intercept + (X1*Volume_Forecast) + (X2*Peak_Month)

(2) CYXX_Cost_Forecast = Intercept + (Y1*Volume_Forecast)

(3) CY_Full_Cost_Forecast = (CYLV_Cost_Forecast) + (CYXX_Cost_Forecast)

3. TPEC dominant:

1) First regression equation predicts CYLV cost (lift cost).

(1) Explanatory variable is Laden Lift Volume (in TEU's).

2) Second regression equation predicts CYXX cost (the sum of all other CY Full cost codes besides CYLV).

(1) Explanatory variables are Laden Lift Volume (in TEU's) and the dummy variable "Peak Month".

a. The Peak Month variable is equal to 1 when forecasting a 5-week month, and 0 in all other cases.

3) CYLV and CYXX forecasts are summed together to obtain CY Full regular cost forecasts.

4) Summary of computation steps for TPEC dominant CY Full forecasts:

(1) CYLV_Cost_Forecast = Intercept + (X1*Volume_Forecast)

(2) CYXX_Cost_Forecast = Intercept + (Y1*Volume_Forecast) + (Y2*Peak_Month)

(3) CY_Full_Cost_Forecast = (CYLV_Cost_Forecast) + (CYXX_Cost_Forecast)

4. TPEC non-dominant:

1) First regression equation predicts CYLV cost (lift cost).

(1) Explanatory variable is Laden Lift Volume (in TEU's).

2) Second regression equation predicts CYXX cost (the sum of all other CY Full cost codes besides CYLV).

(1) Explanatory variable is Laden Lift Volume (in TEU's).

3) CYLV and CYXX forecasts are summed together to obtain CY Full regular cost forecasts.

4) Summary of computation steps for TPEC dominant CY Full forecasts:

(1) CYLV_Cost_Forecast = Intercept + (X1*Volume_Forecast)

(2) CYXX_Cost_Forecast = Intercept + (Y1*Volume_Forecast)

(3) CY_Full_Cost_Forecast = (CYLV_Cost_Forecast) + (CYXX_Cost_Forecast)

C. CY Full Process Steps: Preparing the Forecast Template

1. Have the "Forecast Template" file and the most recent copies of the "Monthly Cost Summary" and "CY Commission Cost Report" files open on your screen.

2. In the "Forecast Template" file, enter the "WC CY Full Forecasts" worksheet.

1) Scroll down to the TPWC actuals data. Dominant data should begin in cell A53.

2) Highlight the blank row between the TPWC dominant and TPWC non-dominant actuals data, and insert another blank row, so there are now two blank rows in between dominant and non-dominant actuals.

3. In the new blank row directly below the last line of TPWC **dominant** actuals data, begin entering a new row of actuals data.

   1) The entries in columns A and B will be equal to the entries in cells above, column C will be filled with the corresponding Gains month that has just ended, and column D will equal the fiscal year in which the month lands.

   2) CYLV actuals will be obtained from the "CY Commission Cost Report" file.

      (1) Make sure the pivot table is filtered in the following ways:

         a. The COUNTRY field should be filtered to only US and CA.

         b. The TRADE_GRP_CODE field should be filtered to only TPWC-TG.

         c. The TRADE_DOMINANT_ID field should be filtered to only A.

      (2) Copy the most recent CYLV number displayed on the pivot table, and paste into the proper cell of the "Format Template" file.

3	MGT_PL_ITEM_NAME	CY(full)
4	TRADE_GRP_CODE	TPWC-TG
5	TRADE_DOMINANT_ID	A
6	COUNTRY	(Multiple Items)
7		
8	**Sum of USD**	**Column Labels**
9	**Row Labels**	**201703**
10	CFLS	24,873
11	CYCP	1,734
12	CYLA	3,454
13	CYLC	16,975
14	CYLG	18,481
15	CYLM	72,534
16	CYLO	488
17	CYLP	11,483
18	CYLR	97
19	CYLS	186,122
20	CYLT	1,195
21	CYLV	7,766,654
22	CYOT	60,975
23	CYRL	366,043
24	CYSO	200
25	CYWA	1,198,740
26	CYWD	(22,167)
27	CYWO	140,751
28	CYWR	(23,047)
29	CYWS	26,540
30	CYXM	9,673
31	CYXX	440,698
32	**Grand Total**	**10,302,497**

   3) CYXX actuals will also be obtained from the "CY Commission Cost Report" file.

      (1) Keep the pivot table filters the same as described above.

a. Sum the values of each cost code for the month of interest, leaving out the CYLV cost code. This is your actual value of CYXX cost that can be pasted into the "Forecast Template" file.

3	MGT_PL_ITEM_NAME	CY(full)
4	TRADE_GRP_CODE	TPWC-TG
5	TRADE_DOMINANT_ID	A
6	COUNTRY	(Multiple Items)
7		
8	**Sum of USD**	**Column Labels**
9	**Row Labels**	**201703**
10	CFLS	24,873
11	CYCP	1,734
12	CYLA	3,454
13	CYLC	16,975
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19	CYLS	186,122
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22	CYOT	60,975
23	CYRL	366,043
24	CYSO	200
25	CYWA	1,198,740
26	CYWD	(22,167)
27	CYWO	140,751
28	CYWR	(23,047)
29	CYWS	26,540
30	CYXM	9,673
31	CYXX	440,698
32	**Grand Total**	**10,302,497**

Sum of all cost codes EXCEPT CYLV = CYXX Cost

4) CY Full actuals will be taken from the "Monthly Cost Summary" Report.

(1) Enter the "CY Full" tab, scroll to the TPWC dominant section, and focus on the column with the most recent actuals number.

a. In order to avoid throwing off data by including exceptional cost, sum the amounts in the rows labeled "CM (Regular)" and "PM (Regular)". This amount is your value of CY Full actuals that can be pasted into the "Forecast Template" file.

TPWC Cost (USD)	FY2016 December (Actuals)	January (Actuals)	February (Forecasts)	February (Actuals)	March (Forecasts)	March (Actuals)
TPWC	$ 16,972,018	$ 12,728,076	$ 14,494,279	$ 14,900,540	$ 19,408,456	$ 20,339,301
Dom	$ 8,732,919	$ 7,583,807	$ 7,867,085	$ 7,676,772	$ 10,431,523	$ 10,302,497
Current Month Total	$ 8,725,623	$ 7,765,654	$ 7,867,085	$ 7,126,530	$ 10,431,523	[illegible]
CM (Regular)	$ 8,725,623	$ 7,765,654	$ 7,867,085	$ 7,126,530	$ 10,431,523	$ 10,204,487
CM (Exceptional)	$ -	$ -	$ -	$	$	$ -
						$ -
						$ -
						$ -
Prior Month Total	$ 7,295	$ (181,847)	$ -	$ 550,242	$ -	[illegible]
PM (Regular)	$ 7,295	$ 80,101	$ -	$ 550,242	$ -	$ 98,010
PM (Exceptional)	$ -	$ (261,948)	$ -	$ -	$ -	$ -
	$ -	$ (261,948)				$ -
						$ -
						$
						=SUM(LR74,LR68
Non Dom	$ 8,239,099	$ 5,144,268	$ 6,627,194	$ 7,223,769	$ 8,976,933	SUM(number1, [nu
Current Month Total	$ 7,634,389	$ 5,129,242	$ 6,627,194	$ 7,004,272	$ 8,976,933	$ 9,816,861
CM (Regular)	$ 7,634,389	$ 5,129,242	$ 6,627,194	$ 7,004,272	$ 8,976,933	$ 9,816,861
CM (Exceptional)	$ -	$ -	$ -	$ -	$ -	$ -

Sum CM (Regular) and PM (Regular) to get CY Full actuals

Mar'17 | Fcst Comp. (Mar) | CY (Full) | Feeder | Eqp. Positioning | Eqp. Cost | CY Lift & Feeder Forecast | All Costs

5) Volume actuals will also be taken from the "Monthly Cost Summary" Report.

(1) In the "CY Full" tab, scroll down to the CY Lifting section.

a. Use the proper entry from this section as the Volume actual.

CY Lifting Budget, Forecast and Actuals (TEUs)	FY2016 December (Actuals)	January (Actuals)	February (Forecasts)	February (Actuals)	March (Forecasts)	March (Actuals)
TPWC	70,252	58,745	58,391	59,963	82,442	84,258
Dom	40,760	38,131	32,838	32,451	48,055	47,460
Non Dom	29,492	20,614	25,553	27,512	34,387	36,798
TPEC	56,146	44,999	43,932	42,614	58,380	60,559
Dom	37,051	30,015	26,006	24,045	37,626	38,397
Non Dom	19,095	14,984	17,926	18,569	20,754	22,162
TAS	5,047	3,708	4,144	4,335	6,866	6,169
Dom	3,182	1,924	2,569	2,516	4,238	3,788
Non Dom	1,865	1,784	1,575	1,819	2,628	2,381

6) After pasting the proper value of Volume actuals, the new row of TPWC dominant actuals data will be complete.

4. Scroll to the blank row directly below the last line of TPWC **non-dominant** actuals data (located beneath dominant actuals) and enter a new row of most recent actuals data using the same steps as with dominant actuals, with the exception of the following:

    1) The “CY Commission Cost Report” pivot table TRADE_DOMINANT_ID filter will be changed to B when obtaining CYLV and CYXX actuals.

    2) CY Full cost actuals will be taken from the non-dominant section of the “Monthly_Cost_Summary” report, which is located directly below the TPWC dominant section.

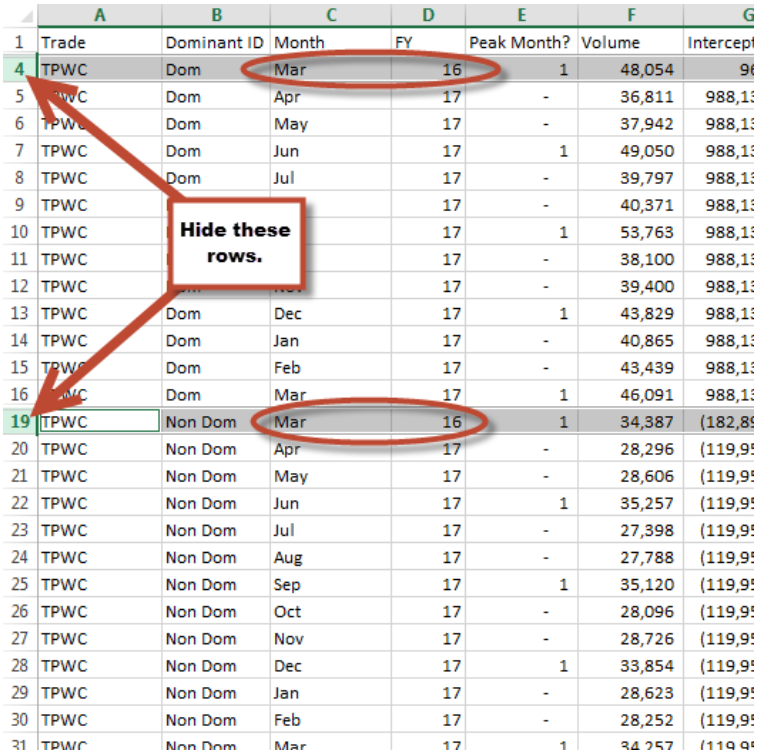
    3) Laden lift volume actuals will equal the number below the TPWC dominant number in the CY Lifting section of the “Monthly_Cost_Summary” report.

    4) Add this step: in the Peak Month column of non-dominant actuals data (column I of the “Forecast Template” file), enter a 1 if the corresponding month is a 5-week month, and 0 otherwise.

5. Scroll to the top of the sheet so you are focusing on the forecast generating template (rows 1 through 31).

    1) Hide the rows of any months in which actuals data is now available. Do this for both dominant and non-dominant templates (dominant: rows 1 through 16; non-dominant: rows 17 through 31).

        (1) In my example, actuals for March have just come in, so I would hide rows 4 and 19.



	A	B	C	D	E	F	G
1	Trade	Dominant ID	Month	FY	Peak Month?	Volume	Intercept
4	TPWC	Dom	Mar	16	1	48,054	9
5	TPWC	Dom	Apr	17	-	36,811	988,1
6	TPWC	Dom	May	17	-	37,942	988,1
7	TPWC	Dom	Jun	17	1	49,050	988,1
8	TPWC	Dom	Jul	17	-	39,797	988,1
9	TPWC			17	-	40,371	988,1
10	TPWC			17	1	53,763	988,1
11	TPWC			17	-	38,100	988,1
12	TPWC			17	-	39,400	988,1
13	TPWC	Dom	Dec	17	1	43,829	988,1
14	TPWC	Dom	Jan	17	-	40,865	988,1
15	TPWC	Dom	Feb	17	-	43,439	988,1
16	TPWC	Dom	Mar	17	1	46,091	988,1
19	TPWC	Non Dom	Mar	16	1	34,387	(182,8
20	TPWC	Non Dom	Apr	17	-	28,296	(119,9
21	TPWC	Non Dom	May	17	-	28,606	(119,9
22	TPWC	Non Dom	Jun	17	1	35,257	(119,9
23	TPWC	Non Dom	Jul	17	-	27,398	(119,9
24	TPWC	Non Dom	Aug	17	-	27,788	(119,9
25	TPWC	Non Dom	Sep	17	1	35,120	(119,9
26	TPWC	Non Dom	Oct	17	-	28,096	(119,9
27	TPWC	Non Dom	Nov	17	-	28,726	(119,9
28	TPWC	Non Dom	Dec	17	1	33,854	(119,9
29	TPWC	Non Dom	Jan	17	-	28,623	(119,9
30	TPWC	Non Dom	Feb	17	-	28,252	(119,9
31	TPWC	Non Dom	Mar	17	1	34,257	(119,9

2) Next, focus on column F of the Forecast Template. These are Laden Lift Volume forecasts that may update every month.
   (1) These are obtained from the “CY(Full)” worksheet of the “Monthly_Cost_Summary” file.
      a. Scroll back down to the CY Lifting section, and focus on the forecast numbers for future months volume.
         a) Paste dominant forecast numbers into the proper cells of the Forecast Template for each corresponding month.
         b) Do the same for non-dominant volume forecast numbers.

6. Make sure that there are no new assumptions to account for in the model.

   1) Assumptions are illustrated between rows 34 and 51 in the “WC CY Full Forecasts” worksheet of the “Forecast Template” file.

      (1) Keep in mind that the assumption section was created in December of 2016, so the months listed in the assumptions begin with January 2017.

         a. Past months assumptions can be ignored. Only update assumptions for the current month forward.

   2) Verify that there is no change in cost distribution ratios (assumption section labeled “CY Full Dist.”).

      (1) These assumptions indicate the percentage of total west coast CY Full cost attributed to each port area.

      (2) Cost distribution assumptions are located in columns K through O, from row 34 to 50 (rows and columns may be different on the EC sheet).

         a. The new distribution percentage can be entered directly into the cell for the correct corresponding ports and months.

            a) It may also be helpful to update the written-out assumptions to the right (column Q) to keep track of what all this data means.

Writing out assumptions can help to keep track of them.

	J	K	L				P	Q	R
32									
33									
34		CY Full/Lift Dist.							
35	LA/LGB	Month	Vancouver	Seattle(PNW)	Oakland	LA/LGB		Vancouver	
36	1.0146	Jan	16%	8%	12%	64%		*16% of CY Full Cost	
37	1.0146	Feb	16%	8%	12%	64%		*2.1% CYLV increase begins April	
38	1.0146	Mar	16%	8%	12%	64%		*2.6% CYXX increase begins April	
39	1.0146	Apr	16%	8%	12%	64%		Seattle	
40	1.0146	May	16%	8%	12%	64%		*8% of CY Full Cost	
41	1.0146	Jun	16%	8%	12%	64%		*1.5% CYLV increase begins July	
42	1.040	Jul	16%	8%	12%	64%		*2.1% CYXX increase begins July	
43	1.040	Aug	16%	8%	12%	64%		Oakland	
44	1.040	Sep	16%	8%	12%	64%		*12% of CY Full Cost	
45	1.040	Oct	16%	8%	12%	64%		*2.4% CYLV increase begins July	
46	1.040	Nov	16%	8%	12%	64%		*2.1% CYXX increase begins July	
47	1.040	Dec	16%	8%	12%	64%		LA	
48	1.040	Jan	16%	8%	12%	64%		*64% of CY Full Cost	
49	1.040	Feb	16%	8%	12%	64%		*1% CYLV increase begins Jan 2017	
50	1.040	Mar	16%	8%	12%	64%		*1.46% CYXX increase begins Jan 2017	
51								*2.5% CLYV & CYXX increase begins July	

3) Next, verify that there are no changes in assumed rate increases/decreases.
   (1) Assumed rate increases/decreases are separated out by CYLV and CYXX, and are illustrated in columns A through J and rows 34 through 50 (rows and columns may be different on the EC sheet).
      a. Rate changes are represented as percentages. These assumed percentages are converted into decimal form and added to 1.
         a) For example, at Vancouver ports in April, there is an assumed contractual CYLV rate increase of 2.1%, and an assumed contractual CYXX rate increase of 2.6%.
            (a) 2.1% = .021 → .021 + 1 = 1.021
            (b) 2.6% = .026 → .026 + 1 = 1.026
         b) As an example of how a rate decrease would be illustrated, look at CYLV rates in LA/LGB ports in April.
            (a) There is an assumed rate decrease of 4.5%
               a. -4.5% = -.045 → 1 + -.045 = .955
         c) See below screenshot for reference to these examples.
   (2) Again, updating the written-out assumptions in column Q accordingly can help keep track of assumptions.

	A	B	C	D	E	F	G	H	I	J
32										
33	Assumptions									
34	CYLV					CYXX				
35	Month	Vancouver	Seattle(PNW)	Oakland	LA/LGB	Month	Vancouver	Seattle(PNW)	Oakland	LA/LGB
36	Jan		1	1	1.010	Jan	1	1	1	1.0146
37	Feb	1	1	1	1.010	Feb	1	1	1	1.0146
38	Mar	1	1	1	1.010	Mar	1	1	1	1.0146
39	Apr	1.021	1	1	0.955	Apr	1.026	1	1	1.0146
40	May	1.021	1	1	0.955	May	1.026	1	1	1.0146
41	Jun	1.021	1	1	0.955	Jun	1.026	1	1	1.0146
42	Jul	1.021	1.015	1.024	0.955	Jul	1.026	1.021	1.021	1.040
43	Aug	1.021	1.015	1.024	0.955	Aug	1.026	1.021	1.021	1.040
44	Sep	1.021	1.015	1.024			1.026	1.021	1.021	1.040
45	Oct	1.021	1.015	1.024			1.026	1.021	1.021	1.040
46	Nov	1.021	1.015	1.024			1.026	1.021	1.021	1.040
47	Dec	1.021	1.015	1.024	0.955	Dec	1.026	1.021	1.021	1.040
48	Jan	1.021	1.015	1.024	0.955	Jan	1.026	1.021	1.021	1.040
49	Feb	1.021	1.015	1.024	0.955	Feb	1.026	1.021	1.021	1.040
50	Mar	1.021	1.015	1.024	0.955	Mar	1.026	1.021	1.021	1.040

CYLV increase of 2.1% CYXX increase of 2.6% in Vancouver in April

CYLV rate decrease of 4.5% in LA starting in April

4) **<u>Important:</u>** the data in all assumption cells is directly linked to equations within the forecast generating template, so any alteration of these assumptions will automatically alter the forecast numbers.

7. Be sure to save the file once all of these alterations have been made.

8. Repeat steps 1 through 7 (including sub-steps) again to update the "EC CY Full Forecasts" worksheet of the "Forecast Template" file. Make the following adjustments to steps as needed:

   1) When obtaining CYLV and CYXX actuals from the "CY Commission Cost Report" file, change the pivot table filter TRADE_GRP_CODE to TPEC-TG.

   2) Alter steps as necessary to fit with the location of TPEC dominant and non-dominant numbers taken from the "Monthly_Cost_Summary" file.

   3) Also alter steps slightly as necessary to fit with the location of certain assumptions on the "EC CY Full Forecasts" worksheet.

9. After these steps are finished, you can close out of the "CY Commission Cost Report".

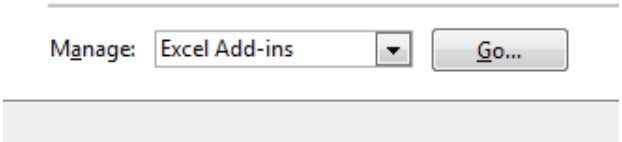
D. CY Full Process Steps: Generating Forecasts

1. Have the “Forecast Template” file and the “T-table & F-table” document open on your screen.

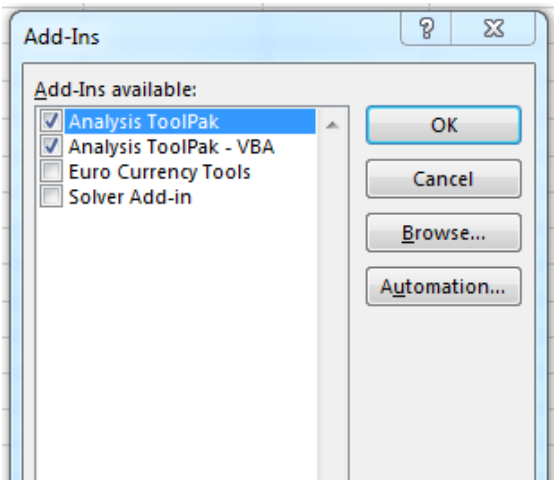
2. If you have not already set up the Analysis Toolpak add-in in Excel, follow these steps:

   1) Click on File > Options > Add-Ins

   2) At the bottom of the window, there will be a scroll-box. Select “Excel Add-Ins” and click “Go”.



   3) A new window will pop up. Select “Analysis ToolPak” and hit “OK”.



3. Begin with generating TPWC dominant forecasts on the “WC CY Full Forecasts” tab of the “Forecast Template” file.

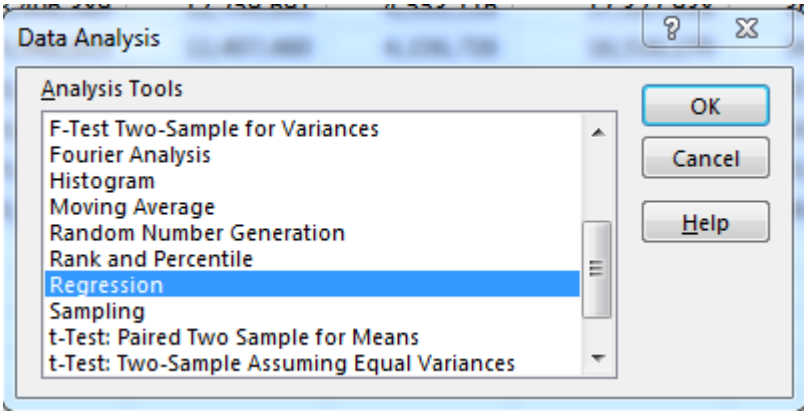
   1) Scroll down to the TPWC dominant actuals data that should start somewhere around row 53.

   2) Start with deriving the CYLV forecast equation (refer to section B for details on equation set up for each trade).

      (1) Click on the Data tab at the top of the Excel toolbar.

      (2) Select “Data Analysis”.

(3) When the Data Analysis window pops up, select “Regression” and hit “OK”.



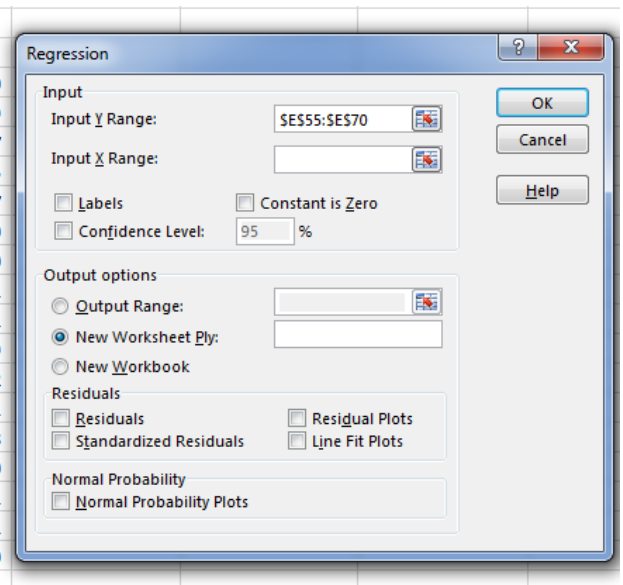
(4) Another window will pop up titled “Regression”. Enter the information using the following guidelines:

a. Input Y Range: This is our dependent variable. For the CYLV equation, the dependent variable is CYLV cost.

a) Select the **<u>SECOND FROM THE TOP NUMERIC</u>** data entry for CYLV, and drag the dotted green outline to the final CYLV actual entry.

(a) Note: it is crucial to leave out the top numeric data entry of a column when selecting regression input in order to avoid biased regression statistics.

Actuals:							
TRADE GROUP	TRADE TYPE	MONTH	FY	CYLV	CYXX	CY FULL	Volume
TPWC	DOM	Nov	15	5,835,715	2,217,827	8,053,524	35,560
TPWC	DOM	Dec	15	6,825,089	2,528,074	9,454,938	39,709
TPWC	DOM	Jan	15	5,374,169	1,689,534	6,861,540	31,377
TPWC	DOM	Feb	15	5,786,333	1,994,864	7,781,198	33,465
TPWC	DOM	Mar	15	6,026,527	1,924,322	8,097,831	37,487
TPWC	DOM	Apr	16	5,692,210	2,200,235	7,892,445	33,840
TPWC	DOM	May	16	5,447,716	1,506,100	7,102,238	31,800
TPWC	DOM	Jun	16	7,573,925	2,289,834	9,863,759	46,041
TPWC	DOM	Jul	16	6,158,319	2,248,069	8,406,458	36,161
TPWC	DOM	Aug	16	5,933,780	1,015,039	7,867,645	34,249
TPWC	DOM	Sep	16	7,862,642	2,314,781	10,411,140	47,092
TPWC	DOM	Oct	16	6,716,476	1,897,075	8,613,551	36,791
TPWC	DOM	Nov	16	6,961,119	2,168,222	9,129,341	41,048
TPWC	DOM	Dec	16	6,738,846	1,994,073	8,732,919	40,760
TPWC	DOM	Jan	16	5,779,429	1,804,378	7,845,755	38,131
TPWC	DOM	Feb	16	6,102,193	1,574,579	7,676,772	32,451
TPWC	DOM	Mar	16	7,766,654	2,535,843	10,302,497	47,460

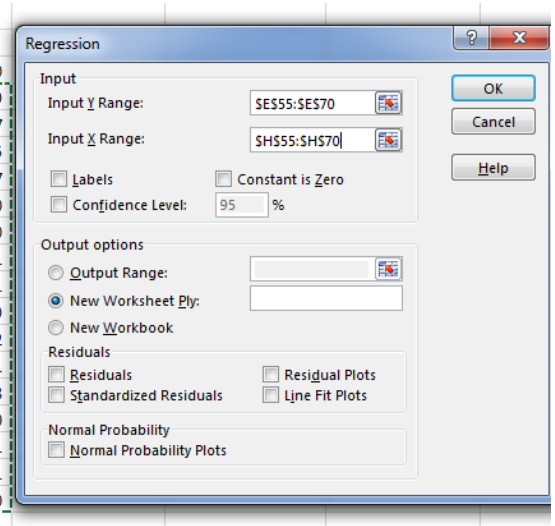


b. Input X Range: This is our explanatory variable. For the CYLV equation, the explanatory variable is Volume.

a) Select the **<u>SECOND FROM THE TOP NUMERIC</u>** data entry for Volume, and drag the dotted green outline to the final Volume actual entry.

(a) Note: it is crucial to leave out the top numeric data entry of a column when selecting regression input in order to avoid biased regression statistics.

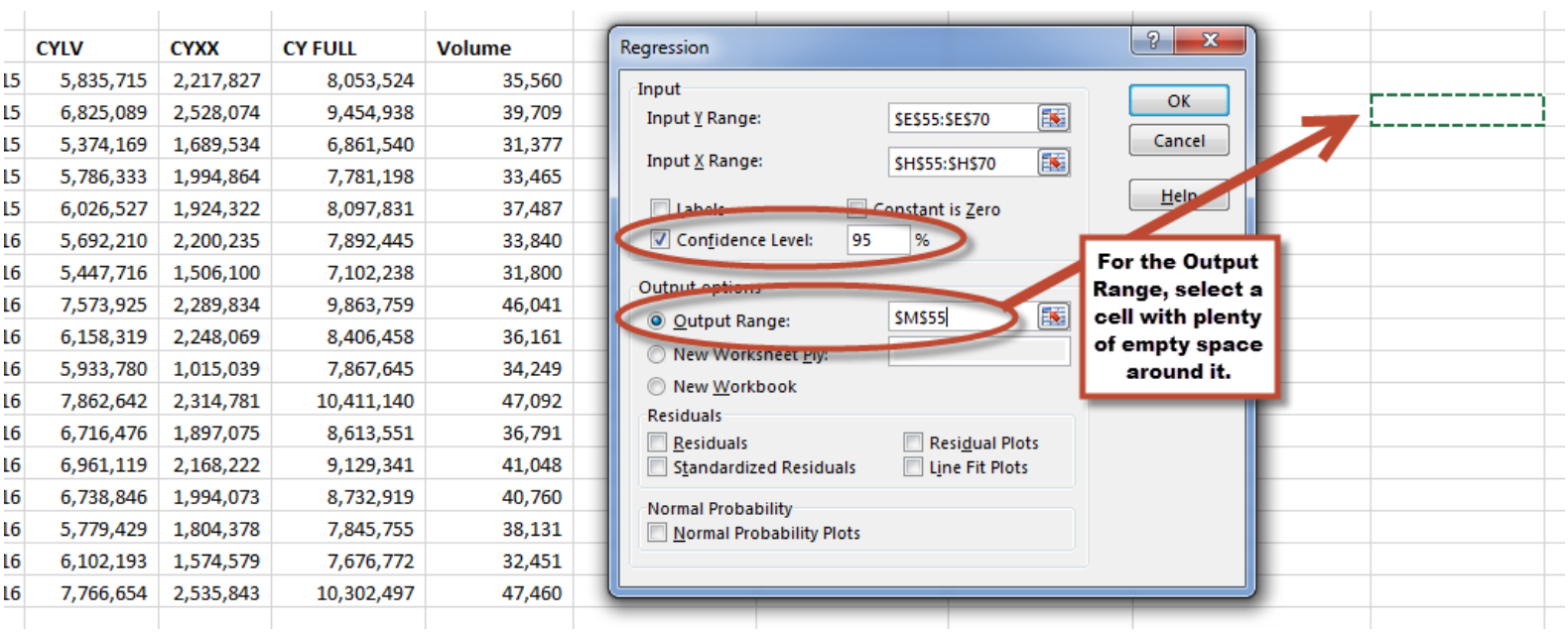
52	**Actuals:**							
53	**TRADE GROUP**	**TRADE TYPE**	**MONTH**	**FY**	**CYLV**	**CYXX**	**CY FULL**	**Volume**
54	TPWC	DOM	Nov	15	5,835,715	2,217,827	8,053,524	35,560
55	TPWC	DOM	Dec	15	6,825,089	2,528,074	9,454,938	39,709
56	TPWC	DOM	Jan	15	5,374,169	1,689,534	6,861,540	31,377
57	TPWC	DOM	Feb	15	5,786,333	1,994,864	7,781,198	33,465
58	TPWC	DOM	Mar	15	6,026,527	1,924,322	8,097,831	37,487
59	TPWC	DOM	Apr	16	5,692,210	2,200,235	7,892,445	33,840
60	TPWC	DOM	May	16	5,447,716	1,506,100	7,102,238	31,800
61	TPWC	DOM	Jun	16	7,573,925	2,289,834	9,863,759	46,041
62	TPWC	DOM	Jul	16	6,158,319	2,248,069	8,406,458	36,161
63	TPWC	DOM	Aug	16	5,933,780	1,015,039	7,867,645	34,249
64	TPWC	DOM	Sep	16	7,862,642	2,314,781	10,411,140	47,092
65	TPWC	DOM	Oct	16	6,716,476	1,897,075	8,613,551	36,791
66	TPWC	DOM	Nov	16	6,961,119	2,168,222	9,129,341	41,048
67	TPWC	DOM	Dec	16	6,738,846	1,994,073	8,732,919	40,760
68	TPWC	DOM	Jan	16	5,779,429	1,804,378	7,845,755	38,131
69	TPWC	DOM	Feb	16	6,102,193	1,574,579	7,676,772	32,451
70	TPWC	DOM	Mar	16	7,766,654	2,535,843	10,302,497	47,460
71								



c. Check the "Confidence Level" box and make sure the level is set to 95%.

d. Under the Output Options section, select "Output Range", and select a cell to the right of the actuals data with plenty of empty cell space surrounding it.

e. Hit "OK".



(5) The regression output should look similar to below.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.943150505
R Square	0.889532876
Adjusted R Square	0.881642367
Standard Error	278276.016
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	8.72989E+12	8.72989E+12	112.7345386	4.42448E-08
Residual	14	1.08413E+12	77437541101		
Total	15	9.81401E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	988137.0308	516444.8106	1.913344874	0.076376522	-119526.924	2095800.986	-119526.924	2095800.986
X Variable 1	143.0180435	13.46983688	10.61765222	4.42448E-08	114.1281166	171.9079703	114.1281166	171.9079703

3) Next, run the CY Full regression analysis (refer to section B for details on equation set up for each trade).

(1) Click on the Data tab at the top of the Excel toolbar.

(2) Select “Data Analysis”.

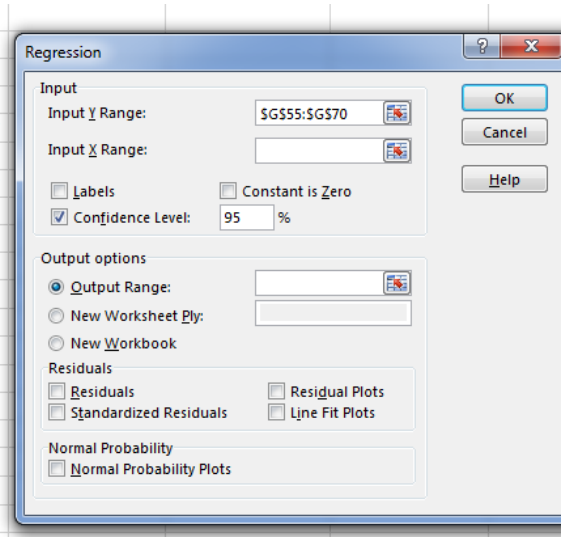
(3) When the Data Analysis window pops up, select “Regression” and hit OK.

(4) Another window will pop up titled “Regression” enter the information using the following guidelines:

a. Input Y Range: This is our dependent variable. For the CY Full equation, the dependent variable is CY Full cost.

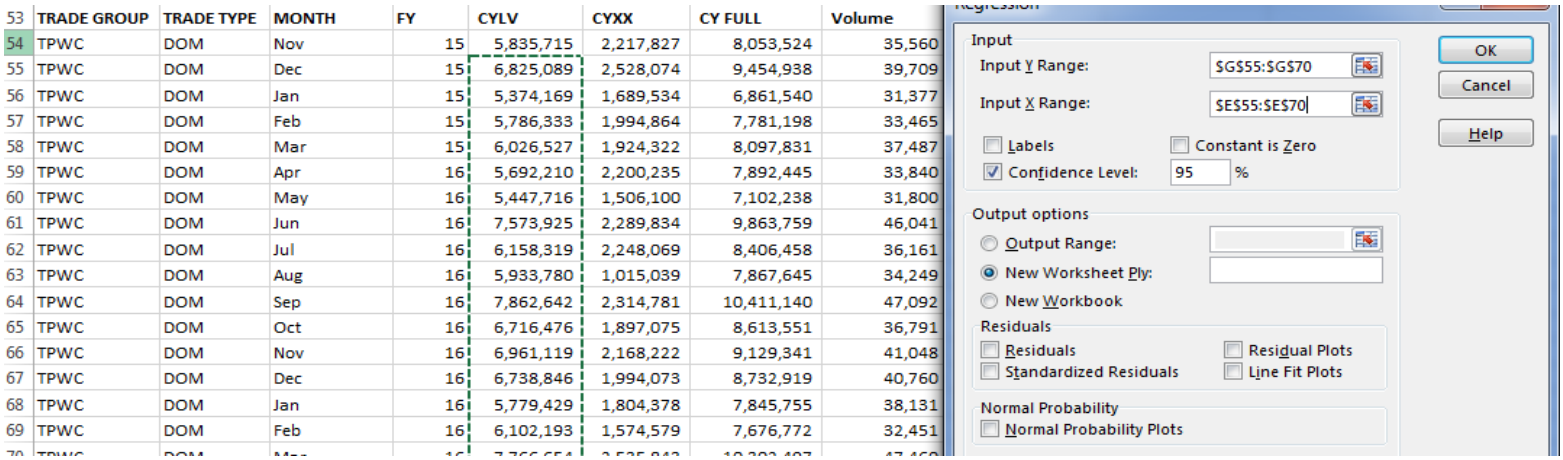
a) Select the **SECOND FROM THE TOP NUMERIC** data entry for CY Full, and drag the dotted green outline to the final CY Full actual entry.

52	Actuals:							
53	TRADE GROUP	TRADE TYPE	MONTH	FY	CYLV	CYXX	CY FULL	Volume
54	TPWC	DOM	Nov	15	5,835,715	2,217,827	8,053,524	35,560
55	TPWC	DOM	Dec	15	6,825,089	2,528,074	9,454,938	39,709
56	TPWC	DOM	Jan	15	5,374,169	1,689,534	6,861,540	31,377
57	TPWC	DOM	Feb	15	5,786,333	1,994,864	7,781,198	33,465
58	TPWC	DOM	Mar	15	6,026,527	1,924,322	8,097,831	37,487
59	TPWC	DOM	Apr	16	5,692,210	2,200,235	7,892,445	33,840
60	TPWC	DOM	May	16	5,447,716	1,506,100	7,102,238	31,800
61	TPWC	DOM	Jun	16	7,573,925	2,289,834	9,863,759	46,041
62	TPWC	DOM	Jul	16	6,158,319	2,248,069	8,406,458	36,161
63	TPWC	DOM	Aug	16	5,933,780	1,015,039	7,867,645	34,249
64	TPWC	DOM	Sep	16	7,862,642	2,314,781	10,411,140	47,092
65	TPWC	DOM	Oct	16	6,716,476	1,897,075	8,613,551	36,791
66	TPWC	DOM	Nov	16	6,961,119	2,168,222	9,129,341	41,048
67	TPWC	DOM	Dec	16	6,738,846	1,994,073	8,732,919	40,760
68	TPWC	DOM	Jan	16	5,779,429	1,804,378	7,845,755	38,131
69	TPWC	DOM	Feb	16	6,102,193	1,574,579	7,676,772	32,451
70	TPWC	DOM	Mar	16	7,766,654	2,535,843	10,302,497	47,460



b. Input X Range: This is our explanatory variable. For the CY Full equation, the explanatory variable is CYLV cost.

   a) Select the **<u>SECOND FROM THE TOP NUMERIC</u>** data entry for CYLV, and drag the dotted green outline to the final CYLV actual entry.

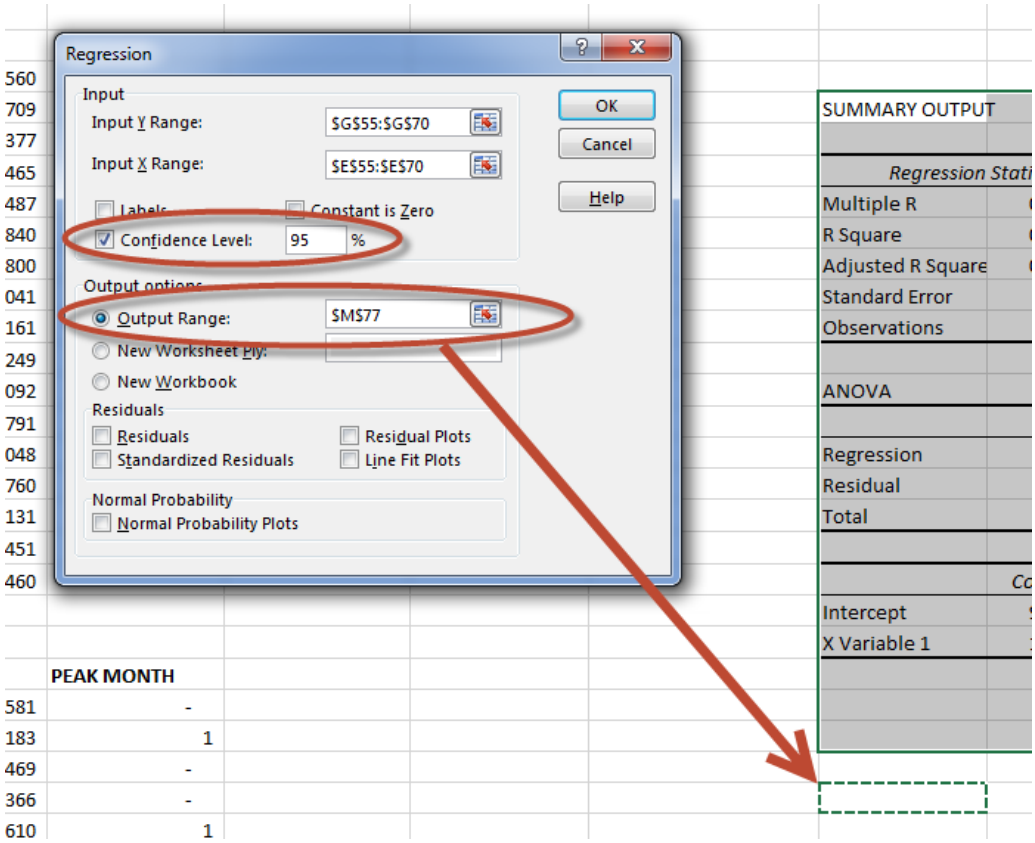


53	TRADE GROUP	TRADE TYPE	MONTH	FY	CYLV	CYXX	CY FULL	Volume
54	TPWC	DOM	Nov	15	5,835,715	2,217,827	8,053,524	35,560
55	TPWC	DOM	Dec	15	6,825,089	2,528,074	9,454,938	39,709
56	TPWC	DOM	Jan	15	5,374,169	1,689,534	6,861,540	31,377
57	TPWC	DOM	Feb	15	5,786,333	1,994,864	7,781,198	33,465
58	TPWC	DOM	Mar	15	6,026,527	1,924,322	8,097,831	37,487
59	TPWC	DOM	Apr	16	5,692,210	2,200,235	7,892,445	33,840
60	TPWC	DOM	May	16	5,447,716	1,506,100	7,102,238	31,800
61	TPWC	DOM	Jun	16	7,573,925	2,289,834	9,863,759	46,041
62	TPWC	DOM	Jul	16	6,158,319	2,248,069	8,406,458	36,161
63	TPWC	DOM	Aug	16	5,933,780	1,015,039	7,867,645	34,249
64	TPWC	DOM	Sep	16	7,862,642	2,314,781	10,411,140	47,092
65	TPWC	DOM	Oct	16	6,716,476	1,897,075	8,613,551	36,791
66	TPWC	DOM	Nov	16	6,961,119	2,168,222	9,129,341	41,048
67	TPWC	DOM	Dec	16	6,738,846	1,994,073	8,732,919	40,760
68	TPWC	DOM	Jan	16	5,779,429	1,804,378	7,845,755	38,131
69	TPWC	DOM	Feb	16	6,102,193	1,574,579	7,676,772	32,451

c. Check the "Confidence Level" box and make sure the level is set to 95%.

d. Under the Output Options section, select "Output Range", and select a cell to the right of the actuals data **AND** well below the output data of CYLV regression, as shown in the screen shot below.

e. Hit "OK".



(5) The output of the two regressions should look similar to below. It may help you to label which output belongs to which regression equation.

You may want to clearly label which output belongs to which regression equation.

SUMMARY OUTPUT

CYLV

Regression Statistics	
Multiple R	0.943150505
R Square	0.889532876
Adjusted R Square	0.881642367
Standard Error	278276.016
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	8.72989E+12	8.72989E+12	112.7345386	4.42448E-08
Residual	14	1.084[illegible]5E+12	77437541101		
Total	15	9.[illegible]1401E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	988137.[illegible]308	516444.8106	1.913344874	0.076376522	-119526.924	2095800.986	-119526.924	2095801
X Variable 1	143.[illegible]180435	13.46983688	10.61765222	4.42448E-08	114.1281166	171.9079703	114.1281166	171.90797

SUMMARY OUTPU[illegible]

CY Full

Regression Statistics	
Multiple R	0.976286583
R Square	0.953135491
Adjusted R Square	0.949788026
Standard Error	240901.083
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.6524E+13	1.6524E+13	284.7335273	1.06202E-10
Residual	14	8.12467E+11	58033331774		
Total	15	1.73365E+13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	169963.7117	497466.8681	0.341658355	0.737682141	-896996.6047	1236924.028	-896996.605	1236924
X Variable 1	1.297581919	0.076898077	16.87404893	1.06202E-10	1.132651947	1.462511892	1.132651947	1.4625119

4) **IMPORTANT:** as previously noted, each regression's input range of dependent and explanatory variable data must start with the second from the top numeric entry to avoid biased results. Including all numeric data entries will skew forecast coefficients.

5) Make sure that the regression equations are statistically significant.

(1) This should not be an issue because these variables have been tested multiple times, but it is still important to check that the new actuals data did not throw anything off.

(2) Start with the CYLV regression output.

a. Consult the regression output looking for the Degree of Freedom value labeled **"Total".**

a) In this walk through, the value is 15.

df = Degree of Freedom

SUMMARY OUTPUT								
CYLV								
Regression Statistics								
Multiple R	0.943150505							
R Square	0.889532876							
Adjusted R Square	0.881642367							
Standard Error	278276.016							
Observations	16							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	8.72989E+12	8.72989E+12	112.7345386	4.42448E-08			
Residual	14	1.08413E+12	77437541101					
Total	15	9.81401E+12						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	988137.0308	516444.8106	1.913344874	0.076376522	-119526.924	2095800.986	-119526.924	2095801
X Variable 1	143.0180435	13.46983688	10.61765222	4.42448E-08	114.1281166	171.9079703	114.1281166	171.90797

b. Consult the standard **T-Table** in the "T-table & F-table" document to obtain a value of the t-stat (use the T-table because there is only one explanatory variable in this regression).

a) The t-stat is the entry in which your Degree of Freedom (DF) value (labeled on the left side of the table), meets your confidence level value (along the bottom of the table).

(a) In this walk through the DF = 15 and the confidence level = 95%, so the t-stat value from the T-Table is 2.131 (see screenshot below).

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	0.50	0.25	0.20	0.15	0.10	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	1.00	0.50	0.40	0.30	0.20	0.10	0.05	0.02	0.01	0.002	0.001
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										

c. Compare the T-Table t-stat to the t-stat from the regression output.

a) Ignore the t-stat for the intercept; we only care about the t-stat for "X Variable 1" (which represents the Volume variable in the CYLV equation).

(a) In this example, the t-stat for the Volume variable is about 10.62

SUMMARY OUTPUT

CYLV

Regression Statistics	
Multiple R	0.943150505
R Square	0.889532876
Adjusted R Square	0.881642367
Standard Error	278276.016
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	8.72989E+12	8.72989E+12	112.7345386	4.42448E-08
Residual	14	1.08413E+12	77437541101		
Total	15	9.81401E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	988137.0308	516444.8106	1.913344874	0.076376522	-119526.924	2095800.986	-119526.924	2095801
X Variable 1	143.0180435	13.46983688	10.61765222	4.42448E-08	114.1281166	171.9079703	114.1281166	171.90797

b) We assume that the correlation between the dependent variable (CYLV cost) and the explanatory variable (Volume) is positive.

(a) Because we assume a positive correlation between the two variables, the regressions Volume variable t-stat must be **GREATER THAN OR EQUAL TO** the value presented on the T-Table.

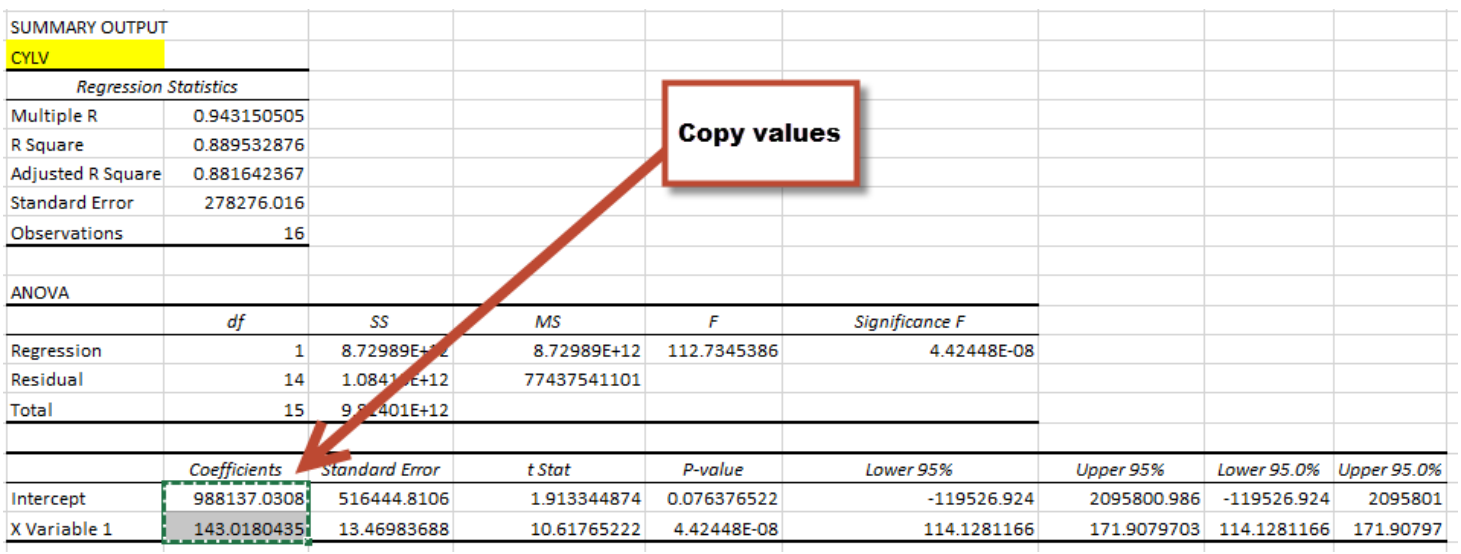
a. In this example, the t-stat for Volume is about 10.62 which is far greater than the t-stat 2.131 from the T-Table, so the relationship between CYLV cost and Volume remains significant.

(3) Repeat this process of confirming statistical significance, this time with the CY Full regression output.

6) Assuming that both equations are significant, focus on the regression coefficients of each equations output.

(1) Start with copying the two regression coefficients for the CYLV equation.

a. Coefficients are labeled Intercept and X Variable 1.



SUMMARY OUTPUT								
CYLV								
Regression Statistics								
Multiple R	0.943150505							
R Square	0.889532876							
Adjusted R Square	0.881642367							
Standard Error	278276.016							
Observations	16							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	8.72989E+12	8.72989E+12	112.7345386	4.42448E-08			
Residual	14	1.0841[illegible]E+12	77437541101					
Total	15	9.[illegible]401E+12						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	988137.0308	516444.8106	1.913344874	0.076376522	-119526.924	2095800.986	-119526.924	2095801
X Variable 1	143.0180435	13.46983688	10.61765222	4.42448E-08	114.1281166	171.9079703	114.1281166	171.90797

b. Scroll to the top of the worksheet where the forecasting template is located, and **paste special > values > transpose** into columns G through H (labeled "Intercept" and "X1 = Volume") of the top-most visible row.

a) Copy these values and paste into all of the remaining template entries for the dominate trade **ONLY**. Dominant template ends in row 16 (column B labels rows dom or non-dom). See below screenshot for reference.

	A	B	C	D	E	F	G	H	I	
1	Trade	Dominant ID	Month	FY	Peak Month?	Volume	Intercept	X1 = Volume	X2 = Peak Month?	Un
5	TPWC	Dom	Apr	17	-	36,811	988,137.031	143.018		$
6	TPWC	Dom	May	17	-	37,942	988,137.031	143.018	(Ctrl)	$
7	TPWC	Dom	Jun	17	1	49,050	988,137.031	143.018		$
8	TPWC	Dom	Jul	17	-	39,797	988,137.031	143.018		$
9	TPWC	Dom	Aug	17	-	40,371	988,137.031	143.018		$
10	TPWC	Dom	Sep	17	1	53,763	988,137.031	143.018		$
11				17	-	38,100	988,137.031	143.018		$
12				17	-	39,400	988,137.031	143.018		$
13				17	1	43,829	988,137.031	143.018		$
14				17	-	40,865	988,137.031	143.018		$
15	TPWC	Dom	Feb	17		4[illegible],439	988,137.031	143.018		$
16	TPWC	Dom	Mar	17	1	4[illegible]	988,137.031	143.018		$
20	TPWC	Non Dom	Apr	17	-	28,296	(119,956.673)	171.932	(114,214.929)	$
21	TPWC	Non Dom	May	17	-	28,606	(119,956.673)	171.932	(114,214.929)	$
22	TPWC	Non Dom	Jun	17	1	35,257	(119,956.673)	171.932	(114,214.929)	$
23	TPWC	Non Dom	Jul	17	-	27,398	(119,956.673)	171.932	(114,214.929)	$
24	TPWC	Non Dom	Aug	17	-	27,788	(119,956.673)	171.932	(114,214.929)	$
25	TPWC	Non Dom	Sep	17	1	35,120	(119,956.673)	171.932	(114,214.929)	$
26	TPWC	Non Dom	Oct	17	-	28,096	(119,956.673)	171.932	(114,214.929)	$
27	TPWC	Non Dom	Nov	17	-	28,726	(119,956.673)	171.932	(114,214.929)	$
28	TPWC	Non Dom	Dec	17	1	33,854	(119,956.673)	171.932	(114,214.929)	$
29	TPWC	Non Dom	Jan	17	-	28,623	(119,956.673)	171.932	(114,214.929)	$
30	TPWC	Non Dom	Feb	17	-	28,252	(119,956.673)	171.932	(114,214.929)	$
31	TPWC	Non Dom	Mar	17	1	34,257	(119,956.673)	171.932	(114,214.929)	$
32										

Paste regression coefficients up to here.

(2) Next, copy the two regression coefficients of the CY Full equation.

SUMMARY OUTPUT

CY Full

Regression Statistics	
Multiple R	0.976286583
R Square	0.953135491
Adjusted R Square	0.949788026
Standard Error	240901.083
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.6524E+1[illegible]	1.6524E+13	284.7335273	1.06202E-10
Residual	14	8.1246[illegible]+11	58033331774		
Total	15	1.7[illegible]65E+13			

	Coefficients	*[illegible]andard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper*
Intercept	169963.7117	497466.8681	0.341658355	0.737682141	-896996.6047	1236924.028	-896996.605	12
X Variable 1	1.297581919	0.076898077	16.87404893	1.06202E-10	1.132651947	1.462511892	1.132651947	1.46

Copy values

a. Scroll to the top of the worksheet where the forecasting template is located, and **past special > values > transpose** into columns AF through AG (labeled "Intercept" and "Z1 = CYLV") of the top-most visible row.

a) Copy these values and paste into all of the remaining template entries for the dominate trade **ONLY**. Dominant template ends in row 16.

AD	AE	AF	AG	AH	AI	AJ
LA Adj CYXX	Forecasted CYXX	Intercept	Z1 = CYLV	Unadjusted CY Full	Forecasted CY Full	Cost/TEU
1,318,607	$ 2,058,099	169,963.712	1.298	$ 8,283,450	$ 8,151,802	$ 221
1,349,869	$ 2,106,892	169,963.712	1.298	$ 8,493,377	$ 8,358,263	$ 220
1,656,842	$ 2,586,019	169,963.712	1.298	$ 10,554,735	$ 10,385,590	$ 212
1,436,218	$ 2,231,057	169,963.712	1.298	$ 8,837,672	$ 8,768,268	$ 220
1,452,471	$ 2,256,306	169,963.712	1.298	$ 8,944,151	$ 8,873,823	$ 220
1,831,827	$ 2,845,607	169,963.712	1.298	$ 11,429,353	$ 11,337,471	$ 211
1,388,130	$ 2,156,356	169,963.712	1.298	$ 8,522,641	$ 8,455,969	$ 222
1,424,958	$ 2,213,567	169,963.712	1.298	$ 8,763,911	$ 8,695,146	$ 221
1,550,422	$ 2,408,464	169,963.712	1.298	$ 9,585,834	$ 9,509,941	$ 217
1,466,466	$ 2,278,045	169,963.712	1.298	$ 9,035,831	$ 8,964,708	$ 219
1,539,378	$ 2,391,309	169,963.712	1.298	$ 9,513,488	$ 9,438,222	$ 217
1,614,499	$ 2,508,004	169,963.712	1.298	$ 10,005,611	$ 9,926,077	$ 215
1,740,734	$ 2,71[illegible]				$ 7,341,278	$ 259
1,765,465	$ 2,[illegible]5,569				$ 7,431,821	$ 260
2,296,051	$ 3,583,704				$ 9,263,079	$ 263
1,710,900	$ 2,657,756				$ 7,150,378	$ 261
	[illegible]7,252				$ 7,265,437	$ 261
	[illegible]8,593				$ 9,318,641	$ 265
	[illegible]6,391				$ 7,356,418	$ 262
1,819,475	$ 2,826,419				$ 7,542,449	$ 263
2,238,807	$ 3,477,820				$ 8,944,910	$ 264
1,811,052	$ 2,813,335				$ 7,512,035	$ 262
1,780,715	$ 2,766,207				$ 7,402,483	$ 262
2,271,761	$ 3,529,012				$ 9,063,911	$ 265

Paste only up to this point.

7) New forecasts for TPWC **dominant** CY Full cost can now be gathered from the column labeled "Forecasted CY Full" (column AI) through row 16.

4. Next, repeat the process of generating new forecasts with slightly different steps for TPWC non-dominant trade.

1) Scroll down to the TPWC non-dominant actuals data located below the dominant actuals data.

2) Start with deriving the CYLV forecast equation (refer to section B for details on equation set up for each trade).

(1) Click on the Data tab at the top of the Excel toolbar.

(2) Select "Data Analysis".

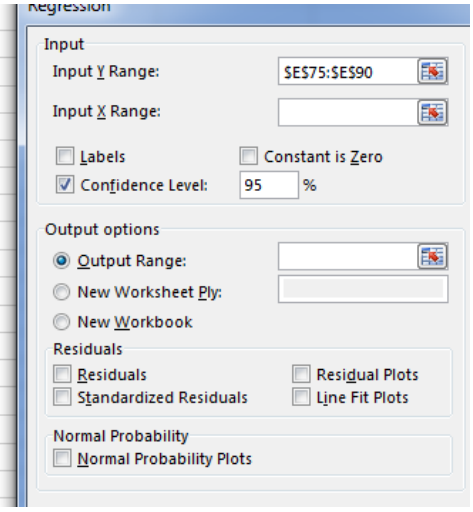
(3) When the Data Analysis window pops up, select "Regression" and hit OK.

(4) Another window will pop up titled “Regression” enter the information using the following guidelines:

a. Input Y Range: This is our dependent variable. For the CYLV equation, the dependent variable is CYLV cost.

a) Select the **SECOND FROM THE TOP NUMERIC** data entry for CYLV, and drag the dotted green outline to the final CYLV actual entry.

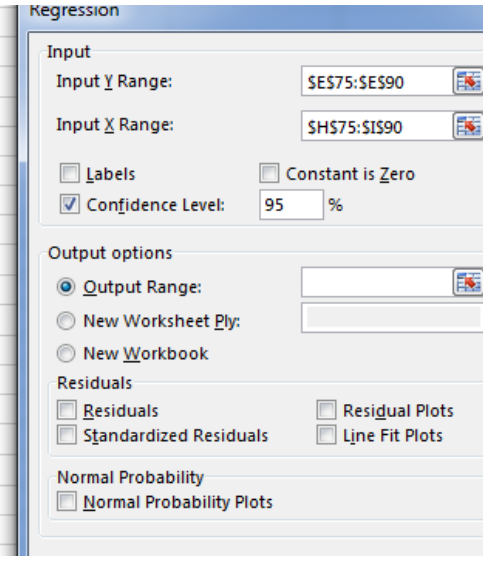
TRADE GROUP	TRADE TYPE	MONTH	FY	CYLV	CYXX	CY FULL	TEU	PEAK MONTH
TPWC	NON DOM	Nov	15	3,690,477	1,935,721	5,626,198	21,581	-
TPWC	NON DOM	Dec	15	3,826,529	2,413,441	6,483,522	25,183	1
TPWC	NON DOM	Jan	15	2,943,336	1,339,889	4,117,139	16,469	-
TPWC	NON DOM	Feb	15	3,491,494	2,044,950	5,536,444	21,366	-
TPWC	NON DOM	Mar	15	4,789,106	2,909,478	7,698,583	29,610	1
TPWC	NON DOM	Apr	16	4,335,195	2,786,836	7,122,031	26,679	-
TPWC	NON DOM	May	16	3,949,753	1,648,776	6,079,316	24,328	-
TPWC	NON DOM	Jun	16	4,926,309	2,657,791	7,584,100	29,642	1
TPWC	NON DOM	Jul	16	3,896,822	1,724,145	5,796,189	22,795	-
TPWC	NON DOM	Aug	16	3,723,369	2,015,820	5,769,422	22,269	-
TPWC	NON DOM	Sep	16	5,201,304	2,176,480	7,612,205	30,097	1
TPWC	NON DOM	Oct	16	4,178,937	2,098,435	6,277,372	24,705	-
TPWC	NON DOM	Nov	16	4,540,123	2,672,301	7,212,424	27,208	-
TPWC	NON DOM	Dec	16	4,889,612	3,349,488	8,239,099	29,492	1
TPWC	NON DOM	Jan	16	3,226,110	1,918,158	5,406,290	20,614	-
TPWC	Non Dom	Feb	16	4,737,940	2,485,828	7,223,769	27,512	-
TPWC	Non Dom	Mar	16	6,051,211	3,985,593	10,036,804	36,798	1



b. Input X Range: These are our explanatory variables. For this CYLV equation, there are two explanatory variables -- Volume and Peak Month.

a) Select the **SECOND FROM THE TOP NUMERIC** data entry for Volume. Drag the dotted green outline to the final Volume entry, and then drag over to the right so that the same entries of the Peak Month variable column are also captured in the green dotted border.

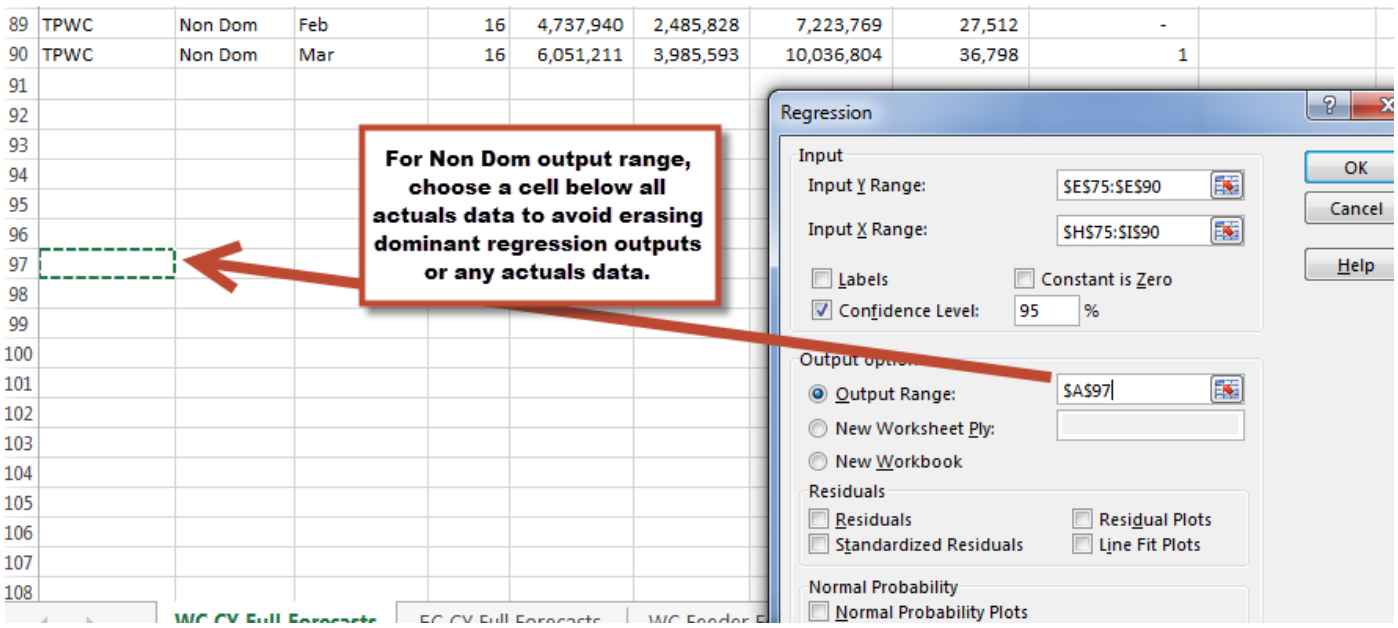
TRADE GROUP	TRADE TYPE	MONTH	FY	CYLV	CYXX	CY FULL	TEU	PEAK MONTH
TPWC	NON DOM	Nov	15	3,690,477	1,935,721	5,626,198	21,581	-
TPWC	NON DOM	Dec	15	3,826,529	2,413,441	6,483,522	25,183	1
TPWC	NON DOM	Jan	15	2,943,336	1,339,889	4,117,139	16,469	-
TPWC	NON DOM	Feb	15	3,491,494	2,044,950	5,536,444	21,366	-
TPWC	NON DOM	Mar	15	4,789,106	2,909,478	7,698,583	29,610	1
TPWC	NON DOM	Apr	16	4,335,195	2,786,836	7,122,031	26,679	-
TPWC	NON DOM	May	16	3,949,753	1,648,776	6,079,316	24,328	-
TPWC	NON DOM	Jun	16	4,926,309	2,657,791	7,584,100	29,642	1
TPWC	NON DOM	Jul	16	3,896,822	1,724,145	5,796,189	22,795	-
TPWC	NON DOM	Aug	16	3,723,369	2,015,820	5,769,422	22,269	-
TPWC	NON DOM	Sep	16	5,201,304	2,176,480	7,612,205	30,097	1
TPWC	NON DOM	Oct	16	4,178,937	2,098,435	6,277,372	24,705	-
TPWC	NON DOM	Nov	16	4,540,123	2,672,301	7,212,424	27,208	-
TPWC	NON DOM	Dec	16	4,889,612	3,349,488	8,239,099	29,492	1
TPWC	NON DOM	Jan	16	3,226,110	1,918,158	5,406,290	20,614	-
TPWC	Non Dom	Feb	16	4,737,940	2,485,828	7,223,769	27,512	-
TPWC	Non Dom	Mar	16	6,051,211	3,985,593	10,036,804	36,798	1



c. Check the “Confidence Level” box and make sure the level is set to 95%.

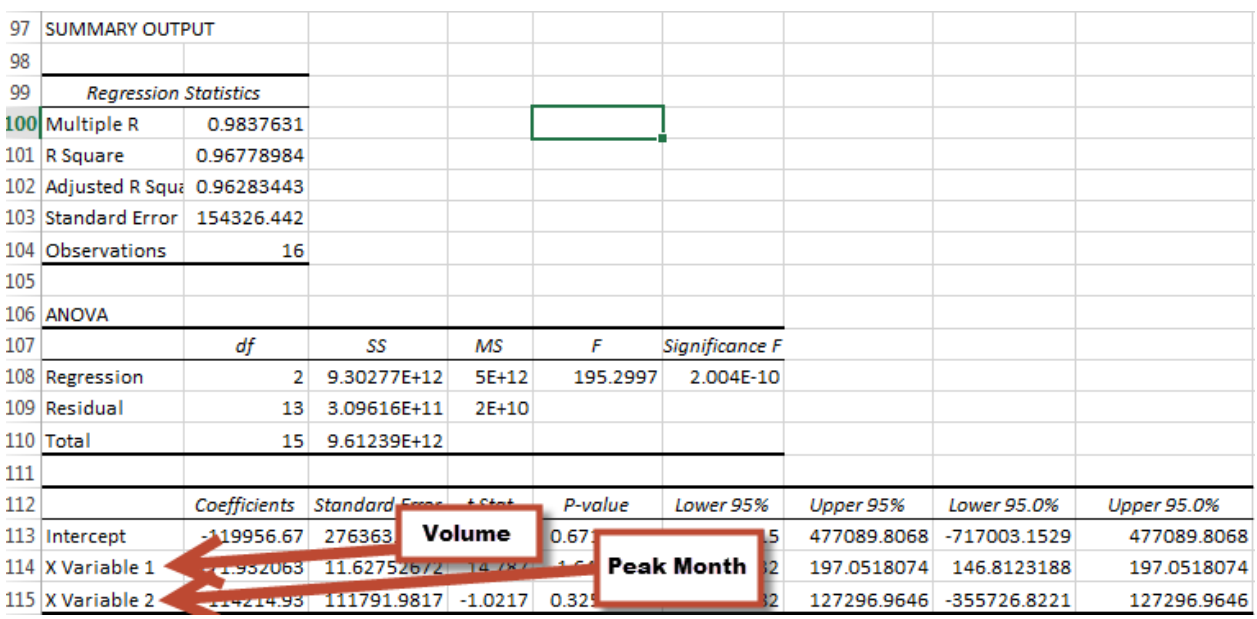
d. Under the Output Options section, select “Output Range”, and select a cell underneath the actuals data with plenty of empty cell space surrounding it (make sure the output from TPWC dominant regressions is not in the way).

e. Hit “OK”.



(5) The regression output should look similar to below.

a. “X Variable 1” represents the Volume variable, and “X Variable 2” represents the Peak Month dummy variable.



97	SUMMARY OUTPUT								
98									
99	*Regression Statistics*								
100	Multiple R	0.9837631							
101	R Square	0.96778984							
102	Adjusted R Squa	0.96283443							
103	Standard Error	154326.442							
104	Observations	16							
105									
106	ANOVA								
107		*df*	*SS*	*MS*	*F*	*Significance F*			
108	Regression	2	9.30277E+12	5E+12	195.2997	2.004E-10			
109	Residual	13	3.09616E+11	2E+10					
110	Total	15	9.61239E+12						
111									
112		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
113	Intercept	-119956.67	276363		0.67	5	477089.8068	-717003.1529	477089.8068
114	X Variable 1	-1.932063	11.62752672	14.787	1.64	2	197.0518074	146.8123188	197.0518074
115	X Variable 2	-114214.93	111791.9817	-1.0217	0.325	2	127296.9646	-355726.8221	127296.9646

3) Next, run the CYXX regression analysis (refer to section B for details on equation set up for each trade).

(1) Click on the Data tab at the top of the Excel toolbar.

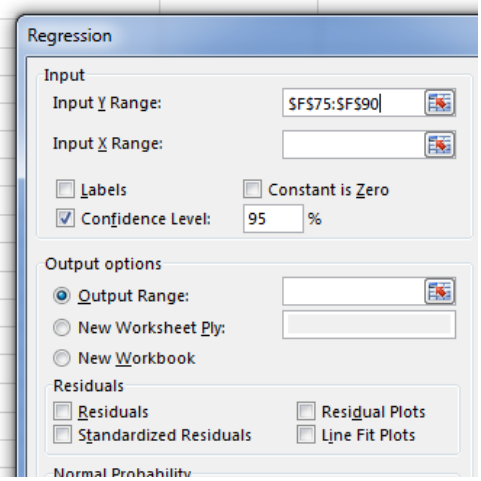
(2) Select “Data Analysis”.

(3) When the Data Analysis window pops up, select “Regression” and hit OK.

(4) Another window will pop up titled “Regression” enter the information using the following guidelines:

a. Input Y Range: This is our dependent variable. For the CYXX cost equation, the dependent variable is CYXX cost.
   a) Select the **SECOND FROM THE TOP NUMERIC** data entry for CYXX, and drag the dotted green outline to the final CYXX actual entry.

TRADE GROUP	TRADE TYPE	MONTH	FY	CYLV	CYXX	CY FULL	TEU	PEAK MONTH
TPWC	NON DOM	Nov	15	3,690,477	1,935,721	5,626,198	21,581	-
TPWC	NON DOM	Dec	15	3,826,529	2,413,441	6,483,522	25,183	1
TPWC	NON DOM	Jan	15	2,943,336	1,339,889	4,117,139	16,469	-
TPWC	NON DOM	Feb	15	3,491,494	2,044,950	5,536,444	21,366	-
TPWC	NON DOM	Mar	15	4,789,106	2,909,478	7,698,583	29,610	1
TPWC	NON DOM	Apr	16	4,335,195	2,786,836	7,122,031	26,679	-
TPWC	NON DOM	May	16	3,949,753	1,648,776	6,079,316	24,328	-
TPWC	NON DOM	Jun	16	4,926,309	2,657,791	7,584,100	29,642	1
TPWC	NON DOM	Jul	16	3,896,822	1,724,145	5,796,189	22,795	-
TPWC	NON DOM	Aug	16	3,723,369	2,015,820	5,769,422	22,269	-
TPWC	NON DOM	Sep	16	5,201,304	2,176,480	7,612,205	30,097	1
TPWC	NON DOM	Oct	16	4,178,937	2,098,435	6,277,372	24,705	-
TPWC	NON DOM	Nov	16	4,540,123	2,672,301	7,212,424	27,208	-
TPWC	NON DOM	Dec	16	4,889,612	3,349,488	8,239,099	29,492	1
TPWC	NON DOM	Jan	16	3,226,110	1,918,158	5,406,290	20,614	-
TPWC	Non Dom	Feb	16	4,737,940	2,485,828	7,223,769	27,512	-
TPWC	Non Dom	Mar	16	6,051,211	3,985,593	10,036,804	36,798	1



b. Input X Range: This is our explanatory variable. For the CYXX equation, the explanatory variable is Volume.
   a) Select the **SECOND FROM THE TOP NUMERIC** data entry for Volume, and drag the dotted green outline to the final actual entry for Volume.
c. Check the “Confidence Level” box and make sure the level is set to 95%.
d. Under the Output Options section, select “Output Range”, and select a cell below the actuals data, to the right of the CYLV regression output, AND well below the output data of the TPWC dominant regressions.
e. Hit “OK”.

(5) The output of the two regressions should look similar to the below screenshot. It may help you to label which output belongs to which regression equation.

Label the output of each regression.

SUMMARY OUTPUT

CYLV

Regression Statistics	
Multiple R	0.9837631
R Square	0.96778984
Adjusted R Squa	0.96283443
Standard Error	154326.442
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	9.30277E+12	5E+12	195.2997	2.004E-10
Residual	13	3.09616E+11	2E+10		
Total	15	9.61239E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-119956.67	276363.2392	-0.4341	0.67136574	-717003.15	477089.8068	-717003.1529	477089.8068
X Variable 1	171.932063	11.62752672	14.787	1.6472E-09	146.81232	197.0518074	146.8123188	197.0518074
X Variable 2	-114214.93	111791.9817	-1.0217	0.32557255	-355726.82	127296.9646	-355726.8221	127296.9646

SUMMARY OUTPUT

CYXX

Regression Statistics	
Multiple R	0.879572893
R Square	0.773648475
Adjusted R Square	0.757480508
Standard Error	330667.379
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5.23204E+12	5.23204E+12	47.8506987	7.12348E-06
Residual	14	1.53077E+12	1.09341E+11		
Total	15	6.76281E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-795576.7932	467764.0902	-1.700807757	0.111074703	-1798830.987	207677.4006
X Variable 1	122.8560511	17.7603864	6.917419945	7.12348E-06	84.76381081	160.9482915

4) Make sure that the regression equations are statistically significant.

   (1) This should not be an issue at all because these variables have been tested multiple times, but it is still important to check that the new actuals data did not throw anything off.

   (2) Start with the CYLV regression output.

      a. Because this regression has multiple explanatory variables (Volume & Peak Month), you will need to calculate two types of Degree of Freedom manually.

         a) Numerator Degree of Freedom (NDF) = k – 1

            (a) k = number of explanatory variables

            (b) The NDF will **ALWAYS equal 1** for the TPWC non-dominant CYLV regression (unless more variables are added to the model down the road).

         b) Denominator Degree of Freedom (DDF) = N – k

            (a) N = number of data entries used as explanatory variable input.

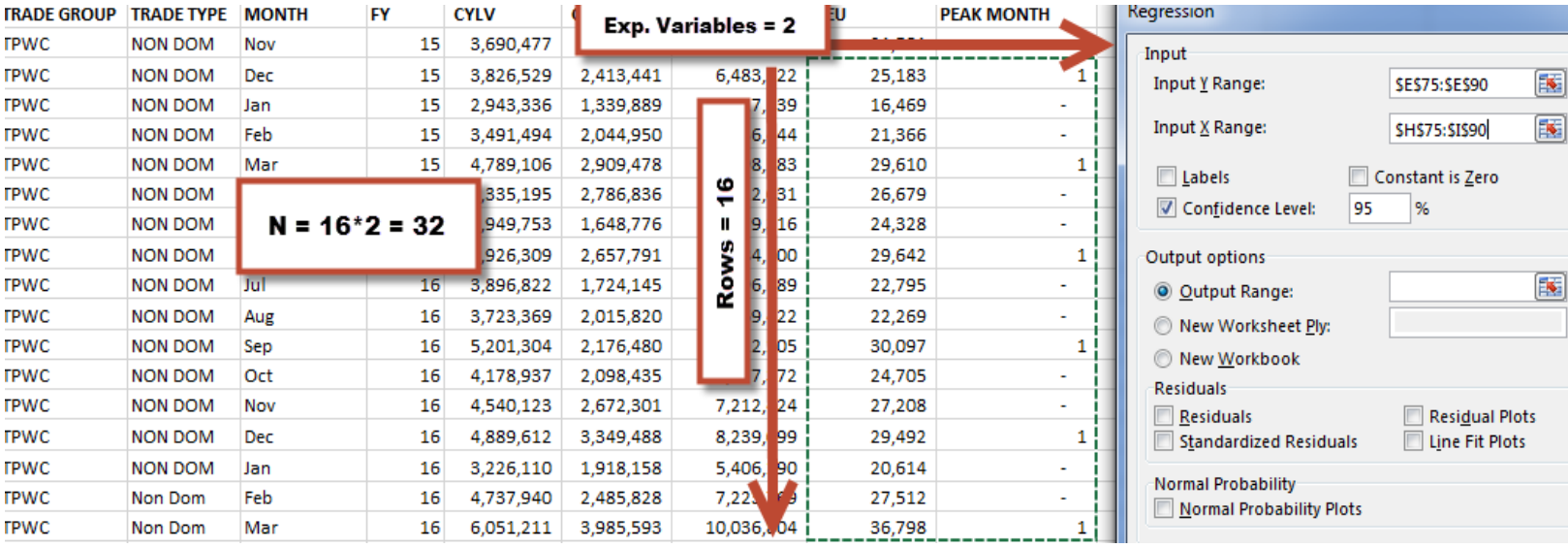
               a. This is the number of cells that you highlighted with the green dotted outline when entering the "Input X Range" field in the regression analysis window.

               b. This number will vary each time you test equation significance because an additional row of actuals data will be included in regression input each month.

i. In this walk through example, I have 17 months of data (from Nov FY 2015 to March FY 2016), which means I have included 16 months' worth of data in the regression analysis. There are also two explanatory variables (Volume and Peak Month).

ii. N = 16*2 = 32 → **<u>BUT THIS IS NOT OUR VALUE OF DDF</u>**

(b) **<u>DDF</u>** = N – k = 32- 2 = **<u>30</u>**



TRADE GROUP	TRADE TYPE	MONTH	FY	CYLV				PEAK MONTH
TPWC	NON DOM	Nov	15	3,690,477				
TPWC	NON DOM	Dec	15	3,826,529	2,413,441	6,483, 22	25,183	1
TPWC	NON DOM	Jan	15	2,943,336	1,339,889	7, 39	16,469	-
TPWC	NON DOM	Feb	15	3,491,494	2,044,950	6, 44	21,366	-
TPWC	NON DOM	Mar	15	4,789,106	2,909,478	8, 83	29,610	1
TPWC	NON DOM			,335,195	2,786,836	2, 31	26,679	-
TPWC	NON DOM			,949,753	1,648,776	9, 16	24,328	-
TPWC	NON DOM			,926,309	2,657,791	4, 00	29,642	1
TPWC	NON DOM	Jul	16	3,896,822	1,724,145	6, 89	22,795	-
TPWC	NON DOM	Aug	16	3,723,369	2,015,820	9, 22	22,269	-
TPWC	NON DOM	Sep	16	5,201,304	2,176,480	2, 05	30,097	1
TPWC	NON DOM	Oct	16	4,178,937	2,098,435	7, 72	24,705	-
TPWC	NON DOM	Nov	16	4,540,123	2,672,301	7,212, 24	27,208	-
TPWC	NON DOM	Dec	16	4,889,612	3,349,488	8,239, 99	29,492	1
TPWC	NON DOM	Jan	16	3,226,110	1,918,158	5,406, 90	20,614	-
TPWC	Non Dom	Feb	16	4,737,940	2,485,828	7,22	27,512	-
TPWC	Non Dom	Mar	16	6,051,211	3,985,593	10,036, 04	36,798	1

b. Consult the standard **<u>F-Table</u>** to obtain a value of the f-stat (Use the F-Table instead of the T-Table because there is more than one explanatory variable).

a) The f-stat is the entry in which your NDF value (along the top of the table), meets your DDF value (labeled on the left side of the table).

(a) If the exact DDF value is not represented on the table, round to the nearest value of DDF that is on the table.

(b) In our example, DDF = 30 and NDF = 1, so the f-stat value from the F-Table is 4.1709 (see below screenshot).

F - Distribution ($\alpha = 0.05$ in the Right Tail)

Denominator Degrees of Freedom (df_2) \ Numerator Degrees of Freedom (df_1)	1	2	3	4	5	6	7	8	9
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385
3	10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123
4	7.7086	9.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	6.9988
5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725
6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990
7	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767
8	5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005	3.4381	3.3881
9	5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789
10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204
11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962
12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964
13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144
14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458
15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876
16	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377
17	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943
18	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563
19	4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227
20	4.3512	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928
21	4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3660
22	4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419
23	4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201
24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002
25	4.2417	3.3852	2.9912	2.7587	2.6030	2.4904	2.4047	2.3371	2.2821
26	4.2252	3.3690	2.9752	2.7426	2.5868	2.4741	2.3883	2.3205	2.2655
27	4.2100	3.3541	2.9604	2.7278	2.5719	2.4591	2.3732	2.3053	2.2501
28	4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360
29	4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2783	2.2229
30	4.1709	3.3158	2.9223	2.6896	2.5336	2.4205	2.3343	2.2662	2.2107
40	4.0847	3.2317	2.8387	2.6060	2.4495	2.3359	2.2490	2.1802	2.1240
60	4.0012	3.1504	2.7581	2.5252	2.3683	2.2541	2.1665	2.0970	2.0401
120	3.9201	3.0718	2.6802	2.4472	2.2899	2.1750	2.0868	2.0164	1.9588
∞	3.8415	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9384	1.8799

c. Compare the F-Table f-stat to the f-stat from the regression output.

   a) The regression f-stat needs to be **greater than** the f-stat on the table.

   b) In this example, the regression f-stat is about 195.3 which is greater than 4.1709

d. Next, make sure the Significance F is **less than** .05

e. Last, make sure the R Square is **greater than** .6

R Square > .6

f-stat > F-Table stat

Significance F < .05

97	SUMMARY OUTPUT								
98	CYLV								
99	*Regression Statistics*								
100	Multiple R	0.9837631							
101	R Square	0.96778984							
102	Adjusted R Squa	0.96283443							
103	Standard Error	154326.442							
104	Observations	16							
105									
106	ANOVA								
107		*df*	*SS*	*MS*	*F*	*Significance F*			
108	Regression	2	9.30277E+12	5E+12	195.2997	2.004E-10			
109	Residual	13	3.09616E+11	2E+10					
110	Total	15	9.61239E+12						
111									
112		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
113	Intercept	-119956.67	276363.2392	-0.4341	0.67136574	-717003.15	477089.8068	-717003.1529	477089.8068
114	X Variable 1	171.932063	11.62752672	14.787	1.6472E-09	146.81232	197.0518074	146.8123188	197.0518074
115	X Variable 2	-114214.93	111791.9817	-1.0217	0.32557255	-355726.82	127296.9646	-355726.8221	127296.9646

(3) Next, verify CYXX equation significance.

a. To do this, use steps similar to those laid out earlier in the TPWC dominant steps for verifying a regression with a single explanatory variable.

5) Assuming that both equations are significant, focus on the regression coefficients from each equations output.

(1) Start with copying the three regression coefficients for the CYLV equation.

a. There will be three coefficients: one for Intercept, one for X Variable 1, one for X Variable 2.

SUMMARY OUTPUT								
CYLV								
Regression Statistics								
Multiple R	0.9837631							
R Square	0.96778984							
Adjusted R Squa	0.96283443							
Standard Error	154326.442							
Observations	16							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	9.30277E+12	5E+12	195.2997	2.004E-10			
Residual	13	3.09616E+11	2E+10					
Total	15	9.61239E+12						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0*
Intercept	-119956.67	276363.2392	-0.4341	0.67136574	-717003.15	477089.8068	-717003.1529	477089.
X Variable 1	171.932063	11.62752672	14.787	1.6472E-09	146.81232	197.0518074	146.8123188	197.051
X Variable 2	-114214.93	111791.9817	-1.0217	0.32557255	-355726.82	127296.9646	-355726.8221	127296.

b. Scroll to the top of the worksheet where the forecasting template is located, and **paste special > values > transpose** into columns G through I (labeled "Intercept", "X1 = Volume", and "X2 = Peak Month?") of the top-most visible row of **non-dominant** trade entries (row 20 in this example).

a) Non-dominant rows of the forecast template begin after row 16 (column B also labels rows as dom or non-dom).

b) Copy these values and paste into all of the remaining template entries for the non-dominate trade **<u>ONLY</u>** (refer to the screenshot below for reference).

	A	B	C	D	E	F	G	H	I
1	Trade	Dominant ID	Month	FY	Peak Month?	Volume	Intercept	X1 = Volume	X2 = Peak Month?
5	TPWC	Dom	Apr	17	-	36,811	988,137.031	143.018	
6	TPWC	Dom	May	17	-	37,942	988,137.031	143.018	
7	TPWC	Dom	Jun	17	1	49,050	988,137.031	143.018	
8	TPWC	Dom	Jul	17	-	39,797	988,137.031	143.018	
9	TPWC	Dom	Aug	17	-	40,371	988,137.031	143.018	
10	TPWC	Dom	Sep	17	1	53,763	988,137.031	143.018	
11	TPWC	Dom	Oct	17	-	38,100	988,137.031	143.018	
12	TPWC	Dom	Nov	17	-	39,400	988,137.031	143.018	
13	TPWC	Dom	Dec	17	1	43,829	988,137.031	143.018	
14	TPWC	Dom	Jan	17	-	40,865	988,137.031	143.018	
15	TPWC	Dom	Feb	17	-	43,439	988,137.031	143.018	
16	TPWC	Dom	Mar	17	1	46,091	988,137.031	143.018	
20	TPWC	Non Dom	Apr	17	-	28,296	(119,956.673)	171.932	(114,214.929)
21	TPWC	Non Dom	May	17	-	28,606	(119,956.673)	171.932	(114,214.929)
22	TPWC	Non Dom	Jun	17	1	35,257	(119,956.673)	171.932	(114,214.929)
23	TPWC	Non Dom	Jul	17	-	27,398	(119,956.673)	171.932	(114,214.929)
24	TPWC	Non Dom	Aug	17	-	27,788	(119,956.673)	171.932	(114,214.929)
25	TPWC	Non Dom	Sep	17	1	35,120	(119,956.673)	171.932	(114,214.929)
26	TPWC	Non Dom	Oct	17	-	28,096	(119,956.673)	171.932	(114,214.929)
27	TPWC	Non Dom	Nov	17	-	28,726	(119,956.673)	171.932	(114,214.929)
28	TPWC	Non Dom	Dec	17	1	33,854	(119,956.673)	171.932	(114,214.929)
29	TPWC	Non Dom	Jan	17	-	28,623	(119,956.673)	171.932	(114,214.929)
30	TPWC	Non Dom	Feb	17	-	28,252	(119,956.673)	171.932	(114,214.929)
31	TPWC	Non Dom	Mar	17	1	34,257	(119,956.673)	171.932	(114,214.929)

(2) Next, copy the two regression coefficients from the CYXX equation.

a. Scroll to the top of the worksheet, and **paste special > values > transpose** into columns T through U (labeled "Intercept" and "Y1 = Volume") of the top-most visible row of non-dominant trade entries.

a) Note that these coefficient values of non-dominant's second equation are pasted into different columns than the coefficients from dominant's second equation (see below screenshot for reference).

b) Non-dominant rows of the forecast template begin after row 16.

c) Copy these values and paste into all of the remaining template entries for the non-dominate trade **ONLY**.

	S	T	U	V	W	X
1	**Forecasted CYLV**	Intercept	Y1 = Volume	Unadjusted CYXX	Vanc Unadj CYXX	PNW(SEA) Unadj CYXX
5	**$ 6,093,704**			$ 2,030,676	324,908	162,454
6	**$ 6,251,371**			$ 2,078,820	332,611	166,306
7	**$ 7,799,571**			$ 2,551,563	408,250	204,125
8	**$ 6,537,210**			$ 2,157,779	345,245	172,622
9	**$ 6,617,517**			$ 2,182,199	349,152	174,576
10	**$ 8,491,864**			$ 2,752,144	440,343	220,172
11	**$ 6,299,613**			$ 2,085,531	333,685	166,842
12	**$ 6,481,579**			$ 2,140,863	342,538	171,269
13	**$ 7,101,477**			$ 2,329,359	372,698	186,349
14	**$ 6,686,662**			$ 2,203,224	352,516	176,258
15	**$ 7,046,913**			$ 2,312,768	370,043	185,021
16	**$ 7,418,073**			$ 2,425,629	388,101	194,050
20	**$ 4,624,319**	(795,576.793)	122.856	$ 2,680,758	428,921	214,461
21	**$ 4,676,262**	(795,576.793)	122.856	(Ctrl) 718,843	435,015	217,507
22	**$ 5,679,375**	(795,576.793)	122.856	$ 3,535,954	565,753	282,876
23	**$ 4,492,622**	(795,576.793)	122.856	$ 2,570,463	411,274	205,637
24	**$ 4,558,185**	(795,576.793)	122.856	$ 2,618,334	418,933	209,467
25	**$ 5,680,048**	(795,576.793)	122.856	$ 3,519,085	563,054	281,527
26	**$ 4,610,027**	(795,576.793)	122.856	$ 2,656,187	424,990	212,495
27	**$ 4,716,031**	(795,576.793)	122.856	$ 2,733,586	437,374	218,687
28	**$ 5,467,091**	(795,576.793)	122.856	$ 3,363,592	538,175	269,087
29	**$ 4,698,700**	(795,576.793)	122.856	$ 2,720,932	435,349	217,675
30	**$ 4,636,276**	(795,576.793)	122.856	$ 2,675,352	428,056	214,028
31	**$ 5,534,899**	(795,576.793)	122.856	$ 3,413,103	546,096	273,048
32						

6) You can now gather new TPWC **non-dominant** forecasts from the column labeled "Forecasted CY Full" (column AI). These new non-dominant forecasts will be located below dominant forecasts, which end in row 16.

5. Repeat steps for generating forecasts in the "EC CY Full Forecasts" worksheet of the "Forecast Template" file.

1) For TPEC dominant, steps for a single explanatory variable analysis should be taken for the CYLV equation, and steps for a multiple explanatory variable analysis should be taken for the CYXX equation.

(1) CYLV equation explanatory variables: Volume.

(2) CYXX equation explanatory variables: Volume and Peak Month.

2) For TPEC non-dominant, steps for a single explanatory variable analysis should be taken for both the CYLV equation and the CYXX equation.

(1) CYLV equation explanatory variables: Volume.

(2) CYXX equation explanatory variables: Volume.