

Registered Unemployment in Barcelona



Hello!

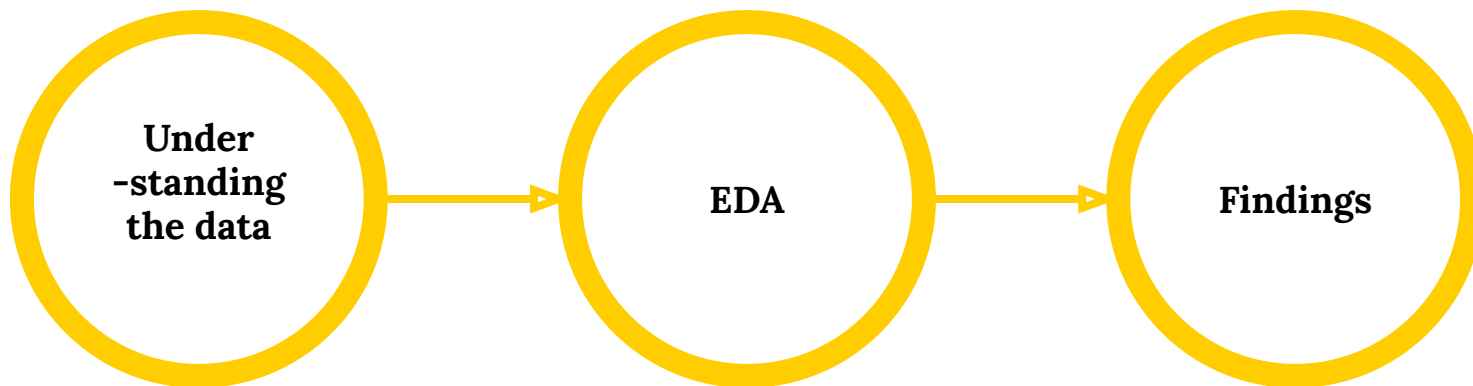


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Presentation itinerary





Source and Data

Registered unemployment in the city of Barcelona



Economy and Business



Employment

Registered unemployment in the city of Barcelona.



View complementary description and field definition



Open Data **BCN**

Source: [here](#)

- 11 csv files from 2011 to 2021.
- Data regarding the registered unemployment in Barcelona per district/neighbourhood
- (Registered and people who applied for the registration)



Data Cleaning

- Combined 11 csv files to one dataframe

- Translate Columns & Values

```
df2 = df2.rename(columns={'Any':'year',  
                          'Mes':'month',  
                          'Codi_Districte':'district_code',  
                          'Nom_Districte':'district_name',  
                          'Codi_Barri':'neighbourhood_code',  
                          'Nom_Barri':'neighbourhood_name',  
                          'Sexe':'sex', 'Demanda_ocupació':'Demand_occupation',  
                          'Nombre':'number', })  
df2.head(2)
```

	year	month	district_code	district_name	neighbourhood_code	neighbourhood_name	sex	Demand_occupation	number
0	2019	1	1	Ciutat Vella	1	el Raval	Homes	Registered Unemployment	1900
1	2019	1	1	Ciutat Vella	2	el Barri Gòtic	Homes	Registered Unemployment	485

- Variable Selection and Merging

1. The total number of unemployed people (registered + applied for the registration per year) ->Q1
2. The total number of unemployed people per district ->Q2
3. The total number of unemployed women/men ->Q3
4. The total number of unemployed people (monthly data) ->Q4



Main Questions

1) What is the trend?

And what caused the trend?

2) Which district has the highest unemployment rate ?

3) The difference between the total numbers of unemployment of men and women

3) Can we predict the next few month's unemployment rate?



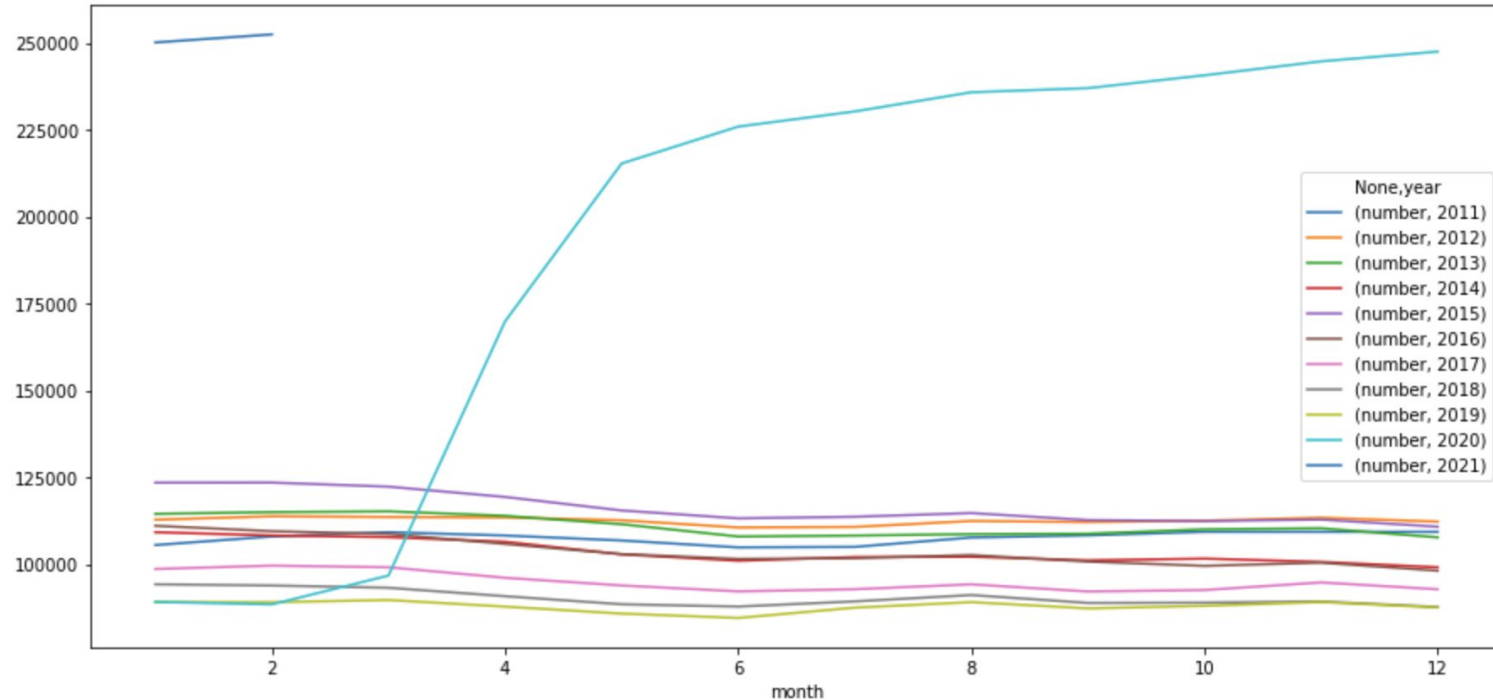
EDA

1

Issue

What is the trend of unemployment in Barcelona?

The unemployment rate in 2020 has increased by **220%** compared to the previous year





There was a significant jump in unemployment rate

- 220% Increase in 2020

Monthly average registered unemployment people in 2019 87823.91666666667

Monthly average registered unemployment people in 2020 193386.91666666666

Monthly average registered unemployment people in 2021 251231.5

- Increased Monthly Average Unemployment Rate

(2019→2020) : 220%

(2020→2021) : 130%

Possible Cause can be 'Covid 19'



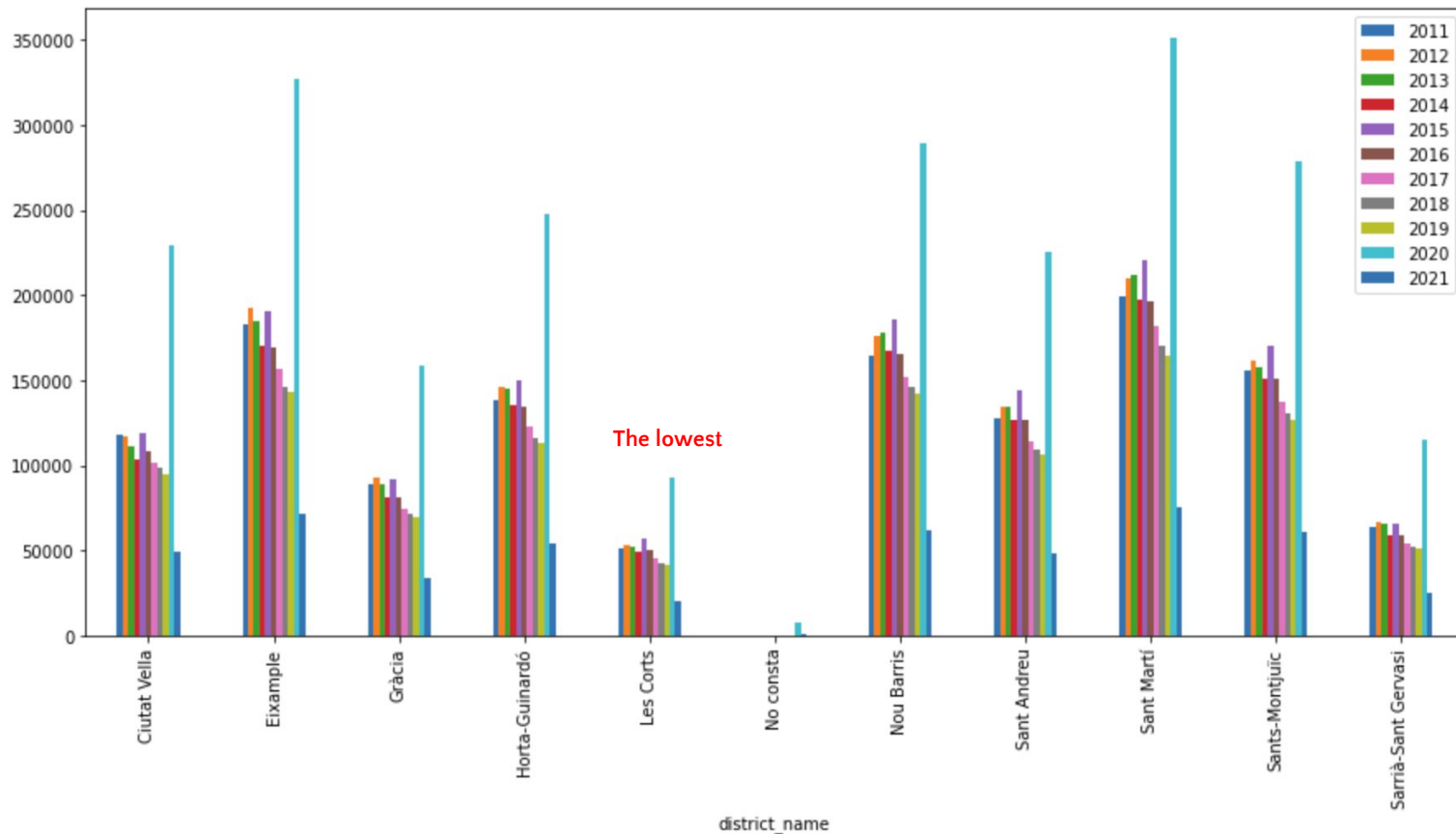
2

Issue

Which district has the highest unemployment rate ?

Distribution of the number of registered & who applied for the registration per each district

The highest

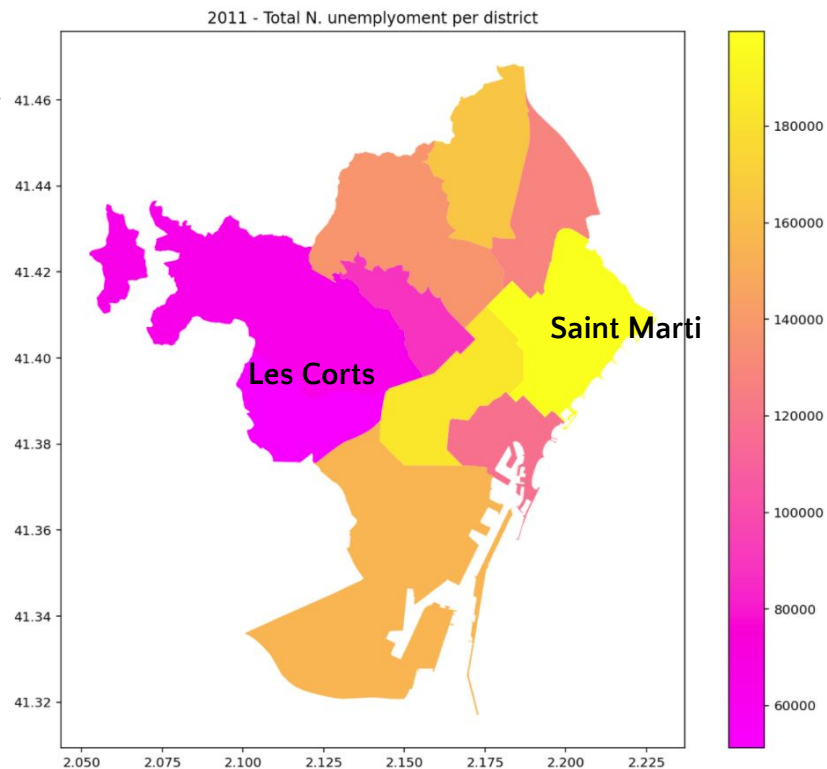




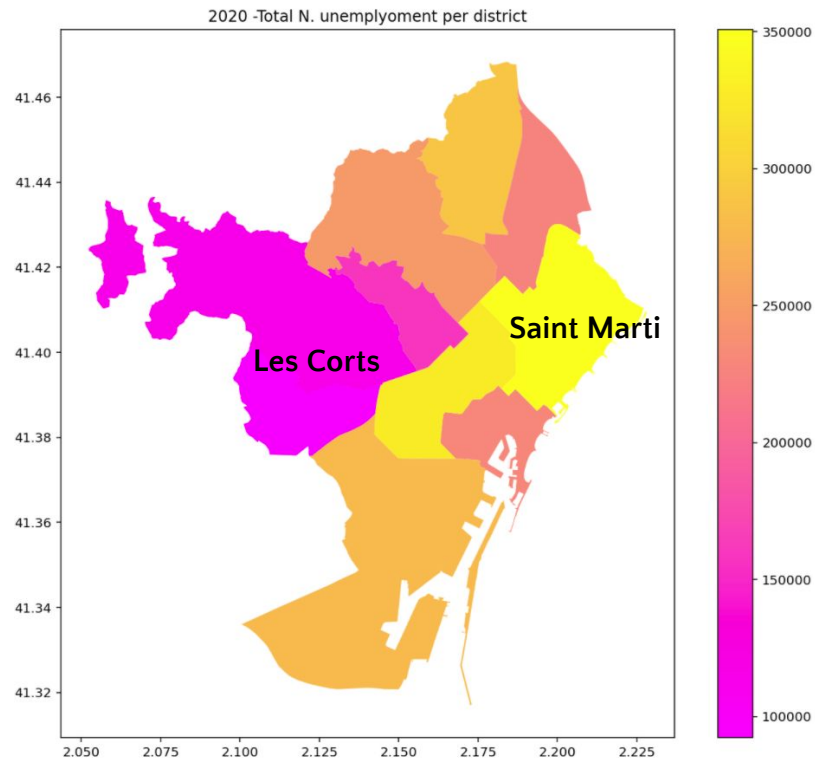
Lowest/highest number(s) of unemployment

- 'Les Corts' has the lowest number of unemployed people between 2011-2021
- 'Sant Marti' has the highest number of unemployed people between 2011-2021

Lowest/highest number(s) of unemployment per district



2011:

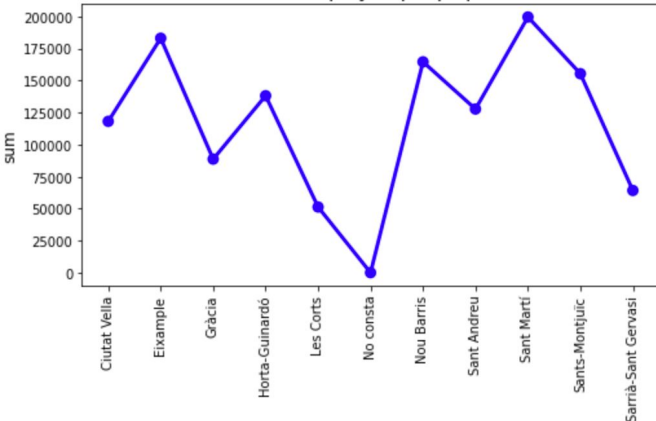


2020:

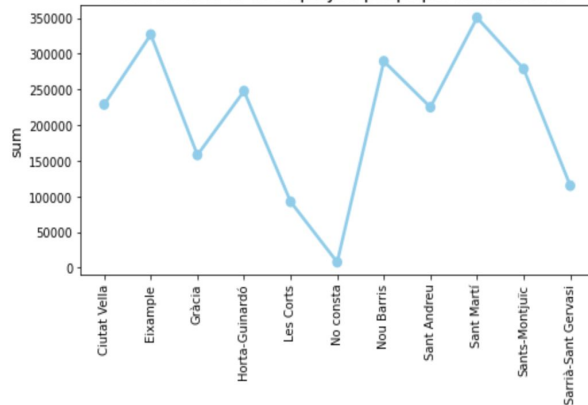


Trends

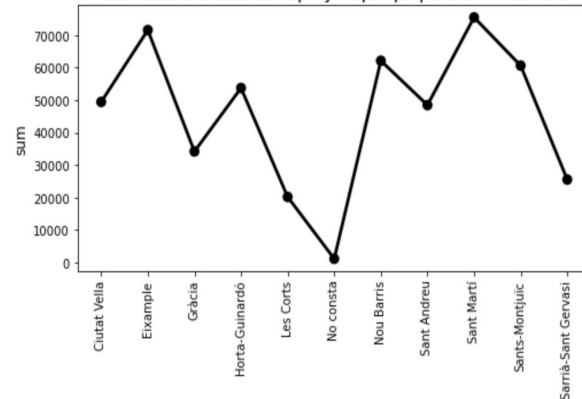
Total number of unemployed peeps per district 2011



Total number of unemployed peeps per district 2020



Total number of unemployed peeps per district 2021



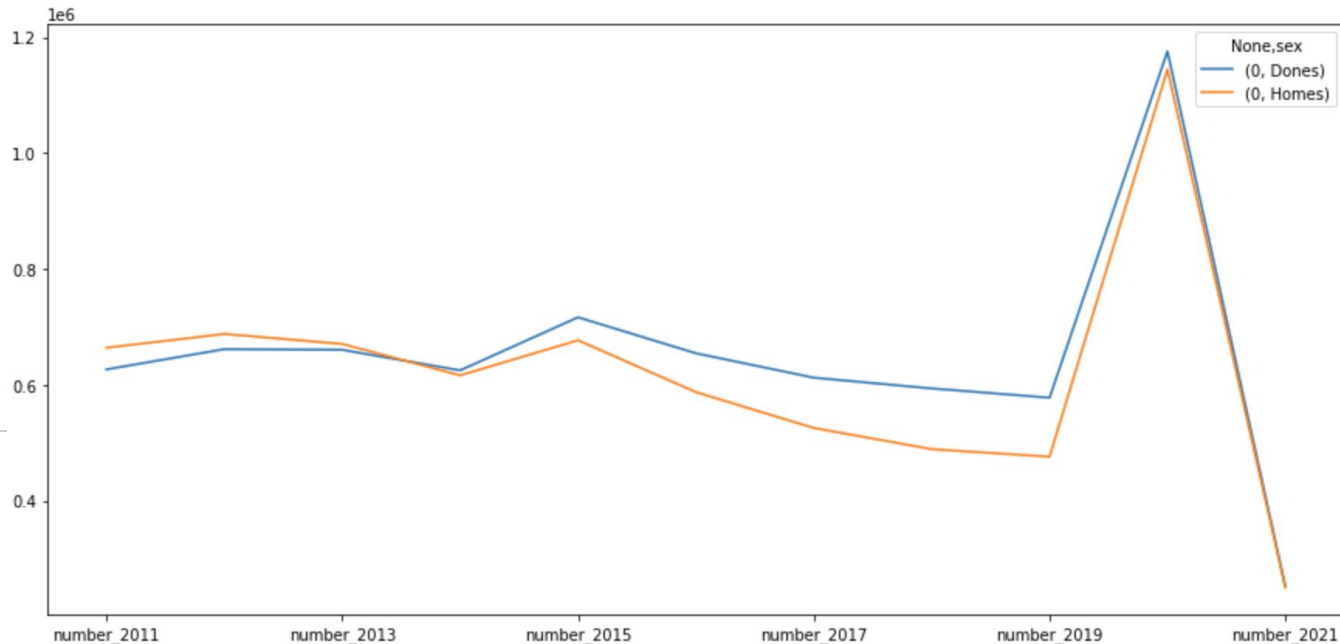
- As you can see, the unemployment trend has not been changed much last 10 years but there is a change in total number of unemployed people per district

3

Issue

The difference between the total numbers of unemployment of men and women

MEN vs Women's Unemployment



```
gender_pivot_sum=gender_pivot.sum()  
gender_pivot_sum=pd.DataFrame(gender_pivot_sum)  
gender_pivot_sum=gender_pivot_sum.unstack()  
gender_pivot_sum
```

0		
sex	Dones	Homes
number_2011	626758	664140
number_2012	661707	687946
number_2013	660552	670661
number_2014	625114	616477
number_2015	716721	677017
number_2016	654554	587530
number_2017	612465	525644
number_2018	593870	489058
number_2019	577869	476018
number_2020	1175900	1144743
number_2021	252223	250240

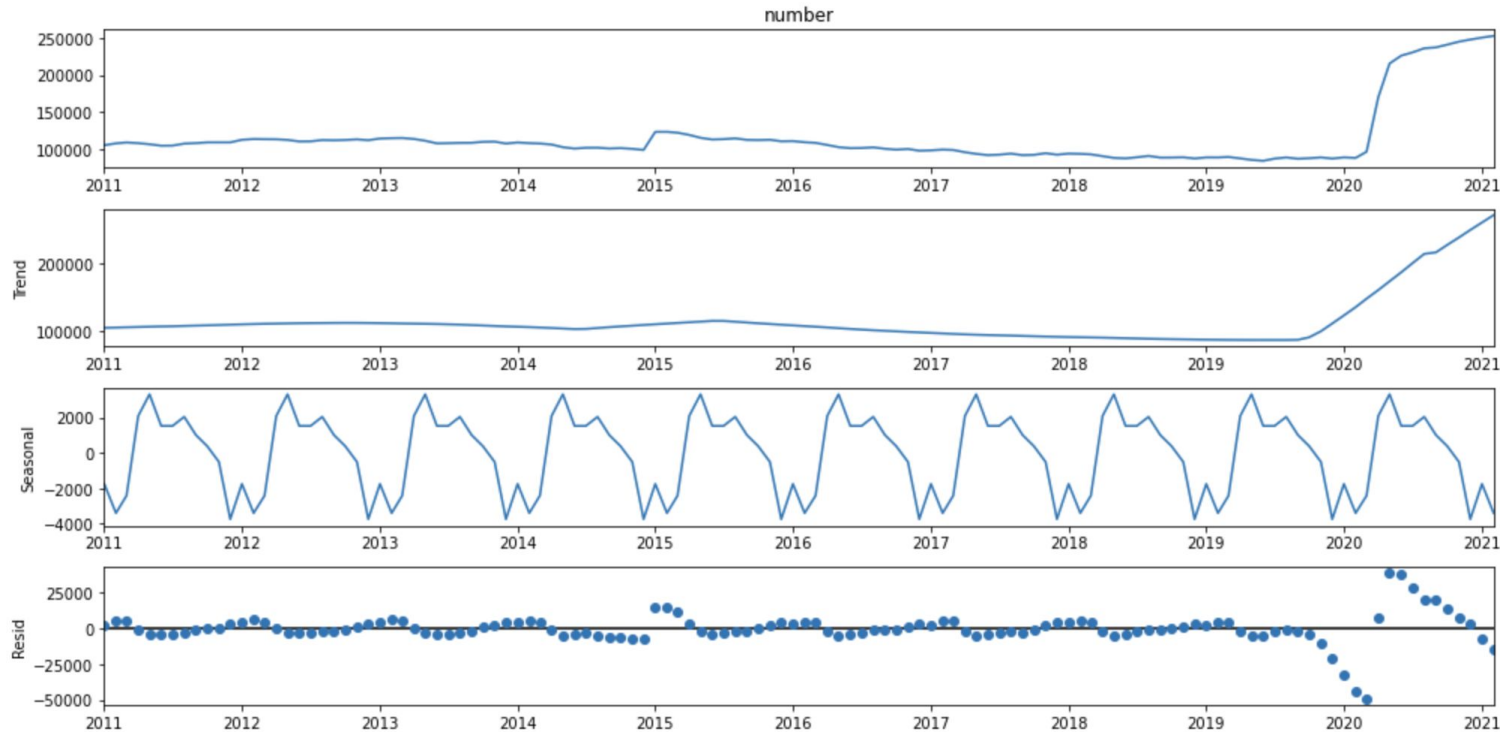
- Except for the years [2011,2012,2013], the women tend to face more unemployment

4

Issue

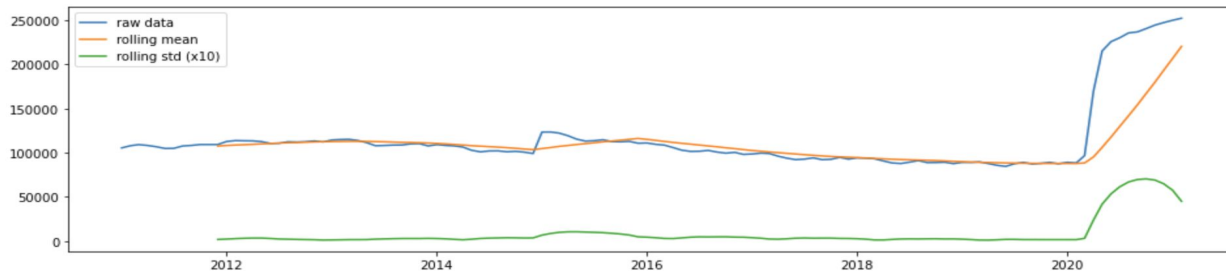
Can we predict the next few month's unemployment rate?

Decompose a dataset



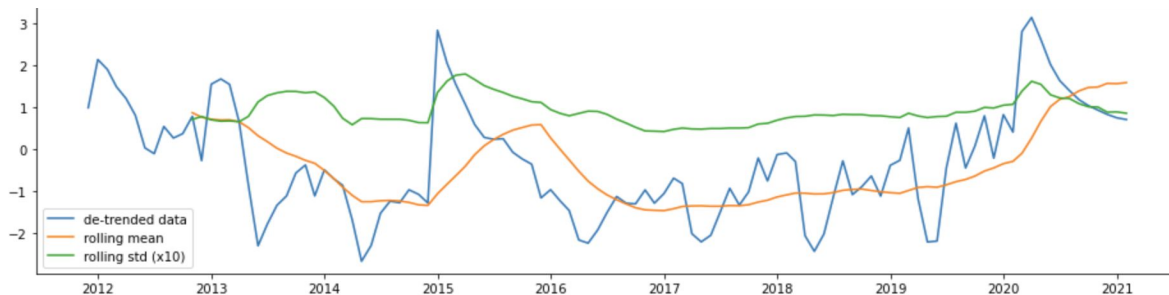
- Clear trend (ups & downs) and we can see a jump in 2020

Decompose a dataset



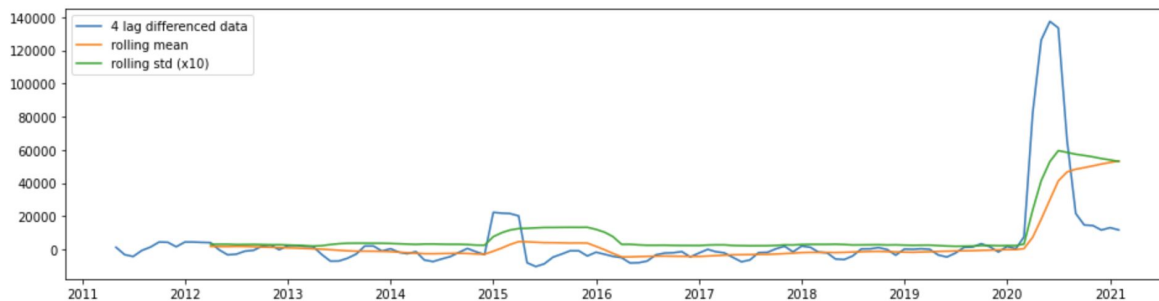
Rolling mean:

Data is non stationary



Rolling window (12):

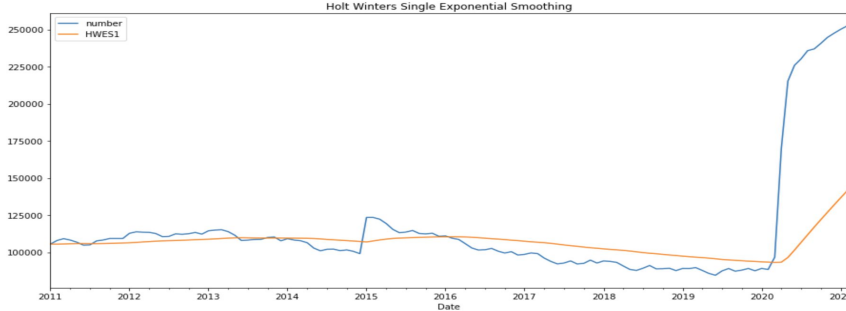
Data is non stationary



4 lag difference (12):

Data is still non stationary

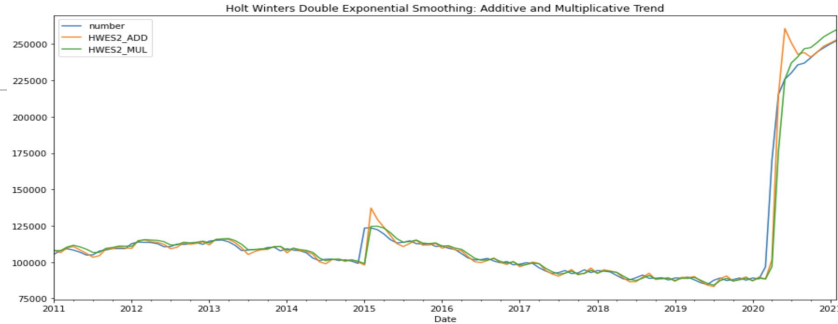
Holt winters exponential smoothing



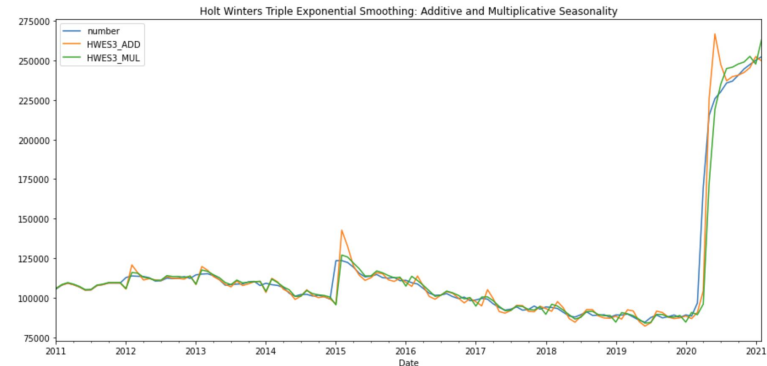
Exponential smoothing methods including Holt-Winters methods are appropriate for (some kinds of) non-stationary data

<- Single HWES
(seasonality x, trends x)

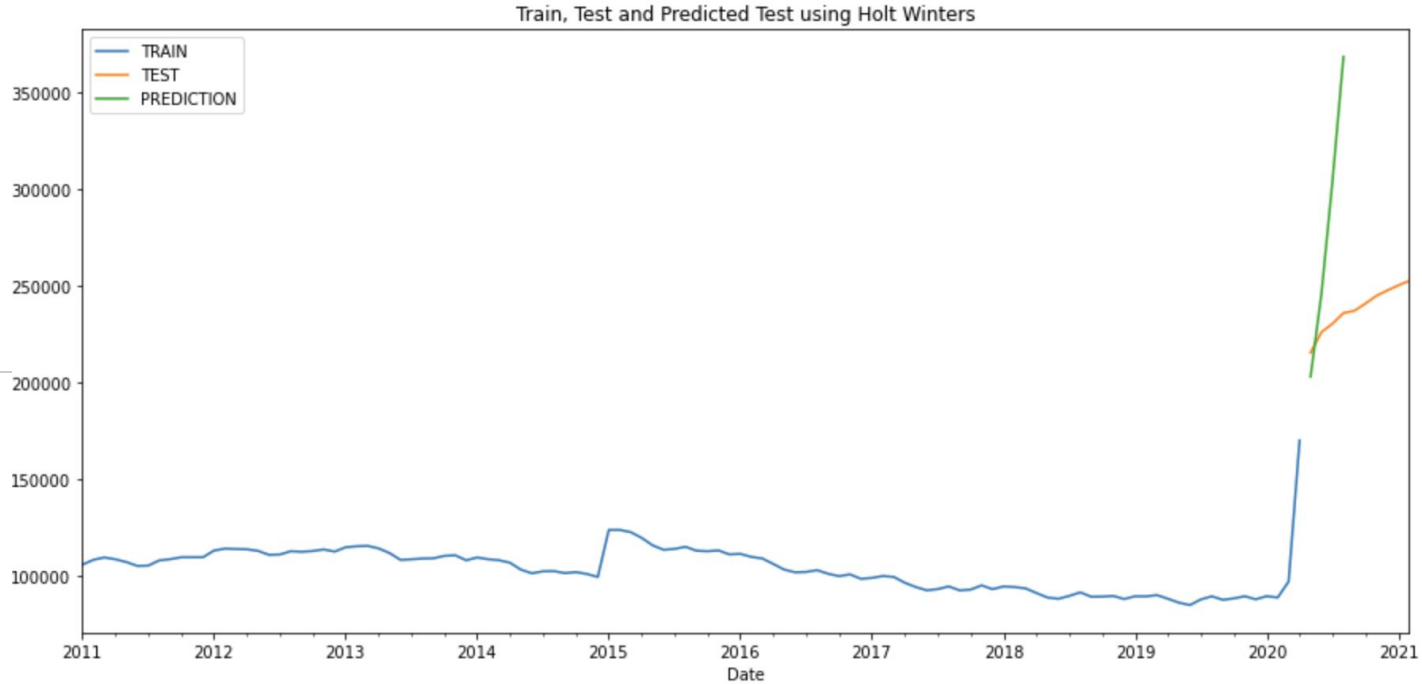
<-Double HWES
(seasonality x, Additive and Multiplicative Trend o)



Triple HWES ->
(Additive and
Multiplicative Seasonality o)



Predicting the unemployment rate



The model did not perform well as it picked the sudden jump in 2020, the prediction also shows the drastic increase in the total number of unemployment



Findings



Through EDA...

Which year?

The total number of unemployment was increased drastically in 2020.

In 2021, the number of unemployed people was still increasing.

Which district?

The unemployment trends over 10 years haven't been changed.

'Les Corts'

-> lowest number of unemployed

'Sant Marti'

-> has the highest number of unemployed people

Which Gender?

Between 2011-2013, men's unemployment rate was higher than women, since 2014 the trend has changed completely.

Total N. of Women's Unemployment

>

Total N of. Men's unemployment

Can you predict?

Not really accurate model, but it seems like the unemployment number will still grow.

Next Things to do...

- Add covid data
- Add multiple features to time series model



Thanks!

Any questions ?

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