

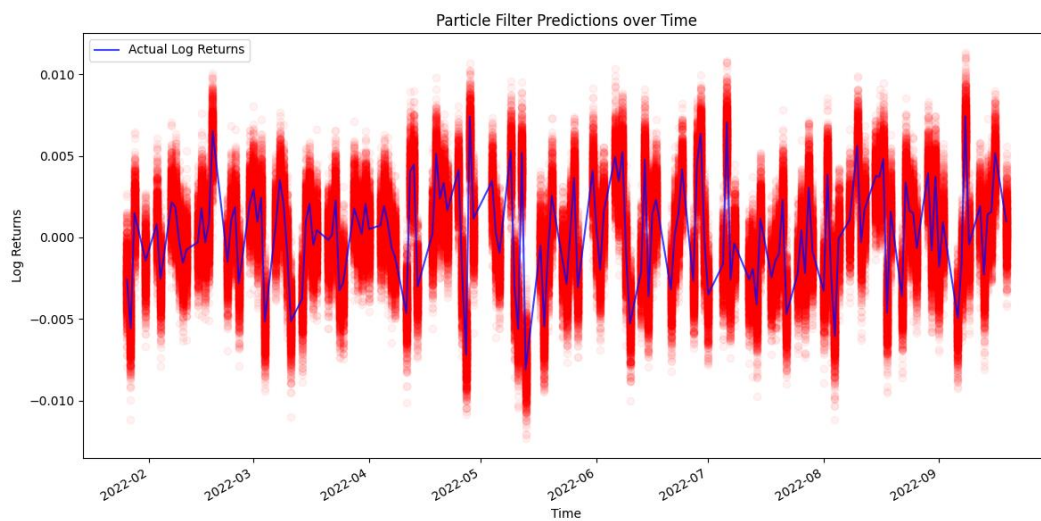
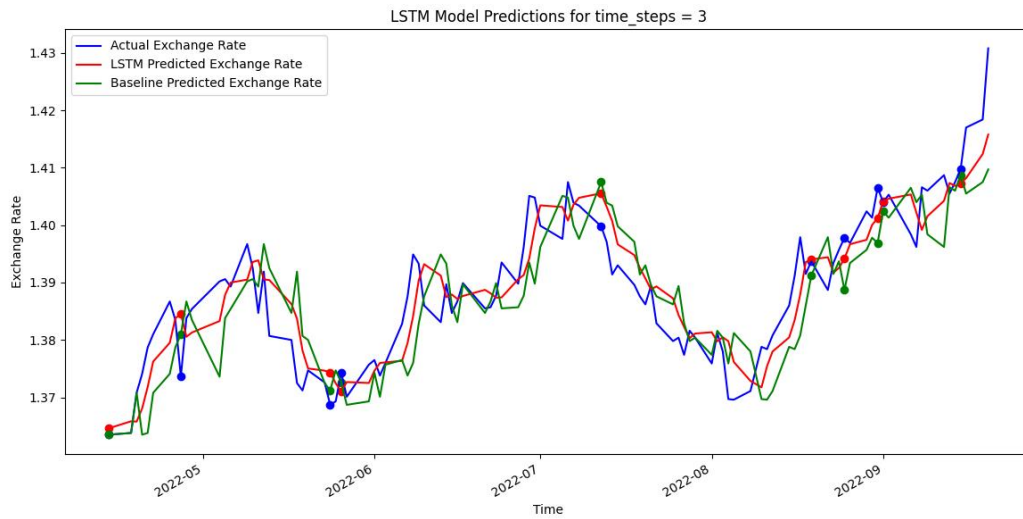
Date: 2022-08-25, Actual: [1.3978], LSTM Predicted: [1.3941449], Baseline Predicted: [1.3887]

Average MAE between LSTM predictions and actual values: 0.004454995089310877

Average MAE between baseline predictions and actual values: 0.0062259615384615465

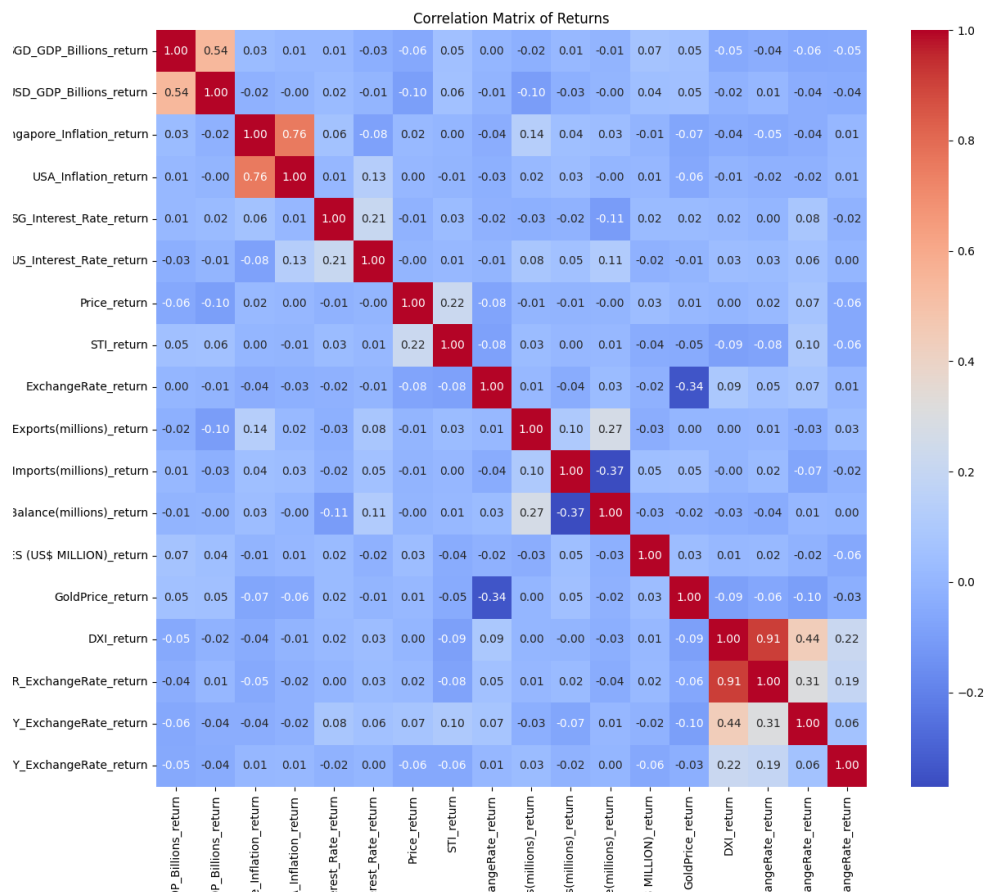
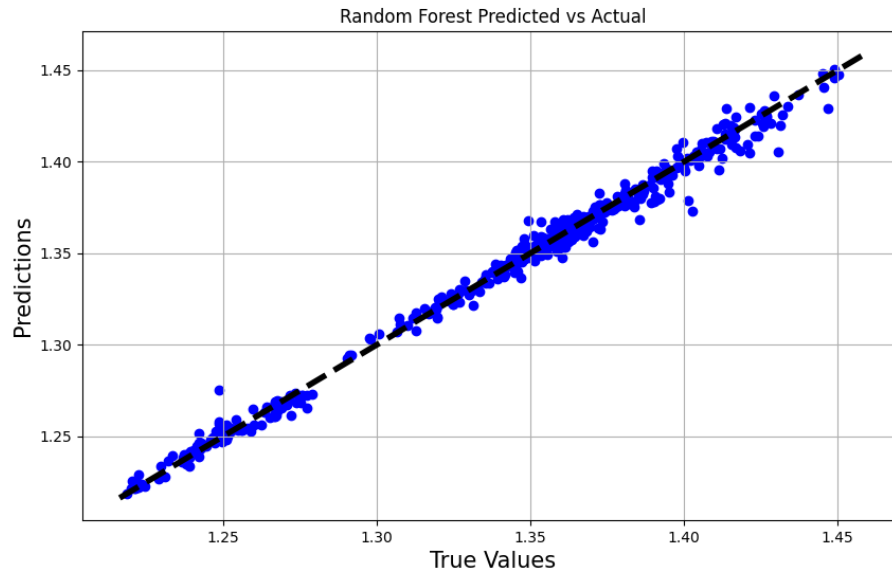
Results for time_steps = 3:

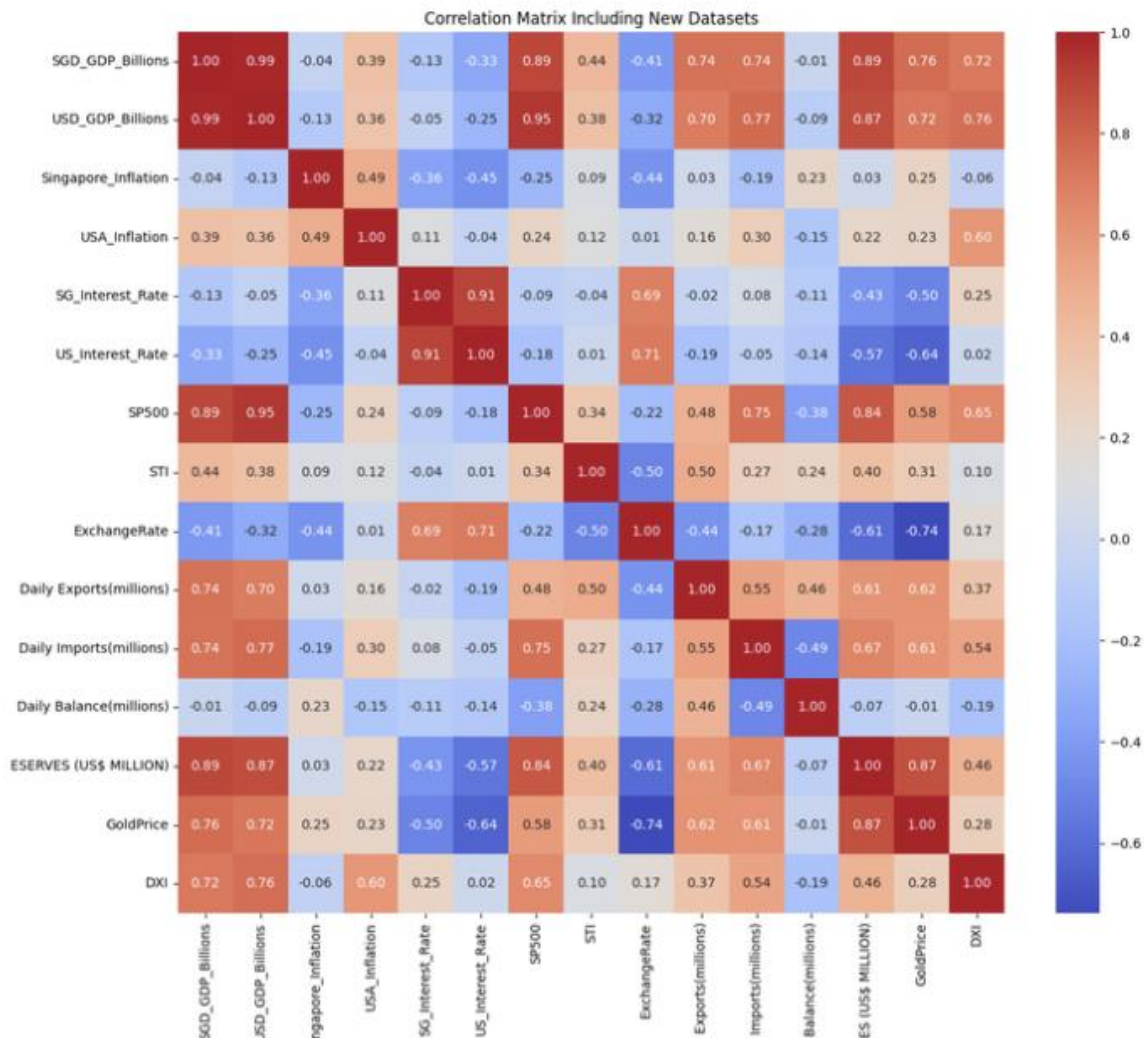
MSE: 2.944818968013553e-05, RMSE: 0.00542661862305944, MAE: 0.004454995089310877,
R^2: 0.8183253286569724



RF (MSE): 0.0001

RF (R²): 0.9920





Data Statistics:

Date impact_score SGD_GDP_Billions USD_GDP_Billions
 Singapore_Inflation USA_Inflation SG_Interest_Rate US_Interest_Rate Price STI
 ExchangeRate Daily Exports(millions) Daily Imports(millions) Daily Balance(millions)
 FOREIGN RESERVES (US\$ MILLION) GoldPrice DXI USD_EUR_ExchangeRate
 USD_JPY_ExchangeRate USD_CNY_ExchangeRate impact_score_return
 SGD_GDP_Billions_return USD_GDP_Billions_return Singapore_Inflation_return
 USA_Inflation_return SG_Interest_Rate_return US_Interest_Rate_return Price_return
 STI_return ExchangeRate_return Daily Exports(millions)_return Daily
 Imports(millions)_return Daily Balance(millions)_return FOREIGN RESERVES
 (US\$ MILLION)_return GoldPrice_return DXI_return USD_EUR_ExchangeRate_return
 USD_JPY_ExchangeRate_return USD_CNY_ExchangeRate_return

count	1531	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000
1531.0000	1531.0000	1531.0000	1531.0000	1531.0000	1531.0000

mean	2016-04-06 19:25:21.358589184	-0.1188	112.2830	19036.1028
2.4595	2.5023	0.4664	0.5210	2263.3633
83.2952	56.5267	26.7685	271789.3037	1375.2749
90.9630	0.8427	106.6619	6.4506	-0.2412
0.0002	0.0002	-0.0016	-0.0012	0.0171
0.0022	0.0008	0.0002	0.0001	0.0007
0.0005	0.0002		0.0001	-0.0001
0.0002	0.0002	0.0001		0.0002

min	2012-01-31 00:00:00	-4.9137	90.2276	16113.4211	-0.3900
-0.3600	0.0300	0.0500	1278.0000	2311.0000	1.2163
37.0533	-47.5742	237896.8645	1049.6000	78.1800	
0.7178	76.1890	6.0312	-149.6078	-0.0051	-
0.0029	-0.7872	-1.2195	-0.7723	-0.2667	-
0.0589	-0.0683	-0.0170	-0.2397	-0.3307	
-3.7334	-0.0119	-0.0934	-0.0219	-0.0278	
-0.0309	-0.0164				

25%	2014-02-25 12:00:00	-0.4759	98.6246	17398.2193	0.6000
1.6400	0.0900	0.1000	1844.3500	2955.5850	1.2666
46.7968	20.2000	250746.3300	1229.3500	82.1950	
0.7736	101.8095	6.2127	-1.5471	-0.0001	
0.0001	0.0000	0.0000	0.0000	0.0000	-
0.0032	-0.0038	-0.0018	0.0000	0.0000	
0.0000	-0.0002	-0.0050	-0.0022	-0.0028	
-0.0030	-0.0008				

50%	2016-02-11 00:00:00	0.0000	108.1818	18609.2088	2.1000
2.8500	0.2400	0.1600	2090.5000	3166.9399	1.3468
53.8200	27.0767	260980.8000	1292.9000	93.5600	
0.8513	108.8600	6.3667	-1.0000	0.0002	
0.0001	0.0000	0.0000	0.0000	0.0000	
0.0005	0.0001	0.0000	0.0000	0.0000	
0.0000	0.0001	0.0000	0.0002	0.0002	
0.0003	0.0000				

75%	2017-10-26 12:00:00	0.2535	121.9960	20101.3357	2.8200
	3.2300	0.6050	0.7900	2551.5000	3294.5599
	60.9036	35.6494		276372.9509	1549.1500
	0.8979	113.7640	6.6627	-0.2555	96.9200
	0.0002	0.0000	0.0000	0.0000	0.0005
	0.0050	0.0044	0.0019	0.0000	0.0000
	0.0000		0.0004	0.0051	0.0027
	0.0032	0.0008			0.0032
max	2022-09-22 00:00:00	4.8991	177.2587	26367.0284	6.6300
	3.8400	4.3900	2.5600	4791.2000	3615.2800
	123.9806	82.2667		423278.3214	2021.0000
	1.0172	144.3160	7.1780	386.4444	0.0044
	0.0037	0.0000	0.1333	6.6667	1.0000
	0.3061	0.0607	0.0119	0.2385	0.4961
	1.6090		0.0076	0.0472	0.0223
	0.0382	0.0186			0.0261
std	NaN	0.7660	17.5646	2177.6673	2.2000
	1.2535	0.5348	0.6259	725.8173	235.6412
	14.3731	14.0117		35421.7731	220.7750
	12.3855	0.2808	14.7805	0.0006	0.0002
	0.0323	0.0343	0.2680	0.0380	0.0128
	0.0032		0.0242	0.0339	0.1678
	0.0010	0.0101	0.0044	0.0054	0.0059
	0.0023				

Correlation Matrix:

	SGD_GDP_Billions_return	USD_GDP_Billions_return		
	Singapore_Inflation_return	USA_Inflation_return	SG_Interest_Rate_return	
	US_Interest_Rate_return	Price_return	STI_return	ExchangeRate_return
	Daily Exports(millions)_return	Daily Imports(millions)_return	Daily Balance(millions)_return	
	FOREIGN RESERVES (US\$ MILLION)_return	GoldPrice_return	DXI_return	
	USD_EUR_ExchangeRate_return	USD_JPY_ExchangeRate_return		
	USD_CNY_ExchangeRate_return			
SGD_GDP_Billions_return		1.0000	0.5433	0.0272
0.0136	0.0129	-0.0323	-0.0563	0.0471
-0.0247	0.0113		-0.0076	0.0651
0.0519	-0.0517	-0.0357	-0.0556	-0.0510
USD_GDP_Billions_return		0.5433	1.0000	-0.0218
-0.0042	0.0216	-0.0059	-0.0970	0.0563
-0.1024	-0.0256		-0.0044	0.0426
0.0501	-0.0176	0.0055	-0.0352	-0.0433

Singapore_Inflation_return			0.0272	-0.0218	1.0000	
0.7582	0.0598	-0.0837	0.0159	0.0030	-0.0380	
0.1355	0.0438		0.0343		-0.0073	-
0.0668	-0.0406	-0.0531		-0.0367	0.0068	
USA_Inflation_return			0.0136	-0.0042	0.7582	
1.0000	0.0080	0.1276	0.0049	-0.0066	-0.0272	
0.0150	0.0342		-0.0005		0.0075	-
0.0557	-0.0120	-0.0179		-0.0192	0.0108	
SG_Interest_Rate_return			0.0129	0.0216	0.0598	
0.0080	1.0000	0.2124	-0.0147	0.0259	-0.0225	
-0.0266	-0.0167		-0.1066		0.0241	
0.0231	0.0166	0.0017		0.0825	-0.0177	
US_Interest_Rate_return			-0.0323	-0.0059	-0.0837	
0.1276	0.2124	1.0000	-0.0048	0.0126	-0.0065	
0.0835	0.0548		0.1118		-0.0222	-
0.0068	0.0326	0.0278		0.0559	0.0011	
Price_return			-0.0563	-0.0970	0.0159	
0.0049	-0.0147	-0.0048	1.0000	0.2212	-0.0762	
-0.0069	-0.0073		-0.0041		0.0310	
0.0142	0.0004	0.0160		0.0725	-0.0585	
STI_return			0.0471	0.0563	0.0030	-
0.0066	0.0259	0.0126	0.2212	1.0000	-0.0825	
0.0266	0.0038		0.0135		-0.0395	-
0.0457	-0.0928	-0.0783		0.1009	-0.0602	
ExchangeRate_return			0.0012	-0.0081	-0.0380	
-0.0272	-0.0225	-0.0065	-0.0762	-0.0825	1.0000	
0.0108	-0.0396		0.0269		-0.0197	-
0.3406	0.0908	0.0527		0.0738	0.0066	
Daily Exports(millions)_return			-0.0247	-0.1024	0.1355	
0.0150	-0.0266	0.0835	-0.0069	0.0266	0.0108	
1.0000	0.1035		0.2708		-0.0343	
0.0010	0.0029	0.0080		-0.0302	0.0272	
Daily Imports(millions)_return			0.0113	-0.0256	0.0438	
0.0342	-0.0167	0.0548	-0.0073	0.0038	-0.0396	
0.1035	1.0000		-0.3714		0.0459	
0.0484	-0.0019	0.0201		-0.0673	-0.0156	

Daily Balance(millions)_return			-0.0076	-0.0044	0.0343	
-0.0005	-0.1066	0.1118	-0.0041	0.0135	0.0269	
0.2708	-0.3714	1.0000			-0.0261	-
0.0217	-0.0299	-0.0438	0.0058		0.0016	
FOREIGN RESERVES (US\$ MILLION)_return			0.0651	0.0426		
-0.0073	0.0075	0.0241	-0.0222	0.0310	-0.0395	
-0.0197	-0.0343	0.0459		-0.0261		
1.0000	0.0346	0.0106	0.0157	-0.0162		-
0.0602						
GoldPrice_return		0.0519	0.0501		-0.0668	
-0.0557	0.0231	-0.0068	0.0142	-0.0457	-0.3406	
0.0010	0.0484	-0.0217			0.0346	
1.0000	-0.0903	-0.0639	-0.0968		-0.0286	
DXI_return		-0.0517	-0.0176		-0.0406	-
0.0120	0.0166	0.0326	0.0004	-0.0928	0.0908	
0.0029	-0.0019	-0.0299			0.0106	-
0.0903	1.0000	0.9094	0.4406		0.2158	
USD_EUR_ExchangeRate_return		-0.0357	0.0055			-
0.0531	-0.0179	0.0017	0.0278	0.0160	-0.0783	
0.0527	0.0080	0.0201		-0.0438		
0.0157	-0.0639	0.9094	1.0000	0.3068		
0.1925						
USD_JPY_ExchangeRate_return		-0.0556	-0.0352			-
0.0367	-0.0192	0.0825	0.0559	0.0725	0.1009	
0.0738	-0.0302	-0.0673		0.0058		
-0.0162	-0.0968	0.4406	0.3068	1.0000		
0.0612						
USD_CNY_ExchangeRate_return		-0.0510	-0.0433			
0.0068	0.0108	-0.0177	0.0011	-0.0585	-0.0602	
0.0066	0.0272	-0.0156		0.0016		
-0.0602	-0.0286	0.2158	0.1925	0.0612		
1.0000						

Singapore_Inflation_return has high correlation with: USA_Inflation_return

USA_Inflation_return has high correlation with: Singapore_Inflation_return

DXI_return has high correlation with: USD_EUR_ExchangeRate_return

USD_EUR_ExchangeRate_return has high correlation with: DXI_return

PCA selected 15 components

Lasso selected features: {'impact_score_return': 5.585603006857564e-06,
'SGD_GDP_Billions_return': 0.0, 'USD_GDP_Billions_return': 0.0,
'Singapore_Inflation_return': -0.0028372846370687817, 'USA_Inflation_return': -0.0,
'SG_Interest_Rate_return': -0.00011214759304724889, 'US_Interest_Rate_return':
0.001300184882402352, 'Price_return': -0.004573180266849013, 'STI_return': -
0.013632728442641632, 'Daily Exports(millions)_return': 0.0, 'Daily
Imports(millions)_return': -0.0015122019543239778, 'Daily Balance(millions)_return':
0.0001653363758992116, 'FOREIGN RESERVES (US\$ MILLION)_return': -0.0,
'GoldPrice_return': -0.090853686693891, 'DXI_return': 0.0,
'USD_EUR_ExchangeRate_return': 0.0, 'USD_JPY_ExchangeRate_return': 0.0,
'USD_CNY_ExchangeRate_return': 0.0}

Random Forest feature importance: {'impact_score_return': 0.06931091854663832,
'SGD_GDP_Billions_return': 0.052848599863640315, 'USD_GDP_Billions_return':
0.06947162679840418, 'Singapore_Inflation_return': 3.6948120585166634e-05,
'USA_Inflation_return': 2.163918699425018e-05, 'SG_Interest_Rate_return':
0.0014683967751587294, 'US_Interest_Rate_return': 0.004206106717557248,
'Price_return': 0.1010371500873077, 'STI_return': 0.10614165607031317, 'Daily
Exports(millions)_return': 0.002492010218900704, 'Daily Imports(millions)_return':
0.004146817064946953, 'Daily Balance(millions)_return': 0.003155467990368533,
'FOREIGN RESERVES (US\$ MILLION)_return': 0.05490356978158703,
'GoldPrice_return': 0.2382348463075633, 'DXI_return': 0.06864379308957413,
'USD_EUR_ExchangeRate_return': 0.06392542844100454,
'USD_JPY_ExchangeRate_return': 0.07797983829981613,
'USD_CNY_ExchangeRate_return': 0.0819751866396396}