Accompanying Notes on Data and Methods for
"Who's Afraid of the Big Bad Oil Shock?"

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This set of notes provides background on the data and methods used in the paper.

I. Data Sources

The data are contained in an Excel spreadsheet "bpea_data_v4.xls" available at http://www.econ.yale.edu/~nordhaus/homepage/bpeadata . The explanations are as follows:

Macroeconomic variables:

Most macroeconomic variables were drawn from the DRI data base. They were updated from the agency web sites using data as of late August 2007. The major variables are the following:

lhur = unem ployment rate of all workers
gdp = nominal GDP
gdpq = real GDP in 2000 chained prices
gdpqpot_cbo = real potential GDP in 2000 chained prices (from CBO)
ppcebea = price index of personal consumption expenditures
punew = consumer price index
picpi = log(punew/punew(-4))
pipcebea = log(ppcebea/ppcebea(-4))
lbout = productivity per hour worked business sector
dla = log(lbout/lbout(-4)) = productivity growth
pcebea = personal consumption expenditures

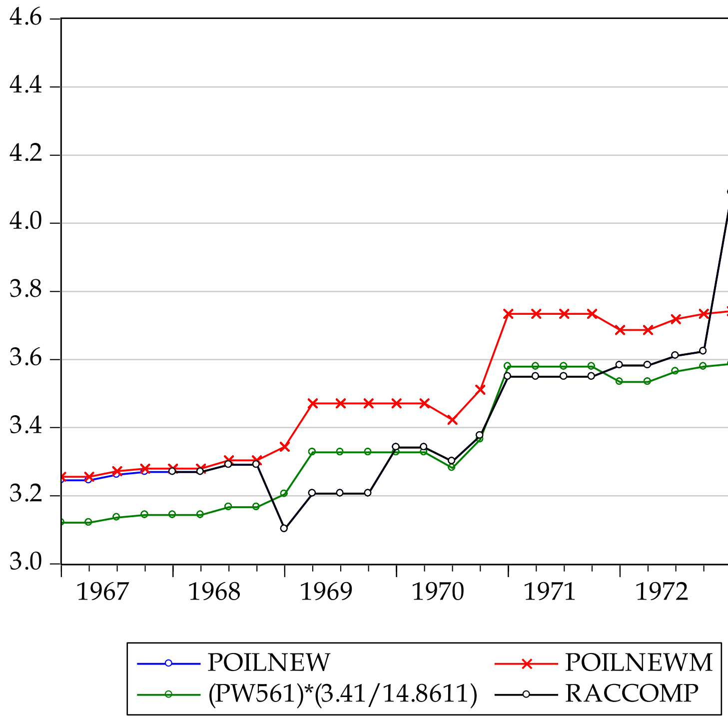
Output gap

The output gap is defined as follows:

cucbo = gdpq/gdpqpot_cbo

Oil prices:

There is a difficulty in creating a good price series for the period before oil-price decontrols in 1981. The EIA data begins in 1974, with spotty data before that. The PPI for crude oil is not consistent with the RAC data. The data are also confused by the oil import quota which was effectively lifted in January 1973. The following shows four constructed series for the period around the first oil shock:



The nominal price of oil (poilnew) used in the study is spliced from several sources. It is defined as the refiner acquisition price of crude oil for the period 1968.1-2007.2. During the period of effective price controls, 1973:3 to 1982:4, the price of domestic crude oil was generally below the import price. For that period, we have used the RAC of imported crude oil. These data were from EIA. For the period 1947.1 to 1967.4, we used the producer price index of crude oil from BLS (data series pw561). The PPI was spliced to the RAC in 1968.1.

The real price of crude oil (rpoilnew) deflates the nominal price of crude oil using the PCE price index from BEA. It is indexed to the price index in 2007:2 and therefore is in 2007 prices.

Oil Consumption

Total consumption of petroleum products (eeps) was taken from the DRI data base and updated from the EIA web site. The seasonal factors were weird, so it was seasonally adjusted separately for the 1947.1-1980.4 and 1981.4 – 2007.2 periods. The seasonally adjusted series is eepssa1.

Share of oil

The share of oil is nominal price times consumption divided by GDP (shareoil).

Energy shock variables

The energy shock variable is defined as follows:

energyshock= (log(rppceenergy)/ log(rppceenergy(-1)))*(pceenergy/pcebea)

where the components are

ppcebea = price index of personal consumption expenditures
ppceenergy = price index of energy goods and services
rppceenergy = real price index of energy goods and services = pceenergy/pce

The cumulative energy shock is defined as:

cumshockenergy=cumshockenergy(-1)+shockenergy

Oil shock variables

The oil shock variable is defined as follows:

Oilshock = log(rpoilnew/rpoilnew(-1))*shareoil

where the components were defined above.

The cumulative oil shock is defined as:

cumshockoil=cumshockoil(-1)+shockoil

Exogenous spending

The exogenous spending ratio is defined as:

autoexppotcbo = autoexpq/gdpqpot_cbo

where

autoexpq = real exports of goods and services + real Government consumption expenditures and gross investment
gdpqpot_cbo = real potential GDP in 2000 chained prices (from CBO)

Interest rates
fyff = Federal funds rate
gyfm3 = 3 –month Treasury bill rate
realtb 3 = real 3-month Treasury bill rate = fygm3-100*pipcebea

II. Notes on Tables and Figures

Tables 1, 2, and 3. All data are defined above and contained in spreadsheet labeled "Table{n}*.xls."

Table 3. The regressions and compilations are available in a spreadsheet labeled, "Table_3_v2.xls." For illustrative purposes, the regression for 1980-2000 is shown below. The coefficients can be seen to correspond to those in Table 3 for that subperiod.

```
Dependent Variable: CUPOT
Method: Least Squares
Date: 09/24/07   Time: 20:51
Sample: 1980Q1 2000Q1
Included observations: 81
Convergence achieved after 13 iterations

                        Coefficient Std. Error   t-Statistic   Prob.

C                         0.371677   0.113456    3.275955     0.0016
AUTOEXPPOTCBO              0.76969   0.291721    2.638442     0.0101
CUPOT(-2)                 0.426829   0.104366    4.089723     0.0001
FYGM3(-2)/100             -0.40886   0.079284    -5.15695          0
CUMSHOCKOIL               -0.06324   0.224382    -0.28185     0.7788
AR(1)                     0.932393   0.037236    25.04035          0

R-squared                 0.928862    Mean dependent va   0.979697
Adjusted R-squared        0.924119    S.D. dependent var  0.021852
S.E. of regression        0.006019    Akaike info criterion -7.31647
Sum squared resid         0.002717    Schwarz criterion   -7.13911
Log likelihood            302.3172    Hannan-Quinn criter -7.24531
F-statistic               195.8575    Durbin-Watson stat  1.350983
Prob(F-statistic)                0

Inverted AR Roots             0.93
```

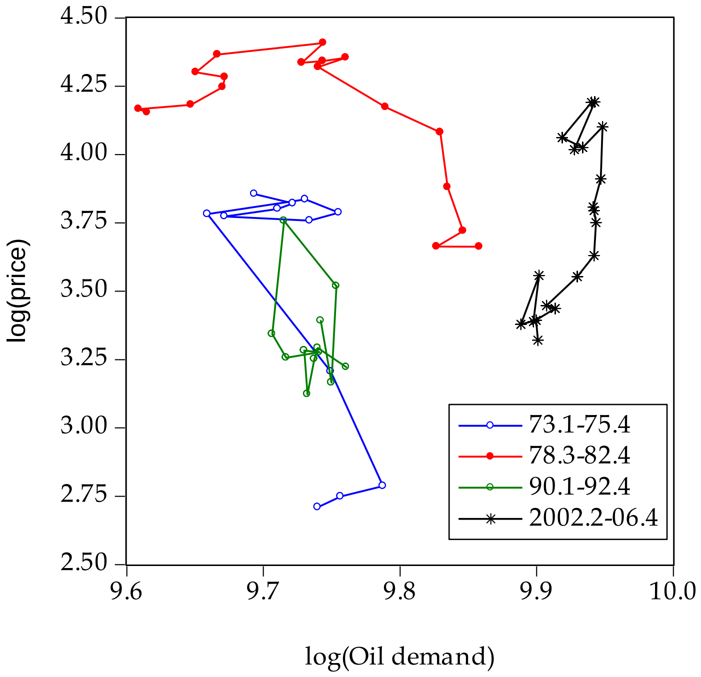
Figures 1, 3, and 4. All data are defined above and contained in spreadsheet labeled "datasources_bpea_v1." Note that the data series for Figures 3 and 4 are normalized so that they equal 0 in the shock period. The program for figures 3 and 4 are in Appendix D.

Figure 5. The underlying regressions are generated in an EViews program called "vol_program_v6.prg" and attached in an Appendix at the end of these notes.

III. *Notes on Other Statements In Text*

1. Estimates of oil price elasticity

Begin with a plot for the period smpl 1973.1 1975.4 smpl 1978.3 1982.4 smpl 1990.1 1992.4 smpl 2002.2 2006.4. This shows that the 2002-06 period was definitely anomalous, looking more like a demand shock. Estimates clearly will be sensitive to sample period.



The equation used to estimate the price elasticity is the following. Note that the standard errors cited in the text are approximate and use the t-statistics for the approximation. The elasticities are somewhat sensitive to the sample period, although the very small coefficient Is clear.

```
Dependent Variable: LOG(EEPSSA1)
Method: Two-Stage Least Squares
Date: 09/21/07   Time: 14:22
Sample: 1973Q1 1992Q4
Included observations: 80
Convergence achieved after 6 iterations
Instrument list:   C  LOG(GDPQBEA) LOG(GDPQBEA(-1))
        LOG(RPOILNEW(-1))  LOG(RPOILNEW(-2))  LOG(RPOILNEW(
        -3))  LOG(RPOILNEW(-4))
    Lagged dependent
  variable & regressors
added to instrument list
==========================================================================
```

```
        Variable          Coefficient    Std. Error    t-Statistic    Prob.
==========================================================================

           C                0.822979      0.379571      2.168185     0.0334
    LOG(RPOILNEW)          -0.014771      0.005237     -2.820664     0.0061
     LOG(GDPQBEA)          -0.012245      0.011845     -1.033773     0.3046
   LOG(EEPSSA1(-1))         0.931855      0.034782      26.79115     0.0000
         AR(1)             -0.158728      0.110981     -1.430228     0.1569
         AR(2)             -0.351100      0.110778     -3.169401     0.0022
==========================================================================

R-squared                   0.837402   Mean dependent var         9.729654
Adjusted R-squared          0.826416   S.D. dependent var         0.061589
S.E. of regression          0.025660   Sum squared resid          0.048725
F-statistic                 75.54113   Durbin-Watson stat         1.940532
Prob(F-statistic)           0.000000
==========================================================================

Inverted AR Roots          -.08-.59i    -.08+.59i
==========================================================================
```

The medium run elasticities are calculated as geometric averages. For example, the 8-year elasticity is the following, where lrp32 is a geometric weighted average with the weight of 0.8 per quarter.

```
Dependent Variable: LOG(EEPSSA1)
Method: Least Squares
Date: 09/21/07   Time: 14:30
Sample: 1973Q1 1992Q4
Included observations: 80
Convergence achieved after 43 iterations
==========================================================================
        Variable          Coefficient    Std. Error    t-Statistic    Prob.
==========================================================================

           C                9.937037      1.692960      5.869622     0.0000
     LOG(GDPQBEA)          -0.062413      0.168558     -0.370274     0.7122
         LRP32             -0.097626      0.053673     -1.818909     0.0730
  LOG(EEPSSA1(-34))         0.075737      0.107113      0.707071     0.4817
         AR(1)              0.804420      0.117523      6.844807     0.0000
         AR(2)              0.080634      0.117429      0.686662     0.4944
==========================================================================

R-squared                   0.811074   Mean dependent var         9.729654
Adjusted R-squared          0.798308   S.D. dependent var         0.061589
S.E. of regression          0.027660   Akaike info criterion     -4.265641
Sum squared resid           0.056614   Schwarz criterion         -4.086989
Log likelihood              176.6256   F-statistic                63.53742
Durbin-Watson stat          2.038955   Prob(F-statistic)          0.000000
==========================================================================
```

```
Inverted AR Roots              .89                -.09
```

2. Estimate of the short-run productivity effect

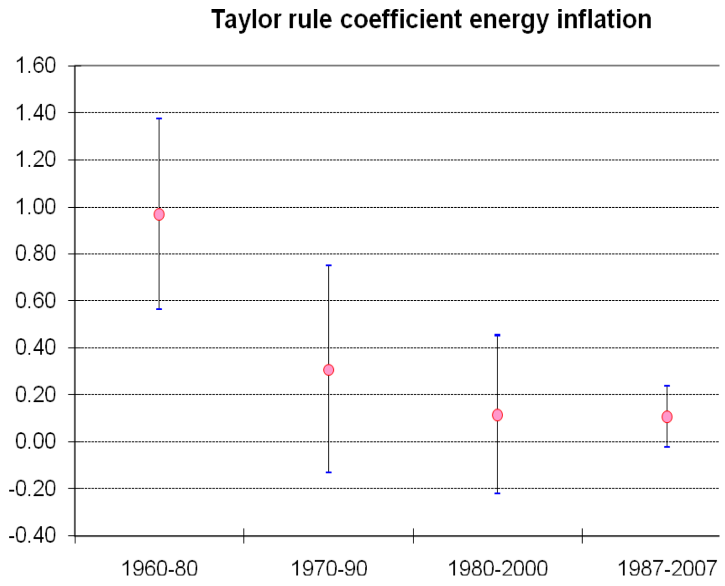
We estimated the productivity effect using a Cobb-Douglas example. The following shows the results. The program is shown as Appendix B. The variable “One” is the log of oil prices. “Oilone” is the price using the lag structure with an elasticity of one. The last column is the long-run elasticity.

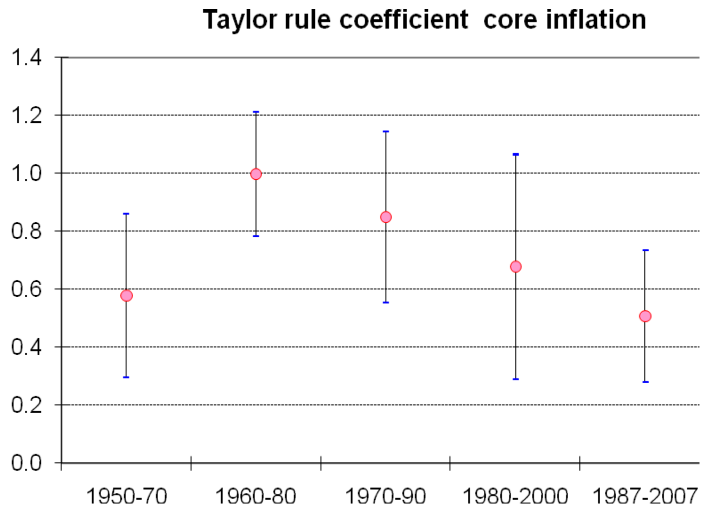
obs	OILONE	OILONE*.03	-c(2)/(1-c(4))
1960Q2	-0.010238	-0.000307	-0.216753
1960Q3	-0.019779	-0.000593	-0.216753
1960Q4	-0.028669	-0.000860	-0.216753
1961Q1	-0.036954	-0.001109	-0.216753
1961Q2	-0.044674	-0.001340	-0.216753
1961Q3	-0.051868	-0.001556	-0.216753
1961Q4	-0.058572	-0.001757	-0.216753
1962Q1	-0.064818	-0.001945	-0.216753
1962Q2	-0.070640	-0.002119	-0.216753
1962Q3	-0.076064	-0.002282	-0.216753
1962Q4	-0.081119	-0.002434	-0.216753
1963Q1	-0.085829	-0.002575	-0.216753
1963Q2	-0.090219	-0.002707	-0.216753
1963Q3	-0.094309	-0.002829	-0.216753
1963Q4	-0.098121	-0.002944	-0.216753
1964Q1	-0.101672	-0.003050	-0.216753
1964Q2	-0.104982	-0.003149	-0.216753
1964Q3	-0.108066	-0.003242	-0.216753
1964Q4	-0.110940	-0.003328	-0.216753
1965Q1	-0.113619	-0.003409	-0.216753
1965Q2	-0.116114	-0.003483	-0.216753
1965Q3	-0.118440	-0.003553	-0.216753
1965Q4	-0.120607	-0.003618	-0.216753
1966Q1	-0.122627	-0.003679	-0.216753
1966Q2	-0.124508	-0.003735	-0.216753
1966Q3	-0.126262	-0.003788	-0.216753
1966Q4	-0.127896	-0.003837	-0.216753
1967Q1	-0.129419	-0.003883	-0.216753
1967Q2	-0.130838	-0.003925	-0.216753
1967Q3	-0.132160	-0.003965	-0.216753
1967Q4	-0.133392	-0.004002	-0.216753
1968Q1	-0.134540	-0.004036	-0.216753

1968Q2	-0.135610	-0.004068	-0.216753
1968Q3	-0.136607	-0.004098	-0.216753
1968Q4	-0.137537	-0.004126	-0.216753
1969Q1	-0.138402	-0.004152	-0.216753
1969Q2	-0.139209	-0.004176	-0.216753
1969Q3	-0.139961	-0.004199	-0.216753
1969Q4	-0.140662	-0.004220	-0.216753
1970Q1	-0.141314	-0.004239	-0.216753
1970Q2	-0.141923	-0.004258	-0.216753

3. Estimate of the differential response of monetary policy to different price indexes

To examine whether the Fed response to inflation has changed, we ran Taylor-rule-type regressions for different subperiods. For example, the regression for 1987.1 to 2007.2 is as shown below. The coefficients along with the one-sigma ranges for core inflation and energy inflation for the subperiods are shown in the two graphs. The energy inflation variable is the contribution of energy inflation to the PCE inflation rate = energy inflation * share of energy in PCE. (We omitted the coefficient for 1950-70 as that was very poorly determined because the energy price and core-energy variables were available only from 1958.1)


Taylor rule coefficient energy inflation



```
Dependent Variable: FYFF/100
Method: Least Squares
Date: 09/21/07   Time: 20:06
Sample (adjusted): 1987Q1 2007Q1
Included observations: 81 after adjustments
Convergence achieved after 12 iterations

                          Coefficient   Std. Error   t-Statistic    Prob.

C                           0.089032     0.018076     4.925444          0
LHUR(-1)/100               -1.295169     0.217418    -5.957057          0
PICOREEN4(-1)               0.508342     0.227542     2.234055     0.0285
FYFF(-2)/100                0.150633     0.098594     1.527811     0.1308
(PIPCEENERGY4(-1))*(        0.107701     0.131194     0.820931     0.4143
AR(1)                       0.963119     0.025619     37.59459          0

R-squared                   0.975988   Mean dependent var        0.048717
Adjusted R-squared          0.974387   S.D. dependent var        0.021725
S.E. of regression          0.003477   Akaike info criterion    -8.414184
Sum squared resid           0.000907   Schwarz criterion        -8.236817
Log likelihood              346.7744   Hannan-Quinn criter.     -8.343022
F-statistic                 609.6774   Durbin-Watson stat        1.246353
Prob(F-statistic)                  0

Inverted AR Roots               0.96
```

4. Direct and Indirect Effects of Oil Shocks

To estimate the total effects, I rely on data on oil consumption provided by EIA for 2004. I divided oil consumption into three parts: direct consumption (such as motor gasoline), indirect consumption (such as jet fuel), and other components of GDP. I then assume that the energy intensities of the second and third components are equal. This yields the following table, which implies that the total effect is 1.78 times the direct effect.

	Output	Energy	Intensity	Total
PCE	8,211.5			757.5
PCE Energy	425.1	425.1	1.000	425.1
PCE Non-energy	7,786.4		0.043	332.4
Other GDP	3,501.0		0.043	149.5
Nonen PCE + Other GDP	11,287.4	481.9	0.043	
Total	11,712.5	907.0		907.0
Ratio of total C to direct C	757.5	/	425.13	1.78

5. Tail Winds and Head Winds

The statements in the text rely on simulations of the aggregate demand equation shown above. For these, we took the equation and ran it with the actual oil shocks and no oil shocks, thereby producing the effect of the cumulative oil shock in the equation. We also examine the effect of the exogenous and other variables with no oil shock. These experiments produced the following. Note that CUPOT_WOIL = simulation with oil shock, CUPOT_NOIL = simulation without oil shock, CUPOT-1 = actual utilization, andCUPOT_NOIL-1 = simulation without oil. The last two columns are the estimated impact of the oil shock and the estimated impact of non-oil variables.

obs	CUPOT_WOIL-CUP	CUPOT-1	CUPOT_NOIL-1	oil	other
1973Q3	-0.016310548	0.04204137	0.012655962		
1975Q2	-0.022308506	-0.032493916	-0.004708188	-0.6%	-1.7%
1978Q4	-0.014502829	0.036247243	-0.009164838		
1980Q3	-0.025503718	-0.027059431	-0.035554774	-1.1%	-2.6%
1990Q3	-0.013981114	-0.007494376	0.015866262		
1990Q4	-0.015432743	-0.022444057	0.016985618	-0.1%	0.1%
2002Q4	-0.015453485	-0.019618661	0.023113063		
2006Q2	-0.022579309	0.001525212	0.022308168	-0.7%	-0.1%

6. The Phillips curve estimates

For the Phillips curve estimates, we estimate the following equation, where lhur is the unemployment rate, nairu is the cbo estimate of the nairu, w4 is the four quarter change in nominal compensation per hour in private business, pipcebea is the inflation rate for PCE, and picoreenergy is the core calculated without energy. In looking at the two sample periods, note that there is essentially no change in the unemployment coefficient, that the wage term doubles, and that the term on excess energy inflation is insignificant, although it goes slightly in the direction of more influence. The coefficients are sensitive to the ARMA specification, however.

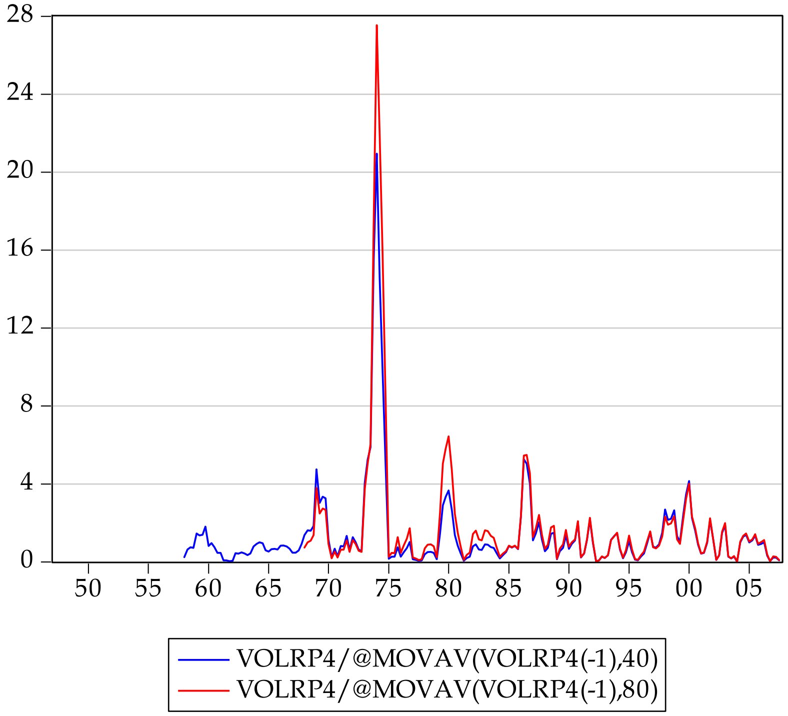
```
Dependent Variable: W4
Method: Least Squares
Date: 09/08/07   Time: 14:02
Sample: 1960Q1 1984Q4
Included observations: 100
W4=C(1)+C(2)*W4(-4)+(1-C(2))*PICOREENERGY+C(3)* (PIPCEBEA
        -PICOREENERGY)+C(4)*( LHUR-NAIRU)
==================================================================
           Variable       Coefficient   Std. Error   t-Statistic    Prob.
==================================================================
             C(1)          0.013410      0.001292     10.38213     0.0000
             C(2)          0.224200      0.060289     3.718738     0.0003
             C(3)         -0.105041      0.147982    -0.709827     0.4795
             C(4)         -0.004249      0.000478    -8.881755     0.0000
==================================================================
R-squared                  0.898363    Mean dependent var       0.061192
Adjusted R-squared         0.895187    S.D. dependent var       0.023583
S.E. of regression         0.007635    Akaike info criterion   -6.873020
Sum squared resid          0.005596    Schwarz criterion       -6.768813
Log likelihood             347.6510    Hannan-Quinn criter.    -6.830845
F-statistic                282.8460    Durbin-Watson stat       0.794471
Prob(F-statistic)          0.000000
==================================================================
```

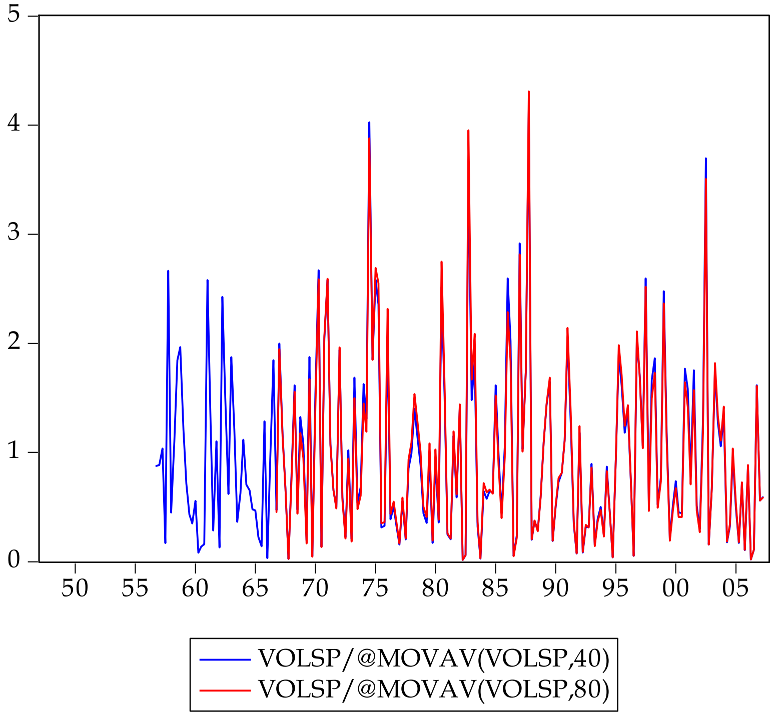
```
Dependent Variable: W4
Method: Least Squares
Date: 09/08/07   Time: 13:44
Sample (adjusted): 1985Q1 2007Q1
```

```
Included observations: 89 after adjustments
W4=C(1)+C(2)*W4(-4)+(1-C(2))*PICOREENERGY+C(3)* (PIPCEBEA
        -PICOREENERGY)+C(4)*( LHUR-NAIRU)
==========================================================================
          Variable        Coefficient    Std. Error    t-Statistic    Prob.
==========================================================================
            C(1)            0.007587      0.002054      3.693336     0.0004
            C(2)            0.551336      0.092238      5.977316     0.0000
            C(3)            0.382621      0.319160      1.198835     0.2339
            C(4)           -0.003902      0.001916     -2.036134     0.0449
==========================================================================
R-squared                  -0.018009    Mean dependent var          0.038840
Adjusted R-squared         -0.053939    S.D. dependent var          0.013795
S.E. of regression          0.014162    Akaike info criterion      -5.632642
Sum squared resid           0.017047    Schwarz criterion          -5.520793
Log likelihood              254.6526    Hannan-Quinn criter.       -5.587559
Durbin-Watson stat          0.622638
==========================================================================
```

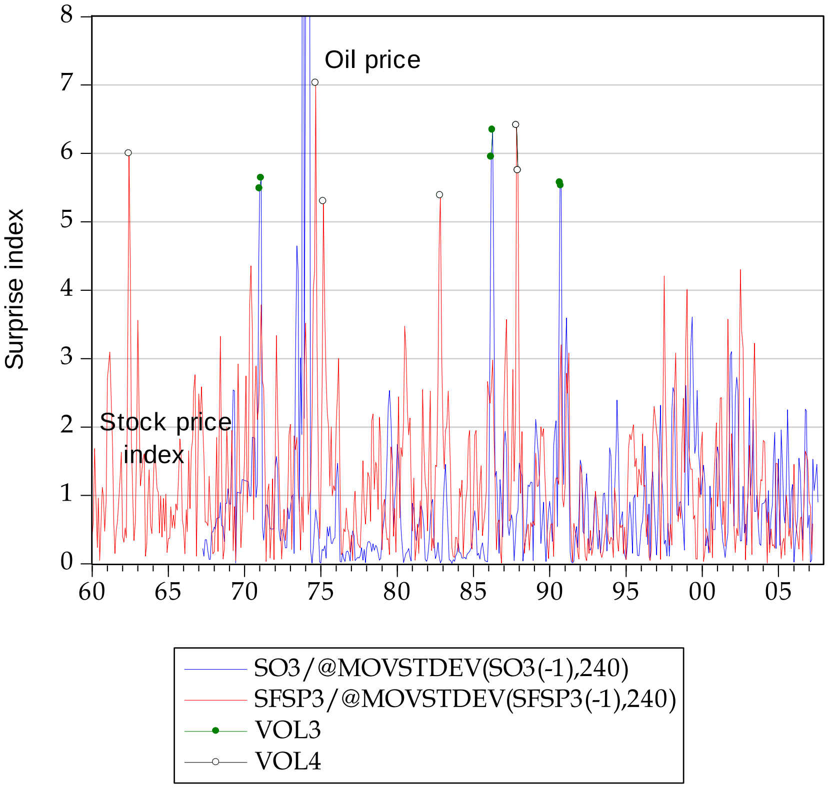
6. Surprise variable

We can calculate the ratio of the "surprise variable" as defined in the text. The numbers are approximately the same for quarterly and monthly data. This was created using the program in Appendix C. The following shows the quarterly data for 10 year and 20 year moving averages. Note that this definition is somewhat different from that proposed by Warren Weaver ("Probability, rarity, interest, and surprise," accessible in *Pediatrics,* Vol. 38 No. 4 October 1966, pp. 667-670). Weaver's surprise index is roughly the inverse of the likelihood. For a normal distribution, it is proportional to exp(surprise index^2/2). Note that the interpretation is heavily dependent upon the assumed distribution.

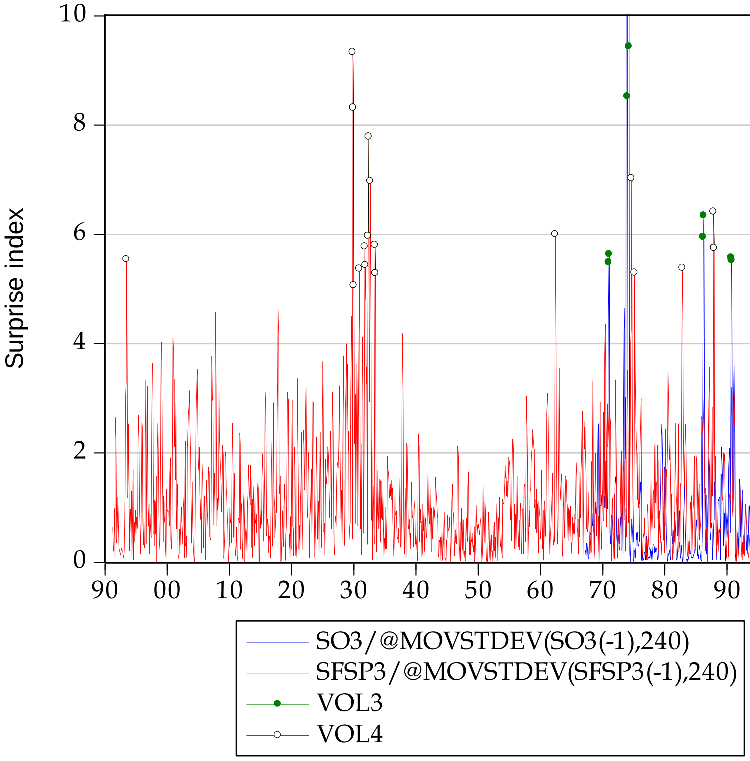

28
24
20
16
12
8
4
0
50
55
60
65
70
75
80
85
90
95
00
05
VOLRP4/@MOVAV(VOLRP4(-1),40)
VOLRP4/@MOVAV(VOLRP4(-1),80)


5
4
3
2
1
0
50
55
60
65
70
75
80
85
90
95
00
05
VOLSP/@MOVAV(VOLSP,40)
VOLSP/@MOVAV(VOLSP,80)

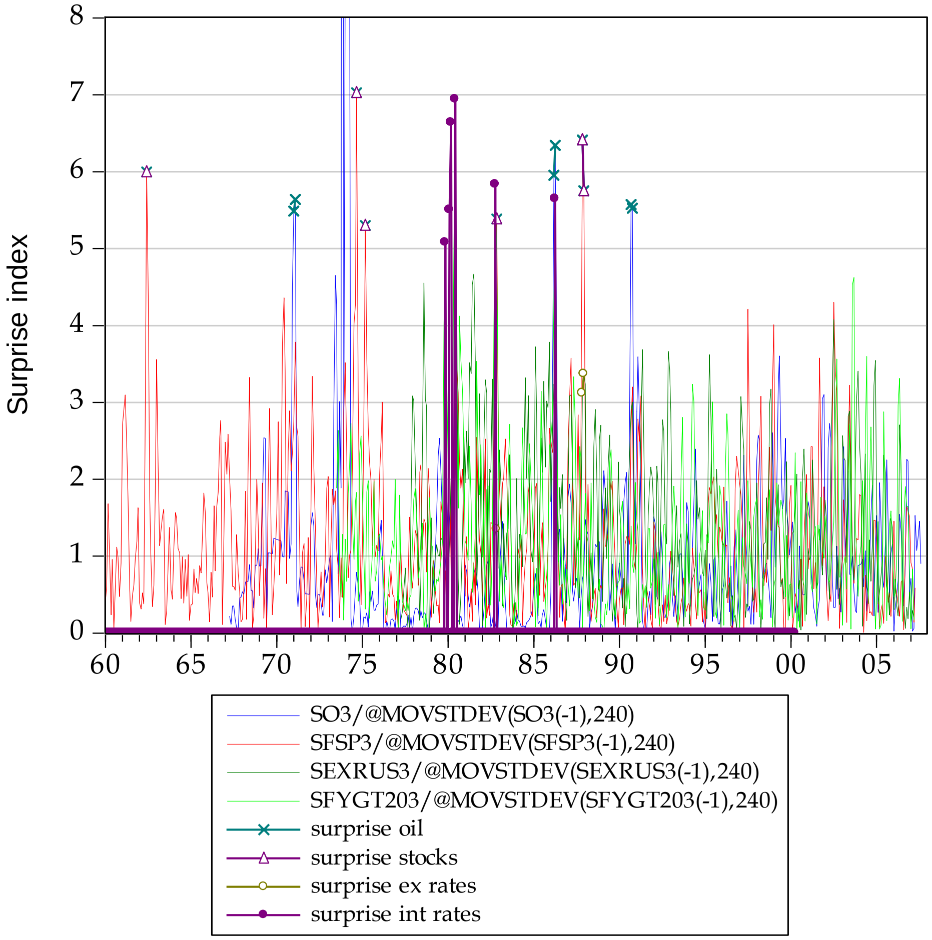
The following rescales the vertical axis:



We also calculated the very long run using Shiller's stock price index scaling to a max of 10, which suggests that the GD surprise was quite a bit higher than recent numbers, but still well below the peak oil number.



We add exchange rates and 20-year interest rates to the figure. Volcker was a surprise, but for all non-oil assets, the maximum surprise was in the 7-sigma range.



Appendix A. EView program for calculating volatilities for Table 4.

```
' program for bpea figure 4 on volatility

smpl @all
series var1=(AUTOEXPPOTCBO-AUTOEXPPOTCBO(-4))
series var2=(cumshockenergy-cumshockenergy(-4))
series var3=(cumshockoil-cumshockoil(-4))
series var4=(fyff-fyff(-4))/100
series var5=(cucbo-cucbo(-4))
series var6=pipcebea-pipcebea(-4)

matrix(6,6) tabvol2

smpl 1950.1 1970.1
tabvol2(1,1)=@stdev(var1)
tabvol2(2,1)=@stdev(var2)
tabvol2(3,1)=@stdev(var3)
tabvol2(4,1)=@stdev(var4)
tabvol2(5,1)=@stdev(var5)
tabvol2(6,1)=@stdev(var6)

smpl 1960.1 1980.1
tabvol2(1,2)=@stdev(var1)
tabvol2(2,2)=@stdev(var2)
tabvol2(3,2)=@stdev(var3)
tabvol2(4,2)=@stdev(var4)
tabvol2(5,2)=@stdev(var5)
tabvol2(6,2)=@stdev(var6)

smpl 1970.1 1990.1
tabvol2(1,3)=@stdev(var1)
tabvol2(2,3)=@stdev(var2)
tabvol2(3,3)=@stdev(var3)
tabvol2(4,3)=@stdev(var4)
tabvol2(5,3)=@stdev(var5)
tabvol2(6,3)=@stdev(var6)

smpl 1980.1 2000.1
tabvol2(1,4)=@stdev(var1)
tabvol2(2,4)=@stdev(var2)
tabvol2(3,4)=@stdev(var3)
tabvol2(4,4)=@stdev(var4)
tabvol2(5,4)=@stdev(var5)
tabvol2(6,4)=@stdev(var6)

smpl 1987.1 2007.2
tabvol2(1,5)=@stdev(var1)
tabvol2(2,5)=@stdev(var2)
tabvol2(3,5)=@stdev(var3)
tabvol2(4,5)=@stdev(var4)
tabvol2(5,5)=@stdev(var5)
tabvol2(6,5)=@stdev(var6)

smpl @all
series v1950
series v1960
```

```
series v1970
series v1980
series v1987
series v

smpl 1840.1 1841.2
group gvol2  v1950 v1960 v1970 v1980 v1987 v
mtos(tabvol2, gvol2)
show v1950 v1960 v1970 v1980 v1987
```

Appendix B. Program for productivity effect

```
' program to simulate the impact of oil in short run
'smpl 1973.1 1981.4 1986.1 1987.4 1990.1 1992.4
smpl 1973.1 1992.4
tsls log(eepssa1) c log(rpoilnew) log(gdpqbea)   log(eepssa1(-1)) ar(1) ar(2) @  c  log(gdpqbea)
log(gdpqbea(-1))  log(rpoilnew(-1))  log(rpoilnew(-2))  log(rpoilnew(-3))  log(rpoilnew(-4))

'ls log(eepssa1) c log(rpoilnew) log(gdpqbea) log(eepssa1(-1)) ar(1)
smpl 1960.1 2007.2
series zero=log(1)
series one=log(2)
series oilone=0
smpl 1960.2 2007.2
series oilone=c(4)*oilone(-1)+c(2)*one
plot oilone
show oilone oilone*.03 c(2)/(1-c(4))
```

Appendix C. Program for surprise variable

```
' QUARTERLY SURPRISE CALCS
smpl @all
series adlrp1=(d(log(rpoilnew))^2^.5)
series adlrfsp=(d(log(fspcom))^2^.5)
smpl 1947.1 2007.4
series surp_rp_1=adlrp1/@movstdev(adlrp1(-1),40)
series surp_stock_1=adlrfsp/@movstdev(adlrfsp(-1),40)


'BUBBLES
smpl if surp_rp_1>5
series vol1=surp_rp_1
smpl if surp_stock_1>5
series vol2=surp_stock_1
smpl 1960.1 2007.4
        plot surp_rp_1 surp_stock_1 vol1 vol2
```

Appendix D.

```
'Fig 3 and 4


for %var cumshockoil cumshockenergy cucbo picpi pipcebea
smpl 1973.3 1973.3
ls {%var} c
smpl 1973.3 1975.4
series {%var}_diff={%var}-c(1)
next

for %var cumshockoil cumshockenergy cucbo picpi pipcebea
smpl 1978.4 1978.4
ls {%var} c
smpl 1978.4 1981.1
series {%var}_diff={%var}-c(1)
next

for %var cumshockoil cumshockenergy cucbo picpi pipcebea
smpl 2002.4 2002.4
ls {%var} c
smpl 2002.4 2006.2
series {%var}_diff={%var}-c(1)
next

'smpl 1973.3 1975.4  1978.4 1981.1 2002.4 2006.2
'plot(t=fig_inflation_shock_3)  -cumshockoil_diff -cumshockenergy_diff cucbo_diff

smpl 1973.3 1975.4  1978.4 1981.1 2002.4 2006.2
plot(t=fig_inflation_shock_3)  cumshockoil_diff  cumshockenergy_diff picpi_diff pipcebea_diff
```