The objects: Dow Jones Industrial Average Index, oil, gold, and natural gas average prices.

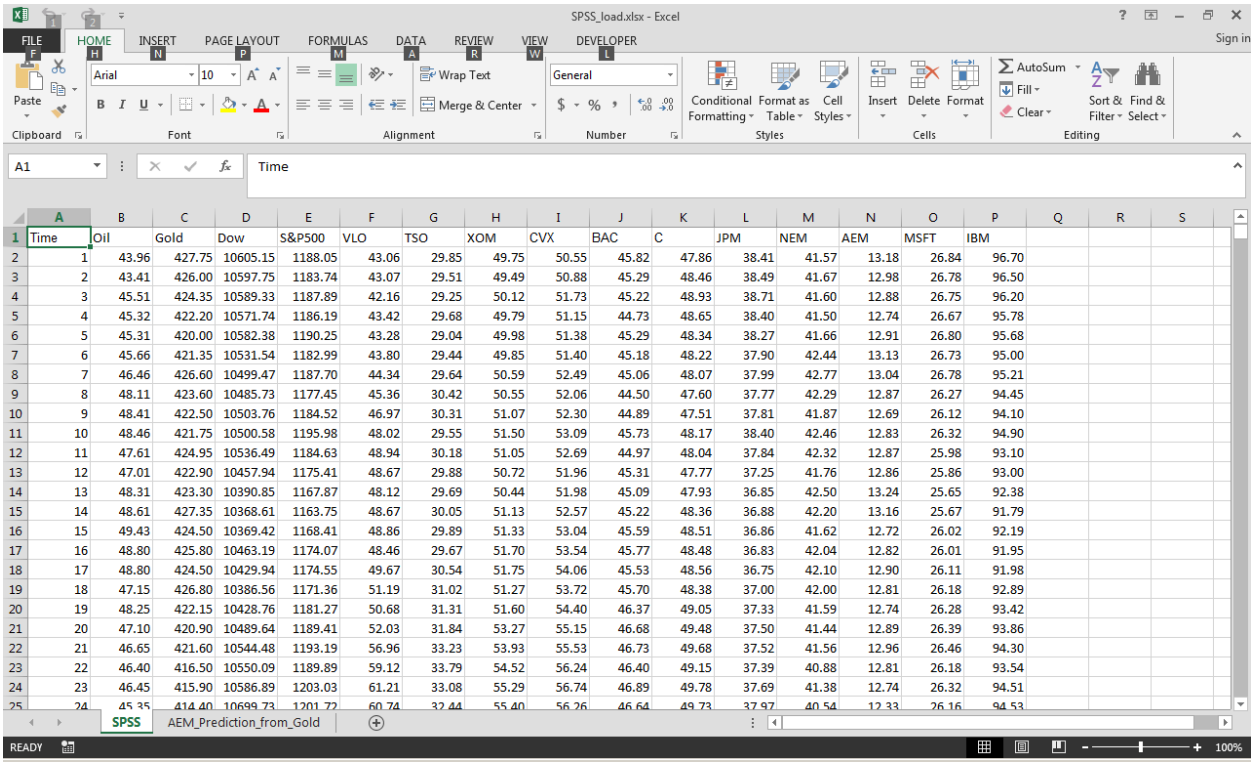
Primary sources of data would be www.finance.yahoo.com and www.macrotrends.net.

The daily average data would be collected and analyzed from 2005 to 2015.

I would like to find correlation between Dow Jones Industrial Average index, oil, gold and natural gas prices.

I expect to find that oil price fluctuation causes changes in Dow Jones Industrial Average Index, gold and natural gas prices.

Raw data collected and saved in exls format:



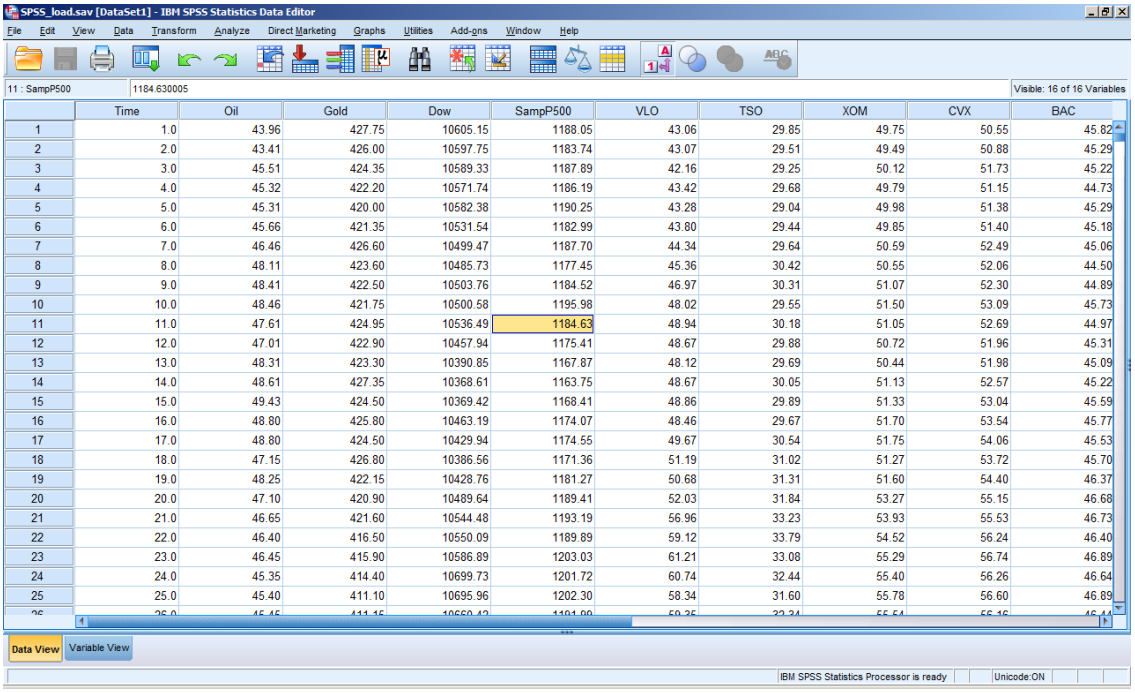
SPSS_load.xlsx - Excel

Time	Oil	Gold	Dow	S&P500	VLO	TSO	XOM	CVX	BAC	C	JPM	NEM	AEM	MSFT	IBM
1	43.96	427.75	10605.15	1188.05	43.06	29.85	49.75	50.55	45.82	47.86	38.41	41.57	13.18	26.84	96.70
2	43.41	426.00	10597.75	1183.74	43.07	29.51	49.49	50.88	45.29	48.46	38.49	41.67	12.98	26.78	96.50
3	45.51	424.35	10589.33	1187.89	42.16	29.25	50.12	51.73	45.22	48.93	38.71	41.60	12.88	26.75	96.20
4	45.32	422.20	10571.74	1186.19	43.42	29.68	49.79	51.15	44.73	48.65	38.40	41.50	12.74	26.67	95.78
5	45.31	420.00	10582.38	1190.25	43.28	29.04	49.98	51.38	45.29	48.34	38.27	41.66	12.91	26.80	95.68
6	45.66	421.35	10531.54	1182.99	43.80	29.44	49.85	51.40	45.18	48.22	37.90	42.44	13.13	26.73	95.00
7	46.46	426.60	10499.47	1187.70	44.34	29.64	50.59	52.49	45.06	48.07	37.99	42.77	13.04	26.78	95.21
8	48.11	423.60	10485.73	1177.45	45.36	30.42	50.55	52.06	44.50	47.60	37.77	42.29	12.87	26.27	94.45
9	48.41	422.50	10503.76	1184.52	46.97	30.31	51.07	52.30	44.89	47.51	37.81	41.87	12.69	26.12	94.10
10	48.46	421.75	10500.58	1195.98	48.02	29.55	51.50	53.09	45.73	48.17	38.40	42.46	12.83	26.32	94.90
11	47.61	424.95	10536.49	1184.63	48.94	30.18	51.05	52.69	44.97	48.04	37.84	42.32	12.87	25.98	93.10
12	47.01	422.90	10457.94	1175.41	48.67	29.88	50.72	51.96	45.31	47.77	37.25	41.76	12.86	25.86	93.00
13	48.31	423.30	10390.85	1167.87	48.12	29.69	50.44	51.98	45.09	47.93	36.85	42.50	13.24	25.65	92.38
14	48.61	427.35	10368.61	1163.75	48.67	30.05	51.13	52.57	45.22	48.36	36.88	42.20	13.16	25.67	91.79
15	49.43	424.50	10369.42	1168.41	48.86	29.89	51.33	53.04	45.59	48.51	36.86	41.62	12.72	26.02	92.19
16	48.80	425.80	10463.19	1174.07	48.46	29.67	51.70	53.54	45.77	48.48	36.83	42.04	12.82	26.01	91.95
17	48.80	424.50	10429.94	1174.55	49.67	30.54	51.75	54.06	45.53	48.56	36.75	42.10	12.90	26.11	91.98
18	47.15	426.80	10386.56	1171.36	51.19	31.02	51.27	53.72	45.70	48.38	37.00	42.00	12.81	26.18	92.89
19	48.25	422.15	10428.76	1181.27	50.68	31.31	51.60	54.40	46.37	49.05	37.33	41.59	12.74	26.28	93.42
20	47.10	420.90	10489.64	1189.41	52.03	31.84	53.27	55.15	46.68	49.48	37.50	41.44	12.89	26.39	93.86
21	46.65	421.60	10544.48	1193.19	56.96	33.23	53.93	55.53	46.73	49.68	37.52	41.56	12.96	26.46	94.30
22	46.40	416.50	10550.09	1189.89	59.12	33.79	54.52	56.24	46.40	49.15	37.39	40.88	12.81	26.18	93.54
23	46.45	415.90	10586.89	1203.03	61.21	33.08	55.29	56.74	46.89	49.78	37.69	41.38	12.74	26.32	94.51
24	45.35	414.40	10699.73	1201.72	60.74	32.44	55.40	56.26	46.64	49.73	37.97	40.54	12.33	26.16	94.53

SPSS | AEM_Prediction_from_Gold

READY

Data loaded in to SPSS:



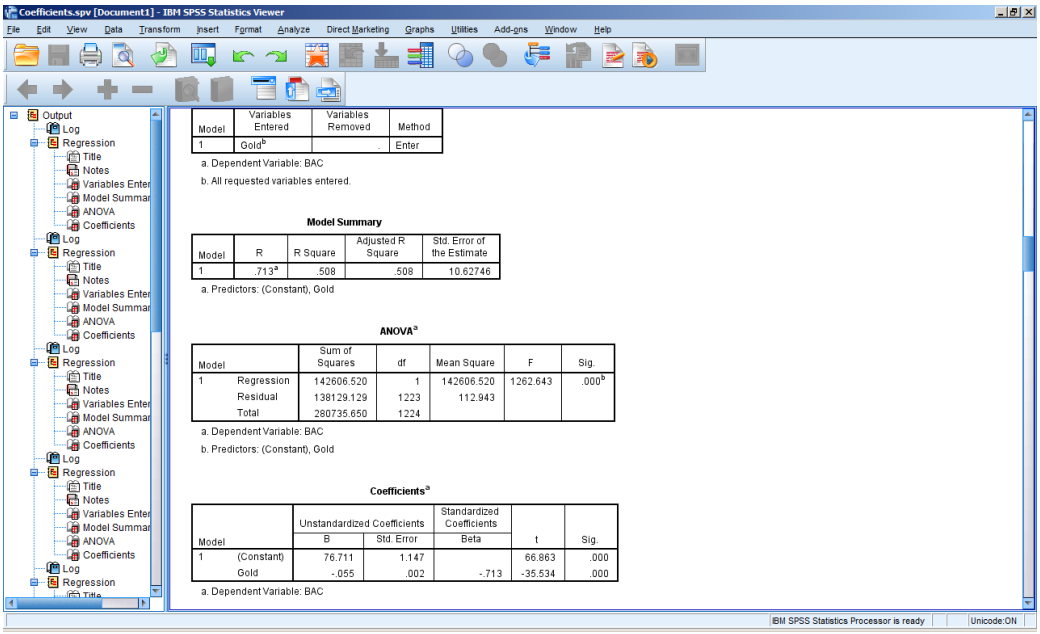
	Time	Oil	Gold	Dow	SampP500	VLO	TSO	XOM	CVX	BAC
1	1.0	43.96	427.75	10605.15	1188.05	43.06	29.85	49.75	50.55	45.82
2	2.0	43.41	426.00	10597.75	1183.74	43.07	29.51	49.49	50.88	45.29
3	3.0	45.51	424.35	10589.33	1187.89	42.16	29.25	50.12	51.73	45.22
4	4.0	45.32	422.20	10571.74	1186.19	43.42	29.68	49.79	51.15	44.73
5	5.0	45.31	420.00	10582.38	1190.25	43.28	29.04	49.98	51.38	45.29
6	6.0	45.66	421.35	10531.54	1182.99	43.80	29.44	49.85	51.40	45.18
7	7.0	46.46	426.60	10499.47	1187.70	44.34	29.64	50.59	52.49	45.06
8	8.0	48.11	423.60	10485.73	1177.45	45.36	30.42	50.55	52.06	44.50
9	9.0	48.41	422.50	10503.76	1184.52	46.97	30.31	51.07	52.30	44.89
10	10.0	48.46	421.75	10500.58	1195.98	48.02	29.55	51.50	53.09	45.73
11	11.0	47.61	424.95	10536.49	1184.63	48.94	30.18	51.05	52.69	44.97
12	12.0	47.01	422.90	10457.94	1175.41	48.67	29.88	50.72	51.96	45.31
13	13.0	48.31	423.30	10390.85	1167.87	48.12	29.69	50.44	51.98	45.09
14	14.0	48.61	427.35	10368.61	1163.75	48.67	30.05	51.13	52.57	45.22
15	15.0	49.43	424.50	10369.42	1168.41	48.86	29.89	51.33	53.04	45.59
16	16.0	48.80	425.80	10463.19	1174.07	48.46	29.67	51.70	53.54	45.77
17	17.0	48.80	424.50	10429.94	1174.55	49.67	30.54	51.75	54.06	45.53
18	18.0	47.15	426.80	10386.56	1171.36	51.19	31.02	51.27	53.72	45.70
19	19.0	48.25	422.15	10428.76	1181.27	50.68	31.31	51.60	54.40	46.37
20	20.0	47.10	420.90	10489.64	1189.41	52.03	31.84	53.27	55.15	46.68
21	21.0	46.65	421.60	10544.48	1193.19	56.96	33.23	53.93	55.53	46.73
22	22.0	46.40	416.50	10550.09	1189.89	59.12	33.79	54.52	56.24	46.40
23	23.0	46.45	415.90	10586.89	1203.03	61.21	33.08	55.29	56.74	46.89
24	24.0	45.35	414.40	10699.73	1201.72	60.74	32.44	55.40	56.26	46.64
25	25.0	45.40	411.10	10695.96	1202.30	58.34	31.60	55.78	56.60	46.89

Data analysis.

Correlation between Oil Dow, Oil and Gold, Dow and Gold

Correlation -> Bivariable -> Oil Dow, Oil Gold, Dow and Gold

Regression -> Linear -> Dependent (Dow, Gold, Gold)



Model	Variables Entered	Variables Removed	Method
1	Gold[b]	.	Enter

a. Dependent Variable: BAC

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.713[a]	.508	.508	10.62746

a. Predictors: (Constant), Gold

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142606.520	1	142606.520	1262.643	.000[b]
	Residual	138129.129	1223	112.943		
	Total	280735.650	1224			

a. Dependent Variable: BAC

b. Predictors: (Constant), Gold

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	76.711	1.147		66.863	.000
	Gold	-.055	.002	-.713	-35.534	.000

a. Dependent Variable: BAC

Calculated coefficients and developed formulas:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8581.316	144.323		59.459	.000
	Oil	34.384	1.932	.454	17.800	.000

a. Dependent Variable: Dow

Y = 34.384*x+ 8581.316

Independent OIL

Oil Gold

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	434.838	17.337		25.081	.000
	Oil	3.970	.232	.439	17.106	.000

a. Dependent Variable: Gold

Y = 3.970*x + 434.838

Dow Gold

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	962.639	37.376		25.755	.000
	Dow	-.022	.003	-.186	-6.606	.000

a. Dependent Variable: Gold

Y= -.022 * x + 962.539

Oil VS XOM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	49.490	.857		57.740	.000
	Oil	.317	.011	.619	27.588	.000

a. Dependent Variable: XOM

Y = 49.49+ 0.317*x

Coefficients by % change in oil to xom

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.119E-5	.001		.099	.921
	OIL	.284	.018	.414	15.896	.000

a. Dependent Variable: XOM

Y=0.00005119 + .284*x

Oil CVX

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	41.032	.819		50.089	.000
	Oil	.428	.011	.745	39.074	.000

a. Dependent Variable: CVX

Y = 41.032 + 0.428 * x

XOM CVX

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-6.404	.641		-9.998	.000
	XOM	1.082	.009	.962	123.289	.000

a. Dependent Variable: CVX

Y = -6.404 + 1.082 * x

GOLD BAC

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	76.711	1.147		66.863	.000
	Gold	-.055	.002	-.713	-35.534	.000

a. Dependent Variable: BAC

Y = 76.711 + (-0.055) * (gold)

GOLD C

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	90.686	1.150		78.891	.000
	Gold	-.080	.002	-.829	-51.896	.000

a. Dependent Variable: C

Y = 90.686 + (- 0.08) * (gold)

GOLD VLO

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	117.662	1.770		66.459	.000
	Gold	-.089	.002	-.731	-37.437	.000

a. Dependent Variable: VLO

Y = 117.662 + (- 0.089) * (gold)

Gold AEM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-20.900	.723		-28.896	.000
	Gold	.085	.001	.929	88.021	.000

a. Dependent Variable: AEM

Y = -20.900 + 0.085 * (gold)

OIL & Gold IBM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	43.175	1.127		38.306	.000
	Oil	.307	.014	.408	22.507	.000
	Gold	.046	.002	.556	30.668	.000

a. Dependent Variable: IBM

Y = 43.175 + 0.307 * (oil) + 0.046 * (gold)

Gold & CVX AEM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-40.565	.829		-48.957	.000
	Gold	.069	.001	.748	76.490	.000
	CVX	.442	.014	.306	31.263	.000

a. Dependent Variable: AEM

Y = -40.565 + 0.069 * (gold) + 0.442 * (CVX)

Gold & TSO BAC

Coefficients[a]

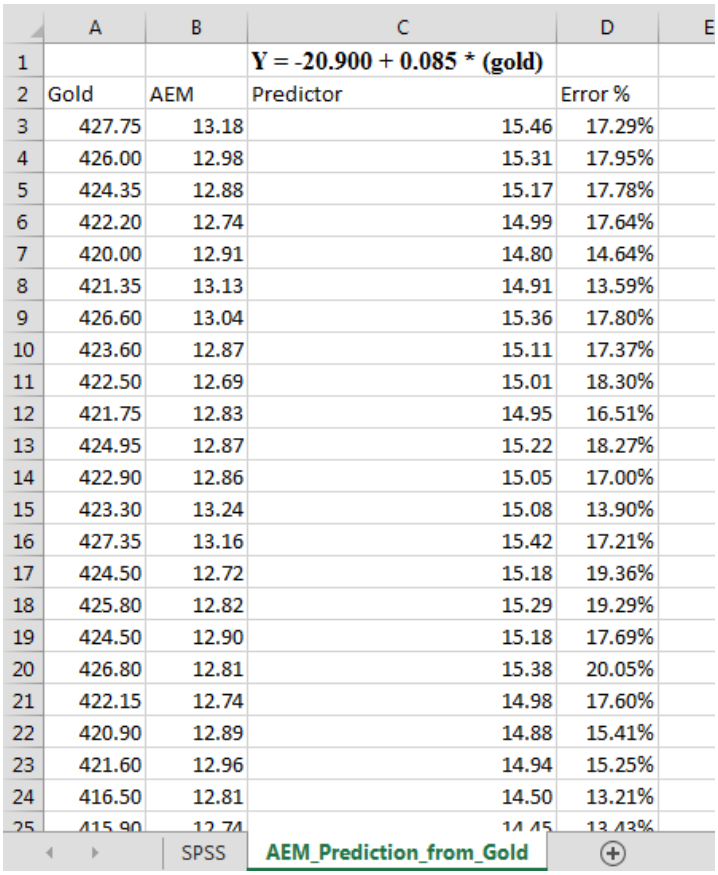
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42.137	1.237		34.055	.000
	Gold	-.029	.001	-.375	-22.479	.000
	TSO	.355	.010	.608	36.448	.000

a. Dependent Variable: BAC

Y = 42.137 + (-0.029) * (gold) + 0.355 * (TSO)

Test developed formula for prediction of the price.

Gold price and mining company:



	A	B	C	D	E
1			**Y = -20.900 + 0.085 * (gold)**		
2	Gold	AEM	Predictor	Error %	
3	427.75	13.18	15.46	17.29%	
4	426.00	12.98	15.31	17.95%	
5	424.35	12.88	15.17	17.78%	
6	422.20	12.74	14.99	17.64%	
7	420.00	12.91	14.80	14.64%	
8	421.35	13.13	14.91	13.59%	
9	426.60	13.04	15.36	17.80%	
10	423.60	12.87	15.11	17.37%	
11	422.50	12.69	15.01	18.30%	
12	421.75	12.83	14.95	16.51%	
13	424.95	12.87	15.22	18.27%	
14	422.90	12.86	15.05	17.00%	
15	423.30	13.24	15.08	13.90%	
16	427.35	13.16	15.42	17.21%	
17	424.50	12.72	15.18	19.36%	
18	425.80	12.82	15.29	19.29%	
19	424.50	12.90	15.18	17.69%	
20	426.80	12.81	15.38	20.05%	
21	422.15	12.74	14.98	17.60%	
22	420.90	12.89	14.88	15.41%	
23	421.60	12.96	14.94	15.25%	
24	416.50	12.81	14.50	13.21%	
25	415.90	12.74	14.45	13.43%	

SPSS | AEM_Prediction_from_Gold

Independent (Oil, Dow)

	Oil	*Gold*	*Dow*	*S&P500*	*VLO*	*TSO*	*XOM*	*CVX*	*BAC*	*C*	*NEM*
Oil	1										
Gold	0.4394	1									
Dow	0.4536	-0.186	1								
S&P500	0.3829	-0.323	0.9831	1							
VLO	0.0064	-0.731	0.5258	0.6212	1						
TSO	-0.127	-0.555	0.6384	0.7256	0.6735	1					
XOM	0.6194	0.5811	0.5266	0.3856	-0.156	-0.04	1				
CVX	0.7451	0.5931	0.5351	0.3995	-0.145	-0.098	0.962	1			
BAC	0.0137	-0.713	0.77	0.8523	0.772	0.8166	-0.065	-0.082	1		
C	-0.182	-0.829	0.6358	0.7435	0.7928	0.847	-0.227	-0.252	0.9618	1	
NEM	0.3409	0.0924	0.3444	0.3832	0.199	0.2923	0.0566	0.1029	0.2746	0.2098	1