

# Unemployment Benefits in New York State

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# Unemployment Insurance in New York State

*We selected the unemployment insurance dataset from data.ny.gov with information on the number of beneficiaries and amount paid out by county from 2001 to 2020 and will explore the following questions:*

- 1 Are there patterns in unemployment benefits over the last 20 years throughout the state of New York?
- 2 How does unemployment in New York during the COVID-19 pandemic compare to the previous two recessions our country has experienced?
- 3 Are there any geographical differences in unemployment benefits throughout the state?
- 4 How did New York City compare to the rest of New York during these different time periods?
- 5 Given that New York City was the initial epicenter of the COVID-19 pandemic, which of the boroughs felt the harshest economic impact of the virus?



# Data Cleaning and Preprocessing

We merged the following datasets to analyze unemployment in the state of New York from 2001-2020.

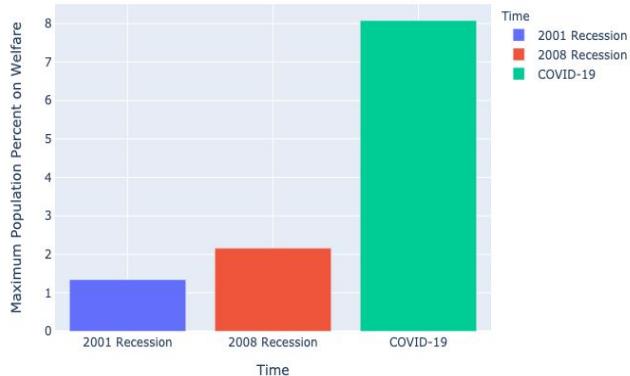
Dataset Name	Key Columns	Data Cleaning
Unemployment Insurance: Beginning 2001	County, Region, Month, Year, Beneficiaries, and Benefit Amounts (Dollars)	<ul style="list-style-type: none"><li>Removed unknown and out of state counties when merged with population data</li><li>Calculated Average Benefits per Beneficiary</li></ul>
US Inflation Calculator	Inflation Rate	<ul style="list-style-type: none"><li>Merged with the unemployment insurance data frame based on year and month</li><li>Calculated the Adjusted Benefits Per Beneficiary and Adjusted Benefits Amounts</li></ul>
Annual Population Estimates for NY State from 1970	Population (2001-2019), FIPS Code	<ul style="list-style-type: none"><li>Merged with the unemployment insurance data frame based on county and year</li><li>Filled in the FIPS code for the 2020 rows</li><li>Calculated the Percent Population on Welfare</li></ul>
New York Counties by Population	Population ( <i>only</i> 2020)	<ul style="list-style-type: none"><li>Merged with the unemployment insurance data frame for 2020 based on county</li></ul>

# Brief Summary of Our Approach

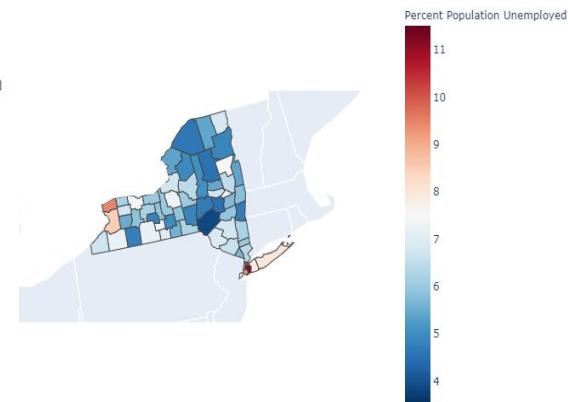
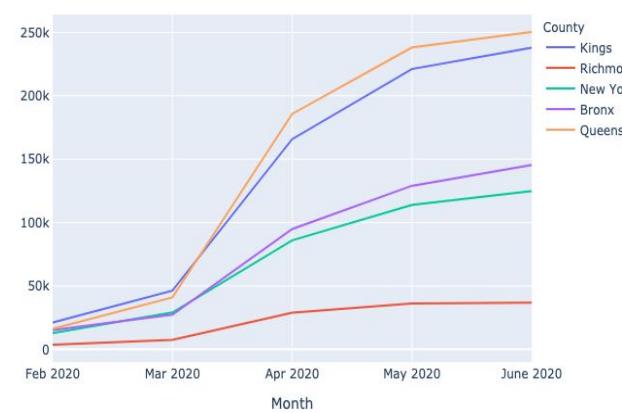


*We used a combination of queries and visualizations to gain an understanding of our dataset.*

Comparing Unemployment Since 2001 in New York



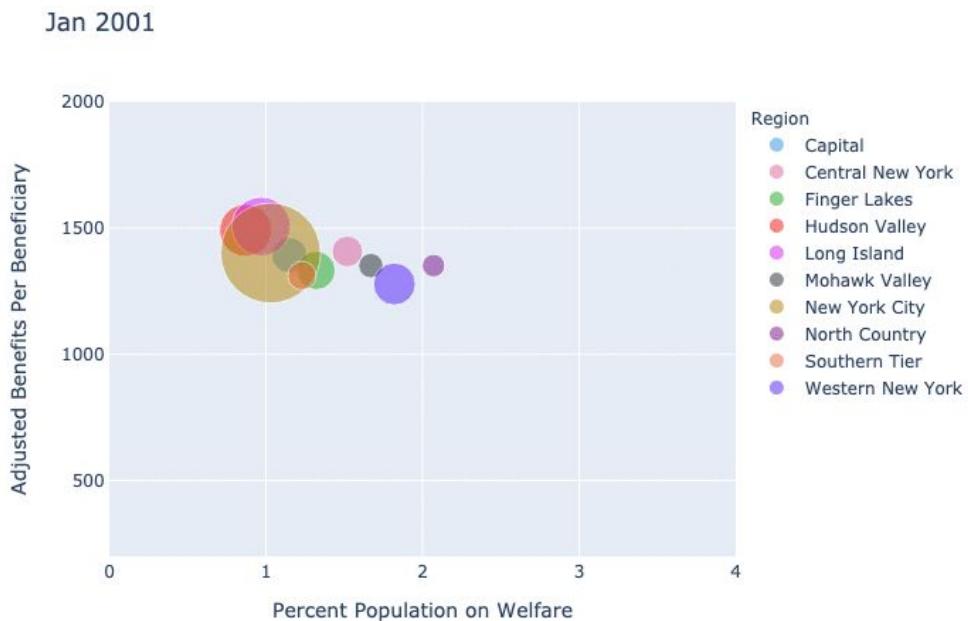
Number of Beneficiaries Over Time



# Are there patterns in unemployment benefits over the last 20 years throughout the state of New York?



*Benefits per beneficiary increases during the recessions, and cyclical unemployment exists during the winter months for the rural regions of New York State.*

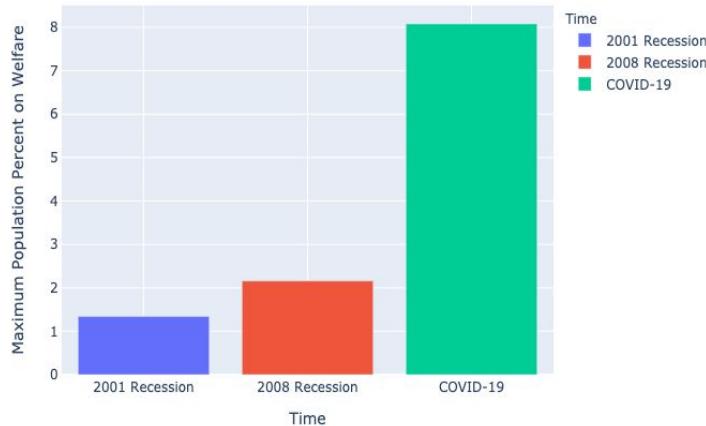




# How does unemployment in New York during the COVID-19 pandemic compare to the previous two recessions?

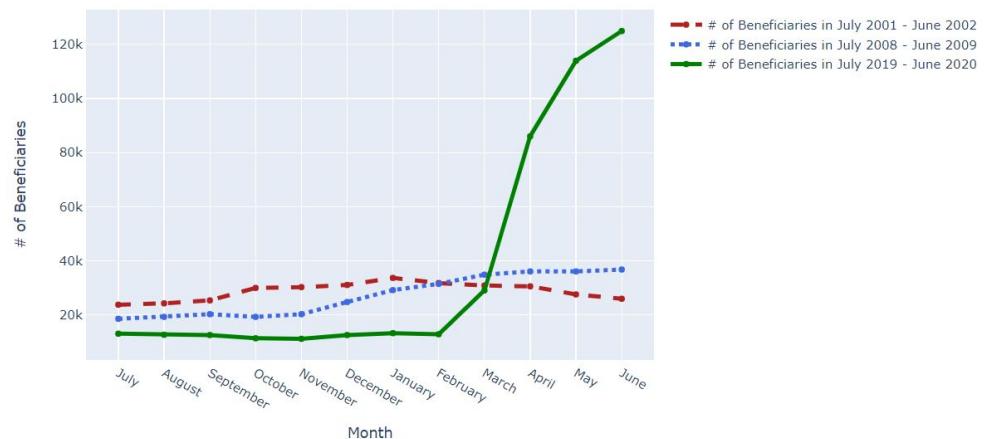
*The maximum number of unemployment beneficiaries has increased over each recession and spiked during the recession caused by COVID-19.*

Comparing Unemployment Since 2001 in New York



Please enter the county name: New York

Number of Unemployment Beneficiaries for Each Recessions in the 2000s in New York County

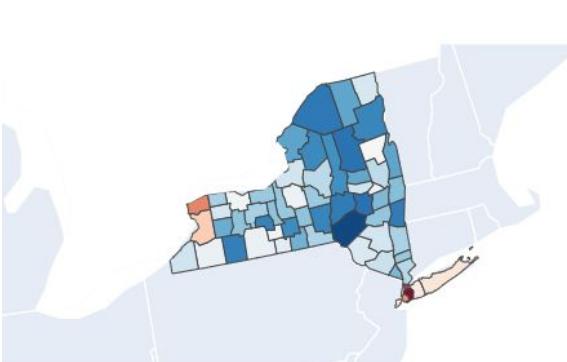


# Are there any geographical differences in unemployment benefits throughout the state?

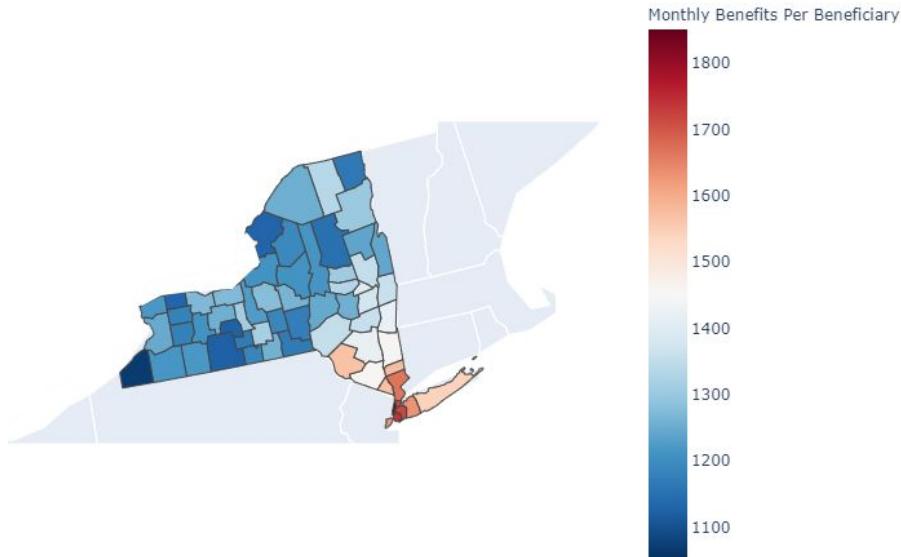


*The highest percentages of unemployment and monthly benefits are located in the New York City boroughs, but these statistics are not correlated in the rest of New York State.*

**Map of % Population Unemployed in June 2020**



**Map of Monthly Benefits in June 2020**

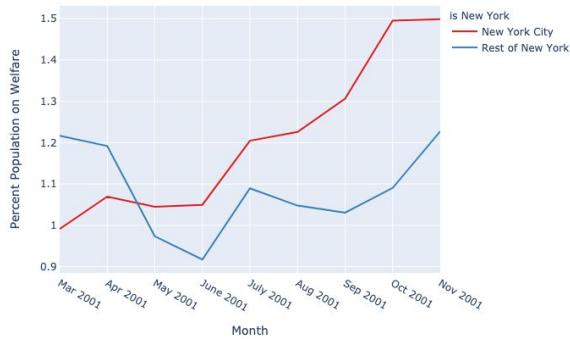


# How did New York City compare to the rest of New York during these different time periods?

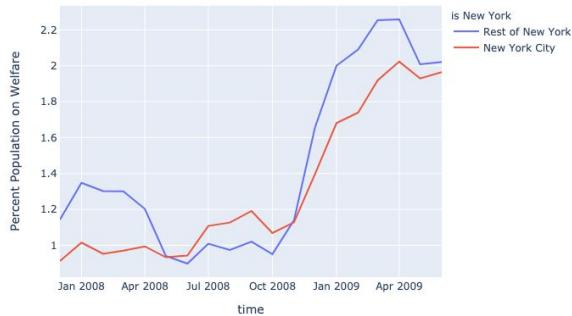


*Unlike previous recessions, New York City has been impacted the most in terms of unemployment during the COVID-19 recession, as compared with the rest of the state. This observation provides insight into the unique nature of this recession as opposed to those of 2001 and 2008.*

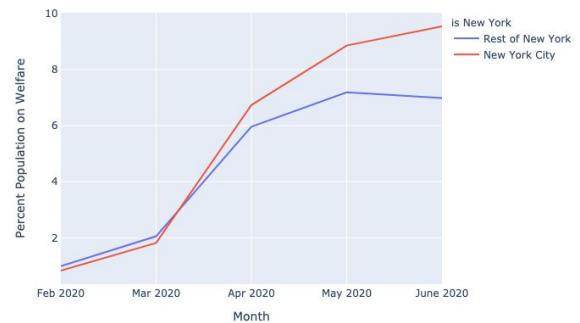
Percent Population on Welfare during 2001 Recession



Percent Population on Welfare during Great Recession



Percent Population on Welfare during Covid-19 Recession

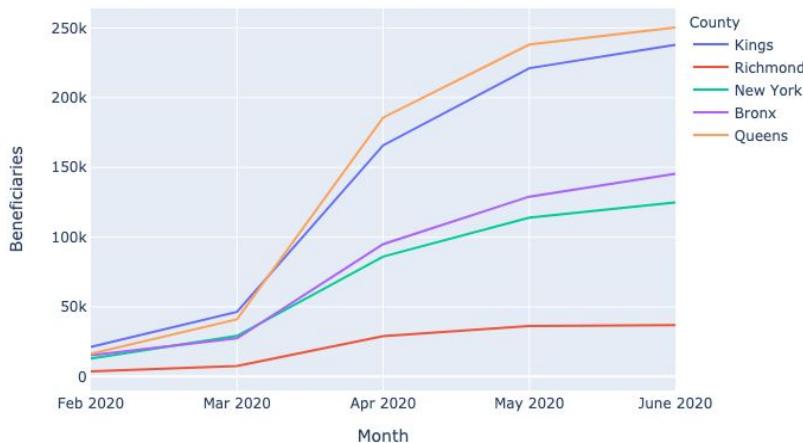


# Which of the boroughs felt the harshest economic impact of the virus?

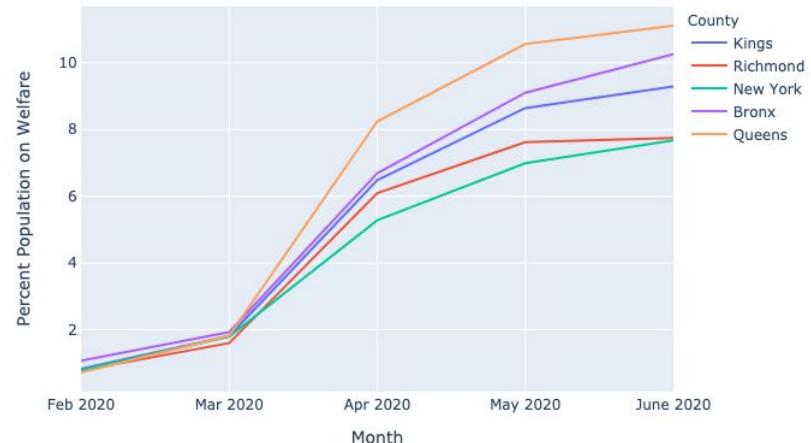


*Queens has seen the greatest increase in unemployment beneficiaries from February 2020 to June 2020. While Richmond has fewer new beneficiaries, the percent population on unemployment increased at approximately the same rate as New York County.*

Number of Beneficiaries Over Time



Percent Population on Welfare Over Time



# Going Beyond the Specifications



We used information from multiple datasets to help refine our data. We created user input feature that allows user to develop their own visualizations on County Data. We used Interactive maps as well as animated graphs to help analyze unemployment data.

----Welcome to the Create Your Own Graph Method---

Here are your graph options:

1. Percent Population on Welfare over Time for a list of Counties:
2. Adjusted Benefits Per Beneficiary over Time for a list of Counties:
3. Adjusted Benefits Amounts over Time for a list of Counties:
4. Beneficiaries over Time for a list of Counties:

Enter Option Number: 4

Enter the start point of your time period with Month spaced By Year: February 2020

Enter the end point of your time period with Month spaced By Year: June 2020

Enter the start point of your time period with Month spaced By Year: February 2020

Enter the end point of your time period with Month spaced By Year: June 2020

Enter County Name (type q to quit):Bronx

Enter County Name (type q to quit):Queens

Enter County Name (type q to quit):Kings

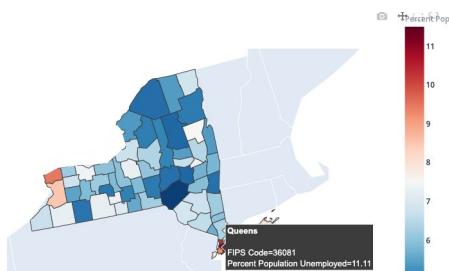
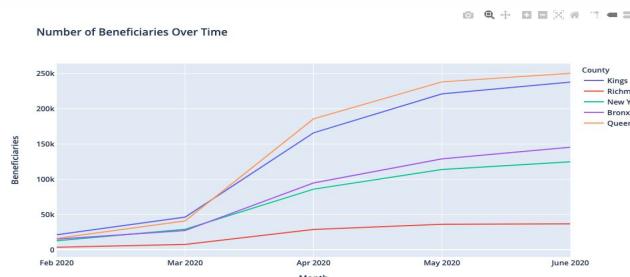
Enter County Name (type q to quit):Richmond

Enter County Name (type q to quit):New York

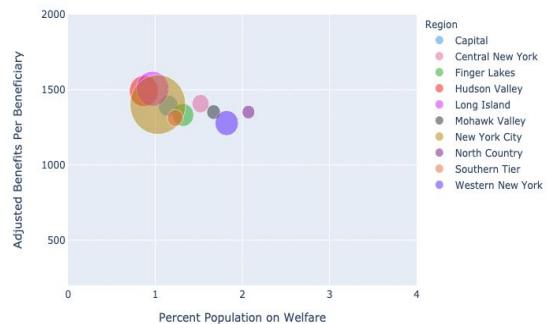
Enter County Name (type q to quit):q

{'Bronx', 'Queens', 'Kings', 'Richmond', 'New York'}

/Users/siddhartharupaneni/opt/anaconda3/lib/python3.7/site-packages/ipykernel\_launcher.py:6: FutureWarning: Indexing with multiple keys (implicitly converted to a tuple of keys) will be deprecated, use a list instead.



Jan 2001



# Testing the Data and Analysis



A combination of unit tests and visual testing were used to confirm the accuracy of our data transformation and analysis.

## Unit Tests

```
class Unemployment(unittest.TestCase):
    # Test to make sure all null FIPS codes were removed.
    def test_FIPS_isnot_null(self):
        self.assertIsNotNone(county_clean['FIPS Code'])

    # Test to ensure all FIPS codes for one county are the same and equal the correct value
    def test_FIPS_is_correct(self):
        self.assertEqual(county_clean['FIPS Code'][county_clean['County']=='Queens'].mean(),36081)

    # Test to check the data starts with the year 2001
    def test_min_year_is_2001(self):
        self.assertEqual(county_clean['Year'].min(),2001)

    # Test to make sure columns were deleted and column count is correct
    def test_column_count(self):
        self.assertEqual(len(county_clean.columns), 13)

    # Test to make sure no percentage is over 100%
    def test_percent_max(self):
        self.assertTrue(max(county_clean['Percent Population on Welfare'])<=100)
```

```
Ran 7 tests in 0.015s
```

```
OK
```

## Visual Testing

Completed the following visual testing:

1. Loading data from csv - compare one row/value with website
2. Writing data to csv - compared one row/value with loaded csv
3. Check that Benefits per Beneficiary returns 0 when Beneficiaries = 0
4. Check that the population column only contains integers

# Conclusion



*After merging unemployment insurance, population, and inflation rate data, we were able to draw the following conclusions based on our analysis:*



Unemployment benefits are highly correlated with economic recessions, and these recessions have resulted in varying effects on unemployment.



This data could be used by others to predict how the number of beneficiaries will change based on the rapid rise in the number of unemployment beneficiaries.



New York City and surrounding counties were hit hardest during COVID-19, and this has resulted in higher than average monthly benefit per beneficiary.



With more time, we would investigate the industries that make up New York City and specifically the five boroughs.