

(R)

Statistics/Data Analysis

(94 observations deleted)

```
name: <unnamed>
log: C:\Users\Neil\Dropbox\HFT\Data_from_2020\data_new_fromat.log
log type: text
opened on: 7 Mar 2021, 12:29:52
```

```
1 .
2 . use 15to21cb1min.dta

3 .
4 .
5 . * -----*
6 . * -----Notation -----*
7 .
8 . * bs will be abbreviation of bitstamp *
9 . * bf will be abbreviation of bitfinex *
10 . * kr will be abbreviation of kraken *
11 . * cb will be abbreviation of coinbase *
12 .
13 . * bs_kr = avg_pr_bs - avg_pr_kr *
14 . * -----*
15 .
16 . * -----*
17 . * getting rid of first few and last few minutes *
18 . * -----*
19 .
20 . keep if interval_id>=5 & interval_id<1436
    (94 observations deleted)

21 .
22 .
23 .
24 . * -----*
25 . * generating % differences max-min within exchange *
26 . * -----*
27 .
28 .
29 . gen kr_diff = (max_pr_kr - min_pr_kr)/avg_pr_kr*100
    (3,923 missing values generated)

30 . gen bs_diff = (max_pr_bs - min_pr_bs)/avg_pr_bs*100
    (1,142 missing values generated)

31 . gen bf_diff = (max_pr_bf - min_pr_bf)/avg_pr_bf*100
    (684 missing values generated)

32 . gen cb_diff = (max_pr_cb - min_pr_cb)/avg_pr_cb*100
    (1,983 missing values generated)

33 .
34 .
35 . * -----*
36 . * generating % differences between exchanges *
37 . * -----*
38 .
```

```

39 .
40 . gen bs_kr_diff = (avg_pr_bs - avg_pr_kr)/avg_pr_kr*100
    (4,265 missing values generated)

41 .
42 . gen kr_bs_diff = (avg_pr_kr - avg_pr_bs)/avg_pr_bs*100
    (4,265 missing values generated)

43 .
44 . gen bf_kr_diff = (avg_pr_bf - avg_pr_kr)/avg_pr_kr*100
    (4,167 missing values generated)

45 . gen kr_bf_diff = (avg_pr_kr - avg_pr_bf)/avg_pr_bf*100
    (4,167 missing values generated)

46 .
47 . gen bs_bf_diff = (avg_pr_bs - avg_pr_bf)/avg_pr_bf*100
    (1,607 missing values generated)

48 . gen bf_bs_diff = (avg_pr_bf - avg_pr_bs)/avg_pr_bs*100
    (1,607 missing values generated)

49 .
50 . gen bf_cb_diff = (avg_pr_bf - avg_pr_cb)/avg_pr_cb*100
    (2,406 missing values generated)

51 . gen cb_bf_diff = (avg_pr_cb - avg_pr_bf)/avg_pr_bf*100
    (2,406 missing values generated)

52 .
53 . gen cb_kr_diff = (avg_pr_cb - avg_pr_kr)/avg_pr_kr*100
    (4,200 missing values generated)

54 . gen kr_cb_diff = (avg_pr_kr - avg_pr_cb)/avg_pr_cb*100
    (4,200 missing values generated)

55 .
56 . gen cb_bs_diff = (avg_pr_cb - avg_pr_bs)/avg_pr_bs*100
    (2,588 missing values generated)

57 . gen bs_cb_diff = (avg_pr_bs - avg_pr_cb)/avg_pr_cb*100
    (2,588 missing values generated)

58 .
59 . * -----*
60 . * generating % differences in max-min across exchanges *
61 . * -----*
62 .
63 .
64 . gen bs_max_kr_min = (max_pr_bs - min_pr_kr)/min_pr_kr*100
    (4,265 missing values generated)

65 . gen bf_max_kr_min = (max_pr_bf - min_pr_kr)/min_pr_kr*100
    (4,167 missing values generated)

```

```

66 . gen bs_max_bf_min = (max_pr_bs - min_pr_bf)/min_pr_bf*100
    (1,607 missing values generated)

67 .
68 . gen kr_max_bs_min = (max_pr_kr - min_pr_bs)/min_pr_bs*100
    (4,265 missing values generated)

69 . gen kr_max_bf_min = (max_pr_kr - min_pr_bf)/min_pr_bf*100
    (4,167 missing values generated)

70 . gen kr_max_cb_min = (max_pr_kr - min_pr_cb)/min_pr_cb*100
    (4,200 missing values generated)

71 . gen cb_max_kr_min = (max_pr_cb - min_pr_kr)/min_pr_kr*100
    (4,200 missing values generated)

72 .
73 .
74 . gen bf_max_bs_min = (max_pr_bf - min_pr_bs)/min_pr_bs*100
    (1,607 missing values generated)

75 .
76 . gen bf_max_cb_min = (max_pr_bf - min_pr_cb)/min_pr_cb*100
    (2,406 missing values generated)

77 . gen cb_max_bf_min = (max_pr_cb - min_pr_bf)/min_pr_bf*100
    (2,406 missing values generated)

78 . gen bs_max_cb_min = (max_pr_bs - min_pr_cb)/min_pr_cb*100
    (2,588 missing values generated)

79 . gen cb_max_bs_min = (max_pr_cb - min_pr_bs)/min_pr_bs*100
    (2,588 missing values generated)

80 .
81 .
82 . * -----*
83 . * % difference in Prices (max price X - min price X)/min Price X within by year *
84 . * 2017 and 2019 do not have enough observations *
85 . * -----*
86 .
87 . sum kr_diff bs_diff bf_diff cb_diff if year==2018

```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_diff	1,429	.2792813	.2670873	0	5.589085
bs_diff	1,431	.2426413	.2008619	0	1.484104
bf_diff	1,431	.2972716	.2092382	0	2.457305
cb_diff	1,431	.3138002	.2053453	0	2.150023

```

88 . sum kr_diff bs_diff bf_diff cb_diff if year==2020

```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_diff	1,384	.0917306	.0829581	0	.7988763
bs_diff	1,431	.0655411	.0749604	0	.7681859
bf_diff	1,428	.0914972	.0792595	0	.4859347
cb_diff	1,431	.0918926	.0866351	0	.8528075

```
89 . sum kr_diff bs_diff bf_diff cb_diff if year==2021
```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_diff	1,431	.2491311	.1778302	.0002541	1.631835
bs_diff	1,431	.2336267	.1674507	0	1.434812
bf_diff	1,430	.239335	.1797681	0	1.46473
cb_diff	1,431	.2349993	.1759988	.0002531	1.664379

```
90 .
```

```
91 .
```

```
92 . * -----*
```

```
93 . * Arbitrage Index 1: % Differences in average prices between exchanges by year *
```

```
94 . * -----*
```

```
95 .
```

```
96 . sum bs_bf_diff bf_bs_diff bf_cb_diff cb_bf_diff bs_cb_diff cb_bs_diff bs_kr_diff kr_b
> s_diff bf_kr_diff kr_bf_diff kr_cb_diff cb_kr_diff if year==2018
```

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_bf_diff	1,431	-.2488586	.9287333	-3.664485	3.426067
bf_bs_diff	1,431	.2582497	.9427604	-3.312576	3.803878
bf_cb_diff	1,431	.5073006	1.177851	-3.036981	3.947206
cb_bf_diff	1,431	-.4911906	1.15713	-3.797318	3.132102
bs_cb_diff	1,431	.2560087	1.420435	-3.941637	4.198697
cb_bs_diff	1,431	-.2353788	1.41123	-4.02951	4.103377
bs_kr_diff	1,429	.3165386	1.318503	-3.699806	4.084617
kr_bs_diff	1,429	-.298333	1.310381	-3.924323	3.841951
bf_kr_diff	1,429	.568457	1.043838	-2.879224	3.796137
kr_bf_diff	1,429	-.5546228	1.024144	-3.657301	2.964581
kr_cb_diff	1,429	-.0530387	1.47433	-3.990918	4.034016
cb_kr_diff	1,429	.0748135	1.475603	-3.877594	4.156813

```
97 . sum bs_bf_diff bf_bs_diff bf_cb_diff cb_bf_diff bs_cb_diff cb_bs_diff bs_kr_diff kr_b
> s_diff bf_kr_diff kr_bf_diff kr_cb_diff cb_kr_diff if year==2020
```

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_bf_diff	1,428	-.0229196	.1047631	-.5621168	.3503286
bf_bs_diff	1,428	.0230346	.1048903	-.3491055	.5652944
bf_cb_diff	1,428	.0306297	.0941976	-.3133186	.5653487
cb_bf_diff	1,428	-.0305318	.0940872	-.5621705	.3143034
bs_cb_diff	1,431	.0076993	.1253445	-.4790024	.4711707
cb_bs_diff	1,431	-.0075417	.1253418	-.4689611	.4813079
bs_kr_diff	1,384	-.0001911	.1250435	-.4163471	.4749016
kr_bs_diff	1,384	.0003473	.1250572	-.4726569	.4180878
bf_kr_diff	1,381	.0238024	.0983489	-.3720343	.5950007
kr_bf_diff	1,381	-.0237002	.0982289	-.5914814	.3734235
kr_cb_diff	1,384	.0076162	.1193026	-.3776001	.4815629
cb_kr_diff	1,384	-.0074734	.1192919	-.4792549	.3790313

```

98 . sum bs_bf_diff bf_bs_diff bf_cb_diff cb_bf_diff bs_cb_diff cb_bs_diff bs_kr_diff kr_b
> s_diff bf_kr_diff kr_bf_diff kr_cb_diff cb_kr_diff if year==2021

```

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_bf_diff	1,430	.0072266	.1469719	-1.129554	.9245018
bf_bs_diff	1,430	-.0070104	.1468768	-.916033	1.142459
bf_cb_diff	1,430	.0002383	.1036314	-.663892	.7547766
cb_bf_diff	1,430	-.000131	.1036179	-.7491224	.6683289
bs_cb_diff	1,431	.0073962	.1381758	-1.283789	.6848779
cb_bs_diff	1,431	-.0072048	.1382175	-.6802192	1.300484
bs_kr_diff	1,431	.0037456	.1680321	-1.183897	.9055821
kr_bs_diff	1,431	-.0034634	.1680043	-.8974549	1.198081
bf_kr_diff	1,430	-.0034211	.138273	-.7203036	.9627953
kr_bf_diff	1,430	.0036123	.1382675	-.953614	.7255296
kr_cb_diff	1,431	.0037768	.1271015	-.7448886	.7461371
cb_kr_diff	1,431	-.0036152	.1270832	-.7406111	.7504789

```

99 .
100 .
101 . * -----*
102 . * Arbitrage Index 2: % Difference "(max price of X - minus min price of Y)/min Y *
103 . * -----*
104 .
105 . *bs bf
106 . sum bs_max_bf_min bf_max_bs_min if year==2018

```

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_bf_~n	1,431	.0229114	.9415575	-3.428971	3.699917
bf_max_bs_~n	1,431	.5274031	.9621835	-3.043548	4.269188

```

107 . sum bs_max_bf_min bf_max_bs_min if year==2020

```

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_bf_~n	1,428	.0532705	.1219028	-.3574088	.8451431
bf_max_bs_~n	1,428	.1040814	.1227463	-.3091207	.9190764

```

108 . sum bs_max_bf_min bf_max_bs_min if year==2021

```

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_bf_~n	1,430	.2432884	.2220867	-.2085432	1.908586
bf_max_bs_~n	1,430	.2307855	.2032392	-.1714679	2.107545

```

109 .
110 . *bf cb
111 . sum cb_max_bf_min bf_max_cb_min if year==2018

```

Variable	Obs	Mean	Std. Dev.	Min	Max
cb_max_bf_~n	1,431	-.1854187	1.145991	-3.564166	3.711799
bf_max_cb_~n	1,431	.8138929	1.222443	-2.636771	4.473561

112 . sum cb_max_bf_min bf_max_cb_min if year==2019

Variable	Obs	Mean	Std. Dev.	Min	Max
cb_max_bf~n	1,370	.8768062	1.088924	-2.255708	2.552137
bf_max_cb~n	1,370	-.7958048	1.079885	-2.273535	2.537689

113 . sum cb_max_bf_min bf_max_cb_min if year==2021

Variable	Obs	Mean	Std. Dev.	Min	Max
cb_max_bf~n	1,430	.2386452	.1975323	-.0980876	1.637464
bf_max_cb~n	1,430	.236742	.1934758	-.1661789	1.482854

114 .

115 . *bs cb

116 . sum bs_max_cb_min cb_max_bs_min if year==2018

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_cb~n	1,431	.53629	1.45145	-3.705646	4.751074
cb_max_bs~n	1,431	.042024	1.417712	-3.634916	4.39929

117 . sum bs_max_cb_min cb_max_bs_min if year==2020

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_cb~n	1,431	.0823561	.140416	-.3130631	.9822472
cb_max_bs~n	1,431	.0753344	.145045	-.2830588	.8747439

118 . sum bs_max_cb_min cb_max_bs_min if year==2021

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_cb~n	1,431	.2400841	.2131755	-.165422	1.667448
cb_max_bs~n	1,431	.2294955	.1988967	-.204571	2.176243

119 .

120 . *bs kr

121 . sum bs_max_kr_min kr_max_bs_min if year==2018

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_kr~n	1,429	.5809112	1.33686	-3.441853	4.929435
kr_max_bs~n	1,429	-.0393226	1.327081	-3.703768	5.357143

122 . sum bs_max_kr_min kr_max_bs_min if year==2020

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_kr~n	1,384	.0766928	.1398624	-.3443232	.9005064
kr_max_bs~n	1,384	.0818673	.1438238	-.3419419	.7628684

123 . sum bs_max_kr_min kr_max_bs_min if year==2021

Variable	Obs	Mean	Std. Dev.	Min	Max
bs_max_kr~n	1,431	.2451904	.2324017	-.1949918	1.822674
kr_max_bs~n	1,431	.2386399	.2153219	-.1444906	2.066076

```
124 .
125 .
126 . *bf kr
127 . sum kr_max_bf_min bf_max_kr_min if year==2018
```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_max_bf~n	1,429	-.267269	1.02936	-3.425579	5.257149
bf_max_kr~n	1,429	.8591015	1.077897	-2.608922	4.472141

```
128 . sum kr_max_bf_min bf_max_kr_min if year==2020
```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_max_bf~n	1,381	.0683698	.1177963	-.3570726	.6970675
bf_max_kr~n	1,381	.1157867	.1180664	-.2952038	.9575494

```
129 . sum kr_max_bf_min bf_max_kr_min if year==2021
```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_max_bf~n	1,430	.2477602	.2112747	-.1282749	1.511917
bf_max_kr~n	1,430	.2418181	.2122912	-.2011011	2.102115

```
130 .
131 .
132 . *kr cb
133 . sum kr_max_cb_min cb_max_kr_min if year==2018
```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_max_cb~n	1,429	.2428279	1.490404	-3.784455	4.972867
cb_max_kr~n	1,429	.373709	1.497497	-3.594594	5.5022

```
134 . sum kr_max_cb_min cb_max_kr_min if year==2020
```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_max_cb~n	1,384	.0978431	.1385842	-.2854517	.949554
cb_max_kr~n	1,384	.0861683	.1377287	-.3443232	.8364542

```
135 . sum kr_max_cb_min cb_max_kr_min if year==2021
```

Variable	Obs	Mean	Std. Dev.	Min	Max
kr_max_cb~n	1,431	.2445838	.2048154	-.1625976	1.504124
cb_max_kr~n	1,431	.2405455	.2093803	-.1892954	1.813967

```
136 .
137 . * -----*
138 . * Correlations of Average prices over time *
139 . * -----*
140 .
141 .
142 . cor avg_pr_kr avg_pr_cb avg_pr_bs avg_pr_bf if year==2018
(obs=1,429)
```

	avg_pr~r	avg_pr~b	avg_pr~s	avg_pr~f
avg_pr_kr	1.0000			
avg_pr_cb	0.7819	1.0000		
avg_pr_bs	0.8160	0.7933	1.0000	
avg_pr_bf	0.8833	0.8572	0.8983	1.0000

143 . cor avg_pr_kr avg_pr_cb avg_pr_bs avg_pr_bf if year==2020
(obs=1,381)

	avg_pr~r	avg_pr~b	avg_pr~s	avg_pr~f
avg_pr_kr	1.0000			
avg_pr_cb	0.9894	1.0000		
avg_pr_bs	0.9883	0.9881	1.0000	
avg_pr_bf	0.9931	0.9936	0.9921	1.0000

144 . cor avg_pr_kr avg_pr_cb avg_pr_bs avg_pr_bf if year==2021
(obs=1,430)

	avg_pr~r	avg_pr~b	avg_pr~s	avg_pr~f
avg_pr_kr	1.0000			
avg_pr_cb	0.9994	1.0000		
avg_pr_bs	0.9989	0.9993	1.0000	
avg_pr_bf	0.9993	0.9996	0.9992	1.0000

145 .

146 .

147 .

148 . cor avg_pr_kr avg_pr_cb avg_pr_bs avg_pr_bf if year==2018 & interval_id>=3 & interval_id<=1438
(obs=1,429)

	avg_pr~r	avg_pr~b	avg_pr~s	avg_pr~f
avg_pr_kr	1.0000			
avg_pr_cb	0.7819	1.0000		
avg_pr_bs	0.8160	0.7933	1.0000	
avg_pr_bf	0.8833	0.8572	0.8983	1.0000

149 . cor avg_pr_kr avg_pr_cb avg_pr_bs avg_pr_bf if year==2020 & interval_id>=3 & interval_id<=1438
(obs=1,381)

	avg_pr~r	avg_pr~b	avg_pr~s	avg_pr~f
avg_pr_kr	1.0000			
avg_pr_cb	0.9894	1.0000		
avg_pr_bs	0.9883	0.9881	1.0000	
avg_pr_bf	0.9931	0.9936	0.9921	1.0000

150 . cor avg_pr_kr avg_pr_cb avg_pr_bs avg_pr_bf if year==2021 & interval_id>=3 & interval_id<=1438
(obs=1,430)

	avg_pr~r	avg_pr~b	avg_pr~s	avg_pr~f
avg_pr_kr	1.0000			
avg_pr_cb	0.9994	1.0000		
avg_pr_bs	0.9989	0.9993	1.0000	
avg_pr_bf	0.9993	0.9996	0.9992	1.0000


```

151 .
152 .
153 . * -----*
154 . * Correlations of Maximum prices over time *
155 . * -----*
156 .
157 .
158 . cor max_pr_kr max_pr_cb max_pr_bs max_pr_bf if year==2018
      (obs=1,429)

```

	max_pr~r	max_pr~b	max_pr~s	max_pr~f
max_pr_kr	1.0000			
max_pr_cb	0.7795	1.0000		
max_pr_bs	0.8146	0.7901	1.0000	
max_pr_bf	0.8802	0.8529	0.8972	1.0000

```

159 . cor max_pr_kr max_pr_cb max_pr_bs max_pr_bf if year==2020
      (obs=1,381)

```

	max_pr~r	max_pr~b	max_pr~s	max_pr~f
max_pr_kr	1.0000			
max_pr_cb	0.9863	1.0000		
max_pr_bs	0.9861	0.9862	1.0000	
max_pr_bf	0.9913	0.9914	0.9916	1.0000

```

160 . cor max_pr_kr max_pr_cb max_pr_bs max_pr_bf if year==2021
      (obs=1,430)

```

	max_pr~r	max_pr~b	max_pr~s	max_pr~f
max_pr_kr	1.0000			
max_pr_cb	0.9993	1.0000		
max_pr_bs	0.9989	0.9992	1.0000	
max_pr_bf	0.9991	0.9995	0.9991	1.0000

```

161 .
162 .
163 .
164 .
165 . * -----*
166 . * Correlations of Minimum prices over time *
167 . * -----*
168 .
169 . cor min_pr_kr min_pr_cb min_pr_bs min_pr_bf if year==2018
      (obs=1,429)

```

	min_pr~r	min_pr~b	min_pr~s	min_pr~f
min_pr_kr	1.0000			
min_pr_cb	0.7803	1.0000		
min_pr_bs	0.8127	0.7916	1.0000	
min_pr_bf	0.8825	0.8581	0.8960	1.0000

170 . cor min_pr_kr min_pr_cb min_pr_bs min_pr_bf if year==2020
(obs=1,381)

	min_pr~r	min_pr~b	min_pr~s	min_pr~f
min_pr_kr	1.0000			
min_pr_cb	0.9892	1.0000		
min_pr_bs	0.9883	0.9877	1.0000	
min_pr_bf	0.9924	0.9925	0.9911	1.0000

171 . cor min_pr_kr min_pr_cb min_pr_bs min_pr_bf if year==2021
(obs=1,430)

	min_pr~r	min_pr~b	min_pr~s	min_pr~f
min_pr_kr	1.0000			
min_pr_cb	0.9993	1.0000		
min_pr_bs	0.9988	0.9993	1.0000	
min_pr_bf	0.9991	0.9996	0.9991	1.0000

172 .
173 .
174 . * -----*
175 . * Correlations of Returns over time - see Word file *
176 . * -----*
177 .
178 .
179 .
180 .
181 .
182 .
183 . #delimit cr
delimiter now cr
184 .
185 .
end of do-file