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<mark>Question 1</mark>

a):

The univariate statistics from the question given are the following:

Security	Mean	Standard Deviation	Skewness	Excess Kurtosis	Minimum	Maximum
		Panel A: Daily Returns				
Value-Weighted Index	0.044	0.82	−1.33	34.92	−18.10	8.87
Equal-Weighted Index	0.073	0.76	−0.93	26.03	−14.19	9.83
International Business Machines	0.039	1.42	−0.18	12.48	−22.96	11.72
General Signal Corp.	0.054	1.66	0.01	3.35	−13.46	9.43
Wrigley Co.	0.072	1.45	−0.00	11.03	−18.67	11.89
Interlake Corp.	0.043	2.16	0.72	12.35	−17.24	23.08
Raytech Corp.	0.050	3.39	2.25	59.40	−57.90	75.00
Ampco-Pittsburgh Corp.	0.053	2.41	0.66	5.02	−19.05	19.18
Energen Corp.	0.054	1.41	0.27	5.91	−12.82	11.11
General Host Corp.	0.070	2.79	0.74	6.18	−23.53	22.92
Garan Inc.	0.079	2.35	0.72	7.13	−16.67	19.07
Continental Materials Corp.	0.143	5.24	0.93	6.49	−26.92	50.00

The following are the screenshot of the univariate results.

The SAS System

The UNIVARIATE Procedure
Variable: RET (Returns)

PERMNO=12095

Moments			
N	8179	Sum Weights	8179
Mean	0.05384914	Sum Observations	440.432113
Std Deviation	1.66057987	Variance	2.75752551
Skewness	0.0061471	Kurtosis	3.34857326
Uncorrected SS	22574.7605	Corrected SS	22551.0436
Coeff Variation	3083.76305	Std Error Mean	0.01836156

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
-13.46154	6358	7.50000	6367
-11.66667	6359	8.25688	1866
-10.24845	5071	8.35579	1811
-9.47368	79	8.39161	3052
-9.37500	3048	9.42857	6633

The SAS System

The UNIVARIATE Procedure
Variable: RET (Returns)

PERMNO=15472

Moments			
N	8175	Sum Weights	8175
Mean	0.07186306	Sum Observations	587.480519
Std Deviation	1.44577172	Variance	2.09025587
Skewness	-0.0032873	Kurtosis	11.027899
Uncorrected SS	17127.9696	Corrected SS	17085.7515
Coeff Variation	2011.84268	Std Error Mean	0.01599027

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
-18.6728	10499	10.0671	14550
-13.2653	14537	10.6557	10312
-11.9919	14551	10.8696	14545
-11.5385	14593	10.8753	14115
-10.5023	14536	11.8852	10937

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	4	0.05	100.00

The SAS System

The UNIVARIATE Procedure
Variable: RET (Returns)

PERMNO=15747

Moments			
N	8179	Sum Weights	8179
Mean	0.04311164	Sum Observations	352.610112
Std Deviation	2.15584401	Variance	4.64766341
Skewness	0.72120107	Kurtosis	12.3521929
Uncorrected SS	38023.7929	Corrected SS	38008.5913
Coeff Variation	5000.60763	Std Error Mean	0.02383786

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
-17.2414	24316	16.9811	23312
-15.7143	23795	17.8571	23727
-13.7931	24241	18.1818	24261
-13.5593	23796	20.8333	23543
-13.4328	23219	23.0769	23344

We rearrange the results from above. The univariate statistics for General Signal Corp., Wrigley Corp., and Interlake Corp. are as followings:

Firm Name	General Signal Corp.	Wrigley Corp.	Interlake Corp.
Permno	12095	15472	15747
Mean	0.05384914	0.07186306	0.04311164
Standard Deviation	1.66057987	1.44577172	2.15584401
Skewness	0.0061471	-0.0032873	0.72120107
Kurtosis	3.34857326	11.027899	12.3521929
Minimum Value	-13.46154	-18.6728	-17.2414
Maximum Value	9.42857	11.8852	23.0769

There is no major differences between our output and the above table from CLM. If we round the univariate statistics results from SAS to the two decimal places, the results from SAS will be the same when compared to statistics from CLM.

b)

The indices database includes date, EWRETD, and VWRETD. The screenshots from SAS results are as followings.

The SAS System

The UNIVARIATE Procedure
Variable: EWRETD (Equal-Weighted Return-incl. dividends)

Moments			
N	8179	Sum Weights	8179
Mean	0.07770968	Sum Observations	635.587469
Std Deviation	0.68435659	Variance	0.46834395
Skewness	-1.0298552	Kurtosis	17.8723253
Uncorrected SS	3879.50811	Corrected SS	3830.11681
Coeff Variation	880.65811	Std Error Mean	0.00756715

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
-10.38971	6358	4.11414	1963
-7.99116	6359	4.61632	2271
-7.65830	6363	5.55784	6367
-5.61102	4447	6.92920	6360
-4.66824	1960	6.95065	1962

The UNIVARIATE Procedure
Variable: VWRETD (Value-Weighted Return-incl. dividends)

Moments			
N	8179	Sum Weights	8179
Mean	0.04377961	Sum Observations	358.073408
Std Deviation	0.80230565	Variance	0.64369436
Skewness	-1.2455306	Kurtosis	31.2870531
Uncorrected SS	5279.80879	Corrected SS	5264.13248
Coeff Variation	1832.6013	Std Error Mean	0.00887135

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
-17.13486	6358	4.12653	4093
-8.25943	6363	4.26398	3066
-5.53500	6414	4.59245	6366
-5.34059	6861	5.29709	1962
-4.71900	6357	8.66174	6360

We have rearranged the results from SAS. The information about mean, standard deviation, skewness, kurtosis, minimum value and maximum value are as following:

Index Name	EWRETD	VWRETD
Mean	0.07770968	0.04377961
Standard Deviation	0.68435659	0.80230565
Skewness	-1.0298552	-1.2455306
Kurtosis	17.8723253	31.2870531
Minimum Value	-10.38971	-17.13486
Maximum Value	6.95065	8.66174

Question 2

a)

We split the Interlake Corp. return from the original database using where command, and then we used 'keep' function for the indices database to split the value-weighted index. We sort the two new databases by date and merge them together by the merge key being date.

You can find that in our code.

b)

The printout of the first 10 observations are as following. We have checked that for each row, excess_ret = RET – VWRETD. Z_{it} is being properly computed.

The SAS System

Obs	PERMNO	DATE	RET	VWRETD	excess_ret
1	15747	19620703	-1.025641	1.129564	-2.15521
2	15747	19620705	0.000000	0.601329	-0.60133
3	15747	19620706	1.036269	-1.070943	2.10721
4	15747	19620709	0.000000	0.676971	-0.67697
5	15747	19620710	0.512821	1.257097	-0.74428
6	15747	19620711	0.000000	0.975727	-0.97573
7	15747	19620712	1.020408	0.553039	0.46737
8	15747	19620713	0.000000	-0.283568	0.28357
9	15747	19620716	0.000000	0.008226	-0.00823
10	15747	19620717	-0.505051	-1.743241	1.23819

c)

We attached the screenshot for the excess return as following.

The SAS System

The UNIVARIATE Procedure
Variable: excess_ret (Interlake Corp. Excess Return)

Moments			
N	8179	Sum Weights	8179
Mean	-0.000668	Sum Observations	-5.463296
Std Deviation	2.08210501	Variance	4.33516127
Skewness	0.73527663	Kurtosis	12.6034418
Uncorrected SS	35452.9525	Corrected SS	35452.9489
Coeff Variation	-311708.11	Std Error Mean	0.0230225

Basic Statistical Measures			
Location		Variability	
Mean	-0.00067	Std Deviation	2.08211
Median	-0.04424	Variance	4.33516
Mode	.	Range	39.73385
		Interquartile Range	1.58078

Tests for Location: Mu0=0				
Test		Statistic	p Value	
Student's t	t	-0.02901	Pr > |t|	0.9769
Sign	M	-132.5	Pr >= |M|	0.0035
Signed Rank	S	-439776	Pr >= |S|	0.0395

Quantiles (Definition 5)	
Level	Quantile
100% Max	22.3959283
99%	6.4347799
95%	3.0509930
90%	1.8927810
75% Q3	0.7732539
50% Median	-0.0442387
25% Q1	-0.8075258
10%	-1.9449979
5%	-2.9956981
1%	-5.9029630
0% Min	-17.3379226

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
-17.3379	7958	16.4628	6954
-15.8408	7437	17.9442	7903
-14.3167	7883	18.0928	7369
-13.4125	7438	20.4084	7185
-13.1850	7133	22.3959	6986

We rearrange the basic statistics in a form and compare these statistics of excess return to those of Interlake Corp. returns and those of value-weighted average index.

Name	Excess return	Interlake Corp.	VWRETD
Mean	-0.000668	0.04311164	0.04377961
Standard Deviation	2.08210501	2.15584401	0.80230565
Skewness	0.73527663	0.72120107	-1.2455306
Kurtosis	12.6034418	12.3521929	31.2870531
Minimum Value	-17.3379	-17.2414	-17.13486
Maximum Value	22.3959	23.0769	8.66174

Our conclusions are as below:

1. Mean:

   The mean of excess returns is nearly zero, and it is much lower than that of Interlake Corp. returns, and that of the value-weighted average index returns.

   The excess return is -0.00668, which is equal to the average return of Interlake Corp. minus that of value-weighted index.

2. Standard Deviation, Skewness, Kurtosis and Maximum Value:

   Because these statistics of the relationship between excess return and the other two returns have the same pattern, we will conclude these 4 items together.

   These four statistics of excess return are between those of Interlake Corp. and those of value-weighted average index.

   These four statistics of excess return are closer to those of Interlake Corp. return than to those of value-weighted average return; the statistics of excess return and those of Interlake Corp. return are very similar.

3. Minimum Value

   The minimum value of excess return, Interlake Corp. return and value-weighted average return are almost the same.

   The minimum value of excess return is smaller than that of Interlake Corp. return and that of value-weighted average return, but the minimum value of excess return is closer to that of Interlake Corp. return than to that of value-weighted average return.

   We have attached our code in the next page.

```
/*****************************************************
Name: 745_homework_1
Date: 02/05/2018
Group member:
Luhao Wang 116089876
Yuying Pei 116348782
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*****************************************************/
options ls=80;
libname worklib 'C:\Users\ypei12\Desktop\SAS_homework\lib';
***Question1 a);
* Read the data from stock returns into 'd1';
* and use the percentage number of the returns;
data d1;
set worklib.a1_data_stocks;
ret=ret*100;
run;
* Read the variable names;
proc contents data=d1;
run;
* Compute the univariate description by permno;
proc univariate data=d1;
var RET;
by PERMNO;
where date>="03JUL1962"d and
date<="30DEC1994"d;
run;
*---------------------------------------------;
***Question1 b)
* Read the data from indices returns into 'd2';
* and use the percentage number of the returns;
data d2;
set worklib.a1_data_indices;
EWRETD=EWRETD*100;
VWRETD=VWRETD*100;
run;
* Read the database contents;
proc contents data=d2;
run;
* Compute the univariate description by market return category;
proc univariate data=d2;
var EWRETD VWRETD;
run;
*----------------------------------------------------;
***Question2 a);
*split Interlake Corp. data from original dataset;
data d_Interlake;
set d1;
where PERMNO=15747;
run;
*split VWRETD from the indices database;
data d_VWRETD;
set d2;
keep date VWRETD;
*merge the two data set and define the labels;
proc sort data=d_Interlake;
by date;
```

```
proc sort data=d_VWRETD;
by date;
data d_merge;
merge d_Interlake d_VWRETD;
by date;
excess_ret=ret-VWRETD;
label
excess_ret="Interlake Corp. Excess Return"
ret='Interlake Corp. Daily Returns, 19620703:19941230';
run;
*check the label of Interlake Corp.;
proc contents data=d_merge;
run;
*---------------------------------------------------------;
***Question2 b)
*print the first 10 observations;
proc print data=d_merge(obs=10);
run;
*---------------------------------------------------------;
***Question2 c);
*compute the univariate statistics for the excess returns;
proc univariate data=d_merge;
var excess_ret;
run;
```