ma615midterm

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Introduction

In this report, one looks at urbanization and carbon dioxide emission throughout the global and investigates into their relationship.

All data used are from World Bank database. And we look specifically at 1995 and 2005 to compare and contrast variable values from different countries.

World Urban Population

One uses the urban population percentage, which is obtained the following formula,

$$urban\ population\ percentage = \frac{urban\ population}{total\ population}$$

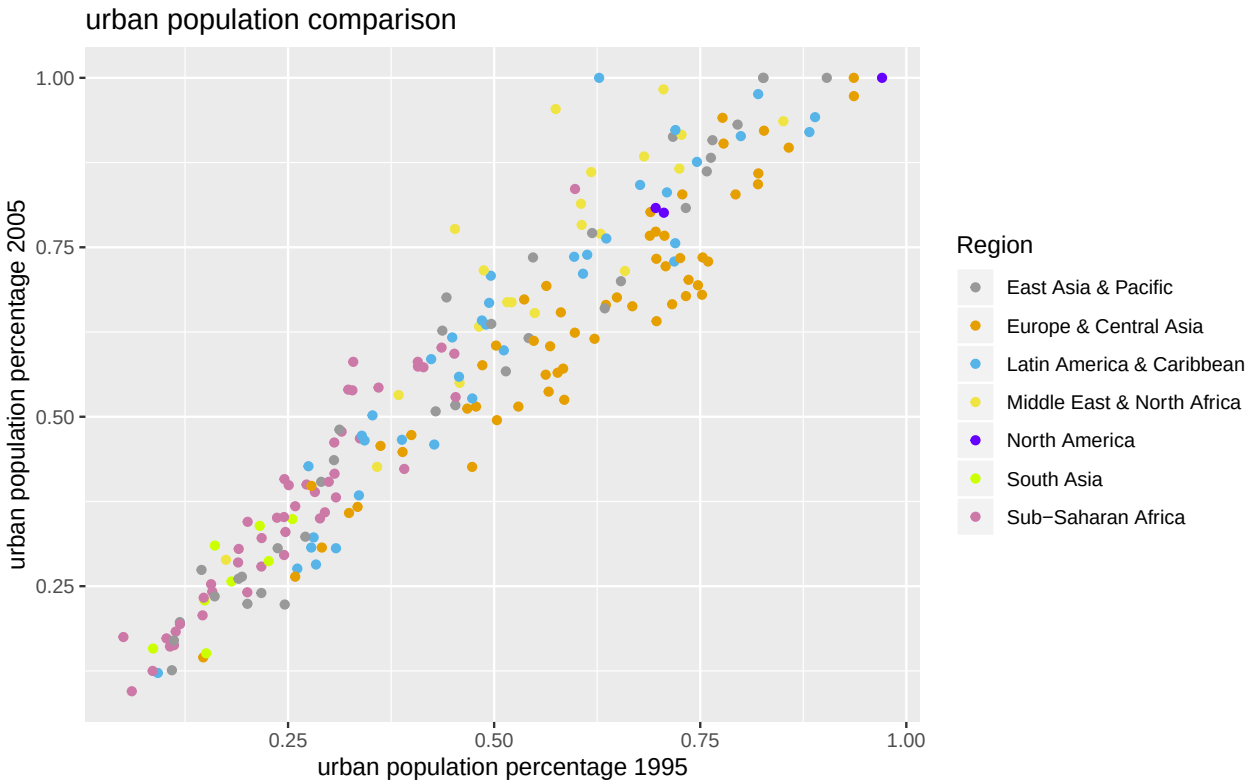
to measure the level of urbanization in each country.

The world is devided into 7 regions by the database, which are
- East Asia & Pacific
- Europe $ Central Asia
- Latin America & Caribbean
- Middle East & North Africa
- North America
- South Asia
- Sub-Saharan Africa

One would follow this devision to compare and contrast the urbanization in different regions.

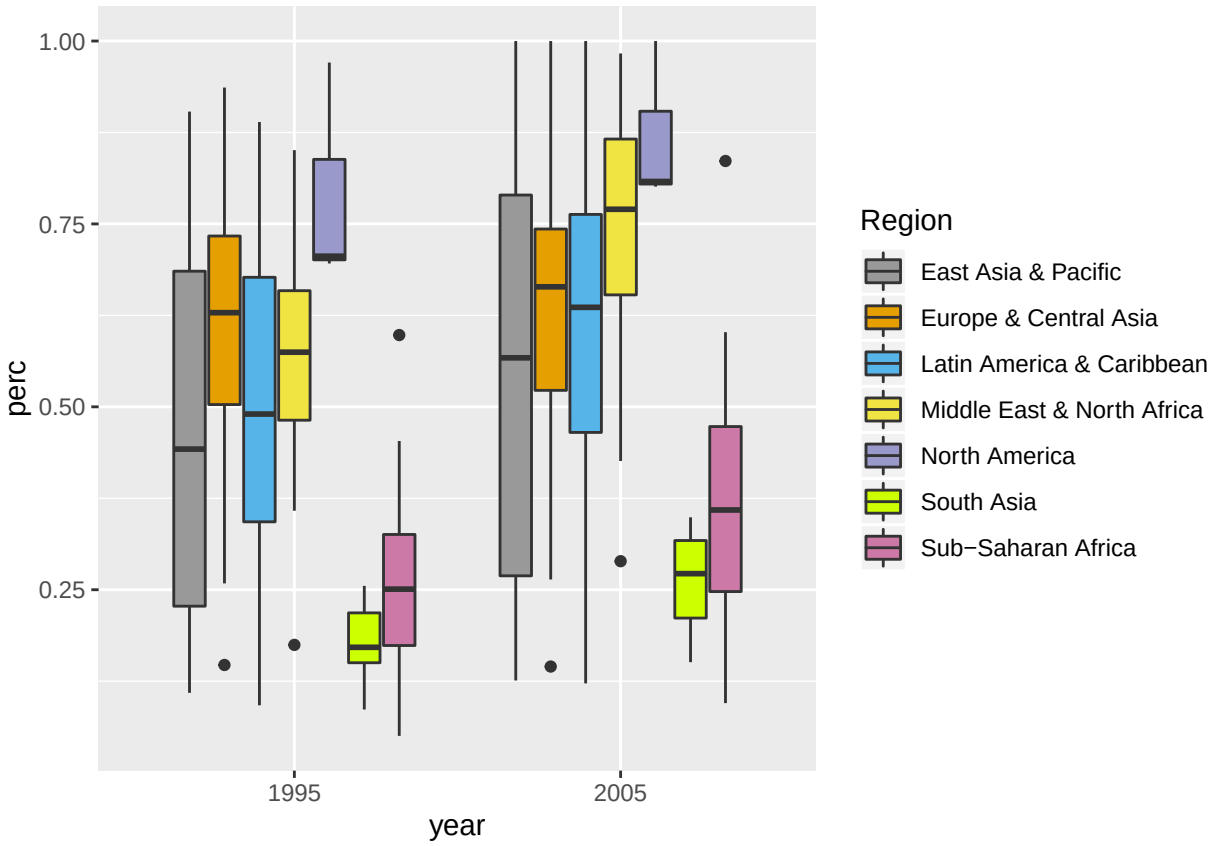
Scatterplot

In the graph below, points above the (imaginary)line going through the origin with slope 1 represent countries with growth in urban population percentage from 1995 to 2005.



Boxplot

We can compare the changes in overall urbanization in the seven regions from 1995 to 2005.



The outliner for Europe & Central Asia Region in 1995 and 2005 is Liechtenstein.
In Middle East & North Africa, the country with an abnormally low urban population percentage is Yemen, Rep. the Sub-Saharan African country that has an abnormally high urban population percentage in both years is Gabon.

Top 10

Table 1: Countries with Lagest Urban Population Percentage

1995		2005	
Country	Urban Population %	Country	Urban Population %
Bermuda	0.9706	Bermuda	1.000
Belgium	0.9364	Cayman Islands	1.000
Monaco	0.9363	Hong Kong SAR, China	1.000
Hong Kong SAR, China	0.9036	Macao SAR, China	1.000
Virgin Islands (U.S.)	0.8893	Monaco	1.000
Uruguay	0.8825	Singapore	1.000
United Kingdom	0.8574	Kuwait	0.983
Malta	0.8508	Puerto Rico	0.976
Iceland	0.8273	Belgium	0.973
Macao SAR, China	0.8268	Qatar	0.954

Countries with bigest Increase

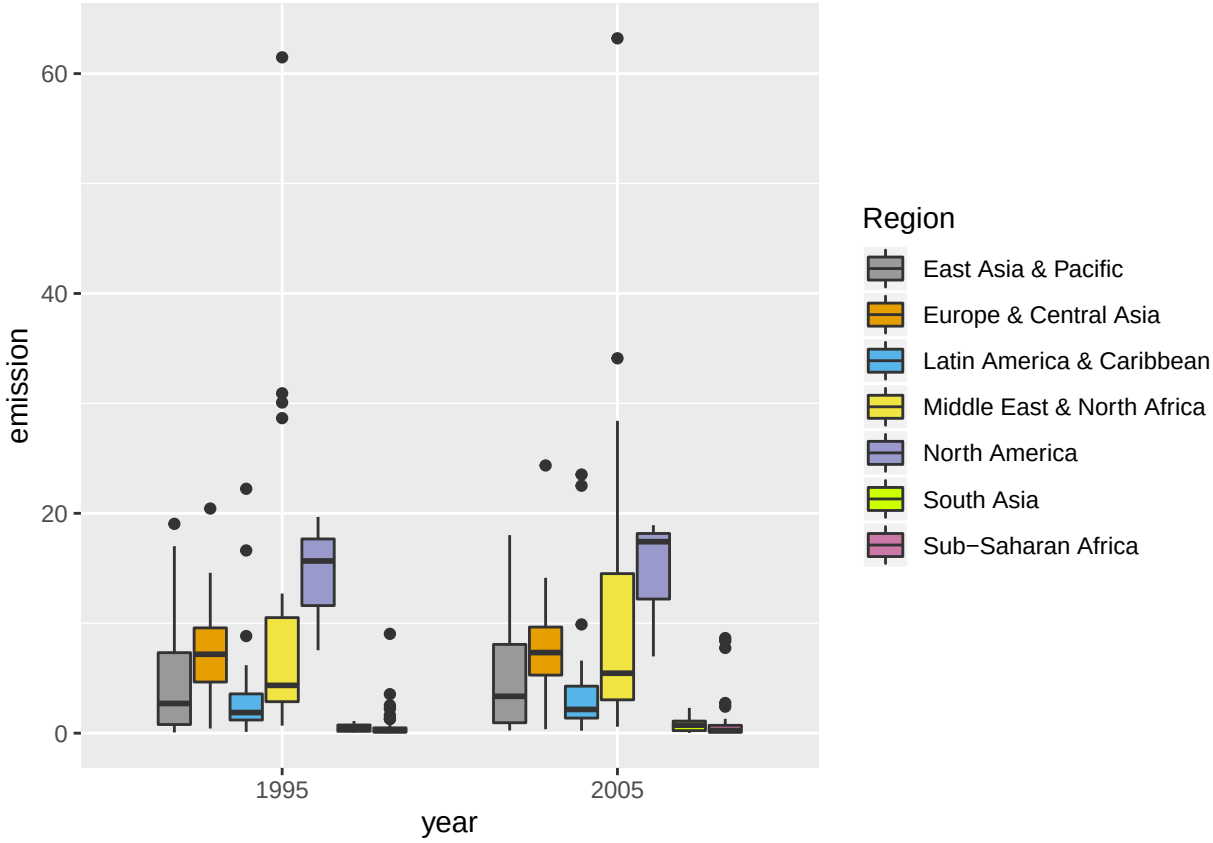
This is a list of the 10 countries whose urban population witnessed the greatest increase in the observed 10 years.

Table 2: Countries with bigest Increase 1995-2005

Country	Urban Population % 1995	Urban Population % 2005	Increment
Qatar	0.5747	0.954	0.3793
Cayman Islands	0.6274	1.000	0.3726
United Arab Emirates	0.4525	0.777	0.3245
Kuwait	0.7054	0.983	0.2776
Liberia	0.3291	0.581	0.2519
Djibouti	0.6177	0.861	0.2433
Gabon	0.5981	0.836	0.2379
Malaysia	0.4422	0.676	0.2338
West Bank and Gaza	0.4874	0.716	0.2286
Angola	0.3230	0.540	0.2170

Carbon Dioxide Emission Per Capita

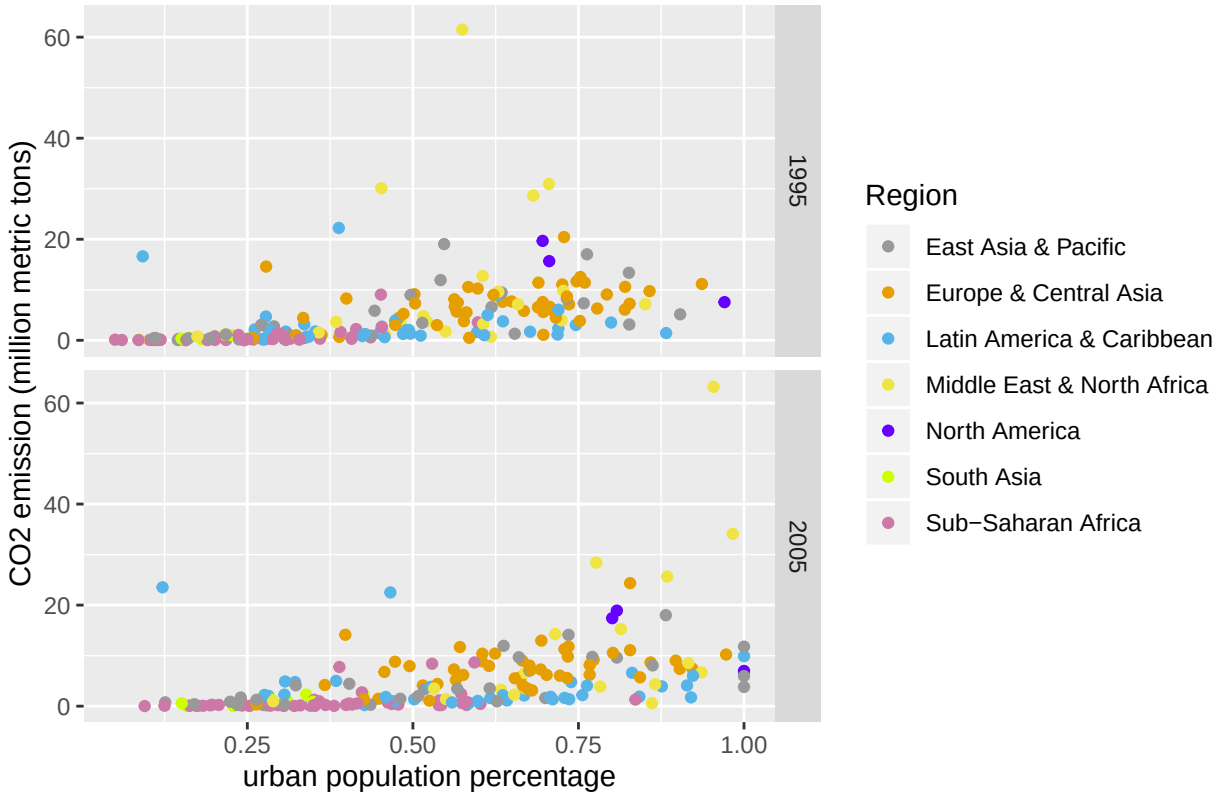
Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring.



Urbanization and Carbon Dioxide Emission

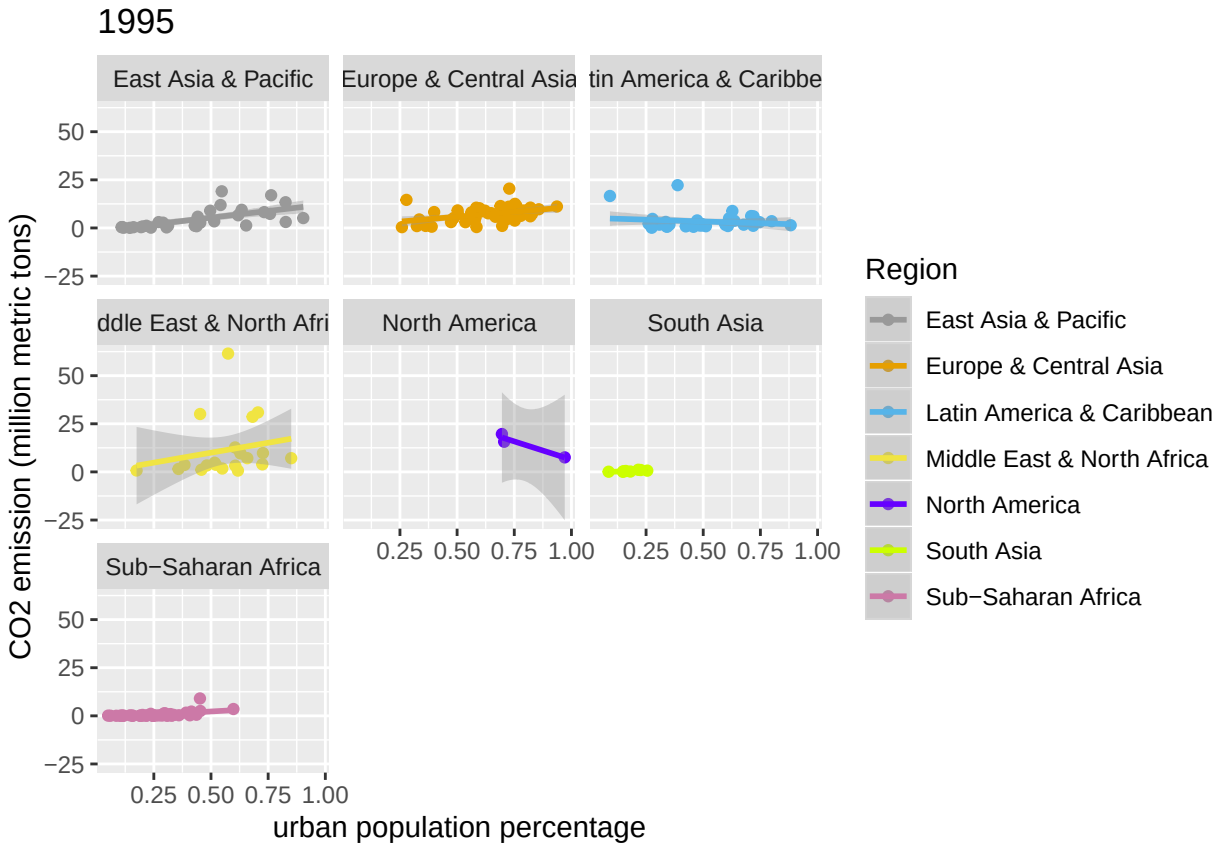
Now one proceed to investigate into the relationship between the two variables. A positive relationship is suspected because CO2 emission can reflect the environmental impact of urbanization.

Scatterplot

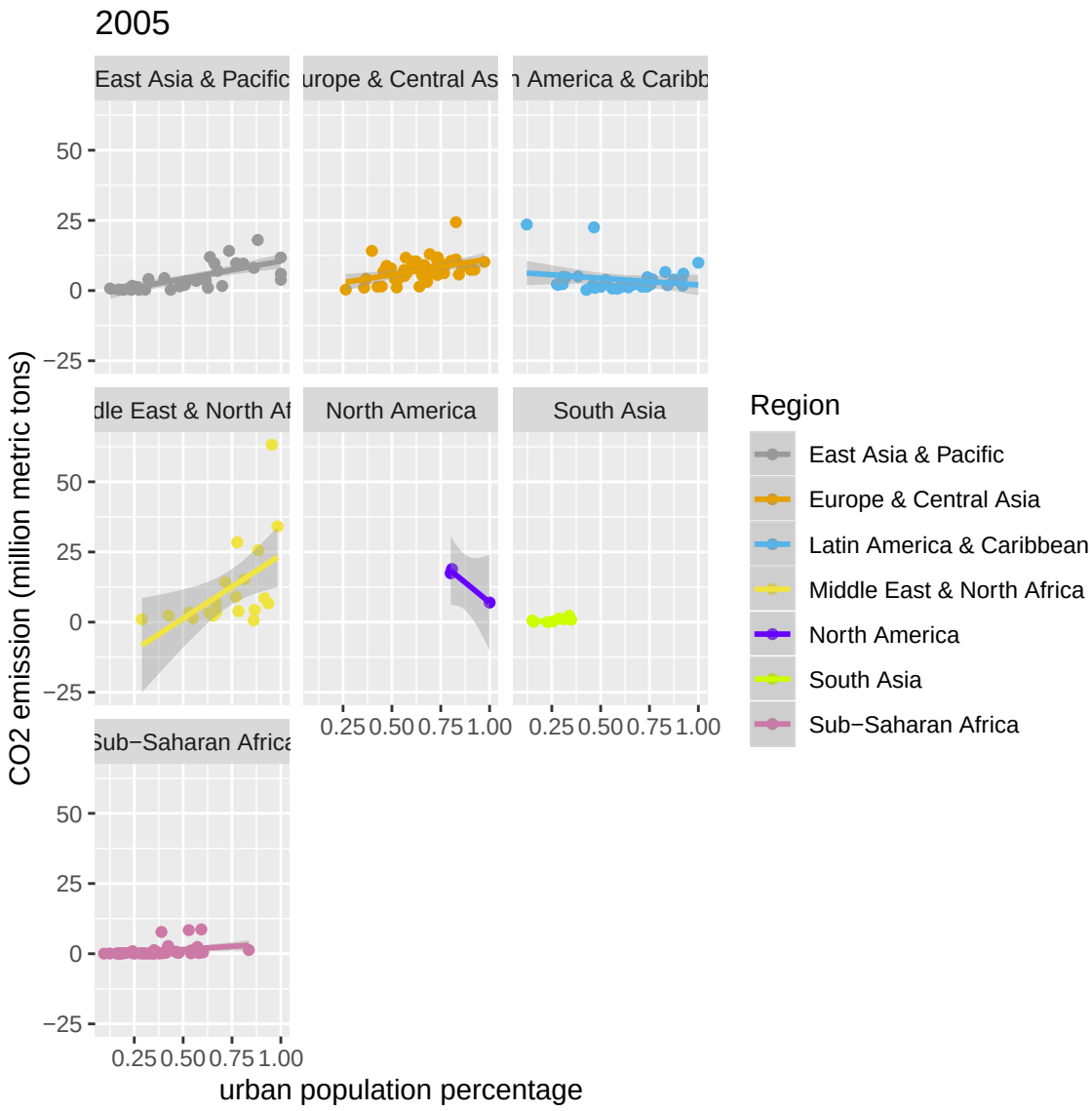


Possible linear relationship

If we look at the relationship exhibited within region,



In 2005, the trend is similar although the actual slopes are slightly different.


2005
East Asia & Pacific
urope & Central As
n America & Caribb
dle East & North Af
North America
South Asia
ub−Saharan Africa
50
25
0
−25
0.25
0.50
0.75
1.00
CO2 emission (million metric tons)
urban population percentage
Region
East Asia & Pacific
Europe & Central Asia
Latin America & Caribbean
Middle East & North Africa
North America
South Asia
Sub−Saharan Africa