COVID 19 Policy Recommendations for Caladan

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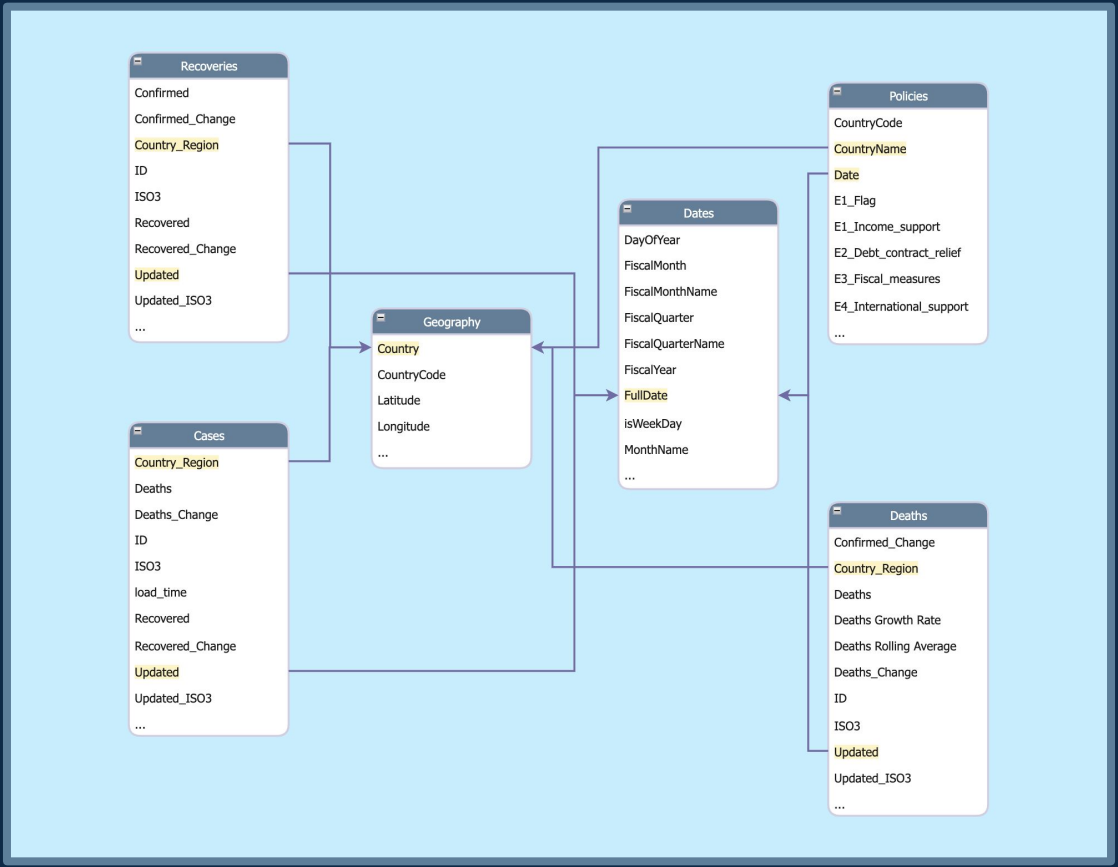
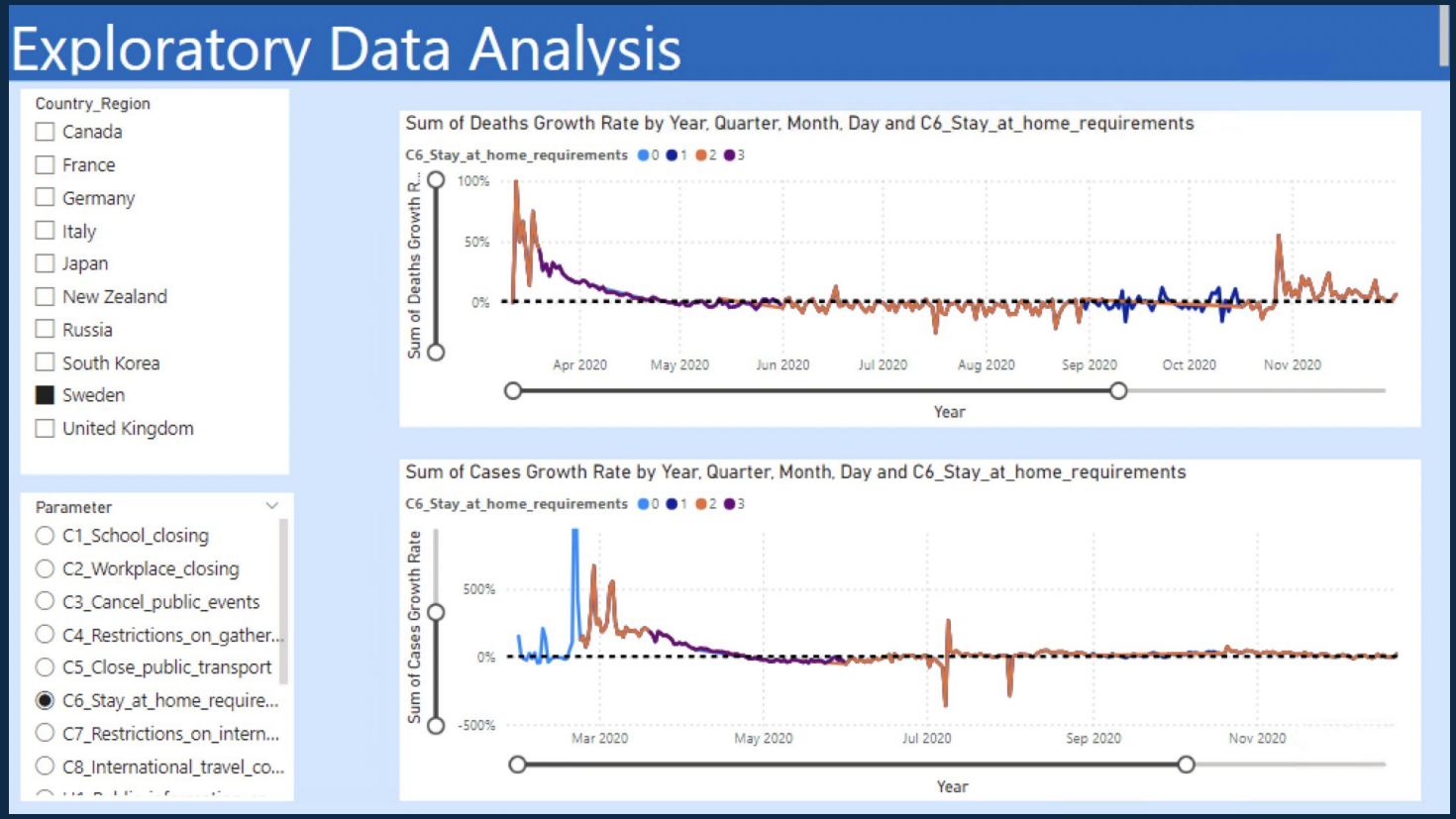
Problem	Caladan is a midsize commonwealth with a population of 3.2 million, featuring two major urban centers, Duncan and Stillgard. The leaders of Caladan are concerned about the impact of the virus and are seeking effective policies to mitigate its spread while keeping the economy as unrestricted as possible.
Goals	Help Caladan's government leaders determine the most effective, minimally restrictive policies that can keep the growth rate of COVID-19 deaths below 1% and the growth rate of new cases below 3% on a 30-day rolling average.
Approach	Utilized a linear regression model to examine the relationship between the policies and the death growth rates/cases growth rates

Galaxy Schema



Exploratory Data Analysis



Confirmatory Data Analysis

Two linear regression models were created to learn the relationship between the policies and the death growth rates and the coefficients corresponding to each policy were ranked to obtain the order of the policies with the most significant impact. We narrowed down 4 policies that overlapped as most significant for both growth rates.

In [290]:

```
from sklearn.linear_model import LinearRegression

## LINEAR REGRESSION FOR CASES GROWTH RATE AGAINST POLICIES

X_cols = ['C1_School_closing', 'C2_Workplace_closing', 'C3_Cancel_public_events',
          'C4_Restrictions_on_gatherings', 'C5_Close_public_transport',
          'C6_Stay_at_home_requirements', 'C7_Restrictions_on_internal_movement',
          'C8_International_travel_controls', 'E1_Income_support',
          'E2_Debt_contract_relief', 'E3_Fiscal_measures', 'E4_International_support',
          'H1_Public_information_campaigns', 'H2_Testing_policy', 'H3_Contact_tracing',
          'H4_Emergency_investment_in_healthcare', 'H6_Facial_Coverings',
          'H7_Vaccination_policy', 'H8_Protection_of_elderly_people']

X = dfcases[X_cols]
y = dfcases['Cases Growth Rate']
model = LinearRegression()
model.fit(X, y)

result = pd.DataFrame({"Coefficient": model.coef_, "Intercept": model.intercept_})
print(result)
```

```
    Coefficient  Intercept
0 -3.137759e-02   0.023354
1  1.055935e-02   0.023354
2 -1.537395e-02   0.023354
3  8.538424e-04   0.023354
4 -6.775959e-03   0.023354
5  2.292902e-02   0.023354
6 -4.208675e-03   0.023354
7 -6.847045e-04   0.023354
8 -1.193934e-02   0.023354
9 -5.383634e-03   0.023354
10 -2.505659e-14   0.023354
11 -7.837292e-13   0.023354
12  2.602085e-18   0.023354
13  1.254895e-02   0.023354
14 -1.933842e-02   0.023354
15  4.072723e-12   0.023354
16  1.128402e-03   0.023354
17  0.000000e+00   0.023354
18  2.267924e-02   0.023354
```

Top Features:

	Feature	Coefficient
0	C1_School_closing	−3.137759e-02
5	C6_Stay_at_home_requirements	−2.292902e-02
2	C3_Cancel_public_events	−1.537395e-02
8	E1_Income_support	−1.193934e-02
4	C5_Close_public_transport	−6.775959e-03
16	H6_Facial_Coverings	−1.128402e-03
6	C7_Restrictions_on_internal_movement	−4.208675e-03
7	C8_International_travel_controls	−6.847045e-04
11	E4_International_support	−7.837292e-13
10	E3_Fiscal_measures	−2.505659e-14
17	H7_Vaccination_policy	0.000000e+00
12	H1_Public_information_campaigns	2.602085e-18
15	H4_Emergency_investment_in_healthcare	4.072723e-12
3	C4_Restrictions_on_gatherings	8.538424e-04
9	E2_Debt_contract_relief	5.383634e-03
1	C2_Workplace_closing	1.055935e-02
13	H2_Testing_policy	1.254895e-02
18	H8_Protection_of_elderly_people	2.267924e-02
14	H3_Contact_tracing	1.933842e-02

Top Features:

	Feature	Coefficient
5	C6_Stay_at_home_requirements	−2.467589e-02
2	C3_Cancel_public_events	−1.668817e-02
4	C5_Close_public_transport	−1.123808e-02
16	H6_Facial_Coverings	−1.106383e-02
9	E2_Debt_contract_relief	−6.448139e-03
13	H2_Testing_policy	−5.354533e-03
14	H3_Contact_tracing	−2.107307e-03
7	C8_International_travel_controls	−2.371305e-04
17	H7_Vaccination_policy	0.000000e+00
12	H1_Public_information_campaigns	6.938894e-18
10	E3_Fiscal_measures	9.221065e-14
15	H4_Emergency_investment_in_healthcare	4.318764e-12
11	E4_International_support	1.246284e-11
0	C1_School_closing	1.279788e-03
3	C4_Restrictions_on_gatherings	3.559271e-03
1	C2_Workplace_closing	3.867059e-03
18	H8_Protection_of_elderly_people	1.039132e-02
6	C7_Restrictions_on_internal_movement	1.070187e-02
8	E1_Income_support	2.830049e-02

Policy Recommendations

Stay at Home

Level 1

This policy recommends that all citizens remain at home, with exceptions only for daily exercise, grocery shopping, and trips deemed 'essential.'

Facial Coverings

Level 2

This policy mandates all individuals to wear facial coverings in all indoor and outdoor spaces

Cancel Public Transportation

Level 1

This policy significantly reduces the volume, routes, and means of transportation available.

Cancel Public Gatherings

Level 2

This policy mandates the cancellation of all public events to prevent large gatherings.

Power BI Demonstration