Getting to know with the Thai Stock data

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EE431

Semester 1/2017

Characteristic of Stock price data

- High-frequency data
  - 5-Minute (tick-by-tick data)
  - Daily frequency
- How do we characterize statistical behavior of financial market data.
- Normally, we look the behavior of returns.
- How do we calculate returns? What sort of behavior do we usually concern? How to get to the quantitative measurement?

Usually we characterize behavior of asset return by using some statistical languages.

- Realized return
  - Mean (average)
  - Volatility (SD/Variance)
  - Noramlity / Skewness / Fat-tail (taliedness)

- Correlation (Covariance)
  - Typically, we have more than one type of assets.
  - Need to characterize how return of each asset commoves too.

Statistical characterization: measuring return

- Realized return
  - Period-by-period return = $\frac{P_{t+1}}{P_t} - 1 \sim \ln\left(\frac{P_{t+1}}{P_t}\right)$
  - Y-o-Y return = $\frac{P_{t+12}}{P_t} - 1 \sim \ln\left(\frac{P_{t+12}}{P_t}\right)$
- This understates the actual level of return that investors can get.
  - Missing dividend payment; hard to calculate.
- Let's calculate market-based return: %price changes of SET index.

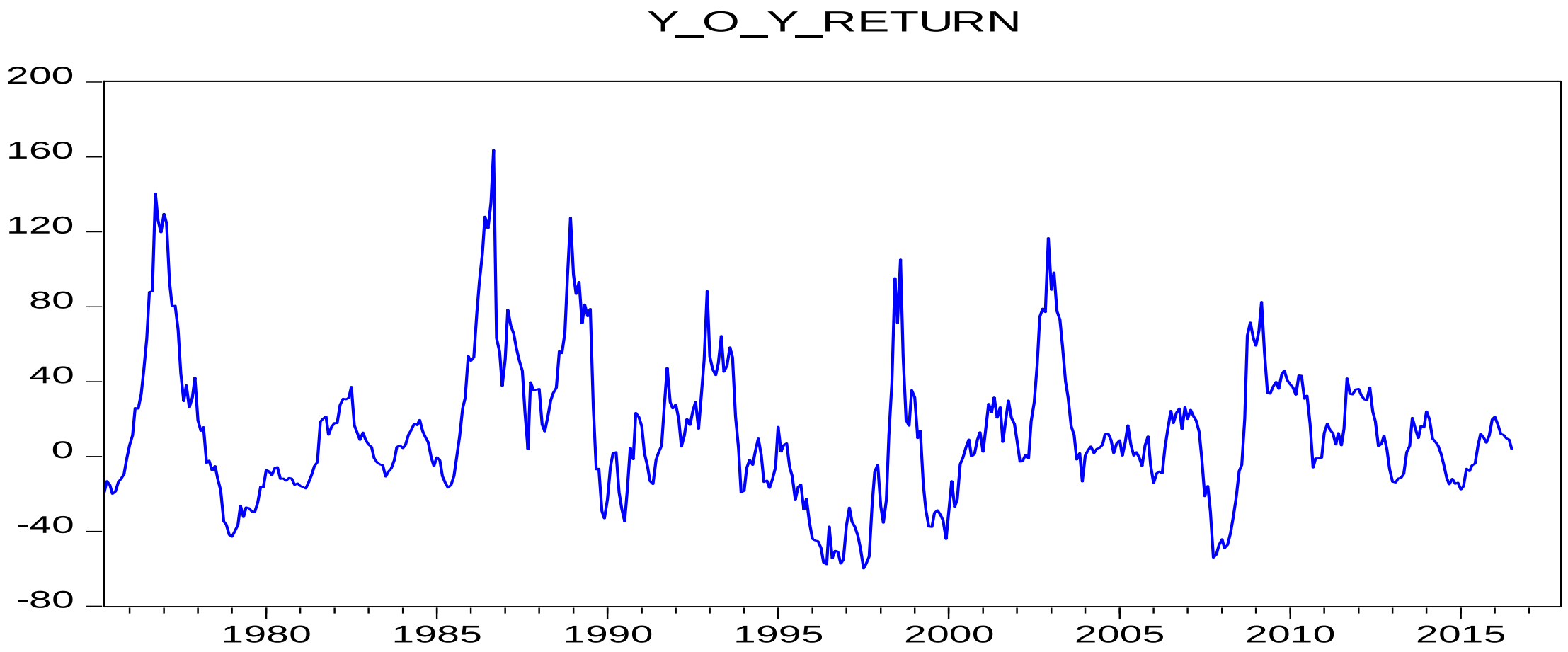
SET index =?

- Each stock has its market price.
- Each company has its market value as measured its market capitalization.

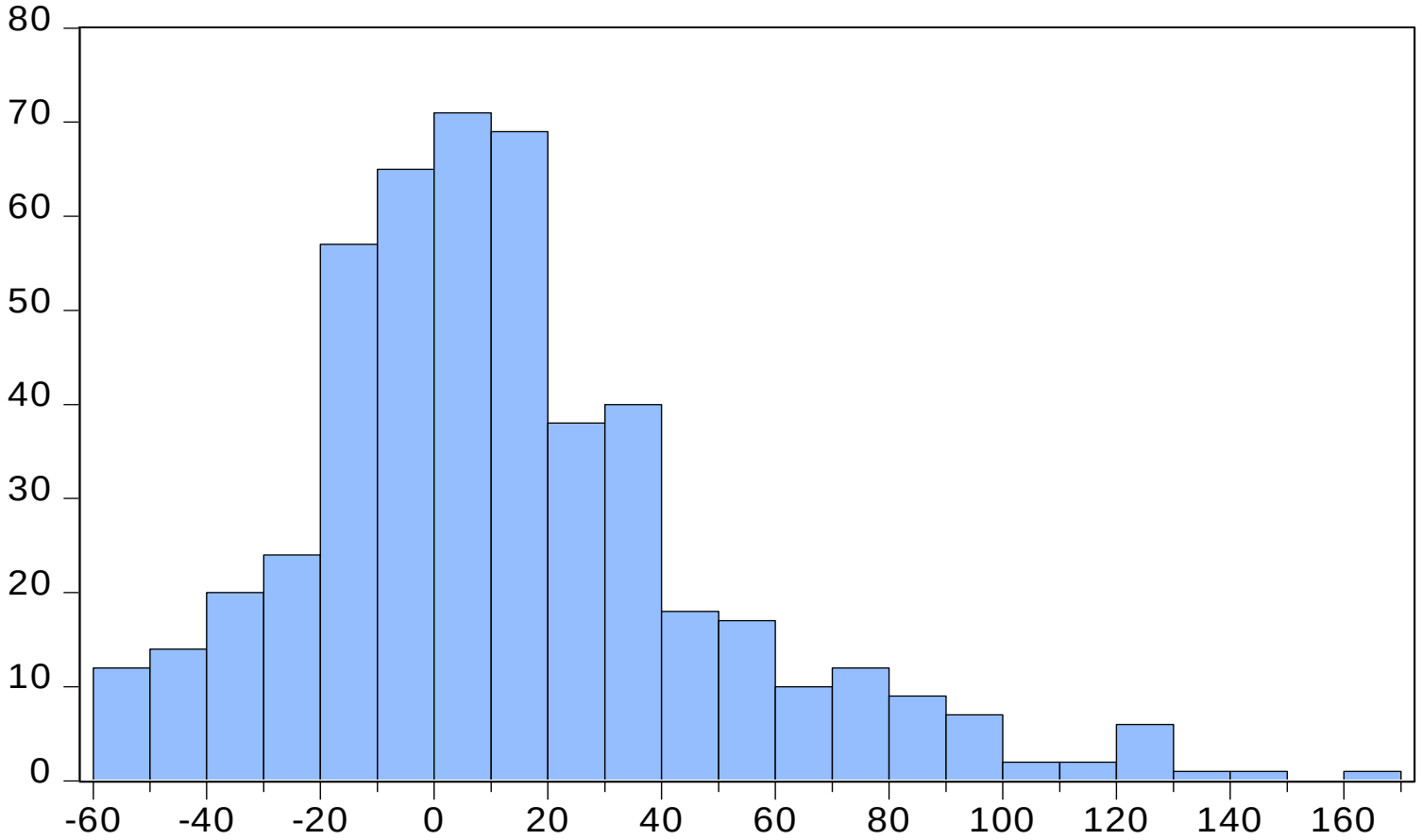
- SET index is the weighted average of each individual stock.
  - Weighted is calculated from company market value to total size of market capitalization

- We usually use the movement (as measured in %) to capture the market-level return on stock investment.

Y-o-Y return using monthly data



How do characterize statistical behavior of return data: simple statistic



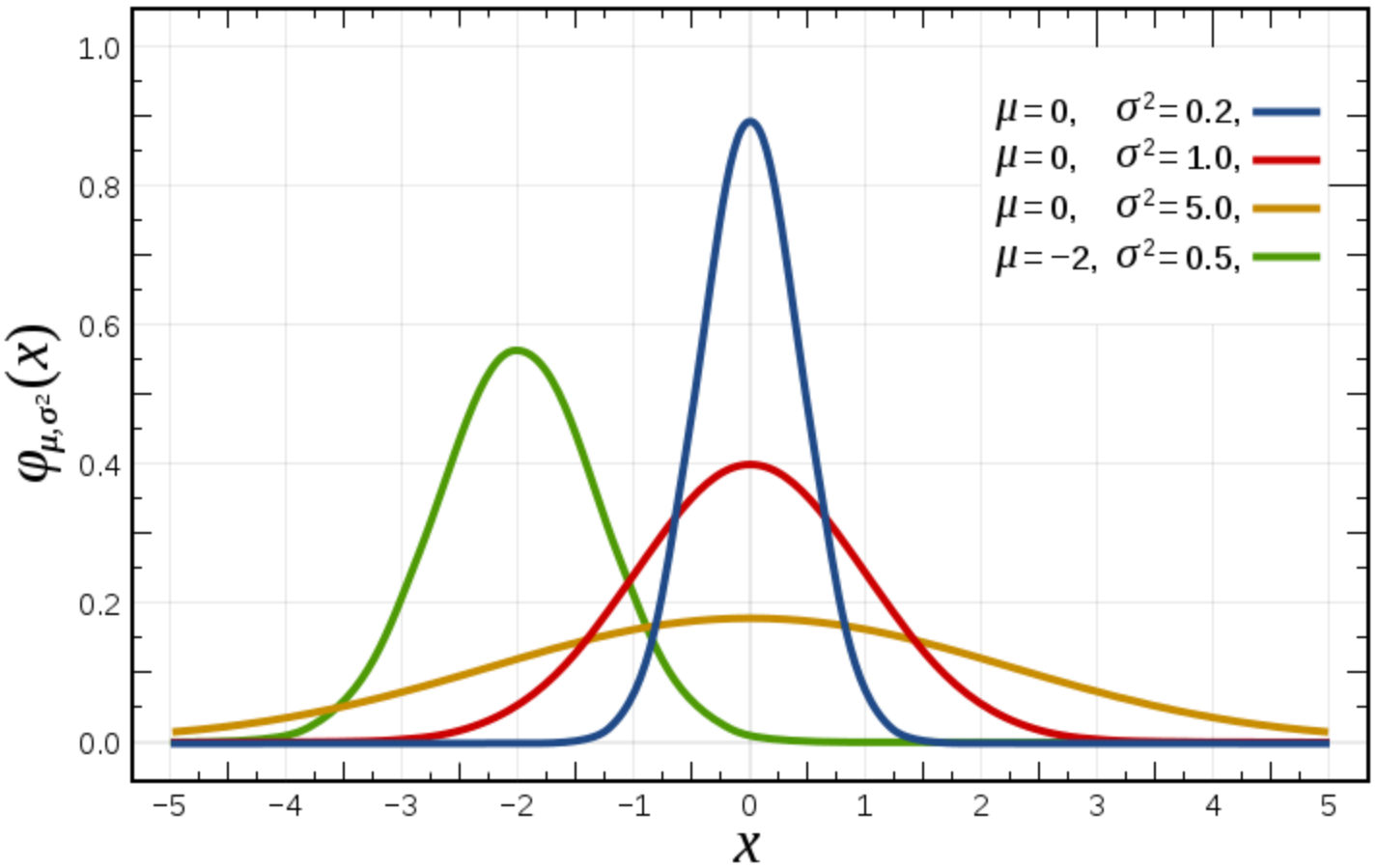
Series: Y_O_Y_RETURN
Sample 1975M04 2017M12
Observations 496

Mean	12.81538
Median	7.763613
Maximum	163.7125
Minimum	-59.92909
Std. Dev.	36.67139
Skewness	0.921753
Kurtosis	4.416006
Jarque-Bera	111.6741
Probability	0.000000

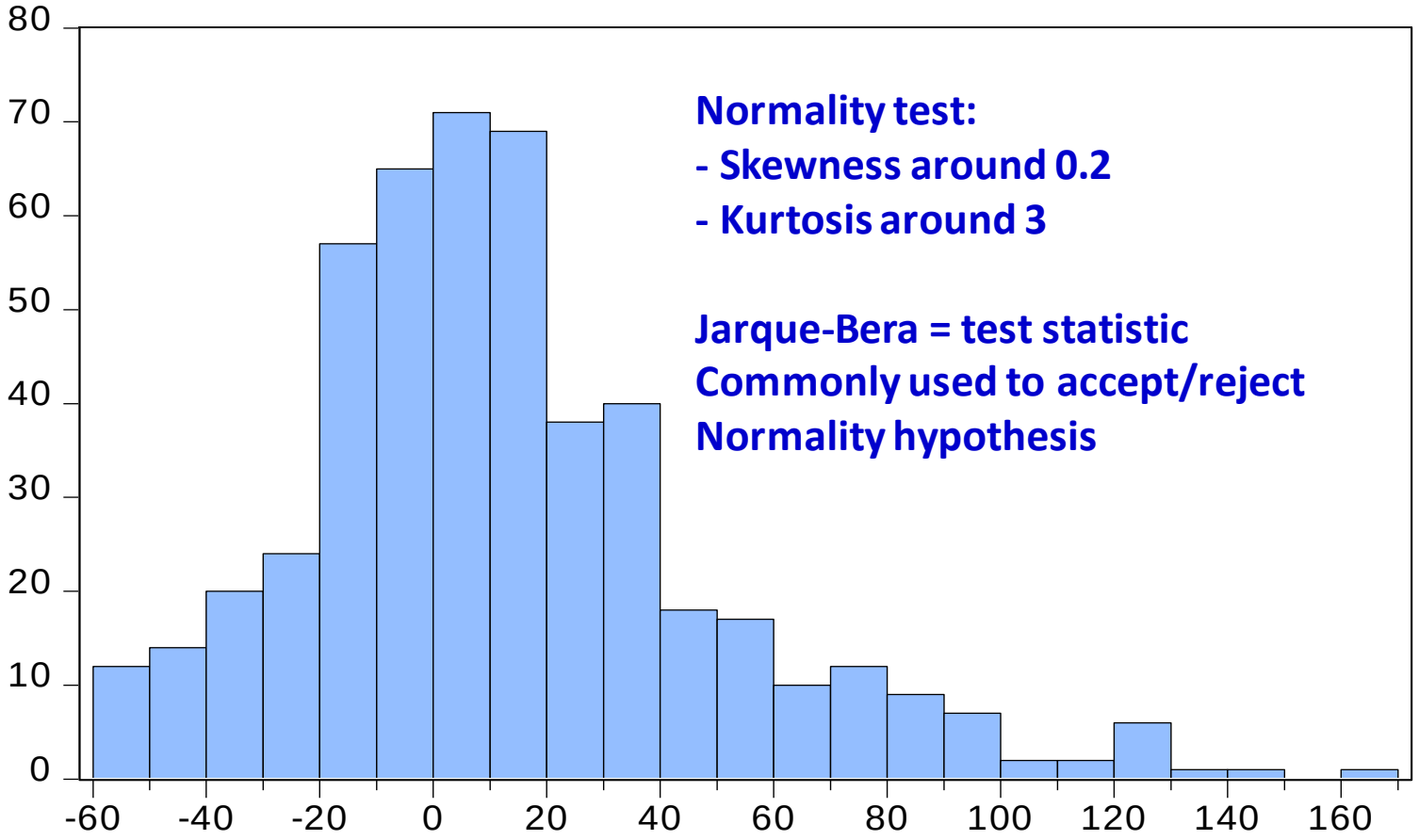
How do characterize statistical behavior of return data: Distributional

- Common assumption used in most (basic) portfolio problem is to treat the asset return as normally distributed random variable.

- Normal distribution



How do characterize statistical behavior of return data: Normality test



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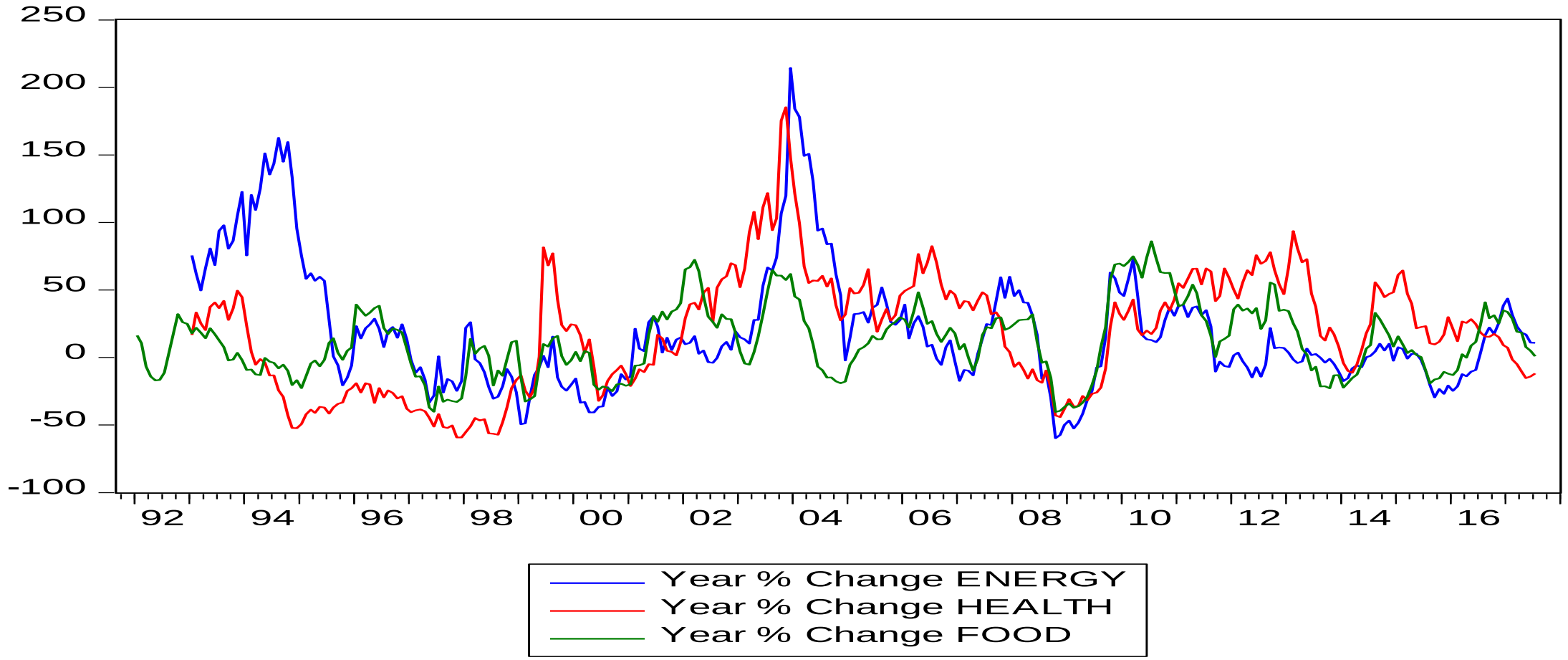
Stock return for some *selective* sectors: 8 industries; 27 sectors



Stock return for some selective industries: Common sample descriptive statistics

	Energy	Health	Food
Mean	11.93686	9.844387	8.359293
Median	9.69068	19.59574	9.933204
Maximum	114.518	104.8317	62.10014
Minimum	-90.7948	-89.68303	-51.64057
Std. Dev.	34.94901	39.57253	24.05465
Skewness	0.238427	-0.51764	-0.218658
Kurtosis	3.488034	2.579403	2.633315
Jarque-Bera	5.722599	15.34866	4.003432
Probability	0.057194	0.000465	0.135103
Sum	3521.373	2904.094	2465.991
Sum Sq. Dev.	359101.5	460399.6	170116.1
Observations	295	295	295

Covariance Analysis: Ordinary
Date: 08/22/17 Time: 08:01
Sample: 1992M01 2016M07
Included observations: 295
Balanced sample (listwise missing value deletion)

Correlation Probability	**energy**	**health**	**food**	**market**
energy	1			
	-----			
health	**0.319649**	1		
	0	-----		
food	**0.450132**	**0.569297**	1	
	0	0	-----	
market	**0.690556**	**0.682075**	**0.642622**	1
	0	0	0	-----