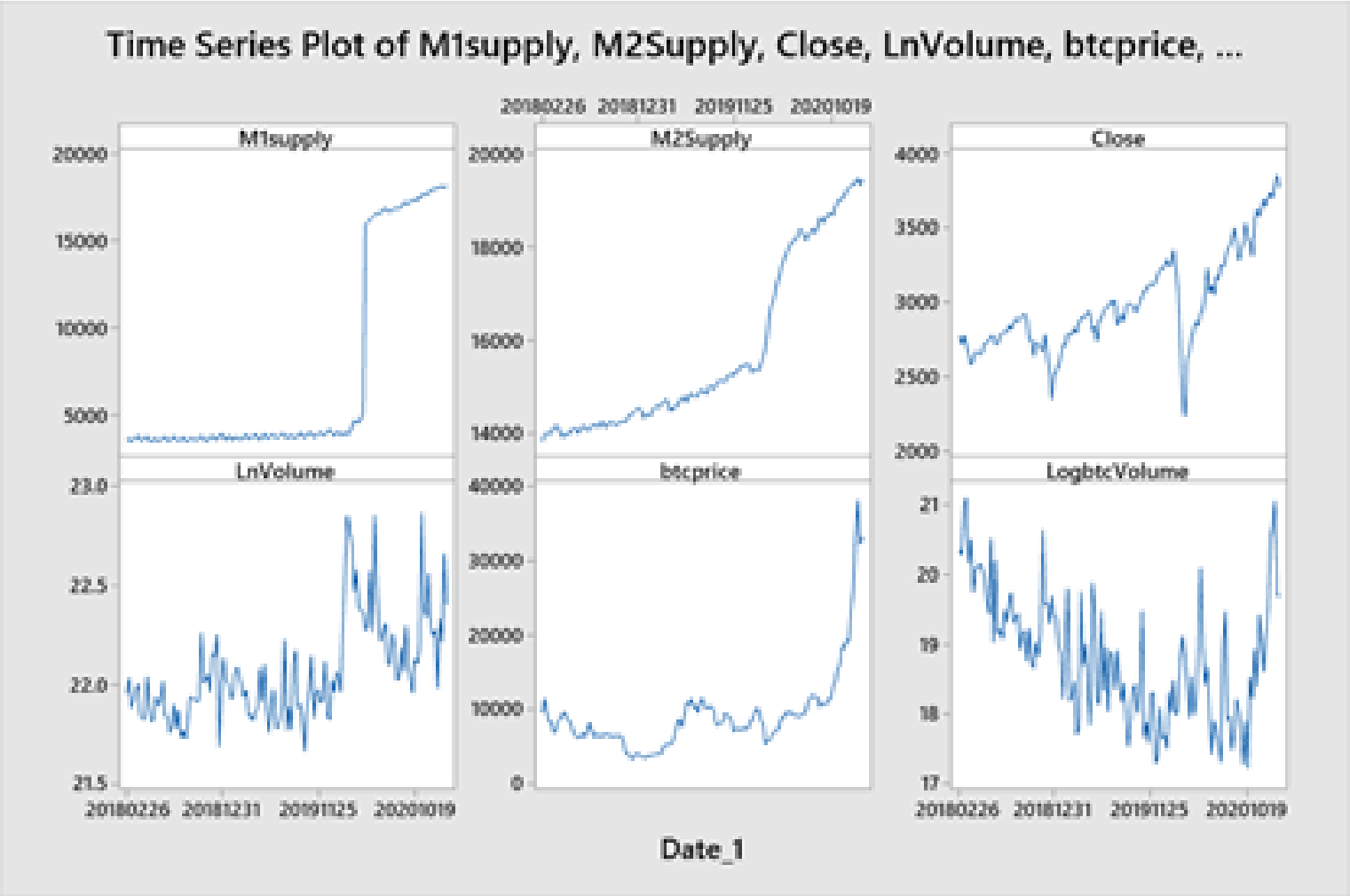
Bitcoin: Trading

Lecture 4

March 2021

Bitcoin Market VS Stock Market



Bitcoin: Some Comparative Assets

2010-2017

Variable	Explanation	Asset class
bitr	WinkDex (Bitcoin exchange rate index)	Digital Currency
sp5r	S&P500 (US equity index)	Equity
sp6r	S&P600 (US equity index)	Equity
gldr	Gold Spot	Precious Metal
silvr	Silver Spot	Precious Metal
eurr	EUR USD (Euro to US Dollar exchange rate)	Currency
audr	AUD USD (Australian Dollar to US Dollar exchange rate)	Currency
jpyr	JPY USD (Japanese Yen to US Dollar exchange rate)	Currency
gbpr	GBP USD (British Pounds to US Dollar exchange rate)	Currency
cnyr	CNY USD (Chinese Yuen to US Dollar exchange rate)	Currency
hufr	HUF USD (Hungarian Forint to US Dollar exchange rate)	Currency
twus	Trade weighted US dollar index	Currency
wtir	WTI 1 month (Crude oil index)	Energy
hhr	HH 1 month (Natural gas index)	Energy
cbr	Bloomberg US Corporate Bond Index	Bond
tbr	Bloomberg US Treasury Bond Index	Bond
hbr	Bloomberg USD High Yield Corporate Bond Index	Bond

This table reports the list of 17 variables, explanation of the variables and the asset classes of the variables used in this analysis.

Asset Performance: Descriptive Statistics

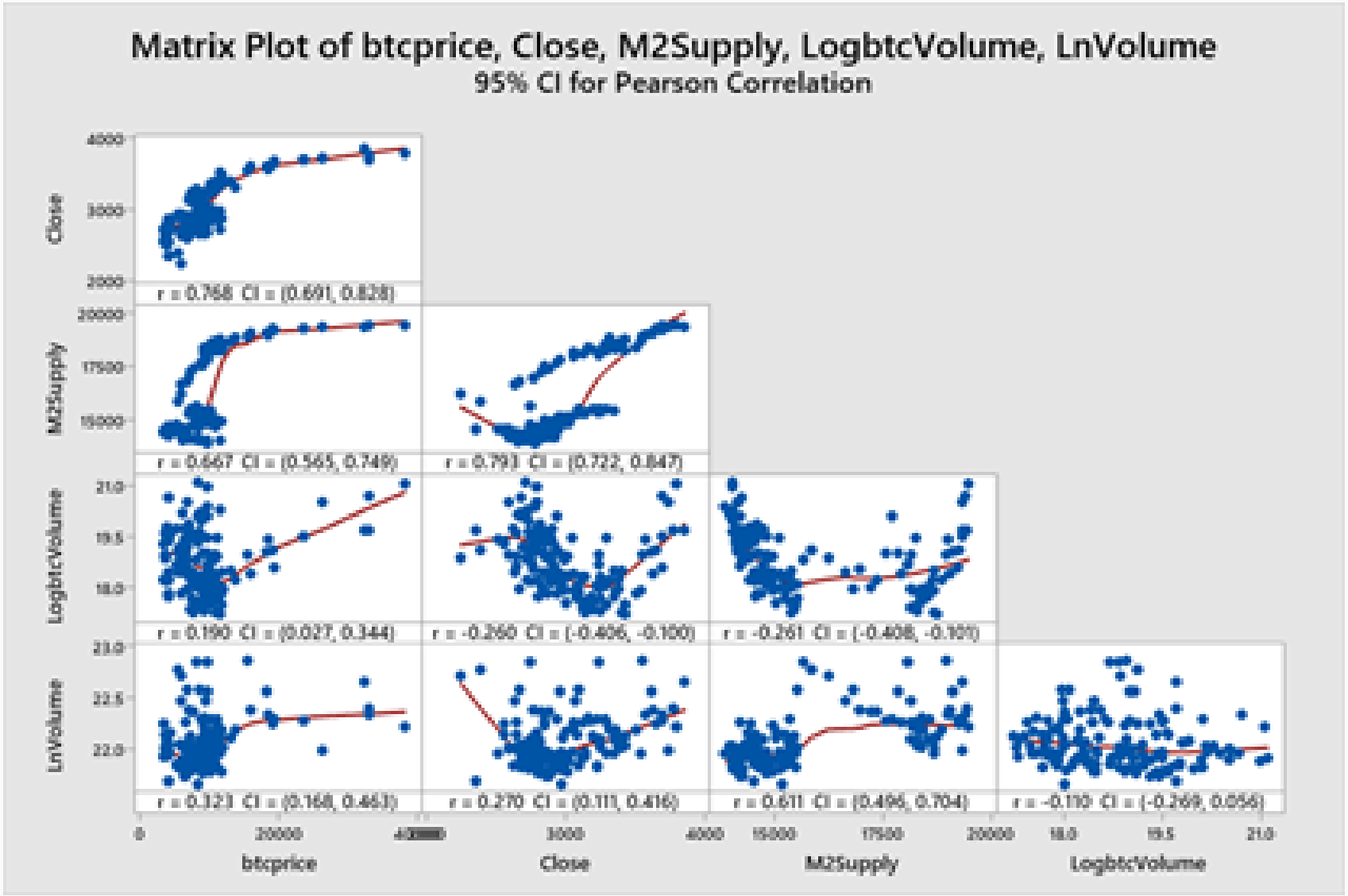
Table 2
Descriptive statistics.

	bitr	*sp5r*	*sp6r*	*gldr*	*silvr*	*Eurr*	*audr*	*jpyr*	*gbpr*
Mean	0.65%	0.05%	0.06%	0.00%	−0.01%	−0.01%	−0.01%	0.03%	0.00%
Stdev	7.60%	0.95%	1.27%	1.09%	2.20%	0.60%	0.71%	0.58%	0.47%
Skewness	−1.01	−0.49	−0.24	−0.89	−0.89	−0.32	−0.19	0.38	-0.06
Kurtosis	17.04	8.25	7.64	10.85	12.94	4.79	4.85	8.22	3.63
	cnyr	*hufr*	*twus*	*wtir*	*hhr*	*cbr*	*tbr*	*hbr*	
Mean	−0.01%	0.02%	0.01%	−0.03%	−0.04%	0.01%	0.01%	0.03%	
Stdev	0.13%	0.93%	0.29%	1.23%	2.27%	0.05%	0.27%	0.18%	
Skewness	0.05	0.17	0.29	−0.64	0.00	−0.31	−0.17	−1.92	
Kurtosis	13.56	4.36	5.97	9.16	3.87	4.98	3.77	17.58	

This table reports the descriptive statistics (mean, standard deviation, skewness and kurtosis) of the variables. Daily data between July 2010 and June 2015 is used. Bitcoin to USD data is from the WinkDex website. Prices for all other data are from Bloomberg.

Key Questions:

- Is there a bubble?
- Is high volatility caused by speculative trading?
- Is there informed trading?
- Is Bitcoin market closely associated with any other economic indicators?

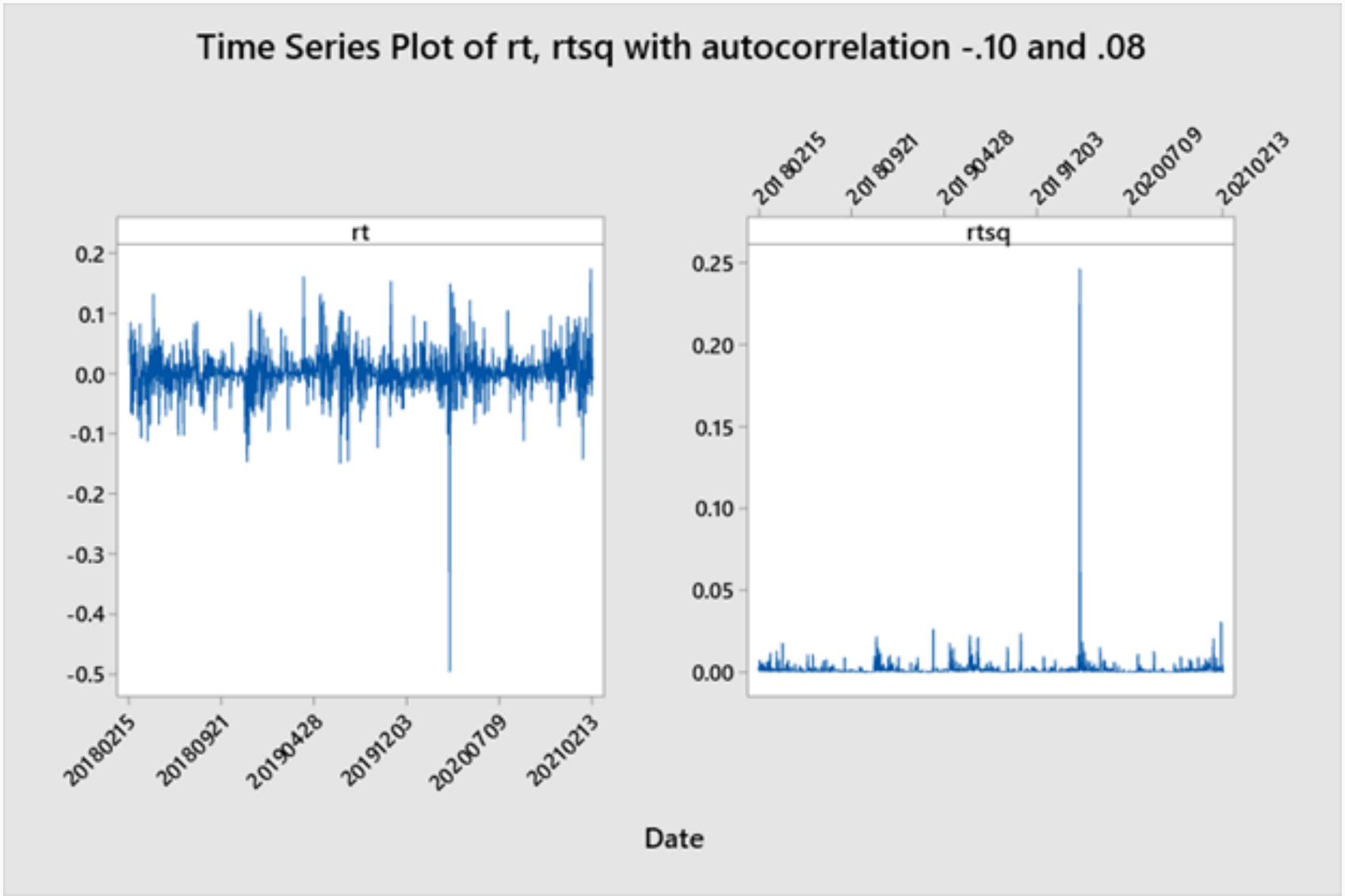

Matrix Plot of btcprice, Close, M2Supply, LogbtcVolume, LnVolume
95% CI for Pearson Correlation
Close
M2Supply
LogbtcVolume
LnVolume
r = 0.768 CI = (0.691, 0.828)
r = 0.667 CI = (0.565, 0.749)
r = 0.793 CI = (0.722, 0.847)
r = 0.190 CI = (0.027, 0.344)
r = -0.260 CI = (-0.406, -0.100)
r = -0.261 CI = (-0.408, -0.101)
r = 0.323 CI = (0.168, 0.463)
r = 0.270 CI = (0.111, 0.416)
r = 0.611 CI = (0.496, 0.704)
r = -0.110 CI = (-0.269, 0.056)
btcprice
Close
M2Supply
LogbtcVolume

- P_t – Price; V_t – Volume
- $p_t lnP_t; r_t = p_t - p_{t-1}; r_t^2$ =volatility
- EMH $\Rightarrow$ r_t has autocorrelation; $\hat{\rho}_k = \frac{\sum r_t r_t t-k}{\sum r_t^2}$

  Bounds: $\pm 2/\sqrt{T}$

Stock Data– Some Common Facts

- RW Model: $p_t = p_{t-1} + \epsilon_t$; $r_t = \epsilon_t$;ϵ_t, random $\sim N(0, \sigma^2)$
- Stylized Facts:
  1. Autocorrelations are insignificant for low frequency returns
  2. Returns exhibit heavy tails
  3. Asymmetry
  4. Volatility Clustering


Time Series Plot of rt, rtsq with autocorrelation -.10 and .08
rt
rtsq
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-0.5
0.25
0.20
0.15
0.10
0.05
0.00
20180215
20180921
20190428
20191203
20200709
20210213
Date

Technical Analysis:

- Moving Average: $MA_t(L) = \frac{1}{L}\sum_{l=0}^{L-1} P_{t-l}$

$$X_t = \frac{MA_{t-1}(L)}{P_{t-1}}$$

- Model: $r_{t+1,t+5} = \alpha + \beta X_t + a_{t+1}$
- $s_{L,t} = \begin{cases} \text{Buy, if } \frac{P_{t-1}}{MA_{t-1}(L)} > 1 \\ 0, \text{ otherwise} \end{cases}$
- Return: $s_{n,t} r_t + (1 - s_{n,t}) r_{ft}$