

```
In [6]: # import datetime
import os
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from datlib.FRED import *
from datlib.plots import *
import pandas_datareader.data as web

%matplotlib inline

# Import Statsmodels

from statsmodels.tsa.api import VAR
from statsmodels.tsa.stattools import adfuller
from statsmodels.tools.eval_measures import rmse, aic
```

```

In [7]: #FRED.py
# . . .
def bil_to_mil(series):
    return series* 10**3
# . . .
#fedProject.py
# . . .
data_codes = {# Assets
    "Balance Sheet: Total Assets ($ Mil)": "WALCL",
    "Balance Sheet Securities, Prem-Disc, Repos, and Loans ($ Mil)": "WALSL",
    "Balance Sheet: Securities Held Outright ($ Mil)": "WSHOSHO",
    ### breakdown of securities holdings ###
    "Balance Sheet: U.S. Treasuries Held Outright ($ Mil)": "WSHOTSL",
    "Balance Sheet: Federal Agency Debt Securities ($ Mil)": "WSHOFAD",
    "Balance Sheet: Mortgage-Backed Securities ($ Mil)": "WSHOMCB",
    # other forms of lending
    "Balance Sheet: Repos ($ Mil)": "WORAL",
    "Balance Sheet: Central Bank Liquidity Swaps ($ Mil)": "SWPT",
    "Balance Sheet: Direct Lending ($ Mil)": "WLCFLL",
    # unamortized value of securities held (due to changes in interest rates)
    "Balance Sheet: Unamortized Security Premiums ($ Mil)": "WUPSHO",
    # Liabilities
    "Balance Sheet: Total Liabilities ($ Mil)": "WLTLECL",
    "Balance Sheet: Federal Reserve Notes Outstanding ($ Mil)": "WLFN",
    "Balance Sheet: Reverse Repos ($ Mil)": "WLRRAL",
    ### Major share of deposits
    "Balance Sheet: Deposits from Dep. Institutions ($ Mil)": "WLODLL",
    "Balance Sheet: U.S. Treasury General Account ($ Mil)": "WDTGAL",
    "Balance Sheet: Other Deposits ($ Mil)": "WOTHLB",
    "Balance Sheet: All Deposits ($ Mil)": "WLDLCL",
    # Capital
    "Balance Sheet: Total Capital": "WCTCL",
    # Interest Rates
    "Unemployment Rate": "UNRATE",
    "Nominal GDP ($ Bil)": "GDP",
    "Real GDP ($ Bil)": "GDPC1",
    "GDP Deflator": "GDPDEF",
    "CPI": "CPIAUCSL",
    "Core PCE": "PCEPILFE",
    "Private Investment": "GPDI",
    "Base: Total ($ Mil)": "BOGMBASE",
    "Base: Currency in Circulation ($ Bil)": "WCURCIR",
    "1 Month Treasury Rate (%)": "DGS1M0",
    "3 Month Treasury Rate (%)": "DGS3M0",
    "1 Year Treasury Rate (%)": "DGS1",
    "2 Year Treasury Rate (%)": "DGS2",
    "10 Year Treasury Rate (%)": "DGS10",
    "30 Year Treasury Rate (%)": "DGS30",
    "Effective Federal Funds Rate (%)": "DFF",
    "Federal Funds Target Rate (Pre-crisis)": "DFEDTAR",
    "Federal Funds Upper Target": "DFEDTARU",
    "Federal Funds Lower Target": "DFEDTARL",
    "Interest on Reserves (%)": "IOER",
    "VIX": "VIXCLS",
    "5 Year Forward Rate": "T5YIFR"
}

```

```

inflation_target = 2

unemployment_target = 4
# Select start and end dates
start = datetime.datetime(2000, 1, 1)
end = datetime.datetime.today()

## year variable automatically adjusts the number of periods
# per year in light of data frequency
annual_div = {"Q":4,
              "W":52,
              "M":12}
### choose frequency
freq = "M"
### set periods per year
year = annual_div[freq]

```

```
In [8]: data=pd.read_csv("data up.csv")
```

```
In [9]: data
```

```
Out[9]:
```

	Date	VIX	Log Total Assets	Log Currency in Circulation (\$ Bil)	Effective Federal Funds Rate (%)	Loss Function
0	12/31/2002	28.210476	13.495030	6.516891	1.238387	-4.053360
1	1/31/2003	27.424286	13.493538	6.521227	1.235161	-3.288373
2	2/28/2003	32.218421	13.488846	6.521846	1.262143	-3.684400
3	3/31/2003	30.634286	13.492065	6.527099	1.252903	-3.663571
4	4/30/2003	23.991905	13.510243	6.532415	1.258000	-4.161742
...
220	4/30/2021	17.416190	15.866549	7.675462	0.069000	-2.827729
221	5/31/2021	19.760500	15.878174	7.681530	0.058065	-1.116398
222	6/30/2021	16.956818	15.898266	7.686549	0.078000	-1.093716
223	7/31/2021	17.603333	15.918468	7.689882	0.098065	0.611392
224	8/31/2021	17.472727	15.930789	7.690558	0.092258	1.117317

225 rows × 6 columns

```
In [10]: data = data.set_index('Date')
```

In [11]: data

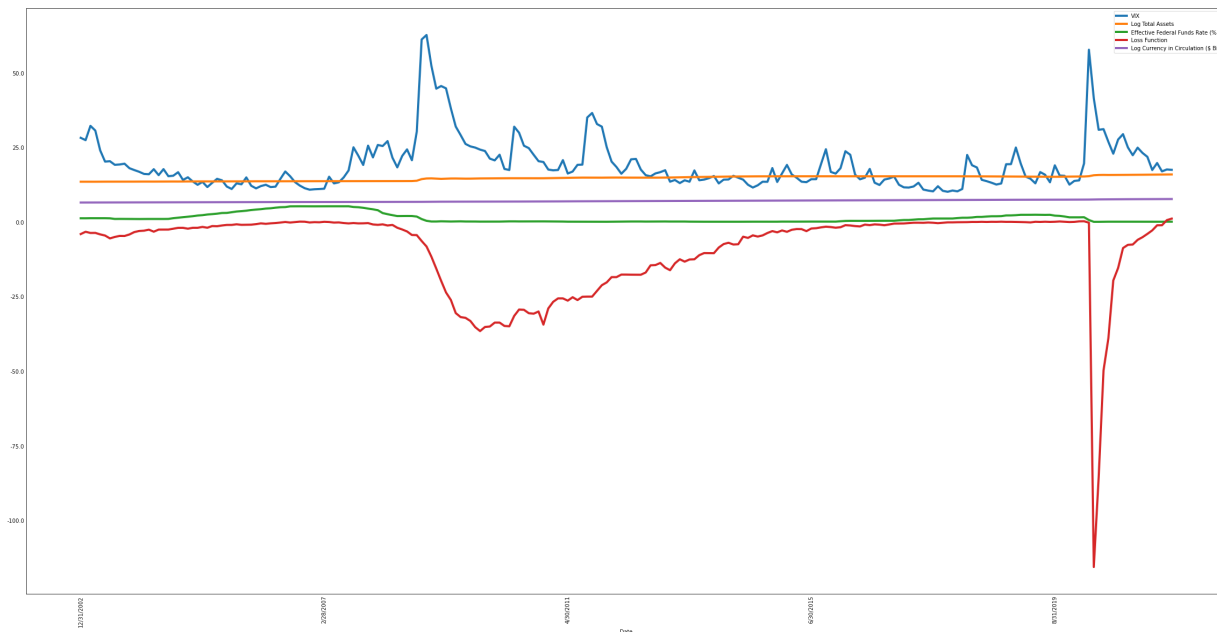
Out[11]:

	VIX	Log Total Assets	Log Currency in Circulation (\$ Bil)	Effective Federal Funds Rate (%)	Loss Function
Date					
12/31/2002	28.210476	13.495030	6.516891	1.238387	-4.053360
1/31/2003	27.424286	13.493538	6.521227	1.235161	-3.288373
2/28/2003	32.218421	13.488846	6.521846	1.262143	-3.684400
3/31/2003	30.634286	13.492065	6.527099	1.252903	-3.663571
4/30/2003	23.991905	13.510243	6.532415	1.258000	-4.161742
...
4/30/2021	17.416190	15.866549	7.675462	0.069000	-2.827729
5/31/2021	19.760500	15.878174	7.681530	0.058065	-1.116398
6/30/2021	16.956818	15.898266	7.686549	0.078000	-1.093716
7/31/2021	17.603333	15.918468	7.689882	0.098065	0.611392
8/31/2021	17.472727	15.930789	7.690558	0.092258	1.117317

225 rows × 5 columns

```
In [12]: from datlib.plots import *  
plot_variables = ["VIX", "Log Total Assets", "Effective Federal Funds Rate (%)",  
plot_lines(data[plot_variables], linewidth=4)
```

C:\Users\HP\Desktop\Jupyter_practice\VAR\datlib\plots.py:21: UserWarning: Fixed
Formatter should only be used together with FixedLocator
ax.set_yticklabels([round(x,2) for x in vals])



In [13]: *## adf*

```
X = data["VIX"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

X = data["Effective Federal Funds Rate (%)"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

X = data["Log Total Assets"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

X = data["Log Currency in Circulation ($ Bil)"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")
```

```

X = data["Loss Function"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

```

```

ADF Statistic: -3.983914
p-value: 0.001497
Critical Values:
    1%: -3.460
    5%: -2.875
   10%: -2.574
Reject Ho - Time Series is Stationary
ADF Statistic: -2.985282
p-value: 0.036292
Critical Values:
    1%: -3.461
    5%: -2.875
   10%: -2.574
Reject Ho - Time Series is Stationary
ADF Statistic: -0.478814
p-value: 0.896085
Critical Values:
    1%: -3.460
    5%: -2.875
   10%: -2.574
Failed to Reject Ho - Time Series is Non-Stationary
ADF Statistic: 2.027487
p-value: 0.998708
Critical Values:
    1%: -3.462
    5%: -2.875
   10%: -2.574
Failed to Reject Ho - Time Series is Non-Stationary
ADF Statistic: -4.705631
p-value: 0.000082
Critical Values:
    1%: -3.460
    5%: -2.875
   10%: -2.574
Reject Ho - Time Series is Stationary

```

```
In [14]: data_diff = data.diff(year).dropna()  
data_diff
```

```
Out[14]:
```

	VIX	Log Total Assets	Log Currency in Circulation (\$ Bil)	Effective Federal Funds Rate (%)	Loss Function
Date					
12/31/2003	-11.384113	0.045793	0.057056	-0.254194	1.032640
1/31/2004	-11.323286	0.047454	0.049309	-0.238065	0.368954
2/29/2004	-16.220000	0.043829	0.047986	-0.254901	1.102860
3/31/2004	-12.946894	0.043121	0.043676	-0.251290	0.404229
4/30/2004	-8.293333	0.033697	0.042352	-0.254000	1.601901
...
4/30/2021	-24.037619	0.210753	0.132517	0.020000	112.839893
5/31/2021	-11.136500	0.124273	0.116395	0.008065	84.519025
6/30/2021	-14.162727	0.118755	0.108215	0.000333	48.659408
7/31/2021	-9.237121	0.162716	0.099906	0.005484	39.538836
8/31/2021	-5.416797	0.172818	0.087397	-0.002903	20.729400

213 rows × 5 columns

```
In [15]: data_new = data_diff.diff(year).dropna()
```


In [16]: data_new

Out[16]:

	VIX	Log Total Assets	Log Currency in Circulation (\$ Bil)	Effective Federal Funds Rate (%)	Loss Function
Date					
12/31/2004	7.017294	0.016904	-0.006413	1.426129	0.032383
1/31/2005	8.660286	0.012750	0.000492	1.520323	0.889740
2/28/2005	11.930526	0.016558	0.002776	1.749446	-0.450845
3/31/2005	8.385867	0.017146	0.008396	1.878710	1.480530
4/30/2005	7.053810	0.019289	0.007823	2.035000	-0.470287
...
4/30/2021	-52.542381	-0.260106	0.043371	2.394667	228.571523
5/31/2021	-25.311682	-0.460421	0.008424	2.349032	170.165523
6/30/2021	-29.446273	-0.499225	-0.009767	2.300333	98.492688
7/31/2021	-22.771667	-0.441530	-0.024475	2.315806	78.485753
8/31/2021	-9.327229	-0.441747	-0.048900	2.027742	40.409641

201 rows × 5 columns

```

In [17]: X = data_new["VIX"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

X = data_new["Effective Federal Funds Rate (%)"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

X = data_new["Log Total Assets"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

X = data_new["Log Currency in Circulation ($ Bil)"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print ("Reject Ho - Time Series is Stationary")
else:
    print ("Failed to Reject Ho - Time Series is Non-Stationary")

```

```

X = data_new["Loss Function"].values
result = adfuller(X)
print('ADF Statistic: %f' % result[0])
print('p-value: %f' % result[1])
print('Critical Values:')
for key, value in result[4].items():
    print('\t%s: %.3f' % (key, value))

if result[0] < result[4]["5%"]:
    print("Reject Ho - Time Series is Stationary")
else:
    print("Failed to Reject Ho - Time Series is Non-Stationary")

```

```

ADF Statistic: -3.389956
p-value: 0.011306
Critical Values:
    1%: -3.466
    5%: -2.877
   10%: -2.575
Reject Ho - Time Series is Stationary
ADF Statistic: -3.092968
p-value: 0.027078
Critical Values:
    1%: -3.466
    5%: -2.877
   10%: -2.575
Reject Ho - Time Series is Stationary
ADF Statistic: -3.264237
p-value: 0.016555
Critical Values:
    1%: -3.466
    5%: -2.877
   10%: -2.575
Reject Ho - Time Series is Stationary
ADF Statistic: -3.960163
p-value: 0.001634
Critical Values:
    1%: -3.466
    5%: -2.877
   10%: -2.575
Reject Ho - Time Series is Stationary
ADF Statistic: -2.885545
p-value: 0.047055
Critical Values:
    1%: -3.466
    5%: -2.877
   10%: -2.575
Reject Ho - Time Series is Stationary

```

```
In [18]: df = data_new
df
```

Out[18]:

	VIX	Log Total Assets	Log Currency in Circulation (\$ Bil)	Effective Federal Funds Rate (%)	Loss Function
Date					
12/31/2004	7.017294	0.016904	-0.006413	1.426129	0.032383
1/31/2005	8.660286	0.012750	0.000492	1.520323	0.889740
2/28/2005	11.930526	0.016558	0.002776	1.749446	-0.450845
3/31/2005	8.385867	0.017146	0.008396	1.878710	1.480530
4/30/2005	7.053810	0.019289	0.007823	2.035000	-0.470287
...
4/30/2021	-52.542381	-0.260106	0.043371	2.394667	228.571523
5/31/2021	-25.311682	-0.460421	0.008424	2.349032	170.165523
6/30/2021	-29.446273	-0.499225	-0.009767	2.300333	98.492688
7/31/2021	-22.771667	-0.441530	-0.024475	2.315806	78.485753
8/31/2021	-9.327229	-0.441747	-0.048900	2.027742	40.409641

201 rows × 5 columns

In [19]: *## Johansen test*

```
from statsmodels.tsa.vector_ar.vecm import coint_johansen

def cointegration_test(df, alpha=0.05):
    """Perform Johanson's Cointegration Test and Report Summary"""
    out = coint_johansen(df, -1, 5)
    d = {'0.90':0, '0.95':1, '0.99':2}
    traces = out.lr1
    cvts = out.cvt[:, d[str(1-alpha)]]
    def adjust(val, length=6): return str(val).ljust(length)

    # Summary
    print('Name    :: Test Stat > C(95%)    => Signif \n', '--'*20)
    for col, trace, cvt in zip(df.columns, traces, cvts):
        print(adjust(col), ':: ', adjust(round(trace,2), 9), ">", adjust(cvt, 8),

cointegration_test(df)
```

```
Name    :: Test Stat > C(95%)    => Signif
-----
VIX      :: 129.38    > 60.0627    => True
Log Total Assets :: 66.89    > 40.1749    => True
Log Currency in Circulation ($ Bil) :: 37.12    > 24.2761    => True
Effective Federal Funds Rate (%) :: 16.2    > 12.3212    => True
Loss Function :: 7.14    > 4.1296    => True
```

```
In [20]: ##Testing Causation using Granger's Causality Test

from statsmodels.tsa.stattools import grangercausalitytests
maxlag=12
test = 'ssr_chi2test'
def grangers_causation_matrix(data_new, variables, test='ssr_chi2test', verbose=False):
    df = pd.DataFrame(np.zeros((len(variables), len(variables))), columns=variables)
    for c in df.columns:
        for r in df.index:
            test_result = grangercausalitytests(data_new[[r, c]], maxlag=maxlag,
            p_values = [round(test_result[i+1][0][test][1],4) for i in range(maxlag)]
            if verbose: print(f'Y = {r}, X = {c}, P Values = {p_values}')
            min_p_value = np.min(p_values)
            df.loc[r, c] = min_p_value
    df.columns = [var + '_x' for var in variables]
    df.index = [var + '_y' for var in variables]
    return df

grangers_causation_matrix(df, variables = df.columns)
```

```
Out[20]:
```

	VIX_x	Log Total Assets_x	Log Currency in Circulation (\$ Bil)_x	Effective Federal Funds Rate (%)_x	Loss Function_x
VIX_y	1.0	0.0000	0.0000	0.0	0.0000
Log Total Assets_y	0.0	1.0000	0.0003	0.0	0.1826
Log Currency in Circulation (\$ Bil)_y	0.0	0.0000	1.0000	0.0	0.0000
Effective Federal Funds Rate (%)_y	0.0	0.0000	0.0000	1.0	0.0000
Loss Function_y	0.0	0.1308	0.0000	0.0	1.0000

VAR

```
In [21]: var = VAR(df)

C:\Users\HP\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:471:
ValueWarning: No frequency information was provided, so inferred frequency M will be used.
    self._init_dates(dates, freq)
```

```
In [22]: x= var.select_order()  
x.summary()
```

Out[22]: VAR Order Selection (* highlights the minimums)

	AIC	BIC	FPE	HQIC
0	2.179	2.266	8.840	2.214
1	-7.134	-6.616	0.0007976	-6.924
2	-8.294	-7.344*	0.0002502	-7.909
3	-8.477	-7.095	0.0002086	-7.917
4	-8.526	-6.712	0.0001992	-7.791
5	-8.900	-6.654	0.0001376	-7.990
6	-8.957	-6.279	0.0001308	-7.872
7	-9.024	-5.913	0.0001235	-7.763
8	-9.205	-5.663	0.0001042	-7.770
9	-10.14	-6.163	4.169e-05	-8.527
10	-10.43	-6.025	3.166e-05	-8.646
11	-10.69	-5.855	2.496e-05	-8.732
12	-11.06	-5.787	1.785e-05	-8.922
13	-12.12	-6.421	6.369e-06	-9.812
14	-12.39*	-6.259	5.065e-06*	-9.908*

```
In [19]: results = var.fit(14)
#We can check the summary of the model by.
results.summary()
```

Out[19]: Summary of Regression Results

```
=====
Model:                VAR
Method:               OLS
Date:                Thu, 17, Mar, 2022
Time:                15:27:09
-----
No. of Equations:      5.00000    BIC:                -6.25923
Nobs:                 187.000    HQIC:              -9.90769
Log likelihood:       187.053    FPE:               5.06528e-06
AIC:                 -12.3932    Det(Omega_mle):    1.01324e-06
-----
```

Results for equation VIX

```
=====
=====
```

		coefficient	std. error
t-stat	prob		

const		0.378062	0.524855
0.720	0.471		
L1.VIX		0.869247	0.101810
8.538	0.000		
L1.Log Total Assets		-10.796343	15.475592
-0.698	0.485		
L1.Log Currency in Circulation (\$ Bil)		-121.688820	144.629392
-0.841	0.400		
L1.Effective Federal Funds Rate (%)		-2.754992	4.040890
-0.682	0.495		
L1.Loss Function		-0.041401	0.077008
-0.538	0.591		
L2.VIX		-0.278706	0.132248
-2.107	0.035		
L2.Log Total Assets		23.002323	25.131928
0.915	0.360		
L2.Log Currency in Circulation (\$ Bil)		179.669553	210.716392
0.853	0.394		
L2.Effective Federal Funds Rate (%)		13.628963	6.966177
1.956	0.050		
L2.Loss Function		0.002954	0.092061
0.032	0.974		
L3.VIX		0.009579	0.120213
0.080	0.936		
L3.Log Total Assets		-1.574639	25.072742
-0.063	0.950		
L3.Log Currency in Circulation (\$ Bil)		-313.969463	192.405475
-1.632	0.103		
L3.Effective Federal Funds Rate (%)		-6.716985	7.586955
-0.885	0.376		
L3.Loss Function		-0.017696	0.076560
-0.231	0.817		
L4.VIX		-0.011544	0.124001
-0.093	0.926		

L4.Log Total Assets	1.084106	25.062648
0.043 0.965		
L4.Log Currency in Circulation (\$ Bil)	148.433045	199.717303
0.743 0.457		
L4.Effective Federal Funds Rate (%)	3.161071	7.723640
0.409 0.682		
L4.Loss Function	0.192015	0.079979
2.401 0.016		
L5.VIX	0.096595	0.126662
0.763 0.446		
L5.Log Total Assets	17.583584	25.293852
0.695 0.487		
L5.Log Currency in Circulation (\$ Bil)	205.278958	197.787118
1.038 0.299		
L5.Effective Federal Funds Rate (%)	-20.355992	7.914019
-2.572 0.010		
L5.Loss Function	-0.219316	0.101196
-2.167 0.030		
L6.VIX	-0.105782	0.126184
-0.838 0.402		
L6.Log Total Assets	-17.989534	22.088406
-0.814 0.415		
L6.Log Currency in Circulation (\$ Bil)	-508.092593	199.558070
-2.546 0.011		
L6.Effective Federal Funds Rate (%)	27.234136	8.553489
3.184 0.001		
L6.Loss Function	0.232986	0.109278
2.132 0.033		
L7.VIX	0.191669	0.128104
1.496 0.135		
L7.Log Total Assets	-48.548024	19.596597
-2.477 0.013		
L7.Log Currency in Circulation (\$ Bil)	721.005087	202.726547
3.557 0.000		
L7.Effective Federal Funds Rate (%)	-29.123424	8.628805
-3.375 0.001		
L7.Loss Function	-0.173039	0.111307
-1.555 0.120		
L8.VIX	-0.187115	0.127787
-1.464 0.143		
L8.Log Total Assets	39.672940	19.969288
1.987 0.047		
L8.Log Currency in Circulation (\$ Bil)	-475.865011	212.105944
-2.244 0.025		
L8.Effective Federal Funds Rate (%)	4.697699	8.524162
0.551 0.582		
L8.Loss Function	0.243399	0.111115
2.191 0.028		
L9.VIX	0.091048	0.131255
0.694 0.488		
L9.Log Total Assets	-14.481909	20.801632
-0.696 0.486		
L9.Log Currency in Circulation (\$ Bil)	113.081467	210.469732
0.537 0.591		
L9.Effective Federal Funds Rate (%)	0.074142	9.569506
0.008 0.994		
L9.Loss Function	-0.275996	0.111084

-2.485	0.013		
L10.VIX		0.073108	0.128096
0.571	0.568		
L10.Log Total Assets		-25.089406	20.292682
-1.236	0.216		
L10.Log Currency in Circulation (\$ Bil)		-52.344296	201.641397
-0.260	0.795		
L10.Effective Federal Funds Rate (%)		13.507896	10.814385
1.249	0.212		
L10.Loss Function		0.033361	0.110307
0.302	0.762		
L11.VIX		-0.130684	0.127895
-1.022	0.307		
L11.Log Total Assets		52.845554	20.147292
2.623	0.009		
L11.Log Currency in Circulation (\$ Bil)		100.956890	196.940762
0.513	0.608		
L11.Effective Federal Funds Rate (%)		-10.828897	10.753841
-1.007	0.314		
L11.Loss Function		0.365737	0.108329
3.376	0.001		
L12.VIX		-0.637052	0.126853
-5.022	0.000		
L12.Log Total Assets		1.465529	20.761851
0.071	0.944		
L12.Log Currency in Circulation (\$ Bil)		11.508564	196.848697
0.058	0.953		
L12.Effective Federal Funds Rate (%)		4.573495	10.701055
0.427	0.669		
L12.Loss Function		-0.444399	0.114716
-3.874	0.000		
L13.VIX		0.494578	0.141902
3.485	0.000		
L13.Log Total Assets		-4.544162	20.862397
-0.218	0.828		
L13.Log Currency in Circulation (\$ Bil)		-64.526079	217.237609
-0.297	0.766		
L13.Effective Federal Funds Rate (%)		15.979988	10.413412
1.535	0.125		
L13.Loss Function		0.321823	0.148452
2.168	0.030		
L14.VIX		-0.006682	0.108061
-0.062	0.951		
L14.Log Total Assets		-4.840925	13.108319
-0.369	0.712		
L14.Log Currency in Circulation (\$ Bil)		-92.604577	145.482975
-0.637	0.524		
L14.Effective Federal Funds Rate (%)		-13.445095	6.249008
-2.152	0.031		
L14.Loss Function		-0.026873	0.131388
-0.205	0.838		

=====

=====

Results for equation Log Total Assets

=====

=====

t-stat	prob	coefficient	std. error

const		-0.000192	0.003538
-0.054	0.957		
L1.VIX		0.000359	0.000686
0.523	0.601		
L1.Log Total Assets		1.250940	0.104318
11.992	0.000		
L1.Log Currency in Circulation (\$ Bil)		0.632483	0.974914
0.649	0.516		
L1.Effective Federal Funds Rate (%)		-0.080820	0.027239
-2.967	0.003		
L1.Loss Function		-0.000820	0.000519
-1.579	0.114		
L2.VIX		-0.002178	0.000891
-2.443	0.015		
L2.Log Total Assets		-0.440844	0.169409
-2.602	0.009		
L2.Log Currency in Circulation (\$ Bil)		-1.076839	1.420392
-0.758	0.448		
L2.Effective Federal Funds Rate (%)		0.180082	0.046957
3.835	0.000		
L2.Loss Function		0.001237	0.000621
1.994	0.046		
L3.VIX		0.001298	0.000810
1.601	0.109		
L3.Log Total Assets		0.016465	0.169010
0.097	0.922		
L3.Log Currency in Circulation (\$ Bil)		0.558087	1.296962
0.430	0.667		
L3.Effective Federal Funds Rate (%)		-0.126035	0.051142
-2.464	0.014		
L3.Loss Function		-0.001649	0.000516
-3.195	0.001		
L4.VIX		-0.001641	0.000836
-1.963	0.050		
L4.Log Total Assets		0.406545	0.168942
2.406	0.016		
L4.Log Currency in Circulation (\$ Bil)		-1.482935	1.346250
-1.102	0.271		
L4.Effective Federal Funds Rate (%)		0.138049	0.052063
2.652	0.008		
L4.Loss Function		0.001046	0.000539
1.941	0.052		
L5.VIX		-0.000046	0.000854
-0.054	0.957		
L5.Log Total Assets		0.097211	0.170500
0.570	0.569		
L5.Log Currency in Circulation (\$ Bil)		1.158163	1.333239
0.869	0.385		
L5.Effective Federal Funds Rate (%)		-0.182552	0.053347
-3.422	0.001		
L5.Loss Function		-0.000006	0.000682
-0.008	0.993		
L6.VIX		0.000249	0.000851

0.293	0.770		
L6.Log Total Assets		-0.320468	0.148893
-2.152	0.031		
L6.Log Currency in Circulation (\$ Bil)		-1.284588	1.345176
-0.955	0.340		
L6.Effective Federal Funds Rate (%)		0.132256	0.057657
2.294	0.022		
L6.Loss Function		0.000581	0.000737
0.789	0.430		
L7.VIX		0.000014	0.000864
0.016	0.987		
L7.Log Total Assets		-0.062401	0.132096
-0.472	0.637		
L7.Log Currency in Circulation (\$ Bil)		3.071697	1.366534
2.248	0.025		
L7.Effective Federal Funds Rate (%)		-0.113164	0.058165
-1.946	0.052		
L7.Loss Function		0.000450	0.000750
0.599	0.549		
L8.VIX		-0.000771	0.000861
-0.895	0.371		
L8.Log Total Assets		-0.357346	0.134609
-2.655	0.008		
L8.Log Currency in Circulation (\$ Bil)		-2.617593	1.429759
-1.831	0.067		
L8.Effective Federal Funds Rate (%)		-0.273518	0.057459
-4.760	0.000		
L8.Loss Function		0.000044	0.000749
0.059	0.953		
L9.VIX		0.000607	0.000885
0.686	0.493		
L9.Log Total Assets		0.296471	0.140219
2.114	0.034		
L9.Log Currency in Circulation (\$ Bil)		1.499275	1.418729
1.057	0.291		
L9.Effective Federal Funds Rate (%)		0.348922	0.064506
5.409	0.000		
L9.Loss Function		-0.000820	0.000749
-1.096	0.273		
L10.VIX		0.001013	0.000863
1.173	0.241		
L10.Log Total Assets		-0.144960	0.136788
-1.060	0.289		
L10.Log Currency in Circulation (\$ Bil)		-2.140963	1.359220
-1.575	0.115		
L10.Effective Federal Funds Rate (%)		-0.061125	0.072897
-0.839	0.402		
L10.Loss Function		-0.001275	0.000744
-1.715	0.086		
L11.VIX		-0.001332	0.000862
-1.545	0.122		
L11.Log Total Assets		0.266289	0.135808
1.961	0.050		
L11.Log Currency in Circulation (\$ Bil)		3.287570	1.327534
2.476	0.013		
L11.Effective Federal Funds Rate (%)		0.072010	0.072489
0.993	0.321		

L11.Loss Function	0.002174	0.000730
2.978 0.003		
L12.VIX	0.000265	0.000855
0.310 0.757		
L12.Log Total Assets	-0.331168	0.139951
-2.366 0.018		
L12.Log Currency in Circulation (\$ Bil)	-1.815733	1.326913
-1.368 0.171		
L12.Effective Federal Funds Rate (%)	-0.048708	0.072133
-0.675 0.500		
L12.Loss Function	-0.000118	0.000773
-0.153 0.878		
L13.VIX	0.000947	0.000957
0.990 0.322		
L13.Log Total Assets	0.413797	0.140629
2.942 0.003		
L13.Log Currency in Circulation (\$ Bil)	0.828671	1.464350
0.566 0.571		
L13.Effective Federal Funds Rate (%)	0.072801	0.070194
1.037 0.300		
L13.Loss Function	-0.000083	0.001001
-0.083 0.934		
L14.VIX	-0.001381	0.000728
-1.896 0.058		
L14.Log Total Assets	-0.194360	0.088360
-2.200 0.028		
L14.Log Currency in Circulation (\$ Bil)	-0.943791	0.980668
-0.962 0.336		
L14.Effective Federal Funds Rate (%)	-0.081008	0.042123
-1.923 0.054		
L14.Loss Function	-0.000251	0.000886
-0.283 0.777		

=====

=====

Results for equation Log Currency in Circulation (\$ Bil)

=====

=====

t-stat	prob	coefficient	std. error

const		0.000122	0.000357
0.343 0.732			
L1.VIX		0.000070	0.000069
1.017 0.309			
L1.Log Total Assets		0.016319	0.010531
1.550 0.121			
L1.Log Currency in Circulation (\$ Bil)		1.365120	0.098418
13.871 0.000			
L1.Effective Federal Funds Rate (%)		-0.004007	0.002750
-1.457 0.145			
L1.Loss Function		-0.000067	0.000052
-1.287 0.198			
L2.VIX		-0.000122	0.000090
-1.352 0.176			
L2.Log Total Assets		-0.002269	0.017102

-0.133	0.894		
L2.Log Currency in Circulation (\$ Bil)		-0.379981	0.143389
-2.650	0.008		
L2.Effective Federal Funds Rate (%)		0.010831	0.004740
2.285	0.022		
L2.Loss Function		0.000195	0.000063
3.108	0.002		
L3.VIX		0.000131	0.000082
1.600	0.110		
L3.Log Total Assets		-0.000654	0.017062
-0.038	0.969		
L3.Log Currency in Circulation (\$ Bil)		0.080830	0.130929
0.617	0.537		
L3.Effective Federal Funds Rate (%)		-0.014876	0.005163
-2.881	0.004		
L3.Loss Function		-0.000103	0.000052
-1.986	0.047		
L4.VIX		-0.000120	0.000084
-1.424	0.155		
L4.Log Total Assets		-0.004976	0.017055
-0.292	0.770		
L4.Log Currency in Circulation (\$ Bil)		-0.041751	0.135905
-0.307	0.759		
L4.Effective Federal Funds Rate (%)		0.014753	0.005256
2.807	0.005		
L4.Loss Function		0.000036	0.000054
0.659	0.510		
L5.VIX		0.000102	0.000086
1.187	0.235		
L5.Log Total Assets		0.005024	0.017212
0.292	0.770		
L5.Log Currency in Circulation (\$ Bil)		-0.172039	0.134591
-1.278	0.201		
L5.Effective Federal Funds Rate (%)		-0.017205	0.005385
-3.195	0.001		
L5.Loss Function		-0.000045	0.000069
-0.660	0.509		
L6.VIX		-0.000113	0.000086
-1.322	0.186		
L6.Log Total Assets		-0.014024	0.015031
-0.933	0.351		
L6.Log Currency in Circulation (\$ Bil)		-0.088466	0.135796
-0.651	0.515		
L6.Effective Federal Funds Rate (%)		0.012189	0.005821
2.094	0.036		
L6.Loss Function		-0.000003	0.000074
-0.038	0.970		
L7.VIX		0.000147	0.000087
1.685	0.092		
L7.Log Total Assets		0.005070	0.013335
0.380	0.704		
L7.Log Currency in Circulation (\$ Bil)		0.322314	0.137952
2.336	0.019		
L7.Effective Federal Funds Rate (%)		-0.005819	0.005872
-0.991	0.322		
L7.Loss Function		-0.000015	0.000076
-0.201	0.841		

L8.VIX		-0.000186	0.000087
-2.143	0.032		
L8.Log Total Assets		-0.006078	0.013589
-0.447	0.655		
L8.Log Currency in Circulation (\$ Bil)		0.046991	0.144335
0.326	0.745		
L8.Effective Federal Funds Rate (%)		-0.000106	0.005801
-0.018	0.985		
L8.Loss Function		0.000084	0.000076
1.113	0.266		
L9.VIX		0.000087	0.000089
0.975	0.329		
L9.Log Total Assets		0.013695	0.014155
0.967	0.333		
L9.Log Currency in Circulation (\$ Bil)		-0.038976	0.143222
-0.272	0.786		
L9.Effective Federal Funds Rate (%)		0.007224	0.006512
1.109	0.267		
L9.Loss Function		-0.000084	0.000076
-1.105	0.269		
L10.VIX		0.000098	0.000087
1.129	0.259		
L10.Log Total Assets		-0.009282	0.013809
-0.672	0.501		
L10.Log Currency in Circulation (\$ Bil)		-0.243190	0.137214
-1.772	0.076		
L10.Effective Federal Funds Rate (%)		-0.000985	0.007359
-0.134	0.894		
L10.Loss Function		0.000019	0.000075
0.255	0.799		
L11.VIX		0.000014	0.000087
0.164	0.870		
L11.Log Total Assets		-0.005631	0.013710
-0.411	0.681		
L11.Log Currency in Circulation (\$ Bil)		0.311039	0.134015
2.321	0.020		
L11.Effective Federal Funds Rate (%)		0.000241	0.007318
0.033	0.974		
L11.Loss Function		0.000064	0.000074
0.870	0.384		
L12.VIX		-0.000090	0.000086
-1.042	0.298		
L12.Log Total Assets		0.013835	0.014128
0.979	0.327		
L12.Log Currency in Circulation (\$ Bil)		-0.849687	0.133953
-6.343	0.000		
L12.Effective Federal Funds Rate (%)		-0.001860	0.007282
-0.255	0.798		
L12.Loss Function		0.000006	0.000078
0.081	0.936		
L13.VIX		0.000019	0.000097
0.193	0.847		
L13.Log Total Assets		0.002060	0.014197
0.145	0.885		
L13.Log Currency in Circulation (\$ Bil)		0.884670	0.147827
5.984	0.000		
L13.Effective Federal Funds Rate (%)		0.002318	0.007086

0.327	0.744		
L13.Loss Function		0.000012	0.000101
0.114	0.909		
L14.VIX		-0.000041	0.000074
-0.552	0.581		
L14.Log Total Assets		-0.002404	0.008920
-0.270	0.788		
L14.Log Currency in Circulation (\$ Bil)		-0.237432	0.098999
-2.398	0.016		
L14.Effective Federal Funds Rate (%)		-0.003454	0.004252
-0.812	0.417		
L14.Loss Function		0.000017	0.000089
0.193	0.847		

=====

=====

Results for equation Effective Federal Funds Rate (%)

=====

=====

t-stat	prob	coefficient	std. error

const		-0.009429	0.013041
-0.723	0.470		
L1.VIX		-0.005089	0.002530
-2.012	0.044		
L1.Log Total Assets		0.343913	0.384522
0.894	0.371		
L1.Log Currency in Circulation (\$ Bil)		3.613703	3.593606
1.006	0.315		
L1.Effective Federal Funds Rate (%)		1.357181	0.100404
13.517	0.000		
L1.Loss Function		-0.000444	0.001913
-0.232	0.817		
L2.VIX		0.006102	0.003286
1.857	0.063		
L2.Log Total Assets		0.183566	0.624453
0.294	0.769		
L2.Log Currency in Circulation (\$ Bil)		3.170309	5.235669
0.606	0.545		
L2.Effective Federal Funds Rate (%)		-0.287793	0.173089
-1.663	0.096		
L2.Loss Function		-0.001910	0.002287
-0.835	0.404		
L3.VIX		-0.006459	0.002987
-2.162	0.031		
L3.Log Total Assets		0.474135	0.622982
0.761	0.447		
L3.Log Currency in Circulation (\$ Bil)		-6.305062	4.780698
-1.319	0.187		
L3.Effective Federal Funds Rate (%)		0.094660	0.188513
0.502	0.616		
L3.Loss Function		0.007313	0.001902
3.844	0.000		
L4.VIX		0.005612	0.003081
1.821	0.069		

L4.Log Total Assets	-0.654583	0.622732
-1.051 0.293		
L4.Log Currency in Circulation (\$ Bil)	-0.312876	4.962375
-0.063 0.950		
L4.Effective Federal Funds Rate (%)	-0.621447	0.191909
-3.238 0.001		
L4.Loss Function	-0.003970	0.001987
-1.998 0.046		
L5.VIX	0.001114	0.003147
0.354 0.723		
L5.Log Total Assets	-1.073113	0.628476
-1.707 0.088		
L5.Log Currency in Circulation (\$ Bil)	-0.664328	4.914416
-0.135 0.892		
L5.Effective Federal Funds Rate (%)	0.642073	0.196640
3.265 0.001		
L5.Loss Function	0.000009	0.002514
0.004 0.997		
L6.VIX	-0.001737	0.003135
-0.554 0.580		
L6.Log Total Assets	0.940673	0.548831
1.714 0.087		
L6.Log Currency in Circulation (\$ Bil)	5.062228	4.958419
1.021 0.307		
L6.Effective Federal Funds Rate (%)	-0.373179	0.212529
-1.756 0.079		
L6.Loss Function	-0.003862	0.002715
-1.422 0.155		
L7.VIX	-0.002433	0.003183
-0.764 0.445		
L7.Log Total Assets	0.400246	0.486917
0.822 0.411		
L7.Log Currency in Circulation (\$ Bil)	-6.168473	5.037146
-1.225 0.221		
L7.Effective Federal Funds Rate (%)	0.397862	0.214400
1.856 0.063		
L7.Loss Function	0.004874	0.002766
1.762 0.078		
L8.VIX	0.007565	0.003175
2.383 0.017		
L8.Log Total Assets	-0.480263	0.496177
-0.968 0.333		
L8.Log Currency in Circulation (\$ Bil)	6.476164	5.270196
1.229 0.219		
L8.Effective Federal Funds Rate (%)	0.084589	0.211800
0.399 0.690		
L8.Loss Function	-0.003154	0.002761
-1.143 0.253		
L9.VIX	-0.000671	0.003261
-0.206 0.837		
L9.Log Total Assets	-0.272412	0.516858
-0.527 0.598		
L9.Log Currency in Circulation (\$ Bil)	-4.386558	5.229541
-0.839 0.402		
L9.Effective Federal Funds Rate (%)	-0.031228	0.237773
-0.131 0.896		
L9.Loss Function	0.002001	0.002760

0.725	0.469		
L10.VIX		-0.002069	0.003183
-0.650	0.516		
L10.Log Total Assets		0.838034	0.504212
1.662	0.096		
L10.Log Currency in Circulation (\$ Bil)		3.774108	5.010183
0.753	0.451		
L10.Effective Federal Funds Rate (%)		-0.257650	0.268705
-0.959	0.338		
L10.Loss Function		0.002546	0.002741
0.929	0.353		
L11.VIX		0.000635	0.003178
0.200	0.842		
L11.Log Total Assets		-0.423313	0.500600
-0.846	0.398		
L11.Log Currency in Circulation (\$ Bil)		-5.951021	4.893386
-1.216	0.224		
L11.Effective Federal Funds Rate (%)		0.034033	0.267201
0.127	0.899		
L11.Loss Function		-0.011044	0.002692
-4.103	0.000		
L12.VIX		0.001893	0.003152
0.600	0.548		
L12.Log Total Assets		-0.533011	0.515870
-1.033	0.301		
L12.Log Currency in Circulation (\$ Bil)		2.472283	4.891099
0.505	0.613		
L12.Effective Federal Funds Rate (%)		-0.305169	0.265889
-1.148	0.251		
L12.Loss Function		0.007244	0.002850
2.541	0.011		
L13.VIX		-0.002745	0.003526
-0.779	0.436		
L13.Log Total Assets		-0.090691	0.518368
-0.175	0.861		
L13.Log Currency in Circulation (\$ Bil)		9.383812	5.397702
1.738	0.082		
L13.Effective Federal Funds Rate (%)		0.203987	0.258742
0.788	0.430		
L13.Loss Function		-0.000852	0.003689
-0.231	0.817		
L14.VIX		-0.000155	0.002685
-0.058	0.954		
L14.Log Total Assets		0.675359	0.325702
2.074	0.038		
L14.Log Currency in Circulation (\$ Bil)		-7.933705	3.614815
-2.195	0.028		
L14.Effective Federal Funds Rate (%)		0.070564	0.155269
0.454	0.649		
L14.Loss Function		0.001145	0.003265
0.351	0.726		

=====

=====

Results for equation Loss Function

=====

=====

t-stat	prob	coefficient	std. error

const		-0.190766	0.646532
-0.295	0.768		
L1.VIX		-0.409297	0.125413
-3.264	0.001		
L1.Log Total Assets		42.208990	19.063285
2.214	0.027		
L1.Log Currency in Circulation (\$ Bil)		-338.928010	178.158700
-1.902	0.057		
L1.Effective Federal Funds Rate (%)		27.508178	4.977687
5.526	0.000		
L1.Loss Function		0.915821	0.094860
9.654	0.000		
L2.VIX		0.350153	0.162907
2.149	0.032		
L2.Log Total Assets		-43.604064	30.958241
-1.408	0.159		
L2.Log Currency in Circulation (\$ Bil)		594.635586	259.566593
2.291	0.022		
L2.Effective Federal Funds Rate (%)		-41.448559	8.581140
-4.830	0.000		
L2.Loss Function		-0.155968	0.113404
-1.375	0.169		
L3.VIX		-0.086644	0.148082
-0.585	0.558		
L3.Log Total Assets		-34.424732	30.885334
-1.115	0.265		
L3.Log Currency in Circulation (\$ Bil)		-584.194957	237.010671
-2.465	0.014		
L3.Effective Federal Funds Rate (%)		17.227121	9.345832
1.843	0.065		
L3.Loss Function		0.170498	0.094308
1.808	0.071		
L4.VIX		0.363777	0.152749
2.382	0.017		
L4.Log Total Assets		21.325961	30.872901
0.691	0.490		
L4.Log Currency in Circulation (\$ Bil)		399.054687	246.017595
1.622	0.105		
L4.Effective Federal Funds Rate (%)		-13.346234	9.514204
-1.403	0.161		
L4.Loss Function		-0.263163	0.098520
-2.671	0.008		
L5.VIX		-0.384378	0.156025
-2.464	0.014		
L5.Log Total Assets		-2.694022	31.157704
-0.086	0.931		
L5.Log Currency in Circulation (\$ Bil)		213.315950	243.639936
0.876	0.381		
L5.Effective Federal Funds Rate (%)		19.663740	9.748720
2.017	0.044		
L5.Loss Function		0.247588	0.124656
1.986	0.047		
L6.VIX		0.383297	0.155437

2.466	0.014		
L6.Log Total Assets		23.523498	27.209142
0.865	0.387		
L6.Log Currency in Circulation (\$ Bil)		-314.494276	245.821447
-1.279	0.201		
L6.Effective Federal Funds Rate (%)		2.276795	10.536437
0.216	0.829		
L6.Loss Function		-0.067405	0.134611
-0.501	0.617		
L7.VIX		-0.143476	0.157803
-0.909	0.363		
L7.Log Total Assets		-33.879782	24.139659
-1.403	0.160		
L7.Log Currency in Circulation (\$ Bil)		179.305931	249.724469
0.718	0.473		
L7.Effective Federal Funds Rate (%)		-20.821410	10.629213
-1.959	0.050		
L7.Loss Function		0.054980	0.137111
0.401	0.688		
L8.VIX		-0.164680	0.157411
-1.046	0.295		
L8.Log Total Assets		2.651711	24.598751
0.108	0.914		
L8.Log Currency in Circulation (\$ Bil)		-233.190590	261.278283
-0.892	0.372		
L8.Effective Federal Funds Rate (%)		6.815138	10.500311
0.649	0.516		
L8.Loss Function		0.015742	0.136875
0.115	0.908		
L9.VIX		0.129774	0.161683
0.803	0.422		
L9.Log Total Assets		-2.974383	25.624056
-0.116	0.908		
L9.Log Currency in Circulation (\$ Bil)		203.754200	259.262750
0.786	0.432		
L9.Effective Federal Funds Rate (%)		-17.542138	11.787997
-1.488	0.137		
L9.Loss Function		-0.123878	0.136837
-0.905	0.365		
L10.VIX		-0.265439	0.157793
-1.682	0.093		
L10.Log Total Assets		28.089192	24.997117
1.124	0.261		
L10.Log Currency in Circulation (\$ Bil)		107.520487	248.387749
0.433	0.665		
L10.Effective Federal Funds Rate (%)		32.096070	13.321475
2.409	0.016		
L10.Loss Function		0.092644	0.135880
0.682	0.495		
L11.VIX		0.061824	0.157545
0.392	0.695		
L11.Log Total Assets		-5.526096	24.818021
-0.223	0.824		
L11.Log Currency in Circulation (\$ Bil)		-178.437753	242.597370
-0.736	0.462		
L11.Effective Federal Funds Rate (%)		-24.103422	13.246895
-1.820	0.069		

L11.Loss Function	-0.019905	0.133443
-0.149 0.881		
L12.VIX	0.089161	0.156261
0.571 0.568		
L12.Log Total Assets	-18.298459	25.575053
-0.715 0.474		
L12.Log Currency in Circulation (\$ Bil)	138.869337	242.483962
0.573 0.567		
L12.Effective Federal Funds Rate (%)	21.172654	13.181872
1.606 0.108		
L12.Loss Function	-1.273299	0.141310
-9.011 0.000		
L13.VIX	-0.311569	0.174799
-1.782 0.075		
L13.Log Total Assets	58.651389	25.698909
2.282 0.022		
L13.Log Currency in Circulation (\$ Bil)	-453.841680	267.599617
-1.696 0.090		
L13.Effective Federal Funds Rate (%)	-11.962509	12.827545
-0.933 0.351		
L13.Loss Function	1.068202	0.182867
5.841 0.000		
L14.VIX	0.198640	0.133113
1.492 0.136		
L14.Log Total Assets	-46.620449	16.147209
-2.887 0.004		
L14.Log Currency in Circulation (\$ Bil)	298.003755	179.210169
1.663 0.096		
L14.Effective Federal Funds Rate (%)	3.852562	7.697710
0.500 0.617		
L14.Loss Function	-0.081028	0.161847
-0.501 0.617		

=====

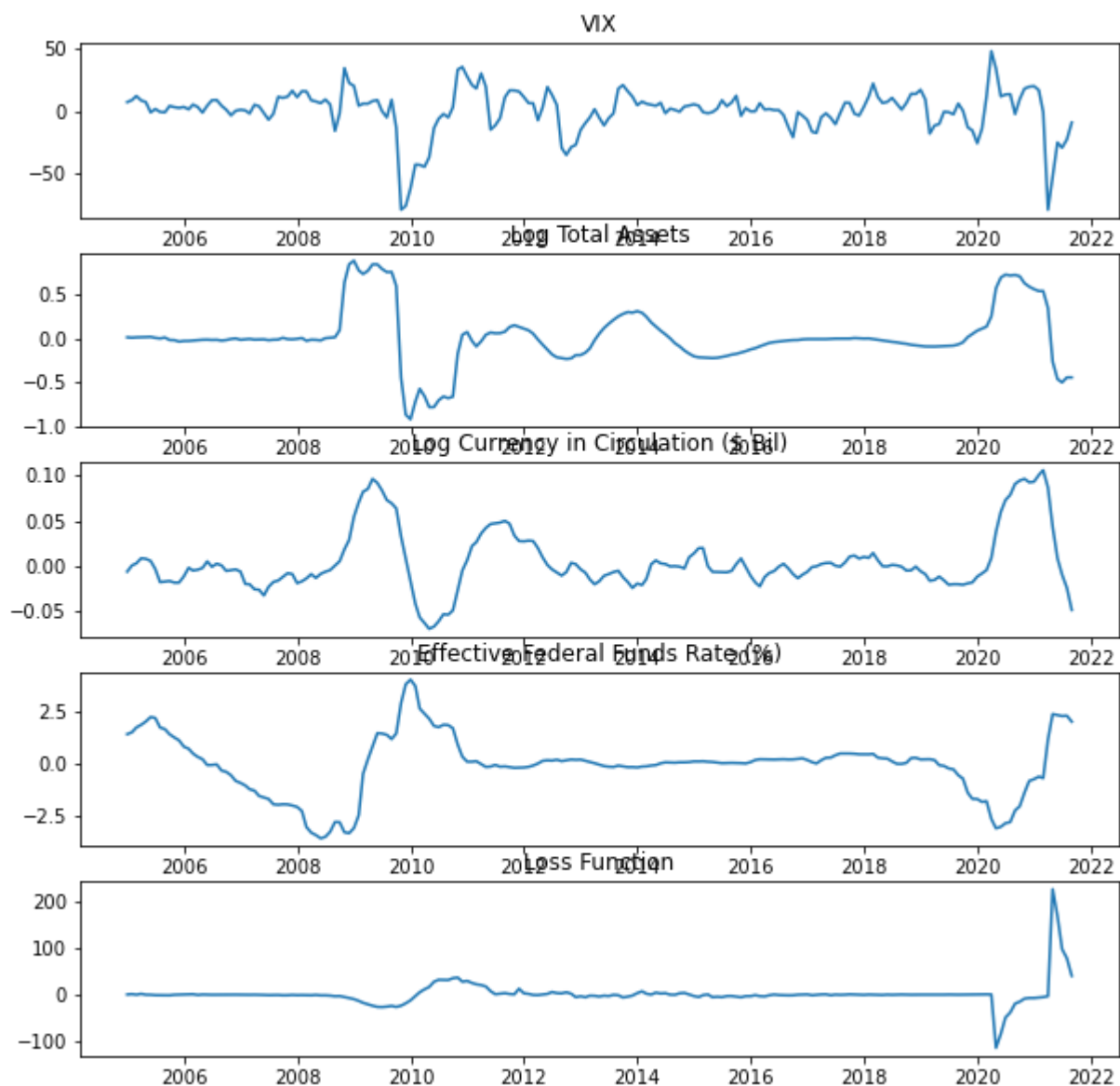
=====

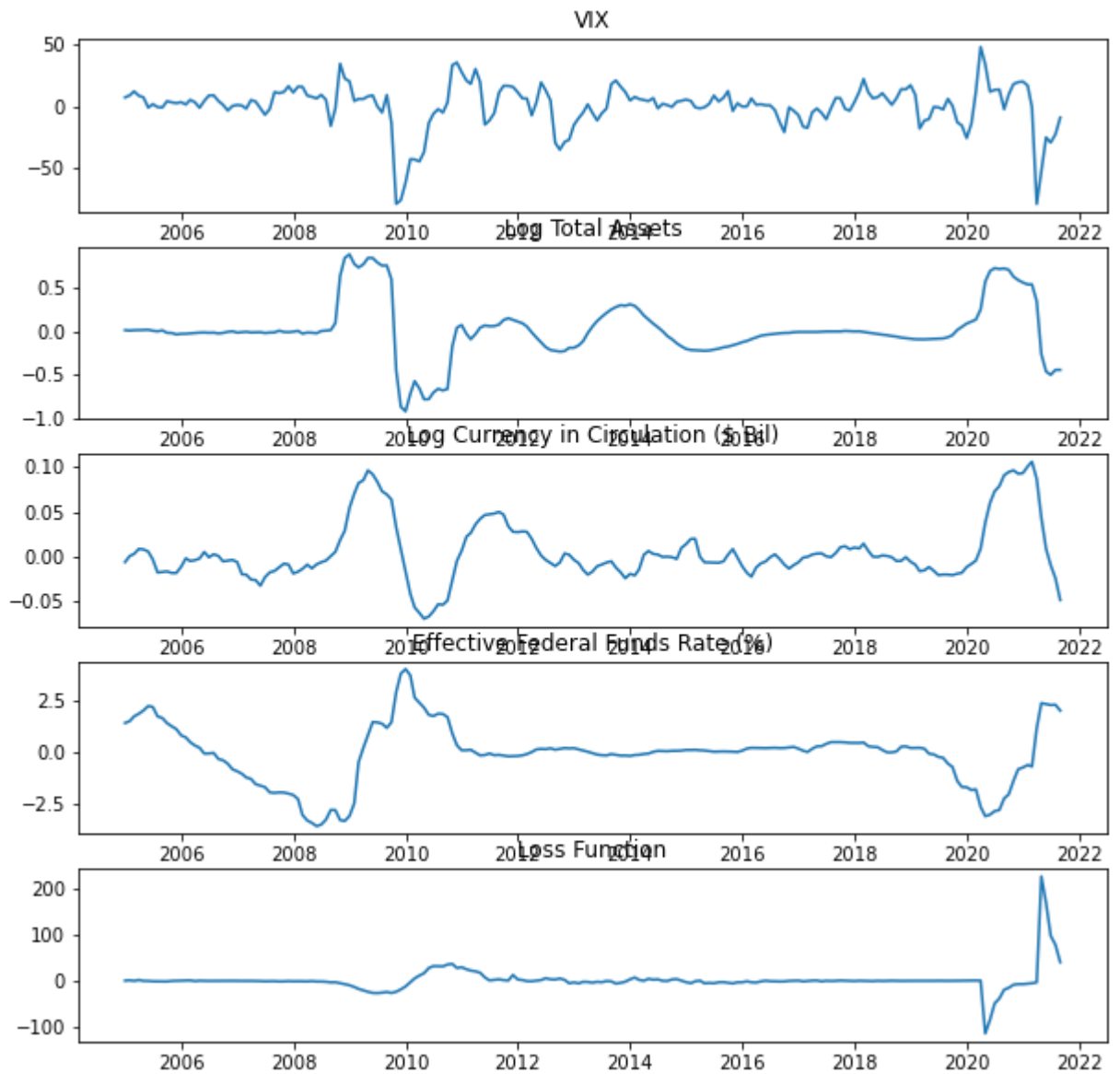
Correlation matrix of residuals

	VIX	Log Total Assets	Log Currency in Circulation (\$ Bil)	Effective Federal Funds Rate (%)	Loss Function
VIX	1.000000				0.386935
0.014807	-0.346480	0.141017			
Log Total Assets	0.386935	1.000000			
0.245548	-0.324200	-0.307548			
Log Currency in Circulation (\$ Bil)	0.014807	0.245548			
1.000000	0.059199	-0.341833			
Effective Federal Funds Rate (%)	-0.346480	-0.324200			
0.059199	1.000000	0.032767			
Loss Function	0.141017	-0.307548			
-0.341833	0.032767	1.000000			

```
In [20]: results.plot()
```

```
Out[20]:
```





```
In [21]: train_df=df[:-12]
         test_df=df[-12:]
```

```
In [22]: model = VAR(train_df)
```

C:\Users\poma.gupta\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:524: ValueWarning: No frequency information was provided, so inferred frequency M will be used.
 warnings.warn('No frequency information was')

```
In [23]: from statsmodels.tsa.statespace.varmax import VARMAX
```

```
var_model = VARMAX(train_df, order=(14,0),enforce_stationarity= True)
fitted_model = var_model.fit(dis=False)
print(fitted_model.summary())
```

```
C:\Users\proma.gupta\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:524: ValueWarning: No frequency information was provided, so inferred frequency M will be used.
```

```
warnings.warn('No frequency information was')
C:\Users\proma.gupta\Anaconda3\lib\site-packages\statsmodels\tsa\statespace\varmax.py:374: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
```

```
warn('Non-stationary starting autoregressive parameters')
C:\Users\proma.gupta\Anaconda3\lib\site-packages\statsmodels\base\model.py:566: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
```

```
warnings.warn("Maximum Likelihood optimization failed to "
```

S

tatespace Model Results

```
=====
=====
=====
```

```
Dep. Variable:      ['VIX', 'Log Total Assets', 'Log Currency in Circulation ($
Bil)', 'Effective Federal Funds Rate (%)', 'Loss Function']  No. Observations:
189
```

Model:

```
VAR(14)    Log Likelihood                -943.495
```

```
+ intercept    AIC                        2626.989
```

Date:

```
Thu, 17 Mar 2022    BIC                        3826.436
```

Time:

```
15:31:58    HQIC                        3112.914
```

Sample:

```
12-31-2004
```

```
- 08-31-2020
```

Covariance Type:

opg

```
=====
=====
```

```
Ljung-Box (L1) (Q):      25.39, 114.44, 86.35, 132.76, 18.41    Jarque-Bera (JB):
11.39, 9.31, 3.16, 33.73, 12736.30
```

```
Prob(Q):                0.00, 0.00, 0.00, 0.00, 0.00    Prob(JB):
```

```
0.00, 0.01, 0.21, 0.00, 0.00
```

```
Heteroskedasticity (H):    0.87, 0.49, 0.76, 0.50, 3.69    Skew:
```

```
0.02, 0.19, -0.14, 0.35, -4.32
```

```
Prob(H) (two-sided):      0.59, 0.01, 0.28, 0.01, 0.00    Kurtosis:
```

```
4.20, 4.02, 3.56, 4.95, 42.27
```

Results for equation VIX

```
=====
=====
```

```
coef      std err      z      P
```


>|z| [0.025 0.975]

intercept			0.9603	0.599	1.604
0.109	-0.213	2.134			
L1.VIX			0.7049	0.260	2.712
0.007	0.196	1.214			
L1.Log Total Assets			-20.5032	0.052	-397.925
0.000	-20.604	-20.402			
L1.Log Currency in Circulation (\$ Bil)			74.0762	0.007	1.11e+04
0.000	74.063	74.089			
L1.Effective Federal Funds Rate (%)			2.2502	0.283	7.956
0.000	1.696	2.805			
L1.Loss Function			0.0985	0.397	0.248
0.804	-0.679	0.876			
L2.VIX			0.1274	0.314	0.406
0.685	-0.488	0.743			
L2.Log Total Assets			2.5800	0.047	54.983
0.000	2.488	2.672			
L2.Log Currency in Circulation (\$ Bil)			-25.9644	0.008	-3299.718
0.000	-25.980	-25.949			
L2.Effective Federal Funds Rate (%)			2.3976	0.243	9.859
0.000	1.921	2.874			
L2.Loss Function			-0.1121	0.465	-0.241
0.810	-1.024	0.800			
L3.VIX			-0.2815	0.344	-0.819
0.413	-0.955	0.392			
L3.Log Total Assets			12.3939	0.048	260.746
0.000	12.301	12.487			
L3.Log Currency in Circulation (\$ Bil)			-34.6931	0.006	-6144.533
0.000	-34.704	-34.682			
L3.Effective Federal Funds Rate (%)			-0.4100	0.232	-1.765
0.078	-0.865	0.045			
L3.Loss Function			0.0531	0.472	0.112
0.910	-0.872	0.978			
L4.VIX			0.0652	0.330	0.198
0.843	-0.582	0.712			
L4.Log Total Assets			3.6409	0.055	66.367
0.000	3.533	3.748			
L4.Log Currency in Circulation (\$ Bil)			-2.0970	0.005	-438.529
0.000	-2.106	-2.088			
L4.Effective Federal Funds Rate (%)			-1.3408	0.217	-6.192
0.000	-1.765	-0.916			
L4.Loss Function			0.0447	0.491	0.091
0.927	-0.917	1.007			
L5.VIX			0.1081	0.400	0.270
0.787	-0.676	0.892			
L5.Log Total Assets			-2.9185	0.069	-42.120
0.000	-3.054	-2.783			
L5.Log Currency in Circulation (\$ Bil)			-10.8006	0.005	-1976.692
0.000	-10.811	-10.790			
L5.Effective Federal Funds Rate (%)			-2.3227	0.186	-12.513
0.000	-2.687	-1.959			
L5.Loss Function			-0.2059	0.531	-0.388
0.698	-1.247	0.835			
L6.VIX			-0.1751	0.356	-0.492
0.623	-0.873	0.522			

L6.Log Total Assets	-6.4487	0.084	-76.490
0.000 -6.614 -6.283			
L6.Log Currency in Circulation (\$ Bil)	52.6363	0.007	7686.747
0.000 52.623 52.650			
L6.Effective Federal Funds Rate (%)	-2.8261	0.154	-18.408
0.000 -3.127 -2.525			
L6.Loss Function	0.2058	0.570	0.361
0.718 -0.910 1.322			
L7.VIX	0.1273	0.330	0.386
0.700 -0.520 0.774			
L7.Log Total Assets	-18.4971	0.089	-208.418
0.000 -18.671 -18.323			
L7.Log Currency in Circulation (\$ Bil)	66.6855	0.004	1.51e+04
0.000 66.677 66.694			
L7.Effective Federal Funds Rate (%)	-3.0481	0.171	-17.808
0.000 -3.384 -2.713			
L7.Loss Function	0.0775	0.448	0.173
0.862 -0.800 0.955			
L8.VIX	0.2733	0.460	0.594
0.552 -0.628 1.174			
L8.Log Total Assets	-6.3479	0.078	-81.065
0.000 -6.501 -6.194			
L8.Log Currency in Circulation (\$ Bil)	16.1725	0.006	2504.348
0.000 16.160 16.185			
L8.Effective Federal Funds Rate (%)	-2.2752	0.174	-13.086
0.000 -2.616 -1.934			
L8.Loss Function	-0.0367	0.623	-0.059
0.953 -1.258 1.184			
L9.VIX	-0.1818	0.435	-0.418
0.676 -1.034 0.670			
L9.Log Total Assets	10.2542	0.062	164.296
0.000 10.132 10.377			
L9.Log Currency in Circulation (\$ Bil)	-28.8895	0.011	-2735.604
0.000 -28.910 -28.869			
L9.Effective Federal Funds Rate (%)	-0.8909	0.208	-4.274
0.000 -1.299 -0.482			
L9.Loss Function	-0.0640	0.489	-0.131
0.896 -1.022 0.894			
L10.VIX	-0.1782	0.382	-0.467
0.641 -0.927 0.570			
L10.Log Total Assets	13.2465	0.073	180.245
0.000 13.102 13.391			
L10.Log Currency in Circulation (\$ Bil)	-40.7468	0.008	-4879.176
0.000 -40.763 -40.730			
L10.Effective Federal Funds Rate (%)	0.2134	0.225	0.947
0.344 -0.228 0.655			
L10.Loss Function	-0.1525	0.680	-0.224
0.822 -1.484 1.180			
L11.VIX	0.0157	0.381	0.041
0.967 -0.731 0.762			
L11.Log Total Assets	8.5578	0.075	113.947
0.000 8.411 8.705			
L11.Log Currency in Circulation (\$ Bil)	-22.7288	0.008	-2725.958
0.000 -22.745 -22.712			
L11.Effective Federal Funds Rate (%)	1.7462	0.260	6.713
0.000 1.236 2.256			
L11.Loss Function	-0.1471	0.632	-0.233

0.816	-1.386	1.092			
L12.VIX			-0.5691	0.405	-1.405
0.160	-1.363	0.225			
L12.Log Total Assets			9.0964	0.086	105.163
0.000	8.927	9.266			
L12.Log Currency in Circulation (\$ Bil)			8.3395	0.008	1020.940
0.000	8.323	8.355			
L12.Effective Federal Funds Rate (%)			1.1633	0.210	5.551
0.000	0.753	1.574			
L12.Loss Function			0.1532	0.532	0.288
0.773	-0.890	1.196			
L13.VIX			-0.0354	0.399	-0.089
0.929	-0.818	0.747			
L13.Log Total Assets			-1.8218	0.097	-18.772
0.000	-2.012	-1.632			
L13.Log Currency in Circulation (\$ Bil)			25.1990	0.011	2340.242
0.000	25.178	25.220			
L13.Effective Federal Funds Rate (%)			3.0472	0.240	12.709
0.000	2.577	3.517			
L13.Loss Function			0.1255	0.652	0.192
0.847	-1.153	1.404			
L14.VIX			0.5606	0.289	1.941
0.052	-0.005	1.127			
L14.Log Total Assets			-12.4653	0.100	-124.277
0.000	-12.662	-12.269			
L14.Log Currency in Circulation (\$ Bil)			37.5954	0.010	3664.909
0.000	37.575	37.615			
L14.Effective Federal Funds Rate (%)			4.0698	0.312	13.029
0.000	3.458	4.682			
L14.Loss Function			0.0324	0.635	0.051
0.959	-1.212	1.276			

Results for equation Log Total Assets

			coef	std err	z	P
> z	[0.025	0.975]				

intercept			0.0415	0.072	0.576	
0.565	-0.100	0.183				
L1.VIX			0.0064	0.014	0.442	
0.659	-0.022	0.035				
L1.Log Total Assets			-0.0462	0.276	-0.167	
0.867	-0.587	0.495				
L1.Log Currency in Circulation (\$ Bil)			-0.5566	0.312	-1.785	
0.074	-1.168	0.055				
L1.Effective Federal Funds Rate (%)			0.0213	0.364	0.059	
0.953	-0.691	0.734				
L1.Loss Function			0.0007	0.043	0.016	
0.987	-0.083	0.085				
L2.VIX			0.0015	0.013	0.119	
0.905	-0.024	0.027				
L2.Log Total Assets			0.2285	0.416	0.549	
0.583	-0.588	1.045				
L2.Log Currency in Circulation (\$ Bil)			-1.2260	0.232	-5.281	
0.000	-1.681	-0.771				
L2.Effective Federal Funds Rate (%)			0.0239	0.369	0.065	

0.948	-0.699	0.747			
L2.Loss Function			-0.0012	0.046	-0.026
0.980	-0.091	0.089			
L3.VIX			-0.0042	0.014	-0.301
0.764	-0.031	0.023			
L3.Log Total Assets			0.3095	0.337	0.919
0.358	-0.351	0.970			
L3.Log Currency in Circulation (\$ Bil)			-0.9898	0.136	-7.269
0.000	-1.257	-0.723			
L3.Effective Federal Funds Rate (%)			0.0014	0.346	0.004
0.997	-0.677	0.680			
L3.Loss Function			0.0016	0.024	0.065
0.948	-0.046	0.049			
L4.VIX			-0.0011	0.015	-0.075
0.940	-0.030	0.028			
L4.Log Total Assets			0.2235	0.428	0.522
0.602	-0.615	1.062			
L4.Log Currency in Circulation (\$ Bil)			-0.7619	0.283	-2.696
0.007	-1.316	-0.208			
L4.Effective Federal Funds Rate (%)			-0.0116	0.386	-0.030
0.976	-0.769	0.745			
L4.Loss Function			8.956e-05	0.019	0.005
0.996	-0.037	0.037			
L5.VIX			-0.0010	0.013	-0.074
0.941	-0.027	0.025			
L5.Log Total Assets			0.1553	0.459	0.338
0.735	-0.745	1.055			
L5.Log Currency in Circulation (\$ Bil)			-0.4431	0.285	-1.557
0.119	-1.001	0.115			
L5.Effective Federal Funds Rate (%)			-0.0331	0.394	-0.084
0.933	-0.805	0.739			
L5.Loss Function			-9.626e-05	0.046	-0.002
0.998	-0.090	0.090			
L6.VIX			-0.0038	0.011	-0.340
0.734	-0.026	0.018			
L6.Log Total Assets			0.0772	0.469	0.165
0.869	-0.842	0.996			
L6.Log Currency in Circulation (\$ Bil)			0.2095	0.275	0.763
0.446	-0.329	0.748			
L6.Effective Federal Funds Rate (%)			-0.0529	0.420	-0.126
0.900	-0.877	0.771			
L6.Loss Function			0.0026	0.045	0.058
0.954	-0.085	0.090			
L7.VIX			-0.0003	0.015	-0.017
0.986	-0.029	0.028			
L7.Log Total Assets			-0.1101	0.593	-0.186
0.853	-1.272	1.052			
L7.Log Currency in Circulation (\$ Bil)			0.5429	0.292	1.857
0.063	-0.030	1.116			
L7.Effective Federal Funds Rate (%)			-0.0686	0.447	-0.153
0.878	-0.945	0.807			
L7.Loss Function			0.0007	0.050	0.015
0.988	-0.096	0.098			
L8.VIX			0.0010	0.014	0.074
0.941	-0.026	0.028			
L8.Log Total Assets			-0.0241	0.627	-0.038
0.969	-1.254	1.206			

L8.Log Currency in Circulation (\$ Bil)	0.1435	0.345	0.416
0.677 -0.533 0.819			
L8.Effective Federal Funds Rate (%)	-0.0729	0.436	-0.167
0.867 -0.928 0.782			
L8.Loss Function	-0.0008	0.056	-0.015
0.988 -0.110 0.108			
L9.VIX	-0.0028	0.012	-0.229
0.819 -0.027 0.022			
L9.Log Total Assets	0.1422	0.399	0.356
0.722 -0.640 0.925			
L9.Log Currency in Circulation (\$ Bil)	-0.2330	0.220	-1.060
0.289 -0.664 0.198			
L9.Effective Federal Funds Rate (%)	-0.0351	0.465	-0.076
0.940 -0.947 0.877			
L9.Loss Function	-0.0010	0.044	-0.023
0.981 -0.088 0.086			
L10.VIX	-0.0023	0.011	-0.202
0.840 -0.024 0.020			
L10.Log Total Assets	0.1123	0.345	0.326
0.745 -0.564 0.788			
L10.Log Currency in Circulation (\$ Bil)	-0.1874	0.178	-1.054
0.292 -0.536 0.161			
L10.Effective Federal Funds Rate (%)	0.0076	0.413	0.018
0.985 -0.801 0.816			
L10.Loss Function	-0.0021	0.045	-0.046
0.964 -0.090 0.086			
L11.VIX	0.0015	0.014	0.109
0.913 -0.026 0.029			
L11.Log Total Assets	-0.0666	0.278	-0.239
0.811 -0.612 0.479			
L11.Log Currency in Circulation (\$ Bil)	0.2757	0.320	0.862
0.389 -0.351 0.902			
L11.Effective Federal Funds Rate (%)	0.0482	0.400	0.121
0.904 -0.736 0.832			
L11.Loss Function	-0.0020	0.038	-0.053
0.957 -0.076 0.072			
L12.VIX	-0.0032	0.017	-0.187
0.851 -0.036 0.030			
L12.Log Total Assets	-0.1963	0.654	-0.300
0.764 -1.479 1.086			
L12.Log Currency in Circulation (\$ Bil)	0.8530	0.205	4.166
0.000 0.452 1.254			
L12.Effective Federal Funds Rate (%)	0.0396	0.402	0.098
0.922 -0.749 0.828			
L12.Loss Function	0.0012	0.029	0.041
0.968 -0.056 0.058			
L13.VIX	0.0013	0.018	0.070
0.944 -0.034 0.036			
L13.Log Total Assets	-0.2051	0.366	-0.560
0.576 -0.923 0.513			
L13.Log Currency in Circulation (\$ Bil)	0.6692	0.204	3.286
0.001 0.270 1.068			
L13.Effective Federal Funds Rate (%)	0.0467	0.422	0.111
0.912 -0.781 0.874			
L13.Loss Function	0.0009	0.036	0.024
0.981 -0.070 0.072			
L14.VIX	0.0067	0.015	0.446

0.656	-0.023	0.036			
L14.Log Total Assets			-0.1564	0.496	-0.315
0.753	-1.129	0.816			
L14.Log Currency in Circulation (\$ Bil)			0.1301	0.208	0.625
0.532	-0.278	0.538			
L14.Effective Federal Funds Rate (%)			0.0424	0.388	0.109
0.913	-0.718	0.803			
L14.Loss Function			-0.0020	0.037	-0.053
0.958	-0.075	0.071			

Results for equation Log Currency in Circulation (\$ B
il)

=====

			coef	std err	z	P
> z	[0.025	0.975]				

intercept			0.0079	0.029	0.269	
0.788	-0.049	0.065				
L1.VIX			1.141e-05	0.006	0.002	
0.998	-0.011	0.012				
L1.Log Total Assets			0.0179	0.321	0.056	
0.955	-0.611	0.647				
L1.Log Currency in Circulation (\$ Bil)			-0.1228	0.571	-0.215	
0.830	-1.242	0.996				
L1.Effective Federal Funds Rate (%)			0.0004	0.144	0.003	
0.998	-0.281	0.282				
L1.Loss Function			-8.124e-05	0.012	-0.007	
0.995	-0.025	0.024				
L2.VIX			9.48e-05	0.005	0.017	
0.986	-0.011	0.011				
L2.Log Total Assets			0.0146	0.382	0.038	
0.969	-0.734	0.764				
L2.Log Currency in Circulation (\$ Bil)			-0.0685	0.393	-0.174	
0.862	-0.840	0.703				
L2.Effective Federal Funds Rate (%)			0.0006	0.181	0.003	
0.997	-0.354	0.355				
L2.Loss Function			-2.718e-05	0.016	-0.002	
0.999	-0.032	0.032				
L3.VIX			-0.0002	0.005	-0.034	
0.973	-0.011	0.011				
L3.Log Total Assets			0.0172	0.286	0.060	
0.952	-0.544	0.579				
L3.Log Currency in Circulation (\$ Bil)			-0.0547	0.492	-0.111	
0.911	-1.018	0.909				
L3.Effective Federal Funds Rate (%)			8.751e-05	0.193	0.000	
1.000	-0.379	0.379				
L3.Loss Function			7.875e-05	0.011	0.007	
0.994	-0.022	0.022				
L4.VIX			-0.0001	0.005	-0.026	
0.979	-0.010	0.010				
L4.Log Total Assets			0.0155	0.351	0.044	
0.965	-0.673	0.704				
L4.Log Currency in Circulation (\$ Bil)			-0.0524	0.561	-0.093	
0.926	-1.153	1.048				
L4.Effective Federal Funds Rate (%)			-0.0004	0.190	-0.002	
0.998	-0.372	0.372				

L4.Loss Function			-8.285e-06	0.012	-0.001
0.999	-0.024	0.024			
L5.VIX			-0.0001	0.004	-0.025
0.980	-0.009	0.009			
L5.Log Total Assets			0.0118	0.350	0.034
0.973	-0.675	0.698			
L5.Log Currency in Circulation (\$ Bil)			-0.0191	0.675	-0.028
0.977	-1.343	1.304			
L5.Effective Federal Funds Rate (%)			-0.0015	0.175	-0.009
0.993	-0.345	0.342			
L5.Loss Function			0.0001	0.017	0.006
0.995	-0.033	0.033			
L6.VIX			-0.0002	0.005	-0.036
0.971	-0.010	0.010			
L6.Log Total Assets			0.0061	0.326	0.019
0.985	-0.632	0.644			
L6.Log Currency in Circulation (\$ Bil)			0.0041	0.483	0.008
0.993	-0.943	0.952			
L6.Effective Federal Funds Rate (%)			-0.0028	0.215	-0.013
0.990	-0.424	0.419			
L6.Loss Function			0.0001	0.017	0.007
0.995	-0.034	0.034			
L7.VIX			-6.111e-05	0.007	-0.009
0.993	-0.014	0.013			
L7.Log Total Assets			-0.0032	0.484	-0.007
0.995	-0.952	0.946			
L7.Log Currency in Circulation (\$ Bil)			0.0251	0.515	0.049
0.961	-0.984	1.034			
L7.Effective Federal Funds Rate (%)			-0.0039	0.157	-0.025
0.980	-0.312	0.304			
L7.Loss Function			5.04e-05	0.020	0.002
0.998	-0.040	0.040			
L8.VIX			-1.695e-05	0.006	-0.003
0.998	-0.013	0.013			
L8.Log Total Assets			-0.0024	0.514	-0.005
0.996	-1.009	1.005			
L8.Log Currency in Circulation (\$ Bil)			0.0156	0.518	0.030
0.976	-1.000	1.031			
L8.Effective Federal Funds Rate (%)			-0.0046	0.187	-0.024
0.980	-0.371	0.362			
L8.Loss Function			-1.636e-05	0.023	-0.001
0.999	-0.045	0.045			
L9.VIX			-9.596e-05	0.006	-0.016
0.988	-0.012	0.012			
L9.Log Total Assets			0.0037	0.452	0.008
0.994	-0.883	0.890			
L9.Log Currency in Circulation (\$ Bil)			0.0018	0.373	0.005
0.996	-0.729	0.732			
L9.Effective Federal Funds Rate (%)			-0.0024	0.232	-0.010
0.992	-0.457	0.452			
L9.Loss Function			-2.96e-05	0.018	-0.002
0.999	-0.035	0.035			
L10.VIX			-6.128e-05	0.005	-0.011
0.991	-0.011	0.011			
L10.Log Total Assets			0.0017	0.416	0.004
0.997	-0.814	0.817			
L10.Log Currency in Circulation (\$ Bil)			0.0025	0.310	0.008

0.994	-0.604	0.609			
L10.Effective Federal Funds Rate (%)			0.0002	0.272	0.001
0.999	-0.533	0.533			
L10.Loss Function			-9.089e-05	0.014	-0.006
0.995	-0.028	0.028			
L11.VIX			8.946e-05	0.006	0.015
0.988	-0.012	0.012			
L11.Log Total Assets			-0.0076	0.323	-0.023
0.981	-0.640	0.625			
L11.Log Currency in Circulation (\$ Bil)			0.0223	0.634	0.035
0.972	-1.220	1.265			
L11.Effective Federal Funds Rate (%)			0.0026	0.252	0.010
0.992	-0.492	0.497			
L11.Loss Function			-9.562e-05	0.011	-0.008
0.993	-0.022	0.022			
L12.VIX			-2.825e-05	0.007	-0.004
0.997	-0.014	0.014			
L12.Log Total Assets			-0.0161	0.314	-0.051
0.959	-0.632	0.600			
L12.Log Currency in Circulation (\$ Bil)			0.0477	0.466	0.102
0.918	-0.865	0.960			
L12.Effective Federal Funds Rate (%)			0.0024	0.238	0.010
0.992	-0.463	0.468			
L12.Loss Function			1.485e-05	0.012	0.001
0.999	-0.023	0.023			
L13.VIX			4.352e-05	0.008	0.006
0.995	-0.015	0.015			
L13.Log Total Assets			-0.0113	0.356	-0.032
0.975	-0.709	0.686			
L13.Log Currency in Circulation (\$ Bil)			0.0281	0.394	0.071
0.943	-0.745	0.801			
L13.Effective Federal Funds Rate (%)			0.0024	0.211	0.011
0.991	-0.412	0.417			
L13.Loss Function			2.633e-05	0.014	0.002
0.998	-0.027	0.027			
L14.VIX			0.0002	0.006	0.039
0.969	-0.012	0.013			
L14.Log Total Assets			-0.0040	0.244	-0.016
0.987	-0.482	0.474			
L14.Log Currency in Circulation (\$ Bil)			-0.0159	0.458	-0.035
0.972	-0.913	0.882			
L14.Effective Federal Funds Rate (%)			0.0018	0.152	0.012
0.990	-0.295	0.299			
L14.Loss Function			-0.0002	0.013	-0.012
0.990	-0.026	0.025			

Results for equation Effective Federal Funds Rate

(%)

=====

			coef	std err	z	P
--	--	--	------	---------	---	---

>|z| [0.025 0.975]

intercept			-0.0032	0.348	-0.009	
0.993	-0.685	0.679				
L1.VIX			-0.0090	0.058	-0.154	
0.878	-0.123	0.105				

L1.Log Total Assets	0.7862	0.405	1.942
0.052 -0.007 1.580			
L1.Log Currency in Circulation (\$ Bil)	-0.2974	0.036	-8.278
0.000 -0.368 -0.227			
L1.Effective Federal Funds Rate (%)	0.1417	0.727	0.195
0.845 -1.283 1.567			
L1.Loss Function	0.0004	0.118	0.004
0.997 -0.232 0.233			
L2.VIX	-0.0061	0.064	-0.096
0.923 -0.131 0.119			
L2.Log Total Assets	0.4103	0.403	1.019
0.308 -0.379 1.200			
L2.Log Currency in Circulation (\$ Bil)	0.4862	0.041	11.763
0.000 0.405 0.567			
L2.Effective Federal Funds Rate (%)	0.2675	0.479	0.559
0.576 -0.671 1.206			
L2.Loss Function	0.0002	0.143	0.002
0.999 -0.280 0.281			
L3.VIX	-5.906e-05	0.051	-0.001
0.999 -0.100 0.100			
L3.Log Total Assets	0.1220	0.390	0.313
0.754 -0.642 0.886			
L3.Log Currency in Circulation (\$ Bil)	0.7475	0.059	12.660
0.000 0.632 0.863			
L3.Effective Federal Funds Rate (%)	0.2381	0.342	0.696
0.486 -0.432 0.909			
L3.Loss Function	-0.0008	0.177	-0.005
0.996 -0.348 0.347			
L4.VIX	0.0010	0.047	0.021
0.983 -0.090 0.092			
L4.Log Total Assets	0.0675	0.286	0.236
0.813 -0.493 0.628			
L4.Log Currency in Circulation (\$ Bil)	0.0428	0.037	1.161
0.246 -0.029 0.115			
L4.Effective Federal Funds Rate (%)	0.1609	0.648	0.248
0.804 -1.110 1.432			
L4.Loss Function	-0.0041	0.230	-0.018
0.986 -0.454 0.446			
L5.VIX	-1.989e-05	0.036	-0.001
1.000 -0.071 0.071			
L5.Log Total Assets	-0.0363	0.287	-0.126
0.899 -0.600 0.527			
L5.Log Currency in Circulation (\$ Bil)	0.1527	0.041	3.758
0.000 0.073 0.232			
L5.Effective Federal Funds Rate (%)	0.1066	0.720	0.148
0.882 -1.304 1.517			
L5.Loss Function	-0.0030	0.218	-0.014
0.989 -0.430 0.424			
L6.VIX	0.0008	0.041	0.020
0.984 -0.080 0.081			
L6.Log Total Assets	-0.0739	0.338	-0.219
0.827 -0.736 0.588			
L6.Log Currency in Circulation (\$ Bil)	0.1036	0.057	1.826
0.068 -0.008 0.215			
L6.Effective Federal Funds Rate (%)	0.0936	0.403	0.232
0.816 -0.696 0.883			
L6.Loss Function	-0.0024	0.243	-0.010

0.992	-0.480	0.475			
L7.VIX			0.0023	0.051	0.044
0.965	-0.098	0.103			
L7.Log Total Assets			-0.1718	0.317	-0.542
0.588	-0.792	0.449			
L7.Log Currency in Circulation (\$ Bil)			0.3687	0.039	9.343
0.000	0.291	0.446			
L7.Effective Federal Funds Rate (%)			0.1003	0.419	0.240
0.811	-0.721	0.921			
L7.Loss Function			-0.0005	0.213	-0.003
0.998	-0.418	0.417			
L8.VIX			0.0034	0.054	0.063
0.950	-0.103	0.110			
L8.Log Total Assets			-0.4962	0.243	-2.041
0.041	-0.973	-0.020			
L8.Log Currency in Circulation (\$ Bil)			1.2474	0.033	37.887
0.000	1.183	1.312			
L8.Effective Federal Funds Rate (%)			0.0977	0.510	0.192
0.848	-0.902	1.097			
L8.Loss Function			0.0017	0.178	0.009
0.992	-0.347	0.350			
L9.VIX			0.0067	0.041	0.164
0.870	-0.074	0.087			
L9.Log Total Assets			-0.7135	0.248	-2.875
0.004	-1.200	-0.227			
L9.Log Currency in Circulation (\$ Bil)			1.5066	0.047	31.808
0.000	1.414	1.599			
L9.Effective Federal Funds Rate (%)			0.0521	0.355	0.147
0.883	-0.644	0.748			
L9.Loss Function			0.0016	0.202	0.008
0.994	-0.395	0.398			
L10.VIX			0.0065	0.048	0.136
0.892	-0.087	0.100			
L10.Log Total Assets			-0.5528	0.203	-2.726
0.006	-0.950	-0.155			
L10.Log Currency in Circulation (\$ Bil)			0.9277	0.046	20.145
0.000	0.837	1.018			
L10.Effective Federal Funds Rate (%)			-0.0181	0.390	-0.046
0.963	-0.783	0.747			
L10.Loss Function			0.0020	0.222	0.009
0.993	-0.434	0.438			
L11.VIX			0.0029	0.064	0.046
0.964	-0.123	0.129			
L11.Log Total Assets			-0.2442	0.195	-1.250
0.211	-0.627	0.139			
L11.Log Currency in Circulation (\$ Bil)			0.0693	0.044	1.585
0.113	-0.016	0.155			
L11.Effective Federal Funds Rate (%)			-0.0959	0.348	-0.276
0.783	-0.777	0.585			
L11.Loss Function			0.0016	0.225	0.007
0.994	-0.440	0.443			
L12.VIX			0.0019	0.058	0.033
0.974	-0.111	0.115			
L12.Log Total Assets			0.0688	0.249	0.276
0.783	-0.420	0.558			
L12.Log Currency in Circulation (\$ Bil)			-0.7950	0.059	-13.421
0.000	-0.911	-0.679			

L12.Effective Federal Funds Rate (%)	-0.1341	0.383	-0.350
0.726 -0.884 0.616			
L12.Loss Function	-0.0005	0.196	-0.003
0.998 -0.384 0.383			
L13.VIX	-0.0010	0.063	-0.015
0.988 -0.125 0.123			
L13.Log Total Assets	0.4002	0.281	1.426
0.154 -0.150 0.950			
L13.Log Currency in Circulation (\$ Bil)	-1.3623	0.048	-28.458
0.000 -1.456 -1.268			
L13.Effective Federal Funds Rate (%)	-0.0945	0.354	-0.267
0.789 -0.788 0.599			
L13.Loss Function	-0.0014	0.221	-0.006
0.995 -0.435 0.432			
L14.VIX	-0.0089	0.057	-0.158
0.874 -0.120 0.102			
L14.Log Total Assets	0.6420	0.289	2.223
0.026 0.076 1.208			
L14.Log Currency in Circulation (\$ Bil)	-1.3544	0.049	-27.730
0.000 -1.450 -1.259			
L14.Effective Federal Funds Rate (%)	-0.0560	0.354	-0.158
0.874 -0.750 0.638			
L14.Loss Function	0.0017	0.139	0.012
0.990 -0.271 0.275			

Results for equation Loss Function

```
=====
=====
```

			coef	std err	z	P
> z	[0.025	0.975]				

intercept			-1.7251	0.394	-4.378	
0.000	-2.497	-0.953				
L1.VIX			-0.2774	0.359	-0.772	
0.440	-0.982	0.427				
L1.Log Total Assets			4.7672	0.030	158.796	
0.000	4.708	4.826				
L1.Log Currency in Circulation (\$ Bil)			92.0230	0.005	2.04e+04	
0.000	92.014	92.032				
L1.Effective Federal Funds Rate (%)			0.7151	0.276	2.593	
0.010	0.175	1.256				
L1.Loss Function			0.5747	0.455	1.264	
0.206	-0.316	1.466				
L2.VIX			0.0476	0.337	0.141	
0.888	-0.613	0.708				
L2.Log Total Assets			-11.3314	0.030	-378.309	
0.000	-11.390	-11.273				
L2.Log Currency in Circulation (\$ Bil)			48.1879	0.005	9780.986	
0.000	48.178	48.198				
L2.Effective Federal Funds Rate (%)			1.1554	0.253	4.560	
0.000	0.659	1.652				
L2.Loss Function			0.0337	0.552	0.061	
0.951	-1.049	1.116				
L3.VIX			0.2381	0.425	0.561	
0.575	-0.594	1.070				
L3.Log Total Assets			-16.8903	0.026	-643.706	
0.000	-16.942	-16.839				

L3.Log Currency in Circulation (\$ Bil)	53.6636	0.005	1.17e+04
0.000 53.655 53.673			
L3.Effective Federal Funds Rate (%)	1.4323	0.244	5.863
0.000 0.954 1.911			
L3.Loss Function	0.0165	0.573	0.029
0.977 -1.106 1.139			
L4.VIX	0.2051	0.373	0.550
0.582 -0.525 0.936			
L4.Log Total Assets	-11.6807	0.031	-372.817
0.000 -11.742 -11.619			
L4.Log Currency in Circulation (\$ Bil)	8.5176	0.003	3011.159
0.000 8.512 8.523			
L4.Effective Federal Funds Rate (%)	0.6037	0.220	2.748
0.006 0.173 1.034			
L4.Loss Function	-0.1793	0.406	-0.441
0.659 -0.975 0.617			
L5.VIX	0.0305	0.383	0.080
0.937 -0.721 0.782			
L5.Log Total Assets	-4.2257	0.030	-138.612
0.000 -4.285 -4.166			
L5.Log Currency in Circulation (\$ Bil)	18.0989	0.003	5682.435
0.000 18.093 18.105			
L5.Effective Federal Funds Rate (%)	0.2231	0.191	1.168
0.243 -0.151 0.597			
L5.Loss Function	0.0574	0.553	0.104
0.917 -1.026 1.141			
L6.VIX	0.0375	0.466	0.081
0.936 -0.875 0.950			
L6.Log Total Assets	-1.2908	0.027	-48.561
0.000 -1.343 -1.239			
L6.Log Currency in Circulation (\$ Bil)	-3.8627	0.005	-728.246
0.000 -3.873 -3.852			
L6.Effective Federal Funds Rate (%)	0.1405	0.169	0.832
0.405 -0.190 0.471			
L6.Loss Function	-0.0467	0.541	-0.086
0.931 -1.107 1.013			
L7.VIX	-0.0219	0.513	-0.043
0.966 -1.028 0.985			
L7.Log Total Assets	-0.7507	0.028	-27.028
0.000 -0.805 -0.696			
L7.Log Currency in Circulation (\$ Bil)	1.5021	0.005	315.271
0.000 1.493 1.511			
L7.Effective Federal Funds Rate (%)	-1.4240	0.145	-9.837
0.000 -1.708 -1.140			
L7.Loss Function	0.0145	0.546	0.027
0.979 -1.056 1.086			
L8.VIX	-0.0903	0.464	-0.195
0.846 -0.999 0.818			
L8.Log Total Assets	-0.2206	0.031	-7.146
0.000 -0.281 -0.160			
L8.Log Currency in Circulation (\$ Bil)	2.6424	0.005	529.345
0.000 2.633 2.652			
L8.Effective Federal Funds Rate (%)	-1.0733	0.160	-6.715
0.000 -1.387 -0.760			
L8.Loss Function	0.0273	0.469	0.058
0.954 -0.891 0.946			
L9.VIX	0.0544	0.547	0.100

0.921	-1.017	1.126			
L9.Log Total Assets			-1.3968	0.035	-40.066
0.000	-1.465	-1.328			
L9.Log Currency in Circulation (\$ Bil)			4.1051	0.005	830.538
0.000	4.095	4.115			
L9.Effective Federal Funds Rate (%)			-0.5650	0.162	-3.482
0.000	-0.883	-0.247			
L9.Loss Function			0.0126	0.492	0.026
0.979	-0.951	0.976			
L10.VIX			0.0072	0.369	0.019
0.985	-0.716	0.730			
L10.Log Total Assets			2.4737	0.041	60.673
0.000	2.394	2.554			
L10.Log Currency in Circulation (\$ Bil)			-7.1562	0.006	-1287.878
0.000	-7.167	-7.145			
L10.Effective Federal Funds Rate (%)			-0.2375	0.159	-1.494
0.135	-0.549	0.074			
L10.Loss Function			-0.0066	0.324	-0.020
0.984	-0.643	0.629			
L11.VIX			-0.1205	0.568	-0.212
0.832	-1.234	0.993			
L11.Log Total Assets			7.6541	0.046	165.818
0.000	7.564	7.745			
L11.Log Currency in Circulation (\$ Bil)			-12.6510	0.006	-2116.656
0.000	-12.663	-12.639			
L11.Effective Federal Funds Rate (%)			0.3410	0.169	2.017
0.044	0.010	0.672			
L11.Loss Function			0.0429	0.596	0.072
0.943	-1.126	1.212			
L12.VIX			0.0418	0.600	0.070
0.944	-1.133	1.217			
L12.Log Total Assets			7.0629	0.052	136.751
0.000	6.962	7.164			
L12.Log Currency in Circulation (\$ Bil)			-27.2911	0.004	-6269.822
0.000	-27.300	-27.283			
L12.Effective Federal Funds Rate (%)			1.3422	0.131	10.244
0.000	1.085	1.599			
L12.Loss Function			-0.0984	0.505	-0.195
0.845	-1.088	0.891			
L13.VIX			-0.1560	0.387	-0.403
0.687	-0.915	0.603			
L13.Log Total Assets			7.3856	0.055	134.561
0.000	7.278	7.493			
L13.Log Currency in Circulation (\$ Bil)			-11.4780	0.005	-2323.997
0.000	-11.488	-11.468			
L13.Effective Federal Funds Rate (%)			0.2372	0.138	1.721
0.085	-0.033	0.507			
L13.Loss Function			0.0300	0.569	0.053
0.958	-1.086	1.146			
L14.VIX			-0.0023	0.365	-0.006
0.995	-0.717	0.713			
L14.Log Total Assets			-0.1275	0.056	-2.262
0.024	-0.238	-0.017			
L14.Log Currency in Circulation (\$ Bil)			12.1490	0.009	1408.858
0.000	12.132	12.166			
L14.Effective Federal Funds Rate (%)			0.7620	0.150	5.066
0.000	0.467	1.057			

```

L14.Loss Function                                0.0729      0.524      0.139
0.889      -0.955      1.100

Error covariance matrix
=====
=====

coef      std err          z      P>|z|      [0.025      0.975]
-----
sqrt.var.VIX
6.8118      0.474      14.367      0.000      5.883      7.741
sqrt.cov.VIX.Log Total Assets
0.0721      0.075      0.965      0.335      -0.074      0.219
sqrt.var.Log Total Assets
0.1185      0.109      1.090      0.276      -0.095      0.332
sqrt.cov.VIX.Log Currency in Circulation ($ Bil)
0.0013      0.035      0.038      0.970      -0.067      0.070
sqrt.cov.Log Total Assets.Log Currency in Circulation ($ Bil)
0.0249      0.044      0.560      0.576      -0.062      0.112
sqrt.var.Log Currency in Circulation ($ Bil)
0.0233      0.026      0.905      0.365      -0.027      0.074
sqrt.cov.VIX.Effective Federal Funds Rate (%)
-0.0744      0.338      -0.220      0.826      -0.737      0.589
sqrt.cov.Log Total Assets.Effective Federal Funds Rate (%)
-0.0520      0.499      -0.104      0.917      -1.029      0.926
sqrt.cov.Log Currency in Circulation ($ Bil).Effective Federal Funds Rate (%)
0.0622      0.483      0.129      0.898      -0.885      1.009
sqrt.var.Effective Federal Funds Rate (%)
0.4599      0.333      1.382      0.167      -0.192      1.112
sqrt.cov.VIX.Loss Function
0.7320      0.325      2.250      0.024      0.094      1.370
sqrt.cov.Log Total Assets.Loss Function
-2.7487      0.146      -18.831      0.000      -3.035      -2.463
sqrt.cov.Log Currency in Circulation ($ Bil).Loss Function
-2.0028      0.166      -12.071      0.000      -2.328      -1.678
sqrt.cov.Effective Federal Funds Rate (%).Loss Function
-0.1312      0.181      -0.723      0.470      -0.487      0.224
sqrt.var.Loss Function
6.4275      0.684      9.402      0.000      5.088      7.767
=====
=====

```

Warnings:

- [1] Covariance matrix calculated using the outer product of gradients (complex-step).
- [2] Covariance matrix is singular or near-singular, with condition number 3.05e+21. Standard errors may be unstable.



```
In [34]: def adjust(val, length= 6): return str(val).ljust(length)
```

```
from statsmodels.stats.stattools import durbin_watson
out = durbin_watson(model_fitted.resid)

for col, val in zip(df.columns, out):
    print(adjust(col), ': ', round(val, 2))
```

```
VIX      : 2.28
Log Total Assets : 2.14
Log Currency in Circulation ($ Bil) : 2.11
Effective Federal Funds Rate (%) : 2.5
Loss Function : 2.18
```

```
In [27]: model = VAR(df)
for i in [1,2,3,4,5,6,7,8,9]:
    result = model.fit(i)
    print('Lag Order =', i)
    print('AIC : ', result.aic)
```

```
Lag Order = 1
AIC : -7.370885960156472
Lag Order = 2
AIC : -8.50174906484796
Lag Order = 3
AIC : -8.663142407952625
Lag Order = 4
AIC : -8.681041273645855
Lag Order = 5
AIC : -9.004618037751214
Lag Order = 6
AIC : -9.026541372463315
Lag Order = 7
AIC : -9.101079767799213
Lag Order = 8
AIC : -9.298669199631963
Lag Order = 9
AIC : -10.145981860708165
```

```
C:\Users\proma.gupta\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:524: ValueWarning: No frequency information was provided, so inferred frequency M will be used.
  warnings.warn('No frequency information was')
```

```
In [31]: x = model.select_order(maxlags=29)
x.summary()
```

Out[31]: VAR Order Selection (* highlights the minimums)

	AIC	BIC	FPE	HQIC
0	2.533	2.624	12.59	2.570
1	-6.812	-6.263	0.001101	-6.589
2	-8.014	-7.008	0.0003310	-7.606
3	-8.192	-6.728	0.0002775	-7.598
4	-8.231	-6.310	0.0002679	-7.452
5	-8.601	-6.222	0.0001861	-7.636
6	-8.654	-5.817	0.0001780	-7.503
7	-8.717	-5.423	0.0001691	-7.380
8	-8.902	-5.151	0.0001426	-7.380
9	-10.06	-5.854	4.557e-05	-8.355
10	-10.46	-5.791	3.150e-05	-8.564
11	-10.78	-5.661	2.342e-05	-8.706
12	-11.30	-5.716	1.457e-05	-9.033
13	-12.36	-6.317	5.294e-06	-9.906
14	-12.63	-6.132	4.261e-06	-9.992
15	-12.64	-5.686	4.493e-06	-9.818
16	-12.69	-5.275	4.629e-06	-9.680
17	-13.05	-5.179	3.529e-06	-9.855
18	-13.42	-5.098	2.689e-06	-10.05
19	-13.68	-4.896	2.352e-06	-10.12
20	-14.02	-4.783	1.922e-06	-10.27
21	-14.47	-4.767	1.458e-06	-10.53
22	-14.86	-4.706	1.189e-06	-10.74
23	-15.71	-5.095	6.380e-07	-11.40
24	-16.43	-5.362	4.022e-07	-11.94
25	-17.52	-5.993	1.847e-07	-12.84
26	-18.51	-6.520	9.966e-08	-13.64
27	-19.22	-6.774	7.609e-08	-14.17
28	-20.22	-7.316	4.791e-08	-14.98
29	-21.80*	-8.440*	1.923e-08*	-16.38*


```
In [33]: model_fitted = model.fit(29)
model_fitted.summary()
```

Out[33]: Summary of Regression Results

```
=====
Model:                                VAR
Method:                               OLS
Date:      Thu, 17, Mar, 2022
Time:      15:34:41
-----
No. of Equations:      5.00000      BIC:                                -8.43980
Nobs:                  172.000      HQIC:                               -16.3784
Log likelihood:        1384.37      FPE:                                1.92271e-08
AIC:                   -21.7983      Det(Omega_mle):                    8.90061e-10
-----
```

Results for equation VIX

```
=====
=====
```

		coefficient	std. error
t-stat	prob		

const		3.788446	1.295140
2.925	0.003		
L1.VIX		0.216120	0.226269
0.955	0.340		
L1.Log Total Assets		-34.946024	34.522345
-1.012	0.311		
L1.Log Currency in Circulation (\$ Bil)		-533.033345	320.936205
-1.661	0.097		
L1.Effective Federal Funds Rate (%)		-13.788108	7.126723
-1.935	0.053		
L1.Loss Function		-0.219993	0.133386
-1.649	0.099		
L2.VIX		-0.660634	0.205248
-3.219	0.001		
L2.Log Total Assets		68.470113	58.891945
1.163	0.245		
L2.Log Currency in Circulation (\$ Bil)		3.421392	458.613704
0.007	0.994		
L2.Effective Federal Funds Rate (%)		6.346509	8.401837
0.755	0.450		
L2.Loss Function		0.027573	0.156830
0.176	0.860		
L3.VIX		-0.539033	0.216669
-2.488	0.013		
L3.Log Total Assets		-22.234154	68.677128
-0.324	0.746		
L3.Log Currency in Circulation (\$ Bil)		878.915819	475.174913
1.850	0.064		
L3.Effective Federal Funds Rate (%)		-7.448830	11.345505
-0.657	0.511		
L3.Loss Function		-0.124598	0.173875
-0.717	0.474		
L4.VIX		-0.319745	0.251171
-1.273	0.203		

L4.Log Total Assets	84.786616	65.556814
1.293 0.196		
L4.Log Currency in Circulation (\$ Bil)	-564.618136	554.229005
-1.019 0.308		
L4.Effective Federal Funds Rate (%)	26.767498	10.745496
2.491 0.013		
L4.Loss Function	0.286784	0.158543
1.809 0.070		
L5.VIX	-0.224590	0.180405
-1.245 0.213		
L5.Log Total Assets	17.063627	58.326094
0.293 0.770		
L5.Log Currency in Circulation (\$ Bil)	347.473127	481.623471
0.721 0.471		
L5.Effective Federal Funds Rate (%)	-21.298751	12.408366
-1.716 0.086		
L5.Loss Function	-0.466442	0.165390
-2.820 0.005		
L6.VIX	-0.365458	0.193758
-1.886 0.059		
L6.Log Total Assets	-6.036133	56.835164
-0.106 0.915		
L6.Log Currency in Circulation (\$ Bil)	-816.230340	380.021972
-2.148 0.032		
L6.Effective Federal Funds Rate (%)	27.371768	13.223521
2.070 0.038		
L6.Loss Function	0.197060	0.183728
1.073 0.283		
L7.VIX	0.494511	0.221642
2.231 0.026		
L7.Log Total Assets	-28.808643	51.491311
-0.559 0.576		
L7.Log Currency in Circulation (\$ Bil)	943.824122	348.093908
2.711 0.007		
L7.Effective Federal Funds Rate (%)	-26.475817	14.437655
-1.834 0.067		
L7.Loss Function	0.164155	0.179478
0.915 0.360		
L8.VIX	-0.365818	0.225309
-1.624 0.104		
L8.Log Total Assets	-79.126989	50.447864
-1.568 0.117		
L8.Log Currency in Circulation (\$ Bil)	-653.247558	327.802578
-1.993 0.046		
L8.Effective Federal Funds Rate (%)	-13.590250	15.080562
-0.901 0.367		
L8.Loss Function	0.068326	0.194296
0.352 0.725		
L9.VIX	0.510882	0.261482
1.954 0.051		
L9.Log Total Assets	3.091181	46.312116
0.067 0.947		
L9.Log Currency in Circulation (\$ Bil)	-493.006973	346.526087
-1.423 0.155		
L9.Effective Federal Funds Rate (%)	-2.771095	20.438753
-0.136 0.892		
L9.Loss Function	-0.387363	0.201458

-1.923	0.055		
L10.VIX		-0.004157	0.258056
-0.016	0.987		
L10.Log Total Assets		-39.531804	50.551401
-0.782	0.434		
L10.Log Currency in Circulation (\$ Bil)		1011.005325	362.755601
2.787	0.005		
L10.Effective Federal Funds Rate (%)		20.069978	23.401358
0.858	0.391		
L10.Loss Function		-0.021455	0.198888
-0.108	0.914		
L11.VIX		-0.070167	0.237718
-0.295	0.768		
L11.Log Total Assets		27.887028	52.060918
0.536	0.592		
L11.Log Currency in Circulation (\$ Bil)		-1011.616527	378.626796
-2.672	0.008		
L11.Effective Federal Funds Rate (%)		-12.305650	22.072790
-0.558	0.577		
L11.Loss Function		-0.167774	0.210794
-0.796	0.426		
L12.VIX		-0.377605	0.250943
-1.505	0.132		
L12.Log Total Assets		20.857109	55.392093
0.377	0.707		
L12.Log Currency in Circulation (\$ Bil)		8.621613	403.298865
0.021	0.983		
L12.Effective Federal Funds Rate (%)		34.293363	21.875811
1.568	0.117		
L12.Loss Function		-0.368953	0.195812
-1.884	0.060		
L13.VIX		-0.492944	0.236015
-2.089	0.037		
L13.Log Total Assets		64.689719	58.272374
1.110	0.267		
L13.Log Currency in Circulation (\$ Bil)		923.596461	450.374731
2.051	0.040		
L13.Effective Federal Funds Rate (%)		-8.910535	21.281493
-0.419	0.675		
L13.Loss Function		-0.130679	0.255496
-0.511	0.609		
L14.VIX		-0.717842	0.260664
-2.754	0.006		
L14.Log Total Assets		-1.670973	53.350452
-0.031	0.975		
L14.Log Currency in Circulation (\$ Bil)		-1328.934749	450.167073
-2.952	0.003		
L14.Effective Federal Funds Rate (%)		-2.550350	20.955580
-0.122	0.903		
L14.Loss Function		0.406921	0.257465
1.580	0.114		
L15.VIX		0.473280	0.304426
1.555	0.120		
L15.Log Total Assets		-92.870073	60.910110
-1.525	0.127		
L15.Log Currency in Circulation (\$ Bil)		941.452718	539.627787
1.745	0.081		

L15.Effective Federal Funds Rate (%)	-13.765285	21.663640
-0.635 0.525		
L15.Loss Function	-0.654699	0.248913
-2.630 0.009		
L16.VIX	-0.917842	0.299953
-3.060 0.002		
L16.Log Total Assets	87.758356	65.260659
1.345 0.179		
L16.Log Currency in Circulation (\$ Bil)	-653.119202	556.090711
-1.174 0.240		
L16.Effective Federal Funds Rate (%)	6.547196	21.834103
0.300 0.764		
L16.Loss Function	0.178588	0.267404
0.668 0.504		
L17.VIX	0.198800	0.260131
0.764 0.445		
L17.Log Total Assets	-32.483673	57.398138
-0.566 0.571		
L17.Log Currency in Circulation (\$ Bil)	-420.155712	471.792891
-0.891 0.373		
L17.Effective Federal Funds Rate (%)	6.376321	20.612615
0.309 0.757		
L17.Loss Function	0.126909	0.610326
0.208 0.835		
L18.VIX	-0.118570	0.253373
-0.468 0.640		
L18.Log Total Assets	-21.623265	47.700738
-0.453 0.650		
L18.Log Currency in Circulation (\$ Bil)	589.155243	340.395938
1.731 0.083		
L18.Effective Federal Funds Rate (%)	-5.449019	20.142195
-0.271 0.787		
L18.Loss Function	-0.507104	0.623491
-0.813 0.416		
L19.VIX	-0.243394	0.231510
-1.051 0.293		
L19.Log Total Assets	59.321047	44.662319
1.328 0.184		
L19.Log Currency in Circulation (\$ Bil)	-43.092325	335.255272
-0.129 0.898		
L19.Effective Federal Funds Rate (%)	8.235796	19.604329
0.420 0.674		
L19.Loss Function	3.462675	0.565265
6.126 0.000		
L20.VIX	0.205549	0.205373
1.001 0.317		
L20.Log Total Assets	-119.044702	43.027942
-2.767 0.006		
L20.Log Currency in Circulation (\$ Bil)	163.027035	363.533668
0.448 0.654		
L20.Effective Federal Funds Rate (%)	-30.402831	17.859034
-1.702 0.089		
L20.Loss Function	0.116357	0.688731
0.169 0.866		
L21.VIX	-0.410211	0.189093
-2.169 0.030		
L21.Log Total Assets	117.948676	44.231109

2.667	0.008		
L21.Log Currency in Circulation (\$ Bil)		-168.361215	394.603715
-0.427	0.670		
L21.Effective Federal Funds Rate (%)		48.837673	18.460147
2.646	0.008		
L21.Loss Function		0.260856	0.697854
0.374	0.709		
L22.VIX		-0.173037	0.200645
-0.862	0.388		
L22.Log Total Assets		11.056987	36.125354
0.306	0.760		
L22.Log Currency in Circulation (\$ Bil)		-193.762555	359.018150
-0.540	0.589		
L22.Effective Federal Funds Rate (%)		-26.132443	16.747340
-1.560	0.119		
L22.Loss Function		0.802835	0.623346
1.288	0.198		
L23.VIX		-0.273939	0.210594
-1.301	0.193		
L23.Log Total Assets		-93.054829	37.122176
-2.507	0.012		
L23.Log Currency in Circulation (\$ Bil)		406.483042	367.932466
1.105	0.269		
L23.Effective Federal Funds Rate (%)		-22.086696	15.816861
-1.396	0.163		
L23.Loss Function		-2.195565	0.654998
-3.352	0.001		
L24.VIX		-0.462982	0.196752
-2.353	0.019		
L24.Log Total Assets		94.154721	35.104282
2.682	0.007		
L24.Log Currency in Circulation (\$ Bil)		-708.174297	380.177726
-1.863	0.062		
L24.Effective Federal Funds Rate (%)		12.453529	18.364884
0.678	0.498		
L24.Loss Function		-0.128817	0.634906
-0.203	0.839		
L25.VIX		-0.289786	0.215146
-1.347	0.178		
L25.Log Total Assets		6.643619	33.516715
0.198	0.843		
L25.Log Currency in Circulation (\$ Bil)		253.192763	367.888667
0.688	0.491		
L25.Effective Federal Funds Rate (%)		0.911721	16.794410
0.054	0.957		
L25.Loss Function		-0.691111	0.704647
-0.981	0.327		
L26.VIX		-0.310103	0.195824
-1.584	0.113		
L26.Log Total Assets		1.503152	32.984384
0.046	0.964		
L26.Log Currency in Circulation (\$ Bil)		-26.934930	421.743361
-0.064	0.949		
L26.Effective Federal Funds Rate (%)		3.791317	14.771133
0.257	0.797		
L26.Loss Function		-0.952541	0.591695
-1.610	0.107		

L27.VIX		0.168173	0.182240
0.923	0.356		
L27.Log Total Assets		6.751341	30.851666
0.219	0.827		
L27.Log Currency in Circulation (\$ Bil)		-596.991500	399.431892
-1.495	0.135		
L27.Effective Federal Funds Rate (%)		6.306431	13.615928
0.463	0.643		
L27.Loss Function		1.196688	0.691669
1.730	0.084		
L28.VIX		-0.369751	0.182200
-2.029	0.042		
L28.Log Total Assets		-29.890331	28.304920
-1.056	0.291		
L28.Log Currency in Circulation (\$ Bil)		218.733924	358.972605
0.609	0.542		
L28.Effective Federal Funds Rate (%)		-18.100143	14.260451
-1.269	0.204		
L28.Loss Function		-0.138052	0.727356
-0.190	0.849		
L29.VIX		0.004819	0.192332
0.025	0.980		
L29.Log Total Assets		13.382563	21.819779
0.613	0.540		
L29.Log Currency in Circulation (\$ Bil)		-215.714203	267.864653
-0.805	0.421		
L29.Effective Federal Funds Rate (%)		11.518094	10.189956
1.130	0.258		
L29.Loss Function		1.134296	0.651559
1.741	0.082		

=====

=====

Results for equation Log Total Assets

=====

=====

t-stat	prob	coefficient	std. error

const		-0.019616	0.010877
-1.803	0.071		
L1.VIX		0.000475	0.001900
0.250	0.802		
L1.Log Total Assets		1.325283	0.289933
4.571	0.000		
L1.Log Currency in Circulation (\$ Bil)		0.849241	2.695352
0.315	0.753		
L1.Effective Federal Funds Rate (%)		-0.075604	0.059853
-1.263	0.207		
L1.Loss Function		-0.000675	0.001120
-0.603	0.547		
L2.VIX		-0.000436	0.001724
-0.253	0.800		
L2.Log Total Assets		-1.134693	0.494598
-2.294	0.022		
L2.Log Currency in Circulation (\$ Bil)		4.521512	3.851623

1.174	0.240		
L2.Effective Federal Funds Rate (%)		0.094343	0.070562
1.337	0.181		
L2.Loss Function		0.000834	0.001317
0.633	0.526		
L3.VIX		0.002200	0.001820
1.209	0.227		
L3.Log Total Assets		0.908207	0.576778
1.575	0.115		
L3.Log Currency in Circulation (\$ Bil)		-2.894561	3.990711
-0.725	0.468		
L3.Effective Federal Funds Rate (%)		0.001848	0.095284
0.019	0.985		
L3.Loss Function		-0.000597	0.001460
-0.409	0.682		
L4.VIX		0.002110	0.002109
1.000	0.317		
L4.Log Total Assets		0.306833	0.550573
0.557	0.577		
L4.Log Currency in Circulation (\$ Bil)		6.101311	4.654639
1.311	0.190		
L4.Effective Federal Funds Rate (%)		0.251683	0.090245
2.789	0.005		
L4.Loss Function		0.002479	0.001332
1.862	0.063		
L5.VIX		0.002100	0.001515
1.386	0.166		
L5.Log Total Assets		-0.294451	0.489846
-0.601	0.548		
L5.Log Currency in Circulation (\$ Bil)		-8.413529	4.044869
-2.080	0.038		
L5.Effective Federal Funds Rate (%)		-0.256969	0.104210
-2.466	0.014		
L5.Loss Function		0.000950	0.001389
0.684	0.494		
L6.VIX		0.002266	0.001627
1.392	0.164		
L6.Log Total Assets		-0.148984	0.477325
-0.312	0.755		
L6.Log Currency in Circulation (\$ Bil)		-1.893871	3.191578
-0.593	0.553		
L6.Effective Federal Funds Rate (%)		-0.057622	0.111056
-0.519	0.604		
L6.Loss Function		-0.000723	0.001543
-0.469	0.639		
L7.VIX		0.002958	0.001861
1.589	0.112		
L7.Log Total Assets		-0.555976	0.432445
-1.286	0.199		
L7.Log Currency in Circulation (\$ Bil)		1.715165	2.923433
0.587	0.557		
L7.Effective Federal Funds Rate (%)		0.025744	0.121253
0.212	0.832		
L7.Loss Function		0.002313	0.001507
1.535	0.125		
L8.VIX		0.000914	0.001892
0.483	0.629		

L8.Log Total Assets	-0.566141	0.423682
-1.336 0.181		
L8.Log Currency in Circulation (\$ Bil)	-0.178444	2.753019
-0.065 0.948		
L8.Effective Federal Funds Rate (%)	-0.405611	0.126653
-3.203 0.001		
L8.Loss Function	-0.002421	0.001632
-1.483 0.138		
L9.VIX	0.003186	0.002196
1.451 0.147		
L9.Log Total Assets	0.520217	0.388948
1.337 0.181		
L9.Log Currency in Circulation (\$ Bil)	-1.823984	2.910266
-0.627 0.531		
L9.Effective Federal Funds Rate (%)	0.609094	0.171653
3.548 0.000		
L9.Loss Function	0.000445	0.001692
0.263 0.792		
L10.VIX	0.001777	0.002167
0.820 0.412		
L10.Log Total Assets	-0.302891	0.424551
-0.713 0.476		
L10.Log Currency in Circulation (\$ Bil)	1.373670	3.046568
0.451 0.652		
L10.Effective Federal Funds Rate (%)	-0.413541	0.196534
-2.104 0.035		
L10.Loss Function	-0.003760	0.001670
-2.251 0.024		
L11.VIX	-0.004244	0.001996
-2.126 0.034		
L11.Log Total Assets	0.645951	0.437229
1.477 0.140		
L11.Log Currency in Circulation (\$ Bil)	1.448218	3.179861
0.455 0.649		
L11.Effective Federal Funds Rate (%)	0.424827	0.185376
2.292 0.022		
L11.Loss Function	0.000315	0.001770
0.178 0.859		
L12.VIX	0.001006	0.002108
0.477 0.633		
L12.Log Total Assets	-0.132371	0.465205
-0.285 0.776		
L12.Log Currency in Circulation (\$ Bil)	-3.527750	3.387067
-1.042 0.298		
L12.Effective Federal Funds Rate (%)	0.051188	0.183722
0.279 0.781		
L12.Loss Function	-0.001596	0.001645
-0.971 0.332		
L13.VIX	-0.005582	0.001982
-2.816 0.005		
L13.Log Total Assets	1.510223	0.489395
3.086 0.002		
L13.Log Currency in Circulation (\$ Bil)	5.175830	3.782429
1.368 0.171		
L13.Effective Federal Funds Rate (%)	-0.076004	0.178731
-0.425 0.671		
L13.Loss Function	0.001601	0.002146

0.746	0.456		
L14.VIX		0.001054	0.002189
0.481	0.630		
L14.Log Total Assets		-1.264891	0.448059
-2.823	0.005		
L14.Log Currency in Circulation (\$ Bil)		-0.402431	3.780685
-0.106	0.915		
L14.Effective Federal Funds Rate (%)		0.059799	0.175993
0.340	0.734		
L14.Loss Function		0.002752	0.002162
1.273	0.203		
L15.VIX		0.004938	0.002557
1.931	0.053		
L15.Log Total Assets		0.391563	0.511548
0.765	0.444		
L15.Log Currency in Circulation (\$ Bil)		-3.671434	4.532012
-0.810	0.418		
L15.Effective Federal Funds Rate (%)		-0.286825	0.181940
-1.576	0.115		
L15.Loss Function		-0.002638	0.002090
-1.262	0.207		
L16.VIX		0.000840	0.002519
0.334	0.739		
L16.Log Total Assets		-0.011658	0.548085
-0.021	0.983		
L16.Log Currency in Circulation (\$ Bil)		4.938353	4.670275
1.057	0.290		
L16.Effective Federal Funds Rate (%)		0.127749	0.183372
0.697	0.486		
L16.Loss Function		0.003722	0.002246
1.657	0.097		
L17.VIX		0.003287	0.002185
1.504	0.132		
L17.Log Total Assets		-0.268170	0.482053
-0.556	0.578		
L17.Log Currency in Circulation (\$ Bil)		-3.345861	3.962308
-0.844	0.398		
L17.Effective Federal Funds Rate (%)		-0.237526	0.173113
-1.372	0.170		
L17.Loss Function		-0.001691	0.005126
-0.330	0.742		
L18.VIX		0.001170	0.002128
0.550	0.583		
L18.Log Total Assets		-0.572266	0.400610
-1.428	0.153		
L18.Log Currency in Circulation (\$ Bil)		5.028244	2.858783
1.759	0.079		
L18.Effective Federal Funds Rate (%)		0.109765	0.169162
0.649	0.516		
L18.Loss Function		0.007906	0.005236
1.510	0.131		
L19.VIX		0.001616	0.001944
0.831	0.406		
L19.Log Total Assets		0.376528	0.375092
1.004	0.315		
L19.Log Currency in Circulation (\$ Bil)		-3.049834	2.815609
-1.083	0.279		

L19.Effective Federal Funds Rate (%)	-0.057559	0.164645
-0.350 0.727		
L19.Loss Function	0.016322	0.004747
3.438 0.001		
L20.VIX	-0.000006	0.001725
-0.003 0.997		
L20.Log Total Assets	-0.987843	0.361366
-2.734 0.006		
L20.Log Currency in Circulation (\$ Bil)	3.539059	3.053103
1.159 0.246		
L20.Effective Federal Funds Rate (%)	-0.170649	0.149987
-1.138 0.255		
L20.Loss Function	-0.001398	0.005784
-0.242 0.809		
L21.VIX	0.001887	0.001588
1.188 0.235		
L21.Log Total Assets	0.928832	0.371471
2.500 0.012		
L21.Log Currency in Circulation (\$ Bil)	-2.379286	3.314042
-0.718 0.473		
L21.Effective Federal Funds Rate (%)	0.395989	0.155036
2.554 0.011		
L21.Loss Function	-0.004062	0.005861
-0.693 0.488		
L22.VIX	0.001189	0.001685
0.705 0.481		
L22.Log Total Assets	-0.082171	0.303395
-0.271 0.787		
L22.Log Currency in Circulation (\$ Bil)	-0.764874	3.015180
-0.254 0.800		
L22.Effective Federal Funds Rate (%)	-0.214824	0.140651
-1.527 0.127		
L22.Loss Function	-0.011427	0.005235
-2.183 0.029		
L23.VIX	-0.001255	0.001769
-0.710 0.478		
L23.Log Total Assets	0.123108	0.311767
0.395 0.693		
L23.Log Currency in Circulation (\$ Bil)	6.202708	3.090046
2.007 0.045		
L23.Effective Federal Funds Rate (%)	0.243594	0.132836
1.834 0.067		
L23.Loss Function	-0.006874	0.005501
-1.250 0.211		
L24.VIX	0.000348	0.001652
0.211 0.833		
L24.Log Total Assets	0.198387	0.294820
0.673 0.501		
L24.Log Currency in Circulation (\$ Bil)	-6.385261	3.192886
-2.000 0.046		
L24.Effective Federal Funds Rate (%)	-0.047962	0.154236
-0.311 0.756		
L24.Loss Function	-0.007540	0.005332
-1.414 0.157		
L25.VIX	0.000307	0.001807
0.170 0.865		
L25.Log Total Assets	0.033472	0.281487

0.119	0.905		
L25.Log Currency in Circulation (\$ Bil)		3.332059	3.089678
1.078	0.281		
L25.Effective Federal Funds Rate (%)		-0.039215	0.141046
-0.278	0.781		
L25.Loss Function		-0.005099	0.005918
-0.862	0.389		
L26.VIX		0.001857	0.001645
1.129	0.259		
L26.Log Total Assets		-0.553868	0.277016
-1.999	0.046		
L26.Log Currency in Circulation (\$ Bil)		-0.055111	3.541971
-0.016	0.988		
L26.Effective Federal Funds Rate (%)		-0.092275	0.124054
-0.744	0.457		
L26.Loss Function		0.008552	0.004969
1.721	0.085		
L27.VIX		0.001607	0.001531
1.050	0.294		
L27.Log Total Assets		0.408949	0.259105
1.578	0.114		
L27.Log Currency in Circulation (\$ Bil)		-3.426781	3.354591
-1.022	0.307		
L27.Effective Federal Funds Rate (%)		0.200686	0.114352
1.755	0.079		
L27.Loss Function		0.006524	0.005809
1.123	0.261		
L28.VIX		0.001705	0.001530
1.114	0.265		
L28.Log Total Assets		-0.718376	0.237716
-3.022	0.003		
L28.Log Currency in Circulation (\$ Bil)		4.467316	3.014797
1.482	0.138		
L28.Effective Federal Funds Rate (%)		-0.261271	0.119765
-2.182	0.029		
L28.Loss Function		0.003472	0.006109
0.568	0.570		
L29.VIX		0.002739	0.001615
1.696	0.090		
L29.Log Total Assets		0.246538	0.183251
1.345	0.179		
L29.Log Currency in Circulation (\$ Bil)		-0.175887	2.249636
-0.078	0.938		
L29.Effective Federal Funds Rate (%)		0.077368	0.085579
0.904	0.366		
L29.Loss Function		-0.007808	0.005472
-1.427	0.154		

=====

=====

Results for equation Log Currency in Circulation (\$ Bil)

=====

=====

		coefficient	std. error
t-stat	prob		

const		0.000113	0.000919
0.123	0.902		
L1.VIX		-0.000152	0.000161
-0.946	0.344		
L1.Log Total Assets		-0.041447	0.024508
-1.691	0.091		
L1.Log Currency in Circulation (\$ Bil)		1.408123	0.227839
6.180	0.000		
L1.Effective Federal Funds Rate (%)		-0.015976	0.005059
-3.158	0.002		
L1.Loss Function		-0.000128	0.000095
-1.352	0.176		
L2.VIX		-0.000203	0.000146
-1.394	0.163		
L2.Log Total Assets		0.066726	0.041809
1.596	0.110		
L2.Log Currency in Circulation (\$ Bil)		-0.702808	0.325579
-2.159	0.031		
L2.Effective Federal Funds Rate (%)		0.015615	0.005965
2.618	0.009		
L2.Loss Function		0.000182	0.000111
1.631	0.103		
L3.VIX		0.000300	0.000154
1.950	0.051		
L3.Log Total Assets		-0.041980	0.048755
-0.861	0.389		
L3.Log Currency in Circulation (\$ Bil)		0.652156	0.337336
1.933	0.053		
L3.Effective Federal Funds Rate (%)		-0.002318	0.008054
-0.288	0.774		
L3.Loss Function		-0.000216	0.000123
-1.749	0.080		
L4.VIX		-0.000093	0.000178
-0.523	0.601		
L4.Log Total Assets		0.038606	0.046540
0.830	0.407		
L4.Log Currency in Circulation (\$ Bil)		-0.387715	0.393458
-0.985	0.324		
L4.Effective Federal Funds Rate (%)		0.016864	0.007628
2.211	0.027		
L4.Loss Function		0.000193	0.000113
1.714	0.087		
L5.VIX		0.000121	0.000128
0.948	0.343		
L5.Log Total Assets		0.025539	0.041407
0.617	0.537		
L5.Log Currency in Circulation (\$ Bil)		0.287417	0.341914
0.841	0.401		
L5.Effective Federal Funds Rate (%)		-0.021957	0.008809
-2.493	0.013		
L5.Loss Function		0.000097	0.000117
0.828	0.408		
L6.VIX		-0.000142	0.000138
-1.036	0.300		
L6.Log Total Assets		-0.074011	0.040348
-1.834	0.067		
L6.Log Currency in Circulation (\$ Bil)		-0.314829	0.269785

-1.167	0.243		
L6.Effective Federal Funds Rate (%)		-0.000692	0.009388
-0.074	0.941		
L6.Loss Function		0.000072	0.000130
0.555	0.579		
L7.VIX		0.000336	0.000157
2.138	0.033		
L7.Log Total Assets		0.013297	0.036555
0.364	0.716		
L7.Log Currency in Circulation (\$ Bil)		-0.306449	0.247119
-1.240	0.215		
L7.Effective Federal Funds Rate (%)		0.000947	0.010250
0.092	0.926		
L7.Loss Function		-0.000337	0.000127
-2.648	0.008		
L8.VIX		-0.000386	0.000160
-2.412	0.016		
L8.Log Total Assets		0.040199	0.035814
1.122	0.262		
L8.Log Currency in Circulation (\$ Bil)		0.668683	0.232713
2.873	0.004		
L8.Effective Federal Funds Rate (%)		0.006065	0.010706
0.566	0.571		
L8.Loss Function		0.000428	0.000138
3.105	0.002		
L9.VIX		0.000414	0.000186
2.228	0.026		
L9.Log Total Assets		-0.099262	0.032878
-3.019	0.003		
L9.Log Currency in Circulation (\$ Bil)		-0.428588	0.246006
-1.742	0.081		
L9.Effective Federal Funds Rate (%)		-0.019626	0.014510
-1.353	0.176		
L9.Loss Function		-0.000101	0.000143
-0.707	0.479		
L10.VIX		0.000113	0.000183
0.614	0.539		
L10.Log Total Assets		0.063930	0.035887
1.781	0.075		
L10.Log Currency in Circulation (\$ Bil)		-0.034414	0.257527
-0.134	0.894		
L10.Effective Federal Funds Rate (%)		0.013199	0.016613
0.795	0.427		
L10.Loss Function		-0.000179	0.000141
-1.268	0.205		
L11.VIX		-0.000028	0.000169
-0.166	0.868		
L11.Log Total Assets		-0.032625	0.036959
-0.883	0.377		
L11.Log Currency in Circulation (\$ Bil)		0.406930	0.268795
1.514	0.130		
L11.Effective Federal Funds Rate (%)		0.011309	0.015670
0.722	0.470		
L11.Loss Function		-0.000093	0.000150
-0.622	0.534		
L12.VIX		-0.000411	0.000178
-2.306	0.021		

L12.Log Total Assets	0.076842	0.039324
1.954 0.051		
L12.Log Currency in Circulation (\$ Bil)	-0.841102	0.286310
-2.938 0.003		
L12.Effective Federal Funds Rate (%)	-0.012999	0.015530
-0.837 0.403		
L12.Loss Function	0.000055	0.000139
0.395 0.693		
L13.VIX	-0.000038	0.000168
-0.229 0.819		
L13.Log Total Assets	-0.050683	0.041369
-1.225 0.221		
L13.Log Currency in Circulation (\$ Bil)	0.706872	0.319730
2.211 0.027		
L13.Effective Federal Funds Rate (%)	0.027186	0.015108
1.799 0.072		
L13.Loss Function	-0.000020	0.000181
-0.109 0.913		
L14.VIX	-0.000232	0.000185
-1.252 0.211		
L14.Log Total Assets	0.037172	0.037875
0.981 0.326		
L14.Log Currency in Circulation (\$ Bil)	-0.053666	0.319582
-0.168 0.867		
L14.Effective Federal Funds Rate (%)	-0.031931	0.014877
-2.146 0.032		
L14.Loss Function	0.000071	0.000183
0.386 0.699		
L15.VIX	0.000154	0.000216
0.711 0.477		
L15.Log Total Assets	-0.041454	0.043241
-0.959 0.338		
L15.Log Currency in Circulation (\$ Bil)	-0.192338	0.383092
-0.502 0.616		
L15.Effective Federal Funds Rate (%)	0.024566	0.015379
1.597 0.110		
L15.Loss Function	-0.000004	0.000177
-0.023 0.981		
L16.VIX	0.000362	0.000213
1.699 0.089		
L16.Log Total Assets	0.064281	0.046330
1.387 0.165		
L16.Log Currency in Circulation (\$ Bil)	0.001177	0.394780
0.003 0.998		
L16.Effective Federal Funds Rate (%)	-0.007912	0.015500
-0.510 0.610		
L16.Loss Function	-0.000048	0.000190
-0.254 0.799		
L17.VIX	-0.000203	0.000185
-1.097 0.273		
L17.Log Total Assets	-0.037637	0.040748
-0.924 0.356		
L17.Log Currency in Circulation (\$ Bil)	0.186021	0.334935
0.555 0.579		
L17.Effective Federal Funds Rate (%)	-0.002382	0.014633
-0.163 0.871		
L17.Loss Function	0.000158	0.000433

0.365	0.715		
L18.VIX		0.000167	0.000180
0.927	0.354		
L18.Log Total Assets		-0.037346	0.033864
-1.103	0.270		
L18.Log Currency in Circulation (\$ Bil)		0.233337	0.241654
0.966	0.334		
L18.Effective Federal Funds Rate (%)		-0.005742	0.014299
-0.402	0.688		
L18.Loss Function		0.000491	0.000443
1.109	0.268		
L19.VIX		-0.000044	0.000164
-0.268	0.789		
L19.Log Total Assets		0.012926	0.031707
0.408	0.684		
L19.Log Currency in Circulation (\$ Bil)		-0.505195	0.238004
-2.123	0.034		
L19.Effective Federal Funds Rate (%)		0.000443	0.013917
0.032	0.975		
L19.Loss Function		-0.000106	0.000401
-0.264	0.792		
L20.VIX		-0.000072	0.000146
-0.496	0.620		
L20.Log Total Assets		0.036647	0.030546
1.200	0.230		
L20.Log Currency in Circulation (\$ Bil)		0.407859	0.258080
1.580	0.114		
L20.Effective Federal Funds Rate (%)		0.004788	0.012678
0.378	0.706		
L20.Loss Function		0.000990	0.000489
2.026	0.043		
L21.VIX		0.000096	0.000134
0.719	0.472		
L21.Log Total Assets		-0.096797	0.031401
-3.083	0.002		
L21.Log Currency in Circulation (\$ Bil)		-0.256286	0.280137
-0.915	0.360		
L21.Effective Federal Funds Rate (%)		-0.017784	0.013105
-1.357	0.175		
L21.Loss Function		-0.000533	0.000495
-1.075	0.282		
L22.VIX		0.000153	0.000142
1.073	0.283		
L22.Log Total Assets		0.057907	0.025646
2.258	0.024		
L22.Log Currency in Circulation (\$ Bil)		0.135163	0.254874
0.530	0.596		
L22.Effective Federal Funds Rate (%)		0.014547	0.011889
1.224	0.221		
L22.Loss Function		-0.000344	0.000443
-0.777	0.437		
L23.VIX		-0.000179	0.000150
-1.195	0.232		
L23.Log Total Assets		0.019773	0.026354
0.750	0.453		
L23.Log Currency in Circulation (\$ Bil)		-0.116860	0.261202
-0.447	0.655		

L23.Effective Federal Funds Rate (%)	0.005159	0.011229
0.459 0.646		
L23.Loss Function	-0.000278	0.000465
-0.597 0.551		
L24.VIX	0.000023	0.000140
0.166 0.868		
L24.Log Total Assets	0.003429	0.024921
0.138 0.891		
L24.Log Currency in Circulation (\$ Bil)	-0.158423	0.269896
-0.587 0.557		
L24.Effective Federal Funds Rate (%)	0.003512	0.013038
0.269 0.788		
L24.Loss Function	-0.001375	0.000451
-3.051 0.002		
L25.VIX	-0.000009	0.000153
-0.058 0.954		
L25.Log Total Assets	-0.028619	0.023794
-1.203 0.229		
L25.Log Currency in Circulation (\$ Bil)	0.078833	0.261171
0.302 0.763		
L25.Effective Federal Funds Rate (%)	-0.006368	0.011923
-0.534 0.593		
L25.Loss Function	0.000671	0.000500
1.340 0.180		
L26.VIX	-0.000103	0.000139
-0.738 0.461		
L26.Log Total Assets	0.017085	0.023416
0.730 0.466		
L26.Log Currency in Circulation (\$ Bil)	-0.091975	0.299404
-0.307 0.759		
L26.Effective Federal Funds Rate (%)	-0.011555	0.010486
-1.102 0.271		
L26.Loss Function	-0.000190	0.000420
-0.453 0.651		
L27.VIX	-0.000024	0.000129
-0.185 0.853		
L27.Log Total Assets	-0.006425	0.021902
-0.293 0.769		
L27.Log Currency in Circulation (\$ Bil)	0.130099	0.283564
0.459 0.646		
L27.Effective Federal Funds Rate (%)	0.019311	0.009666
1.998 0.046		
L27.Loss Function	0.001376	0.000491
2.802 0.005		
L28.VIX	0.000347	0.000129
2.685 0.007		
L28.Log Total Assets	0.002664	0.020094
0.133 0.895		
L28.Log Currency in Circulation (\$ Bil)	-0.321671	0.254842
-1.262 0.207		
L28.Effective Federal Funds Rate (%)	-0.000455	0.010124
-0.045 0.964		
L28.Loss Function	-0.000160	0.000516
-0.309 0.757		
L29.VIX	-0.000118	0.000137
-0.863 0.388		
L29.Log Total Assets	-0.010438	0.015490

-0.674	0.500		
L29.Log Currency in Circulation (\$ Bil)		0.272540	0.190162
1.433	0.152		
L29.Effective Federal Funds Rate (%)		-0.014030	0.007234
-1.939	0.052		
L29.Loss Function		-0.000094	0.000463
-0.204	0.839		
=====			
=====			

Results for equation Effective Federal Funds Rate (%)

		coefficient	std. error
t-stat	prob		

const		0.005926	0.051431
0.115	0.908		
L1.VIX		-0.013025	0.008985
-1.450	0.147		
L1.Log Total Assets		-0.360527	1.370921
-0.263	0.793		
L1.Log Currency in Circulation (\$ Bil)		8.025615	12.744738
0.630	0.529		
L1.Effective Federal Funds Rate (%)		0.803532	0.283010
2.839	0.005		
L1.Loss Function		-0.000278	0.005297
-0.053	0.958		
L2.VIX		0.008435	0.008151
1.035	0.301		
L2.Log Total Assets		1.692461	2.338665
0.724	0.469		
L2.Log Currency in Circulation (\$ Bil)		-12.969034	18.212066
-0.712	0.476		
L2.Effective Federal Funds Rate (%)		0.637417	0.333646
1.910	0.056		
L2.Loss Function		-0.007211	0.006228
-1.158	0.247		
L3.VIX		-0.002681	0.008604
-0.312	0.755		
L3.Log Total Assets		-1.367393	2.727246
-0.501	0.616		
L3.Log Currency in Circulation (\$ Bil)		-2.205185	18.869730
-0.117	0.907		
L3.Effective Federal Funds Rate (%)		-0.028069	0.450543
-0.062	0.950		
L3.Loss Function		0.004731	0.006905
0.685	0.493		
L4.VIX		-0.003951	0.009974
-0.396	0.692		
L4.Log Total Assets		-0.337885	2.603335
-0.130	0.897		
L4.Log Currency in Circulation (\$ Bil)		-14.837910	22.009057
-0.674	0.500		
L4.Effective Federal Funds Rate (%)		-1.335971	0.426716
-3.131	0.002		

L4.Loss Function	-0.007148	0.006296
-1.135 0.256		
L5.VIX	-0.000465	0.007164
-0.065 0.948		
L5.Log Total Assets	-1.663073	2.316195
-0.718 0.473		
L5.Log Currency in Circulation (\$ Bil)	23.309989	19.125809
1.219 0.223		
L5.Effective Federal Funds Rate (%)	0.681621	0.492750
1.383 0.167		
L5.Loss Function	0.003414	0.006568
0.520 0.603		
L6.VIX	-0.004227	0.007694
-0.549 0.583		
L6.Log Total Assets	1.077739	2.256988
0.478 0.633		
L6.Log Currency in Circulation (\$ Bil)	11.360581	15.091100
0.753 0.452		
L6.Effective Federal Funds Rate (%)	0.158534	0.525121
0.302 0.763		
L6.Loss Function	-0.008360	0.007296
-1.146 0.252		
L7.VIX	-0.016004	0.008802
-1.818 0.069		
L7.Log Total Assets	3.061604	2.044778
1.497 0.134		
L7.Log Currency in Circulation (\$ Bil)	-20.186627	13.823200
-1.460 0.144		
L7.Effective Federal Funds Rate (%)	0.493269	0.573336
0.860 0.390		
L7.Loss Function	0.002430	0.007127
0.341 0.733		
L8.VIX	0.006984	0.008947
0.781 0.435		
L8.Log Total Assets	-0.364456	2.003341
-0.182 0.856		
L8.Log Currency in Circulation (\$ Bil)	13.626723	13.017409
1.047 0.295		
L8.Effective Federal Funds Rate (%)	-0.040912	0.598866
-0.068 0.946		
L8.Loss Function	0.006643	0.007716
0.861 0.389		
L9.VIX	-0.007588	0.010384
-0.731 0.465		
L9.Log Total Assets	-2.108968	1.839106
-1.147 0.251		
L9.Log Currency in Circulation (\$ Bil)	-2.240393	13.760941
-0.163 0.871		
L9.Effective Federal Funds Rate (%)	-0.655151	0.811646
-0.807 0.420		
L9.Loss Function	-0.007935	0.008000
-0.992 0.321		
L10.VIX	-0.004998	0.010248
-0.488 0.626		
L10.Log Total Assets	1.842802	2.007453
0.918 0.359		
L10.Log Currency in Circulation (\$ Bil)	-4.016093	14.405433

-0.279	0.780		
L10.Effective Federal Funds Rate (%)		0.593275	0.929294
0.638	0.523		
L10.Loss Function		0.006897	0.007898
0.873	0.383		
L11.VIX		0.002286	0.009440
0.242	0.809		
L11.Log Total Assets		-0.328857	2.067398
-0.159	0.874		
L11.Log Currency in Circulation (\$ Bil)		21.679766	15.035696
1.442	0.149		
L11.Effective Federal Funds Rate (%)		-0.808805	0.876535
-0.923	0.356		
L11.Loss Function		0.004368	0.008371
0.522	0.602		
L12.VIX		-0.002281	0.009965
-0.229	0.819		
L12.Log Total Assets		-3.088239	2.199682
-1.404	0.160		
L12.Log Currency in Circulation (\$ Bil)		-2.378836	16.015451
-0.149	0.882		
L12.Effective Federal Funds Rate (%)		-0.648761	0.868713
-0.747	0.455		
L12.Loss Function		0.006317	0.007776
0.812	0.417		
L13.VIX		0.014835	0.009372
1.583	0.113		
L13.Log Total Assets		-3.498942	2.314061
-1.512	0.131		
L13.Log Currency in Circulation (\$ Bil)		-18.660594	17.884887
-1.043	0.297		
L13.Effective Federal Funds Rate (%)		0.292123	0.845112
0.346	0.730		
L13.Loss Function		-0.009561	0.010146
-0.942	0.346		
L14.VIX		-0.005907	0.010351
-0.571	0.568		
L14.Log Total Assets		4.842110	2.118606
2.286	0.022		
L14.Log Currency in Circulation (\$ Bil)		11.795434	17.876641
0.660	0.509		
L14.Effective Federal Funds Rate (%)		0.214763	0.832170
0.258	0.796		
L14.Loss Function		-0.010511	0.010224
-1.028	0.304		
L15.VIX		-0.014886	0.012089
-1.231	0.218		
L15.Log Total Assets		0.194266	2.418809
0.080	0.936		
L15.Log Currency in Circulation (\$ Bil)		-20.144696	21.429226
-0.940	0.347		
L15.Effective Federal Funds Rate (%)		1.210093	0.860287
1.407	0.160		
L15.Loss Function		0.009568	0.009885
0.968	0.333		
L16.VIX		0.015624	0.011911
1.312	0.190		

L16.Log Total Assets	-0.848453	2.591574
-0.327 0.743		
L16.Log Currency in Circulation (\$ Bil)	10.570924	22.082987
0.479 0.632		
L16.Effective Federal Funds Rate (%)	-0.549559	0.867057
-0.634 0.526		
L16.Loss Function	-0.016652	0.010619
-1.568 0.117		
L17.VIX	-0.019492	0.010330
-1.887 0.059		
L17.Log Total Assets	-0.515662	2.279345
-0.226 0.821		
L17.Log Currency in Circulation (\$ Bil)	21.021356	18.735426
1.122 0.262		
L17.Effective Federal Funds Rate (%)	0.026211	0.818550
0.032 0.974		
L17.Loss Function	0.036503	0.024237
1.506 0.132		
L18.VIX	0.000976	0.010062
0.097 0.923		
L18.Log Total Assets	2.051369	1.894250
1.083 0.279		
L18.Log Currency in Circulation (\$ Bil)	-19.306836	13.517505
-1.428 0.153		
L18.Effective Federal Funds Rate (%)	-0.436441	0.799869
-0.546 0.585		
L18.Loss Function	-0.011084	0.024760
-0.448 0.654		
L19.VIX	-0.003913	0.009194
-0.426 0.670		
L19.Log Total Assets	-0.823543	1.773591
-0.464 0.642		
L19.Log Currency in Circulation (\$ Bil)	-1.852570	13.313364
-0.139 0.889		
L19.Effective Federal Funds Rate (%)	0.861856	0.778510
1.107 0.268		
L19.Loss Function	-0.087285	0.022447
-3.888 0.000		
L20.VIX	-0.005302	0.008156
-0.650 0.516		
L20.Log Total Assets	0.728241	1.708688
0.426 0.670		
L20.Log Currency in Circulation (\$ Bil)	-9.077716	14.436331
-0.629 0.529		
L20.Effective Federal Funds Rate (%)	-0.533736	0.709202
-0.753 0.452		
L20.Loss Function	0.017885	0.027350
0.654 0.513		
L21.VIX	-0.005058	0.007509
-0.674 0.501		
L21.Log Total Assets	-2.166723	1.756467
-1.234 0.217		
L21.Log Currency in Circulation (\$ Bil)	-0.422062	15.670157
-0.027 0.979		
L21.Effective Federal Funds Rate (%)	-0.955154	0.733073
-1.303 0.193		
L21.Loss Function	-0.005758	0.027713

-0.208	0.835		
L22.VIX		-0.004887	0.007968
-0.613	0.540		
L22.Log Total Assets		1.162335	1.434578
0.810	0.418		
L22.Log Currency in Circulation (\$ Bil)		10.925634	14.257014
0.766	0.443		
L22.Effective Federal Funds Rate (%)		1.028371	0.665056
1.546	0.122		
L22.Loss Function		0.009664	0.024754
0.390	0.696		
L23.VIX		0.005147	0.008363
0.615	0.538		
L23.Log Total Assets		0.718607	1.474163
0.487	0.626		
L23.Log Currency in Circulation (\$ Bil)		-18.056546	14.611012
-1.236	0.217		
L23.Effective Federal Funds Rate (%)		0.117928	0.628105
0.188	0.851		
L23.Loss Function		0.033377	0.026011
1.283	0.199		
L24.VIX		0.001970	0.007813
0.252	0.801		
L24.Log Total Assets		-1.752663	1.394030
-1.257	0.209		
L24.Log Currency in Circulation (\$ Bil)		25.584799	15.097285
1.695	0.090		
L24.Effective Federal Funds Rate (%)		-0.524849	0.729290
-0.720	0.472		
L24.Loss Function		-0.005390	0.025213
-0.214	0.831		
L25.VIX		-0.010558	0.008544
-1.236	0.217		
L25.Log Total Assets		0.955243	1.330986
0.718	0.473		
L25.Log Currency in Circulation (\$ Bil)		-25.794849	14.609273
-1.766	0.077		
L25.Effective Federal Funds Rate (%)		0.055052	0.666925
0.083	0.934		
L25.Loss Function		0.047271	0.027982
1.689	0.091		
L26.VIX		0.000207	0.007776
0.027	0.979		
L26.Log Total Assets		0.821966	1.309847
0.628	0.530		
L26.Log Currency in Circulation (\$ Bil)		2.451684	16.747903
0.146	0.884		
L26.Effective Federal Funds Rate (%)		0.379265	0.586578
0.647	0.518		
L26.Loss Function		-0.003791	0.023497
-0.161	0.872		
L27.VIX		-0.003236	0.007237
-0.447	0.655		
L27.Log Total Assets		-1.642145	1.225154
-1.340	0.180		
L27.Log Currency in Circulation (\$ Bil)		7.009072	15.861889
0.442	0.659		

L27.Effective Federal Funds Rate (%)	-0.383719	0.540704
-0.710 0.478		
L27.Loss Function	-0.034359	0.027467
-1.251 0.211		
L28.VIX	-0.004396	0.007235
-0.608 0.543		
L28.Log Total Assets	2.612284	1.124020
2.324 0.020		
L28.Log Currency in Circulation (\$ Bil)	-12.128543	14.255206
-0.851 0.395		
L28.Effective Federal Funds Rate (%)	0.175357	0.566299
0.310 0.757		
L28.Loss Function	0.004579	0.028884
0.159 0.874		
L29.VIX	-0.005763	0.007638
-0.755 0.451		
L29.Log Total Assets	-1.374285	0.866488
-1.586 0.113		
L29.Log Currency in Circulation (\$ Bil)	12.156614	10.637207
1.143 0.253		
L29.Effective Federal Funds Rate (%)	-0.071727	0.404655
-0.177 0.859		
L29.Loss Function	0.020083	0.025874
0.776 0.438		

Results for equation Loss Function

t-stat	prob	coefficient	std. error
const		2.704410	2.819146
0.959 0.337			
L1.VIX		-0.313278	0.492523
-0.636 0.525			
L1.Log Total Assets		59.364133	75.145192
0.790 0.430			
L1.Log Currency in Circulation (\$ Bil)		-1282.499341	698.585582
-1.836 0.066			
L1.Effective Federal Funds Rate (%)		45.073538	15.512821
2.906 0.004			
L1.Loss Function		0.336183	0.290344
1.158 0.247			
L2.VIX		0.012692	0.446765
0.028 0.977			
L2.Log Total Assets		-27.083445	128.190784
-0.211 0.833			
L2.Log Currency in Circulation (\$ Bil)		1561.225410	998.269801
1.564 0.118			
L2.Effective Federal Funds Rate (%)		-45.005330	18.288376
-2.461 0.014			
L2.Loss Function		0.098190	0.341374
0.288 0.774			
L3.VIX		-0.950796	0.471627

-2.016	0.044		
L3.Log Total Assets		-36.970748	149.490307
-0.247	0.805		
L3.Log Currency in Circulation (\$ Bil)		-1088.847011	1034.318779
-1.053	0.292		
L3.Effective Federal Funds Rate (%)		-4.256051	24.695892
-0.172	0.863		
L3.Loss Function		0.383195	0.378475
1.012	0.311		
L4.VIX		0.171644	0.546726
0.314	0.754		
L4.Log Total Assets		-49.636451	142.698283
-0.348	0.728		
L4.Log Currency in Circulation (\$ Bil)		-17.050211	1206.396742
-0.014	0.989		
L4.Effective Federal Funds Rate (%)		-28.848188	23.389848
-1.233	0.217		
L4.Loss Function		-0.874725	0.345103
-2.535	0.011		
L5.VIX		-0.867277	0.392689
-2.209	0.027		
L5.Log Total Assets		79.553989	126.959089
0.627	0.531		
L5.Log Currency in Circulation (\$ Bil)		615.286950	1048.355429
0.587	0.557		
L5.Effective Federal Funds Rate (%)		44.857131	27.009435
1.661	0.097		
L5.Loss Function		0.079804	0.360005
0.222	0.825		
L6.VIX		-0.160827	0.421754
-0.381	0.703		
L6.Log Total Assets		61.001827	123.713764
0.493	0.622		
L6.Log Currency in Circulation (\$ Bil)		211.620462	827.198261
0.256	0.798		
L6.Effective Federal Funds Rate (%)		9.314755	28.783793
0.324	0.746		
L6.Loss Function		-0.073692	0.399924
-0.184	0.854		
L7.VIX		-0.320441	0.482450
-0.664	0.507		
L7.Log Total Assets		12.857290	112.081738
0.115	0.909		
L7.Log Currency in Circulation (\$ Bil)		42.923507	757.700071
0.057	0.955		
L7.Effective Federal Funds Rate (%)		-7.572945	31.426613
-0.241	0.810		
L7.Loss Function		0.312458	0.390673
0.800	0.424		
L8.VIX		-0.025146	0.490432
-0.051	0.959		
L8.Log Total Assets		-37.275720	109.810454
-0.339	0.734		
L8.Log Currency in Circulation (\$ Bil)		-621.452771	713.531697
-0.871	0.384		
L8.Effective Federal Funds Rate (%)		-14.825821	32.826036
-0.452	0.652		

L8.Loss Function	-0.233233	0.422927
-0.551 0.581		
L9.VIX	-0.662191	0.569171
-1.163 0.245		
L9.Log Total Assets	45.338737	100.808123
0.450 0.653		
L9.Log Currency in Circulation (\$ Bil)	797.131494	754.287378
1.057 0.291		
L9.Effective Federal Funds Rate (%)	-20.028506	44.489271
-0.450 0.653		
L9.Loss Function	0.085082	0.438515
0.194 0.846		
L10.VIX	0.368016	0.561713
0.655 0.512		
L10.Log Total Assets	-168.746931	110.035824
-1.534 0.125		
L10.Log Currency in Circulation (\$ Bil)	360.955886	789.614349
0.457 0.648		
L10.Effective Federal Funds Rate (%)	26.119334	50.938009
0.513 0.608		
L10.Loss Function	0.246075	0.432922
0.568 0.570		
L11.VIX	0.438773	0.517444
0.848 0.396		
L11.Log Total Assets	44.649175	113.321607
0.394 0.694		
L11.Log Currency in Circulation (\$ Bil)	-1074.240015	824.161365
-1.303 0.192		
L11.Effective Federal Funds Rate (%)	-41.282508	48.046101
-0.859 0.390		
L11.Loss Function	-0.194702	0.458837
-0.424 0.671		
L12.VIX	0.471148	0.546232
0.863 0.388		
L12.Log Total Assets	-105.122551	120.572615
-0.872 0.383		
L12.Log Currency in Circulation (\$ Bil)	-33.054302	877.865346
-0.038 0.970		
L12.Effective Federal Funds Rate (%)	35.955638	47.617332
0.755 0.450		
L12.Loss Function	-1.196994	0.426226
-2.808 0.005		
L13.VIX	-0.382076	0.513737
-0.744 0.457		
L13.Log Total Assets	141.095350	126.842157
1.112 0.266		
L13.Log Currency in Circulation (\$ Bil)	-726.788741	980.335932
-0.741 0.458		
L13.Effective Federal Funds Rate (%)	-6.049670	46.323673
-0.131 0.896		
L13.Loss Function	0.236332	0.556141
0.425 0.671		
L14.VIX	0.153315	0.567391
0.270 0.787		
L14.Log Total Assets	-57.469643	116.128552
-0.495 0.621		
L14.Log Currency in Circulation (\$ Bil)	625.519674	979.883921

0.638	0.523		
L14.Effective Federal Funds Rate (%)		1.773645	45.614254
0.039	0.969		
L14.Loss Function		0.126893	0.560428
0.226	0.821		
L15.VIX		-0.832478	0.662648
-1.256	0.209		
L15.Log Total Assets		49.273311	132.583748
0.372	0.710		
L15.Log Currency in Circulation (\$ Bil)		156.820254	1174.614101
0.134	0.894		
L15.Effective Federal Funds Rate (%)		-6.883446	47.155498
-0.146	0.884		
L15.Loss Function		-0.192984	0.541812
-0.356	0.722		
L16.VIX		-0.766081	0.652912
-1.173	0.241		
L16.Log Total Assets		8.389461	142.053638
0.059	0.953		
L16.Log Currency in Circulation (\$ Bil)		362.734302	1210.449140
0.300	0.764		
L16.Effective Federal Funds Rate (%)		16.804744	47.526547
0.354	0.724		
L16.Loss Function		-0.496489	0.582061
-0.853	0.394		
L17.VIX		-0.457582	0.566231
-0.808	0.419		
L17.Log Total Assets		74.551974	124.939196
0.597	0.551		
L17.Log Currency in Circulation (\$ Bil)		-762.570857	1026.957092
-0.743	0.458		
L17.Effective Federal Funds Rate (%)		23.809434	44.867720
0.531	0.596		
L17.Loss Function		0.505925	1.328504
0.381	0.703		
L18.VIX		0.186026	0.551520
0.337	0.736		
L18.Log Total Assets		-89.635657	103.830754
-0.863	0.388		
L18.Log Currency in Circulation (\$ Bil)		-678.694770	740.943811
-0.916	0.360		
L18.Effective Federal Funds Rate (%)		-70.474208	43.843752
-1.607	0.108		
L18.Loss Function		-2.136261	1.357160
-1.574	0.115		
L19.VIX		-0.534772	0.503930
-1.061	0.289		
L19.Log Total Assets		26.602560	97.216991
0.274	0.784		
L19.Log Currency in Circulation (\$ Bil)		346.951299	729.754063
0.475	0.634		
L19.Effective Federal Funds Rate (%)		38.864726	42.672972
0.911	0.362		
L19.Loss Function		0.172158	1.230419
0.140	0.889		
L20.VIX		-0.084533	0.447037
-0.189	0.850		

L20.Log Total Assets	49.211447	93.659423
0.525 0.599		
L20.Log Currency in Circulation (\$ Bil)	16.687346	791.307977
0.021 0.983		
L20.Effective Federal Funds Rate (%)	-21.413468	38.873968
-0.551 0.582		
L20.Loss Function	-0.337157	1.499169
-0.225 0.822		
L21.VIX	-0.325308	0.411600
-0.790 0.429		
L21.Log Total Assets	69.880228	96.278371
0.726 0.468		
L21.Log Currency in Circulation (\$ Bil)	917.863891	858.938511
1.069 0.285		
L21.Effective Federal Funds Rate (%)	71.099101	40.182416
1.769 0.077		
L21.Loss Function	2.095152	1.519027
1.379 0.168		
L22.VIX	-0.027065	0.436747
-0.062 0.951		
L22.Log Total Assets	-80.722262	78.634479
-1.027 0.305		
L22.Log Currency in Circulation (\$ Bil)	218.624870	781.478997
0.280 0.780		
L22.Effective Federal Funds Rate (%)	-41.687353	36.454130
-1.144 0.253		
L22.Loss Function	2.604940	1.356845
1.920 0.055		
L23.VIX	0.380338	0.458403
0.830 0.407		
L23.Log Total Assets	-83.276872	80.804274
-1.031 0.303		
L23.Log Currency in Circulation (\$ Bil)	-827.385359	800.882891
-1.033 0.302		
L23.Effective Federal Funds Rate (%)	-20.878204	34.428746
-0.606 0.544		
L23.Loss Function	-0.238647	1.425741
-0.167 0.867		
L24.VIX	0.002004	0.428272
0.005 0.996		
L24.Log Total Assets	17.680032	76.411899
0.231 0.817		
L24.Log Currency in Circulation (\$ Bil)	181.862012	827.537292
0.220 0.826		
L24.Effective Federal Funds Rate (%)	-13.581223	39.975057
-0.340 0.734		
L24.Loss Function	0.874107	1.382008
0.632 0.527		
L25.VIX	-0.650243	0.468311
-1.388 0.165		
L25.Log Total Assets	97.057217	72.956224
1.330 0.183		
L25.Log Currency in Circulation (\$ Bil)	-369.299494	800.787553
-0.461 0.645		
L25.Effective Federal Funds Rate (%)	49.013624	36.556588
1.341 0.180		
L25.Loss Function	-0.220917	1.533814

-0.144	0.885		
L26.VIX		-0.311339	0.426251
-0.730	0.465		
L26.Log Total Assets		-45.384340	71.797493
-0.632	0.527		
L26.Log Currency in Circulation (\$ Bil)		1250.554241	918.013696
1.362	0.173		
L26.Effective Federal Funds Rate (%)		-11.722942	32.152497
-0.365	0.715		
L26.Loss Function		-0.738709	1.287949
-0.574	0.566		
L27.VIX		-0.270047	0.396684
-0.681	0.496		
L27.Log Total Assets		1.766308	67.155181
0.026	0.979		
L27.Log Currency in Circulation (\$ Bil)		-968.145181	869.448060
-1.114	0.265		
L27.Effective Federal Funds Rate (%)		-29.337957	29.637949
-0.990	0.322		
L27.Loss Function		-2.516796	1.505564
-1.672	0.095		
L28.VIX		-0.139753	0.396598
-0.352	0.725		
L28.Log Total Assets		57.259837	61.611649
0.929	0.353		
L28.Log Currency in Circulation (\$ Bil)		420.170243	781.379859
0.538	0.591		
L28.Effective Federal Funds Rate (%)		26.131517	31.040890
0.842	0.400		
L28.Loss Function		0.262772	1.583244
0.166	0.868		
L29.VIX		-0.289123	0.418651
-0.691	0.490		
L29.Log Total Assets		-23.028694	47.495368
-0.485	0.628		
L29.Log Currency in Circulation (\$ Bil)		-517.860792	583.064117
-0.888	0.374		
L29.Effective Federal Funds Rate (%)		0.398669	22.180595
0.018	0.986		
L29.Loss Function		0.677523	1.418257
0.478	0.633		

Correlation matrix of residuals

	VIX	Log Total Assets	Log Currency in Circulation (\$ Bil)	Effective Federal Funds Rate (%)	Loss Function
VIX	1.000000				
0.176686	-0.673130	-0.182578			
Log Total Assets	0.547820	1.000000			
0.716967	-0.592658	-0.650557			
Log Currency in Circulation (\$ Bil)	0.176686	0.716967	1.000000		
Effective Federal Funds Rate (%)	-0.206664	-0.626445	-0.206664	1.000000	
Loss Function	-0.182578	-0.650557	-0.182578	-0.650557	1.000000

-0.626445

0.504493

1.000000



In []:

In []:

In []:

In []:

##Check for Serial Correlation of Residuals (Errors) using Durbin Watson Statistic

Serial correlation of residuals is used to check if there is any leftover pattern in the residuals (errors). What does this mean to us? If there is any correlation left in the residuals, then, there is some pattern in the time series that is still left to be explained by the model. In that case, the typical course of action is to either increase the order of the model or induce more predictors into the system or look for a different algorithm to model the time series. So, checking for serial correlation is to ensure that the model is sufficiently able to explain the variances and patterns in the time series. Alright, coming back to topic. A common way of checking for serial correlation of errors can be measured using the Durbin Watson's Statistic. Durbin Watson Statistic - Formula The value of this statistic can vary between 0 and 4. The closer it is to the value 2, then there is no significant serial correlation. The closer to 0, there is a positive serial correlation, and the closer it is to 4 implies negative serial correlation.

In [35]: df.to_csv("VIX.csv")

```
In [27]: results = var.fit(32)
#We can check the summary of the model by.
results.summary()
```

Out[27]: Summary of Regression Results

```
=====
Model:                VAR
Method:               OLS
Date:                Sat, 19, Mar, 2022
Time:                16:45:49
```

```
-----
No. of Equations:      5.00000    BIC:                -19.8984
Nobs:                 169.000    HQIC:               -28.7569
Log likelihood:       2547.20    FPE:                6.65625e-12
AIC:                  -34.8071    Det(Omega_mle):     2.34473e-13
-----
```

Results for equation VIX

```
=====
=====
```

		coefficient	std. error
t-stat	prob		

const		7.122555	3.649625
1.952	0.051		
L1.VIX		0.278052	0.319154
0.871	0.384		
L1.Log Total Assets		-57.088270	48.843516
-1.169	0.242		
L1.Log Currency in Circulation (\$ Bil)		-1259.325102	537.467240
-2.343	0.019		
L1.Effective Federal Funds Rate (%)		19.033957	23.978314
0.794	0.427		
L1.Loss Function		-0.344182	0.250736
-1.373	0.170		
L2.VIX		-0.285088	0.635805
-0.448	0.654		
L2.Log Total Assets		117.176533	92.440806
1.268	0.205		
L2.Log Currency in Circulation (\$ Bil)		496.810358	683.739490
0.727	0.467		
L2.Effective Federal Funds Rate (%)		24.902786	14.604901
1.705	0.088		
L2.Loss Function		-0.490679	0.393899
-1.246	0.213		
L3.VIX		-0.035585	0.362979
-0.098	0.922		
L3.Log Total Assets		37.713141	142.470171
0.265	0.791		
L3.Log Currency in Circulation (\$ Bil)		-371.139327	929.305394
-0.399	0.690		
L3.Effective Federal Funds Rate (%)		-11.697261	15.850555
-0.738	0.461		
L3.Loss Function		0.157009	0.316906
0.495	0.620		
L4.VIX		-0.456267	0.653076
-0.699	0.485		

L4.Log Total Assets	-11.388319	185.918990
-0.061 0.951		
L4.Log Currency in Circulation (\$ Bil)	1865.503070	1717.286612
1.086 0.277		
L4.Effective Federal Funds Rate (%)	-36.681016	28.627225
-1.281 0.200		
L4.Loss Function	0.754722	0.279322
2.702 0.007		
L5.VIX	0.124870	0.445687
0.280 0.779		
L5.Log Total Assets	111.072585	204.539829
0.543 0.587		
L5.Log Currency in Circulation (\$ Bil)	-308.988413	904.651443
-0.342 0.733		
L5.Effective Federal Funds Rate (%)	11.296041	31.866661
0.354 0.723		
L5.Loss Function	-0.015127	0.434373
-0.035 0.972		
L6.VIX	0.098448	0.850619
0.116 0.908		
L6.Log Total Assets	14.641314	108.435993
0.135 0.893		
L6.Log Currency in Circulation (\$ Bil)	-1135.857770	857.570187
-1.325 0.185		
L6.Effective Federal Funds Rate (%)	39.694504	18.028356
2.202 0.028		
L6.Loss Function	-0.011559	0.234020
-0.049 0.961		
L7.VIX	0.188763	0.490902
0.385 0.701		
L7.Log Total Assets	-111.339440	91.561956
-1.216 0.224		
L7.Log Currency in Circulation (\$ Bil)	-35.496247	1059.993016
-0.033 0.973		
L7.Effective Federal Funds Rate (%)	-52.297758	32.224738
-1.623 0.105		
L7.Loss Function	0.171189	0.538109
0.318 0.750		
L8.VIX	0.141095	0.636112
0.222 0.824		
L8.Log Total Assets	-114.415424	69.544283
-1.645 0.100		
L8.Log Currency in Circulation (\$ Bil)	-1086.711286	708.580789
-1.534 0.125		
L8.Effective Federal Funds Rate (%)	-33.812303	28.550847
-1.184 0.236		
L8.Loss Function	0.167429	0.302893
0.553 0.580		
L9.VIX	0.612085	0.350666
1.745 0.081		
L9.Log Total Assets	-184.068113	132.837675
-1.386 0.166		
L9.Log Currency in Circulation (\$ Bil)	813.846263	690.445654
1.179 0.239		
L9.Effective Federal Funds Rate (%)	-31.041581	25.495995
-1.218 0.223		
L9.Loss Function	-0.679771	0.332214

-2.046	0.041		
L10.VIX		0.053733	0.520995
0.103	0.918		
L10.Log Total Assets		71.167511	80.520737
0.884	0.377		
L10.Log Currency in Circulation (\$ Bil)		-366.642824	559.763540
-0.655	0.512		
L10.Effective Federal Funds Rate (%)		62.277877	42.074740
1.480	0.139		
L10.Loss Function		-0.608823	0.474920
-1.282	0.200		
L11.VIX		-0.312816	0.311982
-1.003	0.316		
L11.Log Total Assets		253.652651	185.126030
1.370	0.171		
L11.Log Currency in Circulation (\$ Bil)		-80.618378	438.413613
-0.184	0.854		
L11.Effective Federal Funds Rate (%)		10.602483	63.143503
0.168	0.867		
L11.Loss Function		0.040431	0.571394
0.071	0.944		
L12.VIX		-0.478414	0.377001
-1.269	0.204		
L12.Log Total Assets		-165.194104	177.687486
-0.930	0.353		
L12.Log Currency in Circulation (\$ Bil)		-76.500470	399.565430
-0.191	0.848		
L12.Effective Federal Funds Rate (%)		23.108494	63.313467
0.365	0.715		
L12.Loss Function		-0.712541	0.444116
-1.604	0.109		
L13.VIX		-0.614655	0.474090
-1.296	0.195		
L13.Log Total Assets		298.138105	202.098873
1.475	0.140		
L13.Log Currency in Circulation (\$ Bil)		-1468.785787	1048.794025
-1.400	0.161		
L13.Effective Federal Funds Rate (%)		45.216731	69.221081
0.653	0.514		
L13.Loss Function		-1.076283	0.354605
-3.035	0.002		
L14.VIX		-1.045945	0.394264
-2.653	0.008		
L14.Log Total Assets		190.015216	137.890853
1.378	0.168		
L14.Log Currency in Circulation (\$ Bil)		218.804155	811.094954
0.270	0.787		
L14.Effective Federal Funds Rate (%)		60.954057	34.984490
1.742	0.081		
L14.Loss Function		0.260194	0.444709
0.585	0.558		
L15.VIX		-0.073991	0.754722
-0.098	0.922		
L15.Log Total Assets		-8.144274	131.147295
-0.062	0.950		
L15.Log Currency in Circulation (\$ Bil)		548.939098	784.876379
0.699	0.484		

L15.Effective Federal Funds Rate (%)	-98.397478	34.120510
-2.884 0.004		
L15.Loss Function	0.399483	0.747279
0.535 0.593		
L16.VIX	0.487195	1.187068
0.410 0.681		
L16.Log Total Assets	-311.605442	229.985356
-1.355 0.175		
L16.Log Currency in Circulation (\$ Bil)	-275.994841	646.226007
-0.427 0.669		
L16.Effective Federal Funds Rate (%)	-30.326040	41.542545
-0.730 0.465		
L16.Loss Function	0.753135	0.579379
1.300 0.194		
L17.VIX	1.181358	0.721335
1.638 0.101		
L17.Log Total Assets	-76.429137	121.177192
-0.631 0.528		
L17.Log Currency in Circulation (\$ Bil)	409.540661	916.358511
0.447 0.655		
L17.Effective Federal Funds Rate (%)	-89.577004	63.209118
-1.417 0.156		
L17.Loss Function	1.635566	1.146645
1.426 0.154		
L18.VIX	-1.097704	0.664214
-1.653 0.098		
L18.Log Total Assets	43.810902	106.077949
0.413 0.680		
L18.Log Currency in Circulation (\$ Bil)	-118.211061	968.574208
-0.122 0.903		
L18.Effective Federal Funds Rate (%)	59.173226	34.333783
1.723 0.085		
L18.Loss Function	-0.036559	1.374890
-0.027 0.979		
L19.VIX	0.346637	0.584856
0.593 0.553		
L19.Log Total Assets	27.578334	75.907738
0.363 0.716		
L19.Log Currency in Circulation (\$ Bil)	160.041902	772.134236
0.207 0.836		
L19.Effective Federal Funds Rate (%)	58.144401	44.763161
1.299 0.194		
L19.Loss Function	3.994760	1.158493
3.448 0.001		
L20.VIX	-0.286657	0.347315
-0.825 0.409		
L20.Log Total Assets	-123.050575	66.377898
-1.854 0.064		
L20.Log Currency in Circulation (\$ Bil)	-304.028387	646.879636
-0.470 0.638		
L20.Effective Federal Funds Rate (%)	-55.499138	40.197693
-1.381 0.167		
L20.Loss Function	2.174230	1.816628
1.197 0.231		
L21.VIX	-0.550561	0.282148
-1.951 0.051		
L21.Log Total Assets	137.239560	97.018775

1.415	0.157		
L21.Log Currency in Circulation (\$ Bil)		490.645563	442.092043
1.110	0.267		
L21.Effective Federal Funds Rate (%)		36.722212	28.889855
1.271	0.204		
L21.Loss Function		3.306292	1.713912
1.929	0.054		
L22.VIX		0.178431	0.515971
0.346	0.729		
L22.Log Total Assets		135.942328	82.437978
1.649	0.099		
L22.Log Currency in Circulation (\$ Bil)		-111.928509	504.618426
-0.222	0.824		
L22.Effective Federal Funds Rate (%)		13.598039	28.168159
0.483	0.629		
L22.Loss Function		-2.055745	1.746254
-1.177	0.239		
L23.VIX		-0.003490	0.546894
-0.006	0.995		
L23.Log Total Assets		141.329096	171.689127
0.823	0.410		
L23.Log Currency in Circulation (\$ Bil)		867.425425	665.270754
1.304	0.192		
L23.Effective Federal Funds Rate (%)		59.707117	44.463445
1.343	0.179		
L23.Loss Function		-2.736887	1.508716
-1.814	0.070		
L24.VIX		-0.318155	0.296148
-1.074	0.283		
L24.Log Total Assets		-118.531827	156.743754
-0.756	0.450		
L24.Log Currency in Circulation (\$ Bil)		-383.521990	968.277857
-0.396	0.692		
L24.Effective Federal Funds Rate (%)		-69.415118	41.888750
-1.657	0.097		
L24.Loss Function		-1.377058	1.352469
-1.018	0.309		
L25.VIX		-0.376498	0.316718
-1.189	0.235		
L25.Log Total Assets		14.874748	95.382313
0.156	0.876		
L25.Log Currency in Circulation (\$ Bil)		-183.319825	602.881511
-0.304	0.761		
L25.Effective Federal Funds Rate (%)		-7.787017	47.960375
-0.162	0.871		
L25.Loss Function		-3.275902	1.530825
-2.140	0.032		
L26.VIX		0.147173	0.713954
0.206	0.837		
L26.Log Total Assets		-25.002556	47.812735
-0.523	0.601		
L26.Log Currency in Circulation (\$ Bil)		-841.318812	599.437159
-1.404	0.160		
L26.Effective Federal Funds Rate (%)		0.500433	29.174816
0.017	0.986		
L26.Loss Function		-0.600885	1.649815
-0.364	0.716		

L27.VIX		0.879014	0.594488
1.479	0.139		
L27.Log Total Assets		-119.676648	93.705466
-1.277	0.202		
L27.Log Currency in Circulation (\$ Bil)		184.606374	571.341289
0.323	0.747		
L27.Effective Federal Funds Rate (%)		-17.280220	18.619572
-0.928	0.353		
L27.Loss Function		-0.413899	1.157705
-0.358	0.721		
L28.VIX		-0.249891	0.618716
-0.404	0.686		
L28.Log Total Assets		-57.741158	62.719405
-0.921	0.357		
L28.Log Currency in Circulation (\$ Bil)		961.955870	607.906069
1.582	0.114		
L28.Effective Federal Funds Rate (%)		6.361882	17.519513
0.363	0.717		
L28.Loss Function		2.875329	2.256931
1.274	0.203		
L29.VIX		0.279853	0.254731
1.099	0.272		
L29.Log Total Assets		41.075053	51.513798
0.797	0.425		
L29.Log Currency in Circulation (\$ Bil)		-578.763815	684.193008
-0.846	0.398		
L29.Effective Federal Funds Rate (%)		-8.840970	20.628249
-0.429	0.668		
L29.Loss Function		2.459221	1.199999
2.049	0.040		
L30.VIX		0.158553	0.601446
0.264	0.792		
L30.Log Total Assets		-40.333203	62.665596
-0.644	0.520		
L30.Log Currency in Circulation (\$ Bil)		869.812216	1040.934491
0.836	0.403		
L30.Effective Federal Funds Rate (%)		43.004707	19.436255
2.213	0.027		
L30.Loss Function		-1.122314	1.496213
-0.750	0.453		
L31.VIX		0.384368	0.489676
0.785	0.432		
L31.Log Total Assets		84.514749	82.205375
1.028	0.304		
L31.Log Currency in Circulation (\$ Bil)		-775.342956	562.779491
-1.378	0.168		
L31.Effective Federal Funds Rate (%)		11.183384	44.525991
0.251	0.802		
L31.Loss Function		-0.721309	1.286676
-0.561	0.575		
L32.VIX		-0.863354	0.378955
-2.278	0.023		
L32.Log Total Assets		45.520703	54.440155
0.836	0.403		
L32.Log Currency in Circulation (\$ Bil)		-878.806184	526.516611
-1.669	0.095		
L32.Effective Federal Funds Rate (%)		-31.632199	50.274499

-0.629	0.529		
L32.Loss Function		-1.106556	1.180656
-0.937	0.349		

=====

=====

Results for equation Log Total Assets

=====

=====

t-stat	prob	coefficient	std. error

const		-0.056604	0.014638
-3.867	0.000		
L1.VIX		0.006423	0.001280
5.018	0.000		
L1.Log Total Assets		1.153860	0.195903
5.890	0.000		
L1.Log Currency in Circulation (\$ Bil)		-9.805785	2.155690
-4.549	0.000		
L1.Effective Federal Funds Rate (%)		0.139014	0.096173
1.445	0.148		
L1.Loss Function		-0.000524	0.001006
-0.521	0.602		
L2.VIX		0.003495	0.002550
1.370	0.171		
L2.Log Total Assets		-0.381277	0.370764
-1.028	0.304		
L2.Log Currency in Circulation (\$ Bil)		6.973261	2.742364
2.543	0.011		
L2.Effective Federal Funds Rate (%)		0.098327	0.058578
1.679	0.093		
L2.Loss Function		-0.001625	0.001580
-1.029	0.304		
L3.VIX		0.006358	0.001456
4.368	0.000		
L3.Log Total Assets		-0.069928	0.571424
-0.122	0.903		
L3.Log Currency in Circulation (\$ Bil)		-2.321575	3.727287
-0.623	0.533		
L3.Effective Federal Funds Rate (%)		-0.085153	0.063574
-1.339	0.180		
L3.Loss Function		0.002019	0.001271
1.588	0.112		
L4.VIX		0.006880	0.002619
2.626	0.009		
L4.Log Total Assets		0.097920	0.745690
0.131	0.896		
L4.Log Currency in Circulation (\$ Bil)		20.287819	6.887747
2.945	0.003		
L4.Effective Federal Funds Rate (%)		-0.097426	0.114819
-0.849	0.396		
L4.Loss Function		0.003908	0.001120
3.488	0.000		
L5.VIX		0.007681	0.001788
4.297	0.000		

L5.Log Total Assets	0.641909	0.820375
0.782 0.434		
L5.Log Currency in Circulation (\$ Bil)	-8.002693	3.628404
-2.206 0.027		
L5.Effective Federal Funds Rate (%)	0.163751	0.127812
1.281 0.200		
L5.Loss Function	0.004127	0.001742
2.369 0.018		
L6.VIX	0.013715	0.003412
4.020 0.000		
L6.Log Total Assets	-1.106136	0.434918
-2.543 0.011		
L6.Log Currency in Circulation (\$ Bil)	-4.301399	3.439569
-1.251 0.211		
L6.Effective Federal Funds Rate (%)	0.009349	0.072309
0.129 0.897		
L6.Loss Function	0.000566	0.000939
0.603 0.547		
L7.VIX	0.005388	0.001969
2.737 0.006		
L7.Log Total Assets	-0.289824	0.367240
-0.789 0.430		
L7.Log Currency in Circulation (\$ Bil)	-2.800022	4.251453
-0.659 0.510		
L7.Effective Federal Funds Rate (%)	-0.329569	0.129248
-2.550 0.011		
L7.Loss Function	0.006218	0.002158
2.881 0.004		
L8.VIX	0.006426	0.002551
2.519 0.012		
L8.Log Total Assets	-1.511741	0.278930
-5.420 0.000		
L8.Log Currency in Circulation (\$ Bil)	-0.014538	2.841998
-0.005 0.996		
L8.Effective Federal Funds Rate (%)	-0.639073	0.114513
-5.581 0.000		
L8.Loss Function	-0.001853	0.001215
-1.525 0.127		
L9.VIX	0.005484	0.001406
3.899 0.000		
L9.Log Total Assets	-0.285347	0.532789
-0.536 0.592		
L9.Log Currency in Circulation (\$ Bil)	0.491762	2.769261
0.178 0.859		
L9.Effective Federal Funds Rate (%)	0.545066	0.102260
5.330 0.000		
L9.Loss Function	-0.002558	0.001332
-1.920 0.055		
L10.VIX	0.003409	0.002090
1.632 0.103		
L10.Log Total Assets	1.267243	0.322955
3.924 0.000		
L10.Log Currency in Circulation (\$ Bil)	-0.235459	2.245117
-0.105 0.916		
L10.Effective Federal Funds Rate (%)	0.199910	0.168755
1.185 0.236		
L10.Loss Function	-0.003376	0.001905

-1.772	0.076		
L11.VIX		-0.004643	0.001251
-3.710	0.000		
L11.Log Total Assets		1.005376	0.742509
1.354	0.176		
L11.Log Currency in Circulation (\$ Bil)		2.218470	1.758403
1.262	0.207		
L11.Effective Federal Funds Rate (%)		0.050360	0.253258
0.199	0.842		
L11.Loss Function		0.006352	0.002292
2.772	0.006		
L12.VIX		0.005767	0.001512
3.814	0.000		
L12.Log Total Assets		-1.516414	0.712674
-2.128	0.033		
L12.Log Currency in Circulation (\$ Bil)		-3.521482	1.602589
-2.197	0.028		
L12.Effective Federal Funds Rate (%)		-0.043664	0.253940
-0.172	0.863		
L12.Loss Function		-0.005217	0.001781
-2.929	0.003		
L13.VIX		-0.003501	0.001901
-1.841	0.066		
L13.Log Total Assets		3.206412	0.810584
3.956	0.000		
L13.Log Currency in Circulation (\$ Bil)		-8.067037	4.206536
-1.918	0.055		
L13.Effective Federal Funds Rate (%)		0.446310	0.277634
1.608	0.108		
L13.Loss Function		-0.003038	0.001422
-2.136	0.033		
L14.VIX		-0.002844	0.001581
-1.798	0.072		
L14.Log Total Assets		-0.150131	0.553057
-0.271	0.786		
L14.Log Currency in Circulation (\$ Bil)		6.596933	3.253165
2.028	0.043		
L14.Effective Federal Funds Rate (%)		0.193390	0.140317
1.378	0.168		
L14.Loss Function		0.002049	0.001784
1.149	0.251		
L15.VIX		0.001983	0.003027
0.655	0.512		
L15.Log Total Assets		0.702132	0.526010
1.335	0.182		
L15.Log Currency in Circulation (\$ Bil)		1.042905	3.148007
0.331	0.740		
L15.Effective Federal Funds Rate (%)		-0.372287	0.136852
-2.720	0.007		
L15.Loss Function		0.005094	0.002997
1.700	0.089		
L16.VIX		0.009694	0.004761
2.036	0.042		
L16.Log Total Assets		-1.765925	0.922432
-1.914	0.056		
L16.Log Currency in Circulation (\$ Bil)		2.785241	2.591903
1.075	0.283		

L16.Effective Federal Funds Rate (%)	-0.161288	0.166620
-0.968 0.333		
L16.Loss Function	0.007066	0.002324
3.041 0.002		
L17.VIX	0.009607	0.002893
3.321 0.001		
L17.Log Total Assets	0.145901	0.486021
0.300 0.764		
L17.Log Currency in Circulation (\$ Bil)	4.562306	3.675359
1.241 0.214		
L17.Effective Federal Funds Rate (%)	-0.635456	0.253521
-2.507 0.012		
L17.Loss Function	0.001961	0.004599
0.426 0.670		
L18.VIX	0.005250	0.002664
1.971 0.049		
L18.Log Total Assets	-0.262302	0.425461
-0.617 0.538		
L18.Log Currency in Circulation (\$ Bil)	4.002757	3.884788
1.030 0.303		
L18.Effective Federal Funds Rate (%)	0.585084	0.137707
4.249 0.000		
L18.Loss Function	0.011377	0.005514
2.063 0.039		
L19.VIX	0.007998	0.002346
3.410 0.001		
L19.Log Total Assets	0.523739	0.304453
1.720 0.085		
L19.Log Currency in Circulation (\$ Bil)	-1.770857	3.096900
-0.572 0.567		
L19.Effective Federal Funds Rate (%)	-0.030863	0.179537
-0.172 0.864		
L19.Loss Function	0.024174	0.004647
5.203 0.000		
L20.VIX	0.002449	0.001393
1.758 0.079		
L20.Log Total Assets	-2.127777	0.266231
-7.992 0.000		
L20.Log Currency in Circulation (\$ Bil)	8.806125	2.594525
3.394 0.001		
L20.Effective Federal Funds Rate (%)	-0.391392	0.161226
-2.428 0.015		
L20.Loss Function	0.005755	0.007286
0.790 0.430		
L21.VIX	0.002970	0.001132
2.624 0.009		
L21.Log Total Assets	0.832166	0.389126
2.139 0.032		
L21.Log Currency in Circulation (\$ Bil)	-1.943240	1.773157
-1.096 0.273		
L21.Effective Federal Funds Rate (%)	0.230800	0.115872
1.992 0.046		
L21.Loss Function	0.006121	0.006874
0.890 0.373		
L22.VIX	0.006959	0.002069
3.363 0.001		
L22.Log Total Assets	0.669611	0.330645

2.025	0.043		
L22.Log Currency in Circulation (\$ Bil)		-4.944322	2.023939
-2.443	0.015		
L22.Effective Federal Funds Rate (%)		-0.119865	0.112978
-1.061	0.289		
L22.Loss Function		-0.025634	0.007004
-3.660	0.000		
L23.VIX		0.004797	0.002194
2.187	0.029		
L23.Log Total Assets		0.216360	0.688616
0.314	0.753		
L23.Log Currency in Circulation (\$ Bil)		10.415349	2.668289
3.903	0.000		
L23.Effective Federal Funds Rate (%)		0.507203	0.178335
2.844	0.004		
L23.Loss Function		-0.013750	0.006051
-2.272	0.023		
L24.VIX		0.004089	0.001188
3.443	0.001		
L24.Log Total Assets		-1.182314	0.628673
-1.881	0.060		
L24.Log Currency in Circulation (\$ Bil)		-2.243086	3.883599
-0.578	0.564		
L24.Effective Federal Funds Rate (%)		-0.304192	0.168009
-1.811	0.070		
L24.Loss Function		-0.009091	0.005425
-1.676	0.094		
L25.VIX		0.005051	0.001270
3.976	0.000		
L25.Log Total Assets		1.121031	0.382562
2.930	0.003		
L25.Log Currency in Circulation (\$ Bil)		-2.818197	2.418056
-1.165	0.244		
L25.Effective Federal Funds Rate (%)		0.319244	0.192361
1.660	0.097		
L25.Loss Function		-0.025883	0.006140
-4.216	0.000		
L26.VIX		0.007817	0.002864
2.730	0.006		
L26.Log Total Assets		-0.883226	0.191769
-4.606	0.000		
L26.Log Currency in Circulation (\$ Bil)		-2.234897	2.404241
-0.930	0.353		
L26.Effective Federal Funds Rate (%)		-0.070899	0.117015
-0.606	0.545		
L26.Loss Function		-0.004129	0.006617
-0.624	0.533		
L27.VIX		0.009746	0.002384
4.087	0.000		
L27.Log Total Assets		-0.674302	0.375837
-1.794	0.073		
L27.Log Currency in Circulation (\$ Bil)		0.798606	2.291553
0.349	0.727		
L27.Effective Federal Funds Rate (%)		0.061711	0.074680
0.826	0.409		
L27.Loss Function		0.002017	0.004643
0.434	0.664		

L28.VIX		0.001989	0.002482
0.801	0.423		
L28.Log Total Assets		-0.710691	0.251557
-2.825	0.005		
L28.Log Currency in Circulation (\$ Bil)		6.075778	2.438209
2.492	0.013		
L28.Effective Federal Funds Rate (%)		-0.361109	0.070268
-5.139	0.000		
L28.Loss Function		0.019274	0.009052
2.129	0.033		
L29.VIX		0.005688	0.001022
5.567	0.000		
L29.Log Total Assets		0.316578	0.206613
1.532	0.125		
L29.Log Currency in Circulation (\$ Bil)		2.699239	2.744183
0.984	0.325		
L29.Effective Federal Funds Rate (%)		0.066073	0.082736
0.799	0.425		
L29.Loss Function		0.007616	0.004813
1.582	0.114		
L30.VIX		0.006964	0.002412
2.887	0.004		
L30.Log Total Assets		0.068498	0.251341
0.273	0.785		
L30.Log Currency in Circulation (\$ Bil)		3.384473	4.175012
0.811	0.418		
L30.Effective Federal Funds Rate (%)		0.512679	0.077956
6.577	0.000		
L30.Loss Function		0.000828	0.006001
0.138	0.890		
L31.VIX		0.004980	0.001964
2.536	0.011		
L31.Log Total Assets		0.183641	0.329712
0.557	0.578		
L31.Log Currency in Circulation (\$ Bil)		-6.253019	2.257213
-2.770	0.006		
L31.Effective Federal Funds Rate (%)		-0.153637	0.178586
-0.860	0.390		
L31.Loss Function		-0.014307	0.005161
-2.772	0.006		
L32.VIX		-0.003105	0.001520
-2.043	0.041		
L32.Log Total Assets		-0.138449	0.218350
-0.634	0.526		
L32.Log Currency in Circulation (\$ Bil)		2.523681	2.111769
1.195	0.232		
L32.Effective Federal Funds Rate (%)		-0.460392	0.201643
-2.283	0.022		
L32.Loss Function		0.000176	0.004735
0.037	0.970		

=====

=====

Results for equation Log Currency in Circulation (\$ Bil)

=====

=====

coefficient std. error

t-stat	prob		

const		0.002156	0.001268
1.701	0.089		
L1.VIX		0.000051	0.000111
0.457	0.647		
L1.Log Total Assets		0.036747	0.016970
2.165	0.030		
L1.Log Currency in Circulation (\$ Bil)		1.052725	0.186741
5.637	0.000		
L1.Effective Federal Funds Rate (%)		0.001827	0.008331
0.219	0.826		
L1.Loss Function		-0.000102	0.000087
-1.174	0.240		
L2.VIX		-0.000028	0.000221
-0.127	0.899		
L2.Log Total Assets		-0.003260	0.032118
-0.102	0.919		
L2.Log Currency in Circulation (\$ Bil)		-0.944458	0.237562
-3.976	0.000		
L2.Effective Federal Funds Rate (%)		0.020161	0.005074
3.973	0.000		
L2.Loss Function		-0.000014	0.000137
-0.103	0.918		
L3.VIX		0.000443	0.000126
3.512	0.000		
L3.Log Total Assets		-0.079789	0.049501
-1.612	0.107		
L3.Log Currency in Circulation (\$ Bil)		1.218274	0.322883
3.773	0.000		
L3.Effective Federal Funds Rate (%)		-0.031617	0.005507
-5.741	0.000		
L3.Loss Function		-0.000009	0.000110
-0.082	0.935		
L4.VIX		-0.000382	0.000227
-1.681	0.093		
L4.Log Total Assets		0.179080	0.064597
2.772	0.006		
L4.Log Currency in Circulation (\$ Bil)		-0.407299	0.596664
-0.683	0.495		
L4.Effective Federal Funds Rate (%)		0.013228	0.009946
1.330	0.184		
L4.Loss Function		0.000491	0.000097
5.063	0.000		
L5.VIX		0.000550	0.000155
3.553	0.000		
L5.Log Total Assets		-0.184510	0.071066
-2.596	0.009		
L5.Log Currency in Circulation (\$ Bil)		0.264141	0.314317
0.840	0.401		
L5.Effective Federal Funds Rate (%)		-0.007546	0.011072
-0.682	0.496		
L5.Loss Function		-0.000229	0.000151
-1.516	0.130		
L6.VIX		-0.000149	0.000296
-0.505	0.613		

L6.Log Total Assets	0.080031	0.037676
2.124 0.034		
L6.Log Currency in Circulation (\$ Bil)	-1.190062	0.297959
-3.994 0.000		
L6.Effective Federal Funds Rate (%)	0.013827	0.006264
2.207 0.027		
L6.Loss Function	0.000008	0.000081
0.100 0.920		
L7.VIX	-0.000112	0.000171
-0.655 0.513		
L7.Log Total Assets	0.021175	0.031813
0.666 0.506		
L7.Log Currency in Circulation (\$ Bil)	1.125349	0.368290
3.056 0.002		
L7.Effective Federal Funds Rate (%)	-0.031520	0.011196
-2.815 0.005		
L7.Loss Function	0.000025	0.000187
0.131 0.896		
L8.VIX	-0.000391	0.000221
-1.769 0.077		
L8.Log Total Assets	-0.098532	0.024163
-4.078 0.000		
L8.Log Currency in Circulation (\$ Bil)	-0.519279	0.246193
-2.109 0.035		
L8.Effective Federal Funds Rate (%)	0.003458	0.009920
0.349 0.727		
L8.Loss Function	0.000291	0.000105
2.766 0.006		
L9.VIX	0.000626	0.000122
5.139 0.000		
L9.Log Total Assets	0.032462	0.046154
0.703 0.482		
L9.Log Currency in Circulation (\$ Bil)	0.331593	0.239892
1.382 0.167		
L9.Effective Federal Funds Rate (%)	0.019892	0.008858
2.246 0.025		
L9.Loss Function	-0.000555	0.000115
-4.806 0.000		
L10.VIX	-0.000758	0.000181
-4.186 0.000		
L10.Log Total Assets	0.111192	0.027977
3.974 0.000		
L10.Log Currency in Circulation (\$ Bil)	-0.039074	0.194487
-0.201 0.841		
L10.Effective Federal Funds Rate (%)	0.006730	0.014619
0.460 0.645		
L10.Loss Function	0.000618	0.000165
3.743 0.000		
L11.VIX	0.000278	0.000108
2.562 0.010		
L11.Log Total Assets	-0.129733	0.064321
-2.017 0.044		
L11.Log Currency in Circulation (\$ Bil)	0.235036	0.152325
1.543 0.123		
L11.Effective Federal Funds Rate (%)	-0.047334	0.021939
-2.158 0.031		
L11.Loss Function	-0.000180	0.000199

-0.905	0.366		
L12.VIX		-0.000145	0.000131
-1.104	0.270		
L12.Log Total Assets		0.112297	0.061737
1.819	0.069		
L12.Log Currency in Circulation (\$ Bil)		-0.841511	0.138827
-6.062	0.000		
L12.Effective Federal Funds Rate (%)		0.064280	0.021998
2.922	0.003		
L12.Loss Function		-0.000160	0.000154
-1.034	0.301		
L13.VIX		-0.000158	0.000165
-0.957	0.339		
L13.Log Total Assets		-0.024050	0.070218
-0.343	0.732		
L13.Log Currency in Circulation (\$ Bil)		0.450693	0.364399
1.237	0.216		
L13.Effective Federal Funds Rate (%)		-0.017801	0.024051
-0.740	0.459		
L13.Loss Function		-0.000217	0.000123
-1.765	0.078		
L14.VIX		-0.000613	0.000137
-4.475	0.000		
L14.Log Total Assets		0.115516	0.047910
2.411	0.016		
L14.Log Currency in Circulation (\$ Bil)		0.081300	0.281811
0.288	0.773		
L14.Effective Federal Funds Rate (%)		0.003384	0.012155
0.278	0.781		
L14.Loss Function		0.000487	0.000155
3.155	0.002		
L15.VIX		0.000680	0.000262
2.595	0.009		
L15.Log Total Assets		-0.112786	0.045567
-2.475	0.013		
L15.Log Currency in Circulation (\$ Bil)		0.017568	0.272702
0.064	0.949		
L15.Effective Federal Funds Rate (%)		0.005822	0.011855
0.491	0.623		
L15.Loss Function		0.000222	0.000260
0.854	0.393		
L16.VIX		0.000239	0.000412
0.579	0.563		
L16.Log Total Assets		-0.014928	0.079907
-0.187	0.852		
L16.Log Currency in Circulation (\$ Bil)		0.161055	0.224528
0.717	0.473		
L16.Effective Federal Funds Rate (%)		-0.050916	0.014434
-3.528	0.000		
L16.Loss Function		0.000244	0.000201
1.214	0.225		
L17.VIX		0.000281	0.000251
1.122	0.262		
L17.Log Total Assets		-0.066781	0.042102
-1.586	0.113		
L17.Log Currency in Circulation (\$ Bil)		0.116572	0.318385
0.366	0.714		

L17.Effective Federal Funds Rate (%)	0.029918	0.021962
1.362 0.173		
L17.Loss Function	-0.000306	0.000398
-0.767 0.443		
L18.VIX	-0.000213	0.000231
-0.922 0.356		
L18.Log Total Assets	0.159662	0.036856
4.332 0.000		
L18.Log Currency in Circulation (\$ Bil)	-0.516423	0.336527
-1.535 0.125		
L18.Effective Federal Funds Rate (%)	0.007164	0.011929
0.601 0.548		
L18.Loss Function	0.000254	0.000478
0.532 0.595		
L19.VIX	-0.000089	0.000203
-0.438 0.661		
L19.Log Total Assets	-0.120573	0.026374
-4.572 0.000		
L19.Log Currency in Circulation (\$ Bil)	0.296935	0.268275
1.107 0.268		
L19.Effective Federal Funds Rate (%)	0.008517	0.015553
0.548 0.584		
L19.Loss Function	0.000136	0.000403
0.337 0.736		
L20.VIX	0.000052	0.000121
0.432 0.666		
L20.Log Total Assets	-0.034425	0.023063
-1.493 0.136		
L20.Log Currency in Circulation (\$ Bil)	0.072859	0.224756
0.324 0.746		
L20.Effective Federal Funds Rate (%)	-0.033096	0.013967
-2.370 0.018		
L20.Loss Function	-0.000103	0.000631
-0.164 0.870		
L21.VIX	-0.000265	0.000098
-2.706 0.007		
L21.Log Total Assets	0.088287	0.033709
2.619 0.009		
L21.Log Currency in Circulation (\$ Bil)	-0.631023	0.153603
-4.108 0.000		
L21.Effective Federal Funds Rate (%)	0.019412	0.010038
1.934 0.053		
L21.Loss Function	0.000103	0.000595
0.173 0.862		
L22.VIX	0.000372	0.000179
2.076 0.038		
L22.Log Total Assets	0.073899	0.028643
2.580 0.010		
L22.Log Currency in Circulation (\$ Bil)	0.560318	0.175327
3.196 0.001		
L22.Effective Federal Funds Rate (%)	0.018884	0.009787
1.929 0.054		
L22.Loss Function	-0.000685	0.000607
-1.129 0.259		
L23.VIX	-0.000179	0.000190
-0.940 0.347		
L23.Log Total Assets	-0.143012	0.059653

-2.397	0.017		
L23.Log Currency in Circulation (\$ Bil)		0.102673	0.231145
0.444	0.657		
L23.Effective Federal Funds Rate (%)		0.006663	0.015449
0.431	0.666		
L23.Loss Function		-0.000355	0.000524
-0.678	0.498		
L24.VIX		0.000219	0.000103
2.132	0.033		
L24.Log Total Assets		0.113985	0.054460
2.093	0.036		
L24.Log Currency in Circulation (\$ Bil)		-0.548037	0.336424
-1.629	0.103		
L24.Effective Federal Funds Rate (%)		-0.021637	0.014554
-1.487	0.137		
L24.Loss Function		-0.000486	0.000470
-1.033	0.301		
L25.VIX		-0.000133	0.000110
-1.207	0.227		
L25.Log Total Assets		-0.056916	0.033140
-1.717	0.086		
L25.Log Currency in Circulation (\$ Bil)		-0.090332	0.209469
-0.431	0.666		
L25.Effective Federal Funds Rate (%)		0.004652	0.016664
0.279	0.780		
L25.Loss Function		-0.000487	0.000532
-0.916	0.360		
L26.VIX		0.000243	0.000248
0.979	0.327		
L26.Log Total Assets		0.005528	0.016612
0.333	0.739		
L26.Log Currency in Circulation (\$ Bil)		0.136413	0.208272
0.655	0.512		
L26.Effective Federal Funds Rate (%)		0.007869	0.010137
0.776	0.438		
L26.Loss Function		0.000291	0.000573
0.507	0.612		
L27.VIX		0.000088	0.000207
0.427	0.669		
L27.Log Total Assets		-0.027783	0.032558
-0.853	0.393		
L27.Log Currency in Circulation (\$ Bil)		0.101669	0.198510
0.512	0.609		
L27.Effective Federal Funds Rate (%)		-0.007608	0.006469
-1.176	0.240		
L27.Loss Function		0.001438	0.000402
3.575	0.000		
L28.VIX		-0.000131	0.000215
-0.610	0.542		
L28.Log Total Assets		0.003334	0.021792
0.153	0.878		
L28.Log Currency in Circulation (\$ Bil)		0.398954	0.211214
1.889	0.059		
L28.Effective Federal Funds Rate (%)		-0.021970	0.006087
-3.609	0.000		
L28.Loss Function		0.000368	0.000784
0.469	0.639		

L29.VIX		0.000242	0.000089
2.736	0.006		
L29.Log Total Assets		0.001948	0.017898
0.109	0.913		
L29.Log Currency in Circulation (\$ Bil)		-0.246529	0.237720
-1.037	0.300		
L29.Effective Federal Funds Rate (%)		0.031977	0.007167
4.462	0.000		
L29.Loss Function		0.001059	0.000417
2.540	0.011		
L30.VIX		0.000237	0.000209
1.133	0.257		
L30.Log Total Assets		0.035901	0.021773
1.649	0.099		
L30.Log Currency in Circulation (\$ Bil)		-0.369792	0.361668
-1.022	0.307		
L30.Effective Federal Funds Rate (%)		0.009380	0.006753
1.389	0.165		
L30.Loss Function		-0.001750	0.000520
-3.367	0.001		
L31.VIX		-0.000395	0.000170
-2.323	0.020		
L31.Log Total Assets		-0.058490	0.028562
-2.048	0.041		
L31.Log Currency in Circulation (\$ Bil)		0.539887	0.195535
2.761	0.006		
L31.Effective Federal Funds Rate (%)		-0.054651	0.015470
-3.533	0.000		
L31.Loss Function		0.000566	0.000447
1.265	0.206		
L32.VIX		-0.000157	0.000132
-1.191	0.234		
L32.Log Total Assets		0.058542	0.018915
3.095	0.002		
L32.Log Currency in Circulation (\$ Bil)		-0.433634	0.182936
-2.370	0.018		
L32.Effective Federal Funds Rate (%)		0.029829	0.017468
1.708	0.088		
L32.Loss Function		-0.000398	0.000410
-0.971	0.332		

=====

=====

Results for equation Effective Federal Funds Rate (%)

=====

=====

t-stat	prob	coefficient	std. error

const		0.023241	0.037831
0.614	0.539		
L1.VIX		-0.021325	0.003308
-6.446	0.000		
L1.Log Total Assets		1.309679	0.506292
2.587	0.010		
L1.Log Currency in Circulation (\$ Bil)		39.952673	5.571166

7.171	0.000		
L1.Effective Federal Funds Rate (%)		-0.367056	0.248549
-1.477	0.140		
L1.Loss Function		0.005780	0.002599
2.224	0.026		
L2.VIX		-0.010444	0.006590
-1.585	0.113		
L2.Log Total Assets		-2.751088	0.958204
-2.871	0.004		
L2.Log Currency in Circulation (\$ Bil)		-18.786021	7.087364
-2.651	0.008		
L2.Effective Federal Funds Rate (%)		0.554416	0.151388
3.662	0.000		
L2.Loss Function		0.000036	0.004083
0.009	0.993		
L3.VIX		-0.009453	0.003762
-2.512	0.012		
L3.Log Total Assets		0.757137	1.476788
0.513	0.608		
L3.Log Currency in Circulation (\$ Bil)		-7.560126	9.632800
-0.785	0.433		
L3.Effective Federal Funds Rate (%)		0.323202	0.164300
1.967	0.049		
L3.Loss Function		-0.009449	0.003285
-2.876	0.004		
L4.VIX		-0.026379	0.006770
-3.897	0.000		
L4.Log Total Assets		1.921970	1.927160
0.997	0.319		
L4.Log Currency in Circulation (\$ Bil)		-42.729285	17.800691
-2.400	0.016		
L4.Effective Federal Funds Rate (%)		0.074510	0.296738
0.251	0.802		
L4.Loss Function		-0.007605	0.002895
-2.627	0.009		
L5.VIX		-0.016804	0.004620
-3.637	0.000		
L5.Log Total Assets		-7.769908	2.120176
-3.665	0.000		
L5.Log Currency in Circulation (\$ Bil)		14.680443	9.377247
1.566	0.117		
L5.Effective Federal Funds Rate (%)		-0.976887	0.330317
-2.957	0.003		
L5.Loss Function		-0.014361	0.004503
-3.190	0.001		
L6.VIX		-0.027657	0.008817
-3.137	0.002		
L6.Log Total Assets		4.797686	1.124003
4.268	0.000		
L6.Log Currency in Circulation (\$ Bil)		2.794306	8.889222
0.314	0.753		
L6.Effective Federal Funds Rate (%)		0.640986	0.186875
3.430	0.001		
L6.Loss Function		-0.015751	0.002426
-6.493	0.000		
L7.VIX		-0.027638	0.005088
-5.431	0.000		

L7.Log Total Assets	4.021547	0.949094
4.237 0.000		
L7.Log Currency in Circulation (\$ Bil)	40.822491	10.987454
3.715 0.000		
L7.Effective Federal Funds Rate (%)	1.187529	0.334028
3.555 0.000		
L7.Loss Function	-0.006710	0.005578
-1.203 0.229		
L8.VIX	-0.022909	0.006594
-3.474 0.001		
L8.Log Total Assets	3.454834	0.720868
4.793 0.000		
L8.Log Currency in Circulation (\$ Bil)	-12.179685	7.344859
-1.658 0.097		
L8.Effective Federal Funds Rate (%)	0.999172	0.295946
3.376 0.001		
L8.Loss Function	0.007345	0.003140
2.339 0.019		
L9.VIX	-0.003309	0.003635
-0.910 0.363		
L9.Log Total Assets	2.768076	1.376941
2.010 0.044		
L9.Log Currency in Circulation (\$ Bil)	-1.606315	7.156877
-0.224 0.822		
L9.Effective Federal Funds Rate (%)	0.506891	0.264281
1.918 0.055		
L9.Loss Function	0.003453	0.003444
1.003 0.316		
L10.VIX	-0.022955	0.005400
-4.251 0.000		
L10.Log Total Assets	-4.267435	0.834645
-5.113 0.000		
L10.Log Currency in Circulation (\$ Bil)	1.031725	5.802280
0.178 0.859		
L10.Effective Federal Funds Rate (%)	-2.044741	0.436130
-4.688 0.000		
L10.Loss Function	0.015070	0.004923
3.061 0.002		
L11.VIX	0.004708	0.003234
1.456 0.145		
L11.Log Total Assets	-3.398141	1.918941
-1.771 0.077		
L11.Log Currency in Circulation (\$ Bil)	6.494246	4.544416
1.429 0.153		
L11.Effective Federal Funds Rate (%)	-0.947565	0.654520
-1.448 0.148		
L11.Loss Function	-0.000714	0.005923
-0.121 0.904		
L12.VIX	0.003490	0.003908
0.893 0.372		
L12.Log Total Assets	-0.592946	1.841836
-0.322 0.748		
L12.Log Currency in Circulation (\$ Bil)	21.104590	4.141732
5.096 0.000		
L12.Effective Federal Funds Rate (%)	0.144544	0.656282
0.220 0.826		
L12.Loss Function	0.017714	0.004604

3.848	0.000		
L13.VIX		0.012992	0.004914
2.644	0.008		
L13.Log Total Assets		-10.640395	2.094874
-5.079	0.000		
L13.Log Currency in Circulation (\$ Bil)		26.474432	10.871370
2.435	0.015		
L13.Effective Federal Funds Rate (%)		-2.433396	0.717517
-3.391	0.001		
L13.Loss Function		0.009748	0.003676
2.652	0.008		
L14.VIX		0.011910	0.004087
2.914	0.004		
L14.Log Total Assets		-1.548692	1.429320
-1.084	0.279		
L14.Log Currency in Circulation (\$ Bil)		-25.531967	8.407479
-3.037	0.002		
L14.Effective Federal Funds Rate (%)		0.083412	0.362635
0.230	0.818		
L14.Loss Function		-0.010466	0.004610
-2.270	0.023		
L15.VIX		-0.010406	0.007823
-1.330	0.183		
L15.Log Total Assets		2.920998	1.359419
2.149	0.032		
L15.Log Currency in Circulation (\$ Bil)		-22.116328	8.135708
-2.718	0.007		
L15.Effective Federal Funds Rate (%)		1.961178	0.353679
5.545	0.000		
L15.Loss Function		-0.029251	0.007746
-3.776	0.000		
L16.VIX		-0.036762	0.012305
-2.988	0.003		
L16.Log Total Assets		4.791314	2.383934
2.010	0.044		
L16.Log Currency in Circulation (\$ Bil)		15.954332	6.698515
2.382	0.017		
L16.Effective Federal Funds Rate (%)		1.586453	0.430613
3.684	0.000		
L16.Loss Function		-0.016792	0.006006
-2.796	0.005		
L17.VIX		-0.026220	0.007477
-3.507	0.000		
L17.Log Total Assets		-0.275394	1.256073
-0.219	0.826		
L17.Log Currency in Circulation (\$ Bil)		0.363813	9.498598
0.038	0.969		
L17.Effective Federal Funds Rate (%)		1.624861	0.655200
2.480	0.013		
L17.Loss Function		-0.033575	0.011886
-2.825	0.005		
L18.VIX		-0.016773	0.006885
-2.436	0.015		
L18.Log Total Assets		4.742518	1.099561
4.313	0.000		
L18.Log Currency in Circulation (\$ Bil)		-22.130540	10.039844
-2.204	0.028		

L18.Effective Federal Funds Rate (%)	-1.793598	0.355890
-5.040 0.000		
L18.Loss Function	-0.031835	0.014252
-2.234 0.025		
L19.VIX	-0.013351	0.006062
-2.202 0.028		
L19.Log Total Assets	-2.949406	0.786829
-3.748 0.000		
L19.Log Currency in Circulation (\$ Bil)	-5.197825	8.003628
-0.649 0.516		
L19.Effective Federal Funds Rate (%)	0.016566	0.463997
0.036 0.972		
L19.Loss Function	-0.089756	0.012008
-7.474 0.000		
L20.VIX	0.001181	0.003600
0.328 0.743		
L20.Log Total Assets	0.496544	0.688046
0.722 0.470		
L20.Log Currency in Circulation (\$ Bil)	-15.486897	6.705290
-2.310 0.021		
L20.Effective Federal Funds Rate (%)	-0.438374	0.416673
-1.052 0.293		
L20.Loss Function	-0.104884	0.018830
-5.570 0.000		
L21.VIX	-0.016584	0.002925
-5.670 0.000		
L21.Log Total Assets	1.039435	1.005657
1.034 0.301		
L21.Log Currency in Circulation (\$ Bil)	-27.317824	4.582545
-5.961 0.000		
L21.Effective Federal Funds Rate (%)	-0.024215	0.299460
-0.081 0.936		
L21.Loss Function	-0.016659	0.017766
-0.938 0.348		
L22.VIX	-0.017979	0.005348
-3.362 0.001		
L22.Log Total Assets	-4.368327	0.854518
-5.112 0.000		
L22.Log Currency in Circulation (\$ Bil)	26.858872	5.230668
5.135 0.000		
L22.Effective Federal Funds Rate (%)	-0.775057	0.291980
-2.654 0.008		
L22.Loss Function	0.067998	0.018101
3.757 0.000		
L23.VIX	-0.023154	0.005669
-4.084 0.000		
L23.Log Total Assets	-2.704312	1.779659
-1.520 0.129		
L23.Log Currency in Circulation (\$ Bil)	-14.127840	6.895925
-2.049 0.040		
L23.Effective Federal Funds Rate (%)	0.127922	0.460890
0.278 0.781		
L23.Loss Function	0.085069	0.015639
5.440 0.000		
L24.VIX	0.001367	0.003070
0.445 0.656		
L24.Log Total Assets	3.729750	1.624742

2.296	0.022		
L24.Log Currency in Circulation (\$ Bil)		-6.552856	10.036772
-0.653	0.514		
L24.Effective Federal Funds Rate (%)		-0.500420	0.434202
-1.153	0.249		
L24.Loss Function		0.072767	0.014019
5.191	0.000		
L25.VIX		-0.022446	0.003283
-6.837	0.000		
L25.Log Total Assets		-2.209778	0.988694
-2.235	0.025		
L25.Log Currency in Circulation (\$ Bil)		7.530943	6.249223
1.205	0.228		
L25.Effective Federal Funds Rate (%)		0.133929	0.497138
0.269	0.788		
L25.Loss Function		0.084901	0.015868
5.350	0.000		
L26.VIX		-0.021690	0.007401
-2.931	0.003		
L26.Log Total Assets		4.307628	0.495607
8.692	0.000		
L26.Log Currency in Circulation (\$ Bil)		-0.328332	6.213521
-0.053	0.958		
L26.Effective Federal Funds Rate (%)		0.908450	0.302414
3.004	0.003		
L26.Loss Function		0.037619	0.017101
2.200	0.028		
L27.VIX		-0.035535	0.006162
-5.767	0.000		
L27.Log Total Assets		3.404031	0.971313
3.505	0.000		
L27.Log Currency in Circulation (\$ Bil)		-12.461557	5.922290
-2.104	0.035		
L27.Effective Federal Funds Rate (%)		0.093770	0.193003
0.486	0.627		
L27.Loss Function		-0.034106	0.012000
-2.842	0.004		
L28.VIX		-0.018940	0.006413
-2.953	0.003		
L28.Log Total Assets		0.946958	0.650124
1.457	0.145		
L28.Log Currency in Circulation (\$ Bil)		10.995667	6.301306
1.745	0.081		
L28.Effective Federal Funds Rate (%)		-0.335961	0.181600
-1.850	0.064		
L28.Loss Function		-0.063758	0.023394
-2.725	0.006		
L29.VIX		-0.015115	0.002640
-5.724	0.000		
L29.Log Total Assets		0.398030	0.533971
0.745	0.456		
L29.Log Currency in Circulation (\$ Bil)		-19.892453	7.092065
-2.805	0.005		
L29.Effective Federal Funds Rate (%)		0.661657	0.213824
3.094	0.002		
L29.Loss Function		-0.018518	0.012439
-1.489	0.137		

L30.VIX		-0.011580	0.006234
-1.858	0.063		
L30.Log Total Assets		-0.267424	0.649566
-0.412	0.681		
L30.Log Currency in Circulation (\$ Bil)		-17.408607	10.789901
-1.613	0.107		
L30.Effective Federal Funds Rate (%)		-1.620340	0.201468
-8.043	0.000		
L30.Loss Function		-0.018653	0.015509
-1.203	0.229		
L31.VIX		-0.010498	0.005076
-2.068	0.039		
L31.Log Total Assets		-3.225143	0.852107
-3.785	0.000		
L31.Log Currency in Circulation (\$ Bil)		26.806102	5.833542
4.595	0.000		
L31.Effective Federal Funds Rate (%)		-0.591350	0.461538
-1.281	0.200		
L31.Loss Function		0.067938	0.013337
5.094	0.000		
L32.VIX		0.009376	0.003928
2.387	0.017		
L32.Log Total Assets		0.175940	0.564304
0.312	0.755		
L32.Log Currency in Circulation (\$ Bil)		9.747063	5.457656
1.786	0.074		
L32.Effective Federal Funds Rate (%)		1.856673	0.521125
3.563	0.000		
L32.Loss Function		0.011582	0.012238
0.946	0.344		

Results for equation Loss Function

t-stat	prob	coefficient	std. error
const		7.564834	5.918749
1.278	0.201		
L1.VIX		-1.106284	0.517585
-2.137	0.033		
L1.Log Total Assets		80.430706	79.211564
1.015	0.310		
L1.Log Currency in Circulation (\$ Bil)		-311.455695	871.633008
-0.357	0.721		
L1.Effective Federal Funds Rate (%)		22.399299	38.886630
0.576	0.565		
L1.Loss Function		0.386942	0.406629
0.952	0.341		
L2.VIX		-0.460018	1.031112
-0.446	0.655		
L2.Log Total Assets		-122.059049	149.915105
-0.814	0.416		
L2.Log Currency in Circulation (\$ Bil)		1969.710583	1108.848808

1.776	0.076		
L2.Effective Federal Funds Rate (%)		-36.189798	23.685377
-1.528	0.127		
L2.Loss Function		0.332671	0.638802
0.521	0.603		
L3.VIX		-0.696937	0.588657
-1.184	0.236		
L3.Log Total Assets		206.829974	231.049810
0.895	0.371		
L3.Log Currency in Circulation (\$ Bil)		-2869.537228	1507.093263
-1.904	0.057		
L3.Effective Federal Funds Rate (%)		31.378311	25.705505
1.221	0.222		
L3.Loss Function		-0.069593	0.513940
-0.135	0.892		
L4.VIX		-0.650415	1.059120
-0.614	0.539		
L4.Log Total Assets		-274.132498	301.512569
-0.909	0.363		
L4.Log Currency in Circulation (\$ Bil)		162.358288	2784.995224
0.058	0.954		
L4.Effective Federal Funds Rate (%)		-35.233191	46.425963
-0.759	0.448		
L4.Loss Function		-0.924238	0.452988
-2.040	0.041		
L5.VIX		-1.759263	0.722789
-2.434	0.015		
L5.Log Total Assets		139.936307	331.710760
0.422	0.673		
L5.Log Currency in Circulation (\$ Bil)		-56.916330	1467.110924
-0.039	0.969		
L5.Effective Federal Funds Rate (%)		-22.801489	51.679491
-0.441	0.659		
L5.Loss Function		-0.159533	0.704440
-0.226	0.821		
L6.VIX		-0.960739	1.379484
-0.696	0.486		
L6.Log Total Assets		120.978917	175.855166
0.688	0.491		
L6.Log Currency in Circulation (\$ Bil)		422.161649	1390.757290
0.304	0.761		
L6.Effective Federal Funds Rate (%)		50.850367	29.237336
1.739	0.082		
L6.Loss Function		-0.590642	0.379520
-1.556	0.120		
L7.VIX		-0.662650	0.796116
-0.832	0.405		
L7.Log Total Assets		-30.561212	148.489838
-0.206	0.837		
L7.Log Currency in Circulation (\$ Bil)		662.141239	1719.034822
0.385	0.700		
L7.Effective Federal Funds Rate (%)		43.114965	52.260200
0.825	0.409		
L7.Loss Function		-0.286930	0.872673
-0.329	0.742		
L8.VIX		-0.636469	1.031610
-0.617	0.537		

L8.Log Total Assets	187.188967	112.782860
1.660 0.097		
L8.Log Currency in Circulation (\$ Bil)	-1258.578655	1149.134977
-1.095 0.273		
L8.Effective Federal Funds Rate (%)	2.872490	46.302098
0.062 0.951		
L8.Loss Function	0.155100	0.491215
0.316 0.752		
L9.VIX	-0.781303	0.568689
-1.374 0.169		
L9.Log Total Assets	-50.480688	215.428391
-0.234 0.815		
L9.Log Currency in Circulation (\$ Bil)	1117.294787	1119.724474
0.998 0.318		
L9.Effective Federal Funds Rate (%)	-70.311160	41.347916
-1.700 0.089		
L9.Loss Function	0.650324	0.538765
1.207 0.227		
L10.VIX	0.272746	0.844920
0.323 0.747		
L10.Log Total Assets	-382.975724	130.583833
-2.933 0.003		
L10.Log Currency in Circulation (\$ Bil)	-128.919222	907.791846
-0.142 0.887		
L10.Effective Federal Funds Rate (%)	-35.144400	68.234359
-0.515 0.607		
L10.Loss Function	-1.051312	0.770197
-1.365 0.172		
L11.VIX	0.175547	0.505954
0.347 0.729		
L11.Log Total Assets	302.997062	300.226593
1.009 0.313		
L11.Log Currency in Circulation (\$ Bil)	-648.462314	710.993616
-0.912 0.362		
L11.Effective Federal Funds Rate (%)	96.755936	102.402448
0.945 0.345		
L11.Loss Function	-0.192128	0.926654
-0.207 0.836		
L12.VIX	-0.070254	0.611399
-0.115 0.909		
L12.Log Total Assets	-129.786718	288.163197
-0.450 0.652		
L12.Log Currency in Circulation (\$ Bil)	737.319817	647.991899
1.138 0.255		
L12.Effective Federal Funds Rate (%)	-47.834940	102.678086
-0.466 0.641		
L12.Loss Function	-0.358344	0.720241
-0.498 0.619		
L13.VIX	-0.615795	0.768852
-0.801 0.423		
L13.Log Total Assets	-14.480123	327.752160
-0.044 0.965		
L13.Log Currency in Circulation (\$ Bil)	-1563.374955	1700.872952
-0.919 0.358		
L13.Effective Federal Funds Rate (%)	-37.172292	112.258711
-0.331 0.741		
L13.Loss Function	0.447643	0.575077

0.778	0.436		
L14.VIX		1.081630	0.639394
1.692	0.091		
L14.Log Total Assets		-249.422169	223.623340
-1.115	0.265		
L14.Log Currency in Circulation (\$ Bil)		916.904054	1315.386468
0.697	0.486		
L14.Effective Federal Funds Rate (%)		-2.460764	56.735804
-0.043	0.965		
L14.Loss Function		-0.538418	0.721203
-0.747	0.455		
L15.VIX		-1.156745	1.223964
-0.945	0.345		
L15.Log Total Assets		249.211785	212.687030
1.172	0.241		
L15.Log Currency in Circulation (\$ Bil)		-36.669690	1272.866713
-0.029	0.977		
L15.Effective Federal Funds Rate (%)		-10.188597	55.334653
-0.184	0.854		
L15.Loss Function		-0.909753	1.211894
-0.751	0.453		
L16.VIX		-1.394227	1.925117
-0.724	0.469		
L16.Log Total Assets		-37.177501	372.976831
-0.100	0.921		
L16.Log Currency in Circulation (\$ Bil)		405.060659	1048.011630
0.387	0.699		
L16.Effective Federal Funds Rate (%)		89.100962	67.371275
1.323	0.186		
L16.Loss Function		-0.468168	0.939603
-0.498	0.618		
L17.VIX		-0.455095	1.169820
-0.389	0.697		
L17.Log Total Assets		38.513850	196.518100
0.196	0.845		
L17.Log Currency in Circulation (\$ Bil)		-942.229568	1486.096763
-0.634	0.526		
L17.Effective Federal Funds Rate (%)		-7.511886	102.508860
-0.073	0.942		
L17.Loss Function		0.588308	1.859561
0.316	0.752		
L18.VIX		-1.112073	1.077184
-1.032	0.302		
L18.Log Total Assets		-151.396966	172.031028
-0.880	0.379		
L18.Log Currency in Circulation (\$ Bil)		-1639.497730	1570.777134
-1.044	0.297		
L18.Effective Federal Funds Rate (%)		-103.170672	55.680526
-1.853	0.064		
L18.Loss Function		-1.793192	2.229717
-0.804	0.421		
L19.VIX		-0.650740	0.948485
-0.686	0.493		
L19.Log Total Assets		116.901662	123.102740
0.950	0.342		
L19.Log Currency in Circulation (\$ Bil)		-148.239753	1252.202250
-0.118	0.906		

L19.Effective Federal Funds Rate (%)	63.262775	72.594283
0.871 0.384		
L19.Loss Function	-1.625582	1.878776
-0.865 0.387		
L20.VIX	-0.480856	0.563254
-0.854 0.393		
L20.Log Total Assets	228.576574	107.647801
2.123 0.034		
L20.Log Currency in Circulation (\$ Bil)	111.254647	1049.071648
0.106 0.916		
L20.Effective Federal Funds Rate (%)	38.064276	65.190272
0.584 0.559		
L20.Loss Function	-1.087728	2.946100
-0.369 0.712		
L21.VIX	-0.826058	0.457571
-1.805 0.071		
L21.Log Total Assets	29.388702	157.339388
0.187 0.852		
L21.Log Currency in Circulation (\$ Bil)	1155.412367	716.959078
1.612 0.107		
L21.Effective Federal Funds Rate (%)	43.718017	46.851882
0.933 0.351		
L21.Loss Function	4.114060	2.779522
1.480 0.139		
L22.VIX	-0.695795	0.836772
-0.832 0.406		
L22.Log Total Assets	-250.750559	133.693102
-1.876 0.061		
L22.Log Currency in Circulation (\$ Bil)	976.459513	818.360718
1.193 0.233		
L22.Effective Federal Funds Rate (%)	-79.020591	45.681477
-1.730 0.084		
L22.Loss Function	2.634632	2.831973
0.930 0.352		
L23.VIX	-0.254032	0.886921
-0.286 0.775		
L23.Log Total Assets	204.042190	278.435408
0.733 0.464		
L23.Log Currency in Circulation (\$ Bil)	-1561.482120	1078.897290
-1.447 0.148		
L23.Effective Federal Funds Rate (%)	16.786705	72.108221
0.233 0.816		
L23.Loss Function	0.044107	2.446747
0.018 0.986		
L24.VIX	-0.111511	0.480275
-0.232 0.816		
L24.Log Total Assets	-126.274152	254.197875
-0.497 0.619		
L24.Log Currency in Circulation (\$ Bil)	-529.476276	1570.296528
-0.337 0.736		
L24.Effective Federal Funds Rate (%)	-57.362607	67.932731
-0.844 0.398		
L24.Loss Function	1.075589	2.193355
0.490 0.624		
L25.VIX	-1.289350	0.513634
-2.510 0.012		
L25.Log Total Assets	35.537705	154.685470

0.230	0.818		
L25.Log Currency in Circulation (\$ Bil)		472.632048	977.718056
0.483	0.629		
L25.Effective Federal Funds Rate (%)		23.977326	77.779338
0.308	0.758		
L25.Loss Function		0.727070	2.482603
0.293	0.770		
L26.VIX		-1.374577	1.157849
-1.187	0.235		
L26.Log Total Assets		74.388141	77.539904
0.959	0.337		
L26.Log Currency in Circulation (\$ Bil)		1378.753495	972.132207
1.418	0.156		
L26.Effective Federal Funds Rate (%)		-3.492541	47.314013
-0.074	0.941		
L26.Loss Function		2.112502	2.675574
0.790	0.430		
L27.VIX		-0.593296	0.964106
-0.615	0.538		
L27.Log Total Assets		66.952122	151.966057
0.441	0.660		
L27.Log Currency in Circulation (\$ Bil)		-817.674818	926.567964
-0.882	0.378		
L27.Effective Federal Funds Rate (%)		9.917194	30.196135
0.328	0.743		
L27.Loss Function		-3.010752	1.877499
-1.604	0.109		
L28.VIX		0.566705	1.003397
0.565	0.572		
L28.Log Total Assets		-46.170176	101.714671
-0.454	0.650		
L28.Log Currency in Circulation (\$ Bil)		568.770039	985.866591
0.577	0.564		
L28.Effective Federal Funds Rate (%)		39.432943	28.412124
1.388	0.165		
L28.Loss Function		-1.810622	3.660159
-0.495	0.621		
L29.VIX		-0.951433	0.413107
-2.303	0.021		
L29.Log Total Assets		85.742489	83.542071
1.026	0.305		
L29.Log Currency in Circulation (\$ Bil)		-1590.306062	1109.584297
-1.433	0.152		
L29.Effective Federal Funds Rate (%)		-34.407133	33.453691
-1.029	0.304		
L29.Loss Function		0.257240	1.946088
0.132	0.895		
L30.VIX		-1.210365	0.975390
-1.241	0.215		
L30.Log Total Assets		-95.203093	101.627408
-0.937	0.349		
L30.Log Currency in Circulation (\$ Bil)		-109.452955	1688.126818
-0.065	0.948		
L30.Effective Federal Funds Rate (%)		-58.068440	31.520584
-1.842	0.065		
L30.Loss Function		0.126189	2.426471
0.052	0.959		

L31.VIX		0.175545	0.794128
0.221	0.825		
L31.Log Total Assets		28.618834	133.315880
0.215	0.830		
L31.Log Currency in Circulation (\$ Bil)		816.371281	912.682940
0.894	0.371		
L31.Effective Federal Funds Rate (%)		95.433174	72.209655
1.322	0.186		
L31.Loss Function		0.820314	2.086656
0.393	0.694		
L32.VIX		-0.065040	0.614567
-0.106	0.916		
L32.Log Total Assets		19.461026	88.287866
0.220	0.826		
L32.Log Currency in Circulation (\$ Bil)		-621.868618	853.873917
-0.728	0.466		
L32.Effective Federal Funds Rate (%)		-8.447298	81.532249
-0.104	0.917		
L32.Loss Function		-0.684683	1.914719
-0.358	0.721		
=====			
=====			

Correlation matrix of residuals

	VIX	Log Total Assets	Log Currency
in Circulation (\$ Bil)	Effective Federal Funds	Rate (%)	Loss Function
VIX	1.000000		0.738255
-0.061007	-0.032107	-0.216812	
Log Total Assets	0.738255	1.000000	
0.162692	-0.032899	0.015891	
Log Currency in Circulation (\$ Bil)	-0.061007	0.162692	
1.000000	0.247649	0.126379	
Effective Federal Funds Rate (%)	-0.032107	-0.032899	
0.247649	1.000000	-0.319148	
Loss Function	-0.216812	0.015891	
0.126379	-0.319148	1.000000	

In []:

In []:

In []:

In []: