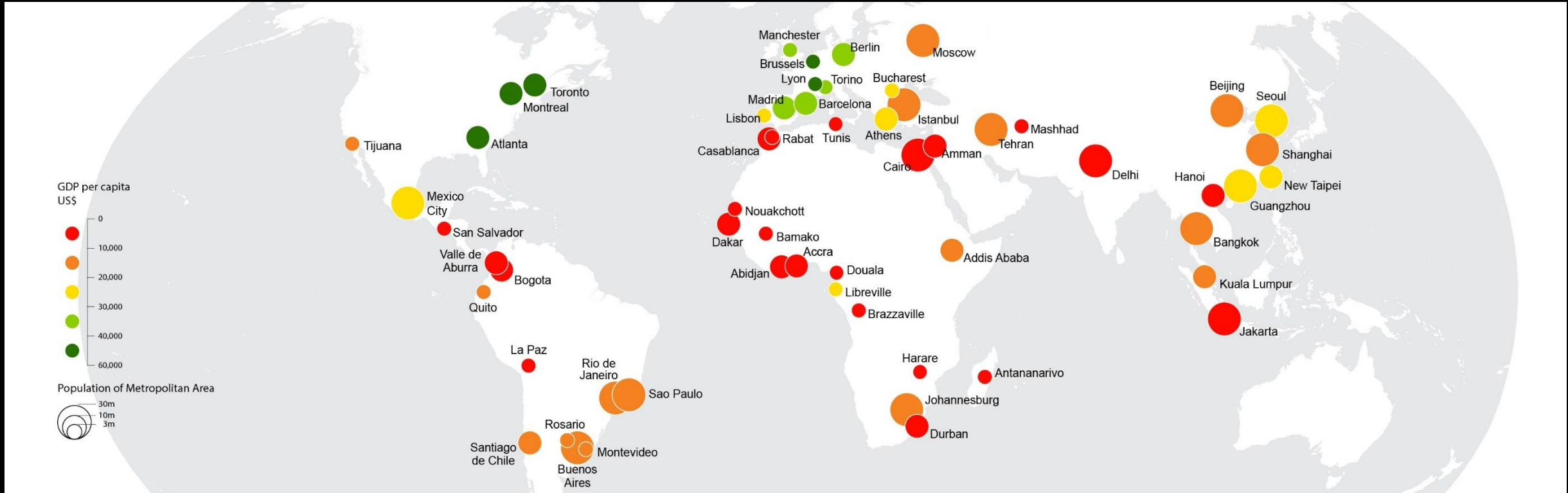


METROPOLITAN INDICATORS

a global database of metropolitan territories



Metropolitan policies and indicators of social cohesion
Barcelona, 27 June 2019

Nuno F. da Cruz
@NFdaCruz

LSE **Cities**

Cities, urban areas, urban agglomerations,
megacities, metropolises, metropolitan
areas, metropolitan statistical areas,
functional areas, city-regions, urban regions,
commuter belts, conurbations (...)

METROPOLITAN INDICATORS PROJECT

The growth of metropolitan areas is reshaping governance and the urban landscape around the world, presenting new challenges but also opportunities for the management of territories.

Global comparative research and governance is confronted with a substantial lack of data at the metropolitan scale.

Objectives:

1. Develop a system of about 30 metropolitan indicators (including new and existing metrics).
2. Collect the corresponding data for 50 metropolitan areas.
3. Produce a brief overview of the main findings



CONTEXT

- More than 3 billion people live in urban areas, yet **no globally standardised** way of **defining urban boundaries**
- Habitat III and **New Urban Agenda** emphasise need for **better data and measurement harmonisation at the level of metropolitan regions** – global recognition that metropolitan management matters.
- **Most rapid population growth tends to be in the urban hinterlands/peripheries** that are not covered by administrative city boundaries
- **Inequalities** at the metropolitan scale – e.g. in terms of access to income, services and amenities – can be more extreme than at other scales

WHY DO WE NEED A CONSISTENT WAY OF MEASURING URBAN AREAS?

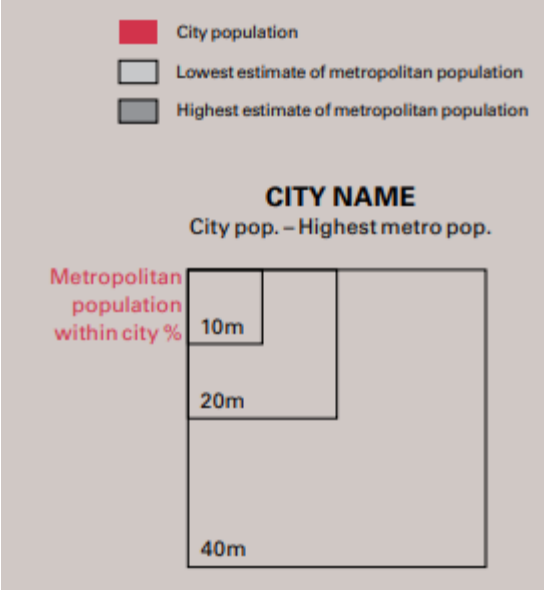
- Important to understand reality of *where* and *how* people live, work and play for urban policy to be coordinated and effective and institutions to work properly
- Challenge of individuals using public services in one place but paying taxes in another – taxation, voice and representation
- Mostly **fixed administrations** vs **many dynamic features** (social, spatial, economic and environmental) – territorial management
- Connection between cities and surrounding areas can have major influence on location of economic activities with major impact on **national growth, environmental performance** and **quality of life**
- Cities want to compare their economic, social and environmental performance with their 'peers' around the world

FIRST TASK

Defining the operational concept of “metropolitan area”

- Develop a methodology for **setting the boundaries of metropolitan areas** (unit of analysis) and suggest how to prioritise urban data sets and collect the most relevant data at the metropolitan scale
- Compare **different approaches** for defining urban areas and understand the **benefits and drawbacks** of different measurement approaches

FINDING THE ‘FIT’ BETWEEN ADMINISTRATIVE CITIES AND METROPOLITAN AREAS



WHAT ARE DIFFERENT WAYS OF DEFINING WHAT THE METROPOLITAN AREA IS AND HOW DO YOU MEASURE IT?

ADMINISTRATIVE BOUNDARY (Political) Territory contained within the legally defined municipal boundaries.

URBAN AGGLOMERATION/URBANISED AREA (Demographic) Area contained within a contiguous territory inhabited at certain urban density levels (threshold varies by country) without regard to administrative boundaries.

URBAN FOOTPRINT (Physical) Extent of contiguous built-up area, measured using high-resolution satellite data.

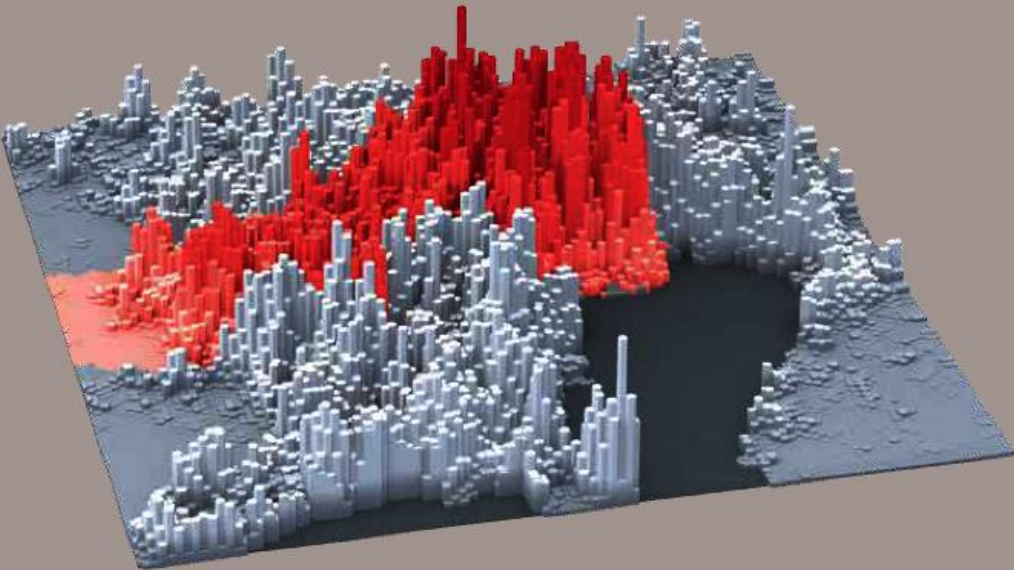
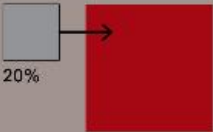
METROPOLITAN AREA/FUNCTIONAL URBAN AREA (Functional) Large urban core + adjacent areas with a high degree of economic and social integration. Most commonly measured using population density, employment, and commuting data (thresholds vary by country). Areas tend to include communities that are physically separated from the main urban core.

URBAN AREAS AND ADMINISTRATIVE BOUNDARY

TOKYO

33,000 people/km²

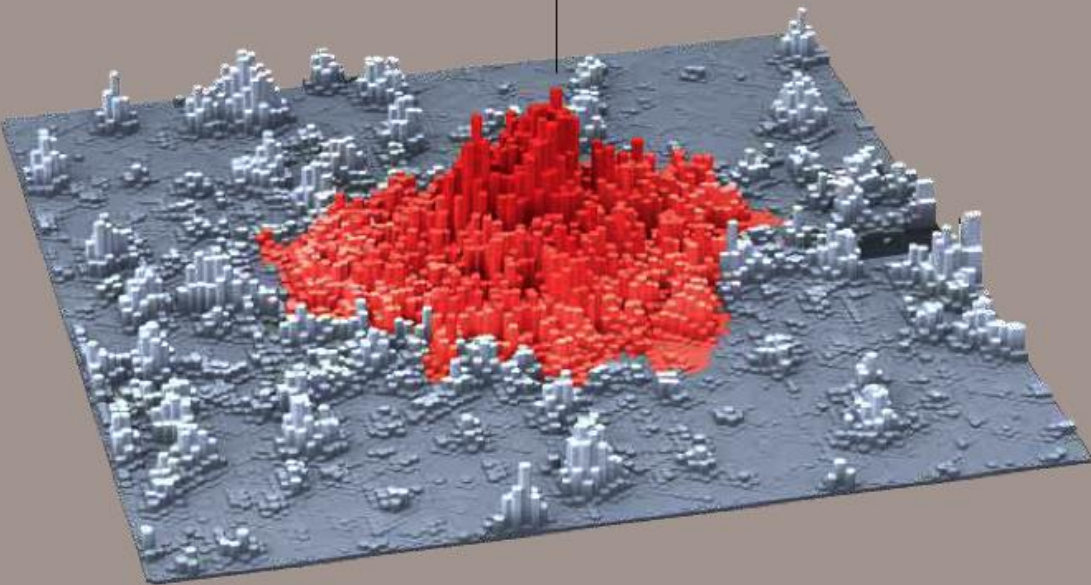
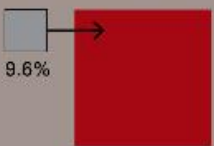
2,530,000 commuters entering
administrative city per day (2010)



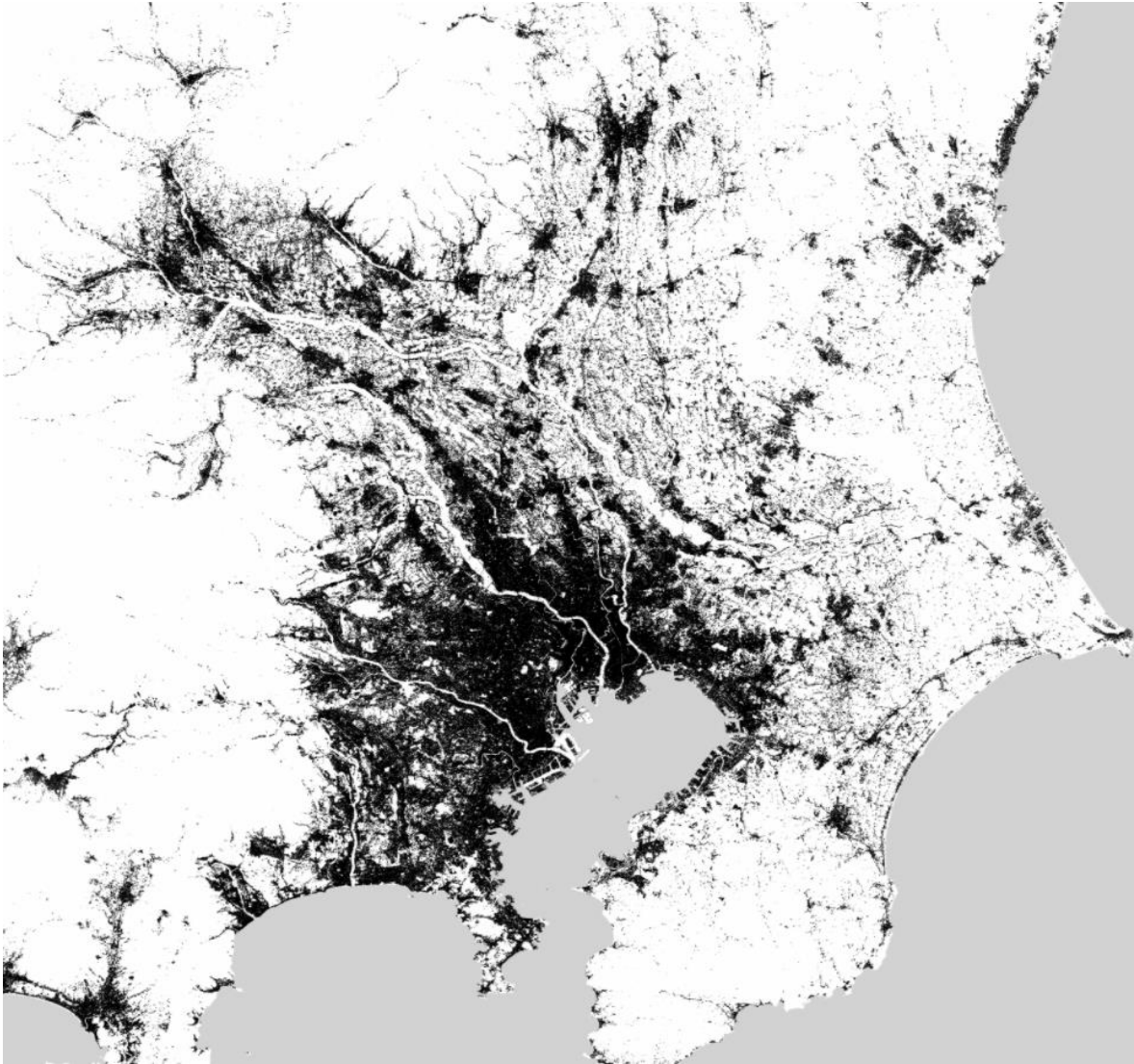
LONDON

21,000 people/km²

722,000 commuters entering
administrative city per day (2007)



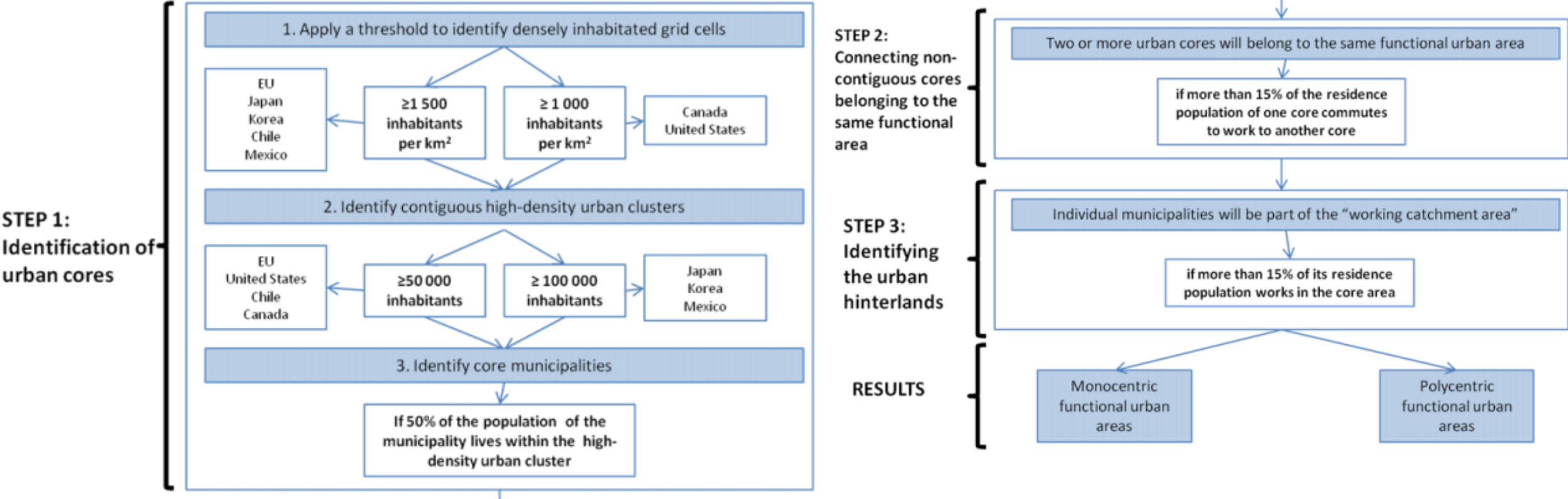
GLOBAL URBAN FOOTPRINT: TOKYO



Data from “Global Urban Footprint” (GUF) project of German Space Agency Earth Observation Centre - worldwide mapping of settlements with unprecedented spatial resolution of 12 m cells

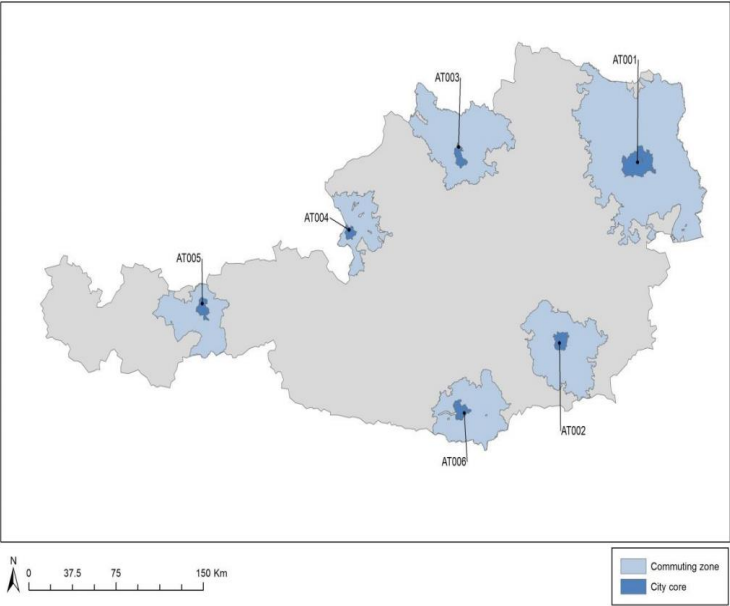
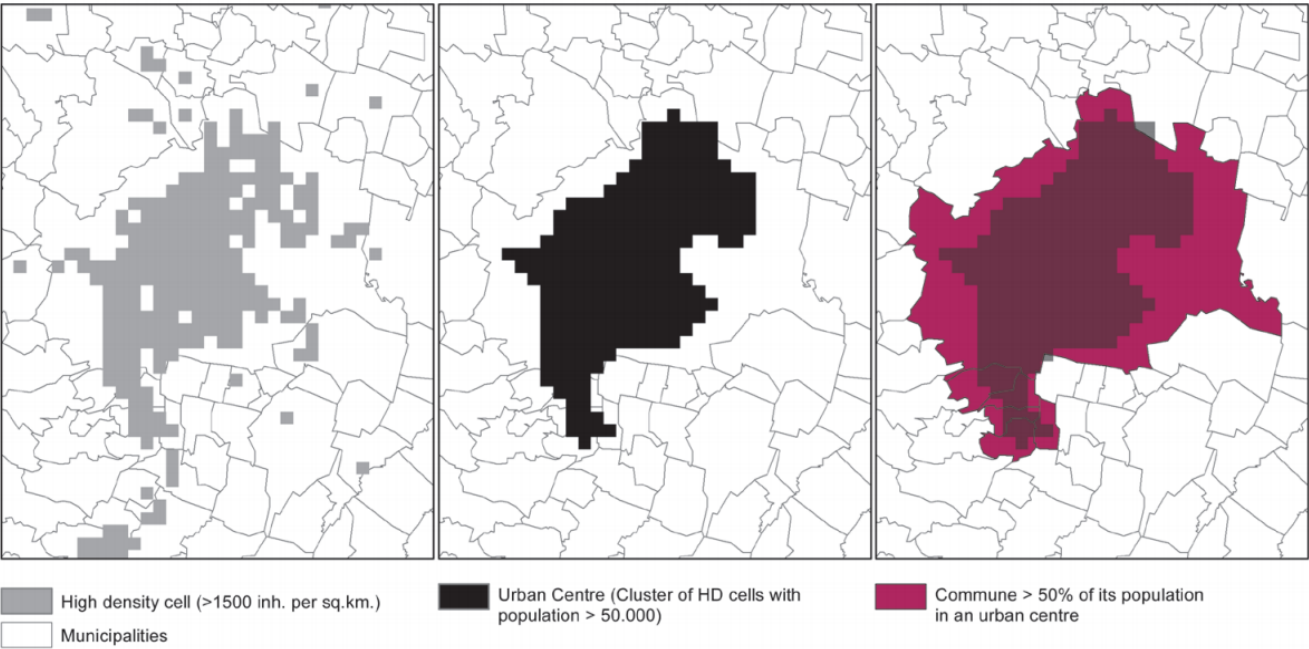
FUNCTIONAL URBAN AREAS WITH INTEGRATED LABOUR MARKETS

Figure 1. Procedure to define Functional urban areas in OECD countries



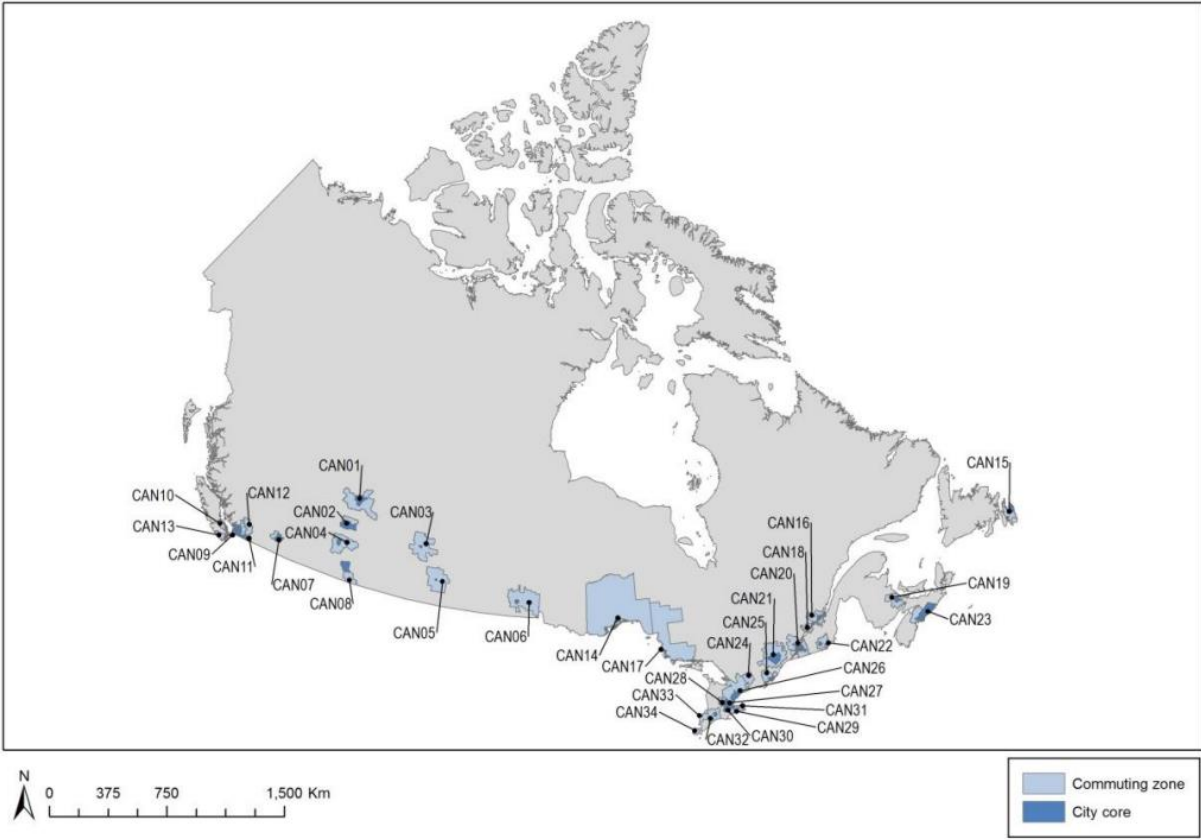
THE CASE OF VIENNA

Figure 10.1-4 High density cells, urban centre and city (Wien)

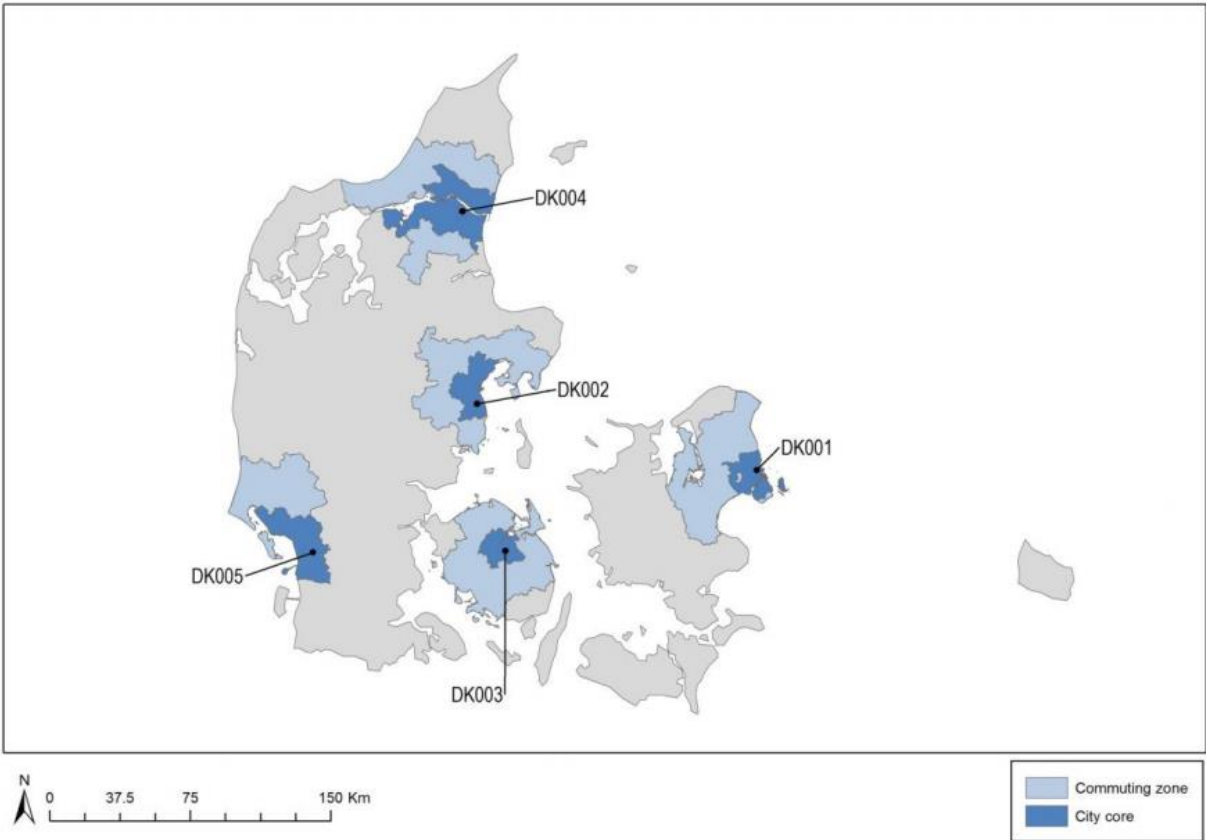


FUNCTIONAL URBAN AREAS

CANADA

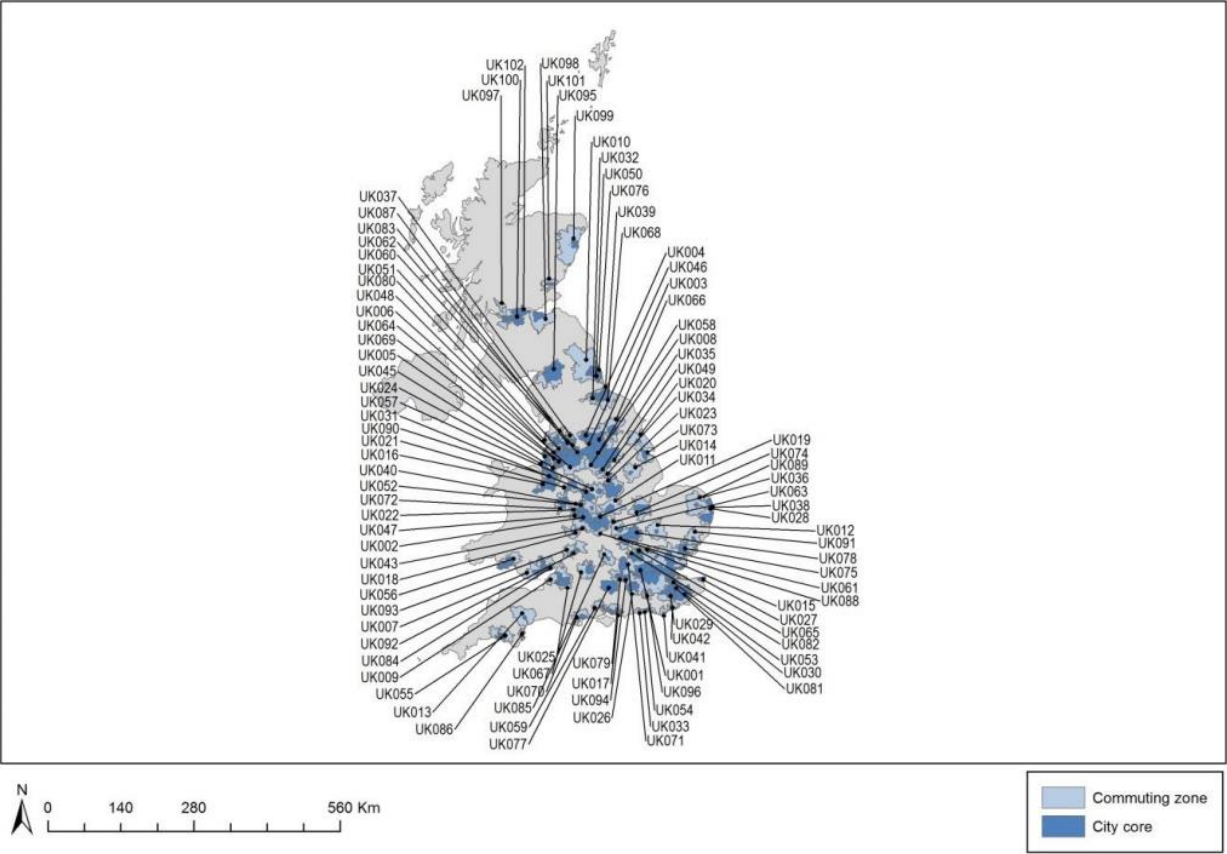


DENMARK

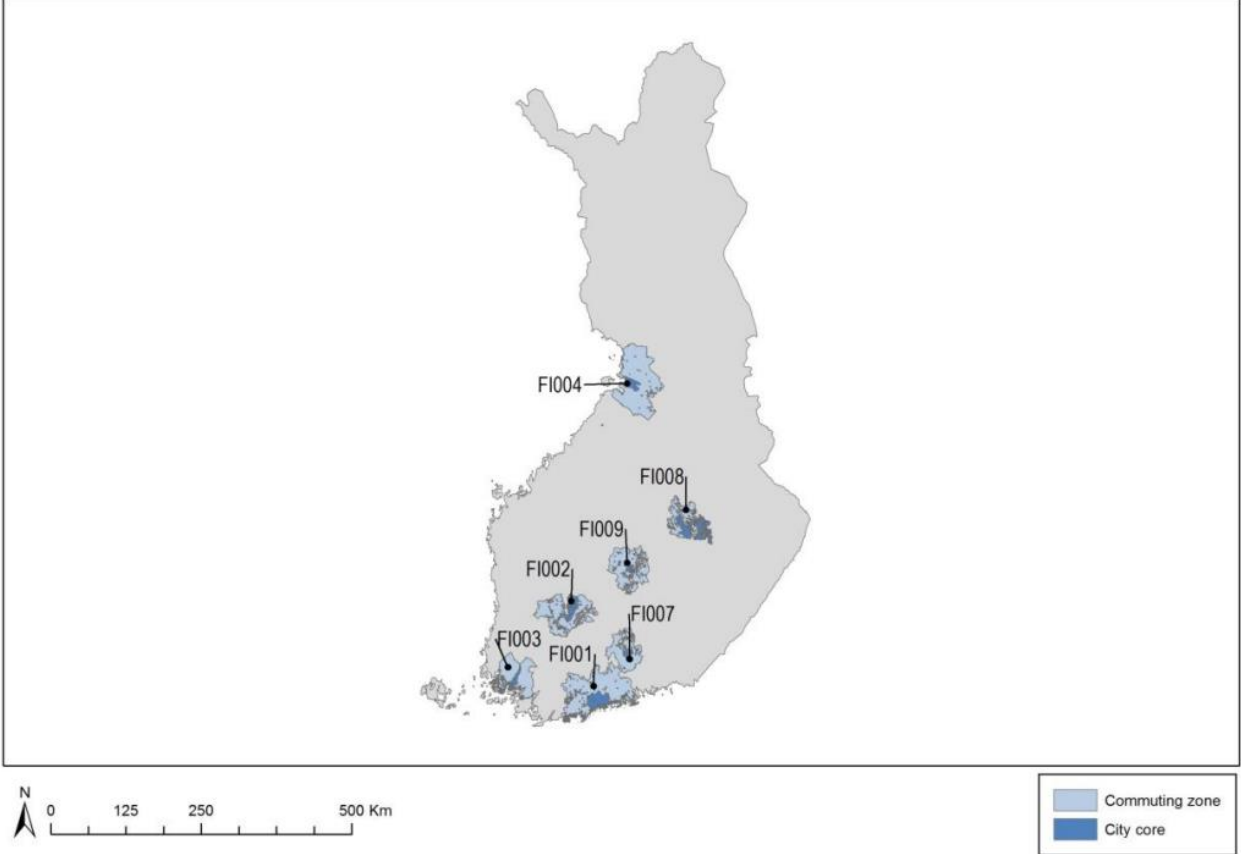


FUNCTIONAL URBAN AREAS

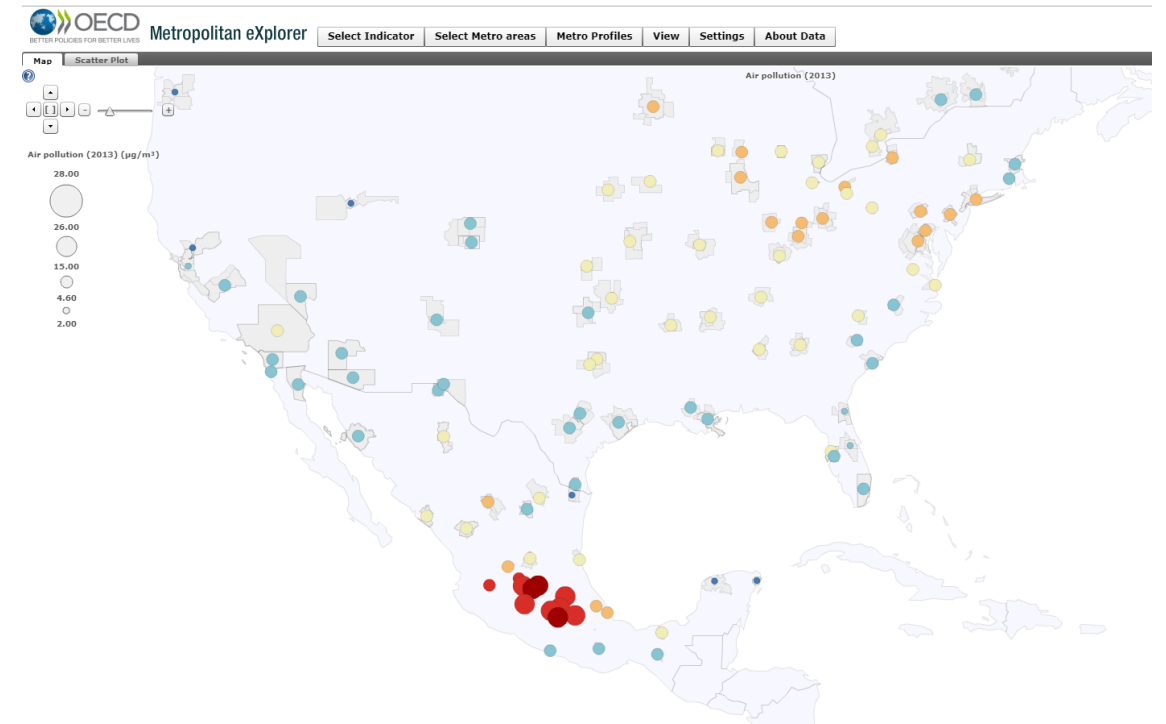
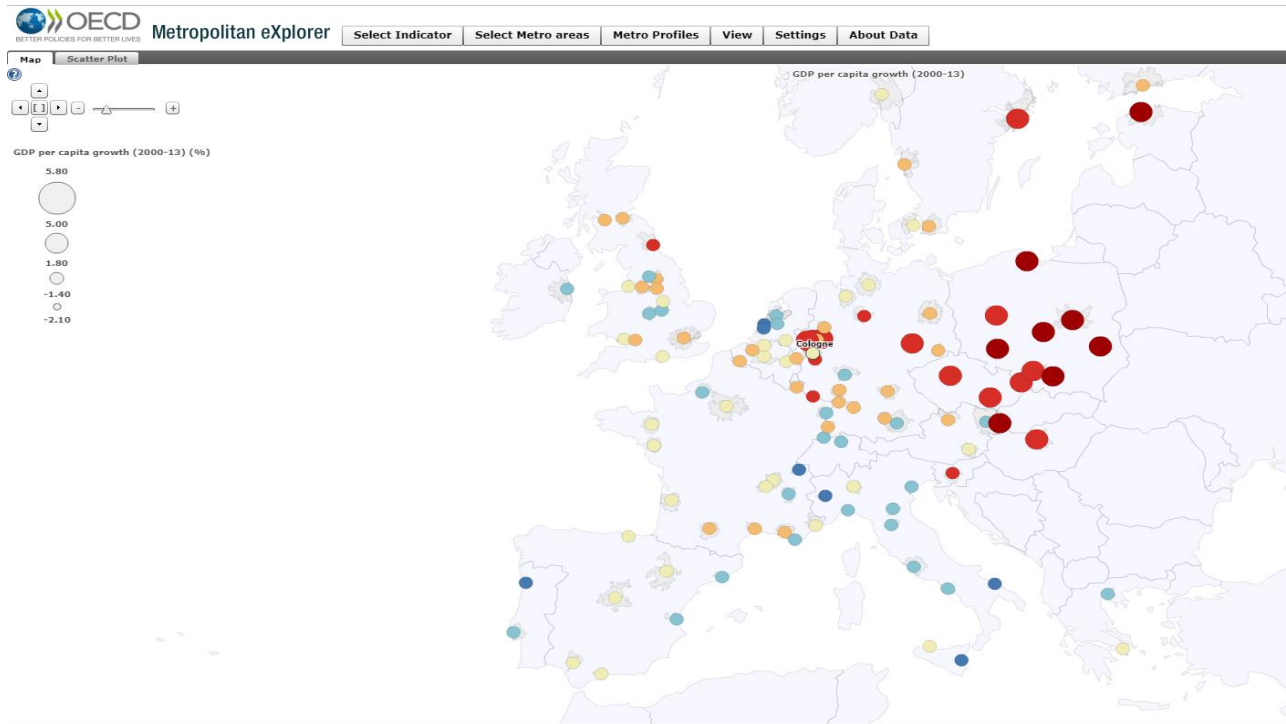
UNITED KINGDOM



FINLAND

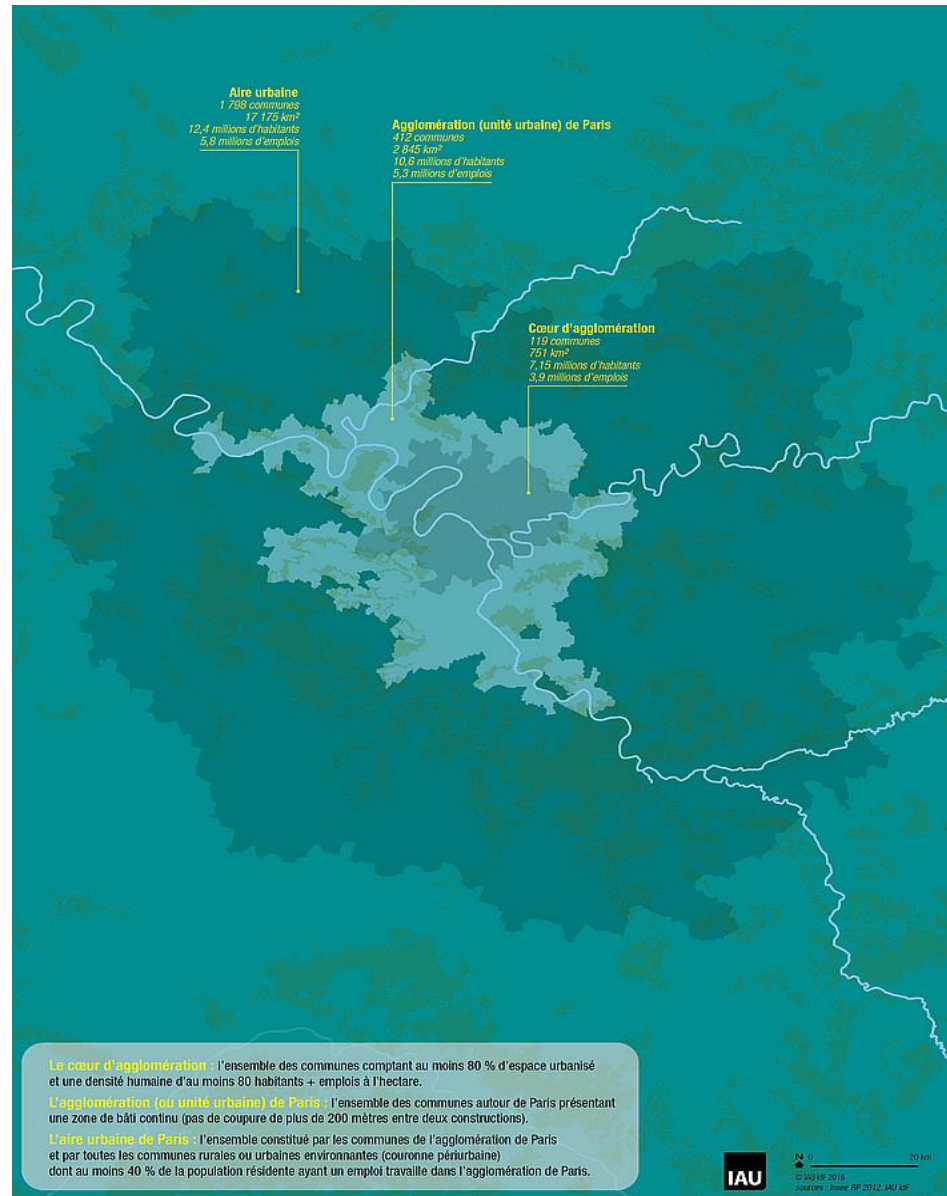
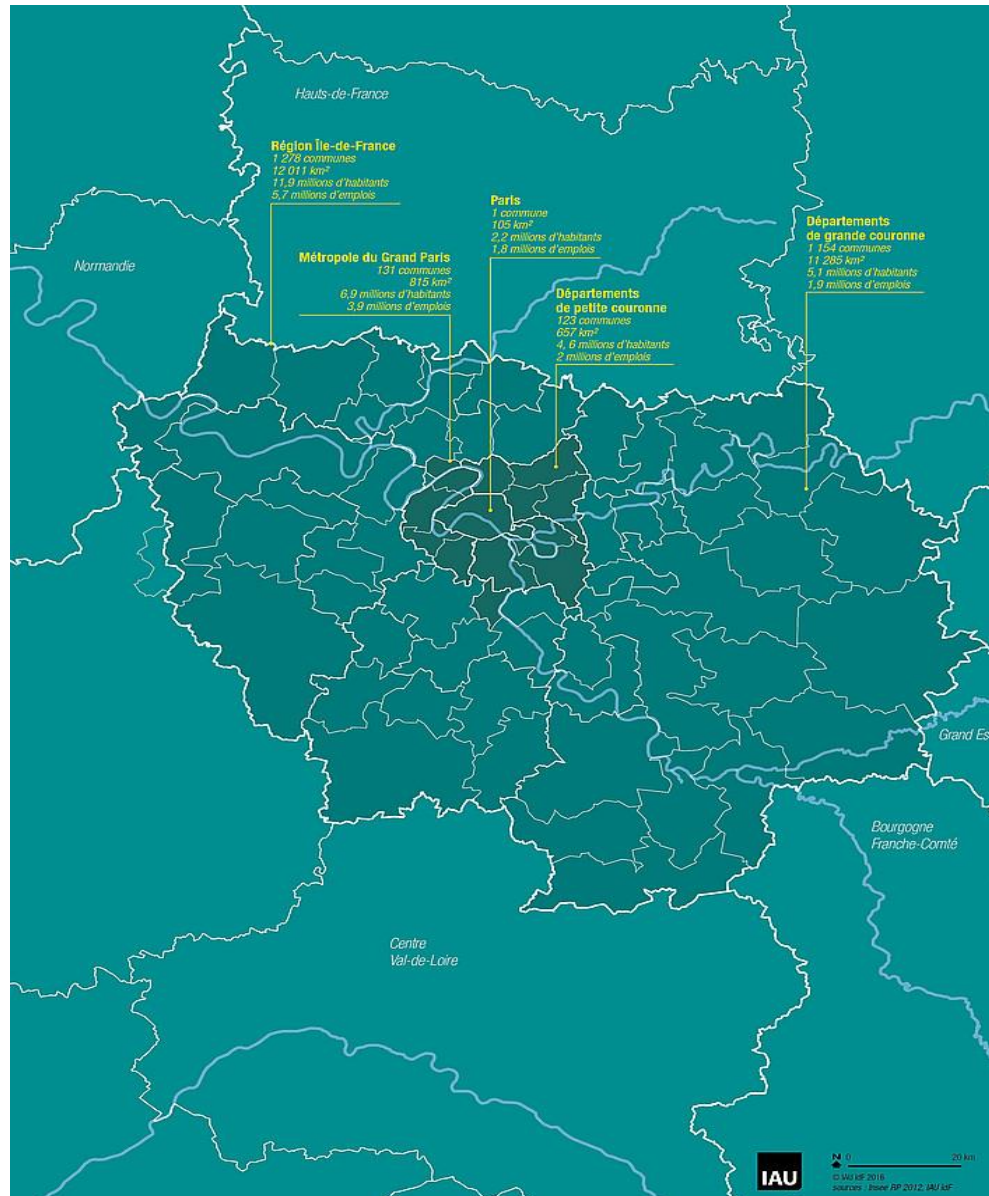


VISUALISING METROPOLITAN DYNAMICS

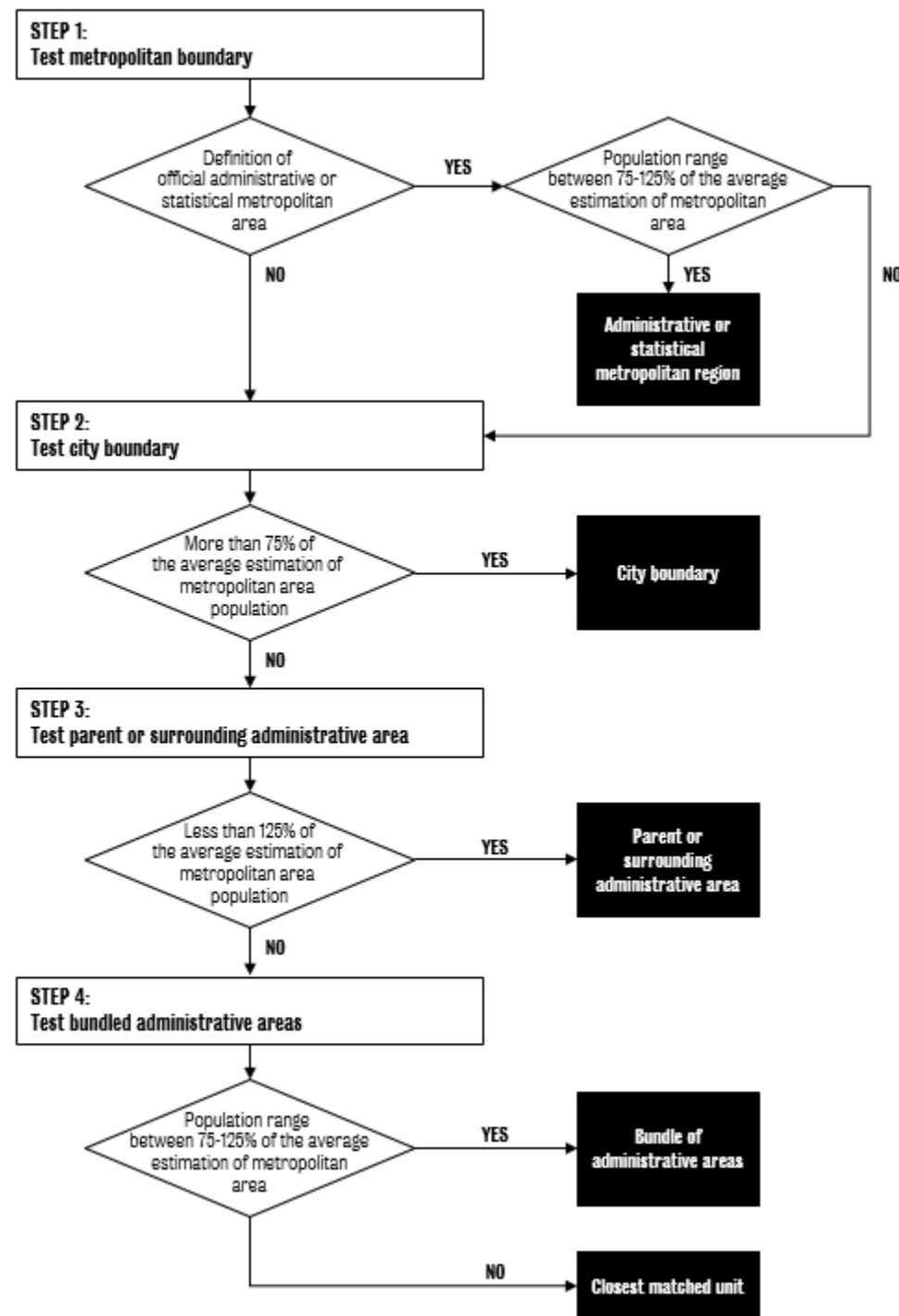


<https://measuringurban.oecd.org>

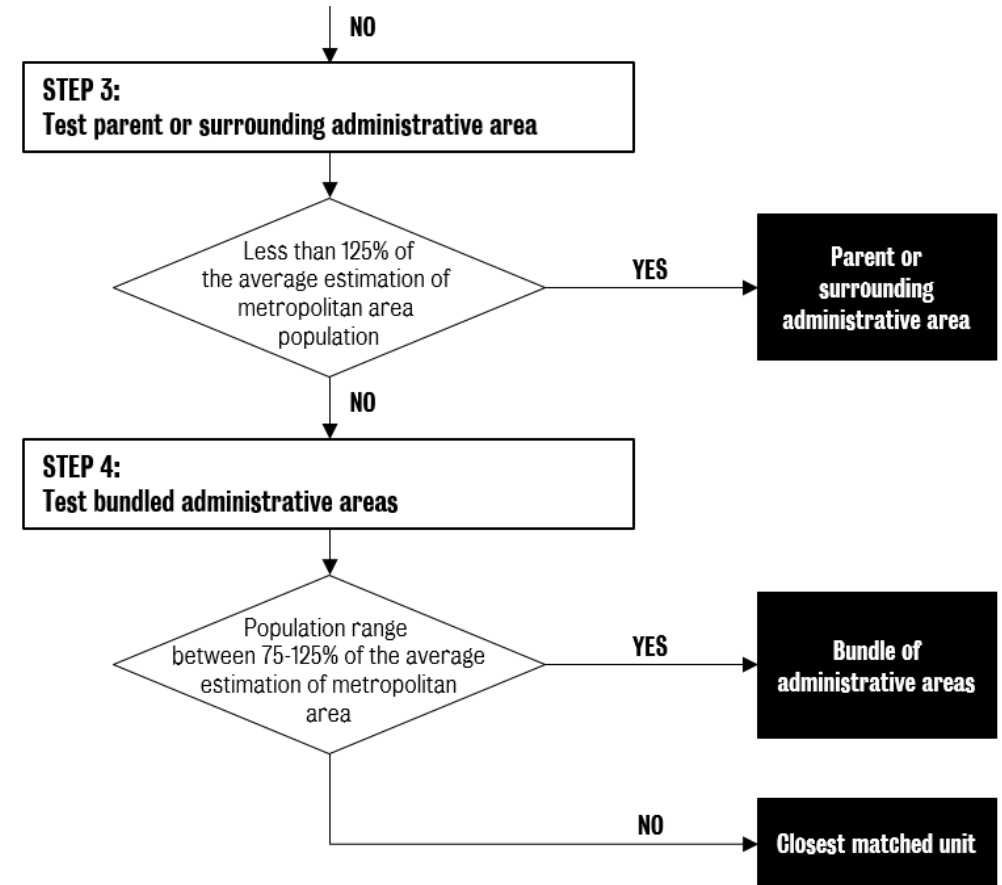
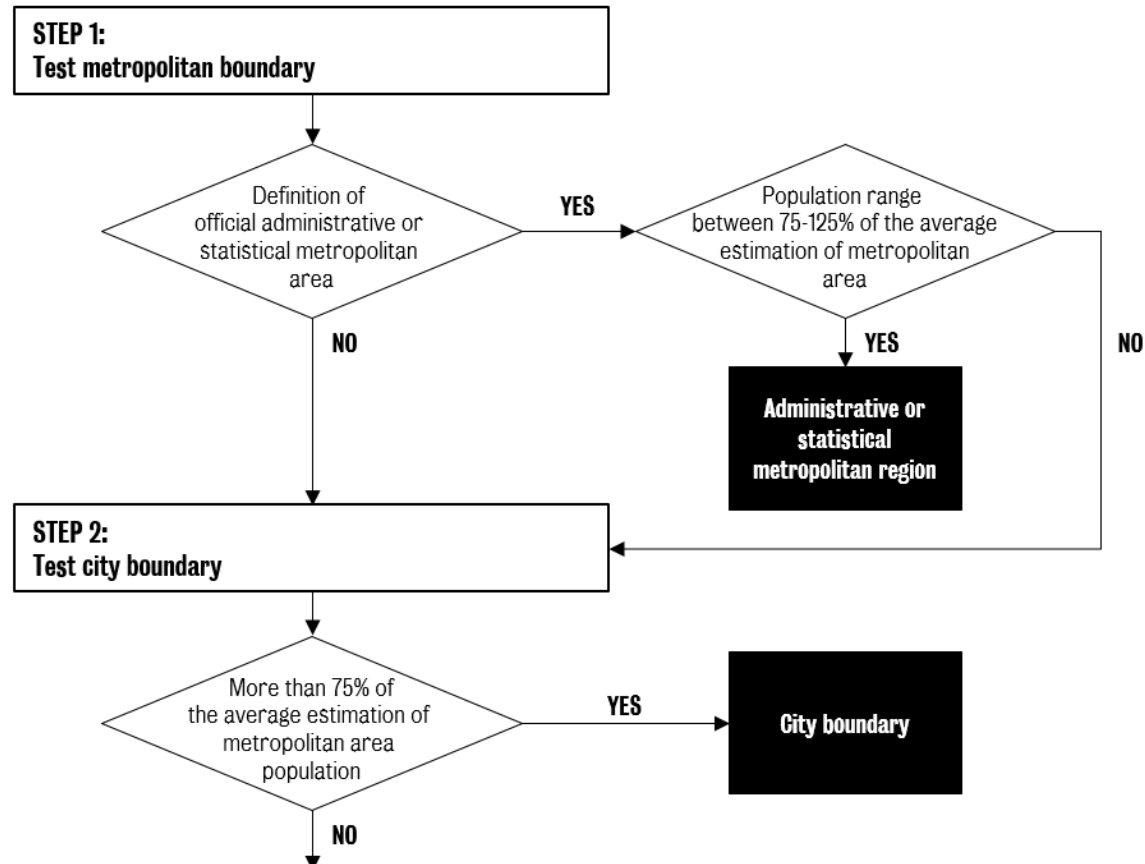
ADMIN BOUNDARIES, AGGLOMERATION AND FUNCTIONAL URBAN AREAS



WHAT HAPPENS IN THE REAL WORLD: DATA SCARCITY



Methodology to define the baseline metropolitan area

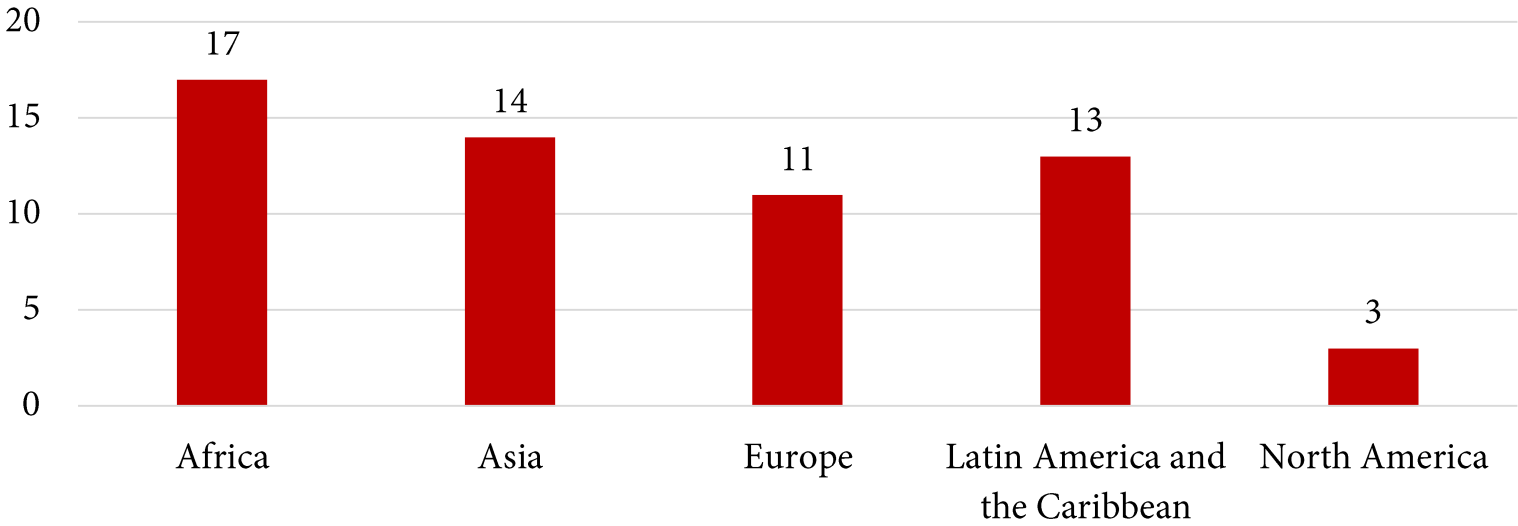


SAMPLE OF METROPOLISES

Metropolis	UN Region	Country
Douala	Africa	Cameroon
Brazzaville	Africa	Congo
Cairo	Africa	Egypt
Addis Ababa	Africa	Ethiopia
Libreville	Africa	Gabon
Accra	Africa	Ghana
Abidjan	Africa	Ivory Coast
Antananarivo	Africa	Madagascar
Bamako	Africa	Mali
Casablanca	Africa	Morocco
Rabat	Africa	Morocco
Nouakchott	Africa	Mauritania
Dakar	Africa	Senegal
Durban	Africa	South Africa
Johannesburg	Africa	South Africa
Tunis	Africa	Tunisia
Harare	Africa	Zimbabwe
Beijing	Asia	China
Guangzhou	Asia	China
Shanghai	Asia	China
Delhi	Asia	India
Jakarta	Asia	Indonesia
Mashhad	Asia	Iran
Tehran	Asia	Iran
Amman	Asia	Jordan
Kuala Lumpur	Asia	Malaysia
Seoul	Asia	South Korea
New Taipei City	Asia	Taiwan
Bangkok	Asia	Thailand
Istanbul	Asia	Turkey
Hanoi	Asia	Vietnam

Metropolis	UN Region	Country
Brussels	Europe	Belgium
Lyon	Europe	France
Berlin	Europe	Germany
Athens	Europe	Greece
Torino	Europe	Italy
Lisbon	Europe	Portugal
Bucharest	Europe	Romania
Moscow	Europe	Russia
Barcelona	Europe	Spain
Madrid	Europe	Spain
Manchester	Europe	United Kingdom
Buenos Aires	Latin American and the Caribbean	Argentina
Rosario	Latin American and the Caribbean	Argentina
La Paz	Latin American and the Caribbean	Bolivia
Rio de Janeiro	Latin American and the Caribbean	Brazil
São Paulo	Latin American and the Caribbean	Brazil
Santiago de Chile	Latin American and the Caribbean	Chile
Bogotá	Latin American and the Caribbean	Colombia
Valle de Aburra	Latin American and the Caribbean	Colombia
Quito	Latin American and the Caribbean	Ecuador
San Salvador	Latin American and the Caribbean	El Salvador
Mexico City	Latin American and the Caribbean	Mexico
Tijuana	Latin American and the Caribbean	Mexico
Montevideo	Latin American and the Caribbean	Uruguay
Montréal	Northern America	Canada
Toronto	Northern America	Canada
Atlanta	Northern America	United States

SAMPLE OF METROPOLISES

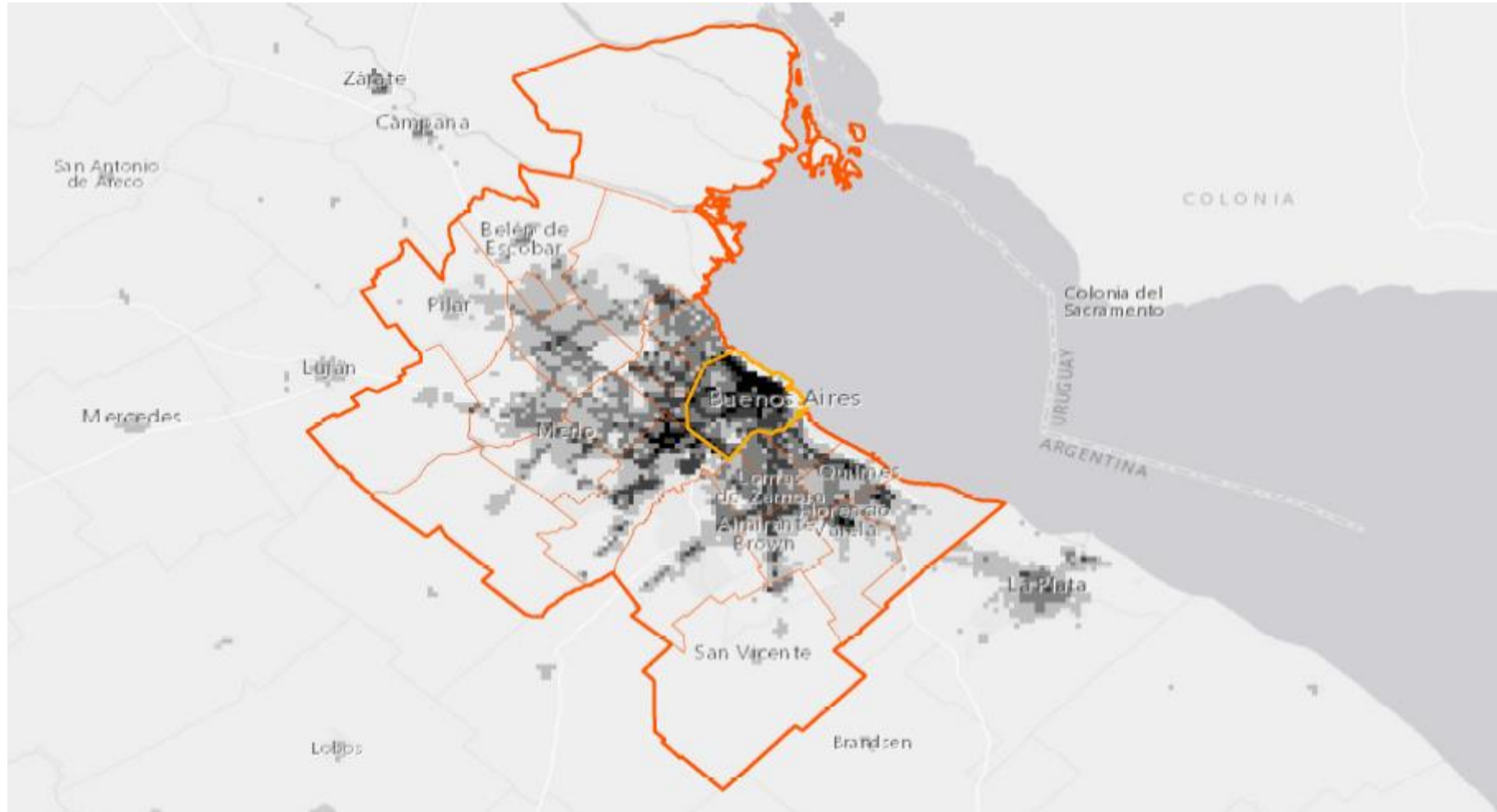


BOUNDARIES OF METROPOLISES – ‘STEP 1’

City	Official Metropolitan area	Official area population	Average estimation of metropolitan population	Official area to the average ratio
Jakarta	Jabodetabek	27,957,194	30,682,261	0.91
Seoul	Capital Region of Korea	25,273,824	22,556,396	1.12
Shanghai	Shanghai Province	22,535,250	26,601,329	0.85
São Paulo	Regiao Metropolitana de São Paulo	21,251,320	20,917,182	1.02
Mexico City	Metropolitan Zone of the Valle de México	20,424,259	20,328,831	1.00
Buenos Aires	Gran Buenos Aires	13,601,547	14,477,418	0.94
Istanbul	Province of Istanbul	13,566,000	14,243,494	0.95
Rio de Janeiro	Região Metropolitana do Rio de Janeiro	12,218,909	12,478,382	0.98
Bogotá	Bogotá Capital District	8,080,734	9,168,319	0.88
Santiago de Chile	Región Metropolitana de Santiago de Chile	7,112,808	6,739,531	1.06
Madrid	Comunidad de Madrid (ES3)	6,476,838	6,306,896	1.03
Toronto	Toronto Census Metropolitan Area	6,126,525	6,389,879	0.96
Atlanta	Atlanta-Sandy Springs-Roswell, GA Metropolitan Statistical Area	5,790,210	5,254,942	1.10
Barcelona	Àmbit Metropolità de Barcelona	4,786,697	4,710,849	1.02
Abidjan	District Autonome d'Abidjan	4,473,441	4,871,409	0.92
Montréal	Montreal Census Metropolitan Area	4,098,915	3,947,592	1.04
Valle de Aburra	Area Metropolitana del Valle de Aburra	3,909,729	3,830,709	1.02
Amman	Greater Amman Municipality	3,793,655	3,905,242	0.97
Athens	Region of Attica	3,773,559	3,563,760	1.06
Berlin	Landes Berlin	3,574,830	4,619,447	0.77
Durban	Ethekwini Municipality	3,442,361	3,486,635	0.99
Dakar	Région de Dakar	3,137,196	3,166,440	0.99
Lisbon	Area Metropolitana de Lisboa	2,821,349	2,804,748	1.01
Manchester	Greater Manchester	2,783,397	2,606,436	1.07
Quito	Distrito Metropolitano de Quito	2,414,585	2,695,337	0.90
Torino	Citta metropolitana di Torino (ITC11)	2,277,857	1,885,057	1.21
Montevideo	Área Metropolitana de Montevideo	1,947,604	1,696,023	1.15
Tijuana	Zona Metropolitana de Tijuana	1,840,710	1,764,075	1.04
La Paz	Región Metropolitana de La Paz	1,829,303	2,091,533	0.87
San Salvador	Área Metropolitana de San Salvador	1,566,629	1,297,244	1.21
Rosario	Area Metropolitana Rosario	1,299,695	1,326,665	0.98

31 metropolises

BOUNDARIES OF METROPOLISES – ‘STEP 1’



BOUNDARIES OF METROPOLISES – ‘STEP 2’

City	Official Metropolitan area	Official area population	Average estimation of metropolitan population	Official area to the average ratio
Beijing	Beijing Municipality	21,729,000	21,288,064	1.02
Guangzhou	Guangzhou Municipality	14,043,500	16,070,061	0.87
Moscow	Government of Moscow	12,197,536	15,754,369	0.77
Hanoi	Government of Hà Noi	7,328,400	6,177,657	1.19
Addis Ababa	City Government of Addis Ababa	3,559,995	3,568,791	1.00
Mashhad	Mashhad Municipality	2,974,930	3,156,479	0.94
Douala	Communauté Urbaine de Douala	2,934,223	2,768,436	0.94
Bamako	Gouvernorat du District de Bamako	2,219,000	2,756,061	0.81
Bucharest	General Council of Bucharest	2,112,483	2,131,290	0.99
Brazzaville	Commune de Brazzaville	1,891,360	1,503,803	0.8
Nouakchott	Nouakchott City	1,077,169	1,014,180	1.06
Libreville	Commune de Libreville	763,856	703,940	0.92

12 cities

BOUNDARIES OF METROPOLISES – ‘STEP 3’

City	Official Metropolitan area	Official area population	Average estimation of metropolitan population	Official area to the average ratio
Kuala Lumpur	W. P. Kuala Lumpur, W. P. Putrajaya and Selangor	8,329,700	7,215,804	1.15
Accra	Greater Accra Region	3,940,330	4,943,075	1.25
Brussels	Region de Bruxelles-Capitale (BE10) and Provincie Vlaams-Brabant (BE24)	2,329,739	2,281,281	1.02
Harare	Harare Province	2,166,851	2,123,132	0.98
Lyon	Rhône (FR716/FRK26) including Métropole de Lyon and Département du Rhône	1,860,112	1,846,419	1.01

5 city regions

BOUNDARIES OF METROPOLISES – ‘STEP 4’

City	Official Metropolitan area	Official area population	Average estimation of metropolitan population	Official area to the average ratio
Delhi	Delhi NCT, Jhajjar, Sonipat, Gurgaon, Faridabad, Baghpat, Ghaziabad, Gautam Buddha Nagar	25,813,953	24,926,321	1.04
Cairo	Cairo, Giza, and Qalyubia Governorates	21,969,528	17,775,925	1.24
Tehran	Tehran, Karaj, Shahriar, Baharestan, Qods, Fardis, Eslamshahr, and Pardis counties	13,297,664	12,278,891	1.08
Bangkok	Bangkok, Nakhon Pathom, Nonthaburi, Pathum Thani, Samut Prakarn, Samut Sakhon	10,765,226	14,365,406	0.75
Johannesburg	City of Johannesburg, City of Ekurhuleni, and City of Tshwane	10,510,203	8,705,488	1.21
New Taipei City	Taipei, New Taipei and Keelung	7,041,404	7,378,680	0.95
Casablanca	Préfecture de Casablanca, Province de Mediouna, Province de Nuaceur and Préfecture de Mohammedia	4,032,149	4,604,414	0.88
Tunis	Tunis, Ben Arous, Ariana and Manouba Governorates	2,500,086	2,643,695	1.06
Antananarivo	Antananarivo-Atsimondrano Districts	2,493,390	2,307,720	0.93
Rabat	Prefecture de Rabat, Prefecture de Sale and Prefecture de Skhirat-Temara	2,118,305	2,028,487	1.04

10 bundles of administrative areas

SECOND TASK

Identifying priority indicators

- What data to collect and analyse based on **availability**
- How to collect **comparable metropolitan data** in diverse urban contexts, and how to deal with conditions of data scarcity

A. Context and
governance

B. Economic
development

C. Social cohesion

D. Gender equality

E. Environmental
sustainability

F. Quality of life

HOW TO SELECT INDICATORS TO MEASURE AT METROPOLITAN LEVEL AND COLLECT RELATED DATA?

What to measure? Issues that should be covered at metro level for strategic or practical reasons.

- Demographic data: e.g. population and density
- Land use: e.g. green, industrial and commercial areas
- Economy: e.g. employment, GDP, wealth distribution
- Transport: e.g. modal share, car use, transport infrastructure
- Environment and sanitation: e.g. air pollution, percentage of population connected to water, sewage, waste
- Economies of scale, economies of scope...

How to do it? What are the challenges?

Which 'urban cells' are included? → collect through census and remote sensing, some data can be collected with local monitors/sensors (i.e. air pollution) , surveys...

REVIEW OF LITERATURE AND GLOBAL DATASETS

Reports

- GOLD IV (UCLG), Making Cities Work for All (OECD), Subnational Governments Around the World - Structure and Finance (OECD), Unpacking Metropolitan Governance (GIZ and UN-Habitat), UN-Habitat 2016 World Cities Report (UN-Habitat), Steering the Metropolis (IDB), Financing metropolitan Governments in Developing Countries (Lincoln Institute), Gobernanza Metropolitana en America Latina (CIPPEC)...

Databases

- Atlas of Urban Expansion, Open Data for Cities, Metropolitan Explorer OECD, Global Metro Monitor, Cities in Motion Index, Urban Dashboard, Global Municipal Database, Resilience Index, City Prosperity Index, UN-Habitat Urban Data, Oxford Economics, Observatorio de Movilidad Urbana, Global Observatory on Local Finance, Global City Index, Fiscally Standardized Cities, Better Life Index, Habitat Commitment Index, Mercer Quality of Living, Urban Public Transport in the 21st Century, Mobility in Cities Database, C40 Greenhouse Gas Protocol for Cities Interactive Dashboard, Social Institutions and Gender Index, Gender Inequality Index, Fragile Cities, Homicide Monitor, UN Data, Minimum Set of Gender Indicators, Atmospheric Composition Analysis Group, Sustainable Healthy Urban Environments (SHUE)...

38 INDICATORS

A. Context and Governance

1	Metropolitan population**
2	Metropolitan area
3	Density
4	Leadership of policy sectors
5	Fiscal decentralisation
6	Territorial fragmentation
7	Metropolitan coordination
8	National prominence
9	Fiscal autonomy
10	Total budget per capita

B. Economic Development

1	GDP per capita
2	Employment share by sector
3	Economic prominence
4	Unemployment**
5	Economic density
6	Informal economy

C. Social Cohesion

1	Literacy*
2	Poverty rate**
3	Income inequality
4	Foreign born population*
5	Murder rate*

D. Gender Equality

1	Share of elected women
2	Women in workforce
3	Female school-aged population enrolled
4	Measures and tools on gender equality
5	Gender pay gap

E. Environmental Sustainability

1	Air quality
2	Carbon emissions
3	Car ownership
4	Green space
5	Waste generated per capita
6	Wastewater collection coverage
7	Renewable energy use

F. Quality of Life

1	Life expectancy*
2	Affordability of housing
3	Access to public transportation
4	Higher education enrolment*
5	Fragile Cities Index

* data disaggregated by sex

** data disaggregated by sex and age

THIRD TASK

Collect the data

- What **sources**?
- How to deal with **absence of data** across sources and **governance scales**?

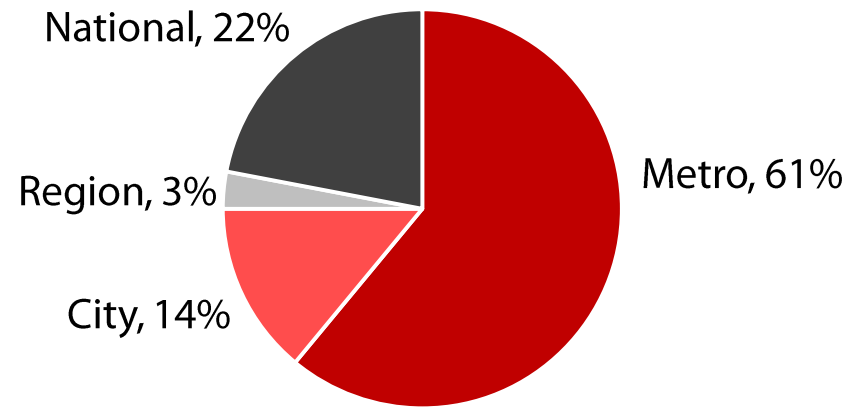
Prioritisation of data sources

1. international bodies / observatories
2. national statistic offices
3. city authorities' data
4. academic references
5. NGOs and associations

DATA COLLECTION: LEVELS OF INFORMATION

Prioritisation of scales

1. Metropolitan
2. City
3. Region
4. National



- Less than 10% of missing data points (if we exclude the survey data)
- 80% of the data relates to the last five years (and around 95% collected after 2010)

DATA COLLECTION: OTHER FEATURES

- Less than 10% of missing data points (if we exclude the survey data)
- 80% of the data relates to the last five years (and around 95% collected after 2010)
- Scarcity of data disaggregated by sex – especially at the metropolitan level!

		No. of metro-level data collected	with data disaggregated by sex (metro)	% of total	% of metro-level data			
						With data disaggregated by sex (all scales)	% of total	ratio (metro/total)
A1	Metropolitan population	58	58	100%	100%	58	100%	100%
B4	Unemployment	47	43	74%	91%	54	93%	80%
C1	Literacy rate	22	12	21%	55%	44	76%	27%
C2	Poverty rate	8	0	0%	0%	0	0%	N/A
C4	Foreign born population	25	13	22%	52%	37	64%	35%
C5	Murder rate	13	1	2%	8%	2	3%	50%
F1	Life expectancy at birth	25	12	21%	48%	45	78%	27%
F4	Higher education enrolment	5	4	7%	80%	57	98%	7%
Total collected datapoints		203	143			297		48%
% of total		44%	31%			64%		

		Abidjan	Cairo	Addis Ababa	Bamako	Casablanca	Dakar	Johannesburg	Shanghai	Delhi	Jakarta	Tehran	Seoul	Bangkok	Istanbul	Brussels	Paris	Berlin	Athens	Barcelona	Buenos Aires	La Paz	Rio de Janeiro	Santiago de Chile	Bogotá	Quito	San Salvador	Mexico City	Montevideo	Montréal	Atlanta	Collected			
A	1	Metropolitan population**	M*	M*	M**	M**	M**	M**	M	M	M**	M*/R**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M*	M**	M**	M**	M**	M**	30	100%		
	2	Metropolitan area	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	30	100%		
	3	Density	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	30	100%		
	4	Leadership of policy sectors [SURVEY]																														0	0%		
	5	Fiscal decentralisation	X	X	X	N	N	N	N	N	N	N	X	N	N	N	N	N	N	N	N	N	N	X	N	N	N	N	N	N	X	N	N	24	80%
	6	Territorial fragmentation	M	M	M	M	M	M	M	M	M	M	M	M		M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	29	97%	
	7	Metropolitan coordination	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	30	100%	
	8	National prominence (budget)	M	C	M	M	M	M	C	M	C	C	C	M	C	M	C	C	M	M	M	C	M	M	C	M	M	M	C	M	C	C	30	100%	
	9	Fiscal autonomy	M	C	M	M	M	M	C	M	C	C	C	M	C	M	C	C	M	M	C	C	M	C	C	M	M	M	C	M	C	C	30	100%	
	10	Total budget per capita	M	C	M	M	M	M	C	M	C	C	C	M	C	M	C	C	M	M	M	C	M	M	C	M	M	M	C	M	C	C	30	100%	
B	1	GDP per capita		M	M	M	M	M	M	C	C	R	M	M	M	M	M	M	M	M	M	C	R	M	M	M	M	M	M	M	M	M	29	97%	
	2	GDP or employment by sector	M	M*	M*	M	M	M	R	M	C	M	R	C*	M*	M*	M	M	M	M	R	M*	R	M	M	M	M	M*	M*	M	M	M	30	100%	
	3	Prominence (GDP)		M	M	M	M	M	M	M	C	C	R	M	M	M	M	M	M	M	M	C	R	M	M	M	M	M	M	M	M	M	29	97%	
	4	Unemployment**	M	C*	M**	M*	M*	M**	M/N*	M	C*	C*	R	M**	M**	M**	M*	M*	M*	M*	M**	M**	M*	M*	M*	M*	M	M*	M**	M*	M**	M	30	100%	
	5	Economic density		M	M	M	M	M	M	M	C	C	R	M	M	M	M	M	M	M	M	C	R	M	M	M	M	M*	M	M	M	M	29	97%	
	6	Informal economy (% jobs) [SURVEY]																															0	0%	
C	1	Literacy rate*	N*	C/N*	N*	N*	C/N*	N*	C/N*	M/N*	N*	C/N*	N*	N	C/N*	N*	C	C	C	C/N*	C/N*	C/N*	N*	M*	N	M/N*	C/N*	M*	C/N*	N*	C	N	30	100%	
	2	Poverty rate**	N	C	N	N	C	N	C	M	N	C	N	N	C	N	C	C	C	C	C	C	N	N	N	M	C	N	C	N	C	N	30	100%	
	3	Income inequality (Gini)	M	C	C	N	C	C	C	M	C	C	C	C	C	M	M	M	M	M	C/R	C	C	M	M	M	C	C	M	C	M	M	30	100%	
	4	Foreign born population*	M	N*	N*	N*	N*	M*/N*	C	M	N*	N*	N*	C/N*	N*	M	C	C	C	C	M	C	N*	C	N	N*	N*	N*	C/N*	N*	C	M	30	100%	
	5	Murder rate*	N	C	N	N	C	N	C	M	C	C	N	N	C	M	C	C	C	C	C	C	C	M*	C	M	C	C	C	C	C	C	30	100%	
D	1	Share of elected women in local government	M	C	M	M	C	M	C	M	C	C	C	M	C	M	M	M	M	M	M	M	M	M	M	C	M	M	M	M	M	M	30	100%	
	2	Women in work force	N	N	M	N	N	N	M	M	M	C	N	M	M	M	M	M	M	M	M	M	M	M	M	M	N	M	M	N	M	N	30	100%	
	3	Enrolment of female school-aged population	N	N	N	N	N	M	C	M	N	N	N	M	N	M	M	M	M	M	C	C	N	N	N	M	N	N	N	N	N	N	30	100%	
	4	Legislation enforcing gender equality [SURVEY]																															0	0%	
	5	Gender pay gap	N	N	N	N	N	N	N	N	N	N	N	N	N	N	C	M	M	M	R	N	N	N	N	N	N	N	N	N	N	M	30	100%	
E	1	Air quality	N	C	N	N	C	C	M	C	C	C	M	C	M	M	M	M	M	M	M	C	C	C	M	M	C	C	M	C	M	M	30	100%	
	2	CO2 emissions	N	C	M	N	N	N	C	M	C	C	N	M	C	M	M	M	M	M	M	C	N	C	M	M	C	N	M	N	M	M	30	100%	
	3	Car ownership	N	M	N	N	N	N	N	M	C	N	C	M	C	M	M	M	M	M	M	C	N	C	C	M	C	N	C	C	C	C	30	100%	
	4	Green space	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	30	100%	
	5	Waste generated per capita	N	C	M	N	C	N	C	N	C	C	N	M	M	M	M	M	M	N	M	C	N	C	C	M	C	N	C	C	M	M	30	100%	
	6	City population served by wastewater collection (%)	M	C	M	C	C	C	N	C	C	C	M	C	M	C	M	M	M	M	C	C	C	M	C	M	C	N	C	C	N	N	30	100%	
	7	Renewable Energy	N	N	M	N	N	N	C	N	N	N	N	M	C	M	N	C	N	C	C	N	C	M	M	M	M	N	C	N	C	C	30	100%	
F	1	Life expectancy*	N	C	N	N	C	N	C	M	N	C	R*	M*	C	M/N*	C	M	M	M	R	C	N	R*	N	M	C	N	M	N	C	R	30	100%	
	2	Affordability of housing	M	C	M	N	C	C	C	M	C	C	C	M	C	M	C	M	M	C	C	C	C	C	C	M	C	C	C	C	M	M	30	100%	
	3	Public Transportation Accessibility	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	30	100%	
	4	Higher education enrolment*	N*	N*	N*	N*	N*	N*	N*	M/N*	N*	N*	R*/N*	M/N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	M/N*	N*	N*	N*	N*	N*	N*	M	M/N*	30	100%	
	5	Fragile Cities Index	M	M	M	M	M	M	M	M	M	M	M	M	M	M	C	C	M	C	M	M	M	M	M	M	M	M	M	C	M	M	30	100%	

Collected	31	34	34	35	35	35	35	35	35	35	35	34	35	34	35	35	35	35	35	35	35	34	35	35	35	35	35	35	34	35	35
	82%	89%	89%	92%	92%	92%	92%	92%	92%	92%	92%	89%	92%	89%	92%	92%	92%	92%	92%	92%	92%	89%	92%	92%	92%	92%	92%	92%	89%	92%	92%

M	Metropolitan-level data collected	549	52.8%
M*	Metropolitan partial disaggregated or non disaggregated		
C	City-level data collected	240	23.1%
R	Regional-level data collected	17	1.6%
N	National-level data collected	204	19.6%
X	Not available		

* Data include classification by sex

** Data include classification by sex and age

1040
91%

		Nouakchott	Rabat	Durban	Beijing	Guangzhou	Mashhad	Amman	Kuala Lumpur	New Taipei	Hanoi	Lyon	Torino	Lisbon	Moscow	Madrid	Manchester	Rosario	Sao Paulo	Valle de Al	Tijuana	Toronto	Collected	
A	1 Metropolitan population**	M**	M**	M**	M*	M**	M*	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	21	100%
	2 Metropolitan area	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	21	100%
	3 Density	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	21	100%
	4 Leadership of policy sectors [SURVEY]																						0	0%
	5 Fiscal decentralisation	X	N	N	N	N	X	N	N	X	N	N	N	N	N	N	N	N	N	N	N	N	18	86%
	6 Territorial fragmentation	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	21	100%
	7 Metropolitan coordination	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	21	100%
	8 National prominence (budget)	X	X	M	M	M	M	M	M	M	M	C	C	M	M	M	M	C	M	M	M	M	19	90%
	9 Fiscal autonomy	X	X	M	M	M	M	M	X	M	M	C	C	M	X	M	X	C	C	M	M	M	16	76%
	10 Total budget per capita	X	X	M	M	M	M	M	M	M	M	C	C	M	M	M	M	C	M	M	M	M	19	90%
B	1 GDP per capita	M	R	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	21	100%
	2 Employment by sector	M	N	M	M	M	M	R	M	M	M	M	M	M	M	M	M	M	M	M	M	C	21	100%
	3 Prominence (GDP)	M	R	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	C	M	21	100%
	4 Unemployment**	M**	R*	M*	M**	M**	R**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M**	M*	C*	21	100%
	5 Economic density	M	R	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	C	21	100%
	6 Informal economy (% jobs) [SURVEY]																						0	0%
C	1 Literacy rate*	M	N*	M	M	M*	M*	M*	N*	M*	M*	N	M*	C	N*	C	C	N*	M	C	M	C	21	100%
	2 Poverty rate**	N	N	N	M	M	R	R	N	N	M	N	N	C	N	C	C	M	M	C	C	C	21	100%
	3 Income inequality (Gini)	M	R	M	M	M	N	M	C	C	M	C	C	C	M	C	C	N	C	C	C	C	21	100%
	4 Foreign born population*	M	R	M	M	M	N	M*	M	C	X	M	R*	M*	M	M*	M	M*	M*	M*	M*	M	20	95%
	5 Murder rate*	N	N	M	N	N	N	M	C	M*	M	M	R*	M	M	C	C	N	C	C	C	M	21	100%
D	1 Share of elected women in local government	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	C	M	M	M	C	21	100%
	2 Women in work force	M	N	N	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	C	M	21	100%
	3 Enrolment of female school-aged population	N	N	N	M	M	N	M	N	C	M	M	M	M	X	M	R	N	N	N	N	C	20	95%
	4 Legislation enforcing gender equality [SURVEY]																						0	0%
	5 Gender pay gap	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	M	N	N	N	21	100%
E	1 Air quality	N	C	M	M	M	C	M	C	C	M	C	C	C	M	C	M	X	M	C	C	M	20	95%
	2 CO2 emissions	N	N	M	M	M	N	M	N	C	C	M	M	M	M	C	M	C	C	M	C	M	21	100%
	3 Car ownership	N	N	M	M	M	M	M	M	M	M	R	C	R	M	M	M	N	M	M	M	C	21	100%
	4 Green space	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	21	100%
	5 Waste generated per capita	M	M	M	M	M	M	M	C	M	C	C	C	M	N	M	M	C	M	M	M	R	21	100%
	6 City population served by wastewater collection (%)	M	C	M	M	M	R	M	M	M	M	R	C	M	M	N	N	M	M	M	M	C	21	100%
	7 Renewable Energy	N	N	N	M	R	M	M	C	C	N	M	C	C	M	C	M	N	C	C	N	C	21	100%
F	1 Life expectancy*	M*	C*	M*	M	M	M	M	M*	C	M	M	M*	M	M*	C	C	C*	M*	C	M	C	21	100%
	2 Affordability of housing	M	C	M	M	M	M	M	C	C	M	C	C	C	M	C	C	C	C	C	M	C	21	100%
	3 Public Transportation Accessibility	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	21	100%
	4 Higher education enrolment*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	N*	R	21	100%
	5 Fragile Cities Index	M	C	M	M	M	M	M	C	C	M	C	C	C	M	C	C	C	C	C	C	C	21	100%
Collected		31	32	35	35	35	34	35	34	34	34	35	35	35	33	35	34	34	35	35	35	35		
		82%	84%	92%	92%	92%	89%	92%	89%	89%	89%	92%	92%	92%	87%	92%	89%	89%	92%	92%	92%	92%		

				Total Sub-National Data	
M	Metropolitan-level data collected	468	65.0%	81.9%	
M	Metropolitan partial disaggregated or non disaggregated				
C	City-level data collected	102	14.2%		
R	Regional-level data collected	20	2.8%		
N	National-level data collected	109	15.1%		
X	Not available				

* Data include classification by sex

** Data include classification by sex and age

720
90%

FEEDBACK

Atlanta Data profile

metropolis  LSE Cities



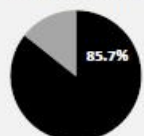
* This metropolitan area was defined according to the method adopted in this project (see enclosed document)

1. Context and Governance



LOCAL GOVERNMENTS IN THE METROPOLITAN AREA

Fiscal autonomy



of total revenue

National prominence



of national gov. budget

Total budget per capita

4737.3 USD
per inhabitant

Fiscal decentralisation (country-level)

18.6 %

Subnational government
expenditure as a % of GDP



0.50
local governments
per 100,000 inh.



There is a multi-purpose/strategic mechanism for
formal cooperation and all jurisdictions
participate on it

	Below city level	City	Metropolitan area	State / Province / Region	National / Federal	Supranational
Urban transport	•	•	•	•	•	•
Spatial planning	•	•	•	•	•	•
Economic develop.	•	•	•	•	•	•
Social services	•	•	•	•	•	•
Environment	•	•	•	•	•	•
Utilities	•	•	•	•	•	•
Health	•	•	•	•	•	•
Education	•	•	•	•	•	•
Housing	•	•	•	•	•	•
Policing & security	•	•	•	•	•	•
Gender equality	•	•	•	•	•	•
Culture	•	•	•	•	•	•

• no influence • limited influence • moderate influence • significant influence

2. Economic Development

GDP per capita

55,300 USD
per inhabitant

Employment share by sector



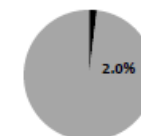
Unemployment

4.5%
Total Female Male Youth

Economic density

16,842,741 USD
per km²

Economic prominence



of Country GDP produced by metropolis

Informal economy

10-20 %
of jobs
5-10 %
of GDP

3. Social Cohesion

Poverty rate



1.0 %
people on less \$1.90/day

Income inequality



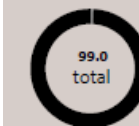
0.39
GINI index

Murder rate



23.5
homicides per 100,000 inh.

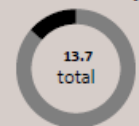
Literacy



N/A women

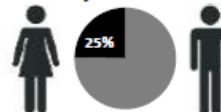


% of Foreign born population



4. Gender Equality

Share of elected women



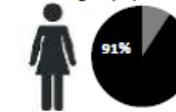
Women in workforce

1 man = 0.88 women

Gender pay gap

\$1 man = \$0.82 women

Female school-aged population enrolled



LEGISLATION ON GENDER EQUALITY

Vocational training and/or support for women (re)entering the labour market	✓	Tailored programmes/actions for supporting women health care	✓
Programmes or specific actions to support women entrepreneurs	✓	Programmes/actions ensuring equal access to land and housing ownership by women	✓
Legislation and/or clear procedures to ensure equal pay to women and men for the same job	✓	Measures to prevent discrimination on the basis of sex or gender	✓
Strategies and/or policies to address barriers to women to access higher education	?	Production of gender statistics for monitoring equality and social policies	?
Programmes/actions to combat sexual harassment in public space against women and girls	✓	Special mechanisms (e.g. police stations, hotlines) for supporting women in violence situations	✓
Gender quotas for positions in public administration	?	Legislation on domestic violence	?

FEEDBACK

5. Environmental Sustainability

Green space

39.4 m²
per inhabitant

Air quality (PM2.5)

10.1 µg/m³
Annual mean

Carbon emissions

10.7 metric tons
per inhabitant

Car ownership

73.8 passenger cars
per 100 inhabitants

Wastewater collection coverage

75.5 %
of population

Waste generated per capita

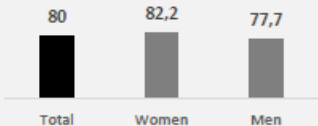
922.7 kg
per inhabitant (annum)

Renewable energy use

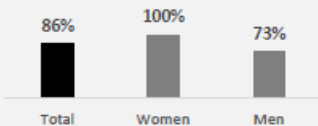
6.0 %
of total energy consumption

6. Quality of Life

Life expectancy (in years)



Higher education enrolment



Access to public transportation

36.0 %
of urban population

Affordability of housing

2.6
nominal house price divided by the nominal disposable income per head

Fragile Cities Index

2.00
Score (from 1.0 less fragile to 5.0 more fragile)

+

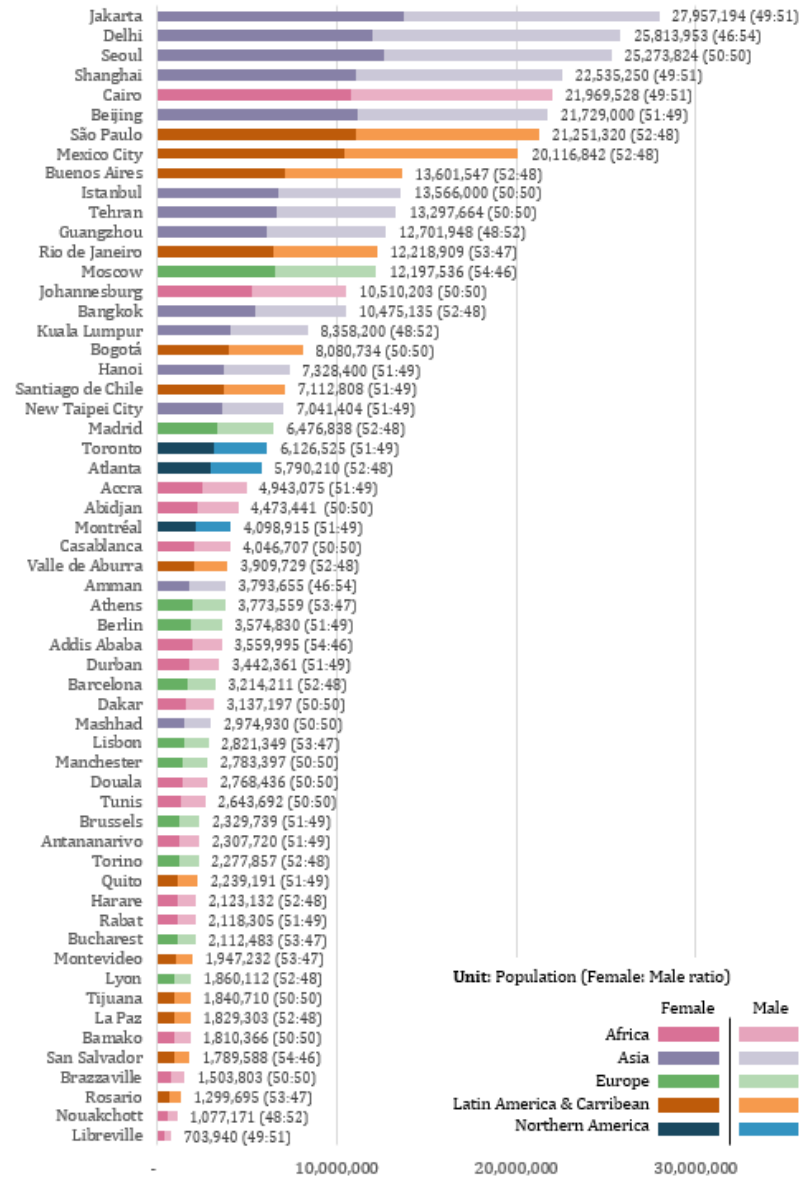
original dataset for their metropolis (where they were able to check the sources of the data and the scale of each data point), the methodology we adopted to set the boundaries, and the description of the indicators



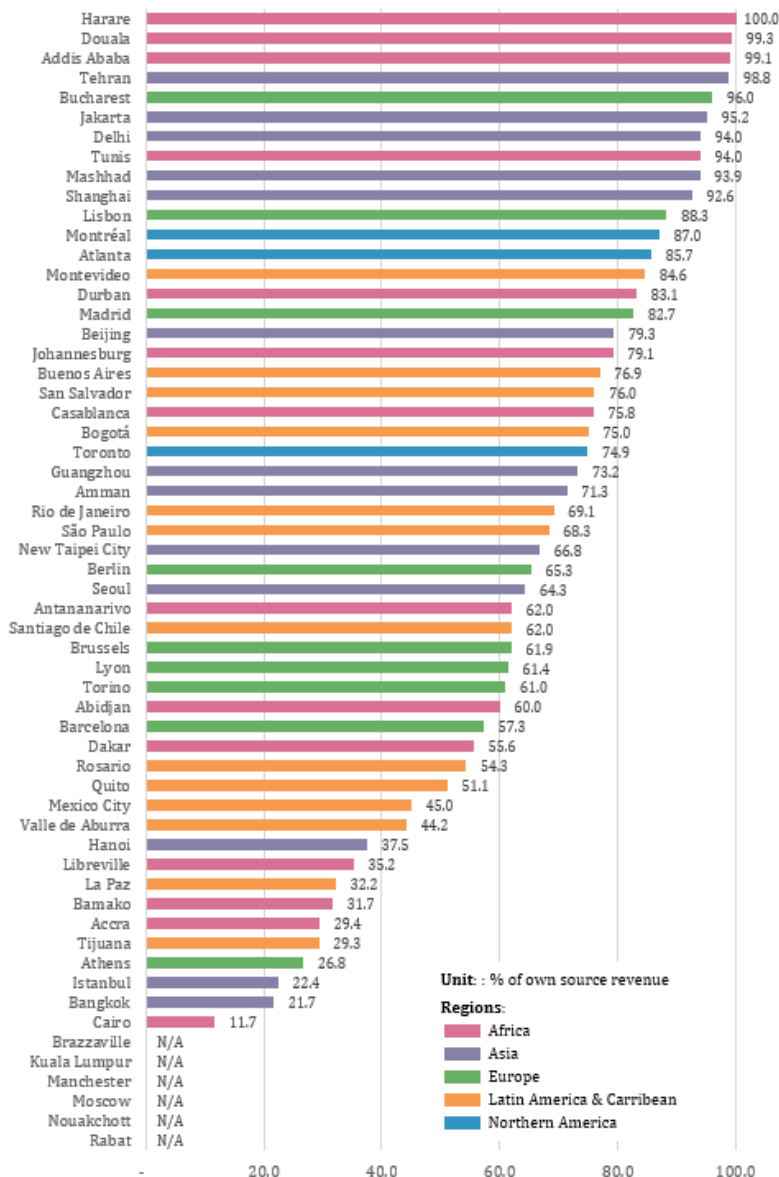
BRIEF OVERVIEW OF RESULTS

CONTEXT AND GOVERNANCE

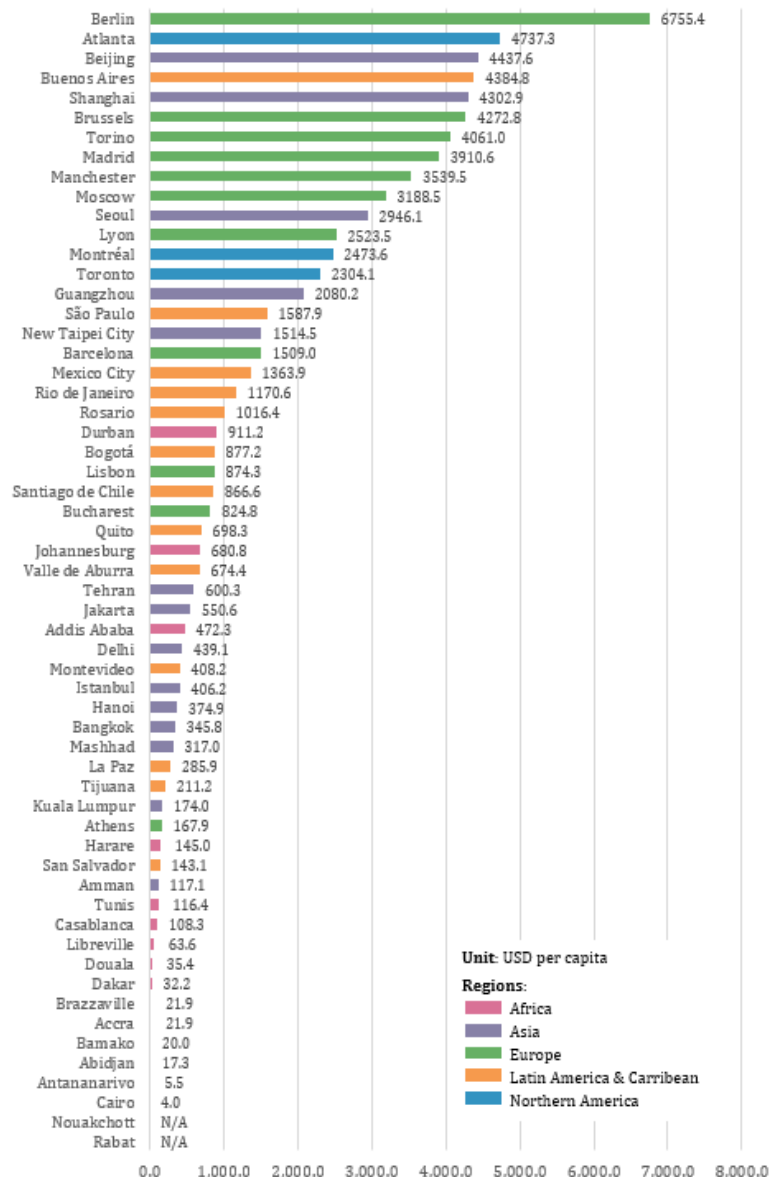
A.1: Population



A.9: Fiscal autonomy



A.10: Total metropolitan budget per capita



CONTEXT AND GOVERNANCE

A.7: Metropolitan coordination

5: There is a metropolitan government/supra municipal structure (25)



4: There is a multipurpose/strategic mechanism for formal cooperation and all jurisdictions within the metro area participate on it (9)



3: There is a multi-purpose/strategic mechanism for formal cooperation but not all jurisdictions participate on it (6)



2 = There is a sectoral/single purpose mechanism for formal cooperation and all jurisdictions participate (9)



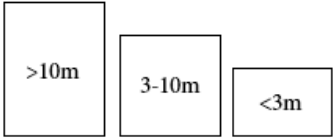
1 = There is a sectoral/single purpose mechanism for formal cooperation but not all jurisdictions participate at all (6)



0 = No formal coordination mechanism (3)



Population of Metro Area

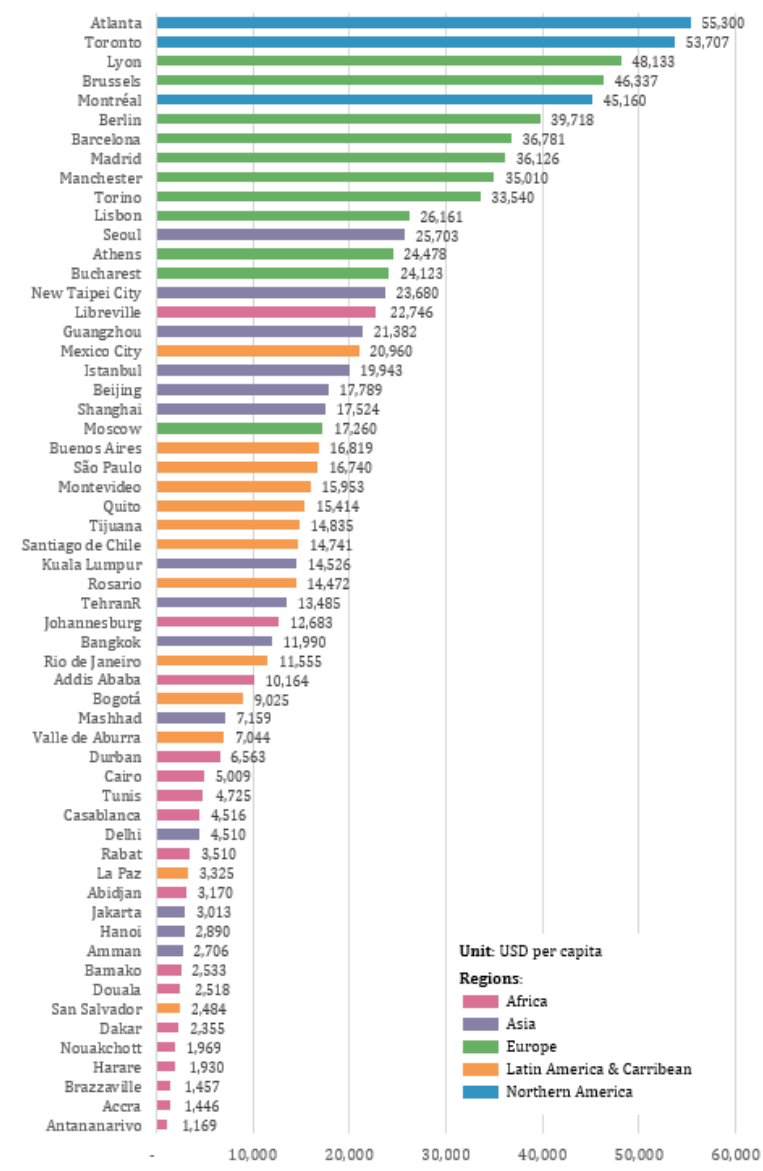


Regions:

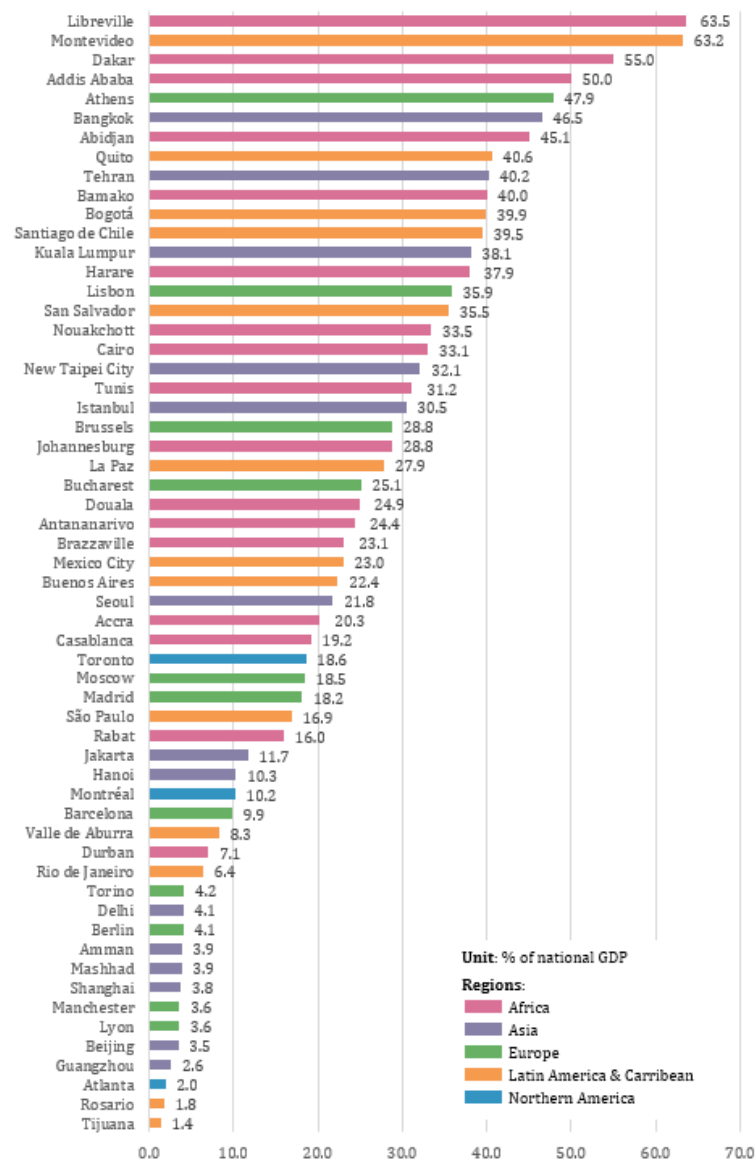


ECONOMIC DEVELOPMENT

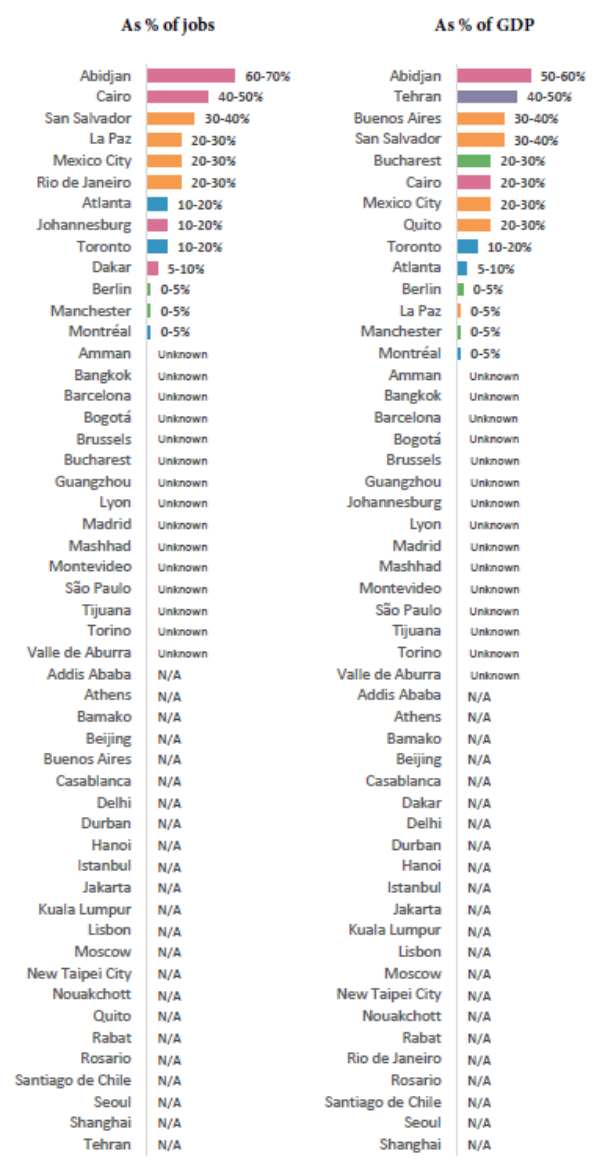
B.1: GDP per capita in the metropolitan area



B.3: Economic prominence (GDP)

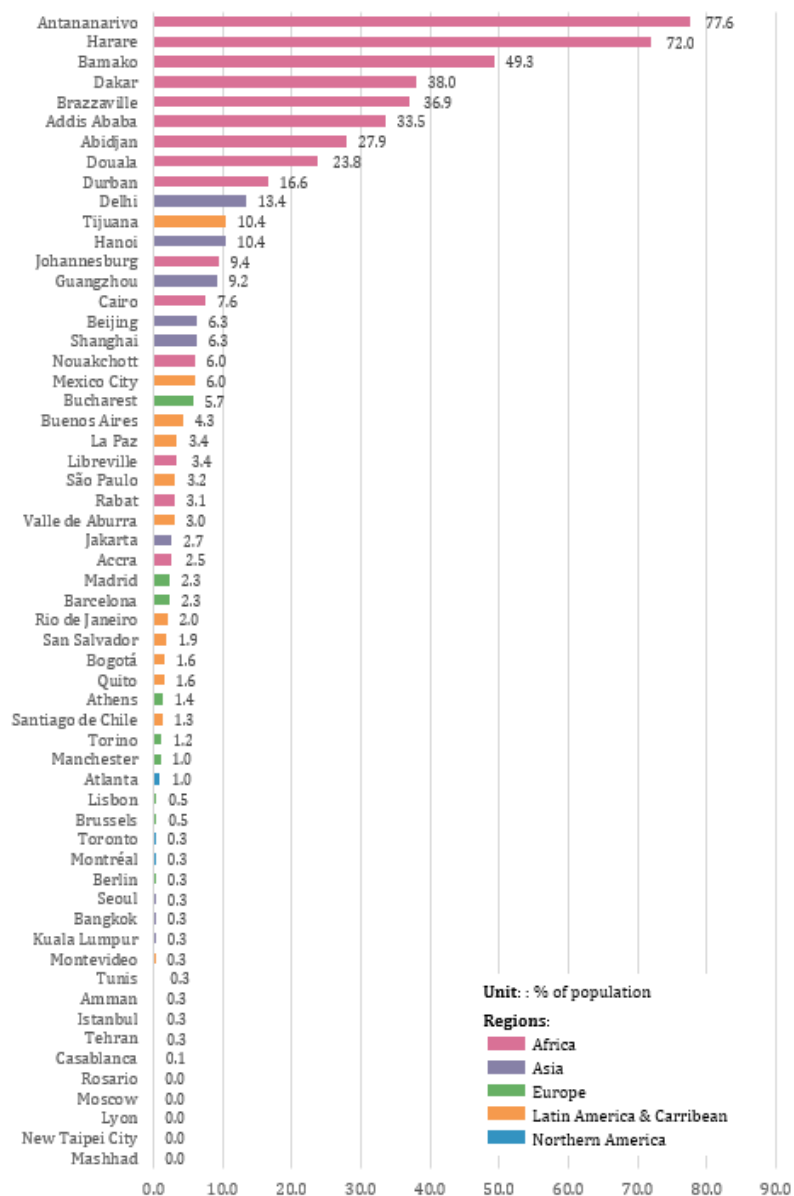


B.6: Informal economy

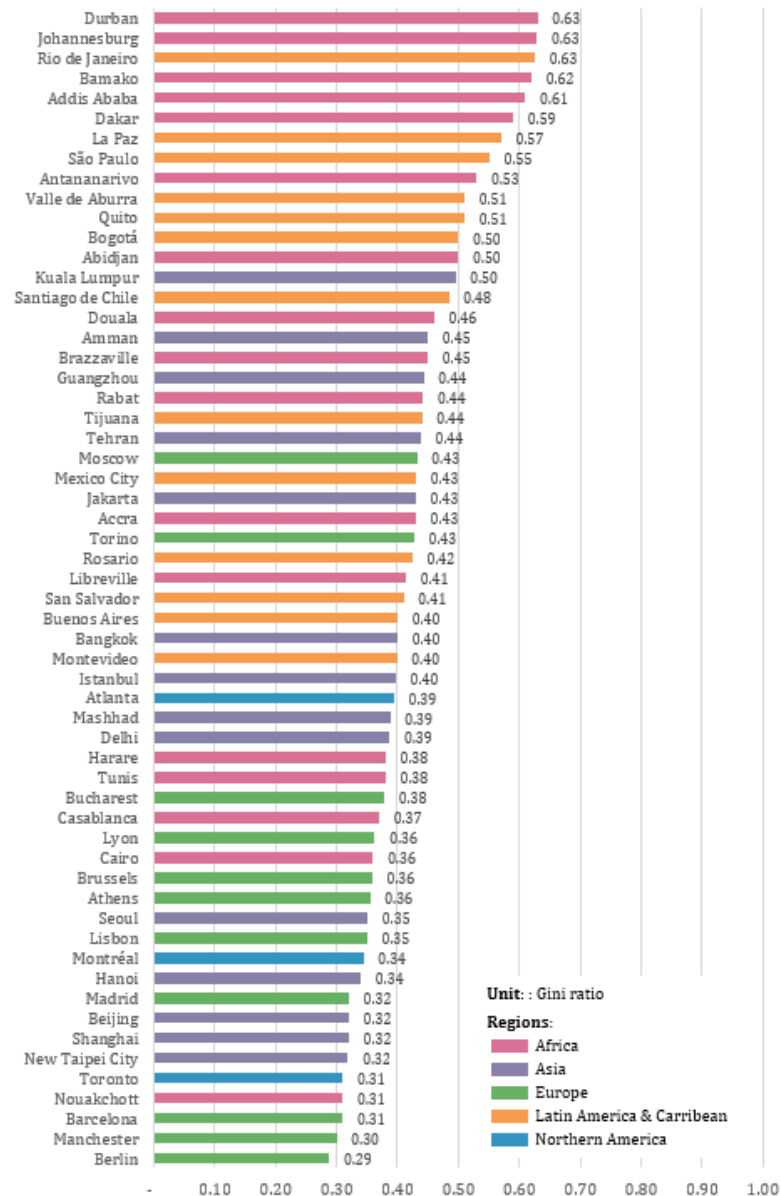


SOCIAL COHESION

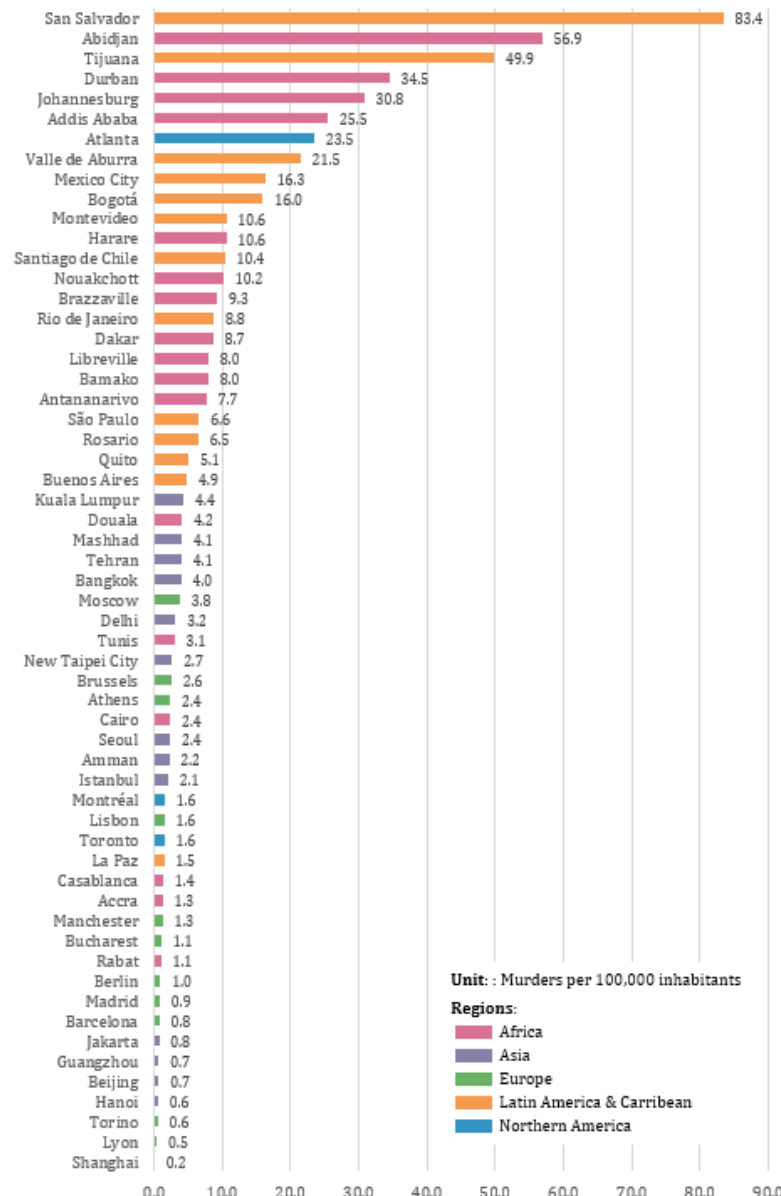
C.2: Poverty rate*



C.3: Income inequality

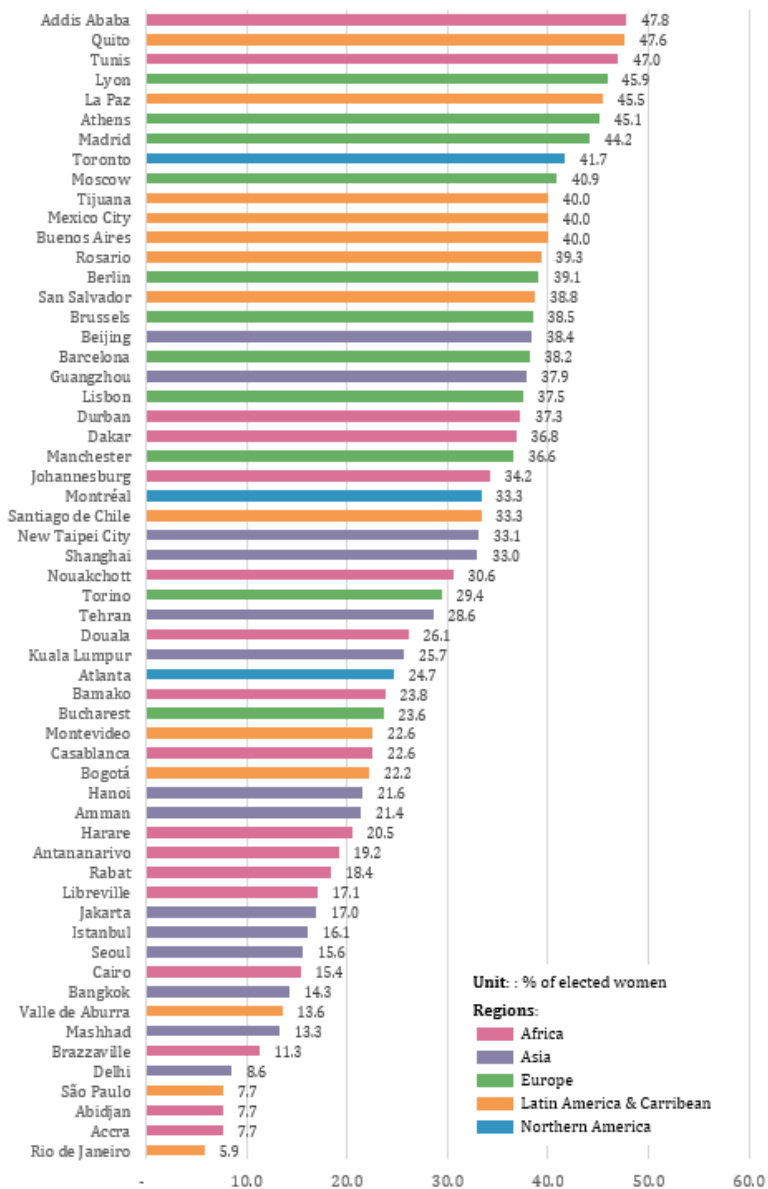


C.5: Murder rate

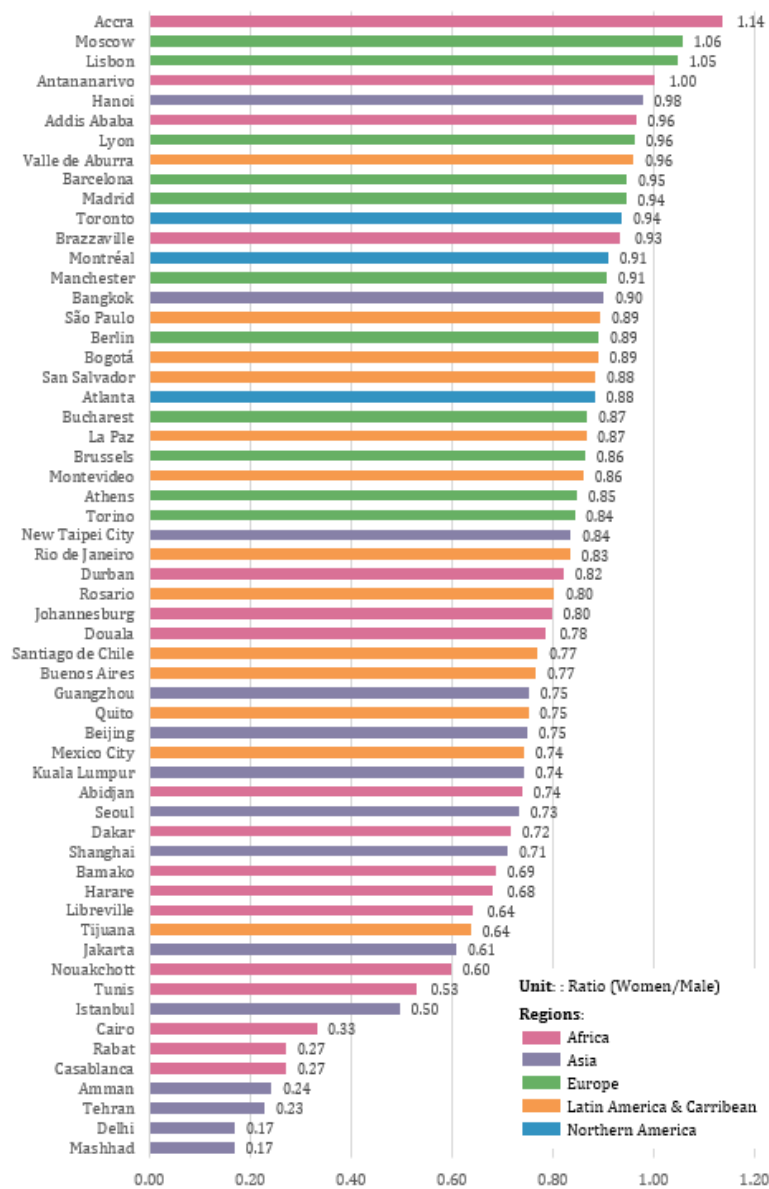


GENDER EQUALITY

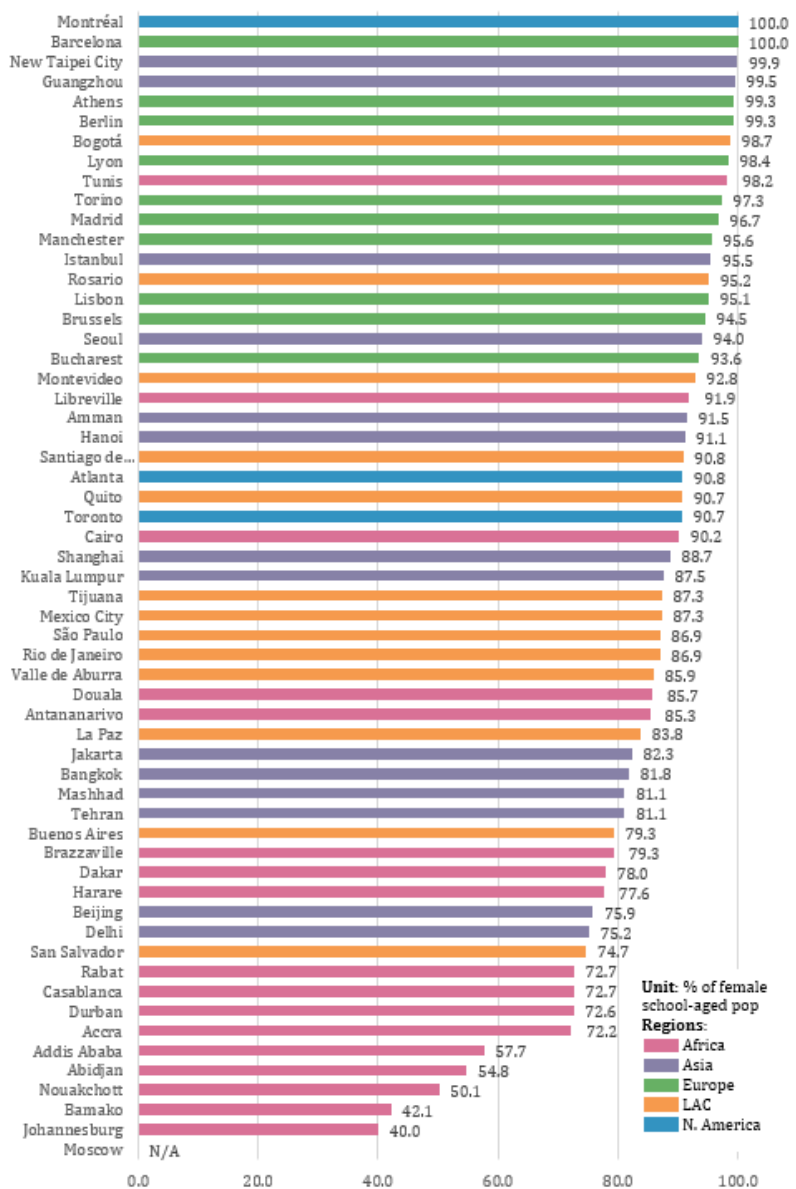
D.1: Share of elected women in local government



D.2: Women in work force

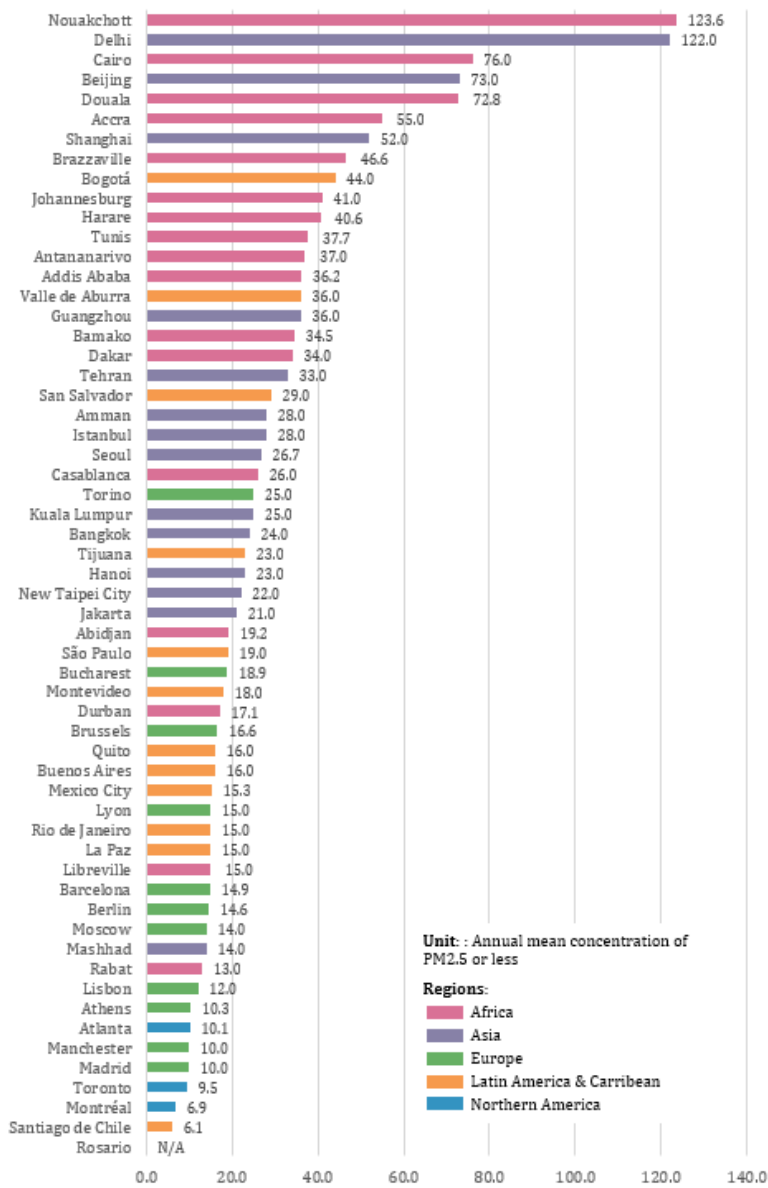


D.3: Enrolment of female school-aged population

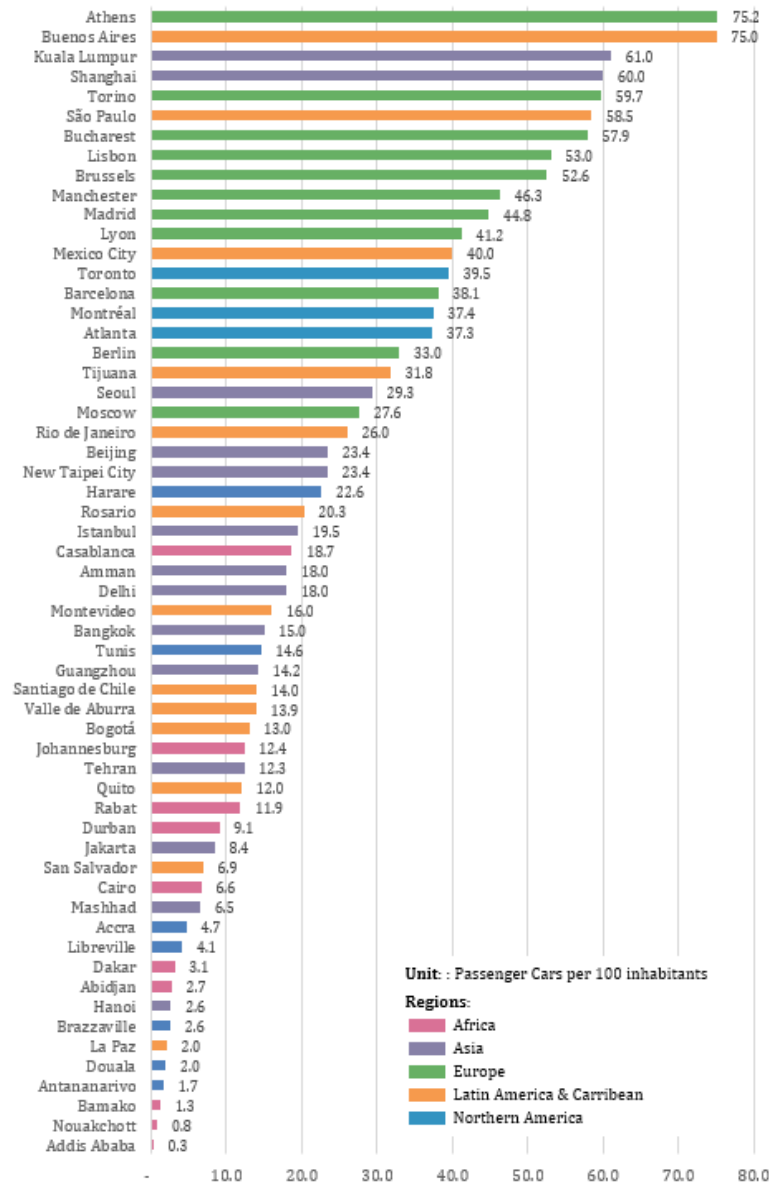


ENVIRONMENTAL SUSTAINABILITY

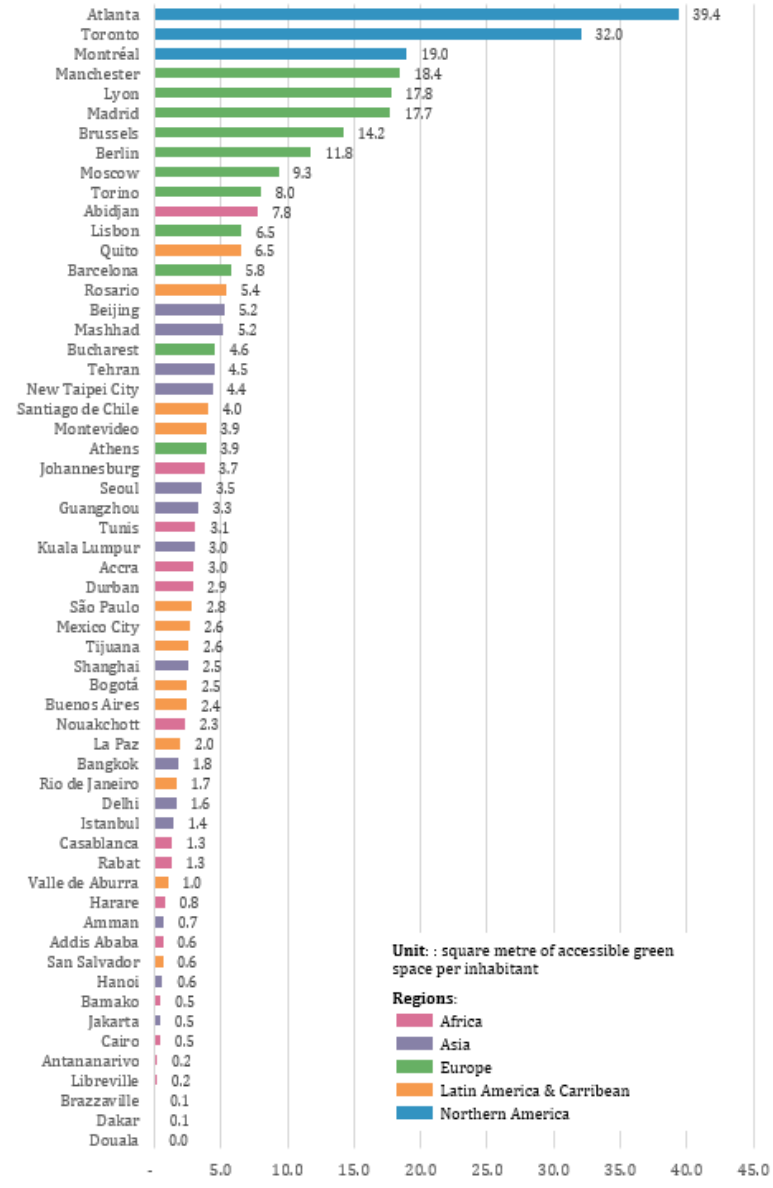
E.1: Air quality (PM 2.5 concentration)



E.3: Car ownership

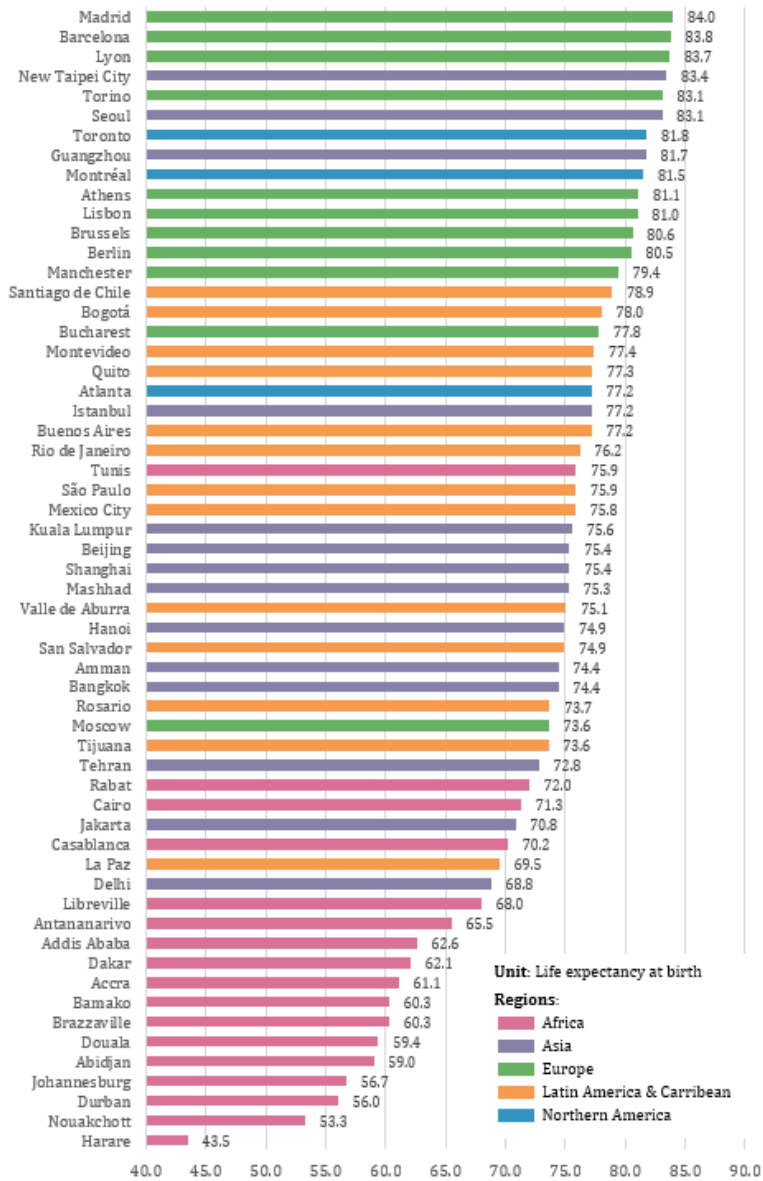


E4: Green space

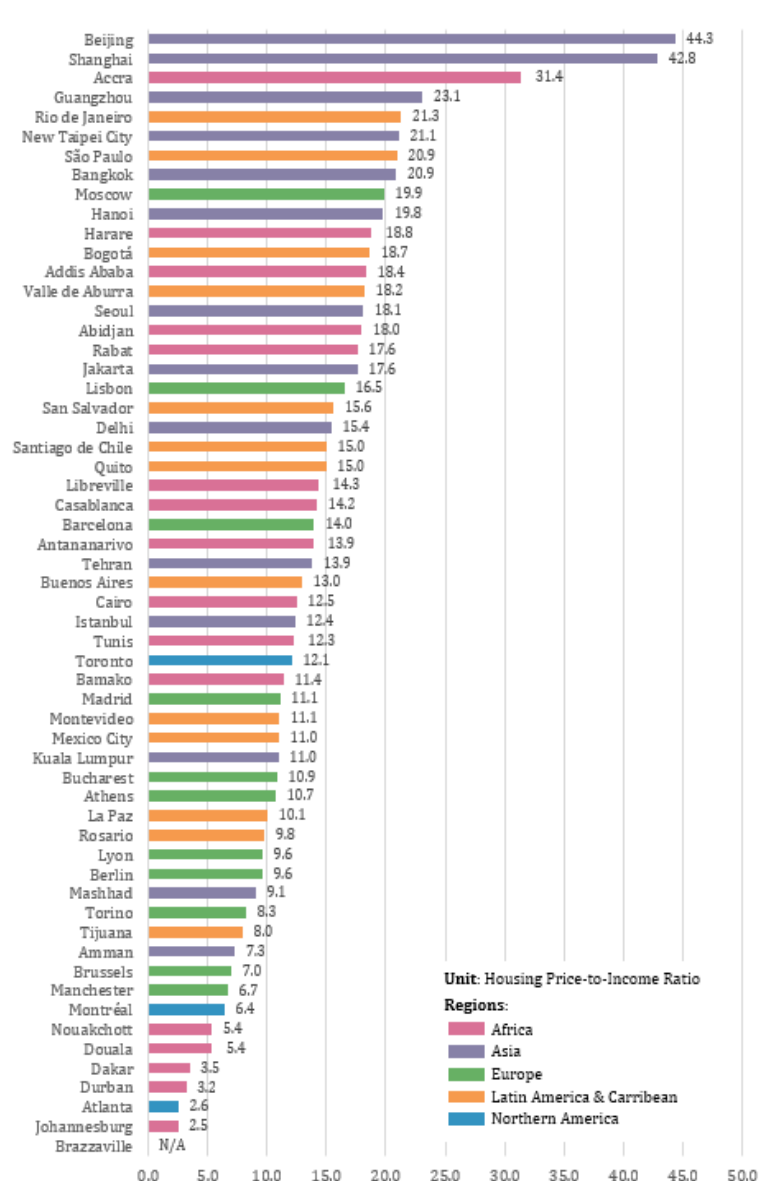


QUALITY OF LIFE

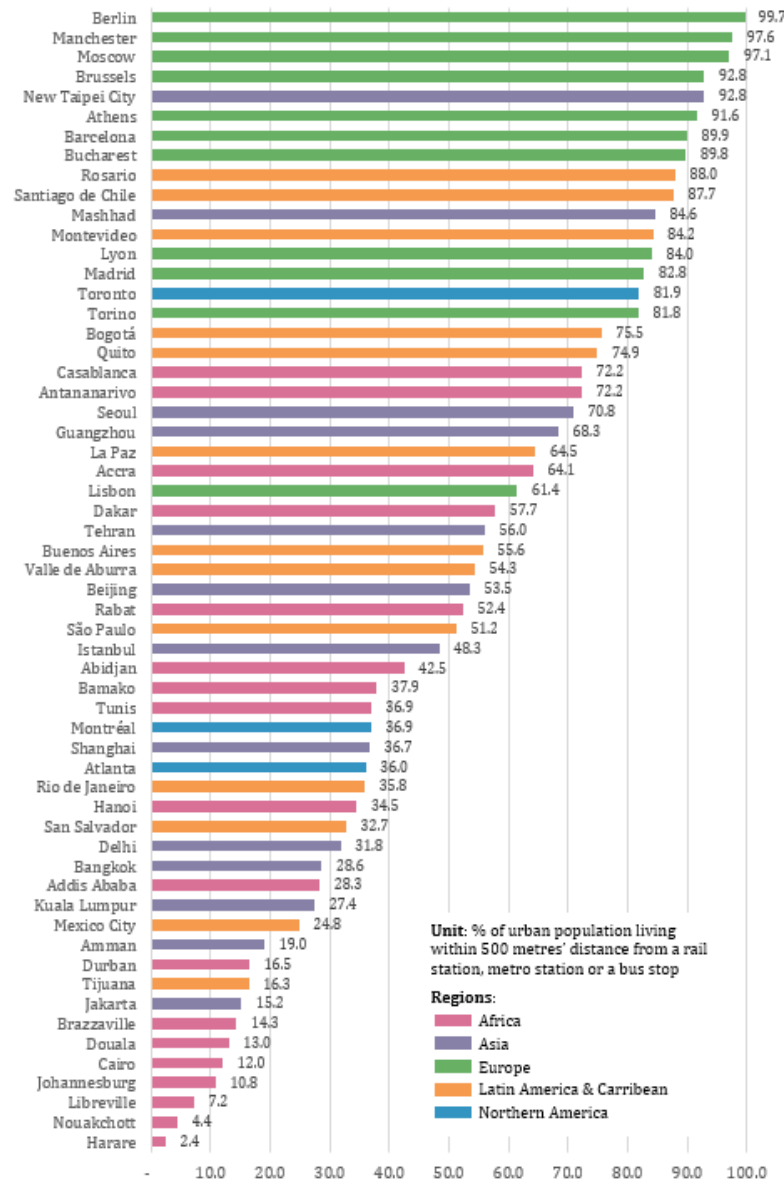
F.1: Life expectancy at birth



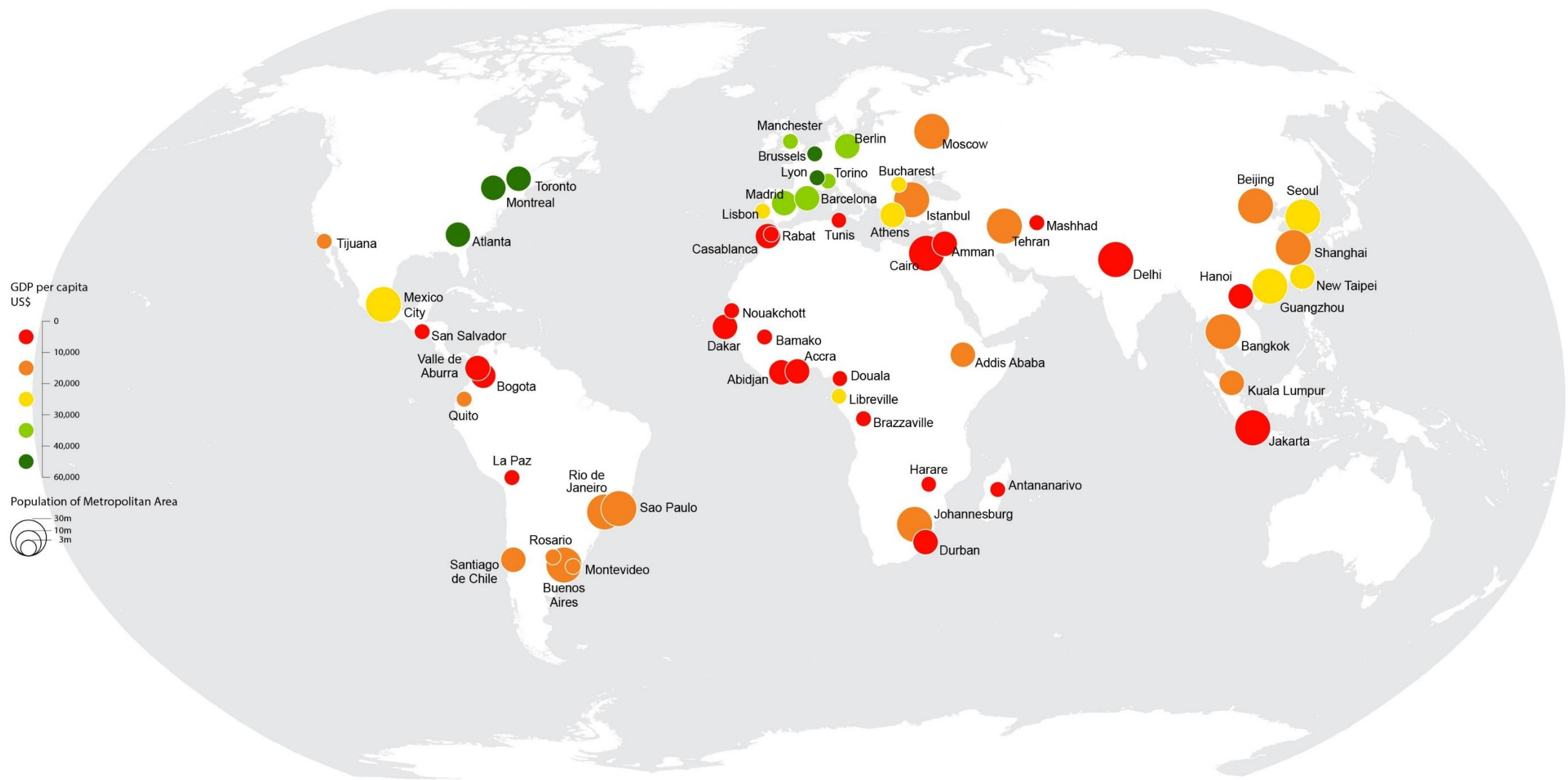
F.2: Affordability of housing



F.3: Access to public transportation



COMBINING DIFFERENT INDICATORS

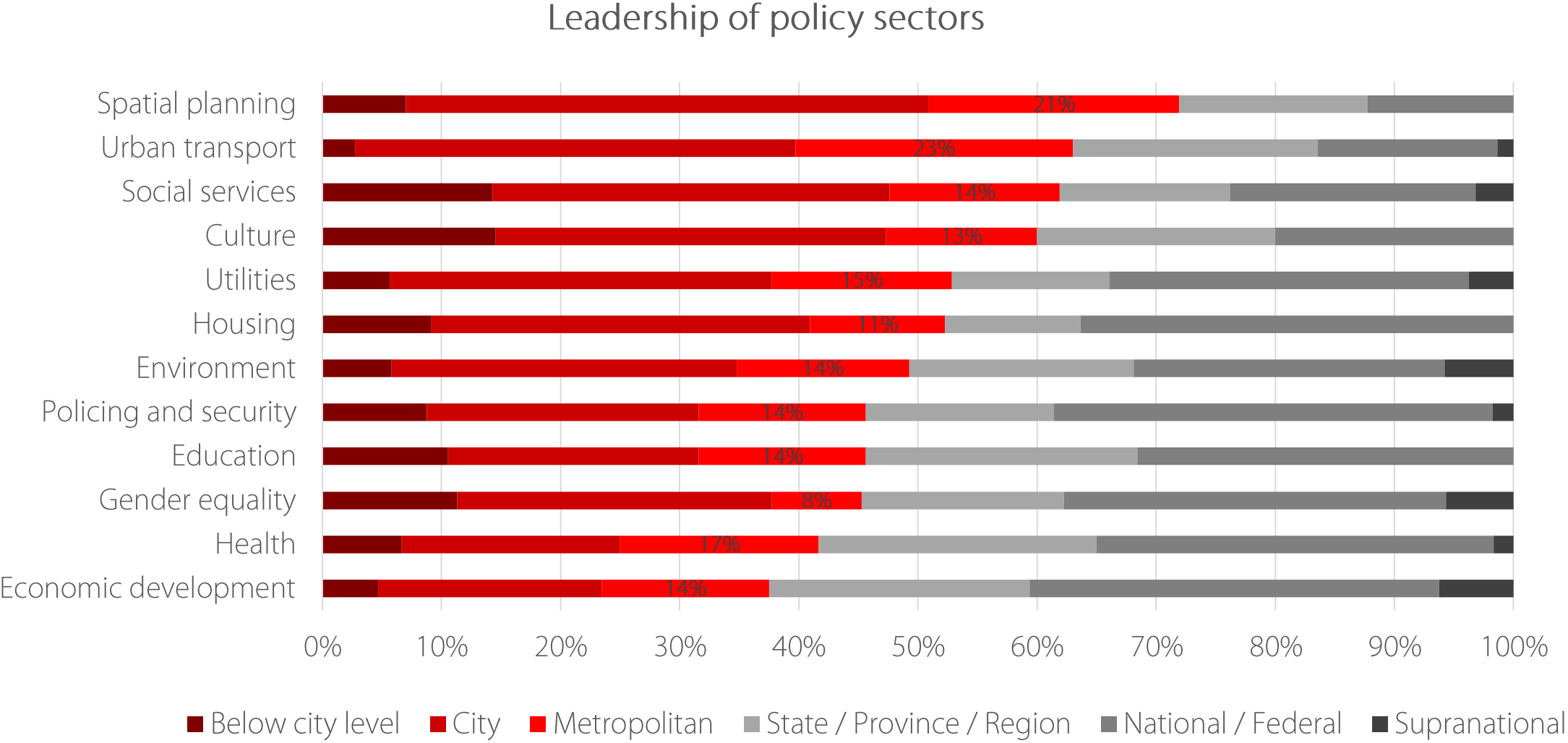


COMBINING DIFFERENT INDICATORS

[illegible]

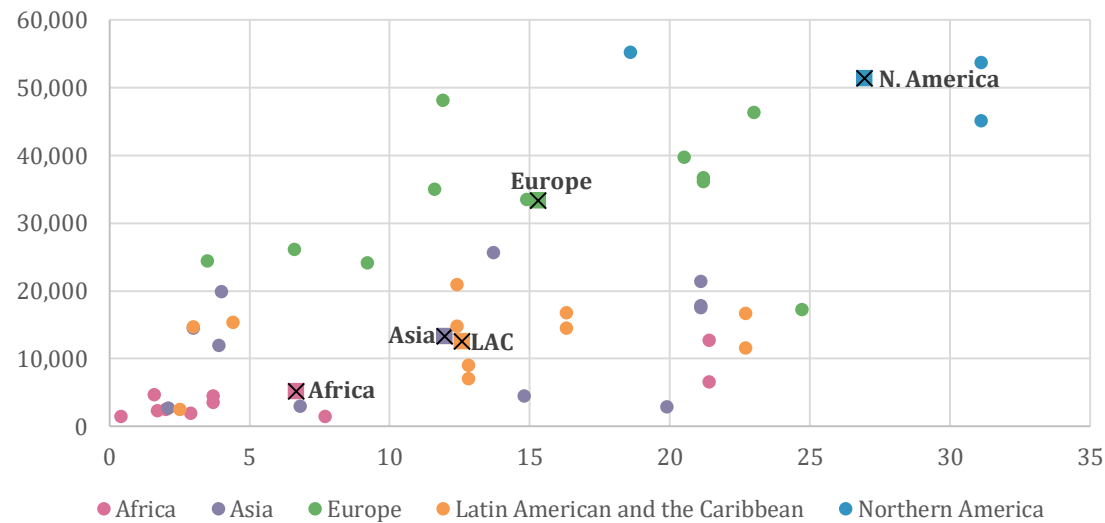
Averages	A1	A2	A3	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D5	E1	E2	E3	E4	E5	E6	E7	F1	F2	F3	F4	F5
Africa	4,303,744	2,683	3,065	6.7	0.7	3.9	2.6	65.4	177	5,204	67.5	32.5	15.3	15,851,912	76.8	24.0	0.5	6.7	13.2	24.9	0.7	71.8	0.5	42.7	2.3	11.0	1.7	288.8	42.7	2.2	63.6	12.7	32.0	16.3	2.58
Asia	14,489,040	6,233	3,038	12.0	0.3	3.0	6.9	70.1	1,329	13,307	66.6	18.1	6.2	35,343,528	94.9	3.6	0.4	4.5	2.3	23.2	0.6	87.5	0.5	37.7	6.1	20.2	2.7	381.8	62.7	4.0	75.9	19.8	47.7	54.3	1.94
Europe	3,947,446	2,982	2,692	12.0	3.6	4.1	2.8	66.7	2,875	33,424	82.3	18.2	9.6	78,144,352	98.1	1.4	0.4	14.3	1.5	38.1	0.9	97.0	0.7	14.7	7.3	40.6	10.7	403.9	95.9	13.9	80.8	11.3	88.0	80.6	1.68
LAC	7,479,816	6,039	1,822	12.6	0.4	3.1	3.3	59.1	1,053	12,567	76.1	25.1	8.3	24,289,952	96.2	3.0	0.5	4.6	18.6	30.5	0.8	87.7	0.6	20.1	3.2	25.3	2.9	368.3	78.7	10.4	75.6	14.4	57.4	54.7	2.03
N. America	5,338,550	10,703	721	26.9	1.0	3.3	2.5	82.5	3,172	51,389	84.5	10.2	6.3	36,832,964	98.3	0.6	0.3	27.8	8.9	33.2	0.9	93.8	0.7	6.2	12.8	28.8	30.1	680.7	86.6	6.8	80.2	7.0	51.6	77.1	1.68

COMBINING DIFFERENT INDICATORS

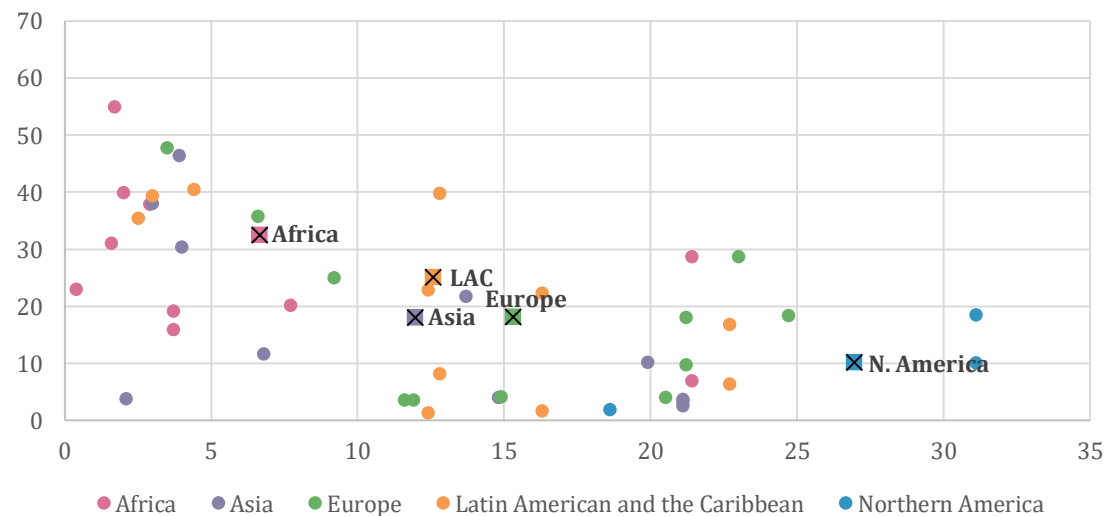


COMBINING DIFFERENT INDICATORS

GDP (y) / Fiscal Decentralisation (x)



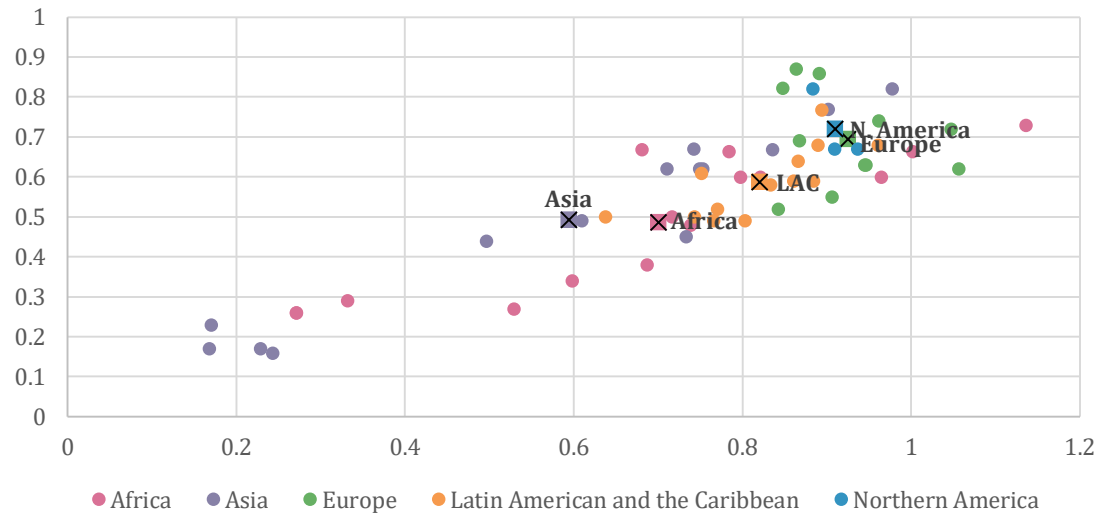
Economic prominence (y) / Fiscal decentralisation (x)



- GDP per capita and metropolitan budget per capita are correlated to fiscal decentralisation
- The degree of fiscal decentralisation is higher in Northern American metro territories followed by European ones. African metros ones are the least decentralised.
- Economic prominence has a negative correlation with fiscal decentralisation.
- African metropolitan territories have a higher economic prominence in their countries (32.5%) while Northern American ones have a smaller economic prominence. Metropolitan territories in Asia, Europe and Latin America and the Caribbean have a similar economic prominence.

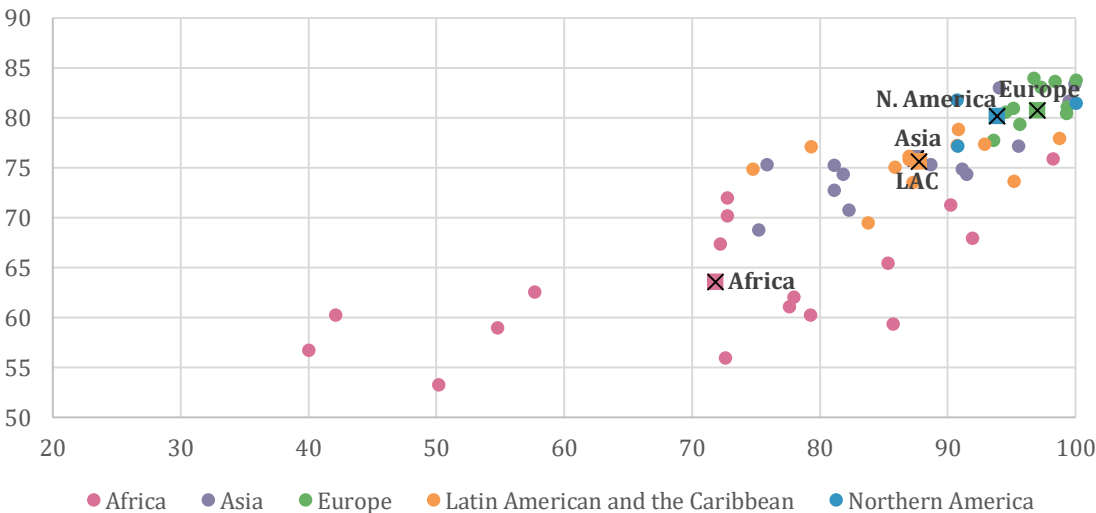
COMBINING DIFFERENT INDICATORS

Gender pay gap (y) / Women in workforce (x)



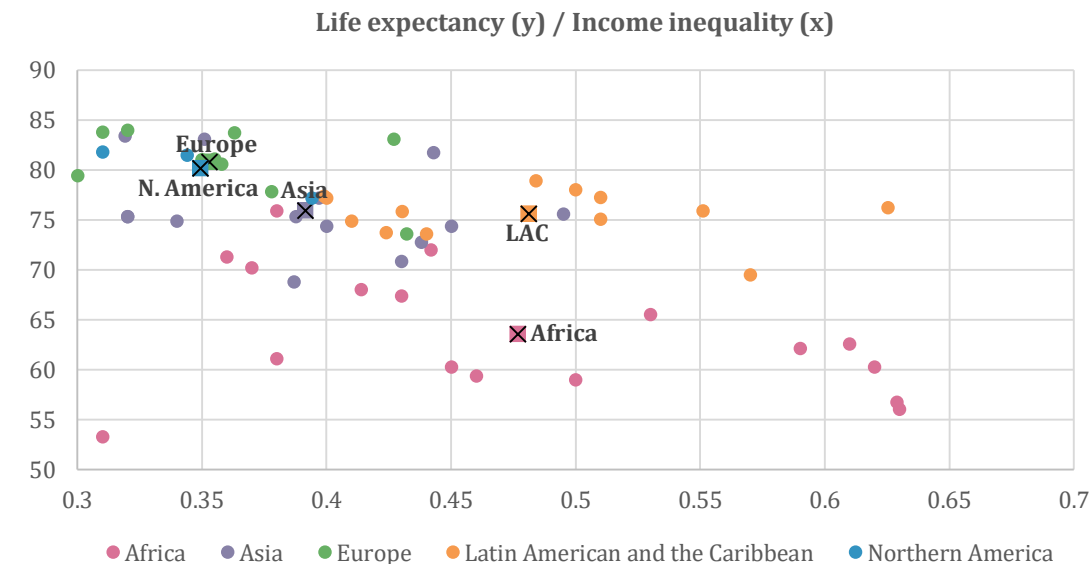
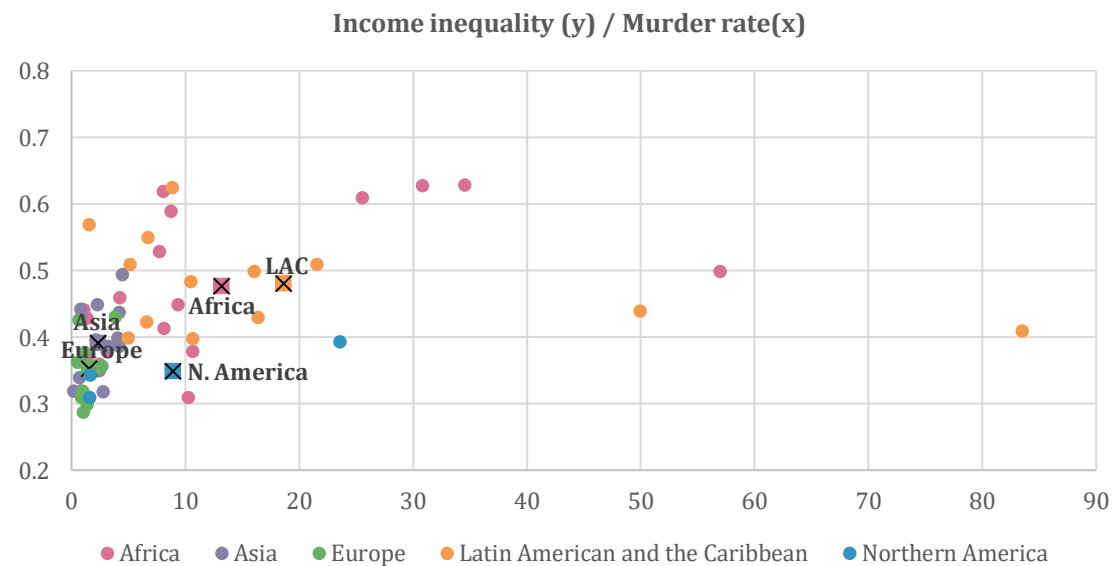
- Women in workforce has the strongest correlation to the gender pay gap even though our gender pay gap data is largely based on the national-level data.
- Women in workforce is also linked to GDP, the ratio of tertiary sector employment and literacy rate.
- European and Northern American metropolitan territories have higher ratio of women in their workforces (0.93 and 0.91 respectively) while the Asian average is the lowest (0.59)

Life expectancy (y) / Female school-aged population enrolled (x)



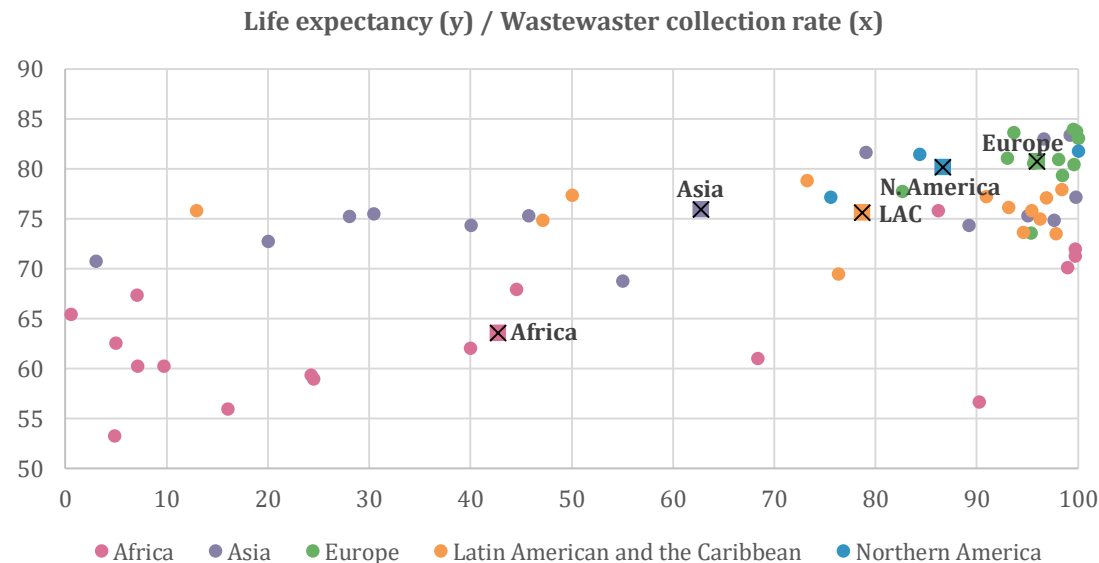
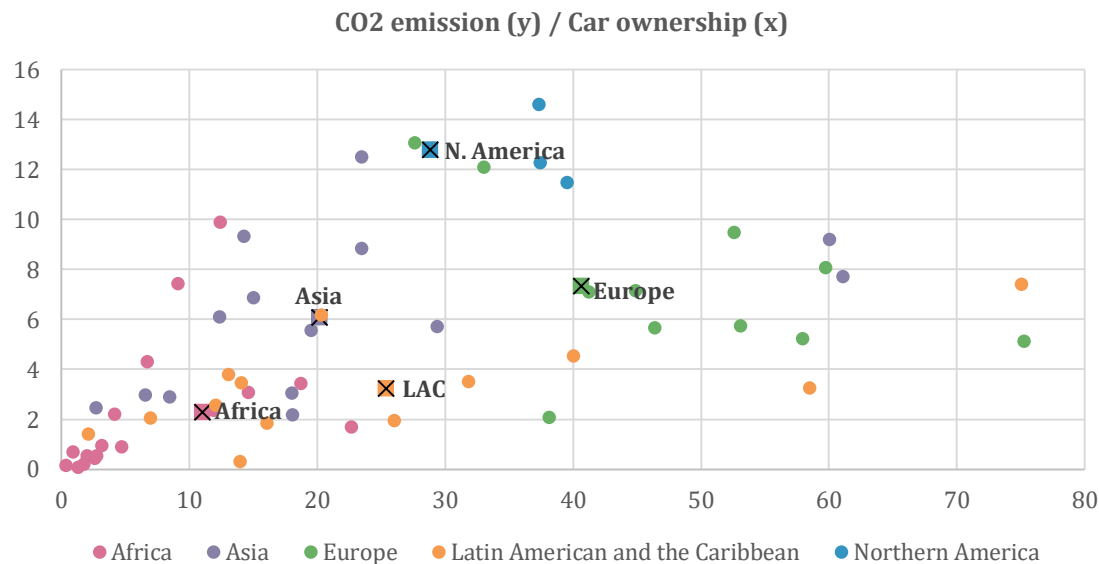
- Female school-aged population enrolled correlates to several socioeconomic indicators including GDP, literacy rate, higher education enrolment and shows the highest correlation to life expectancy.
- The average of female school-aged population enrolled of African metros is the lowest (71.8%), but its distribution varies: the highest metro was Tunis (98.2%), and the lowest one was Johannesburg (40.0%).

COMBINING DIFFERENT INDICATORS



- Murder rate is correlated with income inequality as well as with female school-aged population enrolled and public transportation accessibility.
- It shows no correlation to poverty rate and literacy rate.
- Latin America and the Caribbean metropolitan territories have the highest average murder rate (18.6) while the European metros have the lowest average (1.5).
- Life expectancy has the higher correlation with female school-aged population and higher education enrolment, which are higher than GDP and income inequality – role of education in metro territories.
- Life expectancy has the second largest number of correlated indicators (23 indicators total) after GDP per capita.

COMBINING DIFFERENT INDICATORS



- Car ownership is linked to higher carbon emissions of the metropolitan territories.
- Car ownership has the highest correlation with GDP per capita.
- Wastewater collection rate has the highest correlation with life expectancy while it is also highly related to the wealth of metropolitan territories.
- It is also related to poverty rate and female school-aged population enrolled

SOME TAKEAWAYS

- The concept of 'metropolitan area' is ambiguous...
- International databases with data on metropolitan areas are very limited.
- Expectations placed onto cities and metropolitan areas VS reality (information and capacities)
- There is a need for a vast array of relevant and comparable data to enable the creation of a strong system of cities and metropolitan areas can contribute to a balanced regional socio-economic development.
- Our data set has several limitations. Especially for academic purposes.
- But our project suggests an effective procedure to address this key challenge faced by any research effort on metropolitan areas.

Thank you!

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