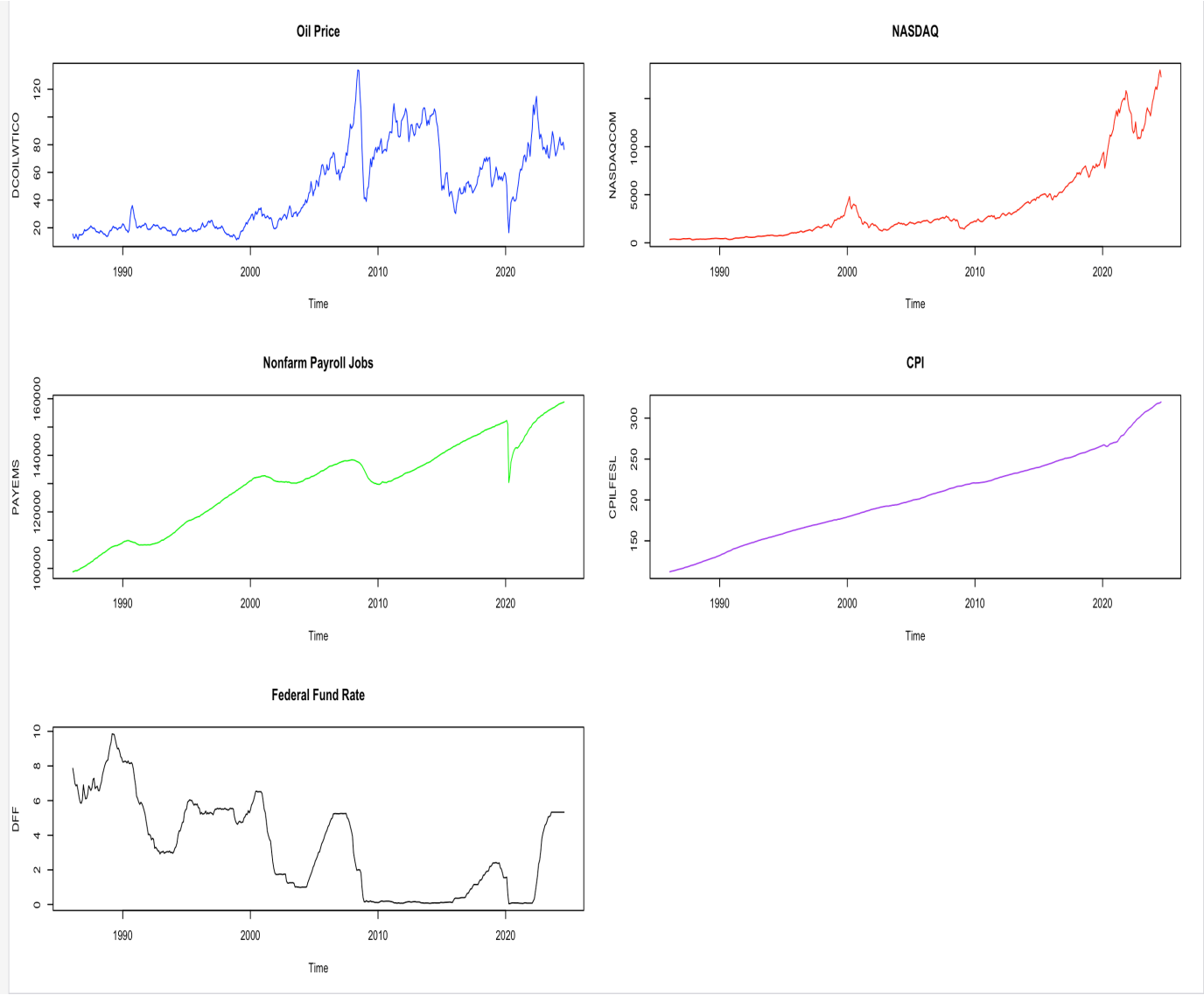
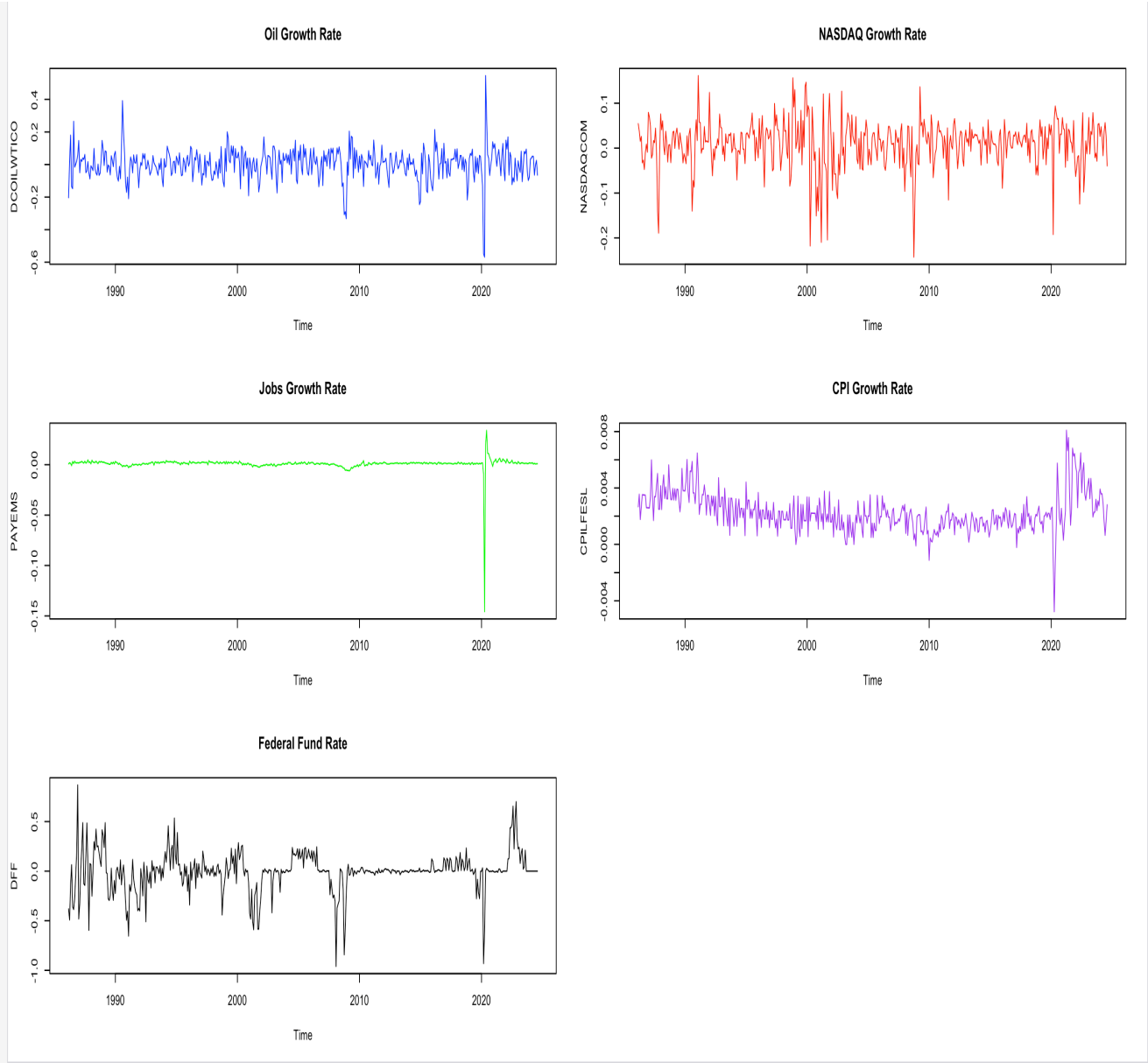
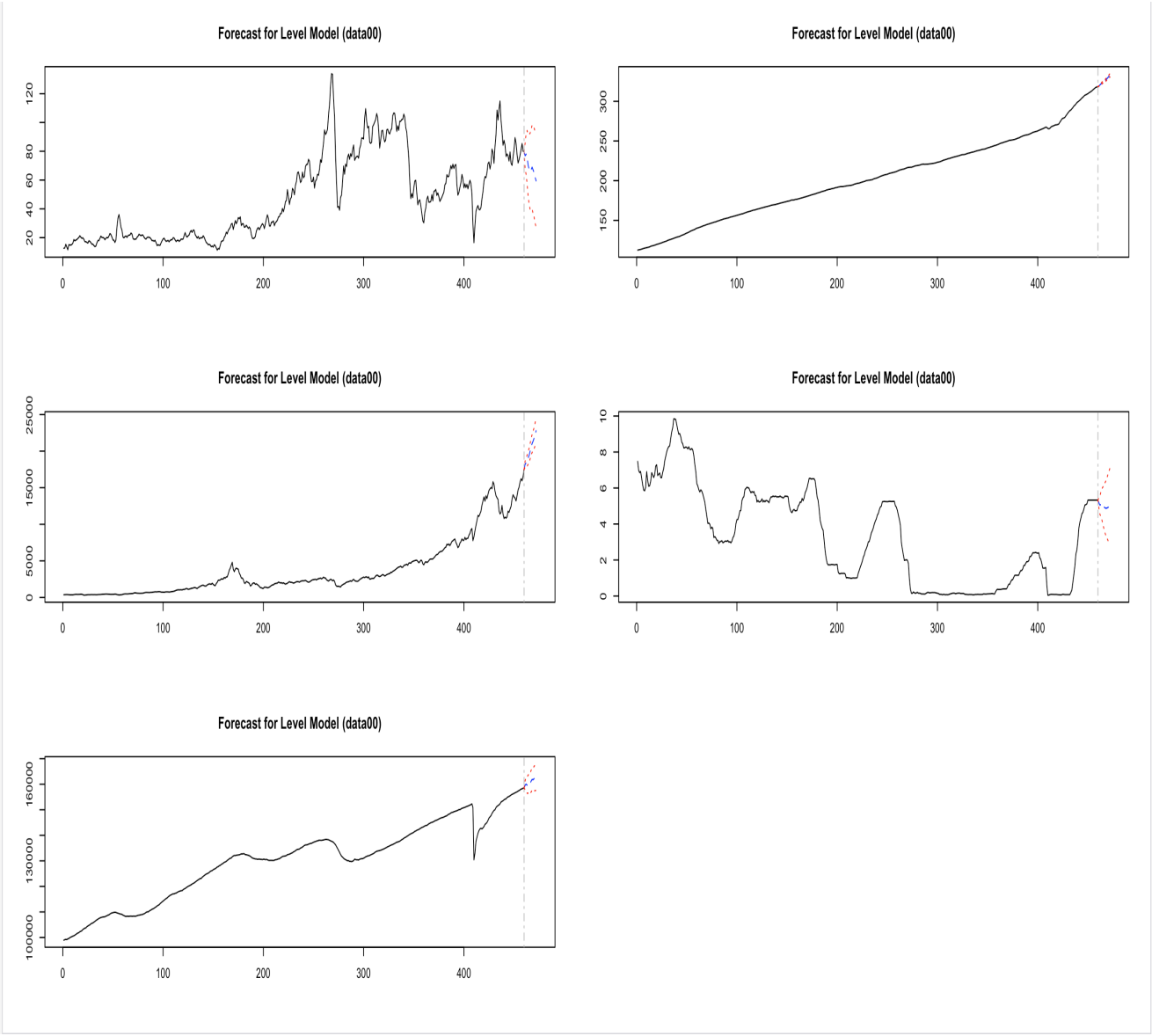
Armaan Dhanda Assignment 4



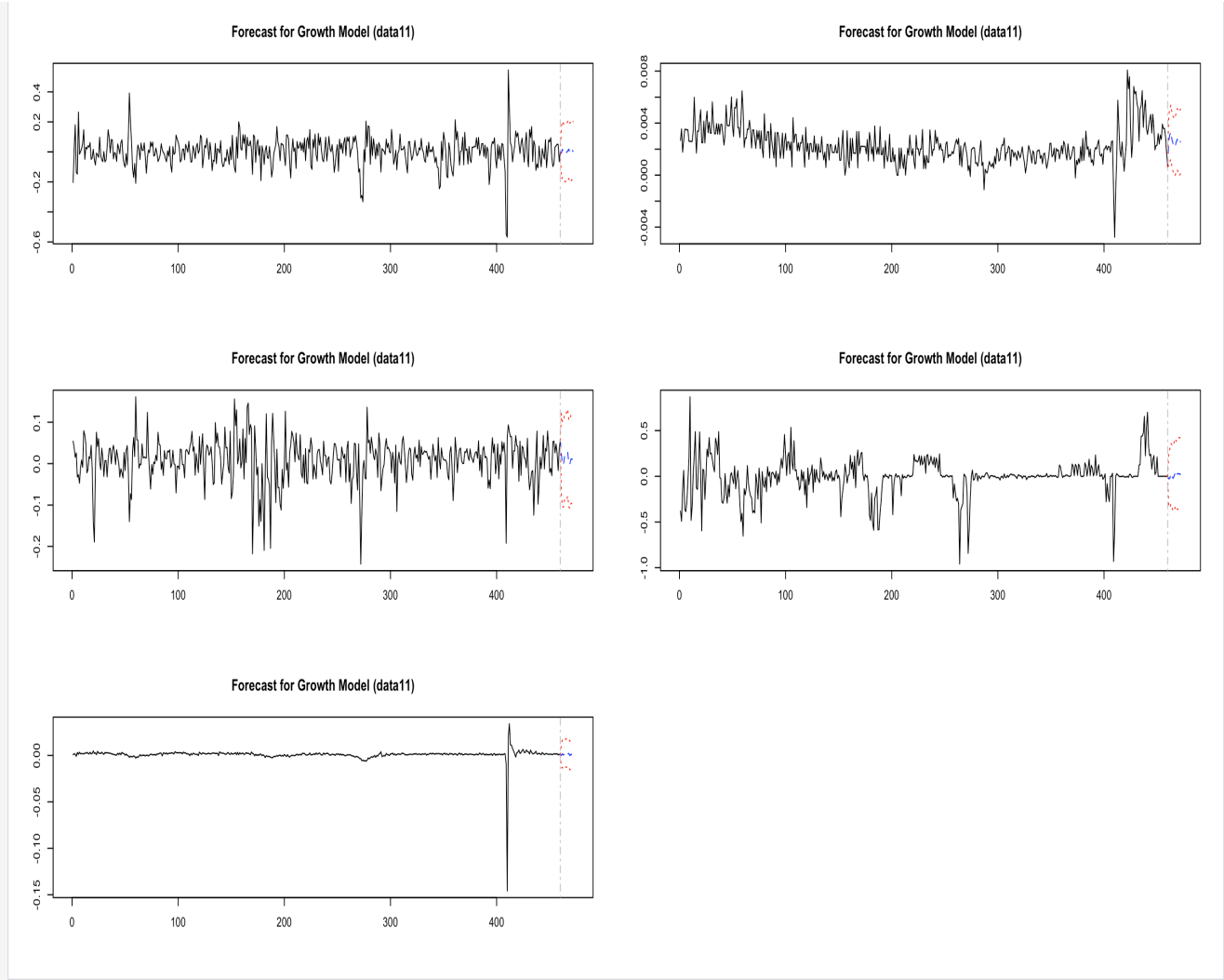
applied (diff()) for FFr and log(diff()) for rest



Level Model (data00) Forecast:



Growth Model (data11):



Level Model (data00):

- **Forecast Pattern**: The level model seems to provide smoother, more linear forecasts for variables like non-farm payrolls, CPI, and Federal Fund Rate (FFR). This is because the model operates directly on the levels of the series, including both constant and trend components. For example:
    - **Oil prices** (first panel, top-left) show some volatility in the forecast but maintain a consistent trend.
    - **Stock prices** (top-right) exhibit a relatively stable upward trend without much deviation.
    - **CPI** (bottom-left) shows steady growth, while **FFR** (bottom-right) is forecasted to slightly increase or remain stable.
- **Stability**: Since this model operates on levels, it tends to capture the general trend over time, providing forecasts that are more predictable and smooth, especially for variables that exhibit long-term growth (like stock prices or payrolls).

- **Drawback**: If the data has underlying growth dynamics or structural changes, the level model may not capture the nuances in short-term fluctuations, which is often reflected in the smoothness of the forecasts.

Growth Model (data11):

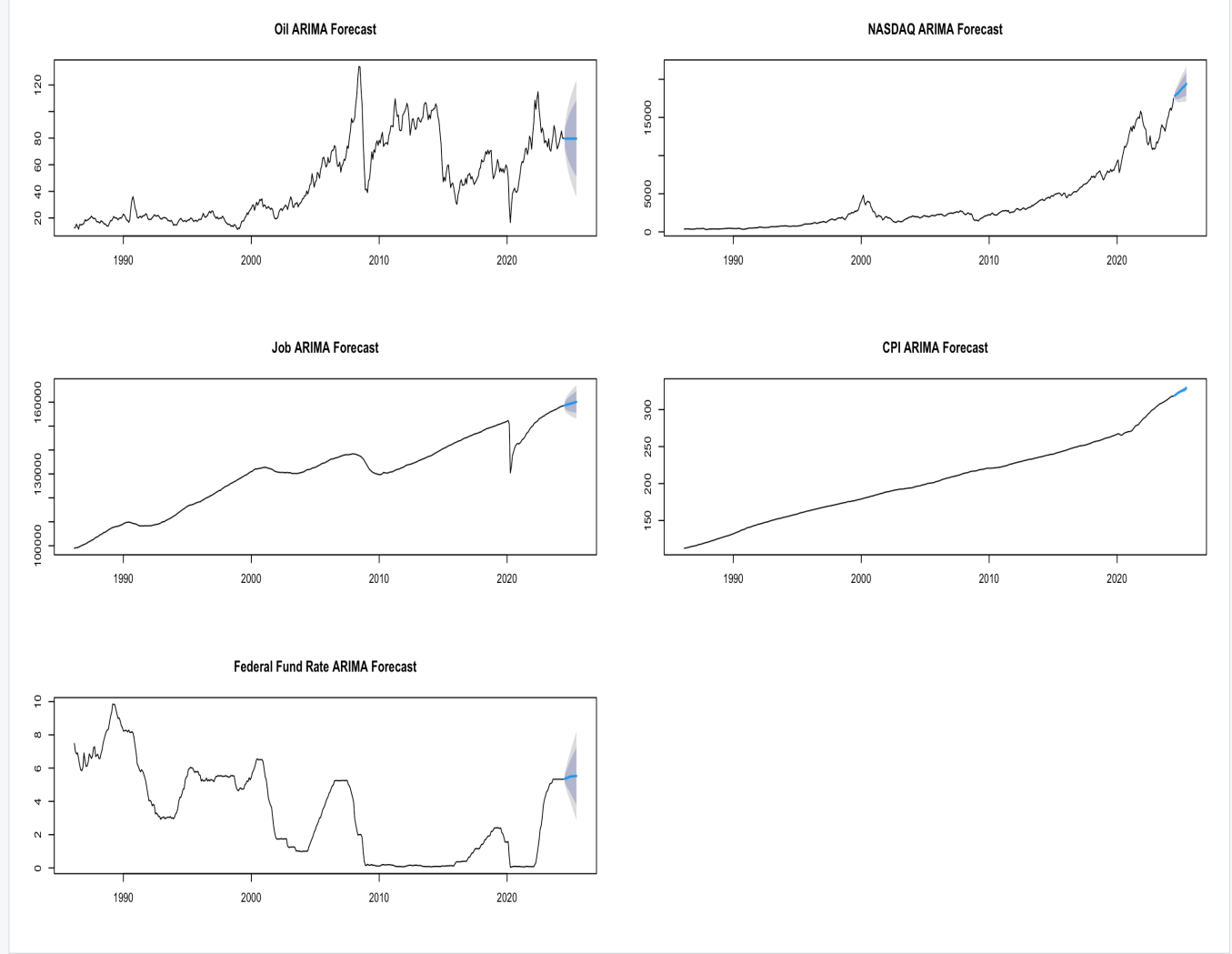
- **Forecast Pattern**: The growth model's forecasts (differenced data) show more **short-term volatility** and **fluctuations** compared to the level model. For example:
    - **Oil prices** show significant oscillations in the growth rates, which makes the forecast appear less smooth.
    - **Stock prices** similarly show fluctuations but with smaller deviations than the oil prices.
    - **CPI and FFR** also exhibit relatively small fluctuations in the forecast but remain much closer to the zero-growth line.
- **Interpretation**: The growth model captures the short-term variations or percentage changes in the series, which leads to greater sensitivity to small changes in the data. This is why the forecasted growth rates are more volatile compared to the level forecasts.
- **Drawback**: The growth model might be **too reactive** to short-term fluctuations and could lead to overfitting, as the forecasted values are more sensitive to recent movements in the data.

Differences Between the Models:

1. **Volatility**: The growth model forecast is more volatile, capturing small fluctuations in the data. This makes sense because the model is forecasting changes (differenced data), which can reflect short-term dynamics more prominently.
    - The level model is smoother, indicating that it captures long-term trends but may miss short-term variability.
2. **Long-term Trends vs Short-term Fluctuations**:
    - **Level Model**: This model is better at capturing long-term trends in the data, such as stock prices or payrolls, which tend to follow a more predictable path over time.
    - **Growth Model**: This model focuses more on capturing the immediate changes in the data, making it better at modeling short-term fluctuations but potentially overreactive for stable variables.

Residual Standard Error and Fit:

- The **Level model** achieves higher **R-squared values** (e.g., for job_ts, adjusted R-squared ~0.99), indicating a stronger fit due to the cumulative nature of the data.
- The **Growth model**, by contrast, has more moderate fit (e.g., adjusted R-squared around 0.27–0.56), reflecting the noisier nature of growth rates and short-term volatility.

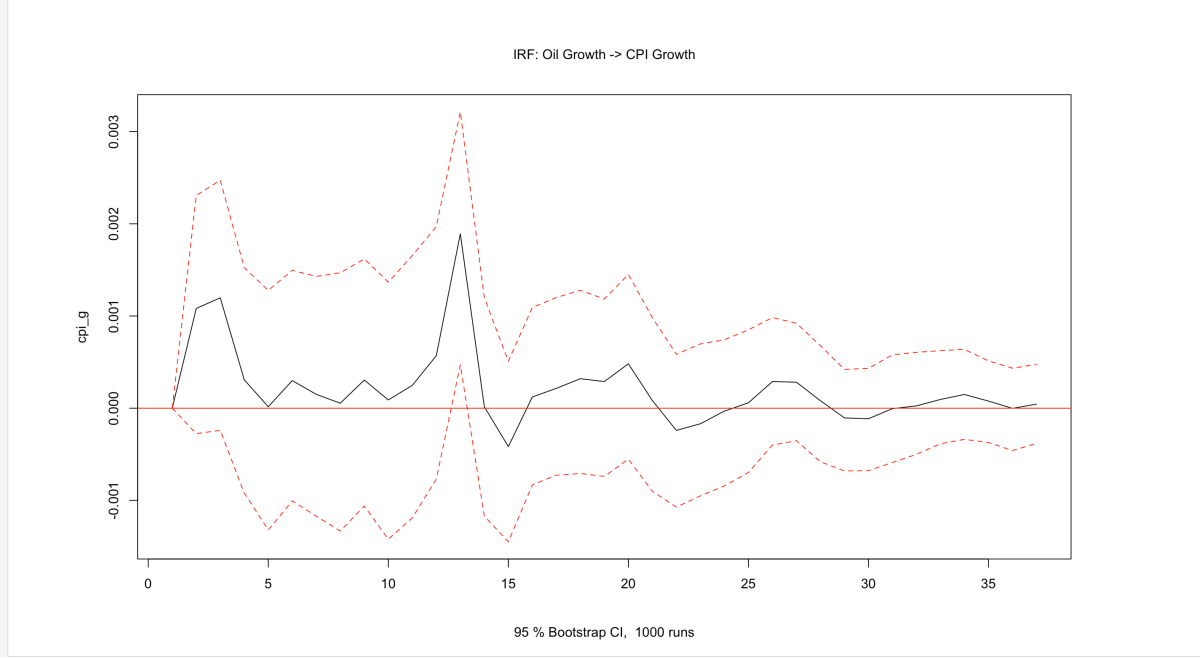


- **Oil ARIMA Forecast**:
  - Shows fluctuations with a slight upward forecast but relatively wide confidence intervals, indicating uncertainty about future trends.
- **NASDAQ ARIMA Forecast**:
  - Strong upward trend with increasing variability reflected in the widening confidence intervals. This suggests the ARIMA model predicts continued stock market growth with some uncertainty.

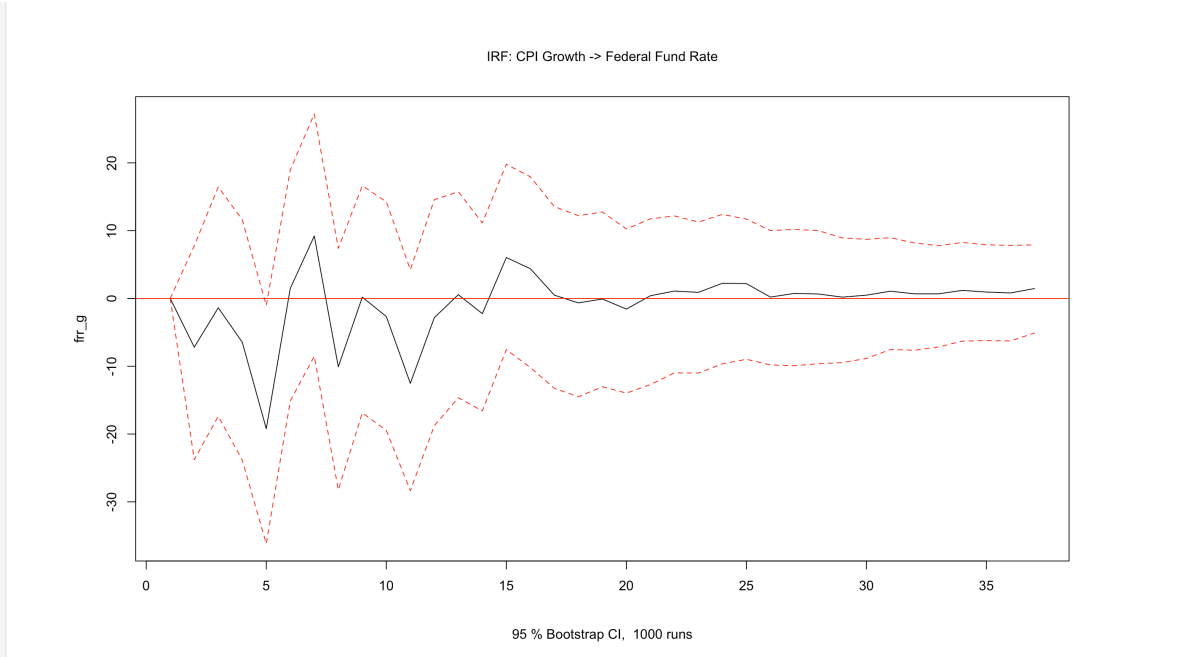
- **Job ARIMA Forecast**:
    - Continues its upward trend, reflecting economic growth with a smaller confidence interval.
- **CPI ARIMA Forecast**:
    - Displays consistent upward growth, reflecting inflationary pressure with very narrow confidence intervals, showing a more confident prediction.
- **Federal Fund Rate ARIMA Forecast**:
    - Predicts a stable trend after the recent rise, but with a wide confidence interval reflecting uncertainty about future monetary policy decisions.

For short-term predictions, ARIMA may be competitive or even better if individual series behave smoothly over time (like CPI or jobs). However, for complex interrelated systems, **VAR models** provide better context and understanding of interactions, particularly for financial data where one variable influences another.

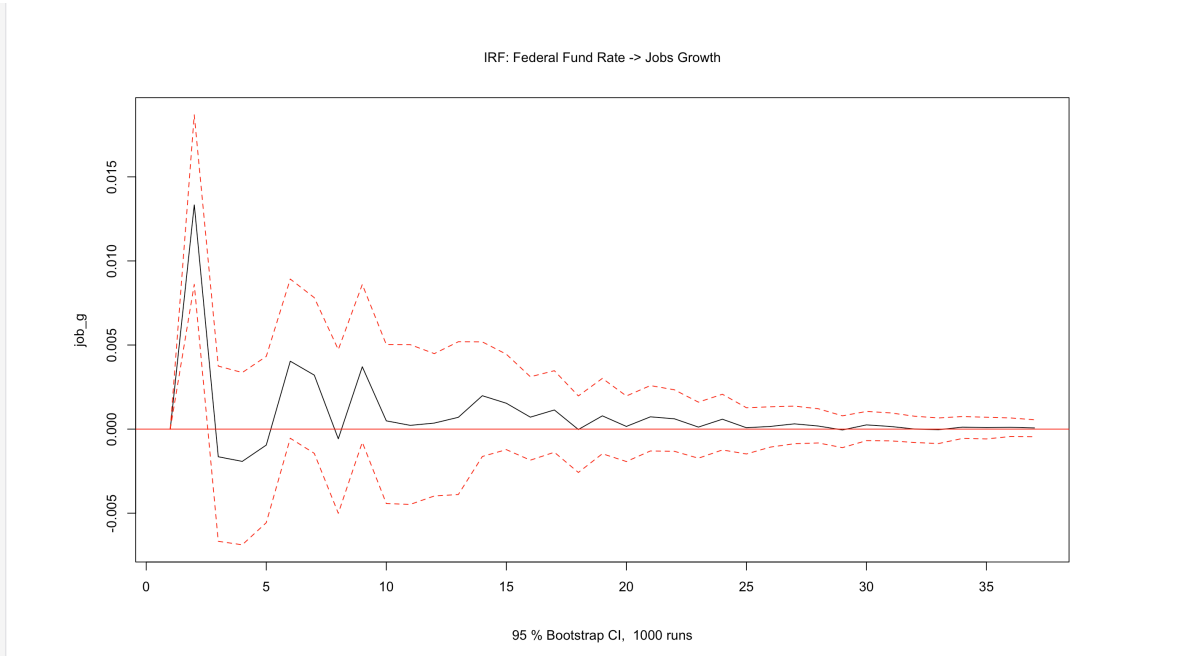
Plot 1



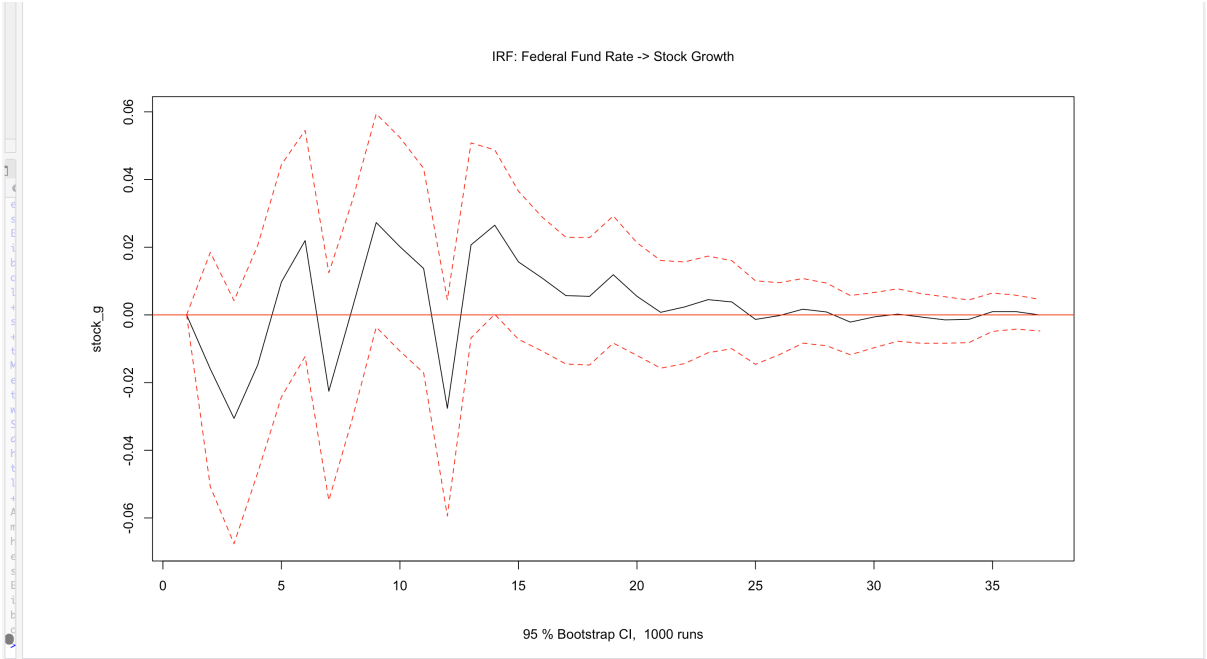
Plot 2


IRF: CPI Growth -> Federal Fund Rate
frr_g
20
10
0
-10
-20
-30
0
5
10
15
20
25
30
35
95 % Bootstrap CI, 1000 runs

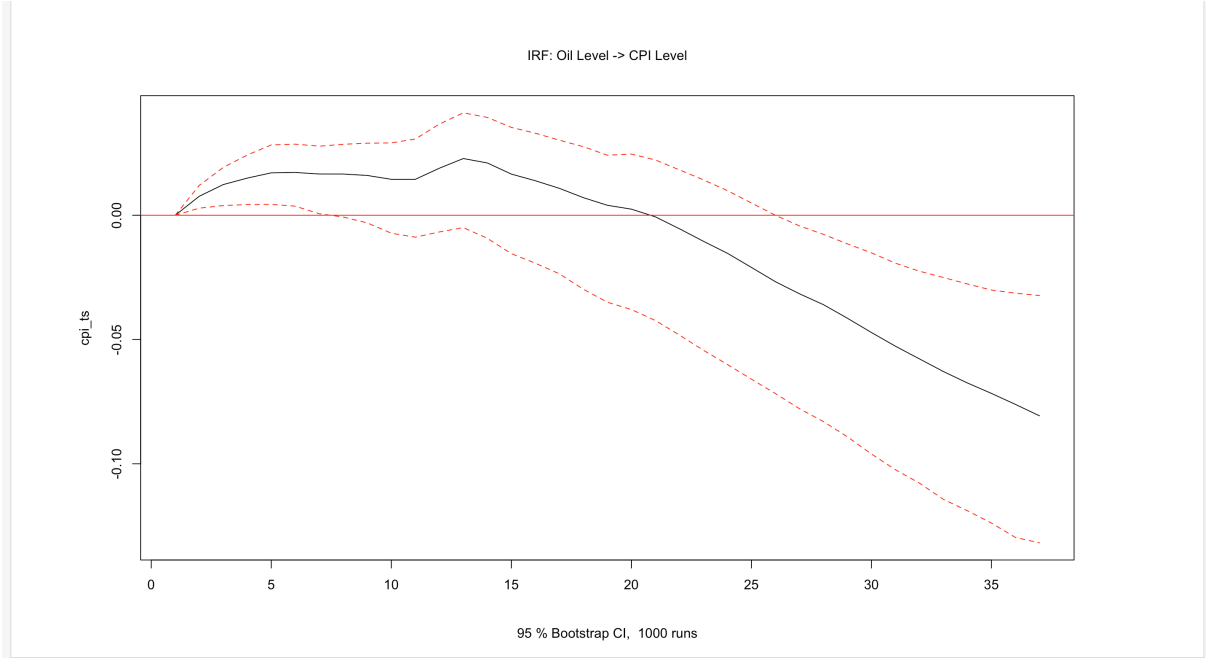
Plot 3


IRF: Federal Fund Rate -> Jobs Growth
job_g
0.015
0.010
0.005
0.000
-0.005
0
5
10
15
20
25
30
35
95 % Bootstrap CI, 1000 runs

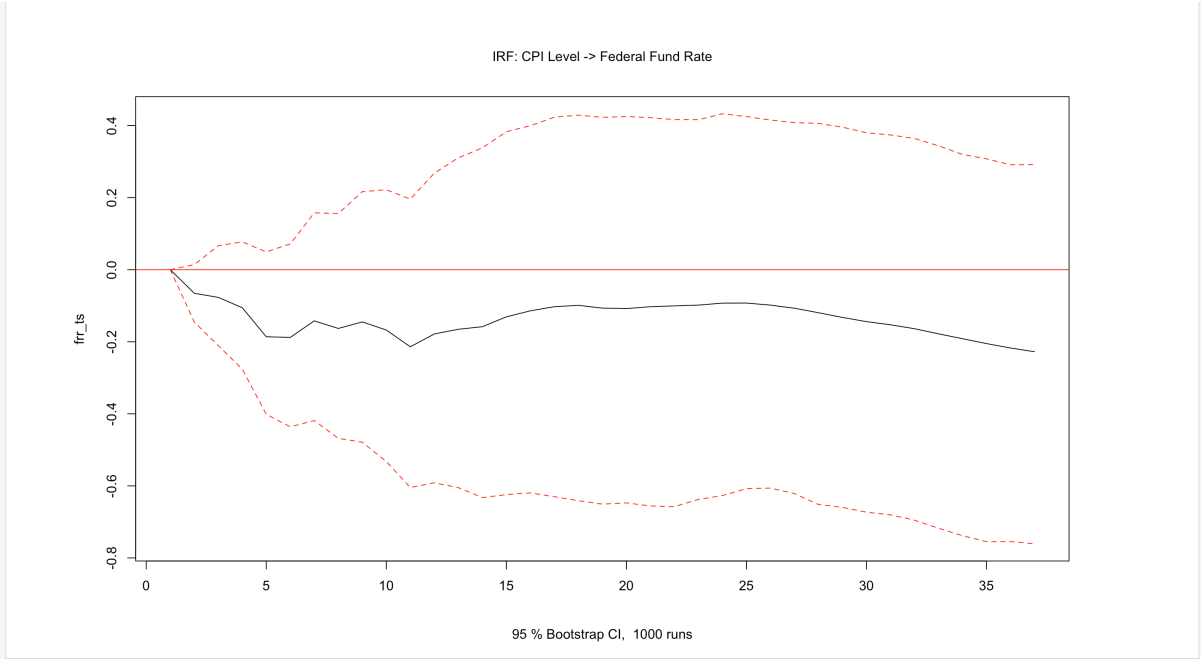
Plot 4


IRF: Federal Fund Rate -> Stock Growth
stock_g
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
0
5
10
15
20
25
30
35
95 % Bootstrap CI, 1000 runs

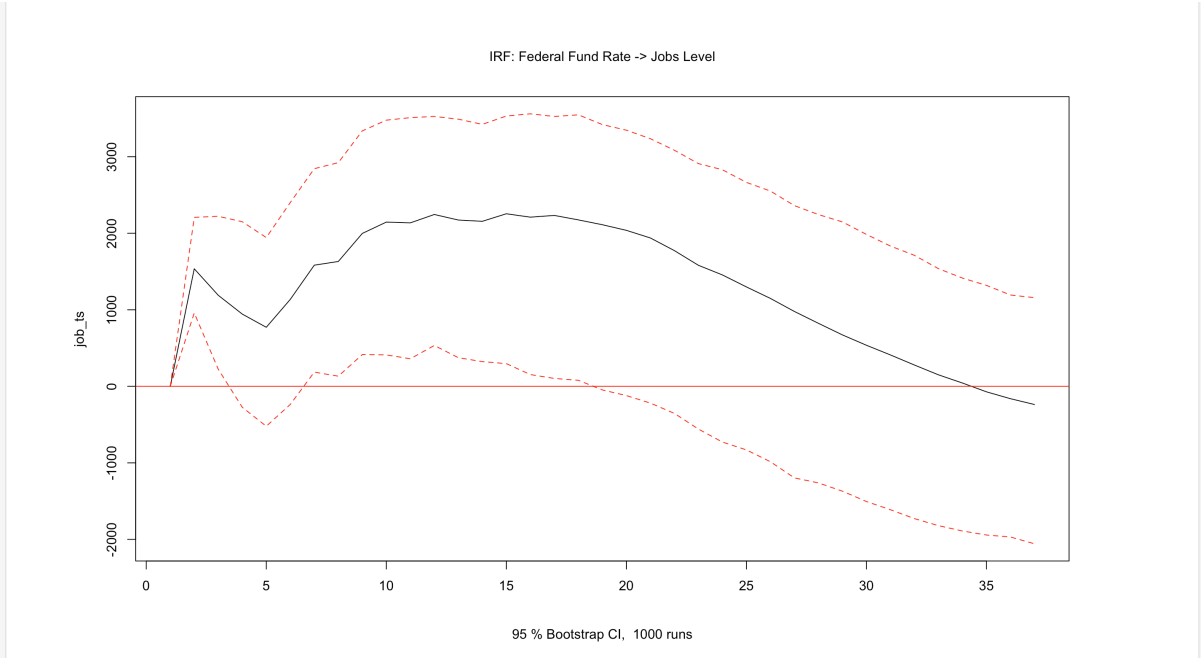
Plot 5


IRF: Oil Level -> CPI Level
cpi_ts
0.00
-0.05
-0.10
0
5
10
15
20
25
30
35
95 % Bootstrap CI, 1000 runs

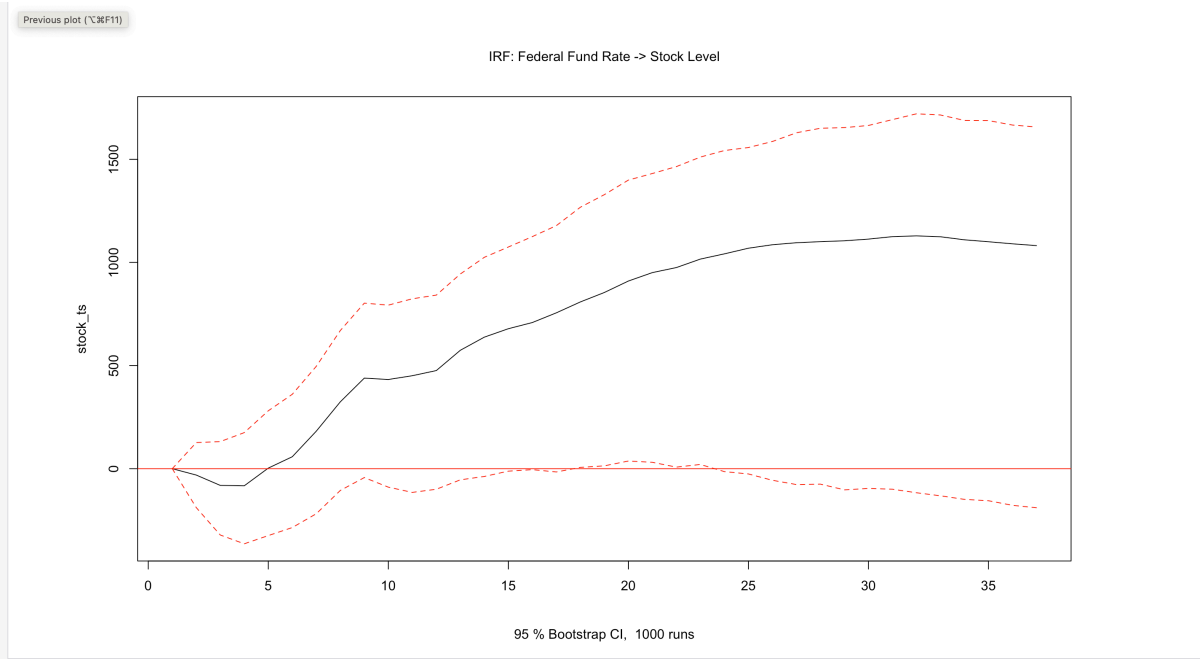
Plot 6


IRF: CPI Level -> Federal Fund Rate
frr_ts
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
0
5
10
15
20
25
30
35
95 % Bootstrap CI, 1000 runs

Plot 7


IRF: Federal Fund Rate -> Jobs Level
job_ts
3000
2000
1000
0
-1000
-2000
0
5
10
15
20
25
30
35
95 % Bootstrap CI, 1000 runs

Plot 8



Plot 1: Oil Growth → CPI Growth

- Following an oil price increase, CPI growth initially spikes due to the direct inflationary pressure from higher energy prices. Over time, this effect diminishes and returns to its equilibrium. The confidence intervals suggest that the initial shock is statistically significant but fades.

Plot 2: CPI Growth → Federal Fund Rate

- The Federal Fund Rate initially rises in response to inflation, likely due to central bank interventions aimed at curbing inflationary pressure. After a few periods, the response stabilizes. Uncertainty (as seen by the widening confidence intervals) grows over time, indicating less precise predictions in the long run.

Plot 3: Federal Fund Rate → Job Growth

- A rise in the Federal Fund Rate, often signaling tighter monetary policy, initially causes a spike in job growth, followed by a negative effect where job growth declines. This is likely due to the delayed negative impact of higher interest rates on business investments and hiring. Over time, the effect on jobs stabilizes close to zero, indicating a return to the natural job growth trend.

Plot 4: Federal Fund Rate → Stock Growth

- The stock market tends to react negatively to higher interest rates, reflected in the initial dip in stock growth. Over time, stock growth fluctuates around zero, suggesting a volatile but overall neutral long-term effect. This highlights the immediate adverse reaction of stocks to tighter monetary policy and the mixed effects in subsequent periods.

Plot 5: Oil Level → CPI Level

- A rise in oil prices initially causes an upward trend in the CPI level due to the inflationary impact of higher energy costs. However, after a certain point, the CPI level begins to decrease as the economy adjusts. The long-term downward trend may suggest that initial inflationary effects can subside or even reverse as the economy stabilizes or compensates for higher oil prices.

Plot 6: CPI Level → Federal Fund Rate

- Initially, the Federal Fund Rate decreases slightly following a rise in the CPI level. Over time, the central bank seems to increase rates gradually to counter the inflationary effects of a higher CPI, followed by a long-term stabilization. The initial decrease might reflect a lag in policy adjustments, while the longer-term upward trend indicates a policy response to inflationary pressures.

Plot 7: Federal Fund Rate → Jobs Level

- Following an increase in the Federal Fund Rate, the level of jobs initially spikes before sharply declining, which could reflect delayed negative effects on employment from tighter financial conditions. Over time, job levels gradually stabilize but remain lower than before, suggesting a longer-term negative impact on employment levels due to higher interest rates.

Plot 8: Federal Fund Rate → CPI Growth

- A rise in the Federal Fund Rate initially causes fluctuations in CPI growth, with the rate eventually declining, suggesting that higher interest rates help to moderate inflation over time. This aligns with central bank policies aimed at reducing inflation by tightening monetary conditions.

Summary:

- **Oil shocks** tend to have a short-term impact on inflation, and oil price increases generally lead to inflationary pressures.
- The **federal funds rate** is used as a tool to respond to inflationary changes, but its impact on job and stock market growth is negative in the short term.
- **Long-term effects** such as the response of jobs and inflation to interest rates are significant but display uncertainty over time.

- > # Output the MSLE results
- > cat("MSLE for VAR Level model: ", msle_var_level, "\n")
- MSLE for VAR Level model: 0.001206959
- > cat("MSLE for VAR Growth model: ", msle_var_growth, "\n")
- MSLE for VAR Growth model: 0.0004811428
- > cat("MSLE for ARIMA model: ", msle_arima, "\n")
- MSLE for ARIMA model: 0.000382364

Arima is just a little better than the var growth model . For short-term predictio ns, ARIMA may be competitive or even better

```
> lag_length <- 12
>
> # Run the VAR model on the level data (data00) with both constant and tren d
> var_level <- VAR(data00, p = lag_length, type = "both")
>
> # Run the VAR model on the growth rate data (data11) with constant only
> var_growth <- VAR(data11, p = lag_length, type = "const")
>
> # Display summaries of both models
> summary(var_level)

VAR Estimation Results:
========================
Endogenous variables: oil_ts, stock_ts, job_ts, cpi_ts, frr_ts
Deterministic variables: both
Sample size: 448
Log Likelihood: -7480.197
Roots of the characteristic polynomial:
1.018  0.99 0.9586 0.9586 0.9577 0.9577 0.9498 0.9498 0.909 0.909 0.9044
0.9044 0.9032 0.9032 0.8987 0.8922 0.8922 0.8869 0.8869 0.874 0.874 0.87
06 0.8706 0.8689 0.8689 0.8579 0.8579 0.8556 0.8556 0.8531 0.8531 0.8475
0.8475 0.8389 0.8389 0.8384 0.8384 0.833 0.833 0.8254 0.8254 0.8074 0.80
74 0.8062 0.8062 0.8057 0.8057 0.7873 0.7873 0.7591 0.7591 0.7086 0.7086
0.6982 0.6982 0.6287 0.6287 0.5976 0.5976 0.4177
Call:
VAR(y = data00, p = lag_length, type = "both")


Estimation results for equation oil_ts:
=======================================
oil_ts = oil_ts.l1 + stock_ts.l1 + job_ts.l1 + cpi_ts.l1 + frr_ts.l1 + oil_ts.l2 + stoc
k_ts.l2 + job_ts.l2 + cpi_ts.l2 + frr_ts.l2 + oil_ts.l3 + stock_ts.l3 + job_ts.l3 + cp
i_ts.l3 + frr_ts.l3 + oil_ts.l4 + stock_ts.l4 + job_ts.l4 + cpi_ts.l4 + frr_ts.l4 + oil_t
s.l5 + stock_ts.l5 + job_ts.l5 + cpi_ts.l5 + frr_ts.l5 + oil_ts.l6 + stock_ts.l6 + job
_ts.l6 + cpi_ts.l6 + frr_ts.l6 + oil_ts.l7 + stock_ts.l7 + job_ts.l7 + cpi_ts.l7 + frr_
ts.l7 + oil_ts.l8 + stock_ts.l8 + job_ts.l8 + cpi_ts.l8 + frr_ts.l8 + oil_ts.l9 + stock
_ts.l9 + job_ts.l9 + cpi_ts.l9 + frr_ts.l9 + oil_ts.l10 + stock_ts.l10 + job_ts.l10 +
cpi_ts.l10 + frr_ts.l10 + oil_ts.l11 + stock_ts.l11 + job_ts.l11 + cpi_ts.l11 + frr_t
s.l11 + oil_ts.l12 + stock_ts.l12 + job_ts.l12 + cpi_ts.l12 + frr_ts.l12 + const + t
rend

              Estimate Std. Error t value Pr(>|t|)
oil_ts.l1     1.302e+00  5.268e-02  24.713  < 2e-16 ***
```

```
stock_ts.l1  -2.120e-03  1.014e-03  -2.091  0.03718 *
job_ts.l1    -1.151e-03  2.732e-04  -4.211 3.17e-05 ***
cpi_ts.l1     2.009e+00  1.203e+00   1.669  0.09584 .
frr_ts.l1     5.515e-01  1.552e+00   0.355  0.72257
oil_ts.l2    -2.687e-01  8.543e-02  -3.145  0.00179 **
stock_ts.l2   4.615e-03  1.564e-03   2.952  0.00335 **
job_ts.l2     9.030e-04  3.768e-04   2.396  0.01703 *
cpi_ts.l2    -2.270e+00  1.881e+00  -1.207  0.22816
frr_ts.l2    -2.167e+00  2.702e+00  -0.802  0.42306
oil_ts.l3    -1.164e-01  8.685e-02  -1.341  0.18084
stock_ts.l3  -3.266e-03  1.687e-03  -1.936  0.05362 .
job_ts.l3     1.484e-04  3.789e-04   0.392  0.69541
cpi_ts.l3     1.032e+00  1.963e+00   0.526  0.59934
frr_ts.l3     4.620e-02  2.621e+00   0.018  0.98595
oil_ts.l4     3.522e-02  8.701e-02   0.405  0.68590
stock_ts.l4  -2.833e-04  1.720e-03  -0.165  0.86924
job_ts.l4    -6.368e-05  3.755e-04  -0.170  0.86543
cpi_ts.l4     1.232e+00  1.970e+00   0.625  0.53223
frr_ts.l4     2.244e+00  2.533e+00   0.886  0.37612
oil_ts.l5     2.960e-02  8.698e-02   0.340  0.73383
stock_ts.l5   2.987e-04  1.734e-03   0.172  0.86330
job_ts.l5    -1.233e-04  3.769e-04  -0.327  0.74366
cpi_ts.l5    -9.769e-01  1.964e+00  -0.497  0.61913
frr_ts.l5    -5.973e-01  2.537e+00  -0.235  0.81403
oil_ts.l6    -1.619e-01  8.802e-02  -1.839  0.06670 .
stock_ts.l6   2.694e-03  1.745e-03   1.544  0.12334
job_ts.l6     2.107e-04  3.795e-04   0.555  0.57904
cpi_ts.l6    -1.103e+00  1.937e+00  -0.569  0.56958
frr_ts.l6     1.511e+00  2.525e+00   0.598  0.55000
oil_ts.l7     1.363e-01  8.815e-02   1.547  0.12280
stock_ts.l7  -9.893e-04  1.734e-03  -0.571  0.56855
job_ts.l7    -2.621e-04  3.776e-04  -0.694  0.48800
cpi_ts.l7     2.027e-01  1.951e+00   0.104  0.91731
frr_ts.l7    -1.603e+00  2.529e+00  -0.634  0.52660
oil_ts.l8     1.912e-02  8.852e-02   0.216  0.82907
stock_ts.l8  -1.865e-04  1.691e-03  -0.110  0.91225
job_ts.l8     1.008e-05  3.801e-04   0.027  0.97885
cpi_ts.l8    -8.995e-01  1.952e+00  -0.461  0.64523
frr_ts.l8     2.502e+00  2.520e+00   0.993  0.32156
oil_ts.l9    -7.957e-02  8.837e-02  -0.900  0.36846
stock_ts.l9   8.633e-04  1.720e-03   0.502  0.61605
job_ts.l9     2.513e-04  3.853e-04   0.652  0.51460
cpi_ts.l9     8.934e-01  1.930e+00   0.463  0.64373
frr_ts.l9    -2.179e+00  2.510e+00  -0.868  0.38582
oil_ts.l10    1.075e-01  8.839e-02   1.216  0.22465
stock_ts.l10 -3.649e-03  1.748e-03  -2.087  0.03751 *
job_ts.l10   -4.669e-04  3.812e-04  -1.225  0.22129
cpi_ts.l10    4.209e-01  1.866e+00   0.226  0.82165
frr_ts.l10    1.090e-01  2.518e+00   0.043  0.96549
oil_ts.l11    1.075e-02  8.663e-02   0.124  0.90132
```

```
stock_ts.l11  3.219e-03  1.737e-03   1.854  0.06453 .
job_ts.l11    3.696e-04  3.487e-04   1.060  0.28978
cpi_ts.l11   -9.028e-01  1.824e+00  -0.495  0.62092
frr_ts.l11   -2.526e-01  2.471e+00  -0.102  0.91865
oil_ts.l12   -6.262e-02  5.448e-02  -1.149  0.25110
stock_ts.l12 -1.797e-03  1.176e-03  -1.528  0.12732
job_ts.l12    1.188e-04  2.477e-04   0.480  0.63176
cpi_ts.l12    3.842e-01  1.122e+00   0.343  0.73214
frr_ts.l12   -2.481e-01  1.453e+00  -0.171  0.86454
const         2.557e+00  7.884e+00   0.324  0.74582
trend         1.269e-02  2.263e-02   0.561  0.57523
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


Residual standard error: 4.365 on 386 degrees of freedom
Multiple R-Squared: 0.9811,             Adjusted R-squared: 0.9781
F-statistic: 328.7 on 61 and 386 DF,  p-value: < 2.2e-16


Estimation results for equation stock_ts:
==========================================
stock_ts = oil_ts.l1 + stock_ts.l1 + job_ts.l1 + cpi_ts.l1 + frr_ts.l1 + oil_ts.l2 + s
tock_ts.l2 + job_ts.l2 + cpi_ts.l2 + frr_ts.l2 + oil_ts.l3 + stock_ts.l3 + job_ts.l3 +
cpi_ts.l3 + frr_ts.l3 + oil_ts.l4 + stock_ts.l4 + job_ts.l4 + cpi_ts.l4 + frr_ts.l4 + oi
l_ts.l5 + stock_ts.l5 + job_ts.l5 + cpi_ts.l5 + frr_ts.l5 + oil_ts.l6 + stock_ts.l6 + j
ob_ts.l6 + cpi_ts.l6 + frr_ts.l6 + oil_ts.l7 + stock_ts.l7 + job_ts.l7 + cpi_ts.l7 + fr
r_ts.l7 + oil_ts.l8 + stock_ts.l8 + job_ts.l8 + cpi_ts.l8 + frr_ts.l8 + oil_ts.l9 + sto
ck_ts.l9 + job_ts.l9 + cpi_ts.l9 + frr_ts.l9 + oil_ts.l10 + stock_ts.l10 + job_ts.l10
+ cpi_ts.l10 + frr_ts.l10 + oil_ts.l11 + stock_ts.l11 + job_ts.l11 + cpi_ts.l11 + frr
_ts.l11 + oil_ts.l12 + stock_ts.l12 + job_ts.l12 + cpi_ts.l12 + frr_ts.l12 + const +
trend

              Estimate Std. Error t value Pr(>|t|)
oil_ts.l1     6.539e-01  2.661e+00   0.246 0.806029
stock_ts.l1   1.091e+00  5.122e-02  21.295  < 2e-16 ***
job_ts.l1    -1.154e-02  1.380e-02  -0.836 0.403545
cpi_ts.l1    -1.610e+02  6.077e+01  -2.649 0.008398 **
frr_ts.l1    -3.096e+01  7.840e+01  -0.395 0.693158
oil_ts.l2    -6.890e-01  4.315e+00  -0.160 0.873232
stock_ts.l2  -1.982e-01  7.898e-02  -2.509 0.012514 *
job_ts.l2    -2.014e-02  1.903e-02  -1.058 0.290652
cpi_ts.l2     3.659e+02  9.500e+01   3.852 0.000137 ***
frr_ts.l2     2.452e+01  1.365e+02   0.180 0.857482
oil_ts.l3    -3.659e+00  4.387e+00  -0.834 0.404728
stock_ts.l3   2.220e-02  8.523e-02   0.260 0.794619
job_ts.l3     1.769e-03  1.914e-02   0.092 0.926398
cpi_ts.l3    -2.321e+02  9.916e+01  -2.340 0.019777 *
frr_ts.l3     5.290e+01  1.324e+02   0.400 0.689736
oil_ts.l4    -3.083e+00  4.395e+00  -0.701 0.483462
```

```
stock_ts.l4   6.633e-02  8.686e-02   0.764 0.445565
job_ts.l4    -3.609e-02  1.897e-02  -1.903 0.057820 .
cpi_ts.l4    -1.654e+01  9.951e+01  -0.166 0.868115
frr_ts.l4     4.270e+01  1.279e+02   0.334 0.738706
oil_ts.l5     1.360e+01  4.393e+00   3.096 0.002103 **
stock_ts.l5   7.611e-02  8.758e-02   0.869 0.385374
job_ts.l5     6.335e-02  1.904e-02   3.328 0.000959 ***
cpi_ts.l5     1.096e+02  9.919e+01   1.105 0.269953
frr_ts.l5    -6.056e+00  1.282e+02  -0.047 0.962335
oil_ts.l6    -9.814e+00  4.446e+00  -2.207 0.027870 *
stock_ts.l6  -1.038e-01  8.813e-02  -1.178 0.239578
job_ts.l6    -2.777e-02  1.917e-02  -1.448 0.148331
cpi_ts.l6    -8.096e+01  9.784e+01  -0.827 0.408484
frr_ts.l6    -6.393e+01  1.276e+02  -0.501 0.616520
oil_ts.l7    -4.603e+00  4.452e+00  -1.034 0.301872
stock_ts.l7   1.025e-01  8.756e-02   1.170 0.242551
job_ts.l7     2.299e-02  1.907e-02   1.205 0.228858
cpi_ts.l7    -7.182e+01  9.857e+01  -0.729 0.466637
frr_ts.l7     1.102e+02  1.277e+02   0.863 0.388649
oil_ts.l8     9.914e-01  4.471e+00   0.222 0.824633
stock_ts.l8  -1.135e-01  8.543e-02  -1.328 0.184837
job_ts.l8    -3.222e-02  1.920e-02  -1.678 0.094183 .
cpi_ts.l8     8.387e+01  9.860e+01   0.851 0.395511
frr_ts.l8    -7.355e+01  1.273e+02  -0.578 0.563778
oil_ts.l9     9.646e+00  4.464e+00   2.161 0.031321 *
stock_ts.l9   4.917e-03  8.689e-02   0.057 0.954905
job_ts.l9     3.592e-03  1.946e-02   0.185 0.853659
cpi_ts.l9    -3.312e+01  9.749e+01  -0.340 0.734295
frr_ts.l9    -4.861e+01  1.268e+02  -0.383 0.701602
oil_ts.l10   -3.179e+00  4.464e+00  -0.712 0.476784
stock_ts.l10  1.196e-01  8.831e-02   1.354 0.176588
job_ts.l10    8.680e-03  1.925e-02   0.451 0.652336
cpi_ts.l10   -2.524e+01  9.424e+01  -0.268 0.788964
frr_ts.l10   -9.458e-01  1.272e+02  -0.007 0.994070
oil_ts.l11   -2.571e+00  4.376e+00  -0.588 0.557142
stock_ts.l11 -1.159e-01  8.772e-02  -1.321 0.187192
job_ts.l11    5.039e-02  1.761e-02   2.861 0.004447 **
cpi_ts.l11   -6.710e+01  9.213e+01  -0.728 0.466887
frr_ts.l11    4.756e+00  1.248e+02   0.038 0.969628
oil_ts.l12   -1.905e-01  2.752e+00  -0.069 0.944842
stock_ts.l12  2.446e-02  5.939e-02   0.412 0.680713
job_ts.l12   -4.498e-02  1.251e-02  -3.595 0.000366 ***
cpi_ts.l12    1.457e+02  5.665e+01   2.572 0.010472 *
frr_ts.l12    3.634e+01  7.341e+01   0.495 0.620844
const         1.023e+02  3.982e+02   0.257 0.797331
trend        -1.851e+00  1.143e+00  -1.619 0.106196
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Residual standard error: 220.5 on 386 degrees of freedom
Multiple R-Squared: 0.9973, Adjusted R-squared: 0.9968
F-statistic: 2317 on 61 and 386 DF, p-value: < 2.2e-16

Estimation results for equation job_ts:
==========

job_ts = oil_ts.l1 + stock_ts.l1 + job_ts.l1 + cpi_ts.l1 + frr_ts.l1 + oil_ts.l2 + sto
ck_ts.l2 + job_ts.l2 + cpi_ts.l2 + frr_ts.l2 + oil_ts.l3 + stock_ts.l3 + job_ts.l3 + c
pi_ts.l3 + frr_ts.l3 + oil_ts.l4 + stock_ts.l4 + job_ts.l4 + cpi_ts.l4 + frr_ts.l4 + oil
_ts.l5 + stock_ts.l5 + job_ts.l5 + cpi_ts.l5 + frr_ts.l5 + oil_ts.l6 + stock_ts.l6 + j
ob_ts.l6 + cpi_ts.l6 + frr_ts.l6 + oil_ts.l7 + stock_ts.l7 + job_ts.l7 + cpi_ts.l7 + fr
r_ts.l7 + oil_ts.l8 + stock_ts.l8 + job_ts.l8 + cpi_ts.l8 + frr_ts.l8 + oil_ts.l9 + sto
ck_ts.l9 + job_ts.l9 + cpi_ts.l9 + frr_ts.l9 + oil_ts.l10 + stock_ts.l10 + job_ts.l10
+ cpi_ts.l10 + frr_ts.l10 + oil_ts.l11 + stock_ts.l11 + job_ts.l11 + cpi_ts.l11 + frr
_ts.l11 + oil_ts.l12 + stock_ts.l12 + job_ts.l12 + cpi_ts.l12 + frr_ts.l12 + const +
trend

	Estimate	Std. Error	t value	Pr(>|t|)	
oil_ts.l1	3.615e+01	1.065e+01	3.392	0.000764	***
stock_ts.l1	1.425e+00	2.051e-01	6.947	1.60e-11	***
job_ts.l1	9.372e-01	5.526e-02	16.959	< 2e-16	***
cpi_ts.l1	7.067e+02	2.433e+02	2.904	0.003894	**
frr_ts.l1	1.536e+03	3.139e+02	4.892	1.47e-06	***
oil_ts.l2	-3.212e+01	1.728e+01	-1.859	0.063822	.
stock_ts.l2	-1.619e+00	3.163e-01	-5.119	4.84e-07	***
job_ts.l2	-3.739e-02	7.621e-02	-0.491	0.624010	
cpi_ts.l2	-1.157e+03	3.804e+02	-3.042	0.002513	**
frr_ts.l2	-2.470e+03	5.464e+02	-4.520	8.24e-06	***
oil_ts.l3	4.651e+00	1.756e+01	0.265	0.791292	
stock_ts.l3	-1.004e-01	3.413e-01	-0.294	0.768827	
job_ts.l3	9.904e-02	7.662e-02	1.293	0.196921	
cpi_ts.l3	-1.500e+01	3.971e+02	-0.038	0.969887	
frr_ts.l3	1.090e+03	5.302e+02	2.056	0.040468	*
oil_ts.l4	-4.641e+00	1.760e+01	-0.264	0.792111	
stock_ts.l4	4.514e-01	3.478e-01	1.298	0.195100	
job_ts.l4	-3.552e-02	7.595e-02	-0.468	0.640273	
cpi_ts.l4	9.042e+02	3.985e+02	2.269	0.023814	*
frr_ts.l4	-3.777e+02	5.123e+02	-0.737	0.461380	
oil_ts.l5	4.110e+00	1.759e+01	0.234	0.815373	
stock_ts.l5	-3.466e-01	3.507e-01	-0.988	0.323643	
job_ts.l5	5.197e-04	7.623e-02	0.007	0.994564	
cpi_ts.l5	-3.828e+02	3.972e+02	-0.964	0.335783	
frr_ts.l5	5.563e+02	5.132e+02	1.084	0.279057	
oil_ts.l6	-6.857e+00	1.780e+01	-0.385	0.700312	
stock_ts.l6	3.255e-01	3.529e-01	0.922	0.356916	
job_ts.l6	-4.828e-03	7.676e-02	-0.063	0.949886	
cpi_ts.l6	-7.353e+02	3.918e+02	-1.877	0.061305	.
frr_ts.l6	-1.981e+02	5.107e+02	-0.388	0.698323	
oil_ts.l7	8.703e+00	1.783e+01	0.488	0.625735	

```
stock_ts.l7  -2.839e-01  3.506e-01  -0.810 0.418655
job_ts.l7    -4.729e-02  7.638e-02  -0.619 0.536154
cpi_ts.l7     7.930e+02  3.947e+02   2.009 0.045205 *
frr_ts.l7    -2.036e+02  5.114e+02  -0.398 0.690788
oil_ts.l8     4.867e+00  1.790e+01   0.272 0.785870
stock_ts.l8   7.898e-01  3.421e-01   2.309 0.021484 *
job_ts.l8     1.932e-01  7.688e-02   2.513 0.012369 *
cpi_ts.l8    -1.148e+01  3.948e+02  -0.029 0.976809
frr_ts.l8     4.912e+02  5.097e+02   0.964 0.335797
oil_ts.l9    -1.797e+01  1.787e+01  -1.005 0.315298
stock_ts.l9  -1.130e+00  3.479e-01  -3.247 0.001267 **
job_ts.l9    -7.867e-02  7.793e-02  -1.010 0.313346
cpi_ts.l9    -1.579e+02  3.904e+02  -0.404 0.686150
frr_ts.l9    -9.581e+02  5.076e+02  -1.888 0.059842 .
oil_ts.l10    2.021e+01  1.788e+01   1.131 0.258919
stock_ts.l10  5.243e-01  3.536e-01   1.483 0.138981
job_ts.l10   -4.195e-02  7.709e-02  -0.544 0.586642
cpi_ts.l10   -1.381e+02  3.773e+02  -0.366 0.714503
frr_ts.l10    5.856e+02  5.092e+02   1.150 0.250854
oil_ts.l11   -1.905e+01  1.752e+01  -1.087 0.277576
stock_ts.l11  2.730e-01  3.512e-01   0.777 0.437511
job_ts.l11    1.841e-02  7.052e-02   0.261 0.794229
cpi_ts.l11    5.719e+02  3.689e+02   1.550 0.121902
frr_ts.l11    9.029e+01  4.998e+02   0.181 0.856739
oil_ts.l12    4.660e+00  1.102e+01   0.423 0.672612
stock_ts.l12 -2.480e-01  2.378e-01  -1.043 0.297709
job_ts.l12   -5.959e-03  5.010e-02  -0.119 0.905379
cpi_ts.l12   -3.837e+02  2.268e+02  -1.692 0.091507 .
frr_ts.l12   -1.887e+02  2.939e+02  -0.642 0.521299
const         1.634e+03  1.595e+03   1.025 0.306071
trend        -6.568e-01  4.578e+00  -0.143 0.885992
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 882.9 on 386 degrees of freedom
Multiple R-Squared: 0.9968,             Adjusted R-squared: 0.9963
F-statistic:  1957 on 61 and 386 DF,  p-value: < 2.2e-16


Estimation results for equation cpi_ts:
=======================================
cpi_ts = oil_ts.l1 + stock_ts.l1 + job_ts.l1 + cpi_ts.l1 + frr_ts.l1 + oil_ts.l2 + sto
ck_ts.l2 + job_ts.l2 + cpi_ts.l2 + frr_ts.l2 + oil_ts.l3 + stock_ts.l3 + job_ts.l3 + c
pi_ts.l3 + frr_ts.l3 + oil_ts.l4 + stock_ts.l4 + job_ts.l4 + cpi_ts.l4 + frr_ts.l4 + oil
_ts.l5 + stock_ts.l5 + job_ts.l5 + cpi_ts.l5 + frr_ts.l5 + oil_ts.l6 + stock_ts.l6 + j
ob_ts.l6 + cpi_ts.l6 + frr_ts.l6 + oil_ts.l7 + stock_ts.l7 + job_ts.l7 + cpi_ts.l7 + fr
r_ts.l7 + oil_ts.l8 + stock_ts.l8 + job_ts.l8 + cpi_ts.l8 + frr_ts.l8 + oil_ts.l9 + sto
ck_ts.l9 + job_ts.l9 + cpi_ts.l9 + frr_ts.l9 + oil_ts.l10 + stock_ts.l10 + job_ts.l10
+ cpi_ts.l10 + frr_ts.l10 + oil_ts.l11 + stock_ts.l11 + job_ts.l11 + cpi_ts.l11 + frr
```

_ts.l11 + oil_ts.l12 + stock_ts.l12 + job_ts.l12 + cpi_ts.l12 + frr_ts.l12 + const + trend

	Estimate	Std. Error	t value	Pr(>|t|)	
oil_ts.l1	7.639e-03	2.425e-03	3.151	0.00176	**
stock_ts.l1	6.534e-05	4.667e-05	1.400	0.16229	
job_ts.l1	1.593e-05	1.258e-05	1.267	0.20607	
cpi_ts.l1	1.239e+00	5.537e-02	22.371	< 2e-16	***
frr_ts.l1	6.294e-02	7.144e-02	0.881	0.37886	
oil_ts.l2	-7.769e-03	3.932e-03	-1.976	0.04889	*
stock_ts.l2	3.548e-05	7.197e-05	0.493	0.62226	
job_ts.l2	5.801e-06	1.734e-05	0.334	0.73820	
cpi_ts.l2	-2.519e-01	8.657e-02	-2.910	0.00382	**
frr_ts.l2	-1.037e-01	1.243e-01	-0.834	0.40493	
oil_ts.l3	-2.616e-04	3.997e-03	-0.065	0.94785	
stock_ts.l3	-1.682e-04	7.766e-05	-2.165	0.03097	*
job_ts.l3	-2.926e-05	1.744e-05	-1.678	0.09408	.
cpi_ts.l3	-1.446e-01	9.036e-02	-1.600	0.11032	
frr_ts.l3	-7.419e-03	1.206e-01	-0.061	0.95099	
oil_ts.l4	4.059e-03	4.004e-03	1.014	0.31136	
stock_ts.l4	-2.741e-06	7.915e-05	-0.035	0.97239	
job_ts.l4	7.944e-06	1.728e-05	0.460	0.64604	
cpi_ts.l4	9.484e-02	9.067e-02	1.046	0.29625	
frr_ts.l4	9.979e-02	1.166e-01	0.856	0.39250	
oil_ts.l5	-1.640e-03	4.003e-03	-0.410	0.68218	
stock_ts.l5	1.122e-04	7.980e-05	1.406	0.16063	
job_ts.l5	3.730e-06	1.735e-05	0.215	0.82986	
cpi_ts.l5	1.329e-01	9.038e-02	1.471	0.14210	
frr_ts.l5	-2.797e-02	1.168e-01	-0.240	0.81081	
oil_ts.l6	-2.420e-03	4.051e-03	-0.597	0.55066	
stock_ts.l6	6.455e-05	8.030e-05	0.804	0.42197	
job_ts.l6	6.866e-06	1.747e-05	0.393	0.69448	
cpi_ts.l6	5.488e-02	8.915e-02	0.616	0.53853	
frr_ts.l6	-8.081e-02	1.162e-01	-0.695	0.48730	
oil_ts.l7	-2.173e-04	4.057e-03	-0.054	0.95731	
stock_ts.l7	-1.568e-04	7.978e-05	-1.966	0.05003	.
job_ts.l7	-4.074e-05	1.738e-05	-2.344	0.01958	*
cpi_ts.l7	-3.812e-02	8.981e-02	-0.424	0.67147	
frr_ts.l7	2.244e-02	1.164e-01	0.193	0.84719	
oil_ts.l8	1.527e-03	4.074e-03	0.375	0.70795	
stock_ts.l8	1.456e-04	7.784e-05	1.870	0.06225	.
job_ts.l8	3.210e-05	1.750e-05	1.835	0.06729	.
cpi_ts.l8	3.484e-02	8.985e-02	0.388	0.69841	
frr_ts.l8	1.368e-01	1.160e-01	1.180	0.23890	
oil_ts.l9	-6.896e-04	4.067e-03	-0.170	0.86545	
stock_ts.l9	2.117e-05	7.917e-05	0.267	0.78934	
job_ts.l9	2.385e-05	1.773e-05	1.345	0.17948	
cpi_ts.l9	-1.108e-01	8.884e-02	-1.247	0.21321	
frr_ts.l9	-2.015e-01	1.155e-01	-1.744	0.08188	.
oil_ts.l10	1.154e-03	4.068e-03	0.284	0.77672	

```
stock_ts.l10  6.200e-05  8.046e-05   0.771  0.44145
job_ts.l10    1.462e-05  1.754e-05   0.834  0.40496
cpi_ts.l10    1.617e-02  8.587e-02   0.188  0.85070
frr_ts.l10    8.964e-02  1.159e-01   0.774  0.43963
oil_ts.l11   -5.379e-04  3.987e-03  -0.135  0.89275
stock_ts.l11 -1.921e-04  7.993e-05  -2.403  0.01672 *
job_ts.l11   -7.840e-06  1.605e-05  -0.489  0.62542
cpi_ts.l11    8.268e-03  8.395e-02   0.098  0.92159
frr_ts.l11   -7.140e-02  1.137e-01  -0.628  0.53055
oil_ts.l12    6.042e-05  2.507e-03   0.024  0.98079
stock_ts.l12  7.460e-05  5.411e-05   1.379  0.16882
job_ts.l12   -3.748e-05  1.140e-05  -3.288  0.00110 **
cpi_ts.l12   -4.207e-02  5.162e-02  -0.815  0.41559
frr_ts.l12    7.858e-02  6.689e-02   1.175  0.24082
const         1.473e+00  3.628e-01   4.060 5.95e-05 ***
trend         1.845e-03  1.042e-03   1.771  0.07732 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 0.2009 on 386 degrees of freedom
Multiple R-Squared:     1,    Adjusted R-squared:     1
F-statistic: 4.537e+05 on 61 and 386 DF,  p-value: < 2.2e-16


Estimation results for equation frr_ts:
=======================================
frr_ts = oil_ts.l1 + stock_ts.l1 + job_ts.l1 + cpi_ts.l1 + frr_ts.l1 + oil_ts.l2 + stoc
k_ts.l2 + job_ts.l2 + cpi_ts.l2 + frr_ts.l2 + oil_ts.l3 + stock_ts.l3 + job_ts.l3 + cp
i_ts.l3 + frr_ts.l3 + oil_ts.l4 + stock_ts.l4 + job_ts.l4 + cpi_ts.l4 + frr_ts.l4 + oil_t
s.l5 + stock_ts.l5 + job_ts.l5 + cpi_ts.l5 + frr_ts.l5 + oil_ts.l6 + stock_ts.l6 + job
_ts.l6 + cpi_ts.l6 + frr_ts.l6 + oil_ts.l7 + stock_ts.l7 + job_ts.l7 + cpi_ts.l7 + frr_
ts.l7 + oil_ts.l8 + stock_ts.l8 + job_ts.l8 + cpi_ts.l8 + frr_ts.l8 + oil_ts.l9 + stock
_ts.l9 + job_ts.l9 + cpi_ts.l9 + frr_ts.l9 + oil_ts.l10 + stock_ts.l10 + job_ts.l10 +
cpi_ts.l10 + frr_ts.l10 + oil_ts.l11 + stock_ts.l11 + job_ts.l11 + cpi_ts.l11 + frr_t
s.l11 + oil_ts.l12 + stock_ts.l12 + job_ts.l12 + cpi_ts.l12 + frr_ts.l12 + const + t
rend

               Estimate Std. Error t value Pr(>|t|)
oil_ts.l1     1.252e-03  1.774e-03   0.705   0.4809
stock_ts.l1   2.894e-05  3.415e-05   0.847   0.3973
job_ts.l1    -1.237e-05  9.203e-06  -1.344   0.1797
cpi_ts.l1    -6.543e-02  4.052e-02  -1.615   0.1072
frr_ts.l1     1.432e+00  5.228e-02  27.395  < 2e-16 ***
oil_ts.l2     2.487e-03  2.878e-03   0.864   0.3880
stock_ts.l2  -3.063e-05  5.267e-05  -0.582   0.5612
job_ts.l2    -3.618e-07  1.269e-05  -0.029   0.9773
cpi_ts.l2     1.087e-01  6.335e-02   1.716   0.0870 .
frr_ts.l2    -3.961e-01  9.100e-02  -4.352 1.73e-05 ***
oil_ts.l3    -4.926e-03  2.925e-03  -1.684   0.0930 .
```

```
stock_ts.l3   6.712e-05  5.683e-05   1.181   0.2383
job_ts.l3     2.482e-05  1.276e-05   1.945   0.0525 .
cpi_ts.l3    -8.200e-02  6.612e-02  -1.240   0.2157
frr_ts.l3     6.790e-02  8.829e-02   0.769   0.4423
oil_ts.l4    -1.608e-03  2.931e-03  -0.549   0.5834
stock_ts.l4  -1.129e-04  5.792e-05  -1.949   0.0520 .
job_ts.l4    -4.282e-06  1.265e-05  -0.339   0.7351
cpi_ts.l4    -3.390e-02  6.636e-02  -0.511   0.6097
frr_ts.l4    -1.033e-01  8.531e-02  -1.211   0.2266
oil_ts.l5     2.984e-03  2.929e-03   1.018   0.3091
stock_ts.l5   1.718e-06  5.840e-05   0.029   0.9765
job_ts.l5    -7.148e-06  1.269e-05  -0.563   0.5737
cpi_ts.l5     1.105e-01  6.614e-02   1.670   0.0957 .
frr_ts.l5     9.665e-02  8.547e-02   1.131   0.2588
oil_ts.l6    -1.368e-03  2.965e-03  -0.461   0.6447
stock_ts.l6   7.855e-05  5.877e-05   1.337   0.1821
job_ts.l6    -8.054e-08  1.278e-05  -0.006   0.9950
cpi_ts.l6     1.741e-02  6.524e-02   0.267   0.7897
frr_ts.l6    -1.118e-01  8.505e-02  -1.315   0.1894
oil_ts.l7     1.188e-03  2.969e-03   0.400   0.6894
stock_ts.l7  -1.600e-05  5.839e-05  -0.274   0.7841
job_ts.l7     1.900e-06  1.272e-05   0.149   0.8813
cpi_ts.l7    -9.872e-02  6.573e-02  -1.502   0.1339
frr_ts.l7    -5.653e-02  8.517e-02  -0.664   0.5072
oil_ts.l8    -6.460e-04  2.981e-03  -0.217   0.8286
stock_ts.l8  -4.297e-05  5.697e-05  -0.754   0.4511
job_ts.l8    -2.093e-05  1.280e-05  -1.635   0.1030
cpi_ts.l8     8.124e-02  6.575e-02   1.236   0.2174
frr_ts.l8     1.086e-01  8.489e-02   1.279   0.2017
oil_ts.l9     4.376e-03  2.977e-03   1.470   0.1423
stock_ts.l9   1.039e-04  5.794e-05   1.794   0.0736 .
job_ts.l9     1.944e-05  1.298e-05   1.498   0.1349
cpi_ts.l9    -2.033e-02  6.501e-02  -0.313   0.7546
frr_ts.l9     7.090e-02  8.454e-02   0.839   0.4022
oil_ts.l10   -2.889e-03  2.977e-03  -0.970   0.3325
stock_ts.l10 -3.019e-05  5.888e-05  -0.513   0.6085
job_ts.l10    1.131e-05  1.284e-05   0.881   0.3787
cpi_ts.l10   -2.592e-02  6.284e-02  -0.412   0.6803
frr_ts.l10   -2.032e-01  8.480e-02  -2.396   0.0171 *
oil_ts.l11   -2.969e-03  2.918e-03  -1.018   0.3095
stock_ts.l11 -4.977e-05  5.849e-05  -0.851   0.3953
job_ts.l11   -3.599e-06  1.174e-05  -0.306   0.7594
cpi_ts.l11    4.335e-02  6.143e-02   0.706   0.4809
frr_ts.l11    3.822e-02  8.323e-02   0.459   0.6464
oil_ts.l12    2.312e-03  1.835e-03   1.260   0.2084
stock_ts.l12  2.171e-05  3.960e-05   0.548   0.5839
job_ts.l12   -7.526e-06  8.343e-06  -0.902   0.3676
cpi_ts.l12   -3.584e-02  3.777e-02  -0.949   0.3433
frr_ts.l12    2.934e-02  4.895e-02   0.599   0.5493
const         1.973e-01  2.655e-01   0.743   0.4580
```

```
trend        -6.370e-04  7.623e-04  -0.836   0.4039
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 0.147 on 386 degrees of freedom
Multiple R-Squared: 0.9974,             Adjusted R-squared: 0.997
F-statistic:  2403 on 61 and 386 DF,  p-value: < 2.2e-16



Covariance matrix of residuals:
          oil_ts  stock_ts    job_ts    cpi_ts    frr_ts
oil_ts    19.0559   108.204    518.43  0.183590  0.131333
stock_ts 108.2039 48616.699  -8267.33  3.869161  4.965761
job_ts   518.4349 -8267.335 779486.06 69.249577 16.580613
cpi_ts     0.1836     3.869     69.25  0.040364  0.002645
frr_ts     0.1313     4.966     16.58  0.002645  0.021618

Correlation matrix of residuals:
         oil_ts stock_ts   job_ts  cpi_ts  frr_ts
oil_ts    1.0000  0.11242  0.13452 0.20933 0.20462
stock_ts 0.1124  1.00000 -0.04247 0.08734 0.15318
job_ts    0.1345 -0.04247  1.00000 0.39040 0.12773
cpi_ts    0.2093  0.08734  0.39040 1.00000 0.08954
frr_ts    0.2046  0.15318  0.12773 0.08954 1.00000


> summary(var_growth)

VAR Estimation Results:
=========================
Endogenous variables: oil_g, stock_g, job_g, cpi_g, frr_g
Deterministic variables: const
Sample size: 448
Log Likelihood: 5710.507
Roots of the characteristic polynomial:
0.9689 0.9059 0.9059 0.9001 0.8974 0.8974 0.8933 0.8933 0.8931 0.8931 0.
8907 0.8907 0.8891 0.8891 0.8855 0.8855 0.8816 0.8816 0.8779 0.8779 0.85
8 0.858 0.8568 0.8568 0.8534 0.8534 0.8452 0.8452 0.8445 0.8445 0.8415 0.
8415 0.835 0.835 0.8336 0.8336 0.833 0.833 0.8299 0.8299 0.8136 0.8136 0.
8088 0.8088 0.8087 0.8087 0.7993 0.7993 0.7901 0.7901 0.7304 0.7304 0.72
04 0.7204 0.7067 0.7067 0.6808 0.6808 0.5393 0.1515
Call:
VAR(y = data11, p = lag_length, type = "const")


Estimation results for equation oil_g:
======================================
```

oil_g = oil_g.l1 + stock_g.l1 + job_g.l1 + cpi_g.l1 + frr_g.l1 + oil_g.l2 + stock_g
.l2 + job_g.l2 + cpi_g.l2 + frr_g.l2 + oil_g.l3 + stock_g.l3 + job_g.l3 + cpi_g.l3 +
frr_g.l3 + oil_g.l4 + stock_g.l4 + job_g.l4 + cpi_g.l4 + frr_g.l4 + oil_g.l5 + stock
_g.l5 + job_g.l5 + cpi_g.l5 + frr_g.l5 + oil_g.l6 + stock_g.l6 + job_g.l6 + cpi_g.l
6 + frr_g.l6 + oil_g.l7 + stock_g.l7 + job_g.l7 + cpi_g.l7 + frr_g.l7 + oil_g.l8 + st
ock_g.l8 + job_g.l8 + cpi_g.l8 + frr_g.l8 + oil_g.l9 + stock_g.l9 + job_g.l9 + cpi
_g.l9 + frr_g.l9 + oil_g.l10 + stock_g.l10 + job_g.l10 + cpi_g.l10 + frr_g.l10 + oi
l_g.l11 + stock_g.l11 + job_g.l11 + cpi_g.l11 + frr_g.l11 + oil_g.l12 + stock_g.l1
2 + job_g.l12 + cpi_g.l12 + frr_g.l12 + const

	Estimate	Std. Error	t value	Pr(>|t|)	
oil_g.l1	0.340191	0.055428	6.138	2.08e-09	***
stock_g.l1	-0.024968	0.089031	-0.280	0.7793	
job_g.l1	-5.378314	0.711878	-7.555	3.05e-13	***
cpi_g.l1	7.871696	4.735613	1.662	0.0973	.
frr_g.l1	0.051044	0.030971	1.648	0.1001	
oil_g.l2	-0.026529	0.058223	-0.456	0.6489	
stock_g.l2	0.264838	0.094869	2.792	0.0055	**
job_g.l2	-0.849283	0.771822	-1.100	0.2719	
cpi_g.l2	1.677012	4.836791	0.347	0.7290	
frr_g.l2	-0.002154	0.033779	-0.064	0.9492	
oil_g.l3	-0.027629	0.058019	-0.476	0.6342	
stock_g.l3	-0.058179	0.095714	-0.608	0.5437	
job_g.l3	-0.825865	0.778768	-1.060	0.2896	
cpi_g.l3	2.569690	4.808399	0.534	0.5934	
frr_g.l3	-0.038135	0.031784	-1.200	0.2309	
oil_g.l4	-0.094651	0.057950	-1.633	0.1032	
stock_g.l4	0.117270	0.096416	1.216	0.2246	
job_g.l4	-0.032900	0.776019	-0.042	0.9662	
cpi_g.l4	2.039584	4.773807	0.427	0.6694	
frr_g.l4	0.037098	0.032009	1.159	0.2472	
oil_g.l5	0.001801	0.057990	0.031	0.9752	
stock_g.l5	-0.102512	0.095865	-1.069	0.2856	
job_g.l5	-0.085630	0.776422	-0.110	0.9122	
cpi_g.l5	1.897695	4.731360	0.401	0.6886	
frr_g.l5	-0.022358	0.032003	-0.699	0.4852	
oil_g.l6	-0.078622	0.058058	-1.354	0.1765	
stock_g.l6	0.074278	0.094906	0.783	0.4343	
job_g.l6	0.112169	0.774708	0.145	0.8850	
cpi_g.l6	-1.599344	4.699495	-0.340	0.7338	
frr_g.l6	0.019249	0.032029	0.601	0.5482	
oil_g.l7	-0.004140	0.057360	-0.072	0.9425	
stock_g.l7	0.083818	0.094656	0.885	0.3764	
job_g.l7	-0.616407	0.761348	-0.810	0.4187	
cpi_g.l7	-2.039714	4.745160	-0.430	0.6675	
frr_g.l7	-0.011716	0.032090	-0.365	0.7152	
oil_g.l8	-0.037990	0.056911	-0.668	0.5048	
stock_g.l8	0.063415	0.094832	0.669	0.5041	
job_g.l8	-0.669309	0.748344	-0.894	0.3717	
cpi_g.l8	-3.526489	4.739021	-0.744	0.4572	

```
frr_g.l8     0.047322   0.031487   1.503   0.1337
oil_g.l9    -0.020353   0.056947  -0.357   0.7210
stock_g.l9   0.110306   0.095403   1.156   0.2483
job_g.l9    -0.596607   0.750600  -0.795   0.4272
cpi_g.l9    -0.030605   4.770198  -0.006   0.9949
frr_g.l9    -0.008602   0.031646  -0.272   0.7859
oil_g.l10    0.067704   0.057025   1.187   0.2359
stock_g.l10 -0.056193   0.095870  -0.586   0.5581
job_g.l10   -1.208069   0.757873  -1.594   0.1117
cpi_g.l10   -1.576770   4.655673  -0.339   0.7350
frr_g.l10    0.014537   0.031419   0.463   0.6439
oil_g.l11    0.048058   0.055986   0.858   0.3912
stock_g.l11  0.111759   0.095620   1.169   0.2432
job_g.l11    0.037758   0.753019   0.050   0.9600
cpi_g.l11   -2.397285   4.648122  -0.516   0.6063
frr_g.l11   -0.017256   0.031503  -0.548   0.5842
oil_g.l12   -0.040547   0.053274  -0.761   0.4471
stock_g.l12 -0.104881   0.090777  -1.155   0.2487
job_g.l12    0.300692   0.708735   0.424   0.6716
cpi_g.l12   -1.870721   4.479692  -0.418   0.6765
frr_g.l12    0.007990   0.028866   0.277   0.7821
const        0.002434   0.011343   0.215   0.8302
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 0.08674 on 387 degrees of freedom
Multiple R-Squared: 0.2711,             Adjusted R-squared: 0.158
F-statistic: 2.398 on 60 and 387 DF,  p-value: 3.182e-07


Estimation results for equation stock_g:
========================================
stock_g = oil_g.l1 + stock_g.l1 + job_g.l1 + cpi_g.l1 + frr_g.l1 + oil_g.l2 + stoc
k_g.l2 + job_g.l2 + cpi_g.l2 + frr_g.l2 + oil_g.l3 + stock_g.l3 + job_g.l3 + cpi_g.
l3 + frr_g.l3 + oil_g.l4 + stock_g.l4 + job_g.l4 + cpi_g.l4 + frr_g.l4 + oil_g.l5 + s
tock_g.l5 + job_g.l5 + cpi_g.l5 + frr_g.l5 + oil_g.l6 + stock_g.l6 + job_g.l6 + cpi
_g.l6 + frr_g.l6 + oil_g.l7 + stock_g.l7 + job_g.l7 + cpi_g.l7 + frr_g.l7 + oil_g.l8
+ stock_g.l8 + job_g.l8 + cpi_g.l8 + frr_g.l8 + oil_g.l9 + stock_g.l9 + job_g.l9 +
cpi_g.l9 + frr_g.l9 + oil_g.l10 + stock_g.l10 + job_g.l10 + cpi_g.l10 + frr_g.l10
+ oil_g.l11 + stock_g.l11 + job_g.l11 + cpi_g.l11 + frr_g.l11 + oil_g.l12 + stock_
g.l12 + job_g.l12 + cpi_g.l12 + frr_g.l12 + const

             Estimate Std. Error t value Pr(>|t|)
oil_g.l1    -0.022333   0.031829  -0.702  0.48332
stock_g.l1   0.322098   0.051126   6.300  8.1e-10 ***
job_g.l1     0.218535   0.408797   0.535  0.59325
cpi_g.l1    -4.425450   2.719432  -1.627  0.10448
frr_g.l1    -0.015977   0.017785  -0.898  0.36955
oil_g.l2    -0.001906   0.033435  -0.057  0.95456
```

```
stock_g.l2  -0.061679   0.054479  -1.132  0.25827
job_g.l2    -0.435110   0.443220  -0.982  0.32686
cpi_g.l2     2.131230   2.777534   0.767  0.44337
frr_g.l2    -0.017383   0.019398  -0.896  0.37074
oil_g.l3     0.017018   0.033318   0.511  0.60980
stock_g.l3   0.001324   0.054964   0.024  0.98080
job_g.l3    -0.316010   0.447209  -0.707  0.48022
cpi_g.l3     0.643873   2.761230   0.233  0.81574
frr_g.l3     0.012080   0.018252   0.662  0.50848
oil_g.l4    -0.037259   0.033278  -1.120  0.26357
stock_g.l4  -0.027945   0.055367  -0.505  0.61403
job_g.l4    -0.741132   0.445630  -1.663  0.09710 .
cpi_g.l4    -0.665315   2.741365  -0.243  0.80837
frr_g.l4     0.016308   0.018381   0.887  0.37551
oil_g.l5     0.014388   0.033301   0.432  0.66594
stock_g.l5   0.039714   0.055050   0.721  0.47110
job_g.l5     0.322886   0.445861   0.724  0.46939
cpi_g.l5    -0.609276   2.716990  -0.224  0.82268
frr_g.l5     0.027386   0.018378   1.490  0.13700
oil_g.l6     0.010068   0.033340   0.302  0.76283
stock_g.l6  -0.002855   0.054500  -0.052  0.95824
job_g.l6    -0.040556   0.444877  -0.091  0.92741
cpi_g.l6     1.049540   2.698692   0.389  0.69756
frr_g.l6    -0.047973   0.018393  -2.608  0.00945 **
oil_g.l7    -0.049559   0.032939  -1.505  0.13325
stock_g.l7   0.015531   0.054356   0.286  0.77525
job_g.l7     0.007435   0.437205   0.017  0.98644
cpi_g.l7    -3.902468   2.724915  -1.432  0.15291
frr_g.l7     0.026958   0.018428   1.463  0.14431
oil_g.l8    -0.051913   0.032681  -1.588  0.11300
stock_g.l8   0.050641   0.054457   0.930  0.35299
job_g.l8    -0.525659   0.429737  -1.223  0.22199
cpi_g.l8     4.131616   2.721389   1.518  0.12978
frr_g.l8     0.026614   0.018082   1.472  0.14186
oil_g.l9     0.036566   0.032702   1.118  0.26419
stock_g.l9  -0.057194   0.054785  -1.044  0.29715
job_g.l9    -0.591720   0.431033  -1.373  0.17061
cpi_g.l9    -1.566991   2.739293  -0.572  0.56763
frr_g.l9     0.008708   0.018173   0.479  0.63208
oil_g.l10   -0.001177   0.032747  -0.036  0.97135
stock_g.l10  0.101570   0.055054   1.845  0.06581 .
job_g.l10    0.107603   0.435210   0.247  0.80485
cpi_g.l10   -2.603033   2.673527  -0.974  0.33085
frr_g.l10   -0.001847   0.018042  -0.102  0.91849
oil_g.l11   -0.048163   0.032150  -1.498  0.13494
stock_g.l11  0.038224   0.054910   0.696  0.48677
job_g.l11    0.731820   0.432422   1.692  0.09138 .
cpi_g.l11    3.495587   2.669191   1.310  0.19111
frr_g.l11   -0.034990   0.018090  -1.934  0.05382 .
oil_g.l12   -0.043404   0.030592  -1.419  0.15677
```

```
stock_g.l12 -0.053951   0.052129  -1.035  0.30133
job_g.l12   -0.480200   0.406992  -1.180  0.23877
cpi_g.l12    0.691125   2.572469   0.269  0.78833
frr_g.l12    0.032863   0.016576   1.983  0.04813 *
const        0.011572   0.006514   1.777  0.07643 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 0.04981 on 387 degrees of freedom
Multiple R-Squared: 0.2286,             Adjusted R-squared: 0.109
F-statistic: 1.911 on 60 and 387 DF,  p-value: 0.0001545


Estimation results for equation job_g:
======================================
job_g = oil_g.l1 + stock_g.l1 + job_g.l1 + cpi_g.l1 + frr_g.l1 + oil_g.l2 + stock_
g.l2 + job_g.l2 + cpi_g.l2 + frr_g.l2 + oil_g.l3 + stock_g.l3 + job_g.l3 + cpi_g.l3
+ frr_g.l3 + oil_g.l4 + stock_g.l4 + job_g.l4 + cpi_g.l4 + frr_g.l4 + oil_g.l5 + sto
ck_g.l5 + job_g.l5 + cpi_g.l5 + frr_g.l5 + oil_g.l6 + stock_g.l6 + job_g.l6 + cpi_
g.l6 + frr_g.l6 + oil_g.l7 + stock_g.l7 + job_g.l7 + cpi_g.l7 + frr_g.l7 + oil_g.l8 +
stock_g.l8 + job_g.l8 + cpi_g.l8 + frr_g.l8 + oil_g.l9 + stock_g.l9 + job_g.l9 + c
pi_g.l9 + frr_g.l9 + oil_g.l10 + stock_g.l10 + job_g.l10 + cpi_g.l10 + frr_g.l10 +
oil_g.l11 + stock_g.l11 + job_g.l11 + cpi_g.l11 + frr_g.l11 + oil_g.l12 + stock_g.
l12 + job_g.l12 + cpi_g.l12 + frr_g.l12 + const

              Estimate Std. Error t value Pr(>|t|)
oil_g.l1     0.0192494  0.0042720   4.506 8.76e-06 ***
stock_g.l1   0.0229520  0.0068619   3.345 0.000904 ***
job_g.l1    -0.1266463  0.0548668  -2.308 0.021512 *
cpi_g.l1     0.9680082  0.3649895   2.652 0.008327 **
frr_g.l1     0.0133298  0.0023870   5.584 4.43e-08 ***
oil_g.l2     0.0019948  0.0044875   0.445 0.656904
stock_g.l2  -0.0076375  0.0073119  -1.045 0.296892
job_g.l2    -0.1085334  0.0594869  -1.824 0.068848 .
cpi_g.l2    -0.3462242  0.3727877  -0.929 0.353601
frr_g.l2    -0.0073298  0.0026035  -2.815 0.005120 **
oil_g.l3     0.0021265  0.0044718   0.476 0.634664
stock_g.l3  -0.0066155  0.0073770  -0.897 0.370400
job_g.l3    -0.0038410  0.0600223  -0.064 0.949009
cpi_g.l3    -0.3184947  0.3705994  -0.859 0.390649
frr_g.l3     0.0002345  0.0024497   0.096 0.923795
oil_g.l4    -0.0024220  0.0044664  -0.542 0.587950
stock_g.l4   0.0021612  0.0074311   0.291 0.771338
job_g.l4    -0.0303276  0.0598104  -0.507 0.612400
cpi_g.l4     0.2960668  0.3679332   0.805 0.421501
frr_g.l4    -0.0018898  0.0024670  -0.766 0.444138
oil_g.l5     0.0016703  0.0044695   0.374 0.708829
stock_g.l5  -0.0051731  0.0073886  -0.700 0.484255
job_g.l5    -0.0749590  0.0598414  -1.253 0.211098
```

```
cpi_g.l5     0.0853392  0.3646617   0.234 0.815091
frr_g.l5     0.0028622  0.0024666   1.160 0.246612
oil_g.l6     0.0023867  0.0044747   0.533 0.594088
stock_g.l6   0.0144116  0.0073147   1.970 0.049525 *
job_g.l6    -0.0281816  0.0597094  -0.472 0.637207
cpi_g.l6    -0.5799628  0.3622058  -1.601 0.110149
frr_g.l6     0.0004348  0.0024686   0.176 0.860290
oil_g.l7     0.0004485  0.0044209   0.101 0.919240
stock_g.l7  -0.0045775  0.0072954  -0.627 0.530734
job_g.l7    -0.0583024  0.0586796  -0.994 0.321053
cpi_g.l7    -0.0271597  0.3657254  -0.074 0.940840
frr_g.l7    -0.0004196  0.0024733  -0.170 0.865362
oil_g.l8     0.0021651  0.0043863   0.494 0.621859
stock_g.l8   0.0141318  0.0073090   1.933 0.053907 .
job_g.l8     0.0610589  0.0576774   1.059 0.290429
cpi_g.l8     0.2107577  0.3652522   0.577 0.564262
frr_g.l8     0.0045848  0.0024268   1.889 0.059611 .
oil_g.l9    -0.0020491  0.0043891  -0.467 0.640863
stock_g.l9  -0.0079981  0.0073530  -1.088 0.277389
job_g.l9     0.0450976  0.0578512   0.780 0.436135
cpi_g.l9    -0.1880755  0.3676551  -0.512 0.609255
frr_g.l9    -0.0050145  0.0024391  -2.056 0.040462 *
oil_g.l10    0.0035414  0.0043951   0.806 0.420876
stock_g.l10  0.0031490  0.0073891   0.426 0.670221
job_g.l10   -0.0045409  0.0584118  -0.078 0.938075
cpi_g.l10   -0.2019589  0.3588283  -0.563 0.573877
frr_g.l10   -0.0001928  0.0024215  -0.080 0.936571
oil_g.l11    0.0005755  0.0043151   0.133 0.893968
stock_g.l11  0.0076475  0.0073698   1.038 0.300063
job_g.l11    0.0095259  0.0580377   0.164 0.869713
cpi_g.l11    0.4758512  0.3582463   1.328 0.184869
frr_g.l11   -0.0004286  0.0024280  -0.177 0.859987
oil_g.l12   -0.0064811  0.0041060  -1.578 0.115277
stock_g.l12  0.0000550  0.0069965   0.008 0.993731
job_g.l12    0.0213639  0.0546246   0.391 0.695936
cpi_g.l12    0.0160418  0.3452649   0.046 0.962966
frr_g.l12    0.0030739  0.0022248   1.382 0.167873
const        0.0001100  0.0008743   0.126 0.899917
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 0.006685 on 387 degrees of freedom
Multiple R-Squared: 0.296,  Adjusted R-squared: 0.1869
F-statistic: 2.712 on 60 and 387 DF,  p-value: 4.523e-09


Estimation results for equation cpi_g:
======================================
```

cpi_g = oil_g.l1 + stock_g.l1 + job_g.l1 + cpi_g.l1 + frr_g.l1 + oil_g.l2 + stock_g.l2 + job_g.l2 + cpi_g.l2 + frr_g.l2 + oil_g.l3 + stock_g.l3 + job_g.l3 + cpi_g.l3 + frr_g.l3 + oil_g.l4 + stock_g.l4 + job_g.l4 + cpi_g.l4 + frr_g.l4 + oil_g.l5 + stock_g.l5 + job_g.l5 + cpi_g.l5 + frr_g.l5 + oil_g.l6 + stock_g.l6 + job_g.l6 + cpi_g.l6 + frr_g.l6 + oil_g.l7 + stock_g.l7 + job_g.l7 + cpi_g.l7 + frr_g.l7 + oil_g.l8 + stock_g.l8 + job_g.l8 + cpi_g.l8 + frr_g.l8 + oil_g.l9 + stock_g.l9 + job_g.l9 + cpi_g.l9 + frr_g.l9 + oil_g.l10 + stock_g.l10 + job_g.l10 + cpi_g.l10 + frr_g.l10 + oil_g.l11 + stock_g.l11 + job_g.l11 + cpi_g.l11 + frr_g.l11 + oil_g.l12 + stock_g.l12 + job_g.l12 + cpi_g.l12 + frr_g.l12 + const

	Estimate	Std. Error	t value	Pr(>|t|)	
oil_g.l1	1.082e-03	6.254e-04	1.731	0.084327	.
stock_g.l1	1.706e-03	1.005e-03	1.699	0.090193	.
job_g.l1	1.406e-02	8.032e-03	1.751	0.080730	.
cpi_g.l1	2.483e-01	5.343e-02	4.646	4.64e-06	***
frr_g.l1	5.289e-04	3.494e-04	1.514	0.130923	
oil_g.l2	3.097e-04	6.569e-04	0.471	0.637627	
stock_g.l2	-6.004e-04	1.070e-03	-0.561	0.575192	
job_g.l2	8.411e-03	8.708e-03	0.966	0.334738	
cpi_g.l2	7.414e-02	5.457e-02	1.359	0.175055	
frr_g.l2	-3.226e-04	3.811e-04	-0.846	0.397812	
oil_g.l3	-4.370e-04	6.546e-04	-0.668	0.504833	
stock_g.l3	-7.586e-04	1.080e-03	-0.702	0.482836	
job_g.l3	-1.274e-02	8.787e-03	-1.449	0.148048	
cpi_g.l3	-1.646e-03	5.425e-02	-0.030	0.975818	
frr_g.l3	-2.290e-04	3.586e-04	-0.639	0.523459	
oil_g.l4	3.078e-04	6.538e-04	0.471	0.638072	
stock_g.l4	-7.812e-04	1.088e-03	-0.718	0.473145	
job_g.l4	-1.148e-02	8.756e-03	-1.311	0.190504	
cpi_g.l4	4.632e-02	5.386e-02	0.860	0.390363	
frr_g.l4	4.668e-04	3.612e-04	1.292	0.196962	
oil_g.l5	8.064e-04	6.543e-04	1.233	0.218501	
stock_g.l5	4.062e-04	1.082e-03	0.376	0.707431	
job_g.l5	-5.154e-03	8.760e-03	-0.588	0.556631	
cpi_g.l5	1.512e-01	5.338e-02	2.832	0.004862	**
frr_g.l5	-8.681e-05	3.611e-04	-0.240	0.810139	
oil_g.l6	-1.509e-05	6.551e-04	-0.023	0.981635	
stock_g.l6	1.610e-03	1.071e-03	1.503	0.133528	
job_g.l6	3.331e-03	8.741e-03	0.381	0.703335	
cpi_g.l6	1.824e-01	5.302e-02	3.439	0.000647	***
frr_g.l6	-4.764e-04	3.614e-04	-1.318	0.188165	
oil_g.l7	-3.358e-04	6.472e-04	-0.519	0.604135	
stock_g.l7	-1.639e-03	1.068e-03	-1.535	0.125579	
job_g.l7	-1.234e-02	8.590e-03	-1.436	0.151805	
cpi_g.l7	1.059e-01	5.354e-02	1.978	0.048627	*
frr_g.l7	-4.068e-05	3.621e-04	-0.112	0.910591	
oil_g.l8	3.229e-04	6.421e-04	0.503	0.615396	
stock_g.l8	1.347e-03	1.070e-03	1.259	0.208857	
job_g.l8	3.237e-03	8.444e-03	0.383	0.701618	
cpi_g.l8	1.317e-01	5.347e-02	2.464	0.014175	*

```
frr_g.l8     3.502e-04  3.553e-04   0.986 0.324852
oil_g.l9    -1.720e-04  6.425e-04  -0.268 0.789073
stock_g.l9   1.238e-03  1.076e-03   1.150 0.250872
job_g.l9     2.190e-02  8.469e-03   2.586 0.010088 *
cpi_g.l9    -4.853e-02  5.382e-02  -0.902 0.367797
frr_g.l9    -3.981e-04  3.571e-04  -1.115 0.265612
oil_g.l10   -2.752e-04  6.434e-04  -0.428 0.669049
stock_g.l10  1.041e-03  1.082e-03   0.963 0.336388
job_g.l10    1.635e-02  8.551e-03   1.912 0.056570 .
cpi_g.l10    3.791e-02  5.253e-02   0.722 0.470939
frr_g.l10    2.229e-04  3.545e-04   0.629 0.529911
oil_g.l11   -3.307e-04  6.317e-04  -0.524 0.600901
stock_g.l11 -8.697e-04  1.079e-03  -0.806 0.420676
job_g.l11    1.264e-02  8.496e-03   1.487 0.137719
cpi_g.l11    4.831e-02  5.244e-02   0.921 0.357510
frr_g.l11   -2.039e-04  3.554e-04  -0.574 0.566598
oil_g.l12    1.082e-03  6.011e-04   1.800 0.072646 .
stock_g.l12  1.036e-03  1.024e-03   1.011 0.312598
job_g.l12   -2.665e-02  7.997e-03  -3.333 0.000942 ***
cpi_g.l12   -8.900e-02  5.054e-02  -1.761 0.079046 .
frr_g.l12    3.797e-06  3.257e-04   0.012 0.990705
const        2.010e-04  1.280e-04   1.570 0.117140
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 0.0009786 on 387 degrees of freedom
Multiple R-Squared: 0.5644,             Adjusted R-squared: 0.4969
F-statistic: 8.357 on 60 and 387 DF,  p-value: < 2.2e-16


Estimation results for equation frr_g:
======================================
frr_g = oil_g.l1 + stock_g.l1 + job_g.l1 + cpi_g.l1 + frr_g.l1 + oil_g.l2 + stock_g
.l2 + job_g.l2 + cpi_g.l2 + frr_g.l2 + oil_g.l3 + stock_g.l3 + job_g.l3 + cpi_g.l3 +
frr_g.l3 + oil_g.l4 + stock_g.l4 + job_g.l4 + cpi_g.l4 + frr_g.l4 + oil_g.l5 + stock
_g.l5 + job_g.l5 + cpi_g.l5 + frr_g.l5 + oil_g.l6 + stock_g.l6 + job_g.l6 + cpi_g.l
6 + frr_g.l6 + oil_g.l7 + stock_g.l7 + job_g.l7 + cpi_g.l7 + frr_g.l7 + oil_g.l8 + st
ock_g.l8 + job_g.l8 + cpi_g.l8 + frr_g.l8 + oil_g.l9 + stock_g.l9 + job_g.l9 + cpi
_g.l9 + frr_g.l9 + oil_g.l10 + stock_g.l10 + job_g.l10 + cpi_g.l10 + frr_g.l10 + oi
l_g.l11 + stock_g.l11 + job_g.l11 + cpi_g.l11 + frr_g.l11 + oil_g.l12 + stock_g.l1
2 + job_g.l12 + cpi_g.l12 + frr_g.l12 + const

             Estimate Std. Error t value Pr(>|t|)
oil_g.l1     0.034380   0.093381   0.368  0.71295
stock_g.l1   0.371203   0.149993   2.475  0.01376 *
job_g.l1    -1.857404   1.199322  -1.549  0.12227
cpi_g.l1    -7.188669   7.978229  -0.901  0.36813
frr_g.l1     0.468543   0.052178   8.980  < 2e-16 ***
oil_g.l2     0.084661   0.098090   0.863  0.38862
```

stock_g.l2	0.087204	0.159829	0.546	0.58565
job_g.l2	-1.135986	1.300311	-0.874	0.38286
cpi_g.l2	6.953521	8.148687	0.853	0.39400
frr_g.l2	0.072415	0.056908	1.272	0.20397
oil_g.l3	-0.096614	0.097747	-0.988	0.32357
stock_g.l3	0.410775	0.161253	2.547	0.01124 *
job_g.l3	1.891810	1.312015	1.442	0.15014
cpi_g.l3	-5.600292	8.100853	-0.691	0.48978
frr_g.l3	0.122090	0.053548	2.280	0.02315 *
oil_g.l4	-0.138934	0.097631	-1.423	0.15552
stock_g.l4	-0.033607	0.162435	-0.207	0.83620
job_g.l4	0.907954	1.307382	0.694	0.48780
cpi_g.l4	-14.689367	8.042575	-1.826	0.06855 .
frr_g.l4	0.039967	0.053926	0.741	0.45905
oil_g.l5	-0.057889	0.097697	-0.593	0.55384
stock_g.l5	-0.269926	0.161506	-1.671	0.09547 .
job_g.l5	0.372799	1.308061	0.285	0.77580
cpi_g.l5	16.628021	7.971063	2.086	0.03763 *
frr_g.l5	0.137259	0.053917	2.546	0.01129 *
oil_g.l6	-0.134094	0.097812	-1.371	0.17119
stock_g.l6	0.176996	0.159891	1.107	0.26899
job_g.l6	0.505533	1.305174	0.387	0.69872
cpi_g.l6	11.337136	7.917380	1.432	0.15297
frr_g.l6	-0.016239	0.053961	-0.301	0.76362
oil_g.l7	0.061030	0.096636	0.632	0.52806
stock_g.l7	-0.035915	0.159469	-0.225	0.82193
job_g.l7	-0.373628	1.282665	-0.291	0.77099
cpi_g.l7	-13.376105	7.994313	-1.673	0.09510 .
frr_g.l7	-0.057074	0.054063	-1.056	0.29177
oil_g.l8	-0.064017	0.095880	-0.668	0.50473
stock_g.l8	-0.076782	0.159766	-0.481	0.63108
job_g.l8	-1.251690	1.260757	-0.993	0.32142
cpi_g.l8	10.854854	7.983970	1.360	0.17475
frr_g.l8	0.047925	0.053048	0.903	0.36686
oil_g.l9	0.268118	0.095940	2.795	0.00545 **
stock_g.l9	-0.013300	0.160728	-0.083	0.93409
job_g.l9	-0.467707	1.264558	-0.370	0.71169
cpi_g.l9	4.663287	8.036495	0.580	0.56207
frr_g.l9	0.072322	0.053315	1.357	0.17573
oil_g.l10	0.051051	0.096072	0.531	0.59546
stock_g.l10	0.185018	0.161516	1.146	0.25271
job_g.l10	3.029853	1.276812	2.373	0.01813 *
cpi_g.l10	-10.019338	7.843551	-1.277	0.20223
frr_g.l10	-0.121546	0.052932	-2.296	0.02219 *
oil_g.l11	-0.003976	0.094322	-0.042	0.96640
stock_g.l11	-0.262745	0.161095	-1.631	0.10370
job_g.l11	1.175261	1.268634	0.926	0.35482
cpi_g.l11	-0.369017	7.830830	-0.047	0.96244
frr_g.l11	-0.131670	0.053073	-2.481	0.01353 *
oil_g.l12	-0.068374	0.089752	-0.762	0.44664

```
stock_g.l12   0.310343   0.152934   2.029  0.04312 *
job_g.l12     1.166428   1.194027   0.977  0.32924
cpi_g.l12     2.917543   7.547072   0.387  0.69928
frr_g.l12     0.057315   0.048631   1.179  0.23930
const        -0.016327   0.019110  -0.854  0.39342
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1


Residual standard error: 0.1461 on 387 degrees of freedom
Multiple R-Squared: 0.4988,             Adjusted R-squared: 0.4211
F-statistic:  6.42 on 60 and 387 DF,  p-value: < 2.2e-16



Covariance matrix of residuals:
           oil_g    stock_g      job_g     cpi_g     frr_g
oil_g   7.523e-03  5.888e-04  1.583e-04 2.058e-05 3.418e-03
stock_g 5.888e-04  2.481e-03 -2.511e-05 2.098e-06 5.402e-04
job_g   1.583e-04 -2.511e-05  4.469e-05 2.173e-06 1.120e-04
cpi_g   2.058e-05  2.098e-06  2.173e-06 9.578e-07 1.927e-05
frr_g   3.418e-03  5.402e-04  1.120e-04 1.927e-05 2.135e-02

Correlation matrix of residuals:
         oil_g  stock_g   job_g   cpi_g   frr_g
oil_g    1.0000  0.13629  0.2729 0.24248 0.26963
stock_g 0.1363  1.00000 -0.0754 0.04305 0.07421
job_g    0.2729 -0.07540  1.0000 0.33217 0.11467
cpi_g    0.2425  0.04305  0.3322 1.00000 0.13478
frr_g    0.2696  0.07421  0.1147 0.13478 1.00000
```