Risk Management Case Competition

Group Name: LIFO5

Group Member: Fan, Qingyuan Hu, Yunlan Wang, Jingyi Zhou, Hanyu

First of all, we choose to use CAPM model (Capital Market Pricing Model) to distinguish high and low beta among 18 companies. In CAMP model, beta is the only asset-specific factor to estimate expected return. Assume market beta equals to 1. A low beta (beta < 1) company indicates the stock of it is theoretically less volatile than the market, which means the portfolio is less risky with the stock included than without it. On the other hand, a high beta (beta >1) company indicates its stock's price is theoretically more volatile than the market, which means adding the stock to a portfolio will increase the portfolio's risk but also increase its expected return. It's worth noting that some companies have negative beta, which means that the stock is inversely correlated to the market benchmark as if it was an opposite, mirror image of the benchmark's trends.

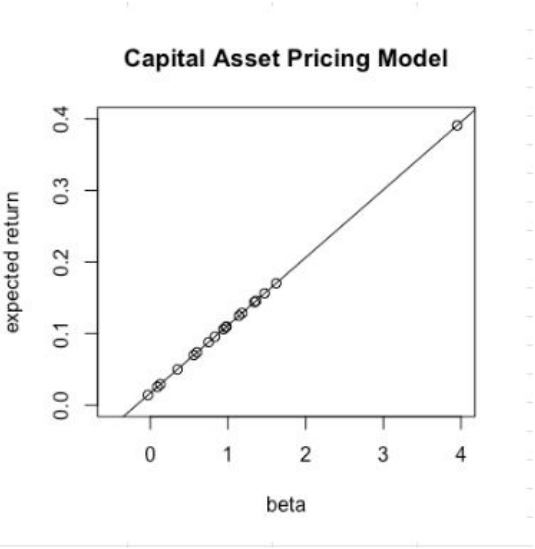
For this model, we find the expected return of market is 11.17% and the risk free rate is 1.71%. In addition, we need to compute companies' expected return, which are simply our today's price divided by yesterday's price minus 1. After calculating these data, we could get beta through the equation $ERi = Rf + \beta_i(ERm - Rf)$.

Finally, we put the expected return and beta of each companies in the following figure.

Then We find the companies with high beta are Kinaxis, Suncor Energy Inc., Canopy Growth Corporation, Dollarama, TMX Group Limited, Superior Plus Corp and Northland Power. And the low beta companies are TECSYS Inc., Constellation Software, TerraVest industries Inc., Parkland Fuel Corporation, Zymeworks, Chartwell Retirement Residences, AGT Food and

Ingredients, Maple Leaf Foods, Alaris Royalty Corp., Royal Bank of Canada and Hydro One Limited.

Company Name	Beta	expected return
TECSYS Inc.	0.73	8.81%
Kinaxis	1.12	12.87%
Constellation Software	0.71	7.39%
TerraVest industries Inc.	0.862	7.01%
Parkland Fuel Corporation	0.35	5.02%
Suncor Energy Inc.	1.04	17.03%
Zymeworks	-0.01	1.43%
Chartwell Retirement Residences	0.81	9.56%
Canopy Growth Corporation	3.89	39.07%
AGT Food and Ingredients	0.09	2.56%
Maple Leaf Foods	0.94	10.60%
Dollarama	1.36	14.58%
Alaris Royalty Corp.	0.96	10.98%
TMX Group Limited	1.43	15.62%
Royal Bank of Canada	0.79	10.89%
Superior Plus Corp	0.16	14.39%
Northland Power	1.46	12.49%
Hydro One Limited	0.13	2.94%



1. Smart Beta Evaluation

(1)Introduction: We use Fama-French Three Factor Model

$$r = R_f + \beta_3(R_m - R_f) + b_s \cdot SMB + b_v \cdot HML + \alpha$$

From the total 18 companies' data,we can derive the total regression statistics, which can show that r=0.001021+0.127112(Rm-Rf)-0.01651*SMB+0.007168*HML.Where SMB represents historic excess returns of small-cap companies over large-cap companies, which is the proportion of bankruptcies of small companies that are higher than the bankruptcy of large companies. Investors are aware of this difference in scale and thus require a higher rate of return.

Since we got a negative coefficient for SMB, the portfolio of companies with smaller market capitalizations cannot bring higher returns. In general, the market does not value this risk heavily. However in the other side, they will also bring low risk.HML refers to the ratio of stock price per share to net assets per share,which can be used for stock investment analysis. Generally

speaking, since we got low coefficient for HML, the portfolio has high investment value. Although, when judging the investment value, the market environment and the company's operation status should also be considered.

In fact, all these three factors have risks behind them: market risk, small size risk, high book value ratio risk and low investment risk. Since both of the coefficients for HML and Rm-Rf are positive, we can conclude that the market value these risks heavily. For High-tech industries(TECSYS Inc., Kinaxis, Constellation Software) stocks,the market is volatile, the beta should be greater than 1, but the corresponding profit space will also be enlarged. This satisfies Kinaxis with beta equals to 1.18 (which also corresponds to the P value for SMB is the only one smaller than 0.025---does not value size effect heavily). However for TECSYS Inc. and Constellation Software, their betas are lower than 1(0.75 and 0.6 respectively). This is because these companies are relatively small companies with positive coefficients for SMB, representing the portfolio of companies with smaller market capitalizations can bring higher returns. For energy companies, the larger the size of company, the higher the beta it has. TerraVest Industries Inc. is the smallest size of these three, also it is the only one which has smaller P value. Parkland Fuel Corporation is the only one which has negative coefficient for SMB, which means it is not good for small-cap portfolio.For healthcare companies, we have an exception for beta, Zymeworks. Negative beta, -0.03, are possible for investments that tend to go down when the market goes up. Meanwhile, we also have an extremely large beta, Canopy. Therefore, healthcare stocks go to extreme.The fluctuation of consumer defensive is small, the beta is usually less than 1, and the profit margin is small.We can see all of the P value for Rm-Rf is less than 0.025, indicates that the rate is not valued heavily. Also coefficients for SMB is negative, which means SMB also not

valued heavily. For Financial Service, all of the three companies has steady beta, which means financial service stock have more steady risk. Alaris Royalty Corp.has negative coefficient for SMB thus it values SMB lightly. At last, the fluctuation of utility is small, the betas are less than 1, and the profit margin are small.

(2) Model Accuracy

We use R-Squared in regression statistics to evaluate the accuracy. From the charts, we can easily conclude that technology industry have high error, since the success of technology companies is often based upon innovation and creativity - factors that have essentially no correlation to the market performance. However utility industry has the smallest error. Usually, a high R-squared value, in relation to its benchmark, would increase the accuracy of the beta measurement.

(3) Prediction Power

We consider our model as highly predictable, since we looked up the beta for 2019, and they all follows the data that we got for the past five years. Those have high beta still have high beta in 2019, and vice versa.

2.Risk Evaluation

(1)Market Risk

CAPM: As mentioned before, companies with low beta have stocks theoretically less volatile than the market, companies with high beta have stocks theoretically more volatile than the market and companies of negative beta have stocks inversely correlated to the market benchmark.

CVaR:

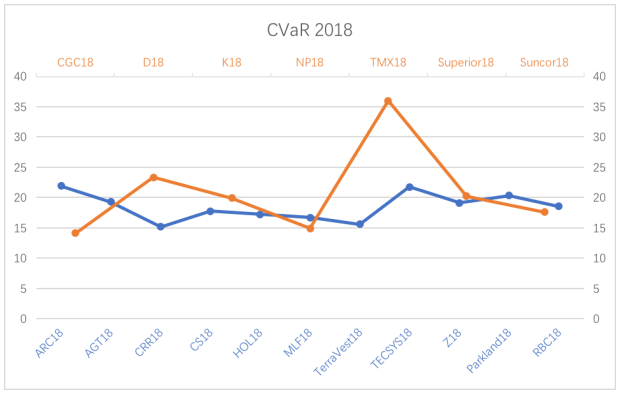
<1> Introduction: Nowadays, VaR and CVaR are useful risk measure tools in finance field. VaR means value at risk, which gives us a range of potential losses. And CVaR stands for conditional value at risk, which gives us an average expected loss. However, we choose to use CVaR here because CVaR is generally considered as better approximation of potential losses. In addition, since the data of 99% interval is too small to observe, we choose to use 95% intervals to evaluate market risk here. For example, if CVaR at 95% interval is equal to 8%, it means in the worst 5% (1-95%) of the returns, average loss will be 8%.

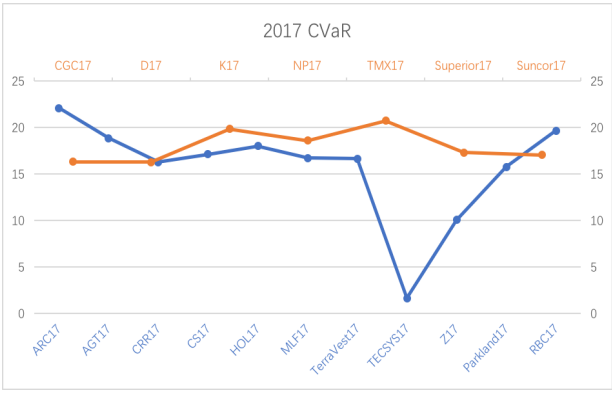
<2> Calculating: Please see the appendices for the data of VaR and CVaR. (We have to calculate VaR first, then get the CVaR)

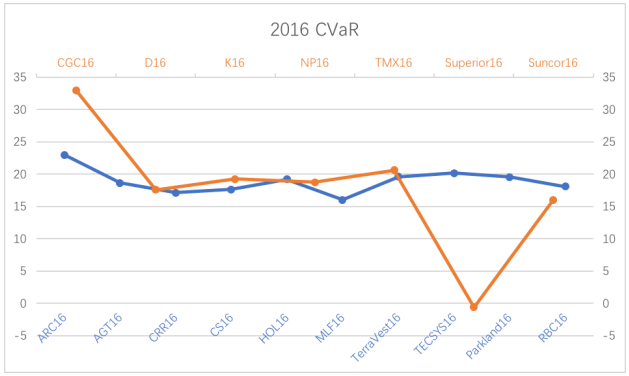
<3> Evaluating: In each graph, we put the low beta companies on the bottom x-axis, and put the high beta companies on the top x-axis. On the whole, the high beta companies have higher losses than low beta companies in the worst 5% of the return during 4 years(2015 - 2018). (For 2014, we do not have information of 2 companies, so we decide to remove this year's CVaR comparison.) This indicates high beta companies have higher market risk than low beta companies. However, among these years, there are some exceptions:

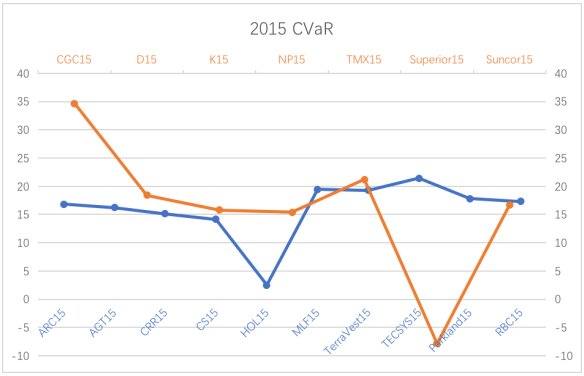
It is worth to note that Superior Plus Corp has a extremely low average loss among high beta companies in 2015 and 2016, but this trend did not continuous. This phenomenon can be interpreted as the suspension of the Dividend Reinvestment Plan and Optional Share Purchase Program after the payment of the August 2016 dividend, thus lower the risk in the following years. Besides, TMX Group Limited has the highest average loss of high beta companies both in 2017 and 2018 because it was transformed from a diverse portfolio of assets into a client-driven solutions provider, thus increase the risk and loss.For low beta companies, TECSYS Inc.

represents a quite low average loss in 2017. According to TECSYS Inc. Annual Report, the company has recognized a significant amount of prior year non-refundable tax credits. This leads that TECSYS Inc. has increased significantly in fiscal 2017 and reduced risk finally.



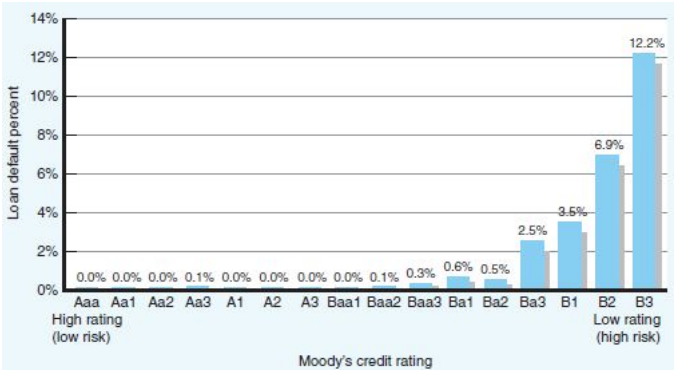






(2)Credit Risk: Credit risks are calculated based on the borrower's overall ability to repay. We mostly rely on the credit history, capacity to repay, capital, the loan's conditions and associated collateral. First, according to the credit rating of the company. If it has a high rating, it is considered to be a safe investment. Based on the stocks with high beta, most companies like Kinaxis, Canopy Growth Corporation, Dollarama, Superior Plus Corp., and Northland Power have a comparatively low credit rating like BBB and BB, which means that these companies have probability to default. While looking at the data of companies with low beta, these companies have higher rate of return on average(even with AA) and they may be less incentive

to default while trading. And we can see the relation between the default rate and Moody's credit risk through the chart below clearly.



To access the capacity to repay, we measure the D/E Ratio, Net Income and Current Ratio. The Current ratio is a liquidity ratio used to determine a company's ability to pay short-term obligations. Several companies like Canopy Growth Corporation and Kinaxis in high beta group have significant high current ratio(greater than 2) leading to the fact that they have great liquidity but the net income of Canopy is negative($-334.17 Million) in the past five years on average and the net income of Kinaxis is not too high as well no matter how it is compared with the companies in the same industry or the companies with the similar size in the other industries. Dollarama and Northland Power have reasonable current ratio(greater than 1) and it is still doubtful to their ability to pay its debt and it increases the risk of insolvency. However, Northland Power has significant high D/E Ratio leading to poor ability of repay. For the rest of the companies in the high beta group, suncor and TMX have the current ratio lower than 1 and it is generally a credit red flag. What's more, the current ratio of Superior Plus that is more volatile than the market, is 1.12 that is not too bad. However, the small capitalization determines the high probability of not paying back the upcoming obligations. More precisely, the Debt to Equity Ratio of Superior Plus is extremely high that is even greater than 1. And it is not hard to figure

that there are more companies in the utility industry with higher market risk and the point is that the infrastructure like power and hydro is usually under the long-term construction. The benefit of investment is hard calculated at the beginning of the work and it needs the companies take higher risks to do the work maybe default at the end of the work . In all, companies with high beta are generally with high credit risk and it has different traits among different industries.

D/E	NI	Current Ratio	
239.16%	$-60.64M	1.67	AGT
21.29%	$101.35M	1.51	Maple
-7.53%	$539.72M	1.1	Dollarama
24.04%	$54.23M	4.34	Alaris
32.71%	$286M	0.99	TMX
416.28%	$12.4M	0.56	RBC
170.24%	$-34M	1.12	Superior Plus
514.42%	$266.58M	1.35	Northland
118.46%	$778B	0.51	Hydro One Li
30.02%	982k	1.83	Tecsys
4.81%	14.41M	2.45	Kinaxis
42.53%	379.3M	0.9	Constellation
127.59%	18.15M	2.01	Terra Vest
125.65%	206M	1.06	Parkland
39.43%	3.29B	0.84	suncor
0.04%	(-36.56M)	6.82	Zyneworks
231.40%	18.52M	0.18	Chartwell
10.66%	(-337.14M)	17.85	Canopy

(3)Liquidity Risk: There are two parts included in the liquidity risk which should be taken into the consideration. One is the funding liquidity risk that occurs when an entity is unable to pay down or refinance its debt, satisfy and cash obligations to counterparties. For which we use current ratio to judge. As for high beta companies , we can see that their current ratio are either too high or too low, which means those of high beta, either they does not have enough asset to cover their liability(which may because their aggressive investment strategy), or they have too many asset to cover(which means they have extremely high profits). However, for low beta companies. The other is the trading liquidity risk that occurs when an entity is unable to buy or sell a security due to a temporary inability to find a counterparty to transact. The quicker a particular asset can be sold at a reasonable price, the more liquid it is. Thus we derive it from

debt to equity ratio or current asset ratio. Those with high beta companies, their ratios always go to the extreme,which actually make sense, because they have high risks and high profit, thus they either have enough ability to afford their positive investment strategy, or they does not have enough time and asset to repay and sell the asset at a reasonable price. And companies with small capitalization are also likely to have liquidity problem like the credit risk we analyse before. The other one included in the liquidity risk is the trading liquidity risk that occurs when an entity is unable to buy or sell a security due to a temporary inability to find a counterparty to transact. The liquidity of the stock can be measured through the spread between the ask price and the bid price and the volume of trading. Generally speaking, the higher the spread, the lower liquidity. By calculating the average spread of all companies in the past 5 years, TMX, Canopy Growth Corporation and Kinaxis have considerably higher spread of ask price and bid price and in the low beta group, Constellation Software has a unusual higher spread. And in low beta group, TECSY Inc., Zymeworks and TerraVest Industries Inc. have some missing data in ask and spread price. These stocks may be infrequently traded and thus difficult to buy or sell, making them extremely illiquid. When the stock is eventually traded, it may have a very wide spread between the bid and ask price relative to that of an active stock.

From the table, we can calculate the average volume during the five year for all 18 companies.Technology: TECSYS Inc.:8031.91659984, Kinaxis: 71795.36713287, Constellation Software: 43668.80513232, Energy: TerraVest Industries Inc: 8626.30473136,Parkland Fuel Corporation: 276321.92141139, Suncor Energy Inc.: 3132326.80577849, Healthcare: Zymeworks:7825.26730310, Chartwell Retirement Residences: 296254.34803529, Canopy Growth Corporation: 2272994.10774411, Consumer Defensive: AGT Food and Ingredients:

77476.26303128, Maple Leaf Foods: 252402.56821830, Dollarama: 1099532.39775461, Financial Services: Alaris Royalty Corp. : 136270.56936648, TMX Group Limited:66336.48757017, Royal Bank of Canada:2424773.05533280. Utilities:Hydro One Limited: 657484.67432950, Northland Power:293503.80112269, superior plus corp: 3151888.93344026. From the above data, we can easily conclude that usually the companies with high beta will have a very large volume. This is because higher-beta stocks tend to be more volatile and therefore riskier, but provide the potential for higher returns. The companies with large volume of stocks means they have relatively positive investment strategy, thus they may have high beta.

Conclusion of evaluating risk:

In general, Utility industry have relatively low risk since their products tend to commodity but we should still keep the eyes on the changing government regulations that mostly restricts the profits of utilities and energy companies.However, the technology industry has higher risk since they need innovation and huge investment that may leads to terrible net income and it may take few years to revolve. What makes things worse is the failure of the scientific research and the money put in the investment will never get back. While considering about including these companies in our portfolio, we have to make sure the technologies of these companies utilise and develop have huge markets and they are the main trend of the world or it plays the leading role of the market. Something interesting is for financial service industry, we have high market risk but low credit and liquidity risk, which is because, nowadays, financial markets and derivatives are facing with a huge market transition Within each industry, the larger the size of the company, the higher the risk.

Appendix

Citation:

"Investors." Tecsys. Accessed March 13, 2019. https://www.tecsys.com/about-us/investors/.

Kenneth R. French - Data Library. Accessed March 13, 2019. http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

"Share Information." Superior Plus. Accessed March 13, 2019. http://www.superiorplus.com/investor-relations/share-information/#dividends.

"Quarterly and Annual Reports." TMX.com. Accessed March 13, 2019. https://www.tmx.com/investor-relations/share-information/quarterly-and-annual-reports.

"Yahoo Finance - Business Finance, Stock Market, Quotes, News." Yahoo! Finance. Accessed March 13, 2019. https://finance.yahoo.com/.

smart beta evaluation：

1	Alaris Royalty Corp.								
2									
3	*Regression Statistics*								
4	Multiple R	0.148706385							
5	R Square	0.022113589							
6	Adjusted R Square	0.019753445							
7	Standard Error	0.017998066							
8	Observations	1247							
9									
10	ANOVA								
11		*df*	*SS*	*MS*	*F*	*Significance F*			
12	Regression	3	0.009105287	0.003035096	9.369592395	3.98742E-06			
13	Residual	1243	0.402645475	0.00032393					
14	Total	1246	0.411750762						
15									
16		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
17	Intercept	7.59345E-05	0.000510225	0.148825623	0.881715372	-0.00092506	0.001076932	-0.00092506	0.001076932
18	X Variable 1	0.316598615	0.061343381	5.16108843	2.85578E-07	0.196250611	0.436946619	0.196250611	0.436946619
19	X Variable 2	-0.008543179	0.100685867	-0.084849833	0.932394439	-0.2060762	0.188989838	-0.2060762	0.188989838
20	X Variable 3	0.153985676	0.100448869	1.532975704	0.125536307	-0.04308238	0.351053733	-0.04308238	0.351053733

1	AGT Food and IngredientsARY OUTPUT								
2									
3	*Regression Statistics*								
4	Multiple R	0.103521							
5	R Square	0.010717							
6	Adjusted F	0.008329							
7	Standard I	0.027723							
8	Observatic	1247							
9									
10	ANOVA								
11		*df*	*SS*	*MS*	*F*	*gnificance F*			
12	Regressior	3	0.010349	0.00345	4.488317	0.003851			
13	Residual	1243	0.955316	0.000769					
14	Total	1246	0.965664						
15									
16		*Coefficients*	*andard Erı*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
17	Intercept	-0.00029	0.000786	-0.3708	0.710849	-0.00183	0.00125	-0.00183	0.00125
18	X Variable	0.346458	0.094489	3.666666	0.000256	0.161084	0.531833	0.161084	0.531833
19	X Variable	-0.0657	0.155089	-0.42363	0.671912	-0.36996	0.238565	-0.36996	0.238565
20	X Variable	0.064684	0.154724	0.418063	0.675973	-0.23886	0.368233	-0.23886	0.368233

1	SUMMARY OUTPUT								
2									
3	*Regression Statistics*								
4	Multiple R	0.109092							
5	R Square	0.011901							
6	Adjusted R Square	0.009397							
7	Standard Error	0.062742							
8	Observations	1188							
9									
10	ANOVA								
11		*df*	*SS*	*MS*	*F*	*Significance F*			
12	Regression	3	0.056137	0.018712	4.753488465	0.002668542			
13	Residual	1184	4.660884	0.003937					
14	Total	1187	4.717021						
15									
16		*Coefficients*	*andard Erı*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
17	Intercept	0.002958	0.001823	1.62311	0.104832061	-0.00061759	0.006534004	-0.00061759	0.006534004
18	X Variable 1	0.724661	0.218443	3.317395	0.000936211	0.296082991	1.15323978	0.296082991	1.15323978
19	X Variable 2	-0.42799	0.357804	-1.19617	0.231870386	-1.1299931	0.274006478	-1.129993104	0.274006478
20	X Variable 3	0.609654	0.35465	1.719029	0.085870455	-0.08615888	1.305466591	-0.086158878	1.305466591

chartwell

Regression Statistics	
Multiple R	0.095774
R Square	0.009173
Adjusted R Square	0.006781
Standard Error	0.02969
Observations	1247

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.010143567	0.003381	3.8357211	0.009486757
Residual	1243	1.095704763	0.000882		
Total	1246	1.10584833			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.00044	0.00084168	-0.5276	0.5978682	-0.00209534	0.001207196	-0.00209534	0.0012072
X Variable 1	0.303191	0.101193606	2.996146	0.0027883	0.104661658	0.501719933	0.10466166	0.50171993
X Variable 2	-0.02143	0.166093975	-0.12899	0.8973831	-0.34728067	0.304430337	-0.34728067	0.30443034
X Variable 3	-0.20741	0.165703017	-1.25172	0.2109067	-0.53250259	0.117674401	-0.53250259	0.1176744

chartwell

Regression Statistics

Multiple R	0.095774
R Square	0.009173
Adjusted R Square	0.006781
Standard Error	0.02969
Observations	1247

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.010143567	0.003381	3.8357211	0.009486757
Residual	1243	1.095704763	0.000882		
Total	1246	1.10584833			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.00044	0.00084168	-0.5276	0.5978682	-0.00209534	0.001207196	-0.00209534	0.0012072
X Variable 1	0.303191	0.101193606	2.996146	0.0027883	0.104661658	0.501719933	0.10466166	0.50171993
X Variable 2	-0.02143	0.166093975	-0.12899	0.8973831	-0.34728067	0.304430337	-0.34728067	0.30443034
X Variable 3	-0.20741	0.165703017	-1.25172	0.2109067	-0.53250259	0.117674401	-0.53250259	0.1176744

dollarama

Regression Statistics	
Multiple R	0.10986271
R Square	0.012069815
Adjusted R Square	0.00968543
Standard Error	0.018245525
Observations	1247

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.005055431	0.001685	5.062024	0.0017331
Residual	1243	0.413793691	0.000333		
Total	1246	0.418849122			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.000473261	0.00051724	0.914973	0.360383	-0.0005415	0.001488021	-0.000541499	0.001488021
X Variable 1	0.193962248	0.062186803	3.119026	0.001856	0.0719596	0.31596494	0.071959556	0.31596494
X Variable 2	0.019835552	0.102070216	0.194332	0.845947	-0.1804134	0.220084488	-0.180413384	0.220084488
X Variable 3	-0.188837583	0.10182996	-1.85444	0.063913	-0.3886152	0.01094	-0.388615166	0.01094

hydro one limited

Regression Statistics	
Multiple R	0.088253248
R Square	0.007788636
Adjusted R Square	0.00659272
Standard Error	0.021812659
Observations	2493

ANOVA

	df	*SS*	*MS*	*F*	*gnificance F*
Regression	3	0.009296068	0.003099	6.512696	0.000219
Residual	2489	1.184246492	0.000476		
Total	2492	1.193542561			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-7.64313E-05	0.000437327	-0.17477	0.861275	-0.00093	0.000781	-0.00093	0.000781
X Variable 1	0.156547317	0.052580231	2.977304	0.002936	0.053442	0.259653	0.053442	0.259653
X Variable 2	-0.041448185	0.086288676	-0.48034	0.631026	-0.21065	0.127757	-0.21065	0.127757
X Variable 3	-0.257110378	0.086094623	-2.98637	0.002851	-0.42593	-0.08829	-0.42593	-0.08829

kinaxis

Regression Statistics	
Multiple R	0.054395955
R Square	0.00295892
Adjusted R Square	0.002157869
Standard Error	0.02287714
Observations	3738

ANOVA

	df	SS	MS	F	gnificance F
Regression	3	0.005799599	0.001933	3.693799	0.011372
Residual	3734	1.954239444	0.000523		
Total	3737	1.960039043			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0%
Intercept	0.000314873	0.000374591	0.840576	0.400639	-0.00042	0.001049	-0.00042	0.001049
X Variable 1	0.107279774	0.045039243	2.381918	0.017273	0.018976	0.195584	0.018976	0.195584
X Variable 2	-0.042536019	0.073917015	-0.57546	0.565017	-0.18746	0.102386	-0.18746	0.102386
X Variable 3	-0.156842595	0.073728499	-2.1273	0.033461	-0.30139	-0.01229	-0.30139	-0.01229

maple leaf

Regression Statistics	
Multiple R	0.125857455
R Square	0.015840099
Adjusted R Square	0.013464814
Standard Error	0.015834346
Observations	1247

ANOVA

	df	SS	MS	F	Significance F
Regression	3	0.00501607	0.001672	6.668714	0.000181917
Residual	1243	0.311653058	0.000251		
Total	1246	0.316669128			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.000222202	0.000448886	0.495008	0.620682	-0.000658455	0.00110286	-0.000658455	0.00110286
X Variable 1	0.2392915	0.053968705	4.433894	1.01E-05	0.133411685	0.34517132	0.133411685	0.345171316
X Variable 2	-0.100888029	0.088581453	-1.13893	0.254952	-0.274673706	0.07289765	-0.274673706	0.072897649
X Variable 3	0.001388146	0.088372947	0.015708	0.98747	-0.171988468	0.17476476	-0.171988468	0.174764761

northland

Regression Statistics	
Multiple R	0.107819
R Square	0.011625
Adjusted R Squa	0.010434
Standard Error	0.019149
Observations	2493

ANOVA

	df	SS	MS	F	gnificance F
Regression	3	0.010734	0.003578	9.758249	2.12E-06
Residual	2489	0.912649	0.000367		
Total	2492	0.923383			

	Coefficients	andard Erro	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0%
Intercept	5.72E-05	0.000384	0.149033	0.88154	-0.0007	0.00081	-0.0007	0.00081
X Variable 1	0.243252	0.046159	5.269901	1.48E-07	0.152738	0.333765	0.152738	0.333765
X Variable 2	-0.08931	0.07575	-1.179	0.238509	-0.23785	0.05923	-0.23785	0.05923
X Variable 3	-0.05933	0.07558	-0.78502	0.432519	-0.20754	0.088875	-0.20754	0.088875

parkland

Regression Statistics	
Multiple R	0.097415
R Square	0.00949
Adjusted R Square	0.007099
Standard Error	0.028624
Observations	1247

ANOVA

	df	SS	MS	F	gnificance F
Regression	3	0.009756839	0.003252	3.969543	0.00789
Residual	1243	1.018400306	0.000819		
Total	1246	1.028157145			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0%
Intercept	5.68E-05	0.000811446	0.07003	0.944181	-0.00154	0.001649	-0.00154	0.001649
X Variable 1	0.334179	0.0975586	3.425423	0.000634	0.142782	0.525577	0.142782	0.525577
X Variable 2	-0.04361	0.160127663	-0.27236	0.785393	-0.35776	0.270538	-0.35776	0.270538
X Variable 3	0.106152	0.159750748	0.664485	0.506503	-0.20726	0.419563	-0.20726	0.419563

royal

Regression Statistics	
Multiple R	0.012026
R Square	0.000145
Adjusted R Square	-0.00106
Standard Error	0.102112
Observations	2493

ANOVA

	df	SS	MS	F	gnificance F
Regression	3	0.003754086	0.001251	0.120014	0.948358
Residual	2489	25.95237426	0.010427		
Total	2492	25.95612834			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0
Intercept	0.002306	0.002047264	1.126142	0.260214	-0.00171	0.00632	-0.00171	0.00632
X Variable 1	-0.10747	0.246144415	-0.43662	0.662424	-0.59014	0.375197	-0.59014	0.375197
X Variable 2	0.051095	0.40394413	0.126491	0.899353	-0.74101	0.843197	-0.74101	0.843197
X Variable 3	0.151654	0.403035706	0.376279	0.706741	-0.63867	0.941974	-0.63867	0.941974

superior

Regression Statistics	
Multiple R	0.011951
R Square	0.000143
Adjusted R Squ	-0.00106
Standard Error	0.102131
Observations	2492

ANOVA

	df	SS	MS	F	Significance F
Regression	3	0.003707187	0.001236	0.11847	0.94928223
Residual	2488	25.95159629	0.010431		
Total	2491	25.95530348			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.002294	0.002048101	1.119918	0.262857	-0.001722453	0.00630986	-0.001722453	0.00630986
X Variable 1	-0.10715	0.246192945	-0.43524	0.663424	-0.589917718	0.3756106	-0.589917718	0.3756106
X Variable 2	0.047568	0.404225633	0.117677	0.906333	-0.745085048	0.84022153	-0.745085048	0.84022153
X Variable 3	0.15	0.403156166	0.372063	0.709877	-0.640556495	0.94055581	-0.640556495	0.94055581

suncor

Regression Statistics	
Multiple R	0.022654
R Square	0.000513
Adjusted F	-0.0019
Standard I	0.047212
Observatic	1247

ANOVA

	df	SS	MS	F	gnificance F
Regressior	3	0.001423	0.000474	0.21274	0.887608
Residual	1243	2.770612	0.002229		
Total	1246	2.772034			

	Coefficients	andard Erri	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0%
Intercept	0.001525	0.001338	1.139284	0.254804	-0.0011	0.004151	-0.0011	0.004151
X Variable	-0.01028	0.160914	-0.0639	0.94906	-0.32598	0.305411	-0.32598	0.305411
X Variable	0.027029	0.264116	0.102337	0.918506	-0.49113	0.545191	-0.49113	0.545191
X Variable	0.207517	0.263494	0.787556	0.431107	-0.30943	0.72446	-0.30943	0.72446

tecys

Regression Statistics	
Multiple R	0.022224
R Square	0.000494
Adjusted F	-0.00071
Standard I	0.037048
Observatic	2493

ANOVA

	df	SS	MS	F	gnificance F
Regressior	3	0.001688	0.000563	0.409994	0.745836
Residual	2489	3.41631	0.001373		
Total	2492	3.417998			

	Coefficients	andard Erri	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0%
Intercept	0.000957	0.000743	1.288462	0.197705	-0.0005	0.002414	-0.0005	0.002414
X Variable	0.08799	0.089306	0.985261	0.324592	-0.08713	0.263111	-0.08713	0.263111
X Variable	0.025891	0.146559	0.176657	0.859792	-0.2615	0.31328	-0.2615	0.31328
X Variable	0.076738	0.146229	0.524781	0.599782	-0.21	0.363481	-0.21	0.363481

VaR and CVaR:

Camoany No.	company&year	var		cvar		number
1	ARC18	var(95)	-0.0245488	cvar(95)	21.9312222	12.5
	ARC17	var(95)	-0.0216758	cvar(95)	22.0767797	12.45
	ARC16	var(95)	-0.0233893	cvar(95)	22.9840476	12.5
	ARC15	var(95)	-0.0284995	cvar(95)	16.8210256	12.5
	ARC14	var(95)	-0.0241132	cvar(95)	18.774612	12.05
2	AGT18	var(95)	-0.0299581	cvar(95)	19.2584206	12.5
	AGT17	var(95)	-0.0352173	cvar(95)	18.8272085	12.45
	AGT16	var(95)	-0.0302343	cvar(95)	18.59602	12.5
	AGT15	var(95)	-0.0288935	cvar(95)	16.2290239	12.5
	AGT14	var(95)	-0.0303553	cvar(95)	16.8057008	12.05
3	CGC18	var(95)	-0.0997215	cvar(95)	14.1259119	12.5
	CGC17	var(95)	-0.045721	cvar(95)	16.2823731	12.45
	CGC16	var(95)	-0.0557621	cvar(95)	32.9564945	12.5
	CGC15	var(95)	-0.0314136	cvar(95)	34.6696631	12.5
	CGC14	var(95)	-0.0717489	cvar(95)	11.7781517	9.2
4	CRR18	var(95)	-0.0160286	cvar(95)	15.1791233	12.5
	CRR17	var(95)	-0.0131495	cvar(95)	16.2547622	12.45
	CRR16	var(95)	-0.0171939	cvar(95)	17.0786005	12.5
	CRR15	var(95)	-0.01832	cvar(95)	15.1290397	12.5
	CRR14	var(95)	-0.0135805	cvar(95)	16.3229132	12.15
5	CS18	var(95)	-0.0249133	cvar(95)	17.7482713	12.5
	CS17	var(95)	-0.0177804	cvar(95)	17.1114005	12.45
	CS16	var(95)	-0.0280587	cvar(95)	17.5956047	12.5
	CS15	var(95)	-0.0305061	cvar(95)	14.1489482	12.5
	CS14	var(95)	-0.0229411	cvar(95)	18.7163602	12.05
6	D18	var(95)	-0.0289634	cvar(95)	23.3326974	12.5
	D17	var(95)	-0.0142664	cvar(95)	16.2497761	12.45
	D16	var(95)	-0.020201	cvar(95)	17.5629233	12.5
	D15	var(95)	-0.0212222	cvar(95)	18.3882244	12.5
	D14	var(95)	-0.012889	cvar(95)	16.7564304	12.15
7	HOL18	var(95)	-0.0138272	cvar(95)	17.2364954	12.5
	HOL17	var(95)	-0.0105634	cvar(95)	17.9922941	12.45
	HOL16	var(95)	-0.0115556	cvar(95)	19.1612759	12.5
	HOL15	var(95)	-0.0266727	cvar(95)	2.47669163	1.5
8	K18	var(95)	-0.0358044	cvar(95)	19.9033454	12.5
	K17	var(95)	-0.0285412	cvar(95)	19.8228986	12.45
	K16	var(95)	-0.035931	cvar(95)	19.2093107	12.5
	K15	var(95)	-0.0316092	cvar(95)	15.7871384	12.5
	K14	var(95)	-0.0269032	cvar(95)	9.43324247	7
9	MLF18	var(95)	-0.0269986	cvar(95)	16.7098182	12.5
	MLF17	var(95)	-0.0128755	cvar(95)	16.7031176	12.45
	MLF16	var(95)	-0.0215176	cvar(95)	16.0012662	12.5
	MLF15	var(95)	-0.0215099	cvar(95)	19.4774152	12.5
	MLF14	var(95)	-0.016997	cvar(95)	16.2856822	12.05
10	NP18	var(95)	-0.0185009	cvar(95)	14.9293399	12.5
	NP17	var(95)	-0.0127388	cvar(95)	18.5860216	12.45
	NP16	var(95)	-0.0206659	cvar(95)	18.7010602	12.5
	NP15	var(95)	-0.0228509	cvar(95)	15.3830383	12.5
	NP14	var(95)	-0.0175919	cvar(95)	16.620241	12.15
11	TerraVest18	VAR(95)	-0.021739	Cvar(95)	15.6105979	12.5
	TerraVest17	VAR(95)	-0.0268043	Cvar(95)	14.9690658	12.5
	TerraVest16	VAR(95)	-0.029752	Cvar(95)	19.5587086	12.55
	TerraVest15	VAR(95)	-0.0252101	Cvar(95)	19.2757204	12.55
	TerraVest14	VAR(95)	-0.0254543	Cvar(95)	-0.0468346	12.55
12	TECSYS18	VAR(95)	-0.0263736	Cvar(95)	21.7611563	12.55
	TECSYS17	VAR(95)	0.03124992	Cvar(95)	1.6403064	12.45
	TECSYS16	VAR(95)	-0.0263156	Cvar(95)	20.1260031	12.55
	TECSYS15	VAR(95)	-0.0251004	Cvar(95)	21.4220506	12.55
	TECSYS14	VAR(95)	-0.033121	Cvar(95)	17.1339014	12.2
13	TMX18	VAR(95)	-0.0016	Cvar(95)	35.9812132	12.55
	TMX17	VAR(95)	-0.0163549	Cvar(95)	20.6947847	12.55
	TMX16	VAR(95)	-0.0162928	Cvar(95)	20.584851	12.55
	TMX15	VAR(95)	-0.0284713	Cvar(95)	21.1757169	12.55
	TMX14	VAR(95)	-0.019008	Cvar(95)	16.1742904	12.2
14	Z18	VAR(95)	-0.0531596	Cvar(95)	19.1320031	12.55
	Z17	VAR(95)	-0.0666667	Cvar(95)	10.0587705	8.4
15	Parkland18	VAR(95)	-0.0220164	Cvar(95)	20.3413773	12.55
	Parkland17	VAR(95)	-0.0206406	Cvar(95)	15.7616417	12.45
	Parkland16	VAR(95)	-0.0203327	Cvar(95)	19.5388001	12.5
	Parkland15	VAR(95)	-0.0250102	Cvar(95)	17.7978644	12.5
	Parkland14	VAR(95)	-0.0196904	Cvar(95)	19.1113757	12.15
16	RBC18	VAR(95)	-0.0126556	Cvar(95)	18.5466111	12.55
	RBC17	VAR(95)	-0.0089315	Cvar(95)	19.6345641	12.55
	RBC16	VAR(95)	-0.0193022	Cvar(95)	18.0458375	12.55
	RBC15	VAR(95)	-0.0168241	Cvar(95)	17.3067585	12.55
	RBC14	VAR(95)	-0.0117663	Cvar(95)	15.497622	12.05
17	Superior18	VAR(95)	-0.0219047	Cvar(95)	20.2273052	12.5
	Superior17	VAR(95)	-0.0164786	Cvar(95)	17.3024732	12.45
	Superior16	VAR(95)	-0.0070479	Cvar(95)	-0.5999578	12.5
	Superior15	VAR(95)	-0.013292	Cvar(95)	-7.8135308	12.5
	Superior14	VAR(95)	-0.0196917	Cvar(95)	-1.6857416	12.15
18	Suncor18	VAR(95)	-0.027972	Cvar(95)	17.5960362	12.55
	Suncor17	VAR(95)	-0.0177329	Cvar(95)	17.0195838	12.45
	Suncor16	VAR(95)	-0.0307342	Cvar(95)	16.0148716	12.5
	Suncor15	VAR(95)	-0.0269913	Cvar(95)	16.6700611	12.5
	Suncor14	VAR(95)	-0.0246225	Cvar(95)	17.8053839	12.05