

United Kingdom's Furlough Rates due to Covid-19

Covid 19 has put the whole world in the state of emergency. COVID-19 is not only a global pandemic and public health crisis; its repercussions, severe and far-reaching, are being felt across the global economies and worlds financial markets. From school closures to devastated industries and millions of jobs lost – the social and economic costs of the pandemic are many and varied. Covid-19 is threatening to widen inequalities everywhere, undermine progress on global poverty and clean energy, and more. Many industries and businesses paused trading due to the global lockdown which restricted the business operation. Due to the sudden and un foreseen stopping of businesses many industries faced economic crises, forcing them to cuts costs or let employees go or stop operating all together. UK like many other countries faced one of its worst economic crisis during the first lockdown with its GDP declining almost 10% in 2020. This lead to many businesses closing across UK and unemployment rates soared as many people were furloughed.

Furloughed workforce across the United Kingdom and covid 19

Analysing the data collected by ONS,I observer that the unemployment rate started climbing from January of 2020 and reached an all-time high in the last months of 2020. The united kingdom has seen one of the worst raises in inflations rates in it the past decade during the peak of covid. Given that the rise in unemployment rates was coinciding with the way covid -19 and lockdowns progressed in the U.K , these two events most likely are related.[Plot1].

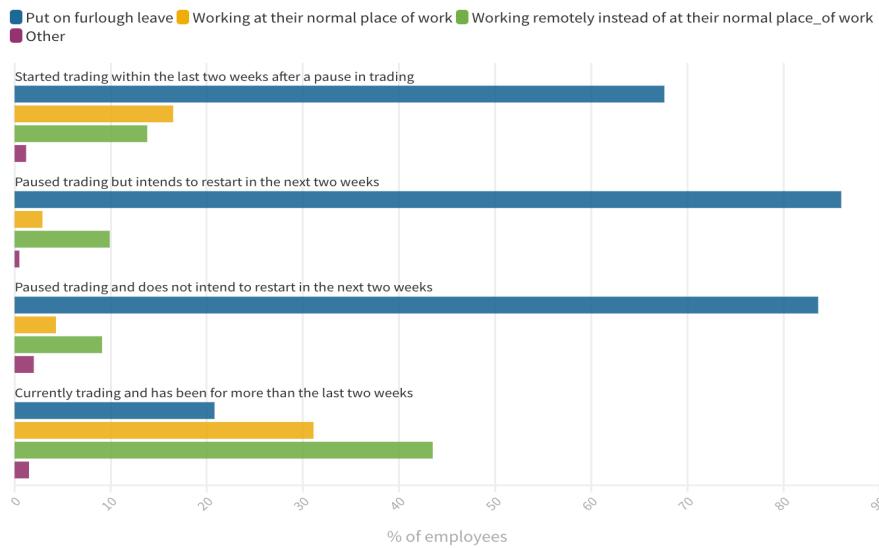
If all the businesses are widely categorized on their operational status during covid, we can categories them as business which are actively trading, businesses which paused trading with the intent to restart trading in two weeks or once which have no such intent to restart in the next two weeks and the one that paused trading at some point during covid but restarted their operation again.

Majority of the employees have been put on furlough leave during the peak of covid- 19. Business which paused operation during some point in covid have put more than 60% of their employees on furlough leave
Businesses that paused and started trading have put almost 68%of its employees on furlough leave.

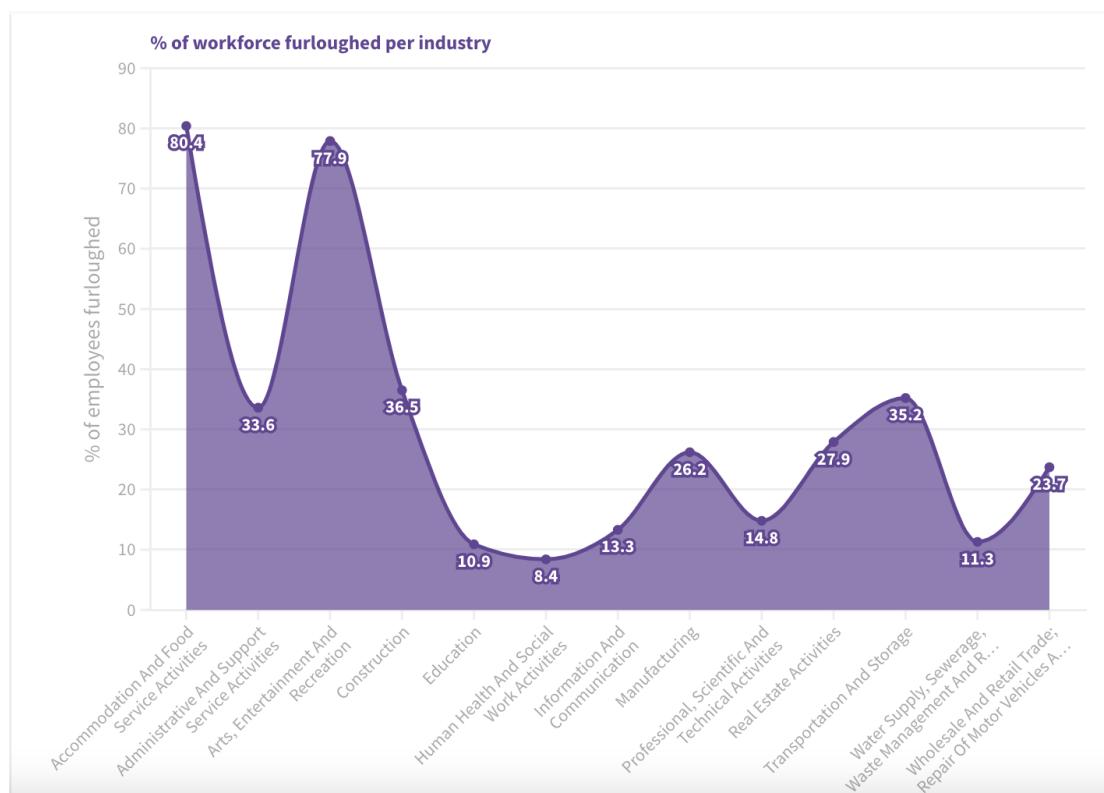
Business that paused trading with or with the intensions to restart over two weeks have put more than 80%of their employees on furlough leave, with businesses with the intent to restart in two weeks having put close to 90% of employees on furlough leave retaining only 3-4% of their original workers.

Currently trading businesses, have the least percentage of employees on furlough leave i.e.. Approximately 20%, instead have opted to let 40% of their employees to work remotely.

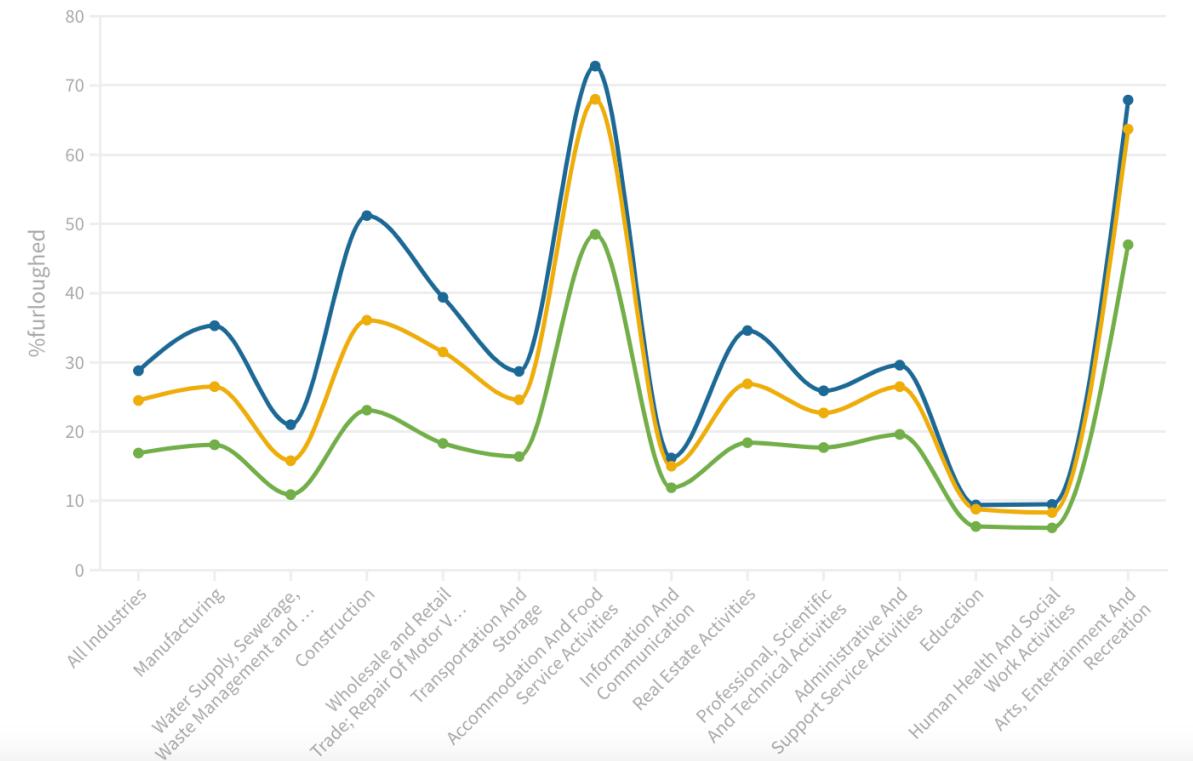
Proportion of the workforce by working arrangements, for responding businesses that have not permanently stopped trading, UK, 18 May to 31 May 2020



Most of the industries in the United Kingdom had to let some percentage of their workforce go. More than 80% of the workforce in 'Accommodation and food service activities' was let go, which makes sense given that, if not all most of the hotels and restaurants were closed throughout the lockdown and remained one of the worst affected industries across the globe throughout the period of the pandemic.



█ HMRC: Proportion Furloughed averaged over May 2020
 █ HMRC: Proportion Furloughed averaged over June 2020
 █ HMRC: Proportion Furloughed averaged over July 2020

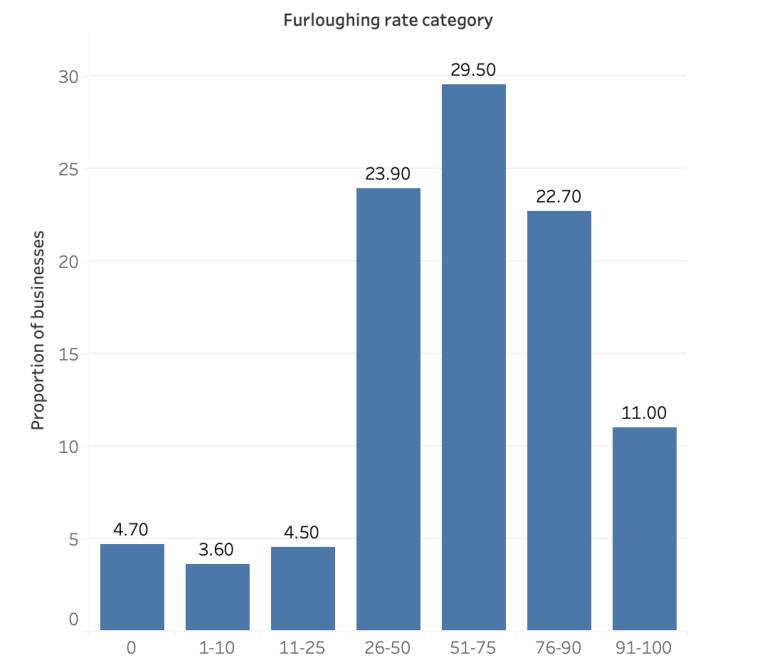


This industry was closely followed by art and entertainment and recreation industry in which 77.9% of the people lost their jobs, making them the most adversely affected industries. The least affected industry is the human health and social work activities, which furloughed only about 8.4 percent of its workforce. This makes sense since health workers as well as social workers were in shortage during covid due to the sudden increase demand on the health care system. Most of the education throughout the United kingdom was shifted online, and the education system came through as the most well-adjusted industry in the covid lockdown situation. Hence the industry retained about 90 % of its workforce. Though the percentage of employee being furloughed did start reducing slightly in the months of June and July, the numbers were still very high indicating more people were losing jobs across all the industries. Adding to the unemployment rates of united kingdom

How furlough rates affect turnovers of businesses?

Businesses which saw a fall in their turnover by more than 50 % , have the highest furlough rate, which is a little more than 60 % or 60.6 %. Businesses which saw a turnovers decrease 20 % -50 % have a furlough rate of 30%.Businesses saw a decrease in turnover by 20 % had a furlough rate of 12.1%.

Businesses which saw an increase in its turnover by 50% had a furlough rate of around 34 percentage.



Of the businesses that are categorised as continuing trade of businesses and are reporting decreases in turnover of more than 50%, majority proportion of the businesses have 51 to 75 furlough rates. 23.9 percent of businesses have a furlough rates between 26 to 50. And approximately 23 percent of businesses have 76 to 90 furlough rates. Only 11 percent of businesses show high furlough rates between 91 and 100 where as a small proportion of businesses which make up only as little as 4.7 percent of total businesses have zero furlough rates.

Businesses having furlough rate of 44.6 percent are expecting their business's turnover to increase a little whereas businesses having a furlough rate of 19.3 percent predict a substantial increase in their business turnover. Businesses with the highest furlough rates of almost 44 percent are neither forecasting an increase nor a decrease in their turnover in the coming couple of weeks.

Coronavirus Job Retention Scheme

Almost all of the surveyed companies which have furloughed a portion of their working staff have applied for Coronavirus Job Retention Scheme

97.3 percentage of the surveyed businesses which are trading at the time of survey applied for Coronavirus Job Retention Scheme

A big proportion of companies, that is almost close to 99.8 percent , which have temporarily closed or paused trading have applied for Coronavirus Job Retention Scheme. So almost all of the companies which have furloughed employees have applied for Coronavirus Job Retention Scheme

Analysis:

Gender vs un employment

The unemployment rates shot up since the beginning of 2020, and when observed gender wise there is noticeable difference between un employment rates between men and women. The percentage of unemployment rates in men are higher than the percentage of unemployment rates in women and the overall percent of unemployment rate. Hence more men are unemployed than women throughout the pandemic with a difference at peak of unemployment by a rate of 0.35 percent.[PLOT 2]

When the same unemployment data is categorised with respect to age, with reference grouping values as 16 to 17years , 18 to 24 years, 25 to 49years and above 50 years, it can be observed that, on a whole it is observed that the unemployment rates in younger/youngest population is the highest. The unemployment rates in teens peaked the highest during covid. There was a slight but noticeable change in the unemployment rates in young adults, that is, population ageing from 18 to 24. However, the unemployment rates in adults, that is , people categorised in the age groups 25 years to 49 years and above 50 years, show almost no change in unemployment rates compare to times pre and post covid 19 pandemic. From these observation it can be concluded that people with more experience are better retained in their work position compared to a teen with little to no experience.

When observed over past few years, it is noticed that the unemployment rate has increased from 2019 from 3.84 percent through the years 2020 and 2021, reaching an high rate of 4.59 in 2021. But 2022 so far looks promising, with unemployment rates falling in the first couple of months to the pre covid levels. However, given that the values for 2022 are just the values for the first 2 months, It is not definite that the unemployment rates are better or equivalent to those of pre covid years.

Age wise analysis:

The unemployment rates shot up in teenagers by almost 8 % since the start of the pandemic. The unemployment rates for teenagers(aged 16 to 17) were 20.50 % and they steadily rose to 28.06 % by the end of year 2021. For the year 2022 so far, the rate remains at 22.04 % [table 1]

The unemployment rate in young adults (ages 18 years to 24 years) also increased to almost 2% from the year 2019 to 2020 , however it is gradually decreasing and currently stands at 9.83% for year 2022 so far.[table 2]

The change in rate of unemployment rates for adults in the ages 25 years to 49 years and above 50 from 2019 to 2021 , through the pandemic was less than 1%

Analysis on unemployed duration

An average of 10,7569 people are unemployed for up to 6 months in the UK between 2019 – 2022. With a minimum of 24087 people and a maximum of around 246479 at a given in the duration of the years.

An mean of approximately 30 thousand people were unemployed for a duration of 6 months to 12 months. And an average of 44042 people were unemployed for over 12 months

On classifying people who were unemployed for the duration of unemployment up to 6 months 'based on gender, It is observed that the average of males is higher than the females. An average of 125000 males were unemployed up to 6 months , whereas only an average of 100,000 women were unemployed for up to 6 months. [Plot 5]

Considering the population that was unemployed for 6 to 12 months during the years 2010-2022 and grouping the population set by gender, it is observed that a relatively small percent of females were unemployed with an average of approximately 22000 women being unemployed for 6 to 12 months, whereas the average number of men who were unemployed for 6 months to 12 months was close to 40000. The outliers represent the sudden raise in unemployed numbers during covid 19 pandemic when many lost their jobs.[PLOT6]

When analysing the number of unemployed population who were unemployed for over an year, during the time frame year 2019 to year 2020 and by grouping them based on gender it can be observed that the average number of females unemployed for over an year is less than 40000 but the average number of males unemployed for over an year was close to 60000.[PLOT 7]

Unemployment rates were always high in the united kingdom but covid and the restrictive lockdown pushed the rates even higher.

The maximum number of the People of the united kingdom who were unemployed for up to 6 months were in the year 2020. The average of the people unemployed for up to 6 months in 2020 was beyond the normal confidence interval for that particular group.

The maximum number of people who were unemployed for over 6 months and up to an year shot up in the year 2021. This could be attributed to the previous year's lockdowns which lead to the closure of many businesses and hence many people were furloughed. The maximum number of people unemployed in year 2019 for over 6 months and up to an year was around 50000. The number of people unemployed for over 6 months and up to an year, was well beyond 80000 in the year 2021.

The numbers of people of the united kingdom who were unemployed for more than a year that is over 12 months, reached an peak value in the year 2021, with a maximum value of 125000 people who were unemployed. This figure was a huge jump from the previous year where were only 80000 people unemployed for over an year for the year 2020.

Insights:

The unemployment rates increased by many folds in the United Kingdom due to covid. Hospitality industries (accommodation and food activities) is one on the major fur lours of workforce

The average of unemployment rates from year 2019 to year 2022 is 4.27 percentage, with an standard deviation of 0.48 and peak value at 5.22 percentage.

The average of unemployment rates of males across united kingdom is 4.45 % for years 2019 -2022 and the average unemployment rate of females is slightly less compared to that of males , i.e., 4.06 %. The maximum unemployment rate of males stands at 5.40 % while that of females stands at 5 %

The average of unemployment rates of people ageing 16 years to 17 years is 24.39% with its max value at 35.48% , while those ageing between 18 to 24 is 11.25 %. The average unemployment of people in the united kingdom aged between 25 years to 49 years is 3.18 percent.

References

Comparison of BICS furlough estimates with HMRC's Coronavirus Job Retention Scheme Statistics

- Office for National Statistics. (n.d.). [Www.ons.gov.uk](http://www.ons.gov.uk).

<https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/datasets/comparisonofbicsfurloughestimateswithhmrcscoronavirusjobretentionschemestatistics>

Furloughing of workers across UK businesses - Office for National Statistics. (n.d.).

[Www.ons.gov.uk](http://www.ons.gov.uk).

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/furloughingofworkersacrossukbusinesses>

Annexure:

```
In [2]: import os
import json
import pandas as pd
import seaborn as sns
from plotly.offline import iplot
import matplotlib.pyplot as plt

import numpy as np
import pandas as pd

plt.style.use("ggplot") #using style ggplot

%matplotlib inline
from mpl_toolkits.mplot3d import Axes3D
import datetime as dt
import plotly.graph_objects as go
import plotly.express as px
```

```
In [6]: !pip install openpyxl

Requirement already satisfied: openpyxl in /usr/local/lib/python3.7/dist-packages (3.0.9)
Requirement already satisfied: et-xmlfile in /usr/local/lib/python3.7/dist-packages (from openpyxl) (1.1.0)
```

```
In [5]: # Mount your Google Drive

# Mounting your Google Drive will enable you to access files from Drive in Google Colab e.g. datasets, notebooks, etc.

from google.colab import drive

# This will prompt for authorization. Enter your authorization code and rerun the cell

drive.mount('/content/drive')

Mounted at /content/drive
```

```
In [7]: df = pd.read_excel('/content/drive/MyDrive/Colab Notebooks/unemp_comb_rates.xlsx')

df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 38 entries, 0 to 37
Data columns (total 8 columns):
 #   Column      Non-Null Count  Dtype  
 ---  --          --          --      
 0   date        38 non-null    datetime64[ns]
 1   un_rate     38 non-null    float64 
 2   un_men_rate 38 non-null    float64 
 3   u_women_rate 38 non-null    float64 
 4   urate_16-17 38 non-null    float64 
 5   urate_18-24 38 non-null    float64 
 6   urate_25-49 38 non-null    float64 
 7   urate_abv50 38 non-null    float64 
dtypes: datetime64[ns](1), float64(7)
memory usage: 2.5 KB
```

```
In [12]: df.head()
```

```
Out[12]:   date  un_rate  un_men_rate  u_women_rate  urate_16-17  urate_18-24  urate_25-49  urate_abv50
0  2019-01-01  3.930562           4.0       3.814125  22.171954  10.363235  2.876018  2.731411
1  2019-02-01  3.941531           4.1       3.815355  21.003489  10.281047  2.956849  2.692000
2  2019-03-01  3.817801           3.9       3.727483  19.197068  9.924567  2.879300  2.659626
3  2019-04-01  3.830274           4.0       3.650409  20.317636  10.196254  2.863850  2.599570
4  2019-05-01  3.795611           4.0       3.613024  19.556493  10.667547  2.759981  2.550958
```

```
In [11]: df["date"] = pd.to_datetime(df["date"])
```

```
In [6]: #checking null values
df.isna().sum()
```

```
Out[6]: date      0
un_rate     0
un_men_rate 0
u_women_rate 0
urate_16-17 0
urate_18-24 0
urate_25-49 0
urate_abv50 0
dtype: int64
```

```
In [8]: df.describe().round(2)
```

```
Out[8]:   un_rate  un_men_rate  u_women_rate  urate_16-17  urate_18-24  urate_25-49  urate_abv50
count    38.00      38.00      38.00      38.00      38.00      38.00      38.00
mean     4.27       4.45       4.06       24.39      11.25      3.18       3.02
std      0.48       0.51       0.45       4.29       1.30       0.39       0.48
min      3.76       3.90       3.53       19.20      9.71       2.72       2.47
25%     3.87       4.03       3.66       21.10      10.22      2.87       2.60
50%     4.07       4.20       3.92       23.39      10.81      3.03       2.79
75%     4.69       4.90       4.43       25.88      11.95      3.54       3.41
max      5.22       5.40       5.00       35.48      13.85      3.95       3.92
```

```
In [14]: # show the relation years to general Unrated
plt.figure(figsize=(15,7))
sns.lineplot(data=df , x="date",y="un_rate")

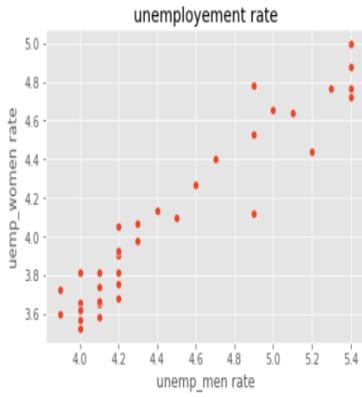
Out[14]: <matplotlib.axes._subplots.AxesSubplot at 0x7fdf7b7b6850>
```

```
In [16]: #histogram of unemployment rates
hplot = df.filter(['un_rate'])

In [19]: p2 = hplot.hist(figsize = (15,8))
```

```
In [10]: #px.scatter_3d(df,x='date',y="un_men rate",z="u_women rate ",color="u_women rate ")
x = sns.scatterplot(x='un_men rate', y='u_women rate ', data=df)
x.legend(loc="upper center", bbox_to_anchor=(1.5, 1.15), ncol=2)

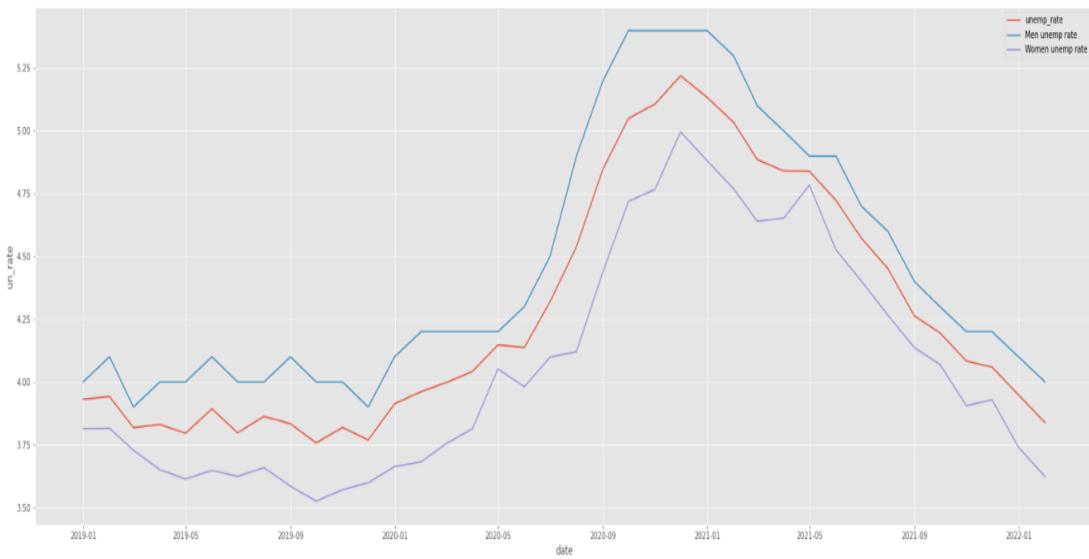
x.set_title('unemployment rate');
x.set_xlabel('unemp_men rate');
x.set_ylabel('uemp_women rate');
```



```
In [12]: # show the relation years to Unrated men and women also general Unrated
plt.figure(figsize=(30,10))
sns.lineplot(data=df,x="date",y="un_rate",label="unemp_rate")
sns.lineplot(data=df,x="date",y="un_men_rate",label="Men unemp rate")
sns.lineplot(data=df,x="date",y="u_women_rate",label="Women unemp rate")

plt.legend
```

```
Out[12]: <function matplotlib.pyplot.legend>
```

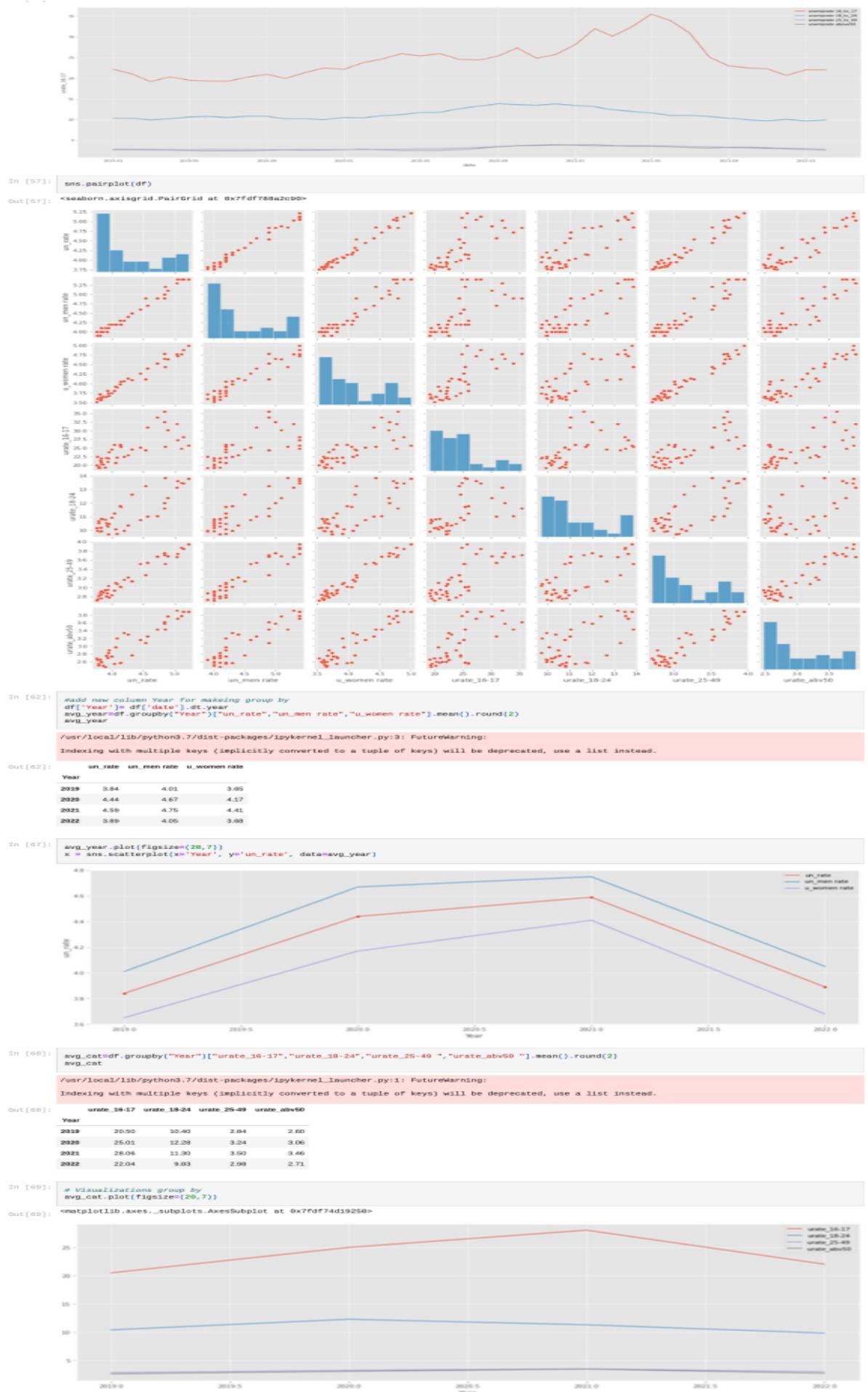


```
In [18]: # show the Unemployment category
plt.figure(figsize=(30,10))

sns.lineplot(data=df,x="date",y="urate_16-17",label="unempreate 16_to_17")
sns.lineplot(data=df,x="date",y="urate_18-24",label="unempreate 18_to_24")
sns.lineplot(data=df,x="date",y="urate_25-49",label="unempreate 25_to_49")
sns.lineplot(data=df,x="date",y="urate_abv50",label="unempreate above50")
```

```
plt.legend
```

```
Out[18]: <function matplotlib.pyplot.legend>
```



```
In [122]: df2 = pd.read_excel('/content/drive/MyDrive/Colab Notebooks/table_time.xlsx')

In [124]: df2.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 304 entries, 0 to 303
Data columns (total 6 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   date             304 non-null    datetime64[ns]
 1   Gender           304 non-null    object  
 2   age              304 non-null    object  
 3   Up to 6 months  304 non-null    float64
 4   Over 6 and up to 12 months 304 non-null    float64
 5   over 12 months  304 non-null    float64
dtypes: datetime64[ns](1), float64(3), object(2)
memory usage: 14.4+ KB

In [73]: def desc_stats(dataframe):
    desc = dataframe.describe().T
    desc_df = pd.DataFrame(index = dataframe.columns,
                           columns = desc.columns,
                           data = desc)

    f,ax = plt.subplots(figsize=(12,
                                desc_df.shape[0] * 0.72))
    sns.heatmap(desc_df,
                 annot = True,
                 cmap = 'Blues',
                 fmt = '.2f',
                 ax = ax,
                 linewidths = 1.2,
                 cbar = False,
                 annot_kws = {"size": 12})

    plt.xticks(size = 16)
    plt.yticks(size = 14,
               rotation = 0)
    plt.title("Descriptive Statistics", size = 14)
    plt.show()

desc_stats(df1[['un_rate','un_men rate','u_women rate','urate_16-17','urate_18-24','urate_25-49 ','urate_abv50 ']])


```

	un_rate	4.27	0.48	3.76	3.87	4.07	4.69	5.22
un_men rate	38.00	4.45	0.51	3.90	4.03	4.20	4.90	5.40
u_women rate	38.00	4.06	0.45	3.53	3.66	3.92	4.43	5.00
urate_16-17	38.00	24.39	4.29	19.20	21.10	23.39	25.88	35.48
urate_18-24	38.00	11.25	1.30	9.71	10.22	10.81	11.95	13.85
urate_25-49	38.00	3.18	0.39	2.72	2.87	3.03	3.54	3.95
urate_abv50	38.00	3.02	0.48	2.47	2.60	2.79	3.41	3.92
count		mean	std	min	25%	50%	75%	max
un_rate	38.00	4.27	0.48	3.76	3.87	4.07	4.69	5.22
un_men rate	38.00	4.45	0.51	3.90	4.03	4.20	4.90	5.40
u_women rate	38.00	4.06	0.45	3.53	3.66	3.92	4.43	5.00
urate_16-17	38.00	24.39	4.29	19.20	21.10	23.39	25.88	35.48
urate_18-24	38.00	11.25	1.30	9.71	10.22	10.81	11.95	13.85
urate_25-49	38.00	3.18	0.39	2.72	2.87	3.03	3.54	3.95
urate_abv50	38.00	3.02	0.48	2.47	2.60	2.79	3.41	3.92

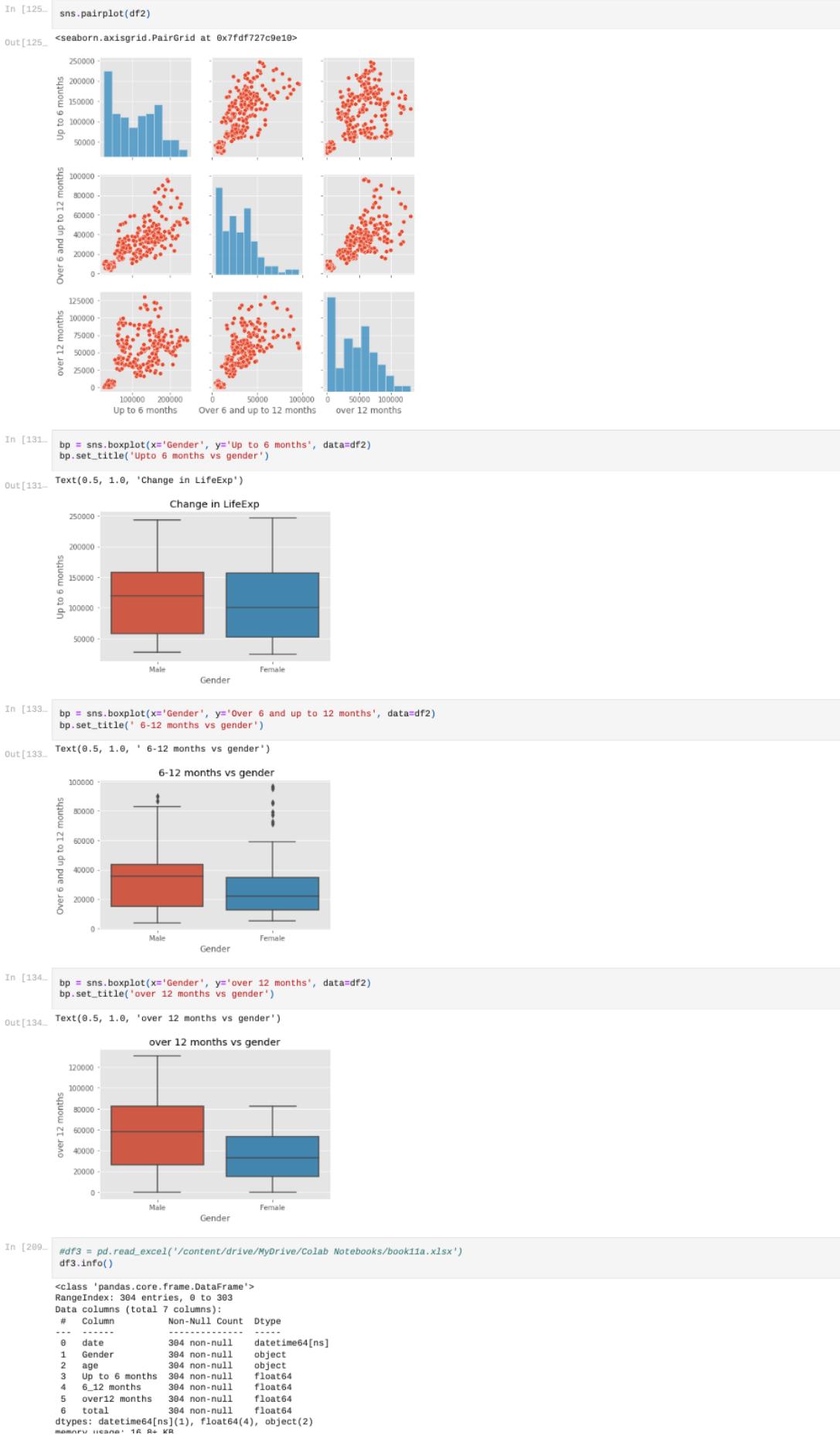
```
In [132]: df2.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 304 entries, 0 to 303
Data columns (total 6 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   date             304 non-null    datetime64[ns]
 1   Gender           304 non-null    object  
 2   age              304 non-null    object  
 3   Up to 6 months  304 non-null    float64
 4   Over 6 and up to 12 months 304 non-null    float64
 5   over 12 months  304 non-null    float64
dtypes: datetime64[ns](1), float64(3), object(2)
memory usage: 14.4+ KB

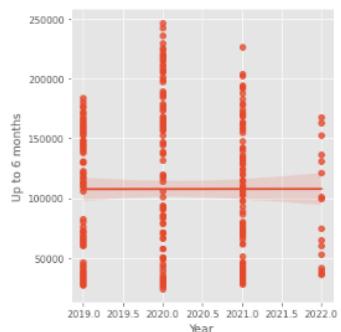
In [108]: colors = {'Mediterranean': '#ff77b4',
                  'Southeastern Anatolia': '#ff77ff0e',
                  'Aegean': "#2ca02c",
                  'Eastern Anatolia': '#d62728',
                  'Central Anatolia': '#9467bd',
                  'Blacksea': '#bbc5e0',
                  'Marmara': '#e377c2'}
```

```
In [165]: p = df2.hist(figsize = (10,10))

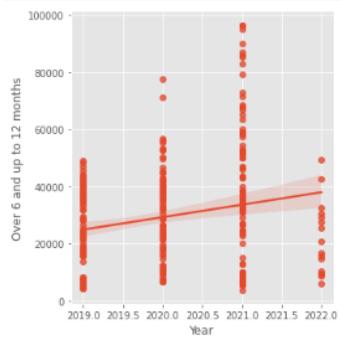

```



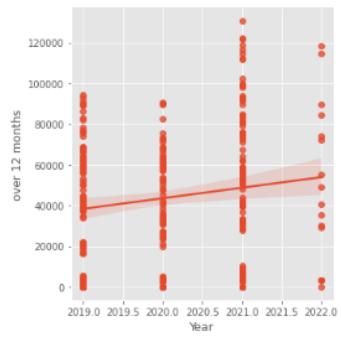
```
memory usage: 10.8+ KB
In [180]: sns.lmplot(x="Year", y="Up to 6 months", data=df2);
```



```
In [181]: sns.lmplot(x="Year", y="Over 6 and up to 12 months", data=df2);
```



```
In [182]: sns.lmplot(x="Year", y="over 12 months", data=df2);
```



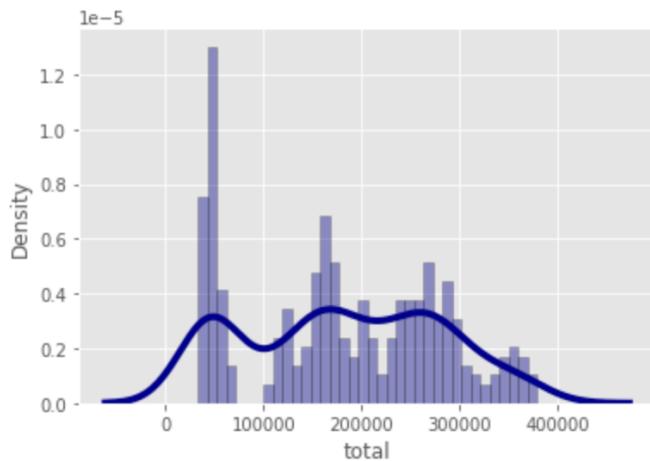
```

▶ import seaborn as sns

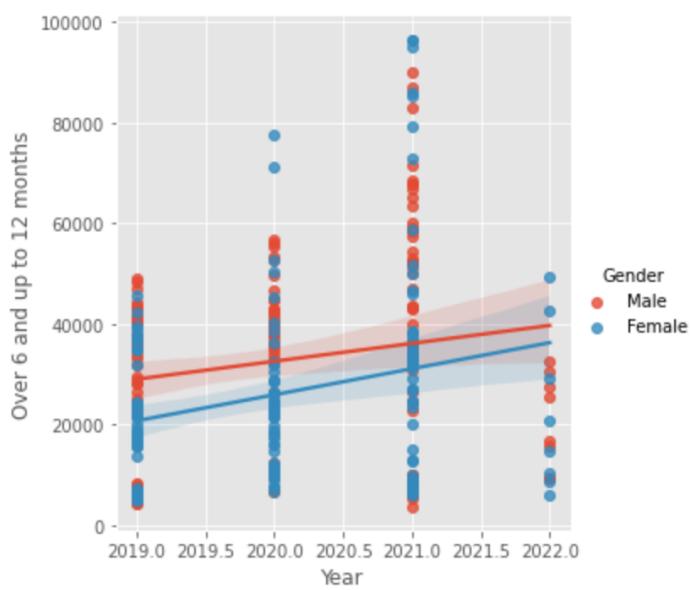
sns.distplot(df3['total'], hist=True, kde=True,
             bins=int(180/5), color = 'darkblue',
             hist_kws={'edgecolor':'black'},
             kde_kws={'linewidth': 4});

↳ /usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2619: FutureWarning:
`distplot` is a deprecated function and will be removed in a future version.

```



```
[ ] sns.lmplot(x="Year", y="Over 6 and up to 12 months", data=df2,hue='Gender');
```



```
▶ sns.lmplot(x="Year", y="Up to 6 months", data=df2, x_estimator=np.mean);
```

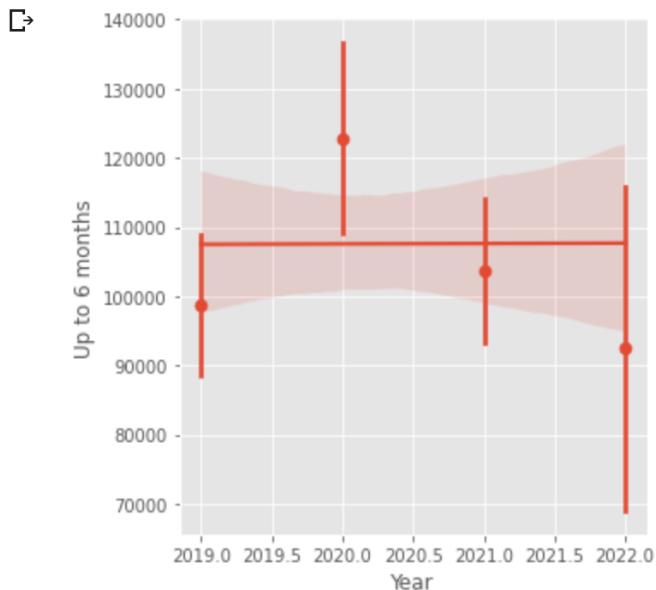


Table 1:

In what way was turnover outside its normal range in the last two weeks?	Furlough rate
Not sure	16.4
Turnover has decreased between 20% and 50%	30
Turnover has decreased by more than 50%	60.6
Turnover has decreased by up to 20%	12.1
Turnover has increased between 20% and 50%	13.7
Turnover has increased by more than 50%	34.1
Turnover has increased by up to 20%	5.4
Turnover has not been affected	7.6

Table 2:

What are the expectations turnover in the next two weeks?	Furlough rate
Not sure	9.7
Expect it to substantially decrease	37.1
Expect it to decrease a little	19.6
Expect it to stay the same	42.3
Expect it to increase a little	44.6
Expect it to substantially increase	19.3