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European Cities and Regions Dataset 1960-2005:

Methods and Sources

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1. INTRODUCTION

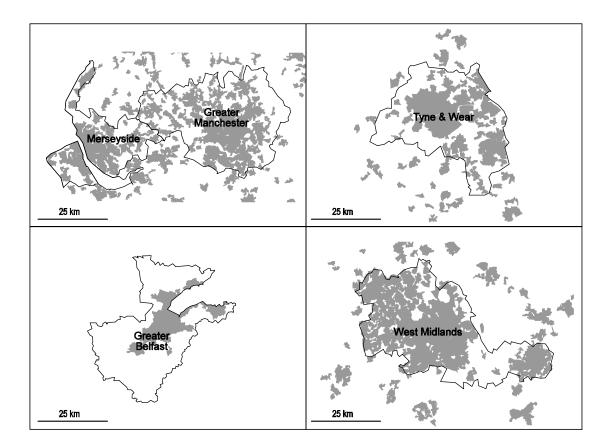
This paper describes the procedures followed by the CPPR Project on *European Cities and Regions: Changing Regional Imbalances* to define consistent spatial units and to identify suitable data sources for analysing long-run European city trajectories. This project's broad aims are to analyse the diverse trajectories and variable performance of cities across Western and Eastern Europe, and to draw out the implications for urban and regional development policy. In order to achieve these objectives, during the 2005-2006 period, an original and extensive dataset was assembled on city performance across Europe covering demographic and economic variables. The dataset on European cities and regions is used to describe the changing fortunes of European free-standing cities and metropolitan areas over the last threefour decades. It is also used to explain the differences in city growth rates over time and in different regions and nations across the continent.

2. DEFINITION OF THE CITY

The extensive temporal and geographical scope of the analysis meant that cities had to be defined clearly and consistently in terms of internal structure, external boundary and size thresholds. The relevant concept is the commonsense idea of a continuous built-up area larger than a certain population size - a concentrated spatial form of socio-economic development. This is a physical and functional definition (the *de facto* city) rather than an administrative or legal one (the *de jure* city) (Parr, 2007). It covers the continuous or near-continuous territory devoted to land uses such as housing, industrial and commercial activity, transport, education and other public services and spaces. In larger urban areas it is equivalent to the idea of a conurbation or metropolitan area. The concern is with change in the city as a whole, rather than particular parts such as the core area or suburban ring. This avoids the possibility of population decline appearing to be a problem where it simply reflects rising incomes or falling household size and people choosing to live at lower densities in the suburbs.

The task was simplest in about a dozen countries where the national statistics agencies provide consistent population figures for spatial units that equate with continuous built-up areas. In these cases we used the national definitions of cities, after checking that they were indeed appropriate, and making minor adjustments if not (see below). They include 'census urban agglomerations' in Austria and Greece, 'principal urban areas' in Cyprus, 'boroughs' (*arrondissements*) for most cities in Belgium, 'urban poles' for most French cities (and *arrondissements* in a few cases where the urban pole extended well beyond the built-up area), 'metropolitan agglomerations' in the Netherlands, 'urban localities/areas' for most Scandinavian cities, 'agglomerations' in Switzerland, and former 'metropolitan counties' in the UK and Ireland (for some examples, see Map A.1). In most cases the boundaries of these entities were enlarged over time to reflect the physical growth of the cities.

In the other countries we had to construct continuous built-up areas ourselves. Since different national and international data sources were used, the basic geographical building blocks had to be simple and broadly comparable. The spatial units with the most readily available data are local authorities. The point of departure in most countries was all urban local authority districts with a population of over 200,000 in 2000, or the closest available year, using population census data. To assess whether the administrative boundary of a qualifying city covered the whole built-up area, a series of topographic maps of Europe were consulted along with the national and European statistical agencies' maps of administrative territories (Eurostat, 2004; topographic maps at www.expedia.co.uk). In cases of 'under-bounding', where the administrative boundaries did not encompass the continuous built-up area, the core local authority district was amalgamated with adjoining districts that clearly formed part of the larger urban area. For example, we constructed 'Greater Belfast' by amalgamating six adjacent local government districts of Belfast, Castlereagh, North Down, Lisburn, Carrickfergus, and Newtownabbey (Map 1). In some cases the NUTS-3 region was used instead of the local authority where it provided a better fit to the built-up area or local authority data was unavailable.



Map 1: Examples of different city definitions.

The size threshold was cities with a population of over 200,000 in the year 2000, or the closest available year, using population census data. This figure is inevitably somewhat arbitrary, although it accords with several previous studies, as does the timing of its application (towards the end of the time series) (van den Berg *et al*, 1982; Cheshire and Hay, 1989). At least three previous studies in Britain used a higher threshold of 250,000 (Begg et al, 1986; Fothergill et al, 1985; Turok and Edge, 1999) and the recent State of the English Cities report used a lower threshold of 125,000 (Parkinson et al, 2006). Clearly, there is no single correct answer.

In places where the population of the core local authority was below 200,000 in 2000, but it clearly formed part of a larger built-up area, that settlement was included on the list of cities (for example, Middlesbrough had 141,000 residents while Teesside conurbation had 464,000; Liège in Belgium had 186,000 while *Arrondissement de Liège* had 585,000). Where there was an established local name for the larger settlement, this was used (for example, Tyne and Wear covering the conurbation

around Newcastle upon Tyne, and Ruhr District Conurbation around the Ruhr valley). Otherwise, 'greater' was added to the core city name to distinguish the larger settlement from the core district (for example, Greater Barcelona and Greater Toulouse). The local authorities that were not contiguous with other urban districts or that covered the whole built-up area were classified as freestanding cities and their conventional city names were used (for example, Vilnius in Lithuania, Århus in Denmark and Swansea in the UK).

Recognising that the physical growth of cities can be substantial over time, and that administrative boundaries can alter radically too, we took a painstaking case-by-case approach and examined every city's continuous built-up area in the early 2000s. The boundary drawn around each city enabled suburban expansion and edge city growth and consolidation to be captured. Similar approaches have been used before in academic research (Turok and Edge, 1999), data collection (Brinkhoff, 2006), the European Urban Audit (European Commission, 2004) and the recent State of the English Cities report (Parkinson et al, 2006). Brinkhoff's work on the world's largest agglomerations and the Urban Audit defined some of their cities on the basis of builtup areas and others on the basis of travel-to-work areas. The Urban Audit is based on a sample of cities within each country and the lower size threshold varies between countries.¹ Brinkhoff's urban agglomerations in Europe are overlapping and not mutually exclusive. Our procedure was similar to the State of English Cities report, except that we took a broader view of selected conurbations and did not, for example, separate Birkenhead from Merseyside, Bradford from Leeds, or Bolton and Rochdale from Greater Manchester.

An alternative approach is to define cities on the basis of 'functional urban regions' (van den Berg *et al*, 1982; Cheshire and Hay, 1989), which are similar to travel-to-work areas but with cities always at the core. These can be very much larger than built-up areas because they include the commuter hinterlands of employment centres, including satellite towns. This is a useful concept for capturing the economic interactions between the city and its surrounding territory. However, it is a region and not a city. A study of the demographic trajectory of cities as discrete entities should arguably focus on the continuous physical area, as the city is conventionally defined (Parr, 2007). The definition of travel-to-work areas is also technically demanding and

requires regular updating in the light of changing commuting patterns. Consequently the task has been completed in very few countries. Several urban researchers have resorted instead to using NUTS-3 regions to encompass the surrounding commuter settlements of major employment centres. The NUTS Regulation lays down a minimum population threshold of 150,000 and a maximum of 800,000 for the average size of NUTS-3 regions in each country. Despite aiming to ensure "that regions of comparable size all appear at the same NUTS level, each level still contains regions which differ greatly in terms of area, population, economic weight ..." (Eurostat, 2004, p.13). For example, NUTS-3 regions range from 19,000 to 5.2 million population, and from just 12 sq. km. to 99,000 sq. km. (Eurostat, 2004, p.24-25). The indiscriminate use of NUTS-3 regions as the building blocks for every city raises bigger concerns about inconsistency between countries.

Europe was defined according to the physical meaning of the continent in order to avoid political confusion and cultural sensitivities. This is normally taken to include the land area between the Arctic Ocean, Atlantic Ocean and the Mediterranean, Black and Caspian Seas. The eastern boundary runs along the Ural Mountains and the Ural River. There are 36 independent states covered by this territory.

The 310 cities that emerged range in size from Bila Tserkva in Ukraine (with 200,000 population) to the Greater London metropolitan area (with nearly 10.6 million). Three clear size bands are apparent:

- (i) 145 'small' cities (47% of all) with between 200,000 and 400,000 people;
- (ii) 100 'medium-sized' cities (32%) with between 400,000 and 1 million; and
- (iii) 65 'large' cities (21%) with a population of over 1 million.

The three capitals of Greater London (10.6m), Greater Moscow (10.4m) and Greater Paris (9.6m) are exceptionally large. In terms of political-economy, 160 cities are in Western Europe, defined as traditional market-oriented economies, including Austria (4 cities), Belgium (5), Cyprus (1), Denmark (2), Finland (3), France (30), Greece (2), Ireland (1), Italy (16), Netherlands (9), Norway (2), Portugal (2), Sweden (3), Switzerland (5), Spain (18), the UK (29) and the former West Germany (28 excluding West Berlin). Former state socialist societies of Eastern Europe have 150 cities,

including Albania (1), Belarus (7), Bosnia and Herzegovina (1), Bulgaria (3), Croatia (1), Czech Republic (3), the former East Germany (8 including Greater Berlin), Estonia (1), Hungary (2), Latvia (1), Lithuania (2), Macedonia (1), Moldova (1), Poland (16), Romania (11), Russia (57), Serbia and Montenegro (1), Slovakia (2), Slovenia (1) and Ukraine (31). Table 1 provides the full list of cities covered by the dataset.

Table 1: Europe's 310 cities above 200,000 population in 2000, by country, ranked nationally according to the size of each core city.

Albania 1. Tirana Austria 1. Greater Vienna 2. Greater Graz 3. Greater Linz 4. Greater Salzburg **Belarus** 1. Minsk 2. Homel 3. Mahilëu 4. Vicebsk 5. Hrodna 6. Brest 7. Babruisk Belgium 1. Greater Brussels 2. Greater Antwerp 3. Greater Ghent 4. Greater Charleroi 5. Greater Liège **Bosnia and** Herzegovina 1. Sarajevo **Bulgaria** 1. Sofia 2. Plovdiv 3. Varna Croatia 1. Zagreb Cyprus 1. Greater Nicosia **Czech Republic** 1. Prague 2. Brno 3. Ostrava

Denmark 1. Greater Copenhagen 2. Århus Estonia 1. Tallinn Finland 1. Greater Helsinki 2. Greater Tampere 3. Greater Turku France 1. Greater Paris 2. Greater Marseille 3. Greater Lyon 4. Greater Lille 5. Greater Nice 6. Greater Toulouse 7 Greater Bordeaux 8. Greater Nantes 9. Greater Toulon 10. Greater Lens 11. Greater Strasbourg 12. Greater Grenoble 13. Greater Rouen 14. Greater Valenciennes 15. Greater Nancy 16. Greater Metz 17. Greater Tours 18. Greater Saint-Étienne 19. Greater Montpellier 20. Greater Rennes 21. Greater Orléans 22. Greater Béthune 23. Greater Clermont-Ferrand

24. Greater Avignon 25. Greater Le Havre 26. Greater Dijon 27. Greater Mulhouse 28. Greater Angers 29. Greater Reims 30. Greater Brest Germany West: 1. Greater Hamburg 2. Greater Munich 3. Greater Cologne 4. Greater Frankfurt 5. The Ruhr District Conurbation (Greater Essen) 6. Greater Stuttgart 7. Greater Düsseldorf 8. Greater Bremen 9. Greater Hanover 10. Greater Nuremberg 11. Wuppertal 12. Bielefeld 13. Greater Bonn 14. Greater Mannheim 15. Greater Karlsruhe 16. Greater Wiesbaden 17. Münster 18. Mönchengladbach 19. Greater Augsburg 20. Greater Aachen 21. Brunswick 22. Greater Krefeld 23. Greater Kiel 24. Greater Lübeck

25. Freiburg im Breisgau 26. Greater Saarbrücken 27. Greater Kassel 28. Greater Ulm East: 1. Greater Berlin 2. Greater Leipzig 3. Greater Dresden 4. Chemnitz 5. Halle An der Saale 6. Magdeburg 7. Erfurt 8. Rostock Greece 1. Greater Athens 2. Greater Thessaloníki Hungary 1. Budapest 2. Debrecen Ireland 1. Greater Dublin Italv 1. Greater Rome 2. Greater Milan 3. Greater Naples 4. Greater Turin 5. Greater Palermo 6. Greater Genoa 7. Greater Bologna 8. Greater Florence 9. Greater Bari 10. Greater Catania 11. Greater Venice 12. Greater Verona 13. Greater Messina 14. Greater Padova 15. Greater Trieste 16. Greater Taranto Latvia 1. Rīga Lithuania 1. Vilnius 2. Kaunas Macedonia 1. Skopje Moldova 1. Chişinău **Netherlands**

1. Greater Amsterdam 2. Greater Rotterdam 3. The Greater Hague 4. Greater Utrecht 5. Greater Eindhoven 6. Greater Leiden 7. Greater Dordrecht 8. Greater Tilburg 9. Greater Heerlen Norway 1. Greater Oslo 2. Bergen Poland 1. Warsaw 2. Lodz 3. Krakow 4. Wrocław 5. Poznań 6. Gdańsk 7. Szczecin 8. Bydgoszcz 9. Lublin 10. The Upper Silesian Conurbation (Greater Katowice) 11. Białystok 12. Gdynia 13. Częstochowa 14. Radom 15. Kielce 16. Toruń **Portugal** 1. Greater Lisbon 2. Greater Porto Romania 1. Bucharest 2. Iasi 3. Cluj-Napoca 4. Timisoara 5. Constanța 6. Craiova 7. Galati 8. Braşov 9. Ploiești 10. Brăila 11. Oradea Russia 1. Moscow 2. St. Petersburg 3. Nizhniy Novgorod

- 4. Samara
- 5. Kazan'
- 6. Rostov-on-Don
- 7. Ufa
- 8. Greater Volgograd
- 9. Perm'
- 10. Saratov
- 11. Voronezh
- 12. Togliatti
- 13. Ul'ianovsk
- 14. Izhevsk
- 15. Yaroslavl'
- 16. Orenburg
- 17. R'iazan'
- 18. Penza
- 19. Naberezhnye
- Chelny
- 20. Lipetsk
- 21. Astrakhan'
- 22. Tula
- 23. Kirov
- 24. Cheboksary
- 25. Ivanovo
- 26. Br'iansk
- 27. Kaliningrad
- 28. Kursk
- 29. Tver'
- 30. Archangel
- 31. Belgorod
- 32. Murmansk
- 33. Kaluga
- 34. Orel
- 35. Smolensk
- 36. Vladimir
- 37. Cherepovets
- 38. Saransk
- 39. Tambov
- 40. Vologda
- 41. Taganrog
- 42. Kostroma
- 43. Petrozavodsk
- 44. Sterlitamak
- 45. Dzerzhinsk
- 46. Yoshkar-Ola
- 47. Orsk
- 48. Syktyvkar
- 49. Nizhnekamsk
- 50. Rybinsk
- 51. Shakhty
- 52. Great Novgorod

53. Staryi Oskol
54. Pskov
55. Severodvinsk
56. Balakovo
Serbia and
Montenegro
1. Belgrade
Slovakia
1. Bratislava
2. Košice
Slovenia
1. Ljubljana
Spain
1. Greater Madrid
2. Greater Barcelona
3. Greater Valencia
4. Greater Seville
5. Zaragoza
6. Málaga
7. Murcia
8. Palma de Mallorca
9. Greater Bilbao
10. Valladolid
11. Córdoba
12. Alicante
13. Vigo 14. Gijón
14. Gijón
15. La Coruña
16. Granada
17. Vitoria-Gasteiz
18. Oviedo
Sweden
1. Greater Stockholm
2. Greater Gothenburg
3. Greater Malmö
Switzerland
1. Greater Zurich
2. Greater Geneva
3. Greater Basel
4. Greater Bern
5. Greater Lausanne

Ukraine

1. Kiev 2. Kharkiv 3. Dnipropetrovs'k 4. Odesa 5. Greater Donets'k 6. Zaporizhzhia 7. L'viv 8. Kryvyi Rih 9. Mykolaiv 10. Mariupol' 11. Luhans'k 12. Vinnytsia 13. Simferopol' 14. Sevastopol' 15. Kherson 16. Poltava 17. Chernihiv 18. Cherkasy 19. Symu 20. Horlivka 21. Zhytomyr 22. Dniprodzerzhyns'k 23. Kirovohrad 24. Khmel'nyts'kyi 25. Rivne 26. Chernivtsi 27. Kremenchuk 28. Ternopil' 29. Ivano-Frankivs'k 30. Luts'k 31. Bila Tserkva United Kingdom 1. Greater London 2. West Midlands Metropolitan County (Greater Birmingham) 3. West Yorkshire Metropolitan County (Greater Leeds-Bradford)

4. Greater Glasgow 5. South Yorkshire Metropolitan County (Greater Sheffield) 6. Greater Edinburgh 7. Merseyside Metropolitan County (Greater Liverpool) 8. Greater Manchester Metropolitan County 9. Greater Bristol 10. Greater Cardiff 11. Greater Leicester 12. Greater Belfast 13. Greater Nottingham 14. Tyne and Wear Metropolitan County (Greater Newcastle) 15. Greater Hull 16. Greater Brighton 17. Greater Stoke-on-Trent 18. Plymouth 19. Derby 20. Swansea 21. Greater Southampton 22. Greater Aberdeen 23. Greater Portsmouth 24. Greater Bournemouth 25. Teesside Conurbation (Greater Middlesbrough) 26. Greater Reading 27. Greater Blackpool 28. Greater Luton 29. Medway Towns

The 200,000 population threshold meant the exclusion of very small countries, dependent territories and islands, including Andorra, Faeroe Islands, Gibraltar, Guernsey, Iceland, Jersey, Liechtenstein, Luxembourg, Malta, Isle of Man, Monaco and San Marino. Istanbul was excluded because it is the only city in Turkey that lies

(partly) in Europe compared with 28 others located in Asia. Russia also spans the two continents: 57 of its cities located within the physical entity of Europe were included and 36 cities located in Asia were excluded. Oral and Atyrau – Kazakstan's two cities situated on the Ural River, the traditional physiographic boundary between Europe and Asia, were below the 200,000 population size threshold.

3. DATA SOURCES AND POPULATION ESTIMATES

There were three main sources of demographic statistics used in the study. The core population data was derived from the most authoritative and regular sources – annual statistical yearbooks and key population and vital statistics published between 1960 and 2005 by the 39 national statistical agencies and general register offices, routinely up-dated through their on-line databases.ⁱⁱ In addition, we used the annual international collections of national population statistics – the United Nations *Demographic Yearbook* series (various years) and the UN International Statistical Institute's *International Statistical Yearbook of Large Towns* (ISI 1962, 1963, 1964, 1970), which were especially helpful in obtaining population data for smaller countries and early historical periods. We also used Eurostat (the Statistical Office of the European Communities), especially its population collection within the *Main Demographic Indicators*

(http://epp.eurostat.cec.eu.int/portal/page?_pageid=0,1136162,0_45572076&_dad=po rtal&_schema=PORTAL; latest accessed date: 14 February 2006). A complete list of 123 main data sources is provided further below.

Given the long timescale covered by the study, we felt that a five-year interval was sufficient to produce a manageable set of 10 cross-sectional times-series population data. In doing so we faced three kinds of data-related problems. First, there was missing data, especially in countries where there was no tradition of producing annual or mid-census population estimates for cities or urban areas, including France and most of southern and south east Europe. Second, there were discontinued data series, mostly involving local authority units and urban agglomerations where a boundary change occurred with no reliable official estimates linking the previous and new population figures. For example, Antwerp went from a population of 196,000 in 1980 to 490,000 in 1985. The third and biggest challenge involved countries with

comprehensive administrative reforms in the 1960s and 1970s resulting in a complete redrawing of municipal boundaries that we were seeking to use as building blocks to construct the built-up area.

Depending on the direction of the population estimate needed (a backward or forward projection), the length of the data gap and the level of the local authority or regional unit for which regular and consistent data was available, simple mathematical formulas were used to generate estimates in a consistent way. The basic principle was to consider the continuous built-up area as an intermediate level between the core local authority unit (in under-bounded cities) and a wider city-region (such as relevant NUTS-level regions of proportional size). We estimated the missing annual population growth rate for a city as the mean of the observed growth rate for the lower-level authority and the rate for the larger statistical region. For example, we were able to estimate the population of 'our' Great London metropolitan area in 1960, 1965 and 1970 on the basis of the growth rate of Greater London), before using our main procedure of amalgamating the relevant core city population figures (Great London in this case) with adjoining urban districts into a continuous built-up area.

The main disadvantage of the amalgamation procedure used here is the inclusion of large, predominantly rural adjoining districts in the population of some cities where no smaller lower-level units existed in the vicinity of the core city to capture suburban growth beyond its administrative boundary. For example, the population of the city of Ulm (West Germany) had to be combined with the rural district (*Landkreise*) of Neu-Ulm to capture long-term demographic changes in the Ulm metropolitan area in a way that was consistent with the procedure used elsewhere. In some cases, therefore, our definition of the city is better suited to examining growth *trends* than to comparing its actual size with other cities.

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NOTES

ⁱ The Urban Audit (2004) aimed to include 258 cities in 25 EU member states and 2 applicant countries with data at three points in time (1991, 1996, and 2001). By June 2006, this full series of population data was available for 174 cities and partial data for another 72 cities. Of these 246 cities, 139 had a population above 200,000, 70 had between 100-200,000 and 37 had less than 100,000. The smallest settlement was Campobasso in Italy with 50,752 residents in 2001. All 139 of the Urban Audit cities with over 200,000 people were included in the database of 310 cities that we assembled.

¹¹ This figure includes the statistical agency of the former GDR as well as separate general register offices for Scotland and Northern Ireland.