Note on the Consumer Credit Delinquency Rate Forecasts

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Moody's Analytics is pleased to present a new block of forecasts in its macroeconomic model: consumer credit delinquency rates. We forecast delinquency rates across nine different product lines as well as a total delinquency rate. We forecast each of these delinquency rate product lines in the 30-, 60-, 90- and 120-day delinquency rate buckets, as well as total delinquency rates for each product line. We use a combination of stochastic equations and identities to do so. We use 34 stochastic equations and 18 identities to forecast this block.

The foundation for the entire block is the FCCDTO30_I equation. It is a logistic specification that forecasts the probability of delinquency based on the unemployment rate, bank willingness to make consumer loans, house prices, stock price volatility, the yield curve, the debt-service burden, an AR(1) term, and a constant term. The level specification provides a long-term anchor, and the AR(1) term smooths any jump offs. The equation features a 0.99 R-squared and a 2.07 Durbin-Watson statistic.

We then use this 30-day delinquency rate forecast to forecast the 30-day delinquency rates of other product lines. We also use an intermediate term for 30-day residential mortgages to forecast the 30-day delinquency rates of the home equity and first mortgage buckets. The 60-day product-line delinquency rate forecasts depend on the 30-day delinquency rate forecasts within the product line, the 90-day depends on the 60-day, and the 120-day depends on the 90-day. Each of the 30-, 60-, 90- and 120-day forecasts utilizes a logistic specification in which delinquency rates on both sides of the forecast equation are transformed. In some instances that are dictated empirically, we use an AR(1) term to combat serial correlation. For other instances, such as the bankcard block, we tolerated serial correlation because adding an AR(1) term flipped the sign or killed the statistical predictive power of the primary regressor. The determination on whether to use AR(1) terms was made with specific consideration to the empirical properties of each equation in each product line.

The two exceptions to this framework are total residential loans and total. For total residential, we use a weighted average of loan volume from home equity and first mortgage to calculate shares, and we apply those shares to the home equity and first mortgage delinquency rates to determine 30-, 60-, 90- and 120-day delinquency rates for total residential loans. We do the same thing for the total delinquency rate buckets, except instead of taking a weighted average of the home equity and first mortgage delinquency rates, we take a weighted average of delinquency rates across all product lines. Once we have 30-, 60-, 90- and 120-day delinquency rates for the eight product lines, total residential and total, we add them together to arrive at the total delinquency rates for all loans made in all product lines.

The consumer credit delinquency forecast variables are as follows:

FCCDAU_US	FCCDTO_US	FCCDCF120_US	FCCDRF120_US
FCCDBC_US	FCCDTO120_US	FCCDCF30_US	FCCDRF30_US
FCCDCF_US	FCCDTO30_US	FCCDCF60_US	FCCDRF60_US
FCCDOT_US	FCCDTO60_US	FCCDCF90_US	FCCDRF90_US
FCCDRA_US	FCCDTO90_US	FCCDOT120_US	FCCDRT120_US
FCCDRA120_US	FCCDAU120_US	FCCDOT30_US	FCCDRT30_US
FCCDRA30_US	FCCDAU30_US	FCCDOT60_US	FCCDRT60_US
FCCDRA60_US	FCCDAU60_US	FCCDOT90_US	FCCDRT90_US
FCCDRA90_US	FCCDAU90_US	FCCDRA30_I_US	FCCDSL120_US
FCCDRE_US	FCCDBC120_US	FCCDRE120_US	FCCDSL30_US
FCCDRF_US	FCCDBC30_US	FCCDRE30_US	FCCDSL60_US
FCCDRT_US	FCCDBC60_US	FCCDRE60_US	FCCDSL90_US
FCCDSL_US	FCCDBC90_US	FCCDRE90_US	FCCDTO30_I_US

New equation specifications:

Dependent Variable: -LOG((FCCDAU30_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/05/19 Time: 00:11
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 165 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.829895	0.646431	-2.830766	0.0066
-LOG((FCCDTO30_I_US^-1)*100-1)	0.275285	0.083054	3.314528	0.0017
@MOVAV(FVHISLAQ_US/FCPIUL1E_US,4)	-1.773609	0.421878	-4.204077	0.0001
AR(1)	0.999262	0.028032	35.64730	0.0000

R-squared	0.979051	Mean dependent var	-3.804935
Adjusted R-squared	0.977843	S.D. dependent var	0.146853
S.E. of regression	0.021859	Akaike info criterion	-4.623199
Sum squared resid	0.024847	Schwarz criterion	-4.478531
Log likelihood	133.4496	Hannan-Quinn criter.	-4.567112
F-statistic	810.0897	Durbin-Watson stat	1.192570
Prob(F-statistic)	0.000000		

Inverted AR Roots	1.00

Dependent Variable: -LOG((FCCDAU60_US^-1)*100-1)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 10/05/19 Time: 14:30
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 10 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.609500	0.494906	-1.231546	0.2238
-LOG((FCCDAU30_US^-1)*100-1)	1.194773	0.118190	10.10895	0.0000
D(@MOVAV(FLBR_US,2))	0.055571	0.023357	2.379207	0.0211
AR(1)	0.993015	0.025410	39.07938	0.0000
SIGMASQ	0.000433	6.80E-05	6.368020	0.0000

R-squared	0.987459	Mean dependent var	-5.209252
Adjusted R-squared	0.986476	S.D. dependent var	0.187499
S.E. of regression	0.021805	Akaike info criterion	-4.651994
Sum squared resid	0.024248	Schwarz criterion	-4.471159
Log likelihood	135.2558	Hannan-Quinn criter.	-4.581884
F-statistic	1003.950	Durbin-Watson stat	1.991574
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99

Dependent Variable: -LOG((FCCDAU90_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/05/19 Time: 00:04
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 7 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.851501	0.465835	-1.827904	0.0732
-LOG((FCCDAU60_US^-1)*100-1)	1.076778	0.090077	11.95399	0.0000
AR(1)	0.946367	0.057065	16.58410	0.0000

R-squared	0.988979	Mean dependent var	-6.486139
Adjusted R-squared	0.988563	S.D. dependent var	0.245906
S.E. of regression	0.026298	Akaike info criterion	-4.346178
Sum squared resid	0.036655	Schwarz criterion	-4.237677
Log likelihood	124.6930	Hannan-Quinn criter.	-4.304112
F-statistic	2377.914	Durbin-Watson stat	2.199335
Prob(F-statistic)	0.000000		

Inverted AR Roots	.95

Dependent Variable: -LOG((FCCDAU120_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/04/19 Time: 23:54
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 18 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.952591	0.545871	-5.408956	0.0000
-LOG((FCCDAU90_US^-1)*100-1)	0.510286	0.078134	6.530912	0.0000
@MOVAV(FLBR_US,4)	0.026441	0.014960	1.767525	0.0830
AR(1)	0.985292	0.030075	32.76170	0.0000

R-squared	0.974100	Mean dependent var	-6.215094
Adjusted R-squared	0.972606	S.D. dependent var	0.185748
S.E. of regression	0.030744	Akaike info criterion	-3.994421
Sum squared resid	0.049149	Schwarz criterion	-3.849753
Log likelihood	115.8438	Hannan-Quinn criter.	-3.938334
F-statistic	651.9078	Durbin-Watson stat	1.351477
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99

Dependent Variable: -LOG((FCCDBC30_US^-1)*100-1)
Method: Least Squares
Date: 09/25/19 Time: 22:54

Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.957310	0.315516	-18.88119	0.0000
FCCDTO30_I_US	0.499824	0.041354	12.08643	0.0000
@MOVAV(FRCCARD_US(-2),3)	0.049573	0.025684	1.930122	0.0590

R-squared	0.768035	Mean dependent var	-4.554219
Adjusted R-squared	0.759282	S.D. dependent var	0.257531
S.E. of regression	0.126353	Akaike info criterion	-1.247399
Sum squared resid	0.846143	Schwarz criterion	-1.138898
Log likelihood	37.92717	Hannan-Quinn criter.	-1.205333
F-statistic	87.74140	Durbin-Watson stat	0.077916
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDBC60_US^-1)*100-1)
Method: Least Squares
Date: 09/25/19 Time: 22:55
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.311151	0.037481	-168.3824	0.0000
FCCDBC30_US	1.121259	0.027399	40.92325	0.0000
@MOVAV(FLBR_US,4)	0.025317	0.004038	6.269516	0.0000

R-squared	0.971268	Mean dependent var	-4.946497
Adjusted R-squared	0.970184	S.D. dependent var	0.333165
S.E. of regression	0.057528	Akaike info criterion	-2.820990
Sum squared resid	0.175405	Schwarz criterion	-2.712489
Log likelihood	81.98771	Hannan-Quinn criter.	-2.778924
F-statistic	895.8267	Durbin-Watson stat	0.167274
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDBC90_US^-1)*100-1)
Method: Least Squares
Date: 09/25/19 Time: 22:55
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.149270	0.029081	-211.4498	0.0000
FCCDBC60_US	1.264791	0.028983	43.63956	0.0000
@MOVAV(FLBR_US,4)	0.010407	0.003970	2.621423	0.0114

R-squared	0.975765	Mean dependent var	-5.140216
Adjusted R-squared	0.974850	S.D. dependent var	0.345093
S.E. of regression	0.054727	Akaike info criterion	-2.920823
Sum squared resid	0.158739	Schwarz criterion	-2.812322
Log likelihood	84.78305	Hannan-Quinn criter.	-2.878758
F-statistic	1066.946	Durbin-Watson stat	0.238775

Prob(F-statistic)	0.000000

Dependent Variable: -LOG((FCCDBC120_US^-1)*100-1)
Method: Least Squares
Date: 09/25/19 Time: 22:54
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.337684	0.033528	-159.1987	0.0000
FCCDBC90_US	1.670188	0.050826	32.86107	0.0000

R-squared	0.952375	Mean dependent var	-4.304574
Adjusted R-squared	0.951493	S.D. dependent var	0.395896
S.E. of regression	0.087194	Akaike info criterion	-2.006310
Sum squared resid	0.410547	Schwarz criterion	-1.933976
Log likelihood	58.17668	Hannan-Quinn criter.	-1.978266
F-statistic	1079.850	Durbin-Watson stat	0.285949
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDCF30_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/04/19 Time: 23:00
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 19 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.182763	0.470223	-6.768631	0.0000
-LOG((FCCDTO30_I_US^-1)*100-1)	0.439838	0.076111	5.778901	0.0000
FSDEBT_US(-2)	0.086133	0.017198	5.008363	0.0000
AR(1)	0.835774	0.080209	10.41996	0.0000

R-squared	0.989519	Mean dependent var	-4.072244
Adjusted R-squared	0.988914	S.D. dependent var	0.241050
S.E. of regression	0.025380	Akaike info criterion	-4.419528
Sum squared resid	0.033496	Schwarz criterion	-4.274860
Log likelihood	127.7468	Hannan-Quinn criter.	-4.363441
F-statistic	1636.385	Durbin-Watson stat	1.972274
Prob(F-statistic)	0.000000		

Inverted AR Roots	.84

Dependent Variable: -LOG((FCCDCF60_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/04/19 Time: 22:56
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 33 iterations
Coefficient covariance computed using outer product of gradients

d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.469320	0.370019	-1.268366	0.2103
-LOG((FCCDCF30_US^-1)*100-1)	1.024139	0.084750	12.08428	0.0000
@MOVAV(FLBR_US,4)	0.009415	0.009995	0.941923	0.3506
AR(1)	0.977944	0.053679	18.21844	0.0000

R-squared	0.993578	Mean dependent var	-4.573680
Adjusted R-squared	0.993207	S.D. dependent var	0.249477
S.E. of regression	0.020561	Akaike info criterion	-4.806140
Sum squared resid	0.021984	Schwarz criterion	-4.661472
Log likelihood	138.5719	Hannan-Quinn criter.	-4.750052
F-statistic	2681.667	Durbin-Watson stat	2.170665
Prob(F-statistic)	0.000000		

Inverted AR Roots	.98

Dependent Variable: -LOG((FCCDCF90_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/04/19 Time: 22:52
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 6 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.634956	0.260322	-2.439120	0.0182
-LOG((FCCDCF60_US^-1)*100-1)	0.921279	0.052972	17.39164	0.0000
@MOVAV(FLBR_US,4)	0.015862	0.006724	2.359035	0.0221
AR(1)	0.813187	0.082594	9.845613	0.0000

R-squared	0.992282	Mean dependent var	-4.746095
Adjusted R-squared	0.991836	S.D. dependent var	0.242791
S.E. of regression	0.021937	Akaike info criterion	-4.713232
Sum squared resid	0.025023	Schwarz criterion	-4.568564
Log likelihood	135.9705	Hannan-Quinn criter.	-4.657145
F-statistic	2228.425	Durbin-Watson stat	1.851130
Prob(F-statistic)	0.000000		

Inverted AR Roots	.81

Dependent Variable: -LOG((FCCDRE30_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/04/19 Time: 23:17
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 22 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-1.808342	0.432363	-4.182465	0.0001
-LOG((FCCDRA30_I_US^-1)*100-1)	0.726685	0.094448	7.694059	0.0000
DLOG(@MOVAV(FHOFHOPIQ_US/(FYPQ_US/FHHOLDQ_US),4))	-1.248794	0.910346	-1.371779	0.1760
AR(1)	0.978504	0.034694	28.20412	0.0000

R-squared	0.990786	Mean dependent var	-4.717829
Adjusted R-squared	0.990255	S.D. dependent var	0.317981
S.E. of regression	0.031391	Akaike info criterion	-3.959470
Sum squared resid	0.051240	Schwarz criterion	-3.814802
Log likelihood	114.8652	Hannan-Quinn criter.	-3.903382
F-statistic	1863.886	Durbin-Watson stat	1.745517
Prob(F-statistic)	0.000000		

Inverted AR Roots	.98

Dependent Variable: -LOG((FCCDRE60_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 12:39
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.259628	0.347512	0.747106	0.4583
-LOG((FCCDRE30_US^-1)*100-1)	1.266286	0.065237	19.41057	0.0000
@MOVAV(FLBR_US,4)	0.029942	0.010734	2.789486	0.0073

R-squared	0.918366	Mean dependent var	-5.526828
Adjusted R-squared	0.915285	S.D. dependent var	0.454054
S.E. of regression	0.132156	Akaike info criterion	-1.157586
Sum squared resid	0.925654	Schwarz criterion	-1.049085
Log likelihood	35.41242	Hannan-Quinn criter.	-1.115521
F-statistic	298.1196	Durbin-Watson stat	0.100914
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDRE90_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 12:40
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.557373	0.154163	3.615481	0.0007
-LOG((FCCDRE60_US^-1)*100-1)	1.198274	0.023700	50.56022	0.0000
@MOVAV(FLBR_US,4)	0.012152	0.005568	2.182346	0.0335

R-squared	0.987123	Mean dependent var	-5.989119
Adjusted R-squared	0.986637	S.D. dependent var	0.561691
S.E. of regression	0.064931	Akaike info criterion	-2.578902
Sum squared resid	0.223449	Schwarz criterion	-2.470401
Log likelihood	75.20925	Hannan-Quinn criter.	-2.536836
F-statistic	2031.396	Durbin-Watson stat	0.186750

Prob(F-statistic)	0.000000

Dependent Variable: -LOG((FCCDRE120_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 12:38
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.985858	0.471685	-2.090074	0.0414
-LOG((FCCDRE90_US^-1)*100-1)	0.749849	0.065046	11.52800	0.0000
@MOVAV(FLBR_US,4)	0.193916	0.018905	10.25740	0.0000

R-squared	0.918992	Mean dependent var	-4.261384
Adjusted R-squared	0.915935	S.D. dependent var	0.744097
S.E. of regression	0.215743	Akaike info criterion	-0.177377
Sum squared resid	2.466883	Schwarz criterion	-0.068876
Log likelihood	7.966542	Hannan-Quinn criter.	-0.135311
F-statistic	300.6294	Durbin-Watson stat	0.082964
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDRF30_US^-1)*100-1)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 10/05/19 Time: 18:49
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 40 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.095348	0.016634	5.732065	0.0000
-LOG((FCCDRA30_I_US^-1)*100-1)	1.013436	0.003821	265.2599	0.0000
@MOVAV(FLBR_US,4)	0.000995	0.000880	1.130966	0.2634
AR(1)	0.990766	0.026635	37.19818	0.0000
SIGMASQ	2.22E-06	4.06E-07	5.466757	0.0000

R-squared	0.999975	Mean dependent var	-4.095547
Adjusted R-squared	0.999973	S.D. dependent var	0.299941
S.E. of regression	0.001561	Akaike info criterion	-9.930826
Sum squared resid	0.000124	Schwarz criterion	-9.749991
Log likelihood	283.0631	Hannan-Quinn criter.	-9.860717
F-statistic	507772.2	Durbin-Watson stat	1.541599
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99

Dependent Variable: -LOG((FCCDRF60_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 16:49
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.462676	0.308519	-1.499668	0.1396
-LOG((FCCDRF30_US^-1)*100-1)	1.182479	0.065370	18.08892	0.0000
@MOVAV(FLBR_US,4)	0.052946	0.010146	5.218661	0.0000

R-squared	0.927297	Mean dependent var	-4.973721
Adjusted R-squared	0.924553	S.D. dependent var	0.437146
S.E. of regression	0.120073	Akaike info criterion	-1.349347
Sum squared resid	0.764132	Schwarz criterion	-1.240846
Log likelihood	40.78172	Hannan-Quinn criter.	-1.307281
F-statistic	337.9966	Durbin-Watson stat	0.204736
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDRF90_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/05/19 Time: 16:39
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 16 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.776676	0.279691	2.776908	0.0076
-LOG((FCCDRF60_US^-1)*100-1)	1.325261	0.047583	27.85157	0.0000
@MOVAV(FLBR_US,4)	0.016534	0.010489	1.576286	0.1210
AR(1)	0.871771	0.078933	11.04440	0.0000

R-squared	0.998297	Mean dependent var	-5.709257
Adjusted R-squared	0.998199	S.D. dependent var	0.603899
S.E. of regression	0.025630	Akaike info criterion	-4.395907
Sum squared resid	0.034158	Schwarz criterion	-4.251239
Log likelihood	127.0854	Hannan-Quinn criter.	-4.339819
F-statistic	10161.24	Durbin-Watson stat	1.940392
Prob(F-statistic)	0.000000		

Inverted AR Roots	.87

Dependent Variable: -LOG((FCCDRF120_US^-1)*100-1)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 10/05/19 Time: 18:48
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 11 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.801064	0.640016	-2.814090	0.0069
-LOG((FCCDRF90_US^-1)*100-1)	0.754799	0.085419	8.836417	0.0000
@MOVAV(FLBR_US,4)	0.217779	0.024703	8.816036	0.0000
AR(1)	0.991529	0.019676	50.39243	0.0000
SIGMASQ	0.002453	0.000537	4.567561	0.0000

R-squared	0.996941	Mean dependent var	-4.436272
Adjusted R-squared	0.996701	S.D. dependent var	0.903458
S.E. of regression	0.051894	Akaike info criterion	-2.921282
Sum squared resid	0.137343	Schwarz criterion	-2.740447
Log likelihood	86.79590	Hannan-Quinn criter.	-2.851173
F-statistic	4154.825	Durbin-Watson stat	0.870877
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99

Dependent Variable: -LOG((FCCDRT30_US^-1)*100-1)
Method: Least Squares
Date: 10/04/19 Time: 18:33
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.798683	0.290485	-9.634508	0.0000
-LOG((FCCDTO30_I_US^-1)*100-1)	0.245831	0.071646	3.431208	0.0012
@PCY(FRTFS$_US)	-0.020029	0.005891	-3.400064	0.0013

R-squared	0.613144	Mean dependent var	-3.876955
Adjusted R-squared	0.598545	S.D. dependent var	0.160947
S.E. of regression	0.101977	Akaike info criterion	-1.676057
Sum squared resid	0.551163	Schwarz criterion	-1.567556
Log likelihood	49.92959	Hannan-Quinn criter.	-1.633991
F-statistic	42.00091	Durbin-Watson stat	0.104187
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDRT60_US^-1)*100-1)
Method: Least Squares
Date: 10/04/19 Time: 18:35
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.307698	0.279369	-4.680903	0.0000
-LOG((FCCDRT30_US^-1)*100-1)	0.800868	0.072176	11.09599	0.0000
D(FLBR_US)	0.082846	0.033973	2.438558	0.0181

R-squared	0.847285	Mean dependent var	-4.414797
Adjusted R-squared	0.841522	S.D. dependent var	0.162073
S.E. of regression	0.064520	Akaike info criterion	-2.591592
Sum squared resid	0.220632	Schwarz criterion	-2.483091
Log likelihood	75.56458	Hannan-Quinn criter.	-2.549527
F-statistic	147.0257	Durbin-Watson stat	0.174871
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDRT90_US^-1)*100-1)
Method: Least Squares
Date: 10/06/19 Time: 13:56

Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.293242	0.124691	-2.351743	0.0224
-LOG((FCCDRT60_US^-1)*100-1)	0.982659	0.028284	34.74210	0.0000
D(FLBR_US(-4))	0.037608	0.013403	2.805949	0.0070

R-squared	0.974009	Mean dependent var	-4.632623
Adjusted R-squared	0.973028	S.D. dependent var	0.169217
S.E. of regression	0.027791	Akaike info criterion	-4.276145
Sum squared resid	0.040933	Schwarz criterion	-4.167644
Log likelihood	122.7321	Hannan-Quinn criter.	-4.234080
F-statistic	993.0759	Durbin-Watson stat	0.494850
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDCF120_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 12:33
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.724774	0.470866	3.662982	0.0006
-LOG((FCCDCF90_US^-1)*100-1)	1.152236	0.091168	12.63861	0.0000
@MOVAV(FLBR_US,4)	0.015670	0.011453	1.368195	0.1770

R-squared	0.810774	Mean dependent var	-3.645632
Adjusted R-squared	0.803634	S.D. dependent var	0.327721
S.E. of regression	0.145224	Akaike info criterion	-0.968998
Sum squared resid	1.117768	Schwarz criterion	-0.860497
Log likelihood	30.13195	Hannan-Quinn criter.	-0.926933
F-statistic	113.5444	Durbin-Watson stat	0.225668
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDOT30_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 02:14
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.561328	0.120738	-12.93153	0.0000
-LOG((FCCDTO30_I_US^-1)*100-1)	0.759862	0.025174	30.18458	0.0000
FLBR_US	0.036039	0.003490	10.32690	0.0000

R-squared	0.978565	Mean dependent var	-4.521018
Adjusted R-squared	0.977756	S.D. dependent var	0.265978
S.E. of regression	0.039669	Akaike info criterion	-3.564423
Sum squared resid	0.083401	Schwarz criterion	-3.455922
Log likelihood	102.8038	Hannan-Quinn criter.	-3.522357
F-statistic	1209.807	Durbin-Watson stat	0.439776

Prob(F-statistic)	0.000000

Dependent Variable: -LOG((FCCDOT60_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 02:13
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.383027	0.317651	-1.205813	0.2332
-LOG((FCCDOT30_US^-1)*100-1)	1.161355	0.061643	18.84003	0.0000
@MOVAV(FLBR_US,4)	0.015963	0.008484	1.881568	0.0654

R-squared	0.935160	Mean dependent var	-5.533482
Adjusted R-squared	0.932713	S.D. dependent var	0.342031
S.E. of regression	0.088722	Akaike info criterion	-1.954539
Sum squared resid	0.417192	Schwarz criterion	-1.846038
Log likelihood	57.72711	Hannan-Quinn criter.	-1.912474
F-statistic	382.1988	Durbin-Watson stat	0.115119
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDOT90_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 02:13
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.758362	0.191681	-3.956379	0.0002
-LOG((FCCDOT60_US^-1)*100-1)	0.973708	0.030084	32.36610	0.0000
@MOVAV(FLBR_US,4)	0.017993	0.005324	3.379481	0.0014

R-squared	0.978673	Mean dependent var	-6.033581
Adjusted R-squared	0.977868	S.D. dependent var	0.362378
S.E. of regression	0.053910	Akaike info criterion	-2.950913
Sum squared resid	0.154034	Schwarz criterion	-2.842412
Log likelihood	85.62556	Hannan-Quinn criter.	-2.908847
F-statistic	1216.052	Durbin-Watson stat	0.137035
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDOT120_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 02:14
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.193166	0.271396	-8.081042	0.0000
-LOG((FCCDOT90_US^-1)*100-1)	0.575326	0.038999	14.75223	0.0000
@MOVAV(FLBR_US,4)	0.105783	0.007313	14.46564	0.0000

R-squared	0.969475	Mean dependent var	-5.001425
Adjusted R-squared	0.968323	S.D. dependent var	0.391886
S.E. of regression	0.069748	Akaike info criterion	-2.435762
Sum squared resid	0.257836	Schwarz criterion	-2.327261
Log likelihood	71.20133	Hannan-Quinn criter.	-2.393696
F-statistic	841.6277	Durbin-Watson stat	0.186481
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDRA30_I_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/04/19 Time: 22:46
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 17 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.493432	0.103853	4.751275	0.0000
-LOG((FCCDTO30_I_US^-1)*100-1)	1.106362	0.023382	47.31713	0.0000
@PCY(@MOVAV(FHOFHOPIQ_US/(FYPQ_US/FHHOLDQ_US),4))	-7.12E-05	0.000840	-0.084791	0.9328
AR(1)	0.986768	0.036486	27.04524	0.0000

R-squared	0.999582	Mean dependent var	-4.135856
Adjusted R-squared	0.999558	S.D. dependent var	0.293921
S.E. of regression	0.006183	Akaike info criterion	-7.200358
Sum squared resid	0.001988	Schwarz criterion	-7.055690
Log likelihood	205.6100	Hannan-Quinn criter.	-7.144271
F-statistic	41414.04	Durbin-Watson stat	1.743622
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99

Dependent Variable: -LOG((FCCDRT120_US^-1)*100-1)
Method: Least Squares
Date: 10/06/19 Time: 14:00
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.861362	0.644070	4.442624	0.0000
-LOG((FCCDRT90_US^-1)*100-1)	1.434922	0.138938	10.32777	0.0000

R-squared	0.663892	Mean dependent var	-3.786093
Adjusted R-squared	0.657668	S.D. dependent var	0.298005
S.E. of regression	0.174360	Akaike info criterion	-0.620330
Sum squared resid	1.641674	Schwarz criterion	-0.547996
Log likelihood	19.36923	Hannan-Quinn criter.	-0.592286
F-statistic	106.6628	Durbin-Watson stat	0.146000
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDSL30_US^-1)*100-1)

Method: Least Squares
Date: 10/05/19 Time: 21:25
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.967044	0.680470	-2.890714	0.0056
-LOG((FCCDTO30_I_US^-1)*100-1)	1.666399	0.120929	13.78001	0.0000
FRPRIME_US	0.169578	0.020965	8.088664	0.0000
@MOVAV(FLBR_US,4)	0.159590	0.021693	7.356617	0.0000

R-squared	0.944750	Mean dependent var	-7.193087
Adjusted R-squared	0.941563	S.D. dependent var	0.698372
S.E. of regression	0.168823	Akaike info criterion	-0.651181
Sum squared resid	1.482065	Schwarz criterion	-0.506513
Log likelihood	22.23307	Hannan-Quinn criter.	-0.595093
F-statistic	296.3930	Durbin-Watson stat	0.387962
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDSL60_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 21:31
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.810769	0.515660	3.511552	0.0009
-LOG((FCCDSL30_US^-1)*100-1)	1.067778	0.059780	17.86180	0.0000
@MOVAV(FLBR_US,4)	0.037372	0.021602	1.729991	0.0895

R-squared	0.902654	Mean dependent var	-5.635612
Adjusted R-squared	0.898980	S.D. dependent var	0.827519
S.E. of regression	0.263015	Akaike info criterion	0.218875
Sum squared resid	3.666386	Schwarz criterion	0.327376
Log likelihood	-3.128490	Hannan-Quinn criter.	0.260940
F-statistic	245.7239	Durbin-Watson stat	0.358241
Prob(F-statistic)	0.000000		

Dependent Variable: -LOG((FCCDSL90_US^-1)*100-1)
Method: Least Squares
Date: 09/25/19 Time: 23:03
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.838863	0.059510	-81.31214	0.0000
FCCDSL60_US/FCCDSL30_US	0.000664	0.009450	0.070296	0.9442
@MOVAV(FLBR_US,4)	0.017801	0.007934	2.243749	0.0291

R-squared	0.095228	Mean dependent var	-4.724016
Adjusted R-squared	0.061085	S.D. dependent var	0.112523
S.E. of regression	0.109032	Akaike info criterion	-1.542263

Sum squared resid	0.630065	Schwarz criterion	-1.433762
Log likelihood	46.18337	Hannan-Quinn criter.	-1.500198
F-statistic	2.789131	Durbin-Watson stat	0.311411
Prob(F-statistic)	0.070517		

Dependent Variable: -LOG((FCCDSL120_US^-1)*100-1)
Method: Least Squares
Date: 10/05/19 Time: 21:31
Sample (adjusted): 2005Q3 2019Q2
Included observations: 56 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.601597	0.579020	-2.766046	0.0078
-LOG((FCCDSL90_US^-1)*100-1)	0.342427	0.119341	2.869307	0.0059
@MOVAV(FLBR_US,4)	0.013134	0.006954	1.888668	0.0644

R-squared	0.240790	Mean dependent var	-3.137039
Adjusted R-squared	0.212141	S.D. dependent var	0.106700
S.E. of regression	0.094708	Akaike info criterion	-1.823947
Sum squared resid	0.475392	Schwarz criterion	-1.715446
Log likelihood	54.07050	Hannan-Quinn criter.	-1.781881
F-statistic	8.404722	Durbin-Watson stat	0.263309
Prob(F-statistic)	0.000675		

Dependent Variable: -LOG((FCCDTO30_I_US^-1)*100-1)
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 10/04/19 Time: 11:40
Sample: 2005Q3 2019Q2
Included observations: 56
Convergence achieved after 16 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.090547	0.106870	-56.98999	0.0000
FLBR_US	0.088775	0.008603	10.31931	0.0000
@MOVAV((FXSLAWINQ_US(-6)),6)	0.001423	0.001054	1.349498	0.1835
DLOG(@MOVAV(FHOFHOPIQ_US/(FYPQ_US/FHHOLDQ_US),4))	-3.269395	0.871335	-3.752167	0.0005
FSPVOL_US	0.028392	0.008651	3.281759	0.0019
@MOVAV(FRGT10Y_US-FRFED_US,4)	-0.057375	0.017713	-3.239217	0.0022
FSDEBT_US(-2)	0.125549	0.009516	13.19409	0.0000
AR(1)	0.552398	0.133776	4.129268	0.0001

R-squared	0.989411	Mean dependent var	-4.190423
Adjusted R-squared	0.987867	S.D. dependent var	0.277487
S.E. of regression	0.030565	Akaike info criterion	-3.999842
Sum squared resid	0.044843	Schwarz criterion	-3.710506
Log likelihood	119.9956	Hannan-Quinn criter.	-3.887667
F-statistic	640.7249	Durbin-Watson stat	2.072377
Prob(F-statistic)	0.000000		

Inverted AR Roots	.55