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투자론

- *R*과 Excel을 통한 금융데이터 분석 -

8주차
R의 Collecting Data 및 Portfolio Analysis

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Unit 02

Portfolio Analysis with R (1)

Overview

- Data Management for Portfolio Analysis

DataGuide

- We can download lots of financial data such as price, returns, financial statements, and etc from the publicly available websites.
- For instance, kind.krx.co.kr, finance.naver.com, data.krx.co.kr, wiseindex.com, and etc.
- But, we do not further explore into how to obtain financial data using API (crawl).
- Instead, we deal with financial data, especially price and return data, from DataGuide.

DataGuide

출처 : 교수자 제공

DataGuide Company Financial Data

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Refresh	Last Refresh: 2022-09-21 16:27:56											
2	Calendar Basis												
3	Portfolio		Default										
4	Item												
5	Frequency	월간	KRW										
6	Non-Trading D	Previous	Asc										
7	Include Weeke	ALL											
8	Term	20100101	Current(20220921)										
9	Symbol	A005930	A005930	A373220	A373220	A000660	A000660	A207940	A207940	A051910	A051910	A006400	A006400
10	Symbol Name	삼성전자	삼성전자ㅣ	너지솔루션ㅣ	너지솔루션	SK하이닉스	SK하이닉스	ㅏ이오로직스	ㅏ이오로직스	LG화학	LG화학	삼성SDI	삼성SDI
11	Kind	SSC	SSC	SSC	SSC	SSC	SSC	SSC	SSC	SSC	SSC	SSC	SSC
12	Item	S41000060F	41000170F	41000060F	41000170F	41000060F	41000170F	41000060F	41000170F	41000060F	41000170F	41000060F	41000170F
13	Item Name	종가(원)	수익률(%)	종가(원)	수익률(%)	종가(원)	수익률(%)	종가(원)	수익률(%)	종가(원)	수익률(%)	종가(원)	수익률(%)
14	Frequency	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY
15	2010-01-31	784,000	-1.88			22,750	-1.73			200,000	-12.47	136,000	-8.42
16	2010-02-28	744,000	-5.10			21,000	-7.69			215,000	7.50	128,500	-5.51
17	2010-03-31	818,000	9.95			26,700	27.14			240,500	11.86	142,000	10.51
18	2010-04-30	849,000	3.79			28,400	6.37			283,000	17.67	149,000	4.93
19	2010-05-31	776,000	-8.60			25,150	-11.44			273,000	-3.53	163,500	9.73
20	2010-06-30	774,000	-0.26			25,050	-0.40			309,500	13.37	173,000	5.81
21	2010-07-31	810,000	4.65			22,500	-10.18			329,000	6.30	170,000	-1.73
22	2010-08-31	756,000	-6.67			21,100	-6.22			345,000	4.86	168,000	-1.18
23	2010-09-30	777,000	2.78			22,150	4.98			333,500	-3.33	156,000	-7.14
24	2010-10-31	745,000	-4.12			23,150	4.51			347,000	4.05	154,500	-0.96
25	2010-11-30	826,000	10.87			23,500	1.51			388,000	11.82	165,500	7.12
26	2010-12-31	949,000	14.89			24,000	2.13			391,000	0.77	168,000	1.51
27	2011-01-31	981,000	3.37			29,650	23.54			420,000	7.42	156,000	-7.14
28	2011-02-28	923,000	-5.91			28,350	-4.38			372,000	-11.43	166,500	6.73
29	2011-03-31	932,000	0.98			31,300	10.41			460,000	23.66	168,000	0.90

Sheet1

출처 : 교수자 제공

Stock Data Management

- We assume that we already downloaded all KSE (Korean Stock Exchange) stocks' return (and price) data, KSE-monthly-return-price.xlsx.

```
my_data <- read_excel("KSE-monthly-return-price.xlsx")
# individual stock data
```

```
stock_name <- my_data[9,]
```

```
datadate <- my_data[14:nrow(my_data),1]
```

DataGuide → R

	...1	Last Refresh: 2022-09-21 16:27:56	...3	...4	...5	...6	...7	...8
1	Calendar Basis	NA	NA	NA	NA	NA	NA	NA
2	Portfolio	NA	Default	NA	NA	NA	NA	NA
3	Item	NA	NA	NA	NA	NA	NA	NA
4	Frequency	월간	KRW	NA	NA	NA	NA	NA
5	Non-Trading Day	Previous	Asc	NA	NA	NA	NA	NA
6	Include Weekend	ALL	NA	NA	NA	NA	NA	NA
7	Term	20100101	Current(20220921)	NA	NA	NA	NA	NA
8	Symbol	A005930	A005930	A373220	A373220	A000660	A000660	A207940
9	Symbol Name	삼성전자	삼성전자	LG에너지솔루션	LG에너지솔루션	SK하이닉스	SK하이닉스	삼성바이오로
10	Kind	SSC	SSC	SSC	SSC	SSC	SSC	SSC
11	Item	S41000060F	S41000170F	S41000060F	S41000170F	S41000060F	S41000170F	S41000060F
12	Item Name	종가(원)	수익률(%)	종가(원)	수익률(%)	종가(원)	수익률(%)	종가(원)
13	Frequency	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY
14	40209	784000	-1.88	NA	NA	22750	-1.73	NA
15	40237	744000	-5.0999999999999996	NA	NA	21000	-7.69	NA
16	40268	818000	9.9499999999999993	NA	NA	26700	27.14	NA
17	40298	849000	3.79	NA	NA	28400	6.37	NA

출처 : 교수자 제공

Step 1

- We first deal with dates by converting date column into Data format in R.

- Dates in R data does not look the same as the date in Excel
  → we have to convert it to dates format in R

	...1
1	40209
2	40237
3	40268
4	40298
5	40329
6	40359
7	40390
8	40421

출처 : 교수자 제공

Dates

Usual code

```
datadate1 <-
as.Date(as.numeric(as.character(datadate)),origin="1
899-12-30") → does not work!! → as.numeric doesn't work since
datadate is listed.
datadate1 <- unlist(datadate)
datadate2<-
as.Date(as.numeric(as.character(datadate1)),origin="
1899-12-30")
datadate4 <- data.frame(datadate2)
```

Converted dates looks this way…

	datadate2
1	2010-01-31
2	2010-02-28
3	2010-03-31
4	2010-04-30
5	2010-05-31
6	2010-06-30
7	2010-07-31
8	2010-08-31
9	2010-09-30
10	2010-10-31
11	2010-11-30

출처 : 교수자 제공

Sorting required data

`ret_entire <- rbind(stock_name, my_data[14:nrow(my_data),])`: stock data with stock names

`ret_entire <- ret_entire[,seq(3,ncol(my_data),2)]`: sort stock returns only

`date <- rbind(c(NA),datadate4)`: match dimension with stock data

`ret_all <- cbind(date, ret_entire)`: what we need

Sorted stock returns

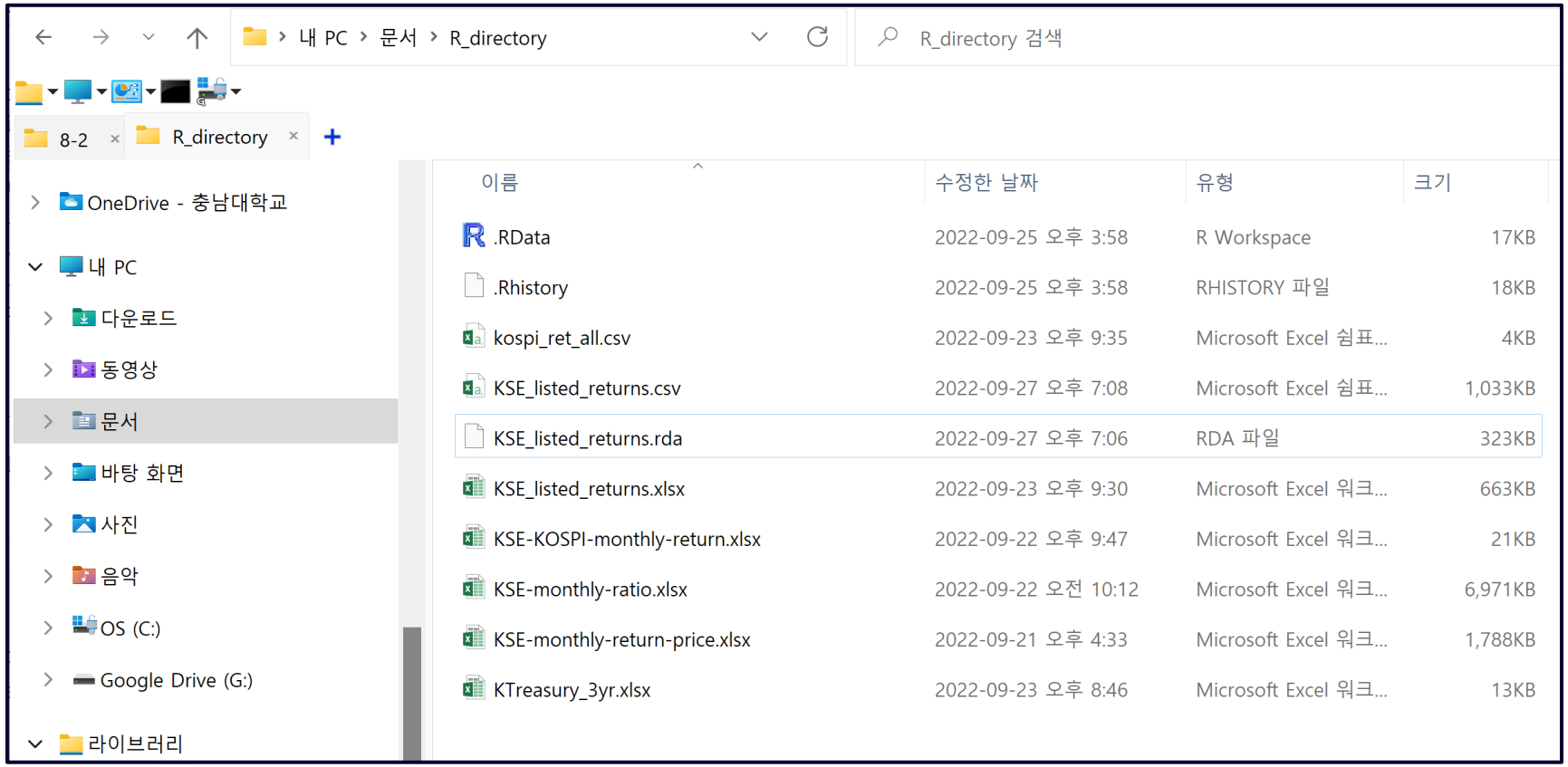
	datadate2	...3	...5	...7	...9	...11	...13
1	NA	삼성전자	LG에너지솔루션	SK하이닉스	삼성바이오로직스	LG화학	삼성SDI
2	2010-01-31	-1.88	NA	-1.73	NA	-12.47	-8.42
3	2010-02-28	-5.0999999999999996	NA	-7.69	NA	7.5	-5.51
4	2010-03-31	9.9499999999999993	NA	27.14	NA	11.86	10.51
5	2010-04-30	3.79	NA	6.37	NA	17.670000000000002	4.93
6	2010-05-31	-8.6	NA	-11.44	NA	-3.53	9.73
7	2010-06-30	-0.26	NA	-0.4	NA	13.37	5.81
8	2010-07-31	4.6500000000000004	NA	-10.18	NA	6.3	-1.73
9	2010-08-31	-6.67	NA	-6.22	NA	4.8600000000000003	-1.18
10	2010-09-30	2.78	NA	4.9800000000000004	NA	-3.33	-7.14
11	2010-10-31	-4.12	NA	4.51	NA	4.05	-0.96
12	2010-11-30	10.87	NA	1.51	NA	11.82	7.12
13	2010-12-31	14.89	NA	2.13	NA	0.77	1.51

출처 : 교수자 제공

Saving the data

```
install.packages("writexl")
library(writexl)
write_xlsx(ret_all, path="C:\\Users\\Hogyu
Jhang\\Documents\\R_directory\\KSE_listed_returns.xlsx")
write_xlsx(ret_all,
path="/Users/hogyujhang/KSE_listed_returns.xlsx") # for Mac
write.csv(ret_all, file="\\Users\\Hogyu
Jhang\\Documents\\R_directory\\KSE_listed_returns.csv")
save(ret_all, file="\\Users\\Hogyu
Jhang\\Documents\\R_directory\\KSE_listed_returns.rda")
```

Saved files look like…



출처 : 교수자 제공

Pick some random stocks from the stock universe

```
set.seed(100) # For the reproducibility
pick_stocks <- floor(runif(10,1,ncol(ret_all)-1))# picker index
ret_ind_raw <- ret_all[,pick_stocks] # picked returns
## Now we remove stocks with NA values
## method 1
ret_ind <- ret_ind_raw[ , colSums(is.na(ret_ind_raw))==0]
## method 2
ret_ind_1 <- ret_ind_raw %>% select_if(~ !any(is.na(.)))
```

Picked stocks look like…

	...489	...409	...879	...89	...769	...589
1	SPC삼립	미원상사	대한제분	엔씨소프트	삼익THK	고려제강
2	-5.97	2.41	-6.57	-12.71	-2.98	-10.1
3	-0.46	-0.47	0.39	1.92	-0.82	-1.71
4	5.68	-1.06	1.95	7.89	17.98	18.670000000000002
5	1.97	0.35	12.21	16.38	94.4	-11.83
6	-5.81	5.36	-3.06	16.170000000000002	9.73	1.94
7	0.91	7.56	13.68	4.9000000000000004	1.31	-1.9
8	8.3699999999999992	-4.41	-5.86	-7.62	-16.53	2.9
9	-1.98	1.0900000000000001	-6.56	22.34	-10.68	2.15

출처 : 교수자 제공

Import KOSPI index returns

- We import KOSPI index returns from KES-KOSPI-monthly-return.xlsx that is downloaded from DataGuide.

- Sorting returns to suit for our analysis is exactly the same as before.

	Dates	Returns
1	2010-01-31	-4.7699999999999996
2	2010-02-28	-0.49
3	2010-03-31	6.16
4	2010-04-30	2.88
5	2010-05-31	-5.76
6	2010-06-30	3.48
7	2010-07-31	3.59

출처 : 교수자 제공