THE EU-OECD DEFINITION OF A FUNCTIONAL URBAN AREA

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Abstract

This paper describes the EU-OECD method to define functional urban areas (FUAs). Being composed of a city and its commuting zone, FUAs encompass the economic and functional extent of cities based on daily people's movements. The paper first presents briefly the methodological approach and subsequently provides a detailed description of the identification algorithm, together with the data needed to apply it. This definition has been applied to 33 OECD member countries and Colombia, as well as to all European Union member countries.

1. INTRODUCTION[1]

Comparing cities in different countries is a challenging task. National definitions of cities are rarely consistent across countries and they rely on administrative or legal boundaries that do not necessarily reflect the functional and economic extent of cities. One main problem that emerges when comparing cities using national definitions is that the size of local units – i.e. administrative or legal units identifying city boundaries formally – can be starkly different across countries. Such differences potentially biases international comparative analyses through the modifiable areas unit problem (Openshaw, 1977).

Making sound international comparisons of cities requires using units of comparable size. However, there are also other aspects to consider, primarily related to the concept that scholars and policy makers use to understand cities, their evolution and economic performance. For simplicity, we can identify two main different but complementary concepts to describe the extent of cities. The first encompasses the space covered by an area of high population density with a minimum size of population. Such a definition, which we call 'city' from now on, accounts only for the agglomeration of people in space using a consistent threshold of density and total population.

A second concept considers the functional and economic extent of cities, beyond the consideration of density and population size only. Such concept includes also other lower

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[1] The views expressed herein are those of the author and do not necessarily reflect those of the OECD, the European Union or of its respective member countries.

density areas surrounding the city but closely linked to the latter from an economic and functional point of view. We call this second concept 'Functional Urban Area' (FUA). A FUA is composed of a 'city' and its surrounding, less densely populated local units that are part of the city's labour market ('commuting zone').

The European Union and the OECD have jointly developed a methodology to define functional urban areas in a consistent way across countries (Dijkstra and Poelman 2012, OECD, 2012). This paper describes such methodology in detail so that it can be replicated in any country once the necessary information is available.

FUAs are defined in several steps. First, a population grid makes it possible to define 'urban centres' independently from administrative or statistical boundaries. An urban centre is a pure grid-based concept, a cluster of contiguous cells of high density and with more than 50,000 inhabitants. This means that an urban centre inside a large local unit and one spread out over multiple local units could be easily identified using the same approach, something which definitions relying only on local unit data struggled to do.

Subsequently, this dense, urban centre is adapted to the closest local units to define a city. Next, commuting flows are used to identify which of the surrounding, less densely populated local units were part of the city's labour market (commuting zone). Commuting flows are based on travel to work i.e. the travel that employed residents in a local unit make to reach the place of work. However, commuting flows also capture some of the flows to access education, health, culture, sports or shops.

FUAs are a powerful tool to compare socio-economic and spatial trends in cities and to design urban development policy. FUAs are better suited than administrative areas to capture agglomeration economies and they encompass the full extent of the city's labour market. It can guide national and city governments when they plan infrastructure, transportation, housing, schools, and spaces for culture and recreation. In summary, FUAs can trigger a change in the way policies are planned and implemented by providing the right scale to address issues that affect both the city and its surrounding commuting zone.

Our definition of urban centres, cities and FUAs is people-based because it only uses density and size of population and the daily mobility of the latter. It is not a definition based on built-up area or morphology. Historically, the data on buildings, i.e. maps, had a higher spatial resolution than the population data. The indirect approach of using building data to identify population centres is no longer necessary as the population grid provides the needed spatial resolution. Furthermore, built-up area per capita varies between cities of different sizes, between developed and less developed countries and tends to grow over time. These three aspects reduce the comparability of definitions using built-up area between cities, countries and over time.

The EU-OECD functional urban area definition is linked to the 'degree of urbanisation' (Eurostat, 2018). Both use the identical city definition, but the degree of urbanisation classifies the remaining local units into towns & suburbs, and rural areas. Both definitions are included in the amended European NUTS regulation (REGULATION (EU) 2017/2391).

The remainder of the paper is organised as follows. Section 2 provides a short description of the method to identify FUAs. Section 3 describes the methodology in more detail. Section 4 discusses what local units to use and the issues linked to this choice. Section 5 lists the terminology used in this definition.

A separate Annex provides the detailed list of all FUAs in all EU and OECD countries, with a map showing FUA boundaries in each country.

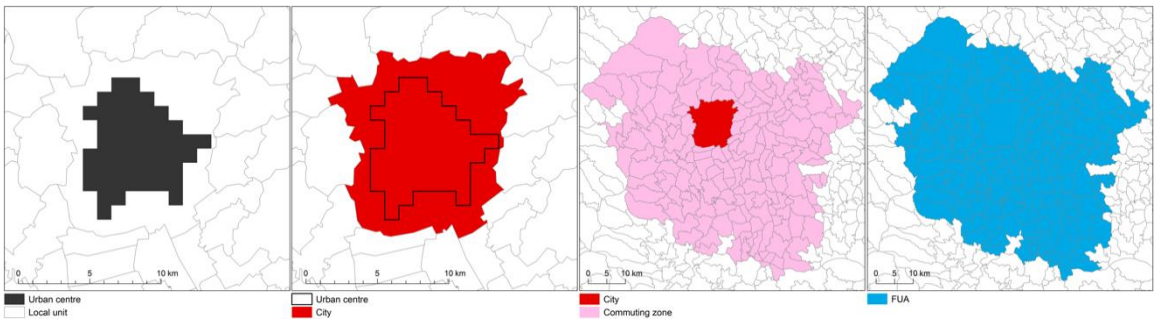
2. THE SHORT DEFINITION

A **functional urban area** can be defined in four steps:

1. Identify an **urban centre:** a set of contiguous, high density (1,500 residents per square kilometre) grid cells with a population of 50,000 in the contiguous cells;
2. Identify a **city**: one or more local units that have at least 50% of their residents inside an urban centre;
3. Identify a **commuting zone**: a set of contiguous local units that have at least 15% of their employed residents working in the city;
4. **A functional urban area** is the combination of the city with its commuting zone.

Figure 1 shows visually the different concepts that are used in the method and that compose a FUA, notably the urban centre, the city, and the commuting zone.

Figure 1. Urban centre, city, commuting zone and functional urban area of Graz, Austria



Applying this definition requires the following data sources:

- A residential population grid with the number of people per cell of 1-square kilometre and the share of land in each cell;
- Digital boundaries of the local units;
- Commuting flows between the local units and number of employed residents per local unit.

2.1. Definition of an urban centre

The first step focuses on the concentration of population in space, which is the simplest and most uncontroverted feature of a city. It is the starting point of this definition. The idea of a city as a place with a relatively high concentration of population in space is common

to many disciplines that describe a city including economic, social, cultural and geographical ones.

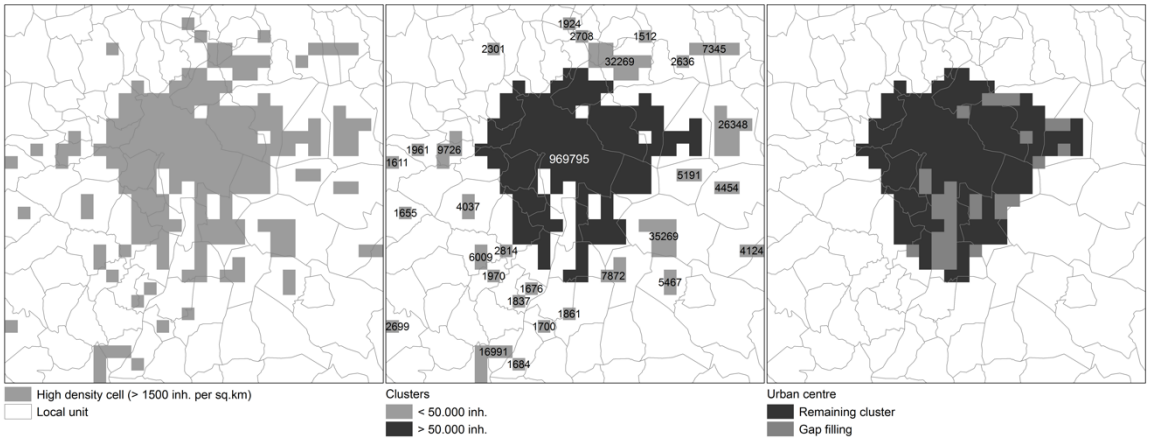
Many national city definitions rely the population size and density of a local unit. This causes two types of problems. A big city in a large local unit will have a very low or rural population density. For example, Ulaanbaatar, the capital city of Mongolia, has a population of 1.4 million but only a density of 270 inhabitants per square kilometre. The population size of a city is difficult to determine when it is spread out over multiple local units. For example, how many people live in Paris?

An urban centre, as defined in this paper, relies on a population grid which can identify spatial concentrations of population independently from political or administrative boundaries, using spatial units of the same shape and size.

An urban centre or high-density cluster is a new spatial concept based on grid cells of 1 square kilometre. It is defined in three steps, as indicated below and represented in Figure 1.

- Step 1: All grid cells with a density of more than 1,500 inhabitants per square kilometre of land are selected.
- Step 2: The contiguous high-density cells are then clustered. Only the clusters with at least 50,000 inhabitants are kept. To avoid over-aggregation, cells with only the corners touching are not considered contiguous.
- Step 3: Gaps in each cluster are filled separately and its edges smoothed (Fig. 2).

Figure 2. High density cells, high density clusters, urban centre in Toulouse, France



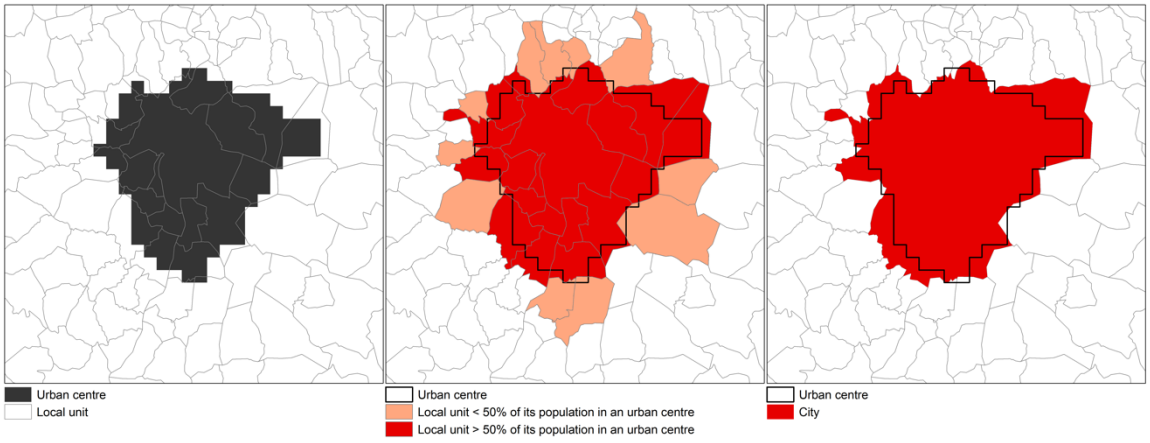
2.2. Definition of a city

A city consists of one or more local units with at least 50% of their population in an urban centre. A local unit can be either administrative or statistical. Examples of administrative units include a municipality, a district, a neighbourhood or metropolitan area. Some of these administrative units also play a political role as electoral districts or local government areas. Statistical units can be enumeration areas, census blocks, census tracts, wards, super output areas, named places or small areas.

Examples of local units used in OECD countries are *communes* in France, municipalities in Italy, *sigungu* in Korea and Census Subdivisions in Canada. The best local unit for this

definition is the smallest unit for which commuting data is available.[2] Figure 3 shows, visually, the process through which a 'city' is identified by intersecting the grid-based urban centre with local units.

Figure 3 Share of population in an urban centre in Toulouse, France



2.3. Definition of a Commuting Zone

Once all cities have been defined, commuting zones can be identified using the following steps:

(1) If 15% of employed persons living in one city work in another city, these cities are treated as a single destination.

(2) All local units with at least 15% of their employed residents working in a city are identified as part of the commuting zone of that city (Figure 4).

(3) Enclaves, i.e. local units entirely surrounded by other local units that belong to a commuting zone or a city are included and exclaves or non-contiguous local units are dropped (Figure 4, third panel).

A Functional Urban Area consists of the city and its respective commuting zone. It can happen that, due to a low intensity of commuting flows, there is no commuting zone. In this case, there is a perfect correspondence between the FUA and the city. The method to delineate FUAs is also visually summarised in Figure 5.

[2] In principle, commuting data at grid level would be another usable option, if available.

Figure 4. A city and its commuting zone

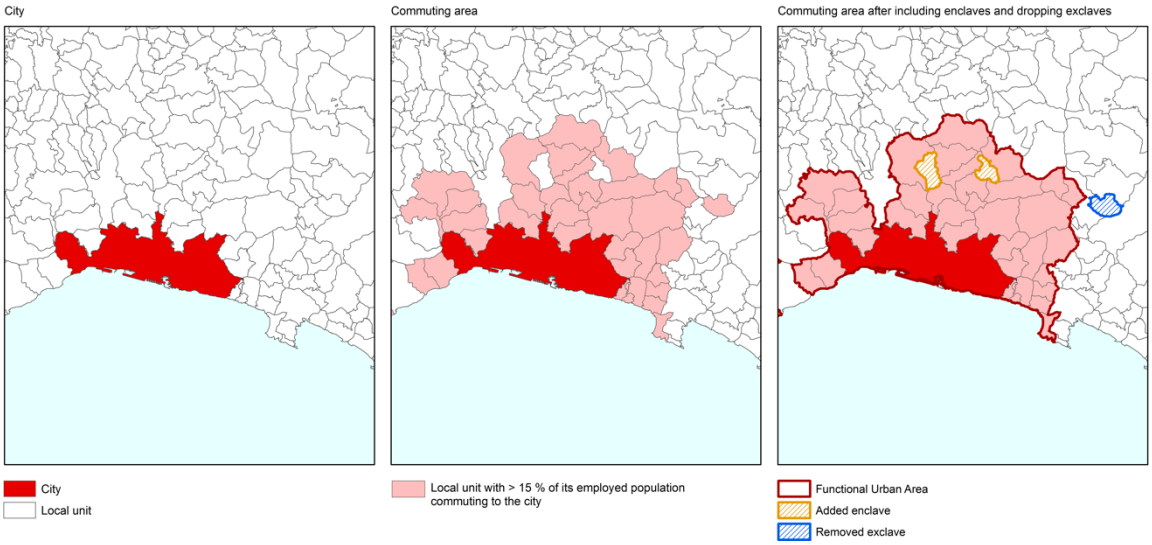
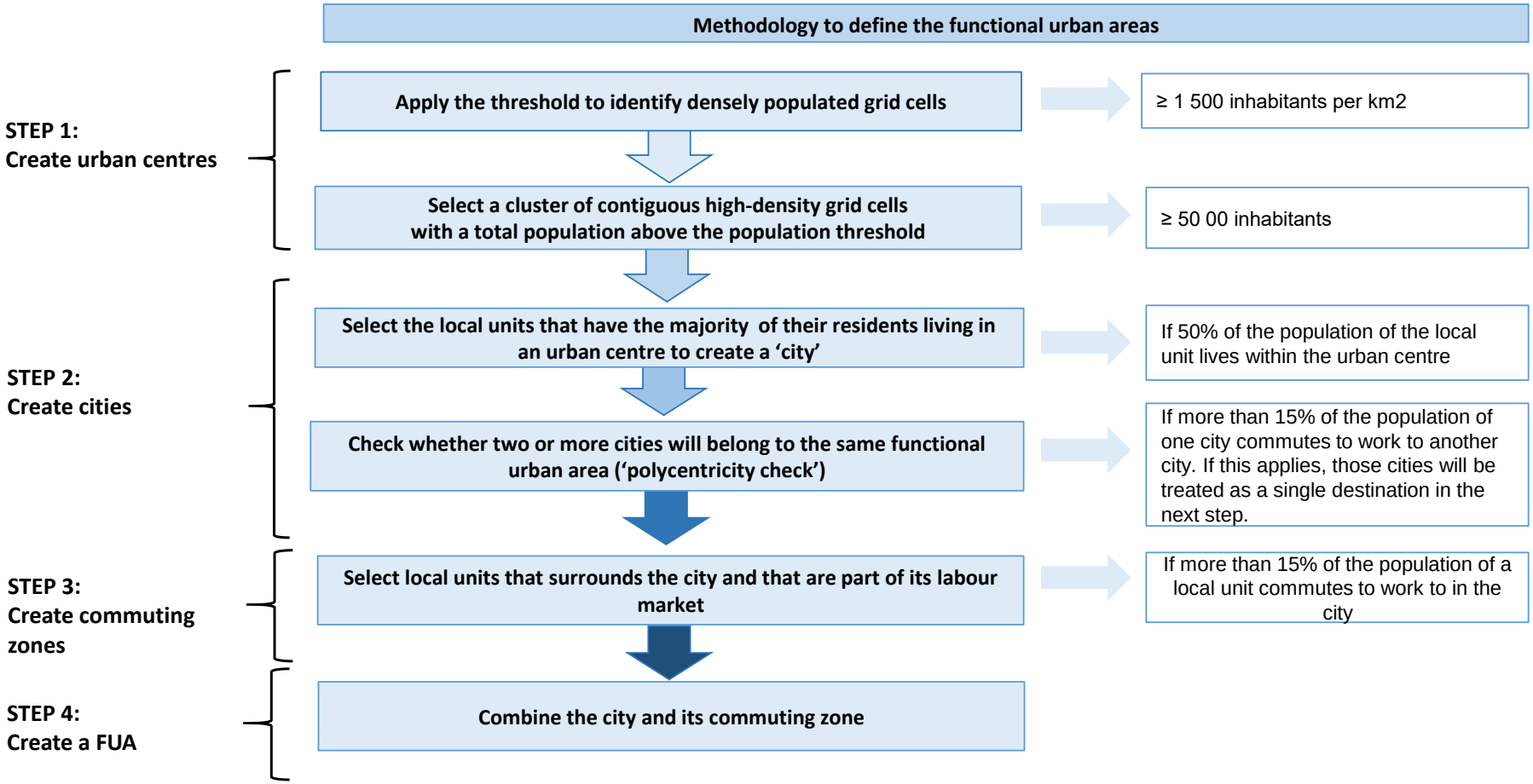


Figure 5. The algorithm to identify a functional urban area



3. DETAILED METHODOLOGY

This section describes the methodology in more detail.

3.1. Defining an urban centre

An urban centre is based on a population grid. Many statistical offices already produce their own grid. For example, the 2011 GEOSTAT grid covers all the EU member states.[3] Brazil, Colombia and Egypt either have their own grid or are developing one. Many more statistical offices will produce an official population grid by geo-coding their next census. Because these grids are based on points, they are called bottom up grids. In other words, the grid is created from the bottom up using data with a higher spatial resolution.

In addition, various institutions provide modelled global population grids that are publicly available. The Joint Research Centre has produced a global disaggregation grid (GHS-POP) using the Global Human Settlement Layer (GHSL[4]) for 2015. It is based on a combination of high-resolution layer of built-up areas and population data collected by CIESIN (GPW v4). WorldPop[5] has also created a global residential population.

The method to define an urban centre is the following:

1. Select all 1-square kilometre grid cells with a density of more than 1,500 residents per square kilometre of land (i.e. for each cell the share of land should be calculated by excluding bodies of water).

2. Cluster all contiguous cells above this density threshold using only four points of contiguity, in other words do not consider the diagonals. For example, in Figure 6 cells 2, 4, 5 and 7 are contiguous with the central cell, while cells 1, 3, 6 and 9 are not considered contiguous.

3. Remove all clusters with less than 50,000 residents.

4. Fill the gaps using the majority rule iteratively until no more cells are added. The majority rule means that if at least five of the eight cells surrounding a cell are part of the same urban centre, this cell is added to that urban centre. The majority rule should be applied to single clusters and not to all clusters at once. This rule should be repeated until no more cells are added.

In countries with relatively low-density urban development, a very accurate population grid and a strong separation of land uses, this approach may lead to an excessive fragmentation of urban centres. In such places, the grid cells with shopping malls, transport infrastructure or business parks will not reach the residential density threshold to be included in the urban centre and will create breaks between adjacent areas that do meet the threshold.

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[3] http://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/geostat

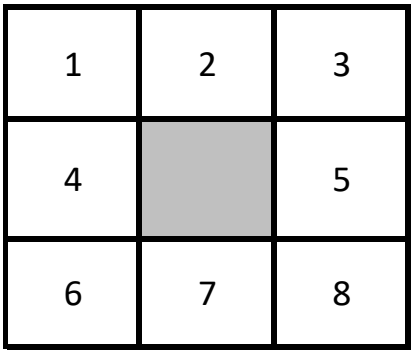
[4] http://ghsl.jrc.ec.europa.eu/

[5] http://www.worldpop.org.uk/

The quality of the population grid also plays a role. In a disaggregation grid, some population would still be attributed to commercial or industrial areas, where as a bottom-up grid would not. Therefore, this issue is less likely to occur when using a disaggregation grid.

To resolve this issue, grid cells that are 50% built-up can be added to the urban centre. This resolves the problem in this specific type of city and has little to no impact on higher density cities, as virtually all the cells that are 50% built-up have a high enough population density or are added as part of the gap filling process.

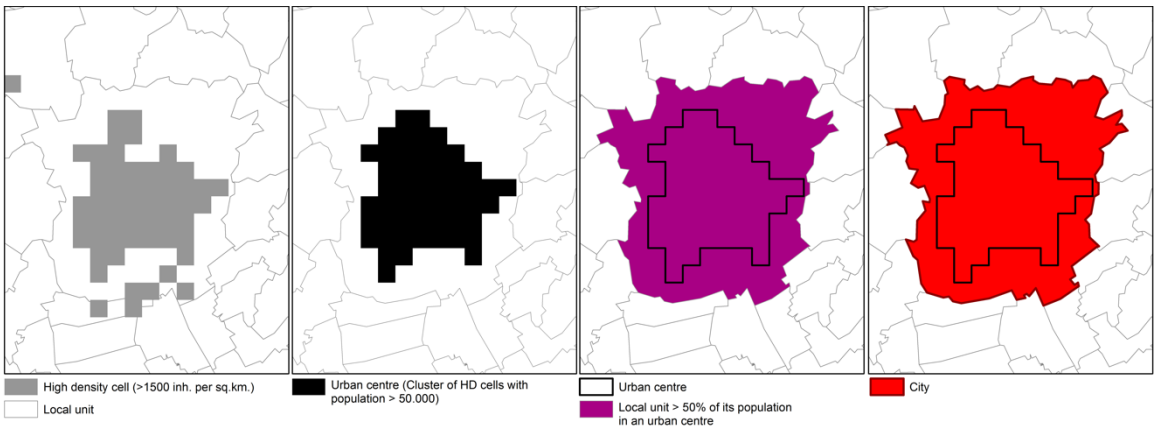
Figure 6. Contiguous grid cells



3.2. Defining a city

In most cases, defining a city is simple. There is a single urban centre located in a single local unit. It means that all of the urban centre population is located in that local unit and the share of the local unit population in that urban centre is very high. See figure 7.

Figure 7: High density, cells, urban centre and city of Graz



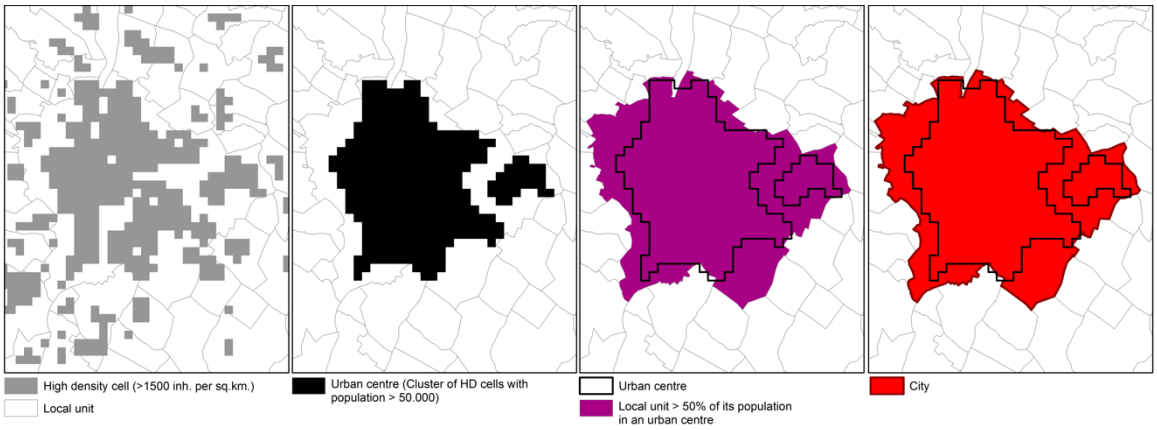
However, in some cases the relationship is more complex. We discuss two cases: a) a city contains more than one urban centre and b) an urban centre covers two distinct cities.

A city has two urban centres

This is the most benign situation. It may be that a wide river, a steep slope or an industrial area has led to a split in the urban centre. In this case, the local unit simply represents both

urban centres. For example, Budapest has two separate urban centres. They both fall within the same local unit (Figure 8).

Figure 8. Two urban centres can fall in the same local unit, i.e. Budapest, Hungary



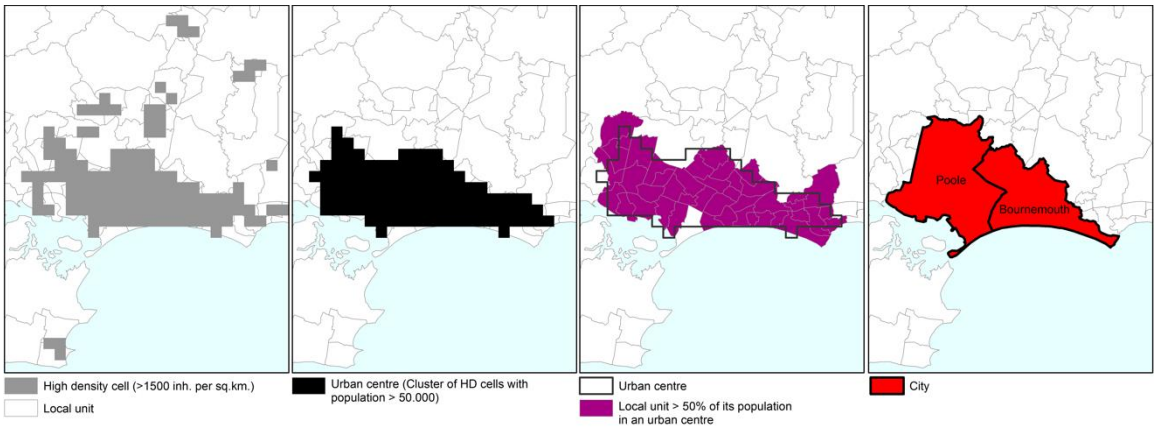
An urban centre covers two distinct cities

Some urban centres cover two distinct cities, in the sense of two distinct urban settlements with their own centre and name. This can happen because these cities have almost grown together but remain functionally distinct. If the population grid is estimated, that situation might occur because the estimated population is often more evenly distributed than the actual population.

In some cases, the urban centre can become too big to be plausible as the centre of a daily urban system, meaning that it is too large to be considered as a space encompassed by the daily movements of people between residence and work places.

When a single urban centre covers two or more distinct cities, a statistical office can choose to create multiple cities. For example, Poole and Bournemouth in the United Kingdom share a single urban centre (see Figure 9) but are two separate cities. Each of these cities, however, should have a population of at least 50,000. If there is at least a one-way commuting flow of more than 15% between these two cities, they should have joint commuting zone and therefore being part of the same FUA. If, instead, there is less than 15% of commuting between the two cities, those two cities could be kept separate.

Figure 9. High density cells, urban centre, local units and cities



3.3. What is a greater city?

In some cases, an urban centre stretches far beyond the boundaries of the central local unit that gives it its name. This is often the case for (large) capital cities that have outgrown the small central local unit, such as Athens, Copenhagen, Paris and Valletta. To avoid the confusion the pre-fix 'greater' is often added to the name. This is already common practice in several countries, see for example Greater London, Greater Dublin, Grand Paris etc.

The EU-OECD FUA definition ensures that the most comparable boundaries are selected. It does this by first defining an urban centre independently from administrative boundaries and only in a second step identifying the administrative boundaries that correspond best to this urban centre. In this way, we ensure we do not compare central Paris with all of London or Berlin. Countries with relatively small local units, such as France and Switzerland, are more prone to this problem of under bounding.

So in short, a greater city is a city. The addition of the term greater functions only as a warning to the data users that this EU-OECD definition of the city contains more local units than the central local unit which gives this city its name (see Section 4 for a discussion on how local units are selected). The term 'Greater City' was previously used by Eurostat with a separate code to identify cities that had two geographical levels: city and greater city. This has been discontinued as it was difficult to communicate and create a risk that city residents would be double counted.

3.4. Defining a commuting zone

Checking for connected cities: the polycentricity check

The definition of the commuting zone starts with the 'polycentricity check', in other words check if two or more cities are linked by strong commuting flows. If city A has 15% of its employed residents commuting to city B, then these two cities will share a single commuting zone. It is sufficient that 15% is reached in one direction. For example, if city B has a commuting flow of less 15% to city A, it will still share the same commuting zone.

The polycentricity check is applied only once. It is not an iterative rule. For example: City C has a commuting flow of 20% to city D. City F has a commuting flow of 10% to city C and 10% to city D. Then cities C and D will have a shared commuting zone, but city F will have its own commuting zone because the flow to each individual city is too small.

If city H and city I both have a commuting flow over 15% to city J, then all three will share a single commuting zone.

Creating the commuting zone

The next step is identifying all local units with at least 15% of their employed residents working in a single city (or both cities in the case of cities linked by commuting flows).

If a local unit has a commuting flow of more than 15% to two different cities, it will become part of the commuting zone of the city to which the flow is biggest. So if a local unit has a commuting flow of 20% to city K and 17% to city L, it will be part of the commuting zone of city K.

Enclaves, i.e. local units surrounded by a single functional area, are included and exclaves or non-contiguous local units are dropped. An enclave is defined as a local unit that shares

100% of its land border with the functional area (city or commuting zone). Water borders are not considered.

Destination of the commuting flows should be the best approximation of the urban centre, i.e. all the units with at least 50% of their population in the urban centre. If the city boundary is adjusted by adding or dropping a few small local units or shifted to a higher administrative level (see next section), this adjusted city should not be used for the commuting analysis. The only exception is where a single urban centre is covered by multiple cities.

4. WHAT LOCAL UNITS TO USE?

The population grid helps to address the modifiable areal unit problem. Yet when these grid concepts are used to classify local units, the problem that different shape and sizes of local units will lead to different results reappears.

Many countries have more than one local administrative levels and more than one potential statistical unit that might be chosen as 'local units' to delineate cities and FUAs. Smaller units will ensure a close match between an urban centre and a city. Statistical offices, however, may not be able to provide annual data for many indicators at this level. Smaller units, such as wards or districts, may not have as strong a political role as municipalities do.

This section describes some of the issues encountered when using different sizes of local units and proposes, where feasible, options of how to address them.

4.1. Large units may lead to the over-, under- or non-representation of an urban centre by a city

The population of the urban centre and that of the city can differ quite a bit if a country has large local units. Here we describe three types of issues that arise when using large local units to define a city.

4.1.1. Overrepresentation

A city can have almost double the population of an urban centre. For example, an urban centre of 50,001 inhabitants in a local unit of 100,000 would mean that this local unit will be defined as a city. This is a tricky problem to solve as the only alternative to the overrepresentation is non-representation, i.e. by not defining this local unit as a city.

4.1.2. Underrepresentation

A city can also have a much smaller population than the urban centre it represents. Take for example, an urban centre of 200,000 inhabitants that is split across four local units. One local unit has a population of 50,000 and all of them live in the urban centre. The other three local units each have a population of 150,000 of which respectively 60,000, 50,000 and 40,000 live in that urban centre. As a result, the city will consist just of that one local unit with a population of 50,000 and not the other three other local units.

This underrepresentation can be reduced by adding the local unit with the highest share of its population in that urban centre to the city (local unit B with 60,000 of its

150,000 inhabitants in the urban centre). This would bring the population of the city up to 200,000 and 110,000 would live in the urban centre. (See rule 1 in section 4.2).

4.1.3. Non-representation

The most extreme form of under-representation is non-representation. For example, a local unit with a population of 200,000 with a single urban centre of 75,000 inhabitants will not be classified as city. As a result, this urban centre will not be represented by a city, i.e. non-representation, something which is more likely to happen to small urban centres.

In a country where all the local units are large, all the small urban centres will not have a city representing it. This would create a quite skewed representation of urban centres as all the small ones would be missing.

One option to address this problem is that for half of the small urban centres without a city, their local unit is classified as a city even though their share of population in an urban centre is less than 50%.

4.2. Small units may lead to a loss of the link to the city government or to less statistical data

In a country with large local units, most cities will consist of a single unit. As a result, each city will have a single local government. This makes it easier to communicate the indicators to local politicians and ensures good input to polity making.

In countries with small local units, most cities will consist of multiple units. These small local units will ensure that there is a close match between the population in the urban centre and the population in the city. The price to pay is that the city will not match a single local government, which makes it more complicated to communicate this data to local politicians.

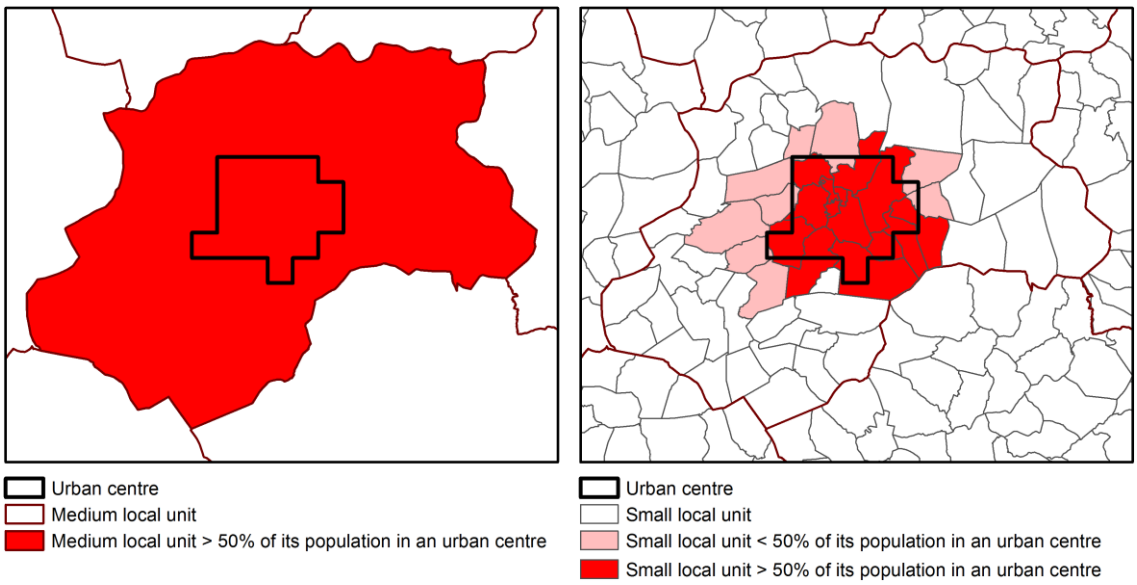
This effect can be shown in Portugal, which has both municipalities (*municipio* or *concelho*) and parishes (*freguesia*). If the urban centre of Braga in Figure 10 is used to define the municipal level (left panel), there is a simple one-to-one relationship. The local government of Braga is organised at the municipal level. If the urban centre is used to define a city at the parish level (Figure 10, right panel), the relationship becomes a more complicated one-to-many relationship. The simple link with local government of Braga is also lost.

When statistical units are used as building blocks to define a city and/or a FUA, the latter can be adapted *ex post* to the closest administrative local units. For example, cities and their commuting zones in the United States have been delineated using census tracts as building block units, but subsequently adapted to the closest county boundaries, by including the counties where the share of population living in cities and FUAs was higher than 50%.

The imperfect match between the cities (and FUAs) and their respective urban centres can be informative to policy makers. Administrative boundaries of cities often remain unchanged for decades, while cities expand or shrink. Many OECD countries, following the process of urbanisation and urban expansion occurred in the last few decades, have created new levels of government for large cities encompassing

multiple local units. For example, France has created *metropoles* to help govern their 21 biggest cities.

Figure 10. Braga defined at parish level and at municipal level



4.3. Adjusting the city to ensure a better representation of the urban centre or a better link to local government

If a country wishes to adjust its cities to get a better link between a city and its urban centre or a city and its local government, it can add or drop a local unit as long as the two following rules are respected:

- Rule 1: A local unit with less than 50% of its population in an urban centre can be added to a city if at least 50% of the population of this expanded city lives in an urban centre.

- Rule 2: A local unit with 50% of its population in an urban centre can be excluded from a city as long as 75% of that urban centre population lives in a city after excluding that local unit.

These two rules were designed to provide statistical limits to these optional changes that can be made: A city should have 50% of its population in an urban centre and an urban centre should have 75% of its population in a city.

4.3.1. City adds a few local units

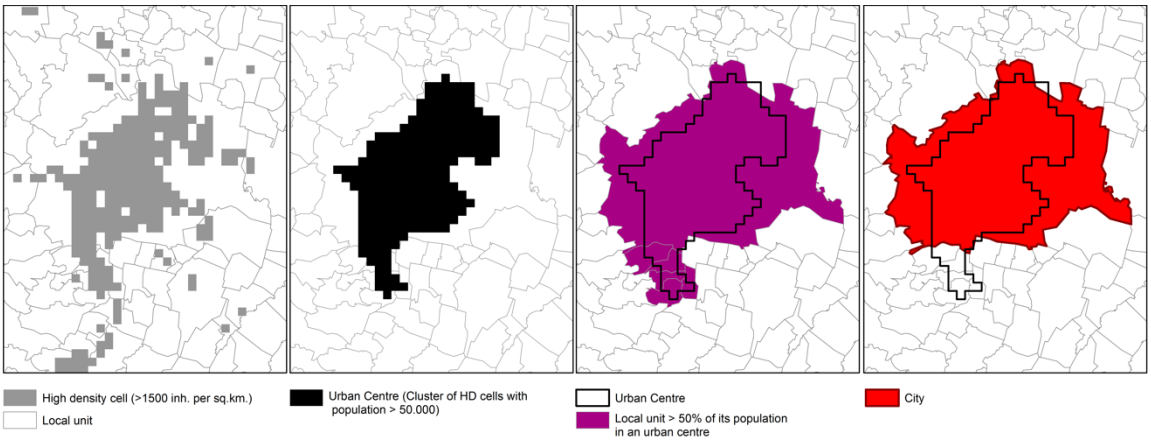
If Braga was defined at the parish level it would only contain some of the parishes in the municipality of Braga. Defining Braga at municipal level amounts to adding the surrounding parishes to the city. As still more than 50% of the population of the municipality of Braga lives in the urban centre, this complies with rule 1. This also ensures a direct link to the Braga local government.

4.3.2. City drops a few local units

An example of the application of rule 2 is Vienna. A number of small local units just south of the city of Vienna have 50% or more of their population in the urban centre of Vienna. As more than 75% of the population of the urban centre live in the city of

Vienna, these smaller units can be dropped without significantly compromising the comparability of the result (see Figure 11).

Figure 11 Dropping a few local units from a city. The case of Vienna, Austria



4.4. Cities without an urban centre

The methodology developed provides an estimate of the population of an urban centre. Two elements may reduce the accuracy of this estimate: 1) geographic features and 2) the source of the population grid data.

The methodology does not take into account the specific geography of a city. Some geographic features, such as steep slopes, cliffs or bodies of water may lead to an underestimation of the population of the urban centre. This affects in particular cities with a small centre.

This method works best when a bottom up grid (based on point data) or a high resolution, hybrid grid (based on a mixture of points and smaller statistical units), is available, which ensure that the population per square kilometre is very accurate. In the countries where such a grid is not yet available, local unit population had to be disaggregated based on a given criterion, such as land use data in the case of the GHS-POP grid produced by the Joint Research Centre. This is called a top-down method, which is less accurate. It tends to underestimate the population cells with a moderate to high density and overestimate population in grid cells with a low population density. Due to this imprecision, there remains a margin of error, especially for smaller centres.

Therefore, a statistical office may opt to classify a local unit as a city when it lacks an urban centre of more than 50,000 inhabitants, but fulfils two conditions:

1. The presence of an urban centre of 50,000 inhabitants, which the method does not capture due to geographic features or population grid estimation methods.

2. The local unit has a population of more than 50,000 inhabitants

For example, a local unit which has two clusters of high density cells separated by a river of bay which together have a population of 50,000 can be argued to have an undetected urban centre. A local unit with a high density cluster of 49,000 inhabitants based on a top-down population grid can be argued to have an undetected urban centre.

5. TERMINOLOGY

This section summarises the terms used in the paper and that are necessary to distinguish the different concepts used for the definition of 'Functional Urban Area' and 'Degree of Urbanisation' (Table 1). As both the Functional Urban Area and the Degree of Urbanisation definitions were developed some time ago, there are terms used in the past which are now discontinued. Table 1 clarifies the terminology currently is use with respect to synonyms or discontinued terms.

Table 1. Terminology related to functional urban areas

Preferred term	Synonym	Discontinued terms	Geographic level
Urban centre	High-density cluster (HDC)		Grid
City	Densely populated area	City core Urban core	Local unit
Commuting zone		Hinterland	Local unit
Functional urban area (FUA)		Larger urban zone (LUZ)	Local unit
Metropolitan area	FUA of at least 250 000 inhabitants		Local unit

In non-technical reports, it may be easier to use a shorter term than functional urban area. If a text uses the term city to refer to the functional urban area, it should explain clearly that it is used in this sense.

The terms 'urban core' and 'city core' are discontinued, but the term 'core' can be still be used as a synonym for either the city or the urban centre as long as this is clearly indicated that it is used as a short term.

Previously, Eurostat had a greater city level with the code K instead of C to identify a greater city that had one or more smaller cities within it. For example, Dublin had both a city and a greater city level. This was confusing to the users and created the risk of double counting of some city residents. For this reason, only one city level is now reported which is the former greater city level, if there was one, or the city level.

REFERENCES

Dijkstra, L. and Poelman, H. (2012). Cities in Europe: the new OECD-EC definition. Regional Focus, 1/2012. European Commission https://ec.europa.eu/regional_policy/sources/docgener/focus/2012_01_city.pdf

Eurostat (2018), *Methodological manual on territorial typologies. 2018 edition.* Publication Office of the European Union, Luxembourg. https://ec.europa.eu/eurostat/documents/3859598/9507230/KS-GQ-18-008-EN-N.pdf

Openshaw, S. (1977), "Optimal zoning systems for spatial interaction models", *Environment and Planning*, Vol. A9, pp. 169 – 184.

OECD (2012), Redefining "Urban": A New Way to Measure Metropolitan Areas, OECD Publishing. http://dx.doi.org/10.1787/9789264174108-en

ANNEX I. OVERVIEW OF THE FUAS PER COUNTRY

The Annex I is available on-line at the web-link below, which is regularly updated.

https://www.oecd.org/cfe/regional-policy/All%20OECD%20countries%20-%20Functionnal%20urban%20areas.pdf