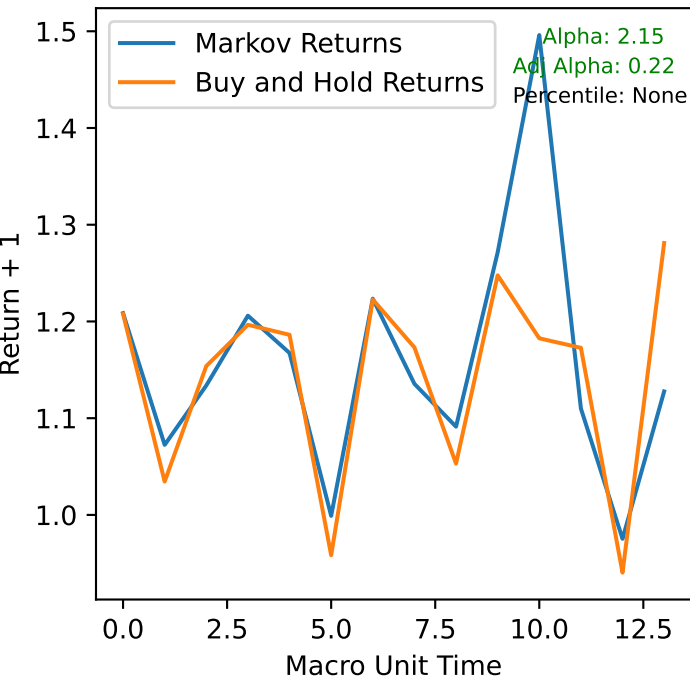
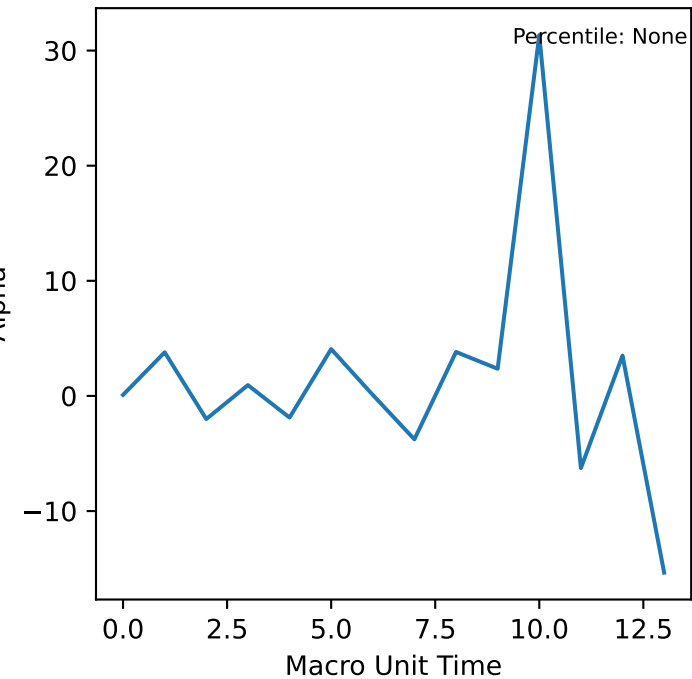


## SPY Return per Macro Unit Time



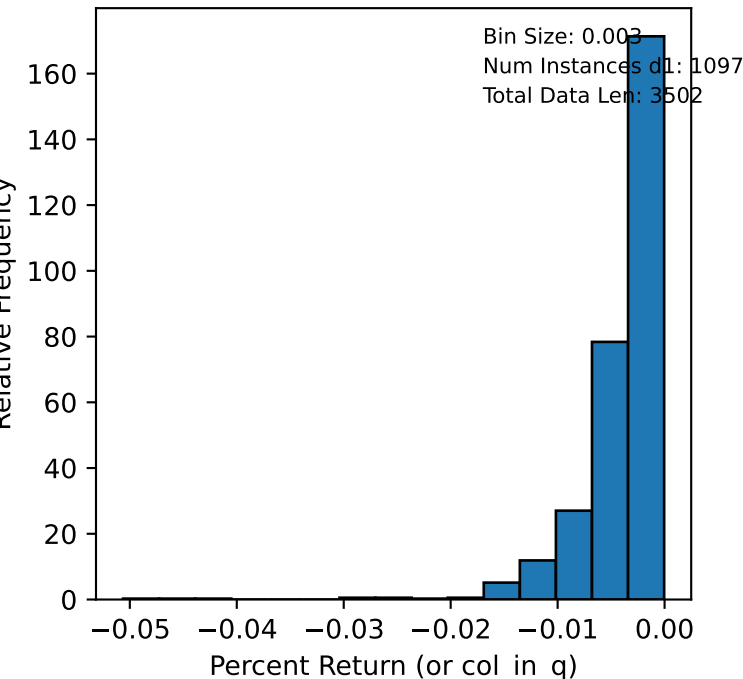
## SPY Alpha per Macro Unit Time



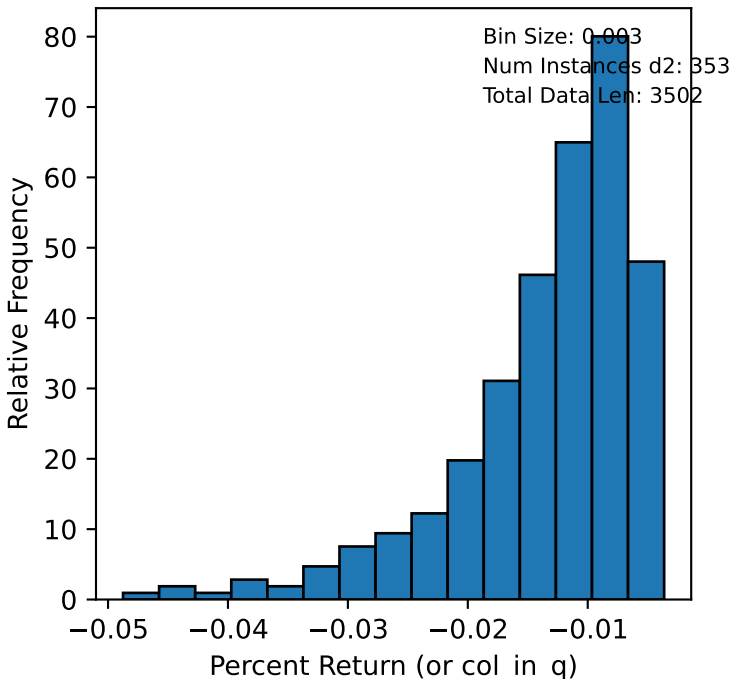
# SPY Transition Probability Matrix

	d1	d2	d3	d4	g1	g2	g3	g4
d1	28.3	27.5	26.8	18.8	33.8	35.8	29.1	16.7
d2	10.7	13.0	12.4	6.2	8.8	8.9	15.2	16.7
d3	3.1	5.1	1.0	6.2	1.9	3.1	2.5	0.0
d4	0.6	0.3	2.1	6.2	0.2	0.0	2.5	0.0
g1	38.1	32.6	30.9	25.0	40.4	37.4	39.2	66.7
g2	16.4	18.4	22.7	25.0	12.6	13.9	8.9	0.0
g3	2.5	3.1	4.1	12.5	2.1	1.0	2.5	0.0
g4	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0

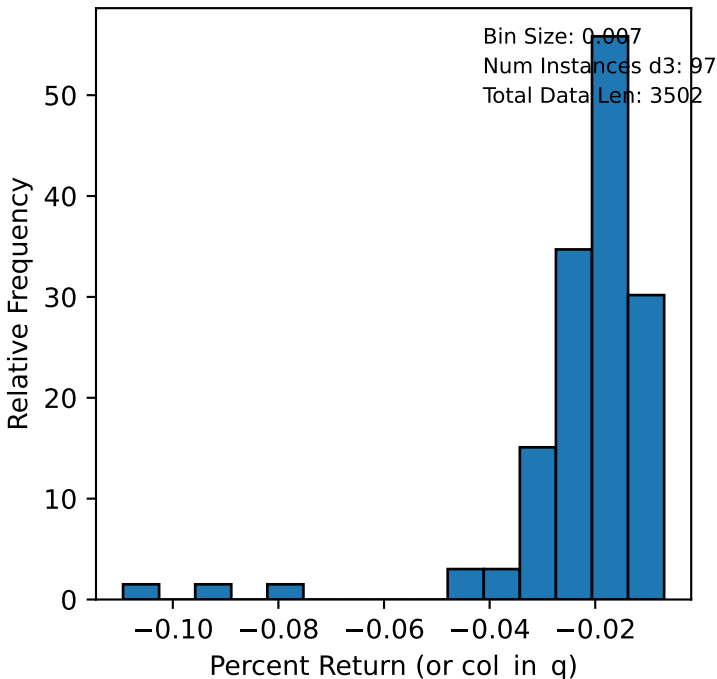
# State Return Distribution for State d1



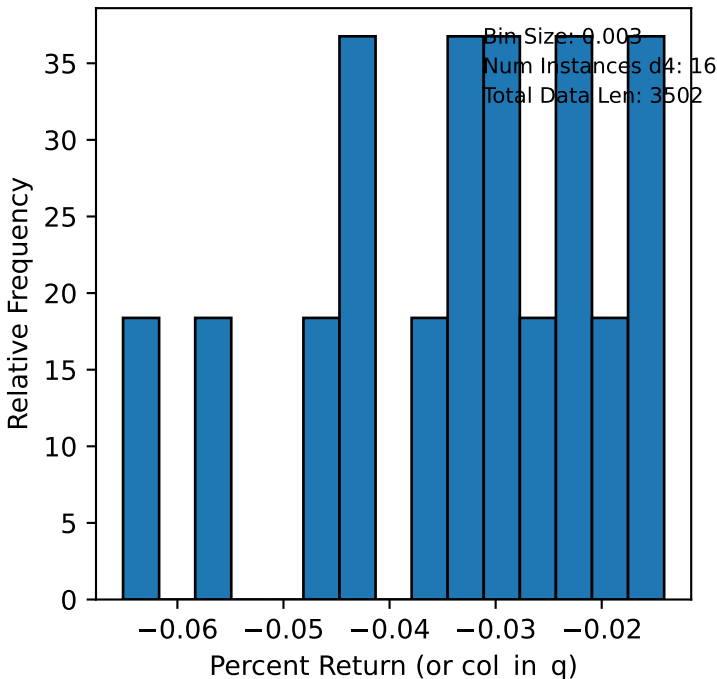
# State Return Distribution for State d2



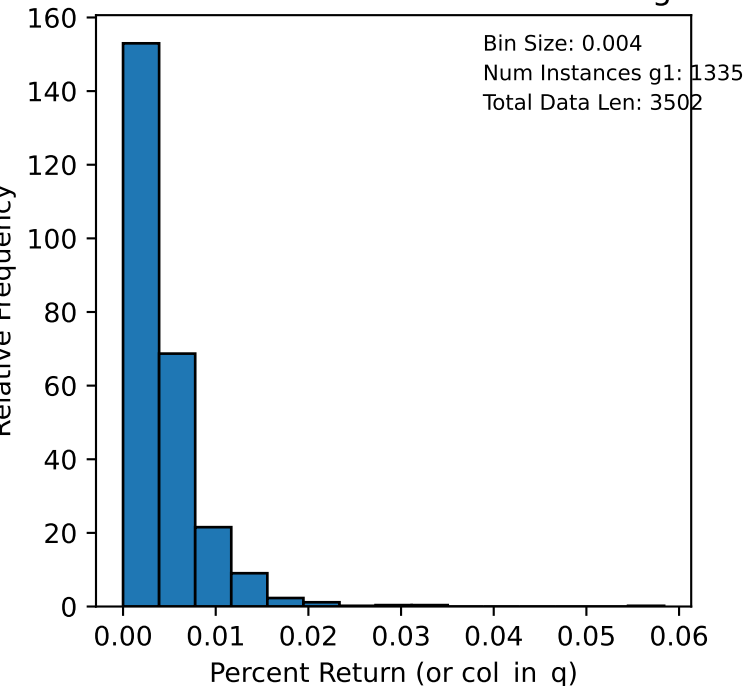
# State Return Distribution for State d3



# State Return Distribution for State d4

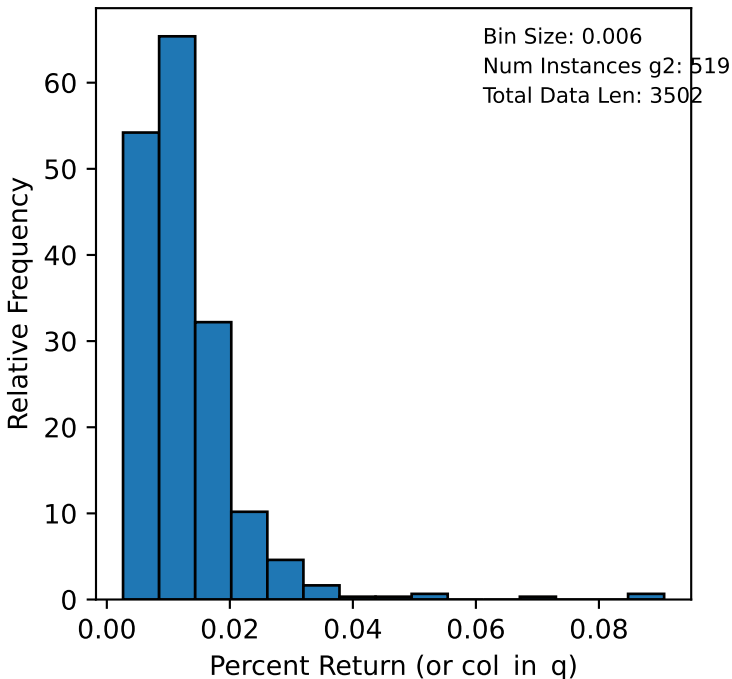


# State Return Distribution for State g1

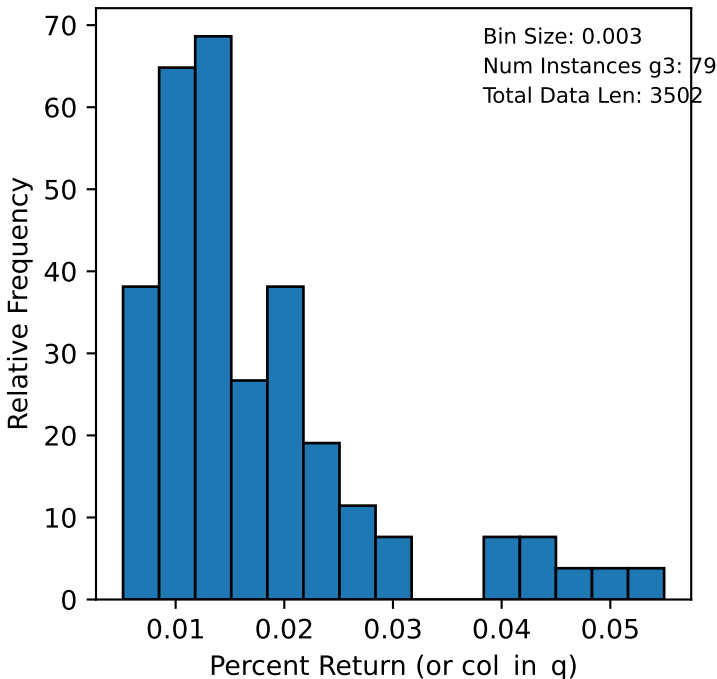




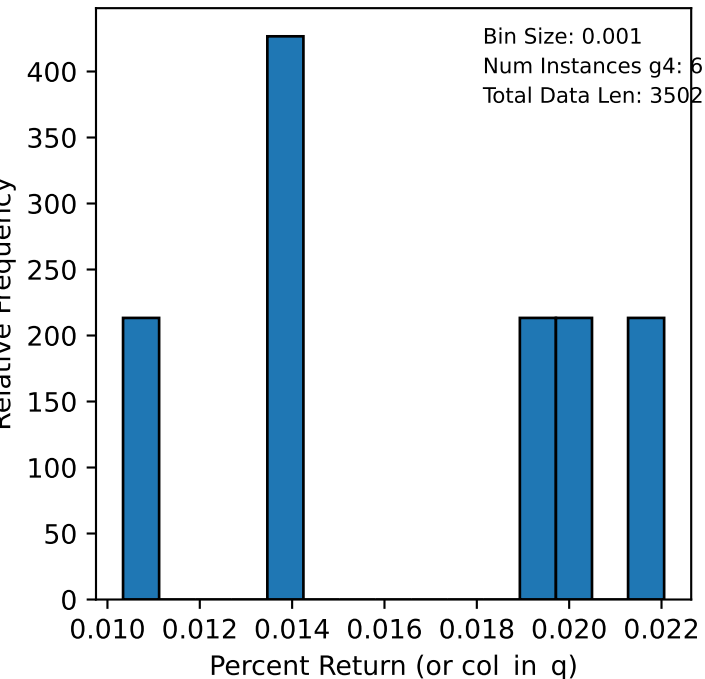
# State Return Distribution for State g2



# State Return Distribution for State g3



# State Return Distribution for State g4



SPY normal\_cov\_map

	Adj Close	COI_20	CWF_20	Close	EMA_20	High	Low	Lower_Band	MACD	Open	RSI_20	SMA_20	STD_L=20	Stochastic_Oscillator_D	Stochastic_Oscillator_K	Upper_Band	Volume	daily_return	state_nominal	volume_change
0	-0.3	33.9	13.7	-0.1	36.6	-1.1	-0.7	6.4	nan	-1.5	90.5	18.8	-2.9	nan	nan	1.3	-16.9	79.9	100.0	-29.7

SPY type1\_cov\_map

	Adj Close	CO_20	CWF_20	Close	EMA_20	High	Low	Lower_Band	MACD	Open	RSI_20	SMA_20	STD_L=20	Stochastic_Oscillator_D	Stochastic_Oscillator_K	Upper_Band	Volume	daily_return	state_nominal	volume_change
0	-0.3	33.8	13.7	-0.1	36.4	-1.1	-0.7	6.3	nan	-1.5	90.1	18.7	-2.9	nan	nan	1.3	-16.8	79.6	99.6	-29.6

SPY type2\_cov\_map

	Adj Close	COI_20	CWF_20	Close	EMA_20	High	Low	Lower_Band	MACD	Open	RSI_20	SMA_20	STD_L=20	Stochastic_Oscillator_D	Stochastic_Oscillator_K	Upper_Band	Volume	daily_return	state_nominal	volume_change
0	8.0	35.0	16.4	8.3	37.5	8.0	8.1	-3.7	nan	7.8	13.3	20.4	6.1	nan	nan	8.5	-0.9	79.9	100.0	-28.0