

## Schedule PKC-1

<b>Credit Ratings</b>				
<b>Company</b>	<b>Ticker Symbol</b>	<b>Moody's</b>	<b>S&amp;P</b>	<b>ValueLine</b>
Atmos Energy Corporation	ATO	A2	A	A+
Chesapeake Utilities Corporation	CPK			B++
One Gas, Inc.	OGS	A2	A	B++
Northwest Natural Gas Company	NWN	A3	A+	A
Spire Inc.	SR	Baa2	A-	B++
Southwest Gas Holdings, Inc.	SWX	Baa1	BBB+	B++

Ratings downloaded from SNL data on Nov. 27, 2017.  
Value Line Financial Strengths rating from latest one-pagers.

**Schedule PKC-2**  
**Common Equity Ratios**

<b>Company</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Average (2014-16)</b>
Atmos Energy Corporation	55.7	56.5	61.3	57.83333
Chesapeake Utilities Corporation	65.5	70.6	76.5	70.86667
One Gas, Inc.	59.9	60.5	61.3	60.56667
Northwest Natural Gas Company	55.2	57.5	55.6	56.1
Spire Inc.	44.9	47	49.1	47
Southwest Gas Holdings, Inc.	47.6	50.7	51.8	50.03333
<b>Average</b>	<b>54.80</b>	<b>57.13</b>	<b>59.27</b>	<b>57.07</b>

Source: Value Line One-pagers (latest as of Nov. 27, 2017)

## Schedule PKC-3

**STOCK PRICES**

Date	ATO	CPK	OGS	NWN	SR	SWX
11/24/2017	88.7200	82.3500	76.7900	66.6500	78.3000	81.7000
11/22/2017	89.1000	82.7000	76.7400	66.7500	78.1500	82.2600
11/21/2017	89.4200	83.6500	77.2400	67.0500	78.9000	82.2900
11/20/2017	89.1100	81.8000	76.9500	66.1500	78.2000	82.1300
11/17/2017	89.3300	81.5500	77.1200	66.7000	78.5500	82.6900
11/16/2017	89.9500	81.8500	77.5300	67.2500	78.7500	82.8500
11/15/2017	89.5700	80.5500	76.8500	67.2500	78.2000	82.4500
11/14/2017	90.5400	81.9000	77.7500	68.0000	78.6000	82.7000
11/13/2017	89.5400	80.1500	76.5600	66.6500	77.4000	79.6800
11/10/2017	89.1600	80.4500	75.9000	66.5500	77.8500	80.0800
11/9/2017	89.7900	80.6500	76.7500	66.7500	78.3000	81.8000
11/8/2017	89.2400	80.1500	77.0900	67.0000	78.5500	83.2000
11/7/2017	88.5700	80.5000	76.8500	66.5500	78.5000	81.8600
11/6/2017	87.8400	79.7500	76.2900	66.0500	78.3000	79.9300
11/3/2017	87.5900	80.0000	76.4200	66.6500	78.6500	80.5000
11/2/2017	86.5200	80.3000	76.4000	66.1000	78.6500	81.8300
11/1/2017	86.9700	79.3500	76.2900	65.7500	78.7000	81.9500
10/31/2017	87.2400	80.5500	76.9800	66.3500	78.9500	82.3900
10/30/2017	86.9400	80.0500	75.6000	65.8000	78.0500	82.2200
10/27/2017	87.2900	81.5000	76.4300	66.8500	78.8500	82.2000
10/26/2017	86.3600	80.1500	75.2700	66.1500	78.1000	80.8800
<b>Average</b>	<b>88.51</b>	<b>80.95</b>	<b>76.66</b>	<b>66.62</b>	<b>78.40</b>	<b>81.79</b>

Source: SNL

**Schedule PKC-4**

<b>Dividend Yield Estimate for the Next Period</b>			
Company	Average Stock Price	2018 Dividend	Div. Yield(1)
ATO	88.51	1.94	2.19%
CPK	80.95	1.33	1.64%
OGS	76.66	1.88	2.45%
NWN	66.62	1.89	2.84%
SR	78.40	2.25	2.87%
SWX	81.79	2.08	2.54%
<b>Average</b>			<b>2.42%</b>

DY data from Value Line (latest one-pagers as of Nov. 27, 2017)

## Schedule PKC-5

## Growth Components

Company		Value Line 5-yearly projections			Consensus EPS	Zacks EPS	SNL LTG	Average EPS	Average of Average EPS, DPS and BPS	Internal growth	External Growth	Internal plus External growth
		EPS growth rate	DPS growth rate	BPS growth rate								
Atmos Energy Corporation	ATO	6.75	5.37	4.37	6.50	6.50	7.00	6.69	5.47	5.52%	4.15%	9.67%
Chesapeake Utilities Corporation	CPK	8.50	5.75	7.74	8.10	6.00	7.07	7.42	6.97	7.40%	10.69%	18.09%
One Gas, Inc.	OGS	9.50	13.50	3.00	6.00	6.30	6.00	6.95	7.82	3.66%	1.70%	5.37%
Northwest Natural Gas Company	NWN	4.75	2.37	3.00	4.00	4.50	5.00	4.56	3.31	3.14%	0.68%	3.82%
Spire Inc.	SR	8.75	4.25	5.24	4.52	5.30	4.75	5.83	5.11	4.15%	0.89%	5.04%
Southwest Gas Holdings, Inc.	SWX	7.25	7.62	3.87	4.00	6.50	4.00	5.44	5.64	4.63%	2.54%	7.17%
<b>Average</b>		<b>7.58</b>	<b>6.48</b>	<b>4.54</b>	<b>5.52</b>	<b>5.85</b>	<b>5.64</b>	<b>6.15</b>	<b>5.72</b>	<b>4.75%</b>	<b>3.44%</b>	<b>8.19%</b>

Value Line data based on information downloaded on November 27, 2017 and the latest Value Line one-pager for OGS.  
Zacks, SNL and Consensus data from Nov. 27, 2017.

## Schedule PKC-6

**"External Component" of COE**

		current market to book ratio	# of shares 2018	# of shares 2020-22	growth rate in # of shares	sv
Atmos Energy Corporation	ATO	2.41	110	120	2.94%	4.15%
Chesapeake Utilities Corporation	CPK	2.92	17	20	5.57%	10.69%
One Gas, Inc.	OGS	2.09	52.5	55	1.56%	1.70%
Northwest Natural Gas Company	NWN	2.21	29.5	30	0.56%	0.68%
Spire Inc.	SR	1.87	48.5	50	1.02%	0.89%
Southwest Gas Holdings, Inc.	SWX	2.27	49	52	2.00%	2.54%

Source: Value Line one-pagers (data as of November. 27, 2017)

Market to book ratio (mrq) based on yahoo finance data from Nov. 27, 2017

**Schedule PKC-7**

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<b>Expected Return on Equity</b>				
EXPECTED ROE		2018	2020-22	2018-22
Atmos Energy Corporation	ATO	10.50%	11.50%	11.25%
Chesapeake Utilities Corp	CPK	9.50%	13.00%	12.13%
One Gas, Inc.	OGS	8.50%	9.50%	9.25%
Northwest Natural Gas Co	NWN	8.00%	10.00%	9.50%
Spire Inc.	SR	8.50%	9.50%	9.25%
Southwest Gas Holdings, I	SWX	9.50%	10.00%	9.88%
Average				10.21%

Source: Value Line one-pagers (latest data as of Nov. 27, 2017)

Schedule PKC-7 (continued)

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Retention Ratio (b)								
		2018			2020-22			Average Retention ratio (b)
		earnings pershare	dividends pershare	b	earnings pershare	dividends pershare	b	
Atmos Energy Corporation	ATO	3.80	1.92	0.49	4.50	2.30	0.49	0.49
Chesapeake Utilities Corp	CPK	2.95	1.33	0.55	4.20	1.55	0.63	0.61
One Gas, Inc.	OGS	3.25	1.88	0.42	4.00	2.45	0.39	0.40
Northwest Natural Gas Co	NWN	2.45	1.89	0.23	3.15	2.00	0.37	0.33
Spire Inc.	SR	3.80	2.25	0.41	4.65	2.50	0.46	0.45
Southwest Gas Holdings,	SWX	3.70	2.08	0.44	4.80	2.50	0.48	0.47

Source: Value Line one-pagers (latest data as of Nov. 27, 2017)



**Schedule PKC-8**

<b>DCF ROE Estimates</b>				
Company		Average of EPS, DPS, and BVPS growth rates	br and sv	EPS growth rates
Atmos Energy Corporation	ATO	7.67%	11.86%	8.88%
Chesapeake Utilities Corporation	CPK	8.61%	19.73%	9.06%
One Gas, Inc.	OGS	10.27%	7.82%	9.40%
Northwest Natural Gas Company	NWN	6.15%	6.66%	7.40%
Spire Inc.	SR	7.98%	7.91%	8.70%
Southwest Gas Holdings, Inc.	SWX	8.19%	9.71%	7.98%
<b>Average Cost of Equity estimate</b>		<b>8.14%</b>	<b>10.62%</b>	<b>8.57%</b>

The shaded cells represent outliers.

DCF All Methods

mean + 2 times st. deviation	10.82%	20.26%	10.06%	9.11%
mean - 2 times st. deviation	5.46%	0.97%	7.08%	15.03%
Without outliers (if applicable)				3.19%
				8.48%

<b>CAPM Method 1</b>	<b>9.55%</b>
<b>CAPM Method 2</b>	<b>8.89%</b>
<b>CAPM Average</b>	<b>9.22%</b>

**Schedule PKC-9**  
**PROXY BETA**

Company		VL Betas	Bloomberg Beta
Atmos Energy Corporation	ATO	0.70	0.58
Chesapeake Utilities Corporation	CPK	0.70	0.74
One Gas, Inc.	OGS	0.70	0.68
Northwest Natural Gas Company	NWN	0.70	0.52
Spire Inc.	SR	0.70	0.62
Southwest Gas Holdings	SWX	0.80	0.63
Proxy Average		<b>0.72</b>	<b>0.63</b>

Sources: Latest Value Line One Pages (Downloaded on Nov. 27, 2017)  
 Bloomberg: Company response to DR OCA 4-17

**Schedule PKC-10**

<b>Pricing Date</b>	<b>10y US T- Note</b>
11/24/2017	2.34
11/23/2017	2.32
11/22/2017	2.32
11/21/2017	2.36
11/20/2017	2.37
11/17/2017	2.35
11/16/2017	2.37
11/15/2017	2.33
11/14/2017	2.38
11/13/2017	2.40
11/10/2017	2.40
11/09/2017	2.33
11/08/2017	2.32
11/07/2017	2.32
11/06/2017	2.32
11/03/2017	2.34
11/02/2017	2.35
11/01/2017	2.37
10/31/2017	2.38
10/30/2017	2.37
10/27/2017	2.42
	2.36

Data source for yields is SNL

<b>CAPM Method 1</b>	
S&P 500	
Return on B-cap-weighted	13.83
market risk premium	11.47
<b>CAPM Method 1 cost-of-equity estimate</b>	<b>9.55</b>

<b>CAPM Method 2</b>	
Value Line using S&P 500 constituents	
VL portfolio beta	1.00
Return on Value Line portfolio	11.49
market risk premium	9.12
<b>CAPM Method 2 cost-of-equity estimate</b>	<b>8.89</b>

## Schedule PKC-11 Value Line Market Returns

Ticker	Exp. EPS Growth Rate	Exp. DPS Growth Rate	Exp. BVPS Growth Rate	BETA	Exp. DY	EPS based DCF	DPS based DCF	BVPS based DCF	MCAP weight	CW EPS weighted EPS	CW EPS weighted DPS	CW EPS weighted VPS	CW Betas
AAL	1.5	24	14	1.3	0.9	2.40675	25.008	14.963	0.001305	0.003142	0.032643	0.019531	0.001697
AAP	9.5	16.5	7.5	1	0.2	9.7095	16.7165	7.7075	0.000321	0.003117	0.005367	0.002475	0.000321
AAPL	11	12.5	15	0.95	1.8	12.899	14.4125	16.935	0.041865	0.540018	0.603381	0.708985	0.039772
ABC	11	9.5	15	0.85	1.7	12.7935	11.28075	16.8275	0.000925	0.011838	0.010438	0.01557	0.000786
ABT	8.5	7	5.5	1.05	2.4	11.002	9.484	7.966	0.004964	0.054616	0.047081	0.039545	0.005212
ACN	9	8.5	11	1	2.1	11.1945	10.68925	13.2155	0.004621	0.051728	0.049393	0.061066	0.004621
ADBE	29.5	0	16.5	1.1	0	29.5	0	16.5	0.004364	0.128728	0	0.072	0.0048
ADI	16	4	15	1.15	2.3	18.484	6.346	17.4725	0.001713	0.031658	0.010869	0.029925	0.00197
ADM	3.5	6.5	4	1.15	3.2	6.756	9.804	7.264	0.001269	0.008574	0.012443	0.009219	0.00146
ADP	9	9	2.5	1	2.4	11.508	11.508	4.93	0.00267	0.030726	0.030726	0.013163	0.00267
AEE	6	4.5	4	0.65	3.2	9.296	7.772	7.264	0.000773	0.007183	0.006006	0.005613	0.000502
AEP	4	5	3.5	0.65	3.4	7.468	8.485	6.9595	0.001877	0.014017	0.015926	0.013063	0.00122
AET	9	17	6.5	1	1.4	10.463	18.519	7.9455	0.002743	0.028698	0.050794	0.021793	0.002743
AFL	4	5	13.5	1	2.3	6.346	7.3575	15.9525	0.001724	0.010942	0.012686	0.027511	0.001724
AGN	10	0	9	1	1.1	11.155	1.1	10.1495	0.003155	0.035193	0.00347	0.032021	0.003155
AIG	27	21.5	5.5	1.05	2.1	29.3835	23.82575	7.65775	0.003036	0.089198	0.072326	0.023246	0.003187
AIZ	4	11.5	9	0.9	2.2	6.244	13.8265	11.299	0.000277	0.00173	0.003832	0.003131	0.000249
AJG	15.5	2.5	7.5	0.95	2.8	18.517	5.335	10.405	0.000584	0.010814	0.003116	0.006077	0.000555
AKAM	11	0	9.5	1.25	0	11	0	9.5	0.000459	0.00505	0	0.004361	0.000574
ALB	9.5	4.5	6	1.3	1.2	10.757	5.727	7.236	0.000791	0.008505	0.004528	0.005721	0.001028
ALGN	17	0	15	1.2	0	17	0	15	0.000842	0.014321	0	0.012636	0.001011
ALK	10	14	7.5	1.15	1.4	11.47	15.498	8.9525	0.000506	0.005803	0.007841	0.00453	0.000582
ALL	7.5	5	8	0.85	1.7	9.26375	6.7425	9.768	0.001746	0.016172	0.011771	0.017053	0.001484
ALXN	23.5	0	6	1.1	0	23.5	0	6	0.001574	0.036979	0	0.009442	0.001731
AMAT	23	7	9	1.15	1.1	24.2265	8.1385	10.1495	0.003102	0.075155	0.025247	0.031486	0.003568
AME	8.5	14	8.5	1.1	0.6	9.1255	14.642	9.1255	0.000818	0.007468	0.011983	0.007468	0.0009
AMG	7	0	6.5	1.4	0.5	7.5175	0.5	7.01625	0.000565	0.004245	0.000282	0.003962	0.000791
AMGN	8	11	12.5	1.05	3.1	11.224	14.2705	15.79375	0.00679	0.076213	0.096899	0.107242	0.00713
AMP	11.5	4	11.5	1.3	2.6	14.2495	6.652	14.2495	0.001191	0.016973	0.007923	0.016973	0.001548
AMT	15.5	16	8	0.95	2.1	17.76275	18.268	10.184	0.003056	0.054288	0.055833	0.031125	0.002903
AMZN	56	0	29	1.15	0	56	0	29	0.024187	1.354455	0	0.701414	0.027815
ANDV	5.5	9	22	1.2	2.6	8.1715	11.717	24.886	0.000864	0.007061	0.010125	0.021505	0.001037
ANTM	11	6	11	0.9	1.4	12.477	7.442	12.477	0.002645	0.033003	0.019685	0.033003	0.002381
AON	12	15.5	10.5	0.9	1.2	13.272	16.793	11.763	0.002	0.026538	0.033578	0.02352	0.0018
AOS	11.5	11	8	1.2	1	12.5575	12.055	9.04	0.000551	0.006923	0.006646	0.004984	0.000662
APA	23	3	-1	1.55	2	25.23	5.03	0.99	0.000789	0.019904	0.003968	0.000781	0.001223
APD	9	6	8.5	1.05	2.7	11.8215	8.781	11.31475	0.00173	0.020452	0.015191	0.019575	0.001817
APH	8.5	7.5	6.5	1	0.9	9.43825	8.43375	7.42925	0.001365	0.012888	0.011516	0.010145	0.001365
ATVI	9	12	5.5	1.1	0.5	9.5225	12.53	6.01375	0.002443	0.023266	0.030614	0.014693	0.002688
AVGO	44	22	19	1.1	1.7	46.074	23.887	20.8615	0.005213	0.240199	0.124531	0.108758	0.005735
AVY	8.5	4.5	9.5	1	2.2	10.7935	6.7495	11.8045	0.000451	0.004868	0.003044	0.005324	0.000451
AWK	8.5	10	5.5	0.65	2.2	10.7935	12.31	7.7605	0.000799	0.008619	0.00983	0.006197	0.000519
AXP	6	8.5	9	1.1	1.7	7.751	10.27225	10.7765	0.004281	0.033179	0.043972	0.04613	0.004709
AYI	16.5	7.5	15	1.25	0.3	16.82475	7.81125	15.3225	0.000345	0.00581	0.002697	0.005291	0.000432
BBT	5.5	7.5	5.5	1	2.9	8.47975	10.50875	8.47975	0.001984	0.016821	0.020846	0.016821	0.001984
BBY	9.5	10.5	4.5	1.05	2.4	12.014	13.026	6.954	0.000874	0.010505	0.011139	0.006081	0.000918
BCR	9.5	7	18	0.85	0.4	9.919	7.414	18.436	0.00123	0.012203	0.009121	0.022681	0.001046
BDX	9	7.5	4	0.8	1.7	10.7765	9.26375	5.734	0.002477	0.026693	0.022946	0.014203	0.001982
BEN	5	12.5	4.5	1.35	2	7.05	14.625	6.545	0.001289	0.009088	0.018852	0.008437	0.00174
BIIB	7	0	10.5	1.15	0	7	0	10.5	0.003444	0.024109	0	0.036163	0.003961
BK	8.5	10	5.5	1.1	1.6	10.168	11.68	7.144	0.002819	0.02866	0.032922	0.020137	0.003101
BLK	8	10	5	1.3	2.6	10.704	12.73	7.665	0.003934	0.042113	0.050084	0.030157	0.005115
BLL	15	9.5	25.5	0.95	0.5	15.5375	10.02375	26.06375	0.000779	0.012103	0.007808	0.020303	0.00074
BMY	14.5	2.5	4	0.9	2.8	17.503	5.335	6.856	0.005385	0.094259	0.028731	0.036922	0.004847
BSX	18.5	0	8	0.95	0	18.5	0	8	0.00211	0.039027	0	0.016877	0.002004
BWA	8	6.5	4.5	1.35	1.3	9.352	7.84225	5.82925	0.000574	0.005372	0.004505	0.003348	0.000775
C	11	43	5	1.3	1.1	12.1605	44.3365	6.1275	0.010436	0.126903	0.462681	0.063945	0.013566
CA	7	3	6.5	1.1	3.1	10.2085	6.1465	9.70075	0.000745	0.007608	0.004581	0.00723	0.00082
CAG	3	2.5	6	0.7	2.4	5.436	4.93	8.472	0.00072	0.003915	0.00355	0.006101	0.000504
CAH	13	13	11.5	0.95	2.6	15.769	15.769	14.2495	0.00108	0.017038	0.017038	0.015397	0.001026
CAT	10	2.5	8.5	1.2	3.1	13.255	5.63875	11.73175	0.004215	0.055869	0.023767	0.049448	0.005058
CB	8	4.5	8	0.85	2	10.08	6.545	10.08	0.003707	0.037371	0.024265	0.037371	0.003151
CBG	7	0	19	1.35	0	7	0	19	0.000689	0.004823	0	0.013092	0.00093
CBOE	13	5.5	51	0.7	1.1	14.1715	6.63025	52.3805	0.000641	0.009091	0.004253	0.033601	0.000449
CBS	13	11	7	1.1	1.1	14.1715	12.1605	8.1385	0.001069	0.015156	0.013005	0.008704	0.001176
CCI	8.5	17.5	0.5	0.85	4	12.67	21.85	4.51	0.002181	0.027635	0.047659	0.009837	0.001854
CCL	11	4	4	0.95	2.7	13.8485	6.754	6.754	0.001829	0.025324	0.012351	0.012351	0.001737

CDNS	10	0	7.5	1.05	0	10	0	7.5	0.000612	0.006116	0	0.004587	0.000642
CELG	25	0	10.5	1.2	0	25	0	10.5	0.004857	0.121433	0	0.051002	0.005829
CERN	9.5	0	14	0.95	0	9.5	0	14	0.001238	0.011763	0	0.017335	0.001176
CFG	10.5	21	4.5	1.15	1.6	12.184	22.768	6.136	0.000991	0.012076	0.022566	0.006082	0.00114
CHD	7	5	7.5	0.75	1.4	8.449	6.435	8.9525	0.000589	0.004973	0.003787	0.005269	0.000441
CHRW	6	6.5	9	0.85	2.6	8.678	9.1845	11.717	0.000571	0.004955	0.005244	0.00669	0.000485
CHTR	26	0	22.5	0.95	0	26	0	22.5	0.005024	0.130625	0	0.113041	0.004773
CI	11.5	4	8.5	0.9	0	11.5	4	8.5	0.002519	0.028964	0.010074	0.021408	0.002267
CINF	6.5	3	3.5	0.9	2.9	9.49425	5.9435	6.45075	0.000645	0.006125	0.003835	0.004162	0.000581
CLX	7.5	7	33.5	0.65	2.4	9.99	9.484	36.302	0.000847	0.008462	0.008034	0.030751	0.000551
CMA	13.5	8.5	4.5	1.25	1.5	15.10125	10.06375	6.03375	0.000716	0.010806	0.007201	0.004318	0.000894
CMCSA	8	9	4	0.9	1.5	9.56	10.5675	5.53	0.008876	0.084853	0.093796	0.049084	0.007988
CME	8.5	7	3	0.8	2.1	10.68925	9.1735	5.1315	0.002351	0.025132	0.021568	0.012065	0.0001881
CMG	15.5	0	14.5	0.95	0	15.5	0	14.5	0.000477	0.007394	0	0.006917	0.000453
CMI	7.5	5.5	7	1.1	2.6	10.1975	8.1715	9.691	0.001543	0.015733	0.012607	0.014951	0.001697
CMS	6.5	6.5	6.5	0.65	2.9	9.49425	9.49425	9.49425	0.000704	0.006689	0.006689	0.006689	0.000458
CNC	17	0	17.5	0.95	0	17	0	17.5	0.000828	0.014071	0	0.014485	0.000786
CNP	6	3.5	2	0.9	3.8	9.914	7.3665	5.838	0.000658	0.006524	0.004847	0.003841	0.000592
COF	4	9.5	8.5	1.15	1.9	5.938	11.49025	10.48075	0.002234	0.013265	0.025669	0.023414	0.002569
COH	8	5.5	10	1.05	2.8	10.912	8.377	12.94	0.00059	0.00644	0.004944	0.007637	0.00062
COL	8	8	8.5	1	1.2	9.248	9.248	9.751	0.001133	0.010475	0.010475	0.011044	0.001133
COO	16.5	0	10	0.95	0	16.5	0	10	0.000605	0.009982	0	0.00605	0.000575
COST	10	10	7.5	0.8	1.3	11.365	11.365	8.84875	0.003659	0.041583	0.041583	0.032377	0.002927
CPB	4	3.5	16.5	0.7	2.7	6.754	6.24725	19.42275	0.000715	0.004831	0.004468	0.013892	0.000501
CSCO	7	9.5	5	1.05	3.7	10.8295	13.37575	8.7925	0.008835	0.095675	0.11817	0.077678	0.009276
CSX	11	9.5	10	1.25	1.6	12.688	11.176	11.68	0.002505	0.031785	0.027997	0.02926	0.003131
CTAS	11	10	12	0.95	1.1	12.1605	11.155	13.166	0.000827	0.010061	0.009229	0.010893	0.000786
CTL	9.5	0	2	1	8.4	18.299	8.4	10.484	0.000531	0.009724	0.004464	0.005571	0.000531
CTXS	5.5	0	2.5	1.2	0	5.5	0	2.5	0.00065	0.003577	0	0.001626	0.00078
CVS	9	15	6.5	0.85	2.6	11.717	17.795	9.1845	0.003987	0.04671	0.07094	0.036614	0.003389
CVX	15	2.5	1	1.2	4.1	19.4075	6.65125	5.1205	0.011657	0.226231	0.077533	0.059689	0.013988
CXO	27	0	5.5	1.6	0	27	0	5.5	0.001002	0.027067	0	0.005514	0.001604
D	5.5	8.5	2	0.65	4.1	9.71275	12.77425	6.141	0.002664	0.025873	0.034028	0.016358	0.001731
DAL	10.5	17.5	15.5	1.3	2.2	12.8155	19.8925	17.8705	0.001956	0.025069	0.038913	0.034958	0.002543
DE	6	2.5	9.5	0.9	2.1	8.163	4.62625	11.69975	0.002172	0.017729	0.010048	0.02541	0.001955
DFS	5	10.5	14	1.05	1.9	6.9475	12.49975	16.033	0.001295	0.008994	0.016182	0.020756	0.001359
DG	9.5	19.5	9	0.85	1.5	11.07125	21.14625	10.5675	0.001186	0.013127	0.025072	0.012529	0.001008
DGX	9.5	9	6.5	0.9	1.7	11.28075	10.7765	8.25525	0.00067	0.007557	0.00722	0.005531	0.000603
DHI	12	15.5	13	1.35	1.3	13.378	16.90075	14.3845	0.000837	0.011191	0.014138	0.012033	0.001129
DHR	9	13	5.5	1.05	0.7	9.7315	13.7455	6.21925	0.003264	0.031764	0.044865	0.0203	0.003427
DIS	8	9.5	10	1	1.4	9.456	10.9665	11.47	0.007827	0.074012	0.085835	0.089776	0.007827
DISCA	13.5	0	12.5	1.15	0	13.5	0	12.5	0.000155	0.002087	0	0.001933	0.000178
DLPH	13.5	10	23	1.25	1.4	14.9945	11.47	24.561	0.001348	0.02021	0.015459	0.033103	0.001685
DLTR	17	0	19	0.8	0	17	0	19	0.001121	0.019065	0	0.021308	0.000897
DOV	8	3	9	1.25	2.1	10.184	5.1315	11.1945	0.000771	0.007849	0.003955	0.008628	0.000963
DPS	7.5	5.5	9	0.75	2.7	10.30125	8.27425	11.8215	0.000841	0.008664	0.006959	0.009943	0.000631
DRI	11	6	5.5	0.85	2.6	13.743	8.678	8.1715	0.000527	0.007247	0.004576	0.004309	0.000448
DTE	6	7	4.5	0.65	3.1	9.193	10.2085	7.66975	0.001043	0.009589	0.010648	0.008	0.000678
DUK	4.5	4.5	1.5	0.6	4.3	8.89675	8.89675	5.83225	0.003178	0.028269	0.028269	0.018532	0.001907
DVA	10	0	9	0.8	0	10	0	9	0.000617	0.006165	0	0.005549	0.000493
DVN	15	-10.5	-1	1.8	0.6	15.645	-9.9315	-0.403	0.000945	0.014778	-0.00938	-0.00038	0.0017
DXC	18	7	7.5	1.1	0.7	18.763	7.7245	8.22625	0.001343	0.025192	0.010371	0.011045	0.001477
EA	13	0	15.5	1.05	0	13	0	15.5	0.001806	0.023479	0	0.027994	0.001896
ECL	8.5	8	9.5	1	1.2	9.751	9.248	10.757	0.001975	0.01926	0.018267	0.021247	0.001975
ED	2.5	3	3.5	0.5	3.6	6.145	6.654	7.163	0.001371	0.008424	0.009121	0.009819	0.000685
EFX	10.5	9	15	1	1.1	11.65775	10.1495	16.1825	0.000676	0.007877	0.006858	0.010934	0.000676
EIX	4	9	4	0.65	2.9	6.958	12.0305	6.958	0.001343	0.009342	0.016152	0.009342	0.000873
EL	8	7.5	3.5	0.85	1.4	9.456	8.9525	4.9245	0.002096	0.01982	0.018765	0.010322	0.001782
EMN	10	8	7	1.2	2.5	12.625	10.6	9.5875	0.000676	0.008537	0.007168	0.006483	0.000811
EMR	5	2.5	1.5	1.1	3.2	8.28	5.74	4.724	0.002204	0.018247	0.01265	0.010411	0.002424
EOG	30	7.5	1.5	1.45	0.8	30.92	8.33	2.306	0.002874	0.088874	0.023943	0.006628	0.004168
EQIX	23	14	7.5	1	1.9	25.1185	16.033	9.47125	0.001862	0.046765	0.02985	0.017633	0.001862
EQT	20.5	5	5.5	1	0.2	20.7205	5.205	5.7055	0.000574	0.011902	0.00299	0.003277	0.000574
ES	6.5	5.5	4	0.65	3.3	9.90725	8.89075	7.366	0.001021	0.01011	0.009073	0.007517	0.000663
ESRX	13	0	9	0.95	0	13	0	9	0.001754	0.022796	0	0.015782	0.001666
ETFC	15.5	0	8.5	1.45	0	15.5	0	8.5	0.000609	0.009442	0	0.005178	0.000883
ETN	7	5.5	2	1.2	3.1	10.2085	8.68525	5.131	0.001836	0.018748	0.01595	0.009423	0.002204
ETR	-3.5	2	0.5	0.65	4.4	0.823	6.444	4.911	0.000796	0.000655	0.005132	0.003911	0.000518
EW	17	0	10	0.85	0	17	0	10	0.001245	0.021159	0	0.012447	0.001058
EXC	7	5.5	4	0.7	3.9	11.0365	9.50725	7.978	0.001979	0.021845	0.018818	0.015791	0.001386
EXPD	10	7.5	12	0.95	1.6	11.68	9.16	13.696	0.000552	0.00645	0.005058	0.007563	0.000525
EXPE	23	17	9	1.2	0.9	24.0035	17.9765	9.9405	0.001179	0.028305	0.021198	0.011722	0.001415
F	3	4	8	1.3	5.4	8.481	9.508	13.616	0.002498	0.021185	0.02375	0.034011	0.003247
FAST	4	6.5	5	0.95	2.9	6.958	9.49425	7.9725	0.000695	0.004832	0.006594	0.005537	0.00066
FB	31.5	0	21	1	0	31.5	0	21	0.025742	0.810861	0	0.540574	0.025742
FBHS	13.5	8.5	8.5	1.25	1.1	14.67425	9.64675	9.64675	0.000541	0.007943	0.005221	0.005221	0.000677

FDX	12.5	21	9.5	1.1	0.9	13.45625	21.9945	10.44275	0.003124	0.042042	0.068719	0.032627	0.003437
FE	9	2	-1.5	0.65	5	14.225	7.05	3.4625	0.000734	0.010438	0.005173	0.002541	0.000477
FFIV	10	0	12	1.1	0	10	0	12	0.000391	0.003906	0	0.004688	0.00043
FIS	10	5.5	3.5	0.9	1.4	11.47	6.9385	4.9245	0.001634	0.018741	0.011337	0.008046	0.00147
FISV	9	0	2.5	0.9	0	9	0	2.5	0.001383	0.012449	0	0.003458	0.001245
FITB	5	7.5	6	1.15	2.4	7.46	9.99	8.472	0.001087	0.00811	0.01086	0.00921	0.00125
FL	6.5	5.5	14	0.9	2.6	9.1845	8.1715	16.782	0.000199	0.001829	0.001627	0.003342	0.000179
FLIR	7.5	12	9	0.95	1.9	9.47125	14.014	10.9855	0.000311	0.002943	0.004355	0.003414	0.000295
FLR	2	0	8	1.4	1.8	3.818	1.8	9.872	0.000308	0.001177	0.000555	0.003044	0.000432
FLS	2.5	6	6.5	1.35	1.6	4.12	7.648	8.152	0.000302	0.001245	0.002311	0.002464	0.000408
FMC	8	6	12	1.25	0.9	8.936	6.927	12.954	0.000652	0.005823	0.004514	0.008442	0.000815
FOXA	12	12.5	4	1.05	1.2	13.272	13.775	5.224	0.001426	0.018931	0.019648	0.007451	0.001498
GD	5.5	5.5	3.5	0.95	1.7	7.24675	7.24675	5.22975	0.003277	0.023745	0.023745	0.017136	0.003113
GE	14	11	2	1.05	3.5	17.745	14.6925	5.535	0.009778	0.173509	0.143662	0.054121	0.010267
GILD	-1	16.5	7	1	2.9	1.8855	19.63925	10.0015	0.005397	0.010176	0.105989	0.053976	0.005397
GIS	3.5	4	3.5	0.75	3.7	7.26475	7.774	7.26475	0.001519	0.011032	0.011805	0.011032	0.001139
GLW	11.5	14	5.5	1.25	2.1	13.72075	16.247	7.65775	0.001488	0.020421	0.020421	0.011397	0.00186
GM	9.5	12	9.5	1.25	4.6	14.3185	16.876	14.3185	0.003494	0.050035	0.058972	0.050035	0.004368
GPC	7	5	5.5	0.95	2.9	10.0015	7.9725	8.47975	0.000674	0.006736	0.00537	0.005711	0.00064
GPS	0.5	2	6.5	1	3.8	4.3095	5.838	10.4235	0.00055	0.00237	0.00321	0.005732	0.00055
GRMN	5	1.5	3.5	1.05	4	9.1	5.53	7.57	0.000576	0.005246	0.003188	0.004364	0.000605
GS	9	7	7.5	1.25	1.3	10.3585	8.3455	8.84875	0.004887	0.050622	0.040784	0.043244	0.006109
GT	10	18.5	7.5	1.4	1.2	11.26	19.811	8.745	0.000442	0.004982	0.008765	0.003869	0.000619
GWV	4.5	9	3.5	0.9	2.9	7.46525	12.0305	6.45075	0.000583	0.004353	0.007015	0.003762	0.000525
HAL	20.5	0.5	3	1.45	1.5	22.15375	2.00375	4.5225	0.00186	0.041213	0.003728	0.008413	0.002697
HAS	10.5	6	8	0.9	2.2	12.8155	8.266	10.288	0.0006	0.007688	0.004959	0.006172	0.00054
HBAN	10	14.5	5.5	1.15	2.7	12.835	17.39575	8.27425	0.000799	0.010257	0.013901	0.006612	0.000919
HBI	9	14	19	1	2.6	11.717	16.782	21.847	0.000435	0.005092	0.007293	0.009494	0.000435
HD	10.5	15	-25	0.95	2.6	13.2365	17.795	-22.725	0.010098	0.133657	0.179687	-0.22947	0.009593
HIG	12.5	7	5.5	1.05	1.9	14.51875	8.9665	7.45225	0.001031	0.014976	0.009249	0.007687	0.001083
HOG	8	4	7	1.1	2.6	10.704	6.652	9.691	0.000435	0.004661	0.002896	0.00422	0.000479
HOLX	25	0	9.5	1	0	25	0	9.5	0.000536	0.013399	0	0.005092	0.000536
HON	8.5	11	8	1.05	2	10.585	13.11	10.08	0.005743	0.060791	0.075293	0.057891	0.00603
HP	8	1	0.5	1.55	4.3	12.472	5.3215	4.81075	0.000294	0.003665	0.001564	0.001414	0.000455
HRB	8	7	15	0.85	3.5	11.64	10.6225	18.7625	0.000285	0.003316	0.003026	0.005345	0.000242
HRL	10.5	9.5	10	0.75	2.2	12.8155	11.8045	12.31	0.000824	0.010564	0.009731	0.010147	0.000618
HRS	10.5	5.5	7.5	1.05	2	12.605	7.555	9.575	0.000842	0.010609	0.006359	0.008059	0.000884
HSIC	8.5	0	10.5	0.9	0	8.5	0	10.5	0.000677	0.005753	0	0.007107	0.000609
HSY	6.5	7	17	0.7	2.4	8.978	9.484	19.604	0.001199	0.010762	0.011368	0.023499	0.000839
HUM	10	14	8.5	0.85	0.7	10.735	14.749	9.22975	0.001838	0.019729	0.027106	0.016963	0.001562
IBM	0	6.5	16.5	0.9	3.9	3.9	10.52675	20.72175	0.007495	0.02923	0.078897	0.155307	0.006745
ICE	12	11.5	8	0.8	1.2	13.272	12.769	9.248	0.001981	0.026289	0.025293	0.018318	0.001585
IFF	7.5	10	11	0.9	2.1	9.67875	12.205	13.2155	0.000607	0.005878	0.007412	0.008026	0.000547
ILMN	17	0	18	0.95	0	17	0	18	0.001591	0.027052	0	0.028643	0.001512
INFO	17.5	0	17	1.05	0	17.5	0	17	0.000896	0.015681	0	0.015233	0.000941
INTC	7.5	3.5	4.5	1.05	3.1	10.71625	6.65425	7.66975	0.009928	0.106387	0.066061	0.076142	0.010424
INTU	13	10.5	10	1.1	1.1	14.1715	11.65775	11.155	0.001968	0.02789	0.022943	0.021954	0.002165
IP	18.5	6	11	1.1	3.3	22.10525	9.399	14.4815	0.00125	0.027629	0.011747	0.0181	0.001375
IPG	13	17	8	1.1	2.9	16.0885	20.1465	11.016	0.000402	0.006467	0.008098	0.004428	0.000442
IR	11	10	12	1.2	1.7	12.7935	11.785	13.802	0.001251	0.016008	0.014746	0.01727	0.001502
ISRG	14	0	11	0.8	0	14	0	11	0.002148	0.030065	0	0.023623	0.001718
ITW	12.5	14	3.5	1.05	1.8	14.4125	15.926	5.3315	0.002813	0.04054	0.044797	0.014997	0.002953
IVZ	5.5	9.5	0.5	1.4	3.4	8.9935	13.0615	3.9085	0.000785	0.007063	0.010258	0.003069	0.001099
JBHT	9	8	15.5	1	1.1	10.1495	9.144	16.68525	0.0006	0.006092	0.005488	0.010015	0.0006
JCI	0.5	5.5	2.5	1.3	2.5	3.00625	8.06875	5.03125	0.002018	0.006068	0.016287	0.010155	0.002624
JEC	8	0	6	1.3	1.1	9.144	1.1	7.133	0.000364	0.003326	0.0004	0.002594	0.000473
JNJ	9.5	9	9.5	0.85	2.8	12.433	11.926	12.433	0.019613	0.243854	0.23391	0.243854	0.016671
JNPR	8	13.5	0	1.15	1.5	9.56	15.10125	1.5	0.000513	0.004907	0.007751	0.00077	0.00059
JPM	5.5	6.5	6.5	1.15	2.3	7.86325	8.87475	8.87475	0.018322	0.144072	0.162605	0.162605	0.021071
JWN	2	6	6.5	1.05	3.2	5.232	9.296	9.804	0.000357	0.001867	0.003318	0.003499	0.000375
K	7	4.5	13.5	0.75	3.2	10.312	7.772	16.916	0.00109	0.011237	0.00847	0.018434	0.000817
KEY	8	13	5.5	1.15	2.1	10.184	15.2365	7.65775	0.001036	0.010548	0.015782	0.007932	0.001191
KHC	12.5	4.5	8.5	0.9	3	15.6875	7.5675	11.6275	0.004853	0.076139	0.036729	0.056434	0.004368
KLAC	10	4.5	8	1.1	2.1	12.205	6.64725	10.184	0.000872	0.010639	0.005795	0.008878	0.000959
KMI	24	1.5	4	1.45	2.6	26.912	4.1195	6.652	0.002105	0.056651	0.008672	0.014003	0.003052
KMX	10	0	12.5	1.25	0	10	0	12.5	0.000703	0.007034	0	0.008793	0.000879
KO	4.5	6	-2.5	0.7	3.4	7.9765	9.502	0.8575	0.010162	0.081059	0.096562	0.008714	0.007114
KORS	3	0	16	1	0	3	0	16	0.00039	0.001169	0	0.006233	0.00039
KR	3.5	10.5	10	0.85	2.2	5.7385	12.8155	12.31	0.000985	0.005654	0.012627	0.012129	0.000838
KSS	7	8	2.5	1.05	5.5	12.6925	13.72	8.06875	0.000382	0.004853	0.005246	0.003085	0.000401
KSU	9.5	6	9	1.15	1.4	10.9665	7.442	10.463	0.000556	0.006099	0.004139	0.005819	0.00064
L	14.5	0	6.5	0.95	0.5	15.03625	0.5	7.01625	0.000842	0.012667	0.000421	0.005911	0.0008
LEG	7.5	6	4.5	1.05	2.7	10.30125	8.781	7.26075	0.000331	0.003413	0.00291	0.002406	0.000348
LEN	10.5	10	13	1.3	0.3	10.81575	10.315	13.3195	0.00061	0.006602	0.006296	0.00813	0.000794
LH	9	0	12	0.9	0	9	0	12	0.000797	0.007175	0	0.009567	0.000718
LKQ	11.5	0	12	1.05	0	11.5	0	12	0.000591	0.006799	0	0.007094	0.000621

LLL	10	5.5	4.5	1	1.8	11.89	7.3495	6.3405	0.00076	0.009031	0.005582	0.004816	0.00076
LLY	11	2	9.5	0.75	2.5	13.6375	4.525	12.11875	0.004838	0.065977	0.021891	0.058629	0.003628
LMT	10	11	6	0.8	2.7	12.835	13.8485	8.781	0.004653	0.059719	0.064435	0.040857	0.003722
LNC	7	15	9	1.45	1.9	8.9665	17.0425	10.9855	0.000882	0.007909	0.015033	0.00969	0.001279
LNT	6	4.5	4	0.7	3	9.09	7.5675	7.06	0.000518	0.004712	0.003922	0.003659	0.000363
LOW	13.5	13.5	-26	1.05	2.1	15.74175	15.74175	-24.173	0.003487	0.054894	0.054894	-0.0843	0.003662
LRCX	20	31	7.5	1.1	1.3	21.43	32.5015	8.84875	0.00172	0.036856	0.055897	0.015218	0.001892
LUK	30	13	4	1.25	0.9	31.035	13.9585	4.918	0.000476	0.014781	0.006648	0.002342	0.000595
LUV	12	20	11	1.15	0.9	12.954	20.99	11.9495	0.001816	0.023522	0.038114	0.021698	0.002088
LVLTL	14.5	0	7	1.2	0	14.5	0	7	0.000995	0.014435	0	0.006968	0.001195
LYB	4	5.5	4.5	1.35	4.2	8.284	9.8155	8.7945	0.002061	0.017075	0.020232	0.018128	0.002783
M	2	5	4	1.05	6.7	8.767	11.8675	10.834	0.000336	0.002948	0.003991	0.003643	0.000353
MA	12.5	8.5	24.5	1.05	0.7	13.24375	9.22975	25.28575	0.00801	0.106087	0.073934	0.0202548	0.008411
MAS	14	8.5	34.5	1.35	1	15.07	9.5425	35.6725	0.000671	0.010114	0.006404	0.023941	0.000906
MAT	12	-12.5	4.5	0.85	6.9	19.314	-6.03125	11.55525	0.000272	0.005259	-0.00164	0.003147	0.000231
MCD	9.5	7	-21	0.8	2.6	12.2235	9.691	-18.673	0.006849	0.083713	0.066369	-0.12788	0.005479
MCHP	12	3	16	1.15	1.8	13.908	4.827	17.944	0.00112	0.015582	0.005408	0.020104	0.001288
MCK	15	11.5	13.5	1.05	0.8	15.86	12.346	14.354	0.001624	0.025764	0.020056	0.023318	0.001706
MDLZ	10	10	6.5	1.05	1.9	11.995	11.995	8.46175	0.003196	0.038337	0.038337	0.027045	0.003356
MDT	5.5	8.5	3	0.95	2.1	7.65775	10.68925	5.1315	0.005497	0.042097	0.058762	0.028209	0.005222
MET	7	6.5	3.5	1.3	3.2	10.312	9.804	6.756	0.002964	0.030562	0.029057	0.020023	0.003853
MHK	8.5	0	13.5	1.2	0	8.5	0	13.5	0.001022	0.008688	0	0.013799	0.001227
MKC	9	6.5	13	0.8	2	11.09	8.565	15.13	0.000613	0.006798	0.005251	0.009275	0.00049
MLM	17.5	2	7.5	1.25	0.7	18.26125	2.707	8.22625	0.000702	0.012823	0.001901	0.005776	0.000878
MMC	10	8	10.5	0.9	1.8	11.89	9.872	12.3945	0.002234	0.022654	0.022055	0.027691	0.002011
MMM	8	8	1	0.9	2.2	10.288	10.288	3.211	0.007225	0.074326	0.074326	0.023198	0.006502
MNST	12	0	19.5	0.85	0	12	0	19.5	0.001666	0.01999	0	0.032484	0.001416
MO	10.5	6.5	15	0.65	3.3	13.97325	9.90725	18.5475	0.006348	0.0887	0.062889	0.117736	0.004126
MON	8	7	14	0.95	1.8	9.872	8.863	15.926	0.002762	0.027267	0.02448	0.043988	0.002624
MOS	3	2	2.5	1.35	2.7	5.7405	4.727	5.23375	0.000392	0.002251	0.001854	0.002052	0.000529
MPC	5.5	10	8	1.4	3	8.5825	13.15	11.12	0.001489	0.012775	0.019574	0.016552	0.002084
MRK	5.5	2	-3	0.85	2.9	8.47975	4.929	-0.1435	0.00888	0.075302	0.043771	-0.00127	0.007548
MS	10.5	14.5	7	1.45	1.8	12.3945	16.4305	8.863	0.004839	0.059978	0.079508	0.042889	0.007017
MSFT	8	9.5	2	1.05	2.3	10.392	11.90925	4.323	0.031391	0.326214	0.373842	0.135703	0.03296
MSI	10.5	9	6	0.95	2.3	12.92075	11.4035	8.369	0.000757	0.009783	0.008635	0.006337	0.000719
MTB	8	1	6.5	0.9	1.9	9.976	2.9095	8.46175	0.001299	0.012961	0.00378	0.010994	0.001169
MTD	9.5	0	16.5	1.05	0	9.5	0	16.5	0.000886	0.008421	0	0.014626	0.000931
MU	25.5	0	22	1.6	0	25.5	0	22	0.002444	0.062331	0	0.053776	0.003911
MYL	10	0	13	1.15	0	10	0	13	0.001077	0.010768	0	0.013999	0.001238
NAVI	6	4	2.5	1.45	4.2	10.326	8.284	6.7525	0.000171	0.001767	0.001418	0.001155	0.000248
NBL	0	5	0	1.5	1.2	1.2	6.23	1.2	0.000681	0.000817	0.004243	0.000817	0.001022
NDAQ	9.5	12	6.5	0.9	2.1	11.69975	14.226	8.6825	0.000632	0.007395	0.008992	0.005479	0.000569
NEE	7	9.5	5	0.65	3	10.105	12.6425	8.075	0.003734	0.037727	0.047201	0.030148	0.002427
NEM	9	17.5	3.5	0.85	0.6	9.627	18.1525	4.1105	0.001022	0.009834	0.018544	0.004199	0.000868
NFLX	44.5	0	12	1.05	0	44.5	0	12	0.004376	0.194744	0	0.052515	0.004595
NFX	18	0	4	1.85	0	18	0	4	0.000296	0.005333	0	0.001185	0.000548
NI	5.5	3	-1.5	0.65	2.8	8.377	5.842	1.279	0.000448	0.003756	0.002619	0.000573	0.000291
NKE	14	12	7	0.95	1.2	15.284	13.272	8.242	0.004497	0.068726	0.059679	0.037061	0.004272
NLSN	0	5.5	0	0.95	3.4	3.4	8.9935	3.4	0.000757	0.002573	0.006805	0.002573	0.000719
NOC	8	8.5	6	0.9	1.6	9.664	10.168	7.648	0.002641	0.025522	0.026853	0.020198	0.002377
NOV	3	-8.5	1	1.15	0.6	3.609	-7.9255	1.603	0.000663	0.002392	-0.00525	0.001063	0.000762
NSC	6.5	3	5.5	1.15	2.1	8.66825	5.1315	7.65775	0.001967	0.017052	0.010095	0.015064	0.002262
NTAP	12.5	7	9	1.05	2.1	14.73125	9.1735	11.1945	0.000624	0.009189	0.005722	0.006983	0.000655
NTRS	7.5	5	6.5	1.1	1.7	9.26375	6.7425	8.25525	0.001137	0.010533	0.007666	0.009386	0.001251
NUE	24.5	5	7.5	1.3	2.7	27.53075	7.7675	10.30125	0.000985	0.027123	0.007652	0.010149	0.001281
NVDA	19.5	7.5	23.5	1.1	0.4	19.939	7.915	23.947	0.00615	0.12263	0.048679	0.14728	0.006765
NWL	23.5	5.5	22	1.15	1.7	25.39975	7.24675	23.887	0.001021	0.02594	0.007401	0.024395	0.001174
NWSA	48	40	0.5	1.3	1.5	49.86	41.8	2.00375	0.000269	0.013428	0.011257	0.00054	0.00035
OKE	14.5	3	36	1.55	4.8	19.648	7.872	41.664	0.001097	0.021549	0.008633	0.045694	0.0017
OMC	7.5	9.5	3.5	1	2.8	10.405	12.433	6.349	0.000844	0.008777	0.010487	0.005355	0.000844
ORCL	8	9.5	5.5	1.05	1.7	9.768	11.28075	7.24675	0.010762	0.10512	0.1214	0.077987	0.0113
ORLY	11	0	16.5	0.9	0	11	0	16.5	0.000923	0.010157	0	0.015235	0.000831
OXY	25	3.5	1.5	1.15	5	30.625	8.5875	6.5375	0.002596	0.079513	0.022296	0.016974	0.002986
PAYX	9	8.5	4	0.95	3.4	12.553	12.0445	7.468	0.001183	0.014852	0.01425	0.008836	0.001124
PBCT	10.5	1.5	3.5	0.9	4	14.71	5.53	7.57	0.000335	0.004927	0.001852	0.002535	0.000301
PCAR	10	6.5	8	1.15	2.5	12.625	9.08125	10.6	0.001276	0.016108	0.011587	0.013524	0.001467
PCG	9.5	7.5	5	0.65	3.3	12.95675	10.92375	8.3825	0.001511	0.019578	0.016506	0.012666	0.000982
PCLN	15.5	0	25	1.2	0	15.5	0	25	0.004891	0.075807	0	0.122269	0.005869
PDCO	10.5	13.5	7	0.9	2.4	13.026	16.062	9.484	0.000197	0.002564	0.003161	0.001867	0.000177
PEG	1	5	3.5	0.7	4.1	5.1205	9.2025	7.67175	0.001281	0.006559	0.011788	0.009827	0.000897
PEP	7.5	6.5	6	0.8	2.9	10.50875	9.49425	8.987	0.008126	0.085393	0.07715	0.073028	0.006501
PFE	11	6	-2.5	0.9	3.8	15.009	9.914	1.2525	0.011144	0.167254	0.110477	0.013957	0.010029
PFGE	5	8	7.5	1.35	2.8	7.87	10.912	10.405	0.001022	0.008045	0.011155	0.010637	0.00138
PG	7.5	6.5	2	0.7	3.1	10.71625	9.70075	5.131	0.011385	0.122001	0.110439	0.058415	0.007969
PGR	8	8	4	0.85	1.6	9.664	9.664	5.632	0.00147	0.014204	0.014204	0.008278	0.001249
PH	7.5	4.5	11.5	1.25	1.6	9.16	6.136	13.192	0.001268	0.011611	0.007778	0.016723	0.001585

PHM	16.5	12	10.5	1.35	1.6	18.232	13.696	12.184	0.000446	0.008139	0.006114	0.005439	0.000603
PKG	8.5	8.5	11	1.1	2.4	11.002	11.002	13.532	0.000577	0.006353	0.006353	0.007814	0.000635
PKI	8	2.5	10	1.05	0.4	8.416	2.905	10.42	0.000407	0.003427	0.001183	0.004243	0.000428
PNC	5.5	8	4.5	1	1.8	7.3495	9.872	6.3405	0.003408	0.025044	0.03364	0.021606	0.003408
PNR	12	7.5	10	1.25	2.1	14.226	9.67875	12.205	0.000661	0.009401	0.006396	0.028066	0.000826
PNW	5.5	5.5	4	0.7	3.2	8.788	8.788	7.264	0.000509	0.004475	0.004475	0.003699	0.000356
PPG	10.5	6.5	4.5	1.2	1.4	11.9735	7.9455	5.9315	0.001542	0.018462	0.012251	0.009146	0.00185
PRGO	-0.5	11	0	0.85	0.9	0.39775	11.9495	0.9	0.000633	0.000252	0.007566	0.00057	0.000538
PRU	5.5	8.5	5	1.3	2.9	8.47975	11.52325	7.9725	0.002491	0.02112	0.0287	0.019856	0.003238
PSX	5	9.5	3.5	1.25	3.7	8.7925	13.37575	7.26475	0.002423	0.021308	0.032415	0.017605	0.003029
PVH	7.5	0	8	1.1	0.1	7.60375	0.1	8.104	0.000518	0.003937	5.18E-05	0.004196	0.00057
PWR	15	0	7.5	1.35	0	15	0	7.5	0.000303	0.004549	0	0.002274	0.000409
PX	8	8.5	9.5	0.95	2.5	10.6	11.10625	12.11875	0.002109	0.02236	0.023428	0.025564	0.002004
PXD	38.5	52.5	6.5	1.45	0	38.5	52.5	6.5	0.001257	0.048389	0.065986	0.00817	0.001822
QCOM	6	10.5	3.5	0.95	3.9	10.017	14.60475	7.46825	0.004131	0.041384	0.060337	0.030854	0.003925
QRVO	28	0	-2.5	1.25	0	28	0	-2.5	0.000469	0.013134	0	-0.00117	0.000586
RCL	19	20.5	4	1.15	1.8	20.971	22.4845	5.836	0.001358	0.028487	0.030543	0.007928	0.001562
RE	3.5	9	7	0.8	2	5.535	11.09	9.07	0.000496	0.002747	0.005504	0.004502	0.000397
RF	9.5	14.5	5	1.25	2.1	11.69975	16.75225	7.1525	0.000952	0.011138	0.015948	0.006809	0.00119
RHI	4.5	7	12	1.15	2.1	6.64725	9.1735	14.226	0.000331	0.002201	0.003037	0.00471	0.000381
RHT	17.5	0	14	1.2	0	17.5	0	14	0.001107	0.019376	0	0.015501	0.001329
RJF	6	7	7	1.2	1.1	7.133	8.1385	8.1385	0.000642	0.004582	0.005228	0.005228	0.000771
RL	1.5	0.5	2.5	1.15	2.8	4.321	3.307	5.335	0.00038	0.001643	0.001257	0.002028	0.000437
RMD	8.5	7	4	0.9	2	10.585	9.07	6.04	0.00058	0.006143	0.005264	0.003505	0.000522
ROK	5.5	5.5	11	1.15	1.9	7.45225	7.45225	13.0045	0.00125	0.009312	0.009312	0.016249	0.001437
ROP	7.5	10.5	9.5	1	0.6	8.1225	11.1315	10.1285	0.001344	0.010916	0.01496	0.013612	0.001344
ROST	9	10.5	15.5	0.9	1.2	10.254	11.763	16.793	0.00128	0.013125	0.015056	0.021494	0.001152
RRC	28	11	7.5	1.15	0.3	28.342	11.3165	7.81125	0.000238	0.006745	0.002693	0.001859	0.000274
RSG	8.5	6.5	6.5	0.75	2.2	10.7935	8.7715	8.7715	0.00111	0.011985	0.00974	0.00974	0.000833
RTN	8	4	6.5	0.8	2	10.08	6.04	8.565	0.002832	0.028544	0.017104	0.024254	0.002265
SBUX	15	16	16	1	1.9	17.0425	18.052	18.052	0.004044	0.068912	0.072994	0.072994	0.004044
SCG	4	5	3.5	0.65	3.8	7.876	8.895	7.3665	0.000356	0.002804	0.003167	0.002623	0.000231
SCHW	4	10	10	1.3	0.7	4.714	10.735	10.735	0.003122	0.014718	0.033516	0.033516	0.004059
SEE	12	7.5	22.5	1.05	1.4	13.484	8.9525	24.0575	0.000437	0.005891	0.003911	0.01051	0.000459
SHW	13.5	10.5	30	1.05	1	14.5675	11.5525	31.15	0.001874	0.027303	0.021652	0.058383	0.001968
SIG	2	14.5	8.5	1.05	2.2	4.222	16.8595	10.7935	0.000207	0.000876	0.003498	0.00224	0.000218
SJM	6	4.5	4.5	0.7	2.7	8.781	7.26075	7.26075	0.000612	0.005373	0.004443	0.004443	0.000428
SLB	17.5	4.5	5	1.2	2.7	20.43625	7.26075	7.7675	0.00446	0.091149	0.032384	0.034644	0.005352
SNA	9.5	5.5	4	1.15	1.8	11.3855	7.3495	5.836	0.000477	0.005435	0.003509	0.002786	0.000549
SNI	9	9	11	0.95	1.6	10.672	10.672	12.688	0.000561	0.005982	0.005982	0.007112	0.000532
SNPS	8	0	6	1	0	8	0	6	0.000657	0.005257	0	0.003943	0.000657
SO	3.5	3.5	3	0.55	4.7	8.28225	8.28225	7.7705	0.0027	0.022366	0.022366	0.020984	0.001485
SPGI	11.5	11	31.5	1.15	1.2	12.769	12.266	32.889	0.002147	0.027411	0.026331	0.070602	0.002469
SRCL	5.5	0	12	0.9	0	5.5	0	12	0.000317	0.001745	0	0.003808	0.000286
SRE	7.5	8.5	3	0.8	3.1	10.71625	11.73175	6.1465	0.001489	0.015958	0.01747	0.009153	0.001191
STI	6.5	14	5.5	1.2	1.9	8.46175	16.033	7.45225	0.00149	0.012609	0.023891	0.011105	0.001788
STT	7.5	9.5	5.5	1.2	2	9.575	11.595	7.555	0.00186	0.017814	0.021572	0.014056	0.002233
STX	4.5	5	10	1.35	6.1	10.73725	11.2525	16.405	0.000577	0.006193	0.00649	0.009462	0.000779
STZ	13.5	17	8.5	0.8	1.1	14.67425	18.1935	9.64675	0.00189	0.027734	0.034386	0.018232	0.001512
SWK	10	4.5	9	1	1.6	11.68	6.136	10.672	0.00131	0.015296	0.008036	0.013976	0.00131
SWKS	14.5	17	19.5	1.2	1.1	15.67975	18.1935	20.70725	0.000997	0.015638	0.018145	0.020652	0.001197
SYF	7.5	42	13	1.1	1.8	9.3675	44.178	14.917	0.00134	0.01255	0.059187	0.019985	0.001474
SYK	14	7	11	0.9	1.3	15.391	8.3455	12.3715	0.002889	0.044462	0.024109	0.035739	0.0026
SYMC	10.5	-1.5	2.5	0.95	0.9	11.44725	-0.60675	3.41125	0.001026	0.011745	-0.00062	0.0035	0.000975
SYT	10.5	5	-11	0.75	2.8	13.447	7.87	-8.354	0.001476	0.019853	0.011619	-0.01233	0.001107
T	5.5	4	6.5	0.7	5.1	10.74025	9.202	11.76575	0.011043	0.118603	0.101617	0.129928	0.00773
TAP	14	8	8	0.9	2	16.14	10.08	10.08	0.000841	0.01358	0.008481	0.008481	0.000757
TEL	8.5	10	7	1.2	2	10.585	12.1	9.07	0.001624	0.017193	0.019654	0.014732	0.001949
TGT	4.5	6.5	6	0.85	4.6	9.2035	11.2495	10.738	0.001773	0.016322	0.019951	0.019043	0.001507
TIF	8	7	7.5	1.1	2.2	10.288	9.277	9.7825	0.000604	0.006209	0.005599	0.005904	0.000664
TJX	11	17	15	0.9	1.8	12.899	18.953	16.935	0.002355	0.030377	0.044634	0.039882	0.00212
TMK	7.5	7	8	0.95	0.8	8.33	7.828	8.832	0.000503	0.004193	0.00394	0.004446	0.000478
TRIP	8	0	10	1.2	0	8	0	10	0.000281	0.002251	0	0.002813	0.000338
TROW	8	6	4.5	1.1	3.2	11.328	9.296	7.772	0.001196	0.013553	0.011122	0.009299	0.001316
TRV	1	4	6	0.85	2.3	3.3115	6.346	8.369	0.001881	0.006228	0.011935	0.01574	0.001599
TSCO	10	13.5	6	1.05	1.9	11.995	15.52825	7.957	0.000381	0.004571	0.005918	0.003032	0.0004
TSN	10.5	20.5	9.5	0.8	1.7	12.28925	22.37425	11.28075	0.001319	0.01621	0.029512	0.01488	0.001055
TSS	10.5	0	14	1	0.7	11.23675	0.7	14.749	0.000648	0.007282	0.000454	0.009558	0.000648
TWX	9.5	7	2.5	1	1.6	11.176	8.656	4.12	0.004033	0.045072	0.034909	0.016616	0.004033
TXN	9.5	8	14	1.05	2.5	12.11875	10.6	16.675	0.004926	0.059697	0.052216	0.082141	0.005172
TXT	12	20	6.5	1.35	0.2	12.212	20.22	6.7065	0.000743	0.009076	0.015028	0.004984	0.001003
UAL	4.5	0	17	1.35	0	4.5	0	17	0.000916	0.004121	0	0.015567	0.001236
UHS	10	18	11	0.95	0.3	10.315	18.327	11.3165	0.00055	0.005676	0.010085	0.006227	0.000523
ULTA	20	0	21	0.9	0	20	0	21	0.000644	0.012887	0	0.013532	0.000508
UNH	13	14	13	0.95	1.4	14.491	15.498	14.491	0.010383	0.150461	0.160917	0.150461	0.009864
UNM	8.5	10	6.5	1.2	1.8	10.3765	11.89	8.3585	0.000615	0.006382	0.007312	0.005141	0.000738



UNP	8	7	5	1.05	2.2	10.288	9.277	7.255	0.004662	0.047963	0.04325	0.033823	0.004895
UPS	10	7.5	32.5	0.85	3.2	13.36	10.82	36.22	0.005348	0.071448	0.057864	0.193701	0.004546
URI	8.5	0	14	1.6	0	8.5	0	14	0.000628	0.005339	0	0.008793	0.001005
USB	5	6.5	7	0.95	2.2	7.255	8.7715	9.277	0.004678	0.033942	0.041037	0.043402	0.004445
UTX	8	5.5	6.5	1	2.3	10.392	7.86325	8.87475	0.004935	0.05128	0.038802	0.043793	0.004935
V	11.5	15	9	0.95	0.8	12.346	15.86	9.836	0.01279	0.157908	0.202853	0.125804	0.012151
VAR	7	0	11.5	0.95	0	7	0	11.5	0.000508	0.003559	0	0.005848	0.000483
VFC	8.5	8.5	5	1.1	3	11.6275	11.6275	8.075	0.001447	0.01682	0.01682	0.011681	0.001591
VIAB	10	8.5	16	1.2	1.9	11.995	10.48075	18.052	0.000467	0.005599	0.004892	0.008426	0.00056
VLO	5	12.5	5.5	1.15	4.2	9.305	16.9625	9.8155	0.00177	0.016473	0.030028	0.017376	0.002036
VMC	20.5	22.5	4	1.3	0.8	21.382	23.39	4.816	0.000845	0.018059	0.019755	0.004068	0.001098
VNO	-0.5	1	2	0.95	3	2.4925	4.015	5.03	0.00072	0.001794	0.00289	0.003621	0.000684
VRSK	10.5	0	28.5	0.9	0	10.5	0	28.5	0.000721	0.007566	0	0.020538	0.000649
VZ	3	2	5.5	0.75	5	8.075	7.05	10.6375	0.0103	0.083174	0.072617	0.109569	0.007725
WAT	6	0	7.5	0.95	0	6	0	7.5	0.000773	0.004636	0	0.005795	0.000734
WBA	11	8	8	0.95	1.8	12.899	9.872	9.872	0.003715	0.04792	0.036675	0.036675	0.003529
WDC	13.5	8.5	13.5	1.35	2.3	15.95525	10.89775	15.95525	0.001338	0.021356	0.014586	0.021356	0.001807
WEC	6	6	5	0.6	3.4	9.502	9.502	8.485	0.001088	0.010337	0.010337	0.009231	0.000653
WFC	5	5	4	1.05	3	8.075	8.075	7.06	0.01409	0.113777	0.113777	0.099476	0.014795
WHR	10.5	7	10.5	1.3	2.3	12.92075	9.3805	12.92075	0.000615	0.007942	0.005766	0.007942	0.000799
WM	8.5	11.5	4	0.75	2.4	11.002	14.038	6.448	0.00177	0.01947	0.024843	0.011411	0.001327
WMB	18.5	-2.5	5.5	1.85	3.9	22.76075	1.35125	9.50725	0.001227	0.027928	0.001658	0.011665	0.00227
WMT	5.5	8	4	0.7	2.7	8.27425	10.808	6.754	0.013559	0.112192	0.146548	0.091579	0.009491
WU	5	13.5	24	1	3.5	8.5875	17.23625	27.92	0.000481	0.004132	0.008294	0.013434	0.000481
WY	14.5	3.5	5	1.15	3.7	18.46825	7.26475	8.7925	0.001355	0.025016	0.009841	0.01191	0.001558
WYN	6.5	7.5	11.5	1.1	2.5	9.08125	10.09375	14.14375	0.000575	0.005226	0.005809	0.008139	0.000633
WYNN	14	2.5	51	1.5	1.7	15.819	4.22125	53.1335	0.000767	0.01213	0.003237	0.040743	0.00115
XEC	31	2	6.5	1.45	0.3	31.3465	2.303	6.80975	0.000557	0.017466	0.001283	0.003794	0.000808
XEL	4.5	6	4	0.6	3.2	7.772	9.296	7.264	0.001296	0.01007	0.012045	0.009412	0.000777
XL	13	9	8	0.9	2	15.13	11.09	10.08	0.000563	0.008521	0.006246	0.005677	0.000507
XLNX	8	6	3	1.05	2.1	10.184	8.163	5.1315	0.000918	0.009354	0.007497	0.004713	0.000964
XOM	10.5	3.5	4	0.95	3.7	14.39425	7.26475	7.774	0.018247	0.262649	0.132558	0.14185	0.017334
XRAY	8	10	16	0.95	0.6	8.624	10.63	16.648	0.000723	0.006238	0.007689	0.012042	0.000687
XRX	4	1.5	-4	1.2	3.5	7.57	5.02625	-0.57	0.000439	0.00332	0.002205	-0.00025	0.000526
XYL	12.5	10	10	1.15	1.3	13.88125	11.365	11.365	0.000601	0.008337	0.006826	0.006826	0.000691
ZBH	11	7	4	1	0.9	11.9495	7.9315	4.918	0.001264	0.015109	0.010029	0.006219	0.001264
ZTS	12	9.5	28.5	0.95	0.7	12.742	10.23325	29.29975	0.00164	0.020894	0.01678	0.048044	0.001558

1 14.03 10.05 10.40 1.002112

Data updated on October 25th, based on Company's response to OCA 4-15 and Value Line data as obtained on October 25th, 2017.

## Schedule PKC-12

## Use of Decoupling Mechanism as of September 2017

Company	Ultimate Parent Ticker	State	Full Decoupling	Partial Decoupling	No Decoupling	Comments
1 Alabama Gas	SR	AL		√		weather normalization clauses (WNC)
2 Southwest Gas	SWX	AZ		√		delivery charge adjustment( excludes effects of weather)
3 Southwest Gas	SWX	CA	√			
4 Chesapeake Utilities	CPK	DE			√	
5 Florida Public Utilities	CPK	FL			√	
6 Atmos Energy	ATO	KS		√		WNC
7 Kansas Gas Service	OGS	KS		√		WNC
8 Atmos Energy	ATO	KY		√		WNC
9 Atmos Energy	ATO	LA		√		WNC
10 Atmos Energy	ATO	MS		√		WNC (for Nov. through April)
11 Laclede Gas	SR	MO			√	
12 Missouri Gas Service	SR	MO			√	
13 Southwest Gas	SWX	NV	√			revenue decoupling to address disincentives to participate in energy conservation programs
14 Oklahoma Natural Gas	OGS	OK		√		WNC & recovery of costs associated with EE and performance-based ratemaking plan riders
15 Northwest Natural Gas	NWN	OR		√		WNC and recovery of impact on revenues of changes in average consumption patterns due to conservation efforts
16 Atmos Energy	ATO	TN		√		WNC
17 Atmos Energy	ATO	TX		√		WNC
18 Texas Gas Service	OGS	TX		√		WNC

Source: SNL RRA

## Schedule PKC-13

## Annualized Growth Projections

3-5 Years EPS growth Projection					3.5 Years DPS Growth Projection					3-5 Years BVPS Growth Projection							
<b>Atmos Energy (ATO)</b>					<b>Atmos Energy (ATO)</b>					<b>Atmos Energy (ATO)</b>							
2019	2020	2021	2022		2019	2020	2021	2022		2019	2020	2021	2022				
7.5	7	6.5		6	3.5	5	6.5	6.5		6.5	4.5	3.5	3				
Source: Value Line					Source: Value Line					Source: Value Line							
				107.5	115.025	122.5016	129.8517		103.5	108.675	115.7389	123.2619		106.5	111.2925	115.1877	118.6434
<b>0.067485363</b>					<b>0.053676</b>					<b>0.043664</b>							
<b>Chesapeake Utilities (CPK)</b>					<b>Chesapeake Utilities (CPK)</b>					<b>Chesapeake Utilities (CPK)</b>							
2018	2019	2020	2021		2018	2019	2020	2021		2018	2019	2020	2021				
#N/A	#N/A	8.5		8.5	#N/A	#N/A	5.5	6		#N/A	#N/A	9	6.5				
Source: Value Line					Source: Value Line					Source: Value Line							
				108.5	117.7225			105.5	111.83			109	116.085				
<b>0.085</b>					<b>0.057497</b>					<b>0.077427</b>							
<b>Northwest Nat. Gas (NWN)</b>					<b>Northwest Nat. Gas (NWN)</b>					<b>Northwest Nat. Gas (NWN)</b>							
2018	2019	2020	2021		2018	2019	2020	2021		2018	2019	2020	2021				
4.5	4	5.5		5	2.5	2.5	2.5	2		3	3	3.5	2.5				
Source: Value Line					Source: Value Line					Source: Value Line							
				104.5	108.68	114.6574	120.3903		102.5	105.0625	107.6891	109.8428		103	106.09	109.8032	112.5482
<b>0.047485083</b>					<b>0.023748</b>					<b>0.029994</b>							
<b>Spire Inc. (SR)</b>					<b>Spire Inc. (SR)</b>					<b>Spire Inc. (SR)</b>							
2019	2020	2021	2022		2019	2020	2021	2022		2019	2020	2021	2022				
8	10	9		8	4	4.5	3.5	5		5.5	7.5	3.5	4.5				
Source: Value Line					Source: Value Line					Source: Value Line							
				108	118.8	129.492	139.8514		104	108.68	112.4838	118.108		105.5	113.4125	117.3819	122.6641
<b>0.087468469</b>					<b>0.042485</b>					<b>0.052396</b>							
<b>Southwest Gas (SWX)</b>					<b>Southwest Gas (SWX)</b>					<b>Southwest Gas (SWX)</b>							
2018	2019	2020	2021		2018	2019	2020	2021		2018	2019	2020	2021				
8	7	7		7	7	7.5	7.5	8.5		5	4.5	3	3				
Source: Value Line					Source: Value Line					Source: Value Line							
				108	115.56	123.6492	132.3046		107	115.025	123.6519	134.1623		105	109.725	113.0168	116.4073
<b>0.072491286</b>					<b>0.076236</b>					<b>0.038712</b>							

Data downloaded from Value Line on November 27, 2017



```

name: <unnamed>
log: C:\Users\pradip.k.chattopadhy\Documents\statawork.smcl
log type: smcl
opened on: 13 Nov 2017, 09:53:02
    
```

- 1 . use "C:\Users\pradip.k.chattopadhy\Desktop\DG 17-048\Oct31 MB EROE work.dta"
- 2 . \* start from scratch by eliminating variables d1 and d2 that are dependent on specif  
> ic runs. Create them afresh
- 3 . reg mbratio lneroe beta pvar rga

Source	SS	df	MS	Number of obs	=	51
Model	<b>8.78569046</b>	<b>4</b>	<b>2.19642262</b>	F(4, 46)	=	<b>17.12</b>
Residual	<b>5.89992489</b>	<b>46</b>	<b>.128259237</b>	Prob > F	=	<b>0.0000</b>
				R-squared	=	<b>0.5983</b>
				Adj R-squared	=	<b>0.5633</b>
Total	<b>14.6856154</b>	<b>50</b>	<b>.293712307</b>	Root MSE	=	<b>.35813</b>

mbratio	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lneroe	<b>1.807103</b>	<b>.2700691</b>	<b>6.69</b>	<b>0.000</b>	<b>1.263482</b>	<b>2.350724</b>
beta	<b>.7567963</b>	<b>.5199245</b>	<b>1.46</b>	<b>0.152</b>	<b>-.2897575</b>	<b>1.80335</b>
pvar	<b>.7288572</b>	<b>1.559768</b>	<b>0.47</b>	<b>0.643</b>	<b>-2.410793</b>	<b>3.868507</b>
rga	<b>.3677471</b>	<b>.1675363</b>	<b>2.20</b>	<b>0.033</b>	<b>.0305141</b>	<b>.7049802</b>
_cons	<b>-2.795609</b>	<b>.6905148</b>	<b>-4.05</b>	<b>0.000</b>	<b>-4.185544</b>	<b>-1.405675</b>

- 4 . \* do a test for heteroskedasticity
  - 5 . estat imtest, white
- White's test for Ho: homoskedasticity  
against Ha: unrestricted heteroskedasticity

```

chi2(14) = 38.86
Prob > chi2 = 0.0004
    
```

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>38.86</b>	<b>14</b>	<b>0.0004</b>
Skewness	<b>20.02</b>	<b>4</b>	<b>0.0005</b>
Kurtosis	<b>0.83</b>	<b>1</b>	<b>0.3616</b>
Total	<b>59.71</b>	<b>19</b>	<b>0.0000</b>

- 6 . \* given the results there is strong evidence of heteroskedasticity
- 7 . \* do some outlier screening to potentially see whether specific observations are dri  
> ving the results and correcting them fixes heteroskedasticity
- 8 . \* start with a graphical look of leverage and residual squares
- 9 . lvr2plot, mlabel(id)

10. graph save Graph "C:\Users\pradip.k.chattopadhy\Desktop\DG 17-048\lvr rsq graph all  
> variables.gph"  
(file C:\Users\pradip.k.chattopadhy\Desktop\DG 17-048\lvr rsq graph all variables.gph  
> saved)

11. drop d1

12. drop d2

13. \* continue with outlier screening using cook's distance

14. predict d1, cooks

15. clist id lneroe beta pvar rga if d1>4/51, noobs

id	lneroe	beta	pvar	rga
16	1.609438	.35	.183871	.0324
26	2.397895	.65	.2461986	.154595
51	2.251292	.8	.1906002	.767645

16. \* check the levels for d1 for the observations with the aforementioned ids

17. clist id if d1>4/51, noobs

```

id
16
26
51
    
```

18. clist id d1 if d1>4/51, noobs

id	d1
16	.5804269
26	1.3587
51	.0818048

19. \* run ols regression dropping observations with id 16, 26, and 51

20. reg mbratio lneroe beta pvar rga if id!=16 & id!=26 & id!=51

Source	SS	df	MS	Number of obs	=	48
Model	8.11638628	4	2.02909657	F(4, 43)	=	25.37
Residual	3.43969456	43	.079992897	Prob > F	=	0.0000
				R-squared	=	0.7023
				Adj R-squared	=	0.6747
Total	11.5560808	47	.24587406	Root MSE	=	.28283

mbratio	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lneroe	2.206578	.236409	9.33	0.000	1.729814	2.683342
beta	.6334145	.4715613	1.34	0.186	-.3175795	1.584408
pvar	3.375973	1.549333	2.18	0.035	.2514448	6.500501
rga	.2522418	.1363106	1.85	0.071	-.0226547	.5271383
_cons	-3.966866	.647394	-6.13	0.000	-5.27246	-2.661272

21. \* check whether heteroskedasticity was sufficiently fixed

22. estat imtest, white

White's test for Ho: homoskedasticity  
against Ha: unrestricted heteroskedasticity

```

chi2(14)    =    10.13
Prob > chi2 =    0.7524
    
```

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>10.13</b>	<b>14</b>	<b>0.7524</b>
Skewness	<b>6.32</b>	<b>4</b>	<b>0.1765</b>
Kurtosis	<b>0.45</b>	<b>1</b>	<b>0.5025</b>
Total	<b>16.90</b>	<b>19</b>	<b>0.5965</b>

23. \* given the Prob > chi2 being pretty high, we can conclude that heteroskedasticity > is no longer an issue

24. \* it is helpful to note that the dl is especially high for id 26. Let's run the ols > regression by deleting only the observation with id=26

25. reg mbratio lneroe beta pvar rga if id!=26

Source	SS	df	MS	Number of obs	=	50
Model	<b>9.53023247</b>	<b>4</b>	<b>2.38255812</b>	F(4, 45)	=	<b>27.78</b>
Residual	<b>3.85926534</b>	<b>45</b>	<b>.085761452</b>	Prob > F	=	<b>0.0000</b>
Total	<b>13.3894978</b>	<b>49</b>	<b>.273255057</b>	R-squared	=	<b>0.7118</b>
				Adj R-squared	=	<b>0.6861</b>
				Root MSE	=	<b>.29285</b>

mbratio	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lneroe	<b>2.049978</b>	<b>.2263827</b>	<b>9.06</b>	<b>0.000</b>	<b>1.59402 2.505936</b>
beta	<b>.3480448</b>	<b>.4333291</b>	<b>0.80</b>	<b>0.426</b>	<b>-.5247248 1.220814</b>
pvar	<b>4.590939</b>	<b>1.501203</b>	<b>3.06</b>	<b>0.004</b>	<b>1.56736 7.614517</b>
rga	<b>.2715429</b>	<b>.1384092</b>	<b>1.96</b>	<b>0.056</b>	<b>-.0072275 .5503133</b>
_cons	<b>-3.537669</b>	<b>.5847775</b>	<b>-6.05</b>	<b>0.000</b>	<b>-4.715471 -2.359866</b>

26. \* check for heteroskedasticity again

27. estat imtest, white

White's test for Ho: homoskedasticity  
against Ha: unrestricted heteroskedasticity

chi2(14) = **10.46**  
Prob > chi2 = **0.7278**

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>10.46</b>	<b>14</b>	<b>0.7278</b>
Skewness	<b>5.87</b>	<b>4</b>	<b>0.2088</b>
Kurtosis	<b>1.27</b>	<b>1</b>	<b>0.2607</b>
Total	<b>17.60</b>	<b>19</b>	<b>0.5493</b>

28. \* The conclusion that heteroskedasticity has been sufficiently fixed remains valid

29. \* For both the regressions wherein outliers were dropped, the variable beta remains > statistically insignificant even at 10 percent level

30. \*let's run the above regressions by dropping beta as a variable

31. reg mbratio lneroe pvar rga if id!=16 & id!=26 & id!=51

Source	SS	df	MS	Number of obs	=	48
Model	<b>7.97205812</b>	<b>3</b>	<b>2.65735271</b>	F(3, 44)	=	<b>32.62</b>
Residual	<b>3.58402272</b>	<b>44</b>	<b>.081455062</b>	Prob > F	=	<b>0.0000</b>
				R-squared	=	<b>0.6899</b>
				Adj R-squared	=	<b>0.6687</b>
Total	<b>11.5560808</b>	<b>47</b>	<b>.24587406</b>	Root MSE	=	<b>.2854</b>

  

mbratio	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lneroe	<b>2.243411</b>	<b>.2369497</b>	<b>9.47</b>	<b>0.000</b>	<b>1.76587</b>	<b>2.720951</b>
pvar	<b>4.046399</b>	<b>1.480081</b>	<b>2.73</b>	<b>0.009</b>	<b>1.063491</b>	<b>7.029306</b>
rga	<b>.2589341</b>	<b>.1374588</b>	<b>1.88</b>	<b>0.066</b>	<b>-.0180959</b>	<b>.5359642</b>
_cons	<b>-3.691391</b>	<b>.6196383</b>	<b>-5.96</b>	<b>0.000</b>	<b>-4.94019</b>	<b>-2.442592</b>

32. \* let's check for heteroskedasticity

33. estat imtest, white

White's test for Ho: homoskedasticity  
against Ha: unrestricted heteroskedasticity

chi2(9) = **5.65**  
Prob > chi2 = **0.7740**

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	<b>5.65</b>	<b>9</b>	<b>0.7740</b>
Skewness	<b>5.38</b>	<b>3</b>	<b>0.1461</b>
Kurtosis	<b>1.11</b>	<b>1</b>	<b>0.2914</b>
Total	<b>12.15</b>	<b>13</b>	<b>0.5158</b>

34. \* Heteroskedasticity is not an issue

35. \* let's run the above regression by dropping only the observation with id=26

36. reg mbratio lneroe pvar rga if id!=26

Source	SS	df	MS	Number of obs	=	50
Model	<b>9.4749068</b>	<b>3</b>	<b>3.15830227</b>	F(3, 46)	=	<b>37.11</b>
Residual	<b>3.91459101</b>	<b>46</b>	<b>.085099805</b>	Prob > F	=	<b>0.0000</b>
				R-squared	=	<b>0.7076</b>
				Adj R-squared	=	<b>0.6886</b>
Total	<b>13.3894978</b>	<b>49</b>	<b>.273255057</b>	Root MSE	=	<b>.29172</b>

  

mbratio	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lneroe	<b>2.113271</b>	<b>.2114046</b>	<b>10.00</b>	<b>0.000</b>	<b>1.687736</b>	<b>2.538806</b>
pvar	<b>4.881197</b>	<b>1.451425</b>	<b>3.36</b>	<b>0.002</b>	<b>1.959631</b>	<b>7.802764</b>
rga	<b>.2830827</b>	<b>.1371294</b>	<b>2.06</b>	<b>0.045</b>	<b>.0070555</b>	<b>.5591099</b>
_cons	<b>-3.48212</b>	<b>.5784291</b>	<b>-6.02</b>	<b>0.000</b>	<b>-4.646437</b>	<b>-2.317803</b>

37. \* report the above regressions which dropped outliers in the testimony

38. log close

name: <unnamed>  
log: C:\Users\pradip.k.chattopadhy\Documents\statawork.smcl  
log type: smcl  
closed on: 13 Nov 2017, 10:34:30

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