Stat. 674 Project

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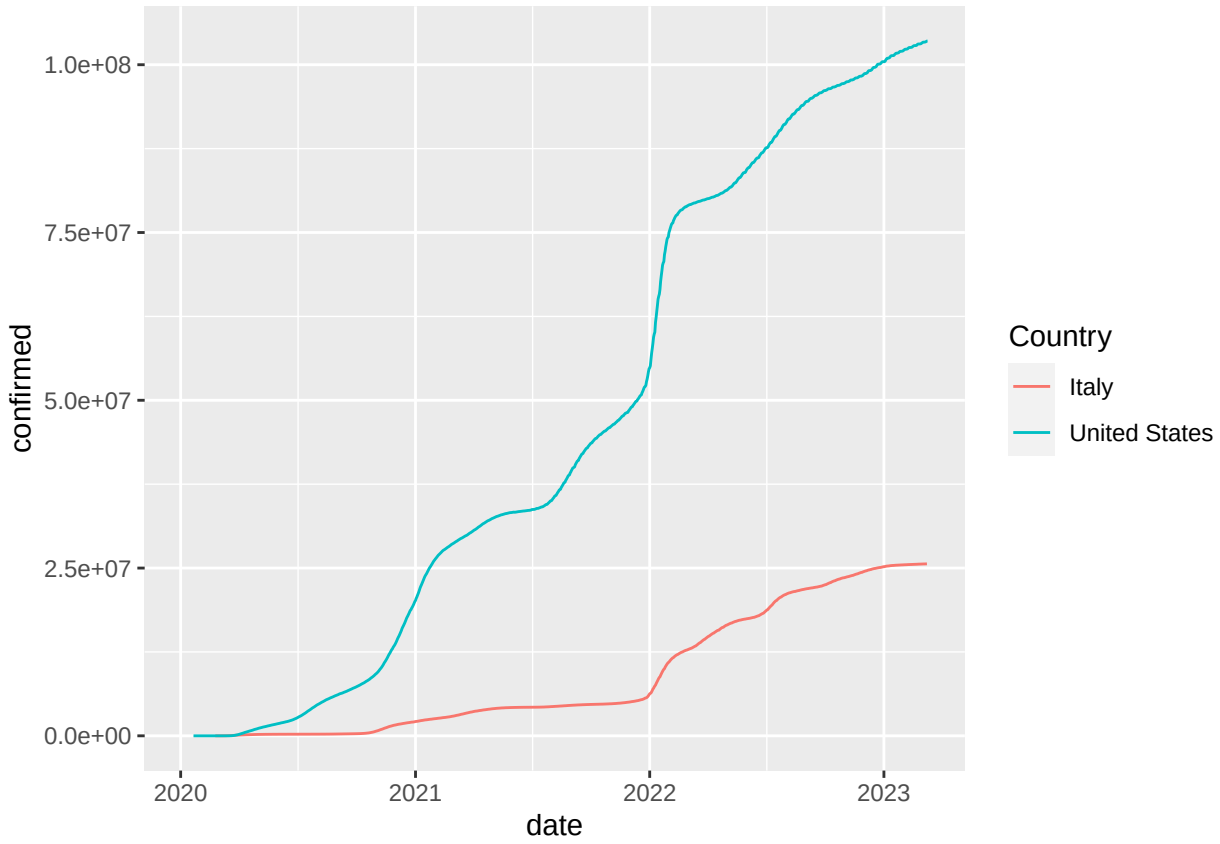
```
covid <- covid19(c("United States", "Italy"))
```

```
##
## We have invested a lot of time and effort in creating COVID-19 Data
## Hub, please cite the following when using it:
##
##   Guidotti, E., Ardia, D., (2020), "COVID-19 Data Hub", Journal of Open
##   Source Software 5(51):2376, doi: 10.21105/joss.02376
##
## The implementation details and the latest version of the data are
## described in:
##
##   Guidotti, E., (2022), "A worldwide epidemiological database for
##   COVID-19 at fine-grained spatial resolution", Sci Data 9(1):112, doi:
##   10.1038/s41597-022-01245-1
##
## To print citations in BibTeX format use:
##  > print(citation('COVID19'), bibtex=TRUE)
##
## To hide this message use 'verbose = FALSE'.
```

```
covid <- covid %>% as_tsibble(key = "administrative_area_level_1", index = "date")
```

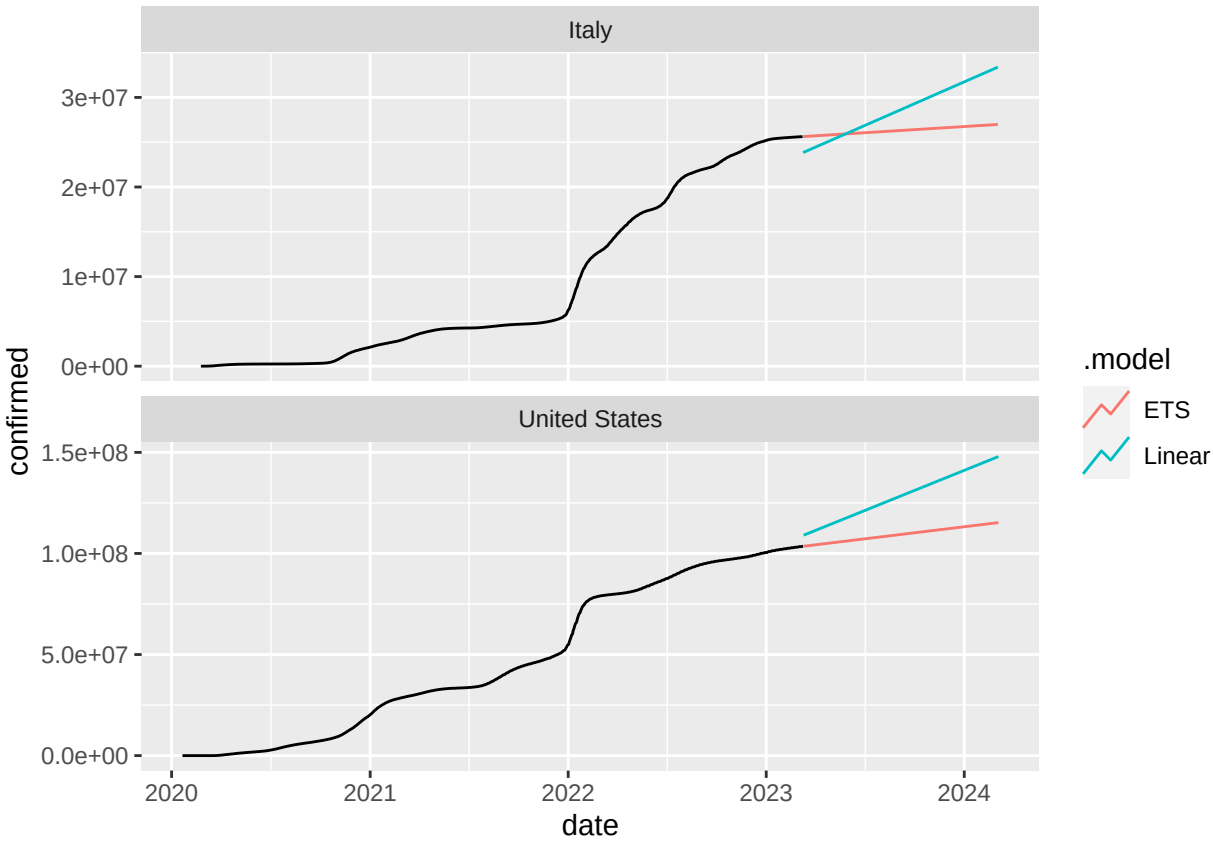
```
ggplot(covid, aes(x = date, y = confirmed, color = administrative_area_level_1)) + geom_line() +
  labs(color = "Country")
```

```
## Warning: Removed 18 rows containing missing values (`geom_line()`).
```



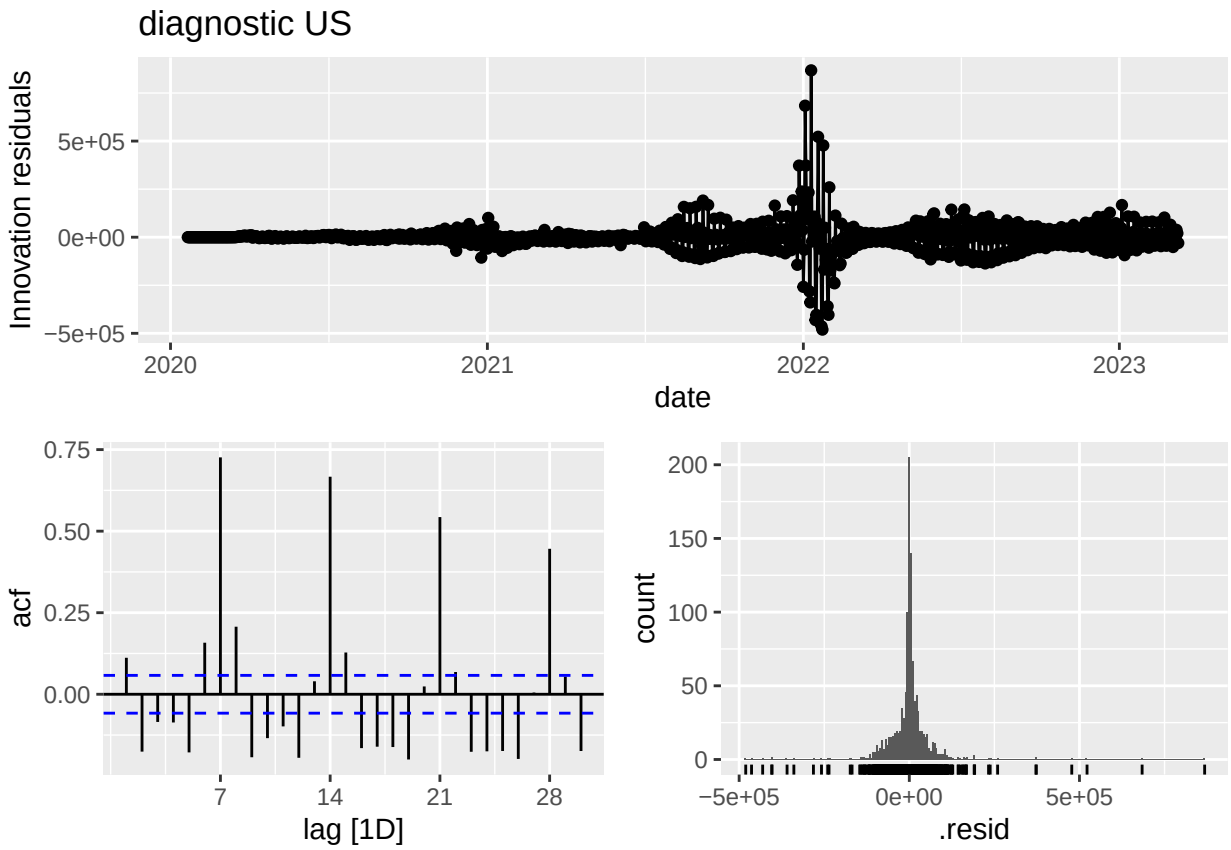
Model.

```
covid <- covid %>% select(confirmed) %>% drop_na()
fit <- covid %>%
  model( Linear = TSLM( confirmed ~ trend()),
         ETS = ETS(confirmed ~ error("A") + trend("A")  + season('N')))
fc <- fit %>% forecast(h = 360)
fc %>% autoplot(covid, level = NULL) +  labs()
```

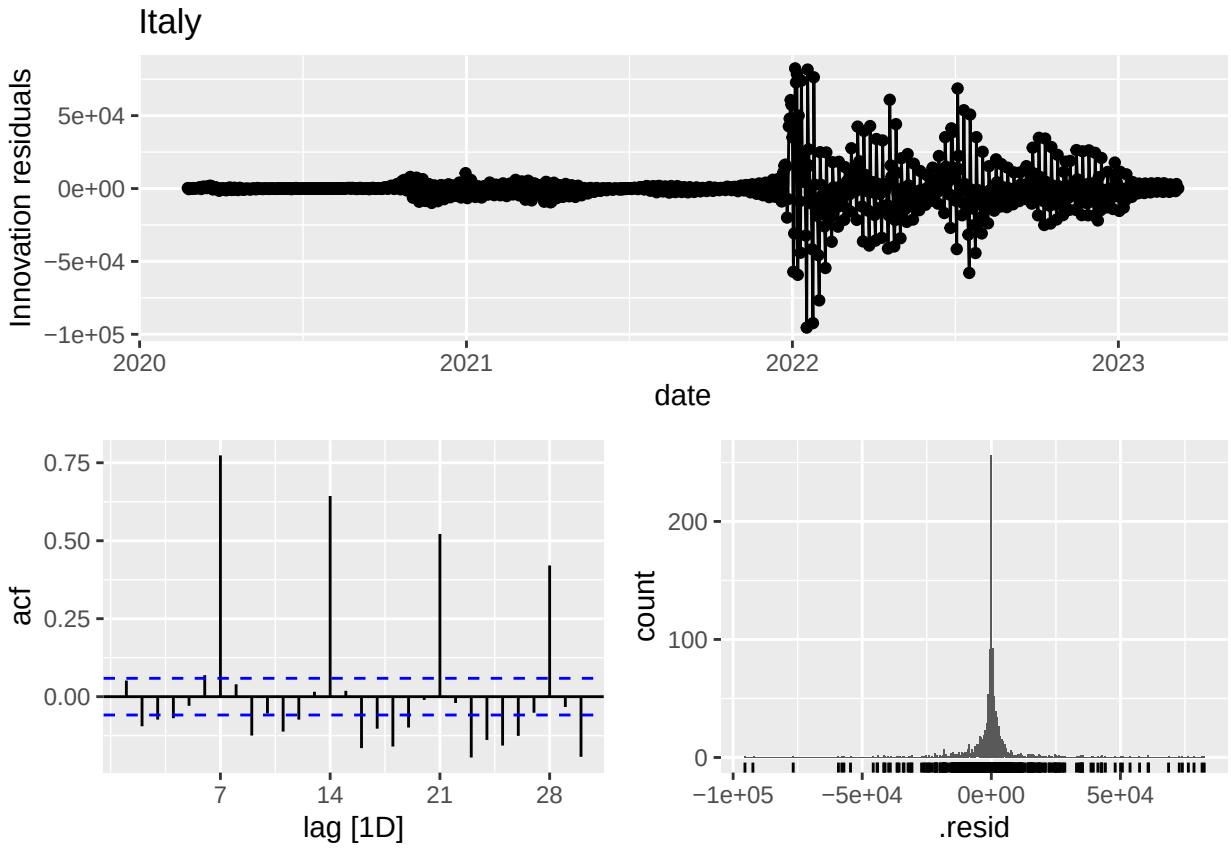


diagnostic

```
fit1 <- covid %>% filter(administrative_area_level_1 == "United States") %>%
  model(AAN = ETS(confirmed ~ error("A") + trend("A")  + season('N')))
fit1 %>% gg_tsresiduals() +ggtitle("diagnostic US")
```

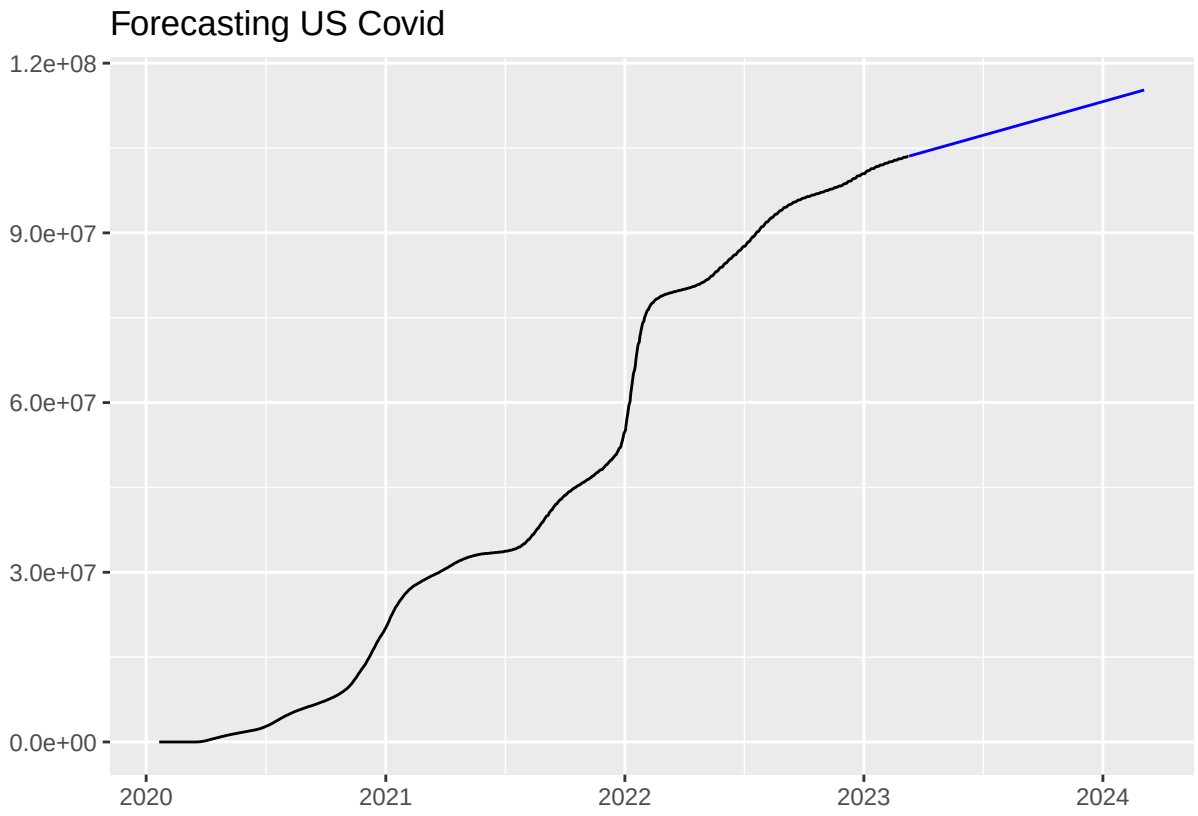



```
fit2 <- covid %>% filter(administrative_area_level_1 == "Italy") %>%
  model(AAN = ETS(confirmed ~ error("A") + trend("A")  + season('N')))
fit2 %>% gg_tsresiduals() +ggtitle("Italy")
```



forecasting

```
fit1  %>% forecast(h = 360) %>% autoplot(covid, level = NULL) +
  labs(title = "Forecasting US Covid", x = "", y ="")
```




```
fit2  %>% forecast(h = 360) %>% autoplot(covid, level = NULL) +
  labs(title = "Forecastiong Italy Covid", x = "", y ="")
```