Advanced features of xts

CASE STUDY: ANALYZING CITY TIME SERIES DATA IN R

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Finding endpoints

- `endpoints()` indexes last observation per interval

```
years <- endpoints(unemployment, on = "years")
unemployment[years]
```

```
                us       ma
Dec 1976  7.650000 8.200000
Dec 1977  6.400000 6.200000
Dec 1978  6.000000 5.700000
Dec 1979  6.000000 4.900000
Dec 1980  7.200000 5.100000
```

Apply by period

- `period.apply()` extends apply functions to time

```
period.apply(unemployment,
             INDEX = years,
             FUN = mean)
```

```
               us       ma
Dec 1976 7.654167 9.633333
Dec 1977 7.016667 7.804167
Dec 1978 6.066667 6.220833
Dec 1979 5.945833 5.516667
Dec 1980 7.200000 5.629167
```

Sports data

- Boston sports games, 2010 through 2015

Let's practice!

Indexing commands in xts

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Extracting the index

- `.index()` extracts raw time index

```
.index(unemployment)
```

```
 [1] 189302400 191980800 194486400 197164800
 [5] 199756800 202435200 205027200 207705600
 [9] 210384000 212976000 215654400 218246400
[13] 220924800 223603200 226022400 228700800
[17] 231292800 233971200 236563200 239241600
```

Weekday observations

- `.indexwday()` gives the weekday of each observation

```
.indexwday(sports)
```

```
 [1] 0 2 3 5 6 0 1 3 4 5 6 0 1 2 3 4 5 6 0 1 2 3 5 6
[25] 0 1 2 3 4 5 6 0 1 2 3 5 6 0 1 2 3 4 5 6 0 1 2 3
[49] 4 5 6 0 2 3 4 5 6 0 1 2 3 4 5 6 ...
```

- Select only Sunday games

```
sunday_games <- which(.indexwday(sports) == 0)
```

Let's practice!

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Congratulations

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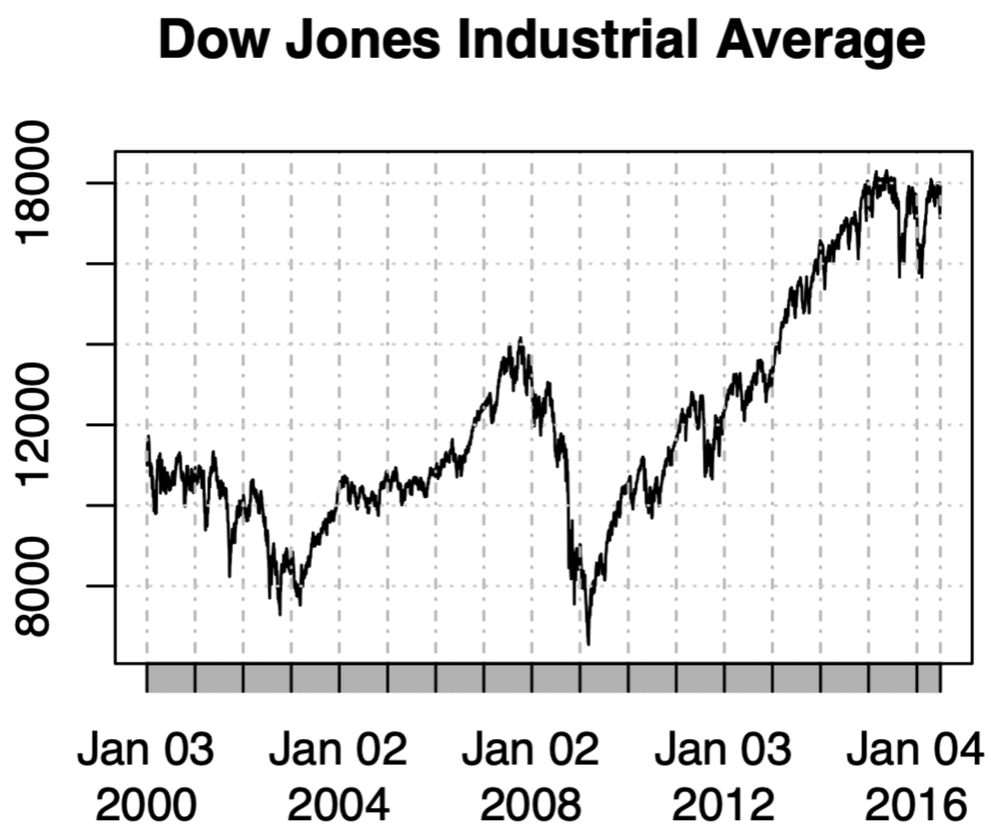
Time series data

- Flight data
- Weather patterns
- Economic data
- Sports scores
- Portfolio returns
- Commodity prices
- User data



Congratulations!

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