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# Forecasting Volatility with Decision Trees

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**MFE 431**

**Machine Learning**

# Forecasting Volatility with Decision Trees

- Variables are constructed using momentum indicators and n-day returns/volatility.

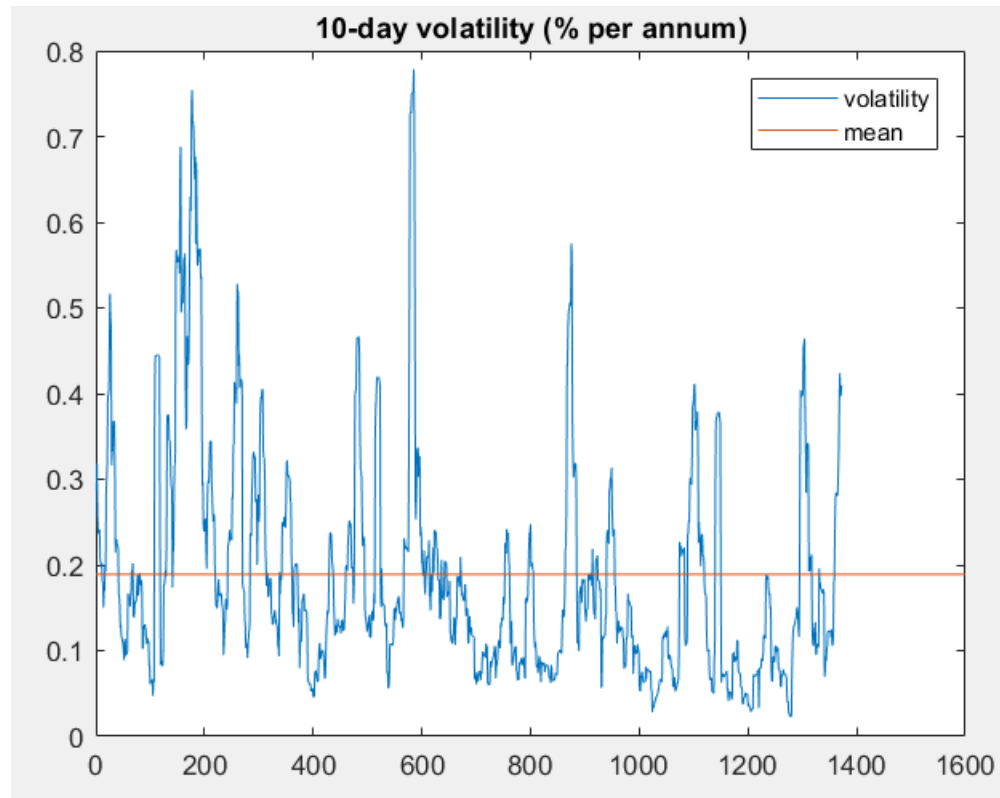
```
18 % Set symbols for retrieving data
19 symbol1 = {'BCHAIN/MKPRU', ...% Bitcoin Market Price USD
20 'BCHAIN/MWNUS', ...% Bitcoin My Wallet Number of Users
21 'BCHAIN/DIFF', ...% Bitcoin Difficulty
22 'BCHAIN/MWNTD', ...% Bitcoin My Wallet Number of Transaction Per Day
23 'BCHAIN/MWTRV', ...% Bitcoin My Wallet Transaction Volume
24 'BCHAIN/AVBLS', ...% Bitcoin Average Block Size
25 'BCHAIN/BLCHS', ...% Bitcoin api.blockchain Size
26 'BCHAIN/ATRCT', ...% Bitcoin Median Transaction Confirmation Time
27 'BCHAIN/MIREV', ...% Bitcoin Miners Revenue
28 'BCHAIN/HRATE', ...% Bitcoin Hash Rate
29 'BCHAIN/CPTRA', ...% Bitcoin Cost Per Transaction
30 'BCHAIN/TRVOU', ...% Bitcoin USD Exchange Trade Volume
31 'BCHAIN/ETRVU', ...% Bitcoin Estimated Transaction Volume USD
32 'BCHAIN/TOUTV', ...% Bitcoin Total Output Volume
33 'BCHAIN/NTRBL', ...% Bitcoin Number of Transaction per Block
34 'BCHAIN/NTRAT', ...% Bitcoin Total Number of Transactions
35 'BCHAIN/TRFUS', ...% Bitcoin Total Transaction Fees USD
36 'BCHAIN/MKTCP', ...% Bitcoin Market Capitalization
37 'BCHAIN/TOTBC'}; % Total Bitcoins
```

	1	2	3	4
	MKPRU	MKPRU_momentum7	MKPRU_momentum15	MKPRU_momentum30
1	110.2950	-18.9044	-21.2050	0.7335
2	107.8000	-12.8029	-24.8900	-9.8800
3	98.4705	-21.5296	-35.5766	-16.9296
4	104.9685	-15.5981	-27.6415	-9.3515
5	108	-14.4051	-20.3210	-9.5030
6	108.1620	-12.5280	-21.8179	-10.8380
7	109	-1.2950	-21.9959	-5.9850
8	100	-7.8000	-27.3407	-15.0902
9	101.9700	3.4995	-27.2295	-22.5200

59	60	61	62	63	64	65	66
ret1	ret5	ret10	ret20	vol10	vol30	vol60	vol180
-0.0861	-0.0855	-0.1405	-0.1087	0.2156	0.1203	0.3021	0.1201
-0.0226	-0.1017	-0.1706	-0.1095	0.2079	0.1186	0.2868	0.1202
-0.0865	-0.1833	-0.2483	-0.1971	0.2366	0.1206	0.2832	0.1207
0.0660	-0.1424	-0.1757	-0.1431	0.2963	0.1285	0.2571	0.1208
0.0289	-0.1051	-0.1641	-0.1194	0.3038	0.1299	0.2253	0.1208

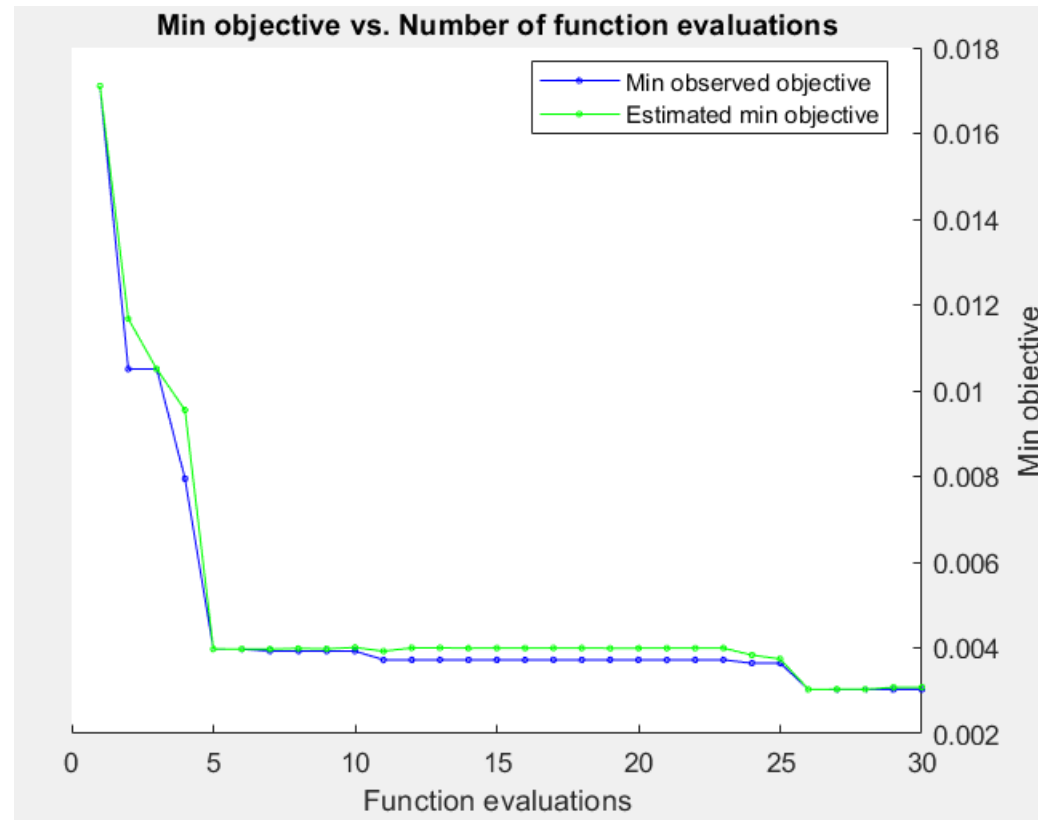
# Forecasting Volatility with Decision Trees... cont'd

- Preview training data.



# Forecasting Volatility with Decision Trees... cont'd

- Training **regression ensemble** for the Decision Tree model.



# Forecasting Volatility with Decision Trees... cont'd

- Compare the predicted volatility with actual volatility (10-day vol).

