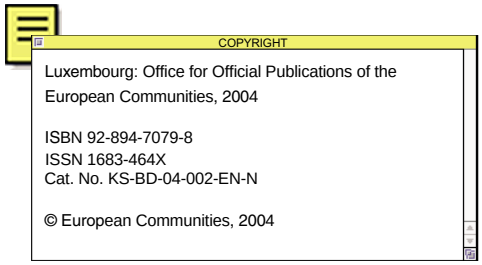
METHODS AND NOMENCLATURES

2004 EDITION

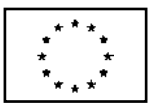
Urban Audit

Methodological Handbook



ISBN 92-894-7079-8
ISSN 1683-464X
Cat. No. KS-BD-04-002-EN-N

1



EUROPEAN COMMISSION

THEME 1
General statistics

Europe Direct is a service to help you find answers to your questions about the European Union

New freephone number:
00 800 6 7 8 9 10 11

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (http://europa.eu.int).

Luxembourg: Office for Official Publications of the European Communities, 2004

ISBN 92-894-7079-8
ISSN 1683-464X

This Handbook was prepared by Landsis g.e.i.e. with contributions from a team of experts in urban statistics:

Mrs Asta MANNINEN, of City of Helsinki – Department Urban Facts, Finland
Mrs Denise PUMAIN, CNRS, University Paris I Panthéon-Sorbonne, France
Mr Risto LEHTONEN, University of Jyväskylä, Finland
Mr Klaus TRUTZEL, Bureau of Statistics and Urban Research of the City of Nuremberg, Germany
Mr Willibald CROI, Landsis g.e.i.e., Luxembourg

Table of Content

List of Tables

List of Figures

1 Introduction

1.1 What is the "Urban Audit"?

The Urban Audit is a response to growing demand for an **assessment of the quality of life in European towns / cities**, where a significant proportion of European Union citizens live. The Urban Audit is a joint effort by the Directorate-General for Regional Policy (DG REGIO) and Eurostat to **provide reliable and comparative information on selected urban areas** in Member States (MS) of the **European Union** (EU) and the Candidate Countries.

Comparison of towns / cities by regional, national and European agencies as well as between the towns / cities themselves, according to their position in Europe (central – peripheral; North – South) and certain developments in different areas (economic activity, employment, public transport, education level etc.) as well as **disparities within towns / cities** are very useful, if not crucial, for policy measures.

In the mid-nineties, the need for comparable information on European Agglomerations was expressed in the Commission's Communications "Towards an Urban Agenda in the European Union COM(97) 197" and "Sustainable Urban Development in the European Union: a Framework for Action" COM(98) 605.

These led to the implementation of the so-called **Urban Audit Pilot Phase (UAPP)**, targeted to "measure the quality of life in our towns and cities through the use of a simple set of urban indicators and a common methodology", in May 1998. The Commission entrusted a private consortium with the implementation of the UAPP. The central project management of the audit was supported by a network of regional or national coordination assistants responsible for the compilation of necessary data from many different sources such as statistical agencies at national or local level as well as other private or semi-private organisations.

The joint effort enabled the collection of information concerning over 500 variables at three points in time (1981, 1991 and 1996) in 21 topical domains and at three spatial levels for 58 towns / cities (in their administrative boundaries) excluding Paris and London, 7 conurbations and 20 wider territorial units comprised by several regions in all 15 Member States. Information on a small number of indicators was collected for 2 500 sub city areas in 54 of the towns / cities to provide information on disparities within cites. Nearly 100 indicators were calculated and published, both in a printed format as well as on the Internet (http://www.europa.eu.int/comm/regional_policy/urban2/urban/audit/index.html).

The pilot phase of the Urban Audit demonstrated, for the first time, the feasibility of obtaining and presenting information on a pan-European basis for a wide range of indicators at the town/ city administrative level, as well as at the levels of the wider urban area and sub-city areas.

In September 2000, the results of the UAPP were presented at an **"Urban Audit Day"** in Paris to the invited mayors of the 58 participating towns / cities and the public. The audience congratulated the Commission on the successful compilation of the large amount of relevant data across the 15 Member States.

The following **conclusions** of this Urban Audit Day were drawn by DG REGIO:

1. The **Urban Audit is** a **useful** and required tool for decision-making at European, national, regional and local level.
2. The Urban Audit should be **continued**.
3. **Paris and London** must be included in future surveys. More **medium-sized towns / cities** should be **included**.
4. The methodology regarding **comparability** of the data must be **improved**.
5. **Eurostat** must be **involved** in the continuation of the Urban Audit.

This led DG REGIO to entrust Eurostat with:

i) the evaluation of the Urban Audit Pilot Phase,

ii) the review of the variables and indicators, and

iii) the organisation of the data collection.

The **evaluation of the pilot phase** led to the conclusion that National Statistical Offices should be integrated into the process of data collection / compilation and quality assurance.

The **variable review** resulted in a changed structure of the statistical fields and domains, and in a substantial reduction in the number of variables from about 500 in the pilot phase to 336. Table 1 presents the 9 statistical fields and 25 domains of the Urban Audit.

Table 1: Structure of the Urban Audit Statistics

1. Demography	
	1.1 Population
	1.2 Nationality
	1.3 Household structure
2. Social aspects	
	2.1 Housing
	2.2 Health
	2.3 Crime
3. Economic aspects	
	3.1 Labour market
	3.2 Economic activity
	3.3 Income disparities and poverty
4. Civic involvement	
	4.1 Civic involvement
	4.2 Local administration
5. Training and education	
	5.1 Education and training provision
	5.2 Educational qualifications
6. Environment	
	6.1 Climate / geography
	6.2 Air quality and noise
	6.3 Water
	6.4 Waste management
	6.5 Land use
	6.6 Energy use
7. Travel & Transport	
	7.1 Travel patterns
8. Information society	
	8.1 Users & infrastructure
	8.2 Local e-Government
	8.3 ICT sector
9.Culture and recreation	
	9.1 Culture and recreation
	9.2 Tourism

1.2 Urban Audit – 2003 data collection

Following the evaluation of the Urban Audit Pilot Phase, Eurostat set up a suitable organisational structure for a second exercise of data collection. A main aim of this project was to have a set of data for at least a number of key variables before the end of June 2003, enabling DG REGIO to make use of it for drafting the 3rd cohesion report planned for publication in December 2003.

1.2.1 Organisational set-up

Eurostat plays the intrinsic role of the Coordinator of statistics in the European Union. In terms of the Urban Audit, this requires the Coordination of a particularly large number of partners; these cover the National Statistical Offices (NSOs), the towns / cities themselves, the existing inter-city co-operation networks, other international organisations and, finally, the political users at the European level; i.e. the Commission, national governments and so forth. **Fostering a given quality of urban statistics** in Europe requires **an intensive and systematic cooperation between all the partners** involved.

In this way, there are three organisational coordination levels in the Urban Audit; these are the European, the national and the local / city levels.

In the Urban Audit 2003 data collection, **Eurostat** has been responsible for **coordinating the flow** of Urban Audit data at the **European level**. This role (in which Eurostat has been assisted by external contractors) has involved maintaining contact with the national Coordinators and the main users in the Commission, the feeding of the database and the dissemination of the results of the Urban Audit. Regarding methodological questions on variable definitions and estimation methods that are required to match the available data with the requested statistics, an expert team of senior statisticians assisted Eurostat and the National Urban Audit Coordinators in their tasks.

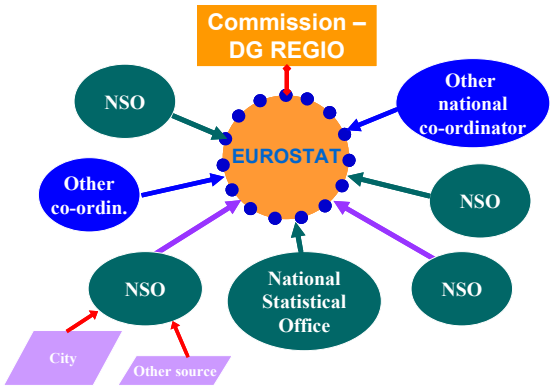


Figure 1: Organisational set-up of the Urban Audit

In terms of organisation, the **national Coordinators** have been mandatory as the link between the towns / cities and Eurostat. The first choice for national Coordinators has been the **National Statistical Offices**, as they have the necessary expertise in statistical matters and in many cases already have at their disposal a large number of the statistics required. In other cases, like in Germany, city networks acted as national Coordinators. The **National Urban Audit Coordinator** (NUAC) collects data from the towns / cities and other sources, validates the data and

makes sure that a complete set of urban statistics is transmitted within the deadlines set. The organisation of the data collection at that level varied depending on the national set-up. Much data already existed at the NSOs in their databases or in administrative registers available to them. The remaining part of the data had to be collected from the **towns / cities**. The local authorities collect a range of data for their own purposes, namely the administration of the City, town planning etc.

1.2.2 Timetable

The decision to **launch** the **Urban Audit** was taken in **mid 2001**. During **2002**, several **preparatory** tasks were carried out; the evaluation and review of the variable list, the selection of the sampling method for the participating towns / cities, the definition of the spatial units in collaboration with the National Urban Audit Coordinators etc.

Data compilation and collection by the National Urban Audit Coordinators started at the **beginning of 2003**. In April 2003, a **methodological workshop** was held in Paris, at which variable definitions and potentially useful estimation methods for small areas and small domains were presented. This workshop successfully provided a platform for discussions between DG REGIO (the main user of the data) and the National Urban Audit Coordinators. Two other **workshops** dealing with methodological and data delivery issues, the database and dissemination were organised in **May and November 2003**.

At the end of **June 2003** data on 86 **"Key Variables"** were made available. The analyses of these data were integrated into DG REGIO's 3rd cohesion report. The **rest** of the **data** (standard variables) were submitted to Eurostat through until the **end of 2003**.

1.2.3 PHARE project for Candidate Countries

In the framework of the **enlargement process, the Candidate Countries** have been invited to participate to the Urban Audit data collection. All of the National Statistical Services of the 12 countries recognised the importance of the Urban Audit and were willing to join the project. Due to administrative delays the data compilation started later than in the EU15 Member States and first data was delivered in December 2003. In the following, the work of the Candidate Countries is acknowledged as much as possible in accordance with the state of progress of the work (February 2004).

1.2.3 Output

Electronic publication on the Internet

The indicators that are calculated from the Eurostat Urban Audit database will be published on the **Urban Audit website**. The site will enable selection of data for specific indicators and cities. Graphs and tables might be created interactively at all three spatial levels and be downloaded free of charge. Maps will only be available for viewing. The web site will be opened in September 2004.

Another access to the Urban Audit data (raw data on the 336 variables and relevant metadata delivered by the National Urban Audit Coordinators) will be through **Eurostat's NewCronos** database (from May 2004 onwards). NewCronos is the public accessible database of Eurostat. Transparent to the user, data is stored in the Eurostat Urban Audit database that has been developed in Oracle Express. It contains the UAPP data that were transferred across from Excel sheets and the newly collected data compiled in 2003.

To facilitate understanding of the data, the flags that are used in the metadata are shown below.

Table 2: Urban Audit Database Flags

Data source:	
N	Data collected by (National or Regional) Statistical Office
S	Data collected by town/ city
M	Data collected by others
Restrictions concerning the data:	
C	Confidential data, restriction on use
P	Provisional data
U	Unreliable data
B	Break in the time series
Statistical basis:	
A	Census
W	Register
G	Sample basis
E	Modelling / estimation
Footnote:	
I	Free-format text (footnote) available

The Paper Publication "Urban Audit 2004"

The analyses of the Urban Audit data will be published in the form of a paper publication in September 2004. Each city will be described in a standard format of 2 pages with chapters on context information about the city itself and key results with diagrams (quintiles). The book will have in total about 400 pages.

The Methodological Handbook

This document, the **Urban Audit Methodological Handbook**, provides both the information required by the data suppliers to achieve coherence and comparability of the Urban Audit data on the one hand, and helps users understand the methods that have been applied in data compilation, and assess the relevance of the data for their own purposes on the other.

The Handbook contains descriptions of the relevant aspects of the Urban Audit project, i.e. the method for selection of spatial units for the three spatial levels (Administrative City, Larger Urban Zone and

Sub-City District) per country, the list of participating towns / cities, the glossary of variables and indicators (definitions and references) and basic information on the estimation methods applied. It does not contain the metadata regarding individual data for a variable and a city (which would run to over 2000 pages), although this information is available in electronic form from Eurostat (NewCronos/Urban Statistics Database).

1.3 Structure of the Handbook

The **objectives** of this Handbook are twofold:

- to provide the data suppliers with the necessary information to achieve coherency and comparability of the Urban Audit data and
- to help users understand the methods that have been applied in data compilation, and so enable them to assess the relevance of the data for their own purposes.

The **opening Chapter** of the Handbook After introduces the **context** of the Urban Audit project. **Chapter 2** provides information about the concept of the **spatial units** and the **three spatial levels** applied for the Urban Audit data collection. It also describes the sampling method for the **participating towns / cities** and presents these in the form of a **listing** and a map.

Chapter 3 consists of a glossary of the **variables and indicators** that have been collected and are presented, distinguished according to the structure of nine statistical fields and 25 domains. Where deemed necessary and useful, the **definitions** applied and some explanations are given after the variable listings.

As might be expected, a part of some variables has had to be estimated due to non-harmonised definitions or the unavailability of official data at the required spatial level. **Estimation methods** are introduced and selected national case studies on such methods **applied** in the framework of the Urban Audit are – non exhaustively – presented in **Chapter 4**.

Chapter 5 provides information – where available at the time of reporting (February 2004) – on the main **sources of the data**.

Chapter 6 provides a short overview of the **data quality checks** that are done centrally in order to control the accuracy of the data.

Finally, **Chapter 7** is a **Bibliography** that lists the references used for drafting this document, which is supplemented with an **index** that will facilitate the search for specific terms in the document.

This handbook is the first edition of its type and should be seen as a **document** that will develop over time. Improvements in the Urban Audit exercise, regarding changes / improvements in variable selection and definitions as well as data sources and estimation methods applied, will mean that the handbook is revised over time; this will provide users with an updated understanding of the Urban Audit data and the data providers with an updated understanding of the way in which data are compiled.

2 Spatial Observation Units in the Urban Audit

As already mentioned above, the Urban Audit aims to provide information at three spatial levels:

- the Core City (administrative definition), as the basic level (Label "A"),
- the Larger Urban Zone (Label "LUZ"), which is an approximation of the functional urban zone centred around the town/ city, and
- the Sub-City District (Label "SCD"), which is a subdivision of the city according to strict criteria (5 000 – 40 000 inhabitants in each sub-town / city district).

The selection of participating towns / cities and the definition of the composition of the LUZ and the SCD in terms of spatial units need to respect certain criteria set by DG REGIO and statistical quality in general:

- the participating towns / cities in each country should represent about 20% of the population in that country
- the participating towns / cities should reflect a good geographic distribution within the country (peripheral, central)
- coverage should reflect more medium-sized towns / cities than was the case in the UAPP (medium-sized towns / cities having a population of between 50 000 – 250 000 inhabitants, large towns / cities with >250 000)
- there should be comparability of data to enable comparative analysis between towns / cities
- data should be available

This "sampling" procedure for the Urban Audit project was closely and specifically designed by Eurostat, DG REGIO, the NSOs and the towns / cities in the countries. The final selection of participating towns / cities in the Urban Audit has been a compromise between all aspects.

The concept and the definition of the town / city are important and, in future, should also be worked out in close co-operation with the individual towns / cities. In striving for **comparable** urban indicators, there is a need for two geographical units: the administrative town / city and the functional urban region of the town / city (FUR).

Towns and cities have, as local councils or governments, most of the responsibility for managing urban change. Very often, towns and cities are service providers and they develop and maintain the infrastructure; the relevant local administration is empowered to run the town / city. In this way, it is clear that information is available at an **administrative** level. More than this, urban areas also have an impact on surrounding areas in terms of commuting, job concentration, traffic systems etc. In this way, there is also a need for a delimitation of functional urban regions and a request of information on these larger "urban" entities.

The definition of the Larger Urban Zone, which corresponds to an estimate of the Functional Urban Region (FUR), is a complex issue. The definition of FURs varies according to the national and local context, although the FUR is very often identified as being an employment zone or a commuting area.

There are variables for which the town / city is relevant (for example municipal expenditure and provision of services for the inhabitants of the town / city) and others for which only the FUR makes sense (for example GDP). There are also variables (such as crime, by way of example) which are difficult to render comparable from one country to another or from city to city.

Statistics at a **sub-city level** are more a matter for the cities themselves. The bigger the city, the more relevant such statistics, as there are likely to be significant intra-city disparities. This is also the level at which the public will identify as it corresponds to neighbourhoods with their own individual characteristics.

The approach of collecting data from existing sources makes it difficult and sometimes impossible to achieve comparability of variables over the entire "population", i.e. the 189 Cities in the EU (plus 69 in Candidate Countries). The National Urban Audit Coordinators tried hard to achieve comparability of urban data, at least within their own country. Wherever it was not possible, attempts were made to estimate the data; where this has been achieved it is noted in the database with a flag or free-text in the metadata of the UA database.

In the following section, the concepts of the three spatial levels are described together with the results of the selection procedure.

2.1 Three Spatial Levels

2.1.1 The Town / City (A)

The **Town / City** has generally been defined as the **Administrative Town / City** (e.g. the central municipality), which is responsible for local government. In most countries, the town / city **corresponds** to the concept of **Local Administrative Unit (LAU) level 2** (formerly NUTS[1] level 5).

Due to varying structures of local government, this town / city concept is not always comparable between the countries. In the discussions with the NSOs in defining the appropriate spatial units for the town / city level, the **emphasis** has been on identifying a **town / city concept with political responsibility**. The following countries have defined the "town / city" in a **different way** to the LAU level 2 in the context of the Urban Audit:

- Belgium: Brussels consists of the "Région de Bruxelles". This is a NUTS region at levels 1, 2 and 3 and it comprises 19 "communes / gemeenten". Other UA towns / cities in Belgium correspond to LAU level 2 (one single "commune/gemeente").
- France: Because the communes in France are relatively small in area, the larger towns and cities have long since expanded beyond the borders of the original "city". In the Urban Audit, the concepts of "Communauté d'agglomération" and "Communauté urbaine" have been used to represent the city level. Many of these units have been established recently (in 2002 and 2003). They are kinds of inter-communal co-operation bodies taking care of tasks that individual communes in an agglomeration can do less well on their own. The "communautés" have a political function and their importance can be expected to grow in future.
- Portugal: LAU level 1 units called "concelhos" have been used as cities. The smaller towns have a rather large area, including surrounding rural areas.
- United Kingdom: LAU level 1 units that are termed "districts" have been used.
- Ireland: LAU level 1 units have been used – for the selected Urban Audit towns. This concept corresponds to "city" (formerly "County Borough"). In Dublin, the "City" does not cover the whole urban area.

Candidate Countries

- Cyprus: The capital, Lefkosia, has been delineated to encompass the urban area. This includes 9 Local Administrative Units.
- Malta: The capital, Valletta, has been delineated to encompass the districts Inner Harbour and Outer Harbour. The second UA town, Gozo, has been defined as the whole island of Gozo.

Kernel (K)

Applying the concept of the "Administrative City" to London and Paris does not yield comparable spatial units. "Greater London" (as classified at the NUTS level 1 region UKI, has a population of 7.2 Mio inhabitants), whereas "Paris" (as classified at the NUTS level 3 region FR101, has a population of 2.1 Mio inhabitants).

To facilitate better comparison between the two largest cities in Europe and with other large cities, an additional spatial unit, the "Kernel" has been developed.

For London, the Kernel consists of "Inner London", which is roughly comparable to the (administrative) city of Paris in terms of size. For Paris, the Kernel includes the first "small ring" of "departments" around the city. The table below explains the different spatial concepts in London and Paris. It is to be noted that the "Kernel" corresponds to a different spatial hierarchy in the two cities.

Table 3: The "Kernels" in Paris and London

	Smallest (comparable to the "Administrative City" of other large cities)	Medium (for comparison of these two cities)	Largest
London	**K** (Inner London, an amalgamation of 13 boroughs) (c. 2.8 million inhabitants) 1 x NUTS 2 region	**A** (Greater London) (c. 7.2 million inhabitants) 1 x NUTS 1 region (equals 2 x NUTS 2 regions)	**LUZ** (c. 11.6 million inhabitants) Greater London + a large number of surrounding LAU 2 districts
Paris	**A** (20 "arrondissements") (c. 2.1 million inhabitants) 1 x NUTS 3 region	**K** ("petite couronne") (c. 6.2 million inhabitants) 4 x NUTS 3 regions	**LUZ** ("grande couronne") (c. 11.0 million inhabitants) 1 x NUTS 2 region

[1] NUTS: Nomenclature of Territorial Statistical Units

2.1.2 The Larger Urban Zones (LUZ)

The same reasoning – comparability and availability of data – applies to information on the larger urban agglomeration. After a thorough discussion with the NSOs it was decided that the concept of "**Functional Urban Regions**" (FUR) would be used as a **proxy** for the **Larger Urban Zones** (LUZ) in the Urban Audit.

This concept is not defined for all cities involved in the Urban Audit, and even where it is defined the criteria and principles are not the same. FURs are also most commonly defined by grouping together LAU level 2 (municipalities; former NUTS 5 regions), without further consideration of administrative delineations on higher levels. Thus, it is questionable to what extent the information requested by the Urban Audit is available for the FUR. Nevertheless, the FUR is the spatial unit that could provide the 'truest' and most comparable data on functional towns and cities.

For this reason, the **FURs are approximated** using **NUTS level 3 or**, if available, **LAU level 1** data. Definitions of the LUZ by LAU level 2 regions (Local Administrative Unit) are also accepted, provided the availability of statistical data is sufficient at this detailed level.

An **advantage** of this approximation approach is the **wealth of statistical data** available for NUTS regions, in particular at **NUTS level 3**. These regions are already widely in use for regional statistics, and in most cases they correspond to unique administrative areas/regions. Therefore, data availability is relatively high. Another advantage is that as the NUTS classification is relatively **stable over time**, statistical time series may be used for the "proxy agglomerations". Provided that data for the different variables are available at **LAU level 2** (commune/ward/Gemeinde or similar units), a number of LAU level 2 units can be used to approximate the LUZ. It is important to bear in mind that the target unit is the *functional* urban region, not the *morphological* agglomeration (built-up area).

In several cases, Urban Audit cities are situated very near each other and form part of one conurbation. In such cases, a common LUZ has been defined for 2 or more cities of the Urban Audit. Examples are the "Ruhrgebiet" in Germany, West Yorkshire in the UK and Katowice-Zory in Poland.

A special situation in France must be mentioned. Since the city concept in France is the political "co-operation bodies" covering several "communes" and the LUZ concept corresponds to the true functional regions ("Aire Urbaine" defined with criteria of commuting intensity), there is a poor relationship between the city and the LUZ. In occasional cases the city stretches further away than the LUZ. This is the case in Marseille and Nice and in several medium-sized cities.

The table below shows what kind of units have been used to define the LUZ in the different countries.

Table 4: Spatial Units used to compose the Larger Urban Zone

Country	N° of cities with LUZ	Building blocks
BE	All 6	Communes NUTS 5 – delimitation of commuting zones based on 1991 Census
DK	All 4	Amter (NUTS 3). Copenhagen: several units
DE	28 of 35 (common LUZ for Ruhr)	Groups of NUTS 3 /Kreise
ES	All 18	Provincias / NUTS 3
EL	All 9	Nomos (NUTS 3) except outlying islands which belong to Attiki
FR	27 of 31	Aires Urbaines, statistically defined. Do not exist in the overseas departments (DOM).
IE	3 of 4	Two NUTS 3 units for Dublin. NUTS 5 used for Cork and Limerick.
IT	All 27	Province NUTS 3
LU	1 of 1	Communes NUTS 5
NL	All 10	COROP-regios (NUTS 3), in some cases 2 regions for one LUZ
AT	All 3	NUTS 3 units (Groups of political "Bezirke"). LUZ of Vienna has 3 units
PT	2 of 8 (the other 6 towns use one concelho each)	Concelhos NUTS 4
FI	All 4	NUTS 5 units which constitute metropolitan areas
SE	All 5	NUTS 3 for Stockholm; NUTS 5 units which constitute metropolitan areas for 2 cities; Local Labour Market areas for remaining 2 towns
UK	20 of 24 (some cities share a common LUZ)	Districts/Unitary Areas (NUTS 4), with one exception that will use NUTS 5 (Lincoln)

Candidate Countries		
BG	All 7	NUTS 4
CZ	All 5	NUTS 4
EE	All 2	NUTS 4
CY	1 of 1	NUTS 4
LV	All 2	NUTS 4
LT	All 3	NUTS 4
HU	All 4	NUTS 4; Budapest: agglomeration based on NUTS 5 units
MT	1 of 2	NUTS 3 = island
PL	All 22	NUTS 4; smaller cities: NUTS 5
RO	All 14	NUTS 5
SK	All 4	NUTS 4; Bratislava NUTS 3
SI	All 2	NUTS 3

2.1.3 The Sub-City Districts (SCD)

Information at the **sub-city level is essential** for the Urban Audit. A meeting of ministers on the 8th of October 2001 concluded that "statistical information on intra-city disparities is an indispensable base for further political action".

The Terms of Reference for the UAPP indicated that the Urban Audit should "enable city authorities to gather precise information on possible 'pockets of concern' within the city, which could lead to serious internal disparities". In particular, the aim is to "pinpoint major disparities in terms of social cohesion" between districts. The UAPP demonstrated that there are **substantial problems** to overcome regarding **statistics at sub-city level**. One important problem is the definition of sub-city areas of **comparable size**. When the sub-city areas become too large, the value of the information for analysis of socio-economic structures is limited.

In the Urban Audit 2003 data collection, the SCDs should have between **5 000 and 40 000 inhabitants** and as far as possible be defined in such a way that they are **internally homogenous** in terms of social structure and built environment, but **show big differences to other SCD within the same city**. This has been solved by the different countries with varying degrees of success. One important factor has been the **availability of statistical data** for the SCD defined. In many countries, some kind of subdivision of cities existed already, but the existing units did not comply completely with the requirements of the Urban Audit. Either the existing units were grouped together, or completely new units were constructed. It was not always possible to find names for the artificial SCD. One additional approach to overcome some of the problems in defining SCD was to introduce **two levels**. **SCD level 1** corresponds to **established city districts** as they are defined in several big cities, while **SCD level 2 follows the criteria** mentioned above. The advantage with having 2 levels is that if statistical data are scarce at SCD level 2, there is more data available at SCD level 1 and at the end there is some differentiation of the city for most variables. For all the participating cities, subdivision into sub-city districts was successful. At SCD level 1 there are in total **357 SCD1 units** (217 in EU Member States, 140 in CCs) and **5711 SCD2 units** (4476 in EU Member States, 1235 in CCs).

Table 5 provides an overview of the numbers of spatial units per type and country.

Table 5: Spatial Units per Country

	City	Kernel	LUZ	SCD level 1	SCD level 2
BE	6		6	0	103
DK	4		4	0	57
DE	35		28	12	605
EL	9		9	12	119
ES	18		18	0	449
FR	31	1	27	0	826
IE	4		3	0	59
IT	27		27	0	561
LU	1		1	0	7
NL	10		10	0	161
AT	3		3	23	81
PT	8		2	96	100
FI	4		4	23	66
SE	5		5	18	81
UK	24	1	20	33	1 202
EU15	**189**	**2**	**167**	**217**	**4 476**
BG	7		7	32	106
CY	1		1	0	8
CZ	5		5	22	87
EE	2		2	8	22
HU	4		4	24	107
LV	2		2	6	35
LT	3		3	0	44
MT	2		1	2	21
PL	23		22	31	412
RO	14		14	6	328
SK	4		4	9	39
SI	2		2	0	26
CC12	**69**		**67**	**140**	**1 235**

TOTAL	**258**	**2**	**234**	**357**	**5 711**

2.2 Participating Cities

The Urban Audit has been based on 258 participating "cities", of which 189 were from the 15 EU Member States (57 of these being kept from the UAPP) and 69 from the 12 Candidate Countries. This selection is, of course, a compromise and tries to approach representativity of the sample according to the above mentioned criteria. In addition to the 258 official UA cities, some countries collected similar statistical data for additional cities for national purposes that might be published separately by the relevant NSOs.

Table 6: Population Coverage of the Urban Audit in Member States and Candidate Countries

Country	Urban Audit population	Large Cities	Nb	Medium sized Cities	Nb	Country Population	UA population (%)	Large Cities (%)	Medium Cities (%)
BE	2 155 858	1 427 093	2	728 765	4	10 263 414	21,01%	13,90%	7,10%
DK	1 131 168	785 816	2	345 352	2	5 349 212	21,15%	14,69%	6,46%
DE	16 749 308	14 679 733	21	2 069 575	14	82 259 540	20,36%	17,85%	2,52%
GR	1 906 575	1 174 572	2	732 003	7	10 554 404	18,06%	11,13%	6,94%
ES	9 675 864	8 453 677	10	1 222 187	8	40 121 673	24,12%	21,07%	3,05%
FR	13 187 178	11 073 284	18	2 113 894	13	59 038 459	22,34%	18,76%	3,58%
IR	738 698	495 781	1	242 917	3	3 825 939	19,31%	12,96%	6,35%
IT	10 924 487	9 126 309	12	1 798 178	15	57 844 017	18,89%	15,78%	3,11%
LU	76 688	0	0	76 688	1	439 539	17,45%	0,00%	17,45%
NL	2 987 018	2 028 625	4	958 393	6	15 987 075	18,68%	12,69%	5,99%
AT	1 959 871	1 550 123	1	409 748	2	8 121 345	24,13%	19,09%	5,05%
PT	1 497 507	827 788	2	669 719	6	10 262 877	14,59%	0,080658	6,53%
FI	1 054 452	559 718	1	494 734	3	5 181 115	20,35%	10,80%	9,55%
SE	1 698 524	1 476 917	3	221 607	2	8 882 792	19,12%	16,63%	0,024948
UK	14 413 773	13 207 059	14	1 206 714	10	59 862 820	24,08%	22,06%	2,02%
EU	**80 156 969**	**66 866 495**	**93**	**13 290 474**	**96**	**377 994 221**	**21,21%**	**17,69%**	**3,52%**
BG	2 275 578	1 742 885	3	532 693	4	7 928 901	28,70%	21,98%	6,72%
CY	200 686	0	0	200 686	1	759 100	26,44%	0,00%	26,44%
CZ	2 121 229	1 862 022	3	259 207	2	10 266 546	20,66%	18,14%	0,025248
EE	500 825	399 685	1	101 140	1	1 366 959	36,64%	29,24%	7,40%
HU	2 242 036	1 777 921	1	464 115	3	10 200 298	21,98%	17,43%	4,55%
LT	1 053 087	933 987	2	119 100	1	3 479 951	30,26%	26,84%	3,42%
LV	845 100	756 627	1	88 473	1	2 364 254	35,74%	32,00%	3,74%
MT	230 669	0	0	230 669	2	391 415	58,93%	0,00%	58,93%
PL	8 096 638	6 575 736	11	1 520 902	12	38 644 200	20,95%	17,02%	3,94%
RO	4 362 714	2 845 415	4	1 517 299	10	22 430 457	19,45%	12,69%	6,76%
SI	366 497	270 032	1	96 465	1	1 990 094	18,42%	13,57%	4,85%
SK	842 327	428 672	1	413 655	3	5 402 547	15,59%	7,93%	7,66%
CC	**23 137 386**	**17 592 982**	**28**	**5 544 404**	**41**	**105 224 722**	**21,99%**	**16,72%**	**5,27%**
EU+CC	**103 294 355**	**84 459 477**	**121**	**18 834 878**	**137**	**483 218 943**	**21,38%**	**17,48%**	**3,90%**

Table 7: Participating Cities in the Urban Audit

Map N°	City Name (EU)	UA Code
1	Antwerpen	BE001C
2	Brugge	BE002C
3	Bruxelles / Brussel	BE003C
4	Charleroi	BE004C
5	Gent	BE005C
6	Liège	BE006C
7	Aalborg	DK001C
8	Aarhus	DK002C
9	København	DK003C
10	Odense	DK004C
11	Augsburg	DE033C
12	Berlin	DE001C
13	Bielefeld	DE017C
14	Bochum	DE015C
15	Bonn	DE034C
16	Bremen	DE012C
17	Darmstadt	DE025C
18	Dortmund	DE010C
19	Dresden	DE009C
20	Düsseldorf	DE011C
21	Erfurt	DE032C
22	Essen	DE006C
23	Frankfurt (Oder)	DE029C
24	Frankfurt am Main	DE005C
25	Freiburg im Breisgau	DE027C
26	Göttingen	DE021C
27	Halle an der Saale	DE018C
28	Hamburg	DE002C
29	Hannover	DE013C
30	Karlsruhe	DE035C
31	Köln	DE004C
32	Leipzig	DE008C
33	Magdeburg	DE019C
34	Mainz	DE037C
35	Moers	DE023C
36	Mönchengladbach	DE036C
37	Mülheim a.d. Ruhr	DE022C
38	München	DE003C
39	Nürnberg	DE014C
40	Regensburg	DE028C
41	Schwerin	DE031C
42	Trier	DE026C
43	Weimar	DE030C
44	Wiesbaden	DE020C
45	Wuppertal	DE016C
46	Athina	GR001C
47	Ioannina	GR006C
48	Irakleio	GR004C
49	Kalamata	GR009C
50	Kavala	GR007C
51	Larisa	GR005C
52	Patra	GR003C
53	Thessaloniki	GR002C
54	Volos	GR008C
55	Badajoz	ES017C
56	Barcelona	ES002C
57	Las Palmas	ES008C
58	Logroño	ES018C
59	Madrid	ES001C
60	Málaga	ES006C
61	Murcia	ES007C
62	Oviedo	ES013C
63	Palma di Mallorca	ES010C
64	Pamplona/Iruña	ES014C
65	Santander	ES015C
66	Santiago de Compostela	ES011C
67	Sevilla	ES004C
68	Toledo	ES016C
69	Valencia	ES003C
70	Valladolid	ES009C
71	Vitoria/Gasteiz	ES012C
72	Zaragoza	ES005C
73	Ajaccio	FR027C
74	Amiens	FR014C
75	Besançon	FR025C
76	Bordeaux	FR007C
77	Caen	FR023C
78	Cayenne	FR031C
79	Clermont-Ferrand	FR022C
80	Dijon	FR020C
81	Fort-de-France	FR030C
82	Grenoble	FR026C
83	Le Havre	FR012C
84	Lille	FR009C
85	Limoges	FR024C
86	Lyon	FR003C
87	Marseille	FR002C
88	Metz	FR017C
89	Montpellier	FR010C
90	Nancy	FR016C
91	Nantes	FR008C
92	Nice	FR005C
93	Orléans	FR019C
94	Paris	FR001C
95	Pointe-á-Pitre	FR029C
96	Poitiers	FR021C
97	Reims	FR018C
98	Rennes	FR013C
99	Rouen	FR015C
100	Saint-Denis	FR028C
101	Saint-Etienne	FR011C
102	Strasbourg	FR006C
103	Toulouse	FR004C
104	Cork	IE002C
105	Dublin	IE001C
106	Galway	IE004C
107	Limerick	IE003C
108	Ancona	IT017C
109	Bari	IT008C
110	Bologna	IT009C
111	Cagliari	IT027C
112	Campobasso	IT020C
113	Caserta	IT021C
114	Catania	IT010C
115	Catanzaro	IT024C
116	Cremona	IT013C
117	Firenze	IT007C
118	Genova	IT006C
119	L'Aquila	IT018C
120	Milano	IT002C
121	Napoli	IT003C
122	Palermo	IT005C
123	Perugia	IT016C
124	Pescara	IT019C
125	Potenza	IT023C
126	Reggio di Calabria	IT025C
127	Roma	IT001C
128	Sassari	IT026C
129	Taranto	IT022C
130	Torino	IT004C
131	Trento	IT014C
132	Trieste	IT015C

133	Venezia	IT011C
134	Verona	IT012C
135	Luxembourg	LU001C
136	Amsterdam	NL002C
137	Arnhem	NL009C
138	Eindhoven	NL005C
139	Enschede	NL008C
140	Groningen	NL007C
141	Heerlen	NL010C
142	Rotterdam	NL003C
143	s' Gravenhage	NL001C
144	Tilburg	NL006C
145	Utrecht	NL004C
146	Graz	AT001C
147	Linz	AT002C
148	Wien	AT003C
149	Aveiro	PT008C
150	Braga	PT003C
151	Coimbra	PT005C
152	Funchal	PT004C
153	Lisboa	PT001C
154	Oporto	PT002C
155	Ponto Delgada	PT007C
156	Setubal	PT006C
157	Helsinki	FI001C
158	Oulu	FI002C
159	Tampere	FI003C
160	Turku	FI004C
161	Göteborg	SE002C
162	Jönköping	SE004C
163	Malmö	SE003C
164	Stockholm	SE001C
165	Umeå	SE005C
166	Aberdeen	UK016C
167	Belfast	UK012C
168	Birmingham	UK002C
169	Bradford	UK005C
170	Bristol	UK011C
171	Cambridge	UK017C
172	Cardiff	UK009C
173	Derry	UK015C
174	Edinburgh	UK007C
175	Exeter	UK018C
176	Glasgow	UK004C
177	Gravesham	UK020C
178	Leeds	UK003C
179	Leicester	UK014C
180	Lincoln	UK019C
181	Liverpool	UK006C
182	London	UK001C
183	Manchester	UK008C
184	Newcastle upon Tyne	UK013C
185	Portsmouth	UK023C
186	Sheffield	UK010C
187	Stevenage	UK021C
188	Worcester	UK024C
189	Wrexham	UK022C

Map N°	City Name (CC-s)	UA Code
190	Burgas	BG004C
191	Pleven	BG005C
192	Plovdiv	BG002C
193	Ruse	BG006C
194	Sofia	BG001C
195	Varna	BG003C
196	Vidin	BG007C
197	Lefkosia	CY001C
198	Brno	CZ002C
199	Ostrava	CZ003C
200	Plzen	CZ004C
201	Praha	CZ001C
202	Usti nad Labem	CZ005C
203	Tallinn	EE001C
204	Tartu	EE002C
205	Budapest	HU001C
206	Miskolc	HU002C
207	Nyíregyháza	HU003C
208	Pécs	HU004C
209	Kaunas	LT002C
210	Panevezys	LT003C
211	Vilnius	LT001C
212	Riga	LV001C
213	Liepaja	LV002C
214	Gozo	MT002C
215	Valletta	MT001C
216	Białystok	PL011C
217	Bydgoszcz	PL008C
218	Gdańsk	PL006C
219	Gorzów Wielkopolski	PL017C
220	Jelenia Góra	PL019C
221	Katowice	PL010C
222	Kielce	PL012C
223	Konin	PL022C
224	Kraków	PL003C
225	Łódź	PL002C
226	Lublin	PL009C
227	Nowy Sącz	PL020C
228	Olsztyn	PL014C
229	Opole	PL016C
230	Poznań	PL005C
231	Rzeszów	PL015C
232	Suwałki	PL021C
233	Szczecin	PL007C
234	Toruń	PL013C
235	Warszawa	PL001C
236	Wrocław	PL004C
237	Zielona Góra	PL018C
238	Żory	PL023C
239	Alba Iulia	RO014C
240	Arad	RO008C
241	Bacau	RO007C
242	Braila	RO005C
243	Bucuresti	RO001C
244	Calarasi	RO012C
245	Cluj-Napoca	RO002C
246	Craiova	RO004C
247	Giurgiu	RO013C
248	Oradea	RO006C
249	Piatra Neamt	RO011C
250	Sibiu	RO009C
251	Targu Mures	RO010C
252	Timisoara	RO003C
253	Ljubljana	SI001C
254	Maribor	SI002C
255	Banska Bystrica	SK003C
256	Bratislava	SK001C
257	Kosice	SK002C
258	Nitra	SK004C

Figure 2: Participating Cities in the Urban Audit

3 Glossary of Variables and Indicators

The **Urban Audit Glossary** is a working document that has been compiled with the help of a team of contracted experts under the overall responsibility of Eurostat. Much progress was achieved during a **Seminar on "Concepts / Definitions and Estimation methods"** that was held in Paris at the beginning of April 2003. Further input was provided during the data compilation phase from the National Urban Audit Coordinators.

The indicators are publicly available on the Internet, while the variables are stored in the Urban Audit Database at Eurostat. Most indicators are automatically derived from the Urban Audit Database, while some others are consistent with variables (e.g. total resident population).

After a short introduction to some **general issues and terminology**, this chapter is structured around the nine statistical fields and their domains. The Urban Audit variables and indicators are listed for each domain and **harmonised definitions** and/or explanations are given where necessary and useful for understanding concepts and intentions of the variables.

For reasons of comparable analysis, **national level data** has been compiled – and presented – for the Urban Audit variables (mainly from the Eurostat NewCronos database). In a number of cases, the UA variables are not available or could be calculated from several NewCronos variables. This data is accordingly flagged in the database or a footnote provides additional information.

3.1 General Terminology

Register = a database which is updated continuously (often for administrative purposes, such as population registers or building registers) and from which statistics can be extracted / aggregated / computed. In theory, statistical data can be extracted from the register on a monthly or even daily basis (although there is generally no need for daily data and costs are prohibitive). For the Urban Audit database, there is the flag "W" to be used.

Census = an exhaustive survey covering the whole of the target population (examples being the Population Census, the Agricultural Census and the Business Census). It requires significant organisation and planning over the course of several years. Census questionnaires either tend to be posted to respondents or presented and completed by a trained surveyor visiting the respondent. Typically, a Census is conducted every 5 or 10 years rather than annually (although this is not always the case). In some countries (e.g. France, UK, USA) the Population Census can have a "long form" which is handed out to a sample of the population. This is not to be treated as a Census because it is a sample within the Census and its results have a sampling error. For the Urban Audit database, where Sample Surveys are the source of data, they are denoted by a "G" flag.

Sample basis = a survey of a sample of the total target population. A sample survey can be repeated much more often than a Census because it costs less. Typical examples of sample surveys include the Labour Force Survey, the Price Index Survey and the Farm Structure Survey.

Survey: refers to any kind of collection of primary information on a situation or population regardless of the method applied (see chapter 5.2).

Modelling/estimation = estimation: refers to the calculation of statistics or estimates (means, proportions, percentages, totals, regression coefficients etc.) using a mathematical formula (estimator) applied to the available data. If the data are from a sample survey then the estimation is affected by random variation or sampling error due to sampling.

The sampling error is measured by the standard error of an estimate. If the data are from a Census survey then there is no sampling variation and the sampling error measured by the standard error is zero by definition. However, both a sample survey and a Census survey there can be other sources of errors, such as measurement errors and errors due to non-response and non-coverage etc. These sources of errors are often adjusted for by using appropriate statistical techniques (reweighting, imputation, modelling).

When using sample survey data in an estimation procedure (for example, to derive a mean or total), **modelling** can be used to incorporate other (auxiliary) data in order to improve the accuracy of the estimates. Such procedures are often based on specific **estimators,** such as the generalised regression estimator, which incorporates the auxiliary data into the estimation procedure by using a regression model. In this way, modelling can be built into an estimation procedure. More complex models than the linear regression model are often used, for example in small-area estimation. Such **model-assisted estimations** are often used by National Statistical Agencies (for example, in the estimation of the total number of unemployed and the unemployment rate in a Labour Force Survey), requiring special statistical software. Modelling can also play an important role in forecasting applications (for example, time series modelling using Census survey data).

Regarding **flags** in the Urban Audit database: if (as is often the case) data are extracted from a long form in a Population Census that only covers a sample of the relevant population, then those data are exposed to a sampling error and should be flagged with "G" in the database. In contrast, a statistic based on "short-form" Census data for the whole population will be flagged as "A" in the database.

3.2 Demography (DE)

Population (DE1)

Variables

Code	Variable	Spatial Unit
DE1001-3V	Number of resident population - total/male/female	A,L,S
DE1040V-DE1057V	Number resident population - total male and female and in age groups 0-4*, 5-14, 15-19, 20-24, 25-54, 55-64, 65-74, 75 and over	A,L

*also for Sub-Districts

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
DE1001I	Total resident population	DE1001V	-	A,L,S
DE1011I	Total population of working age	DE1046V + DE1049V + DE1052V + DE1025V	-	A,L
DE1040I	Proportion of total population aged 0-4	DE1040V	DE1001V	A,L,S
DE1043-55I	Proportion of total population in age groups 5-14, 15-19, 20-24, 25-54, 55-64, 65-74 and 75 and over	DE1043-55V	DE1001V	A,L
DE1003I	Proportion of females to males in total population	DE1003V	DE1002V	A,L,S
DE1057I	Proportion of females to males – aged 75 and over	DE1057V	DE1056V	A,L
DE1061I	Total population change over 1 year	DE1001V (t)	DE1001V (t-1)	A,L,S
DE1062I	Total annual population change over 5 years	DE1001V (t)	nSQR (DE1001V) (t-n)	A,L,S
DE1058I	Demographic dependency: (<20 + >65) / 20-64 years	DE1040V + DE1043V + DE1046V + DE1028V + DE1055V	DE1049V + DE1052V + DE1025V	A,L
DE1059I	Demographic young age dependency: <20 / 20-64 years	DE1040V + DE1043V + DE1046V	DE1049V + DE1052V + DE1025V	A,L
DE1060I	Demographic old age dependency: > 65 / 20-64 years	DE1028V + DE1055V	DE1049V + DE1052V + DE1025V	A,L

Remarks

Population: total usually resident population is defined as the count of all persons recorded as resident in households in an area even if they were present elsewhere on Census night, plus residents in communal establishments who were present in the establishment on Census night. This will include all persons, national or foreign, who are permanently settled (i.e. resident one year or more) in the (urban) area. *UN-ECE and Eurostat 1998: Recommendations for the 2000 Censuses of Population and Housing in the ECE Region.*

It is stressed that this population number is the **reference** for measuring the **general size of the urban entity** within the specified boundaries of the administrative city, the Larger Urban Zone and the Sub-City District. It is the denominator for most derived indicators.

In some countries (e.g. Ireland) the Census counts the "de facto" population, meaning the population present on Census night that is not necessarily registered (="de jure") as required in the above definition. This might disturb comparability in towns with certain institutions, i.e. big hospitals, military bar-

racks, prisons, where people are gathered in unusual concentrations. A database flag in municipalities with such unusual concentrations should help users avoid any mis-conclusions. For the years between the Populations Censuses, a first solution for deriving data is to base it on data from the population register or to make estimates based on the registration of births, deaths, and migration. A second solution is to use interpolation between the Census years. If the births and deaths are given, then interpolation will be restricted to (unknown) migration.

Residents: persons living within the specified spatial unit

Age: for many variables, there are age thresholds (population groupings; single parent households; households with children; pensioner households). Current practice or the legal frameworks in many Member States differ. If these national differences were applied, then the resulting statistics would not be comparable. It is for this reason that the Census age bands (0-4, 5-14, etc.) are requested here, even if it might contradict national practices.

Reference date for population data: to enable better comparability 1st January estimates for all years are provided. Most countries use this date as a reference date.

Nationality (DE2)

Variables

Code	Variable	Spatial Unit
DE2001V	Number of residents who are nationals	A,L
DE2002V	Number of residents who are nationals of another EU Member State	A,L
DE2003V	Number of residents who are not EU nationals	A,L
DE2004V	Number of nationals born abroad	A,L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
DE2001I	Nationals as a proportion of the total population	DE2001V	DE1001V	A,L
DE2002I	EU nationals as a proportion of the total population	DE2002V	DE1001V	A,L
DE2003I	Non-EU nationals as a proportion of the total population	DE2003V	DE1001V	A,L
DE2004I	Nationals born abroad as a proportion of total population	DE2004V	DE1001V	A,L

Remarks

Nationals: citizen of the country in which the city is located; this does not necessarily mean that they are born there (based on citizenship in a country, *UN 1980*).

EU nationals: citizens of other EU countries (1st of January 1995 definition, i.e. 15 Member States).

Nationals born abroad: citizens of the country in which the city is located, but born abroad in another EU/non EU country.

For countries without this information (for example the UK), available ethnicity data is used as a proxy, with a comment regarding the definition. In other countries (e.g. Portugal), data on the place of birth is used for estimation.

Household Structure (DE3)

Variables

Code	Variable	Spatial Unit
DE3001V	Total number of households	A,L,S
DE3002V	Lone-person households (total number)	A,L,S
DE3005-7V	Lone-parent households – total/male*/female* number	A,L,S
DE3008-10V	Lone-pensioner (above retirement age) households - total/male*/female*	A,L,S
DE3011V	Households with children aged 0 to under 18	A,L
DE3012V	Nationals that have moved into the city during the last two years	A
DE3013V	EU nationals that have moved into the city during the last two years	A
DE3014V	Non-EU nationals that have moved into the city during the last two years	A

*only A, L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
DE3003I	Total number of households	DE3001V	-	A,L,S
DE3001I	Average size of households	DE1001V	DE3001V	A,L,S
DE3002I	Proportion of households that are lone-person households	DE3002V	DE3001V	A,L,S
DE3005I	Proportion of households that are lone-parent households	DE3005V	DE3001V	A,L,S
DE3006I	Lone-parent households: male/female	DE3006V	DE3007V	A,L
DE3008I	Proportion households that are lone-pensioner households	DE3008V	DE3001V	A,L,S
DE3009I	Lone-pensioner households: male/female	DE3009V	DE3010V	A,L
DE3011I	Proportion of households with children aged 0-17	DE3011V	DE3001V	A,L
DE3012I	Nationals that have moved to the city over the last 2 yrs as a proportion of the population	DE3012V	DE1001V	A
DE3013I	EU nationals that have moved to the city over last 2 yrs as a proportion of the population	DE3013V	DE1001V	A
DE3014I	Non-EU nationals that have moved to the city over the last 2 yrs as a proportion of the population	DE3014V	DE1001V	A

Remarks

Household: at the EU level, a household is defined in terms of shared residence and common arrangements, as comprising either one person living alone or a group of persons, not necessarily related, living at the same address with common house-keeping – i.e. sharing a meal on most days or sharing a living or sitting room. (*Eurostat 1999: European Community Household Panel (ECHP): Selected Indicators from the 1995 wave*).

Not all countries adhere strictly to this EU definition. Persons currently residing in the household, persons temporarily institutionalized (health home, full-time education, military service) or absent for work or travel are included in all countries. However, in Denmark, persons in health homes are excluded.

Lone (single) parent household: a household with only one adult and at least one dependent child (under 18 years old).

Lone pensioner household: single person household where that person has retired from work and – in the normal case – reached the national retirement age. As the national retirement age varies in different countries, the emphasis is put on the fact that these persons will not work anymore. Persons to be counted have worked earlier, so persons that never worked, for example due to a handicap and persons receiving unemployment benefits are not included.

Households with children aged 0-17: a household with one or more adults (over 18 years old) and at least one dependent child (under 18 years old).

Nationals, EU nationals and non-EU nationals that have moved into the city: all persons are included, whether coming from abroad or from within the country.

3.3 Social Aspects (SA)

Housing (SA1)

Variables

Code	Variable	Spatial Unit
SA1001V	Number of dwellings	A,L,S
SA1004-5V	Number of houses – apartments	A,L
SA1007-8V	Number of households living in houses – apartments	A,L
SA1011V	Households owning their own dwelling	A,L
SA1012V	Households in social housing	A,L,S
SA1013V	Households in private rented housing	A,L
SA1015V	Number of homeless persons	A
SA1016V	Average price for an apartment per m^2 in Euro	A,L
SA1023V	Average price for a house per m^2 in Euro	A,L
SA1017V	Annual rent for social housing per m^2 in Euro	A,L
SA1021V	Average annual rent for an apartment per m^2 in Euro	A,L
SA1024V	Average annual rent for a house per m^2 in Euro	A,L
SA1018V	Dwellings lacking basic amenities	A,L,S
SA1019V	Average occupancy per occupied dwelling	A,L
SA1025V	Empty conventional dwellings	A,L
SA1026V	Non-conventional dwellings	A,L
SA1022V	Average area of living accommodation (m^2 per person)	A,L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
SA1001I	Number of dwellings	SA1001V	-	A,L,S
SA1015I	Number of homeless people / total resident population	SA1015V	DE1001V	A
SA1016I	Average price per m^2 for an apartment	SA1016V	-	A,L
SA1023I	Average price per m^2 for a house	SA1023V	-	A,L
SA1036I	Average price per m^2 for apartment / median household income	SA1016V	EC3039V	A,L
SA1021I	Average annual rent for an apartment per m^2	SA1021V	-	A,L
SA1024I	Average annual rent for a house per m^2	SA1024V	-	A,L
SA1037I	Ratio of average price to average rent for an apartment	SA1016V	SA1021V	A,L
SA1038I	Ratio of average price to average rent for a house	SA1023V	SA1024V	A,L
SA1017I	Average annual social housing rents per m^2	SA1017V	-	A,L
SA1039I	Average social housing rents to median household income	SA1017V	EC3039V	A,L
SA1018I	Proportion of dwellings lacking basic amenities	SA1018V	SA1001V	A,L,S
SA1011I	Proportion of households living in owned dwellings	SA1011V	DE3001V	A,L
SA1012I	Proportion of households living in social housing	SA1012V	DE3001V	A,L,S
SA1013I	Proportion of households living in private rented housing	SA1013V	DE3001V	A,L
SA1007I	Proportion of households living in houses	SA1007V	DE3001V	A,L
SA1008I	Proportion of households living in apartments	SA1008V	DE3001V	A,L
SA1026I	Proportion of non-conventional dwellings	SA1026V	SA1001V	A,L
SA1019I	Average occupancy per occupied dwelling	SA1019V	-	A,L
SA1022I	Average living area in m^2 per person	SA1022V	-	A,L
SA1025I	Empty conventional dwellings per total dwellings	SA1025V	SA1001V	A,L

Remarks

Houses and apartments: correspond to the concepts of **ground-oriented residential buildings** (houses) and **other residential buildings** (apartments) as defined in UN-ECE and Eurostat (1999): *Recommendations for the 2000 Census of Population and Housing in the ECE Region 64*).- Statistical Standards and Studies N° 49. The definition in paragraph 270 applies to houses and apartments (SA1004V etc.):

"A **building** is defined in this context as any independent structure containing one or more dwellings, rooms or other spaces, covered by a roof and enclosed within external walls or dividing walls which extend from the foundations to the roof, whether designed for residential or for agricultural, commercial, industrial or cultural purposes or for the provision of services. Thus a building may be a detached dwelling, **apartment** building, factory, shop, warehouse, garage, barn, etc.

Conventional Dwelling: structurally separate accommodation whose rooms and its accessories (e.g. lobbies, corridors) in a permanent building or structurally separated part thereof are self contained and designed for habitation by one private household all the year round. The definition 233 applies for Dwellings (SA1001V etc.):

A **conventional dwelling** is defined as a room or suite of rooms and its accessories (e.g. lobbies, corridors) in a permanent building or structurally separated part thereof which by the way it has been built, rebuilt or converted is designed for habitation by one private household all the year round and is not at the time of the Census used wholly for non-residential purposes. It should have separate access to the street, direct or via a garden or grounds, or to a common space within the building (staircase, passage, gallery, etc.), but it need not necessarily have a bathroom or toilet available for the exclusive use of its occupants. A "permanent building" is one which was constructed to be structurally stable for at least ten years, but some countries may wish to define permanence instead in terms of the method of construction or in terms of the building materials used in the country. Detached rooms for habitation which are clearly designed to be used as part of the dwelling should be included, e.g. a room or rooms above a detached garage. A conventional dwelling is counted for Census purposes whether or not it is occupied, although some topics and consequently some parts of the tabulation programme apply only to occupied conventional dwellings.

Non-conventional Dwelling: mobile or semi-permanent or improvised housing units and collective living quarters such as hotels, institutions or camps. The international UN definition 234/237 (see annex) applies for Non-conventional Dwellings (SA1026V):

Some housing units do not come fully within the definition of a conventional dwelling because they are **mobile** or **semi-permanent** or **improvised** or are not actually designed for human habitation, but which are used at the time of the Census as the principal usual residence of one or more persons who are members of one or more private households. All these are grouped under the term "non-conventional dwellings", the main distinction between their treatment for Census purposes and the treatment of conventional dwellings being, first, that they are counted only if they are occupied in the sense defined above and, second, that certain Census topics do not apply to them. ….

(a) A mobile housing unit is any type of living accommodation which has been made to be transported (such as a tent) or which is a moving unit (such as a ship, yacht, boat, barge or caravan) and which is designed for human habitation and is occupied at the time of the Census, that is, it is somebody's usual residence. Gypsy camps should be included in this category. Passenger quarters in means of transport such as passenger ships, railroad cars and aircraft should not be considered as housing units and the persons who happen to be travelling in them at the time of the Census should not be counted as living in these vehicles, ships or aircraft.

(b) A semi-permanent housing unit is an independent structure such as a hut or a cabin which has been constructed with locally available crude materials such as wooden planks, sun-dried bricks, straw or any similar vegetable materials for the purpose of habitation by one private household and which is used as the usual residence of at least one person at the time of the Census. Such units may be expected to last for only a limited time, although occasionally they may last for longer periods.

(c) Other housing units designed for habitation comprise independent, makeshift shelters or structures such as shacks and shanties which have been built of waste materials which are used as the usual residence of at least one person at the time of the Census.

(d) Other housing units not designed for habitation comprise premises in permanent or semi-permanent buildings such as stables, barns, mills, garages, warehouses, offices, etc. which have not been built, rebuilt, converted or arranged for human habitation but are, nevertheless, used by one or more private households as their usual residence at the time of the Census. This category also includes natural shelters such as caves which are used by one or more private households as their usual residence at the time of the Census. Premises which, although not initially designed or constructed for human habitation, have been converted for the purpose of habitation by a private household should not be included in this category, but classified to heading 1.2.2.

(e) A hotel is a separate and independent set of premises comprising all or part of a permanent building or set of buildings which by the way it has been built, rebuilt or converted is designed to provide accommodation on a fee basis and which is used as the usual residence of at least one person at the time of the Census. Motels,

inns, boarding houses, pensions, rooming houses and other lodging houses are included in this category. If the accommodation occupied by a private household residing in a hotel or similar establishment fulfils the requirements of a conventional dwelling, it should be classified as such. Otherwise it should be classified with living quarters other than housing units. Some countries may wish to consider distinguishing hotels and similar establishments as a separate category of the classification.

(f) An institution is a separate and independent set of premises comprising all or part of a permanent building or set of buildings which by the way it has been built, rebuilt or converted is designed for habitation by a large group of persons who are subject to a common authority or regime or bound by a common objective or personal interest, and which is used as the usual residence of at least one person at the time of the Census. Such living quarters usually have certain common facilities such as cooking and toilet facilities, baths, lounge rooms or dormitories which are shared by the occupants. This category includes sets of premises such as nurses' hostels, residences for students, hospitals, sanatoria and convalescent homes, welfare institutions, monasteries, convents, military and police barracks, prisons and reformatories.

(g) A camp is a separate and independent set of premises comprising all or part of a semi-permanent or temporary structure or set of structures which by the way it has been built, rebuilt or converted is designed for the temporary accommodation of groups of persons with common activities or interests, and which is used as the usual residence of at least one person at the time of the Census. Such living quarters usually have certain common facilities such as cooking and toilet facilities, baths, lounge rooms or dormitories which are shared by the occupants. This category includes military camps, refugee camps and camps for housing workers employed by agriculture, logging, mining, construction or other enterprises.

Housing units located on the grounds or within a building containing a hotel, institution or camp should be separately identified and counted as housing units. Those which fulfil the requirements of a conventional dwelling should be classified as such, and the others should be classified as non- conventional dwellings."

Social housing: low cost housing provided by the municipality, a housing association or a co-operative (depending on the national legal framework). Only rented housing should be included. "Social" is a feature of the dwelling, not necessarily of the resident.

Households in Private Rented housing: housing supplied by the private sector at the market rates. It also includes housing provided by the employer in the form of job benefits/perks. If a co-operative or a public enterprise operates at market conditions, it is also included.

Household owning their own dwellings: if dwellings are in shared ownership, i.e. people pay part rent and part mortgage for their accommodation, this data is included into the ownership column with an explanation in the free-format text (footnote).

Homelessness: a homeless person is someone who does not have access to accommodation which he/she can reasonably occupy, whether this accommodation is legally their own property or whether the property is rented; provided by institutions; provided by employers; or occupied rent-free under some contractual or other arrangement.

In consequence homeless persons are obliged to sleep either:
(a) outdoors;
(b) in buildings which do not meet commonly agreed criteria for human habitation (e.g. privacy; hygiene; space);
(c) in night-time emergency hostel accommodation provided by public sector or charitable organisations;
(d) in longer-stay hostels provided by public sector or charitable organisations (e.g. non-emergency centres, refuges for battered women, deportation centres for asylum seekers and illegal immigrants);
(e) in Bed & Breakfast accommodation;
(f) in other short-stay accommodation (duration less than 1 month);
(g) in the homes of friends or relatives;
(h) in registered squats;

Persons living in the following sorts of accommodation are excluded:
- hospital wards; mental homes; old-age centres
- prisons; prison cells; borstals
- college halls of residence; boarding schools
- orphanages; foster homes
- military barracks; seamen's missions
- ships at mooring;
- mobile homes (e.g. circuses; Roma)
- au-pairs; domestic servants; live-in hotel staff
- tourists living in hotel rooms
- supported accommodation (low income)

Average area of living accommodation (SA1022V), m^2 per person (occupied dwellings only) and similar variables concerned with **surface areas**: the area refers to the living floor space that is the total area of rooms (rooms have minimum 4 m^2 of area and are min. 2 m high over the major area of the ceiling thus normal bedrooms, dining rooms, living rooms, habitable cellars and attics, servants rooms, kitchens and other separate spaces used or intended for habitation are all rooms; kitchenettes (<4 m^2, <2m wide), corridors, verandas, utility rooms and lobbies do not count as rooms nor do bathrooms and toilets).

Ref.: Recommendations for the 2000 Censuses of Population and Housing on the ECE Region.- UN Statistical Commission Standards and Studies N° 49, jointly prepared by UN-ECE and Eurostat (pp60-61).

Empty conventional dwellings (SA1025V): empty for more than 3 months, not just for quick change of tenant

House prices: average buying price during the reference year per m^2, net of national taxes, for houses available for purchase. This includes both newly built and old (existing) houses, as well as terraced houses and semi-detached houses.

House rents: average annual rent per m^2 for contracts signed during and before the reference year, net of any additional costs such as electricity, water, gas, etc., for houses supplied by the private sector for rent.

Apartment prices: average buying price per m^2 during the reference year, net of national taxes, for apartments available for purchase. This includes both newly built and old (existing) apartments.

Social housing rents: annual rent for contracts signed during and before the reference year, payable for social housing (see definition of social housing above). Rents should correspond to the average for the whole city.

Apartment rents: average annual rent per m^2 for contracts signed during and before the reference year, net of any additional costs such as electricity, water, gas, etc., for apartments supplied by the private sector for rent.

Basic amenities: Examples for basic amenities are piped (running) water, flush toilet, bath/shower, central sewerage connection or individual cesspool and hot water installation. SA1018V: occupied conventional dwellings where **one** or more of the amenities are lacking. It is aimed at harmonisation of the data at least at the country level. The applied criteria are indicated in the metadata.

Average occupancy: average number of occupants per occupied conventional dwelling; (cf. definition of conventional dwellings).

Health (SA2)

Variables

Code	Variable	Spatial Unit
SA2001-3V	Life expectancy at birth – total/male/female (in years)	A,L
SA2004-6V	Infant mortality per year – total/male/female	A,L
SA2007-9V	Number of live births per year - total/male/female	A,L
SA2013-15V	Number of deaths per year under 65 due to heart diseases and respiratory illness – total/male/female	A,L
SA2016-18V	Total deaths under 65 per year – total/male*/female*	A,L,S
SA2019-21V	Total deaths per year – total/male*/female*	A,L,S
SA2022V	Number of hospital beds	A,L
SA2025V	Number of hospital patients	A,L
SA2023V	Number of doctors (FTE)	A,L
SA2024V	Number of dentists (FTE)	A,L

* only A, L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
SA2001I	Life expectancy at birth for males and females	SA2001V	-	A,L
SA2013I	Mortality rate for <65 from heart diseases and respiratory illness	SA2013V	DE1040V + DE1043V + DE1046V + DE1049V + DE1052V + DE1025V	A,L
SA2014I	Mortality rate males <65 from heart diseases and respiratory illness	SA2014V	DE1041V + DE1044V + DE1047V + DE1050V + DE1053V + DE1026V	A,L
SA2015I	Mortality rate females <65 from heart diseases and respiratory illness	SA2015V	DE1042V + DE1045V +	A,L

			DE1048V + DE1051V + DE1054V + DE1027V	
SA2022I	Number of hospital beds per 1 000 residents	SA2022V* 1000	DE1001V	A,L
SA2023I	Number of doctors per 1 000 residents	SA2023V* 1000	DE1001V	A,L
SA2024I	Number of dentists per 1 000 residents	SA2024V* 1000	DE1001V	A,L

Remarks

Life expectancy at birth: the expected number of years that a newborn child is expected to live, if subjected throughout his/her life to the mortality conditions prevailing in the year of birth (age-specific probabilities of dying). *Source: Eurostat CODED*. Synthetic indicator based on standardised death rate.

Preparatory discussions highlighted the fact that people moving in or out of the city do influence greatly the life expectancy of an urban area. As such this variable is not local and may be considered as of little or no meaning at this spatial level. Nevertheless, DG REGIO thought that this variable would provide information on the general health conditions in the city and pushed for its inclusion.

Regarding the **causes of deaths** variables, the International Classification of Diseases and health problems of the WHO is to be applied.

Infant Mortality: total number of deaths of children born alive aged less than 1 year, for the reference year. *Source: Eurostat CODED*.

Hospital beds: This includes beds in wards, which are closed for reasons such as lack of health staff, building works, etc. It also includes beds for patients admitted who require continual assistance, incubators and specialised care (intensive care, coronary units, etc.). It does not include: day care beds, emergency beds, ambulatory haemodialysis beds, pre-anaesthesia beds, wake-up beds, beds for the members of the patient's family, cots for birth without complication, beds for hospital staff.

Doctors and dentists: persons who have an official accreditation to practice.

Number of doctors: the number of general or specialised practitioners whose work-place is in the specified spatial unit, excluding doctors in hospitals (unless they are the first access points for patients). For doctors working part-time in hospital and also in practice, Full Time Equivalents (FTE) are applied. This variable is intended to reflect the number of first access points for patients, which is why focus has been put on generalists working in practices and not at hospitals. It should be noted, however, that the national level data that is presented in conjunction with the urban level data for this variable, is not available from NewCronos in Full Time Equivalents.

Crime (SA3)

Variables

Code	Variable	Spatial Unit
SA3001V	Total number of recorded crimes within city [country for national data]	A,L,S
SA3005V	Number of murders and violent deaths	A,L
SA3006V	Number of car thefts	A,L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
SA3001I	Number of recorded crimes per 1 000 population	SA3001V* 1000	DE1001V	A,L,S
SA3005I	Number of murders and violent deaths per 1 000 population	SA3005V* 1000	DE1001V	A,L
SA3006I	Number of car thefts per 1 000 population	SA3006V* 1000	DE1001V	A,L

Remarks

Crime: all incidents that happen within the "city" limits and are reported to and logged by the police or another official body, which are considered as crime in the national legal framework.

Suicide is excluded from SA3005V **Number of murders and violent deaths**.

Car thefts (SA3006V): only theft of cars themselves are considered, not theft of any contents from cars.

3.4 Economic Aspects (EC)

Labour Market (EC1)

Variables

Code	Variable	Spatial Unit
EC1001-3V	Economically active population - total/male/female	A,L,S
EC1142-44V	Economically active population 15-24 - total/male/female	A,L,S
EC1145-47V	Economically active population 55-64 - total/male/female	A,L
EC1010-12V	Residents unemployed - total/male*/female*	A,L,S
EC1148-50V	Residents unemployed 15-24 - total/male*/female*	A,L,S
EC1151-53V	Residents unemployed 55-64 - total/male/female	A,L
EC1154-56V	Unemployed continuously for more than six months, 15-24 - total/male/female	A,L
EC1157-59V	Unemployed continuously for more than one year, 55-64 - total/male/female	A,L
EC1025-27V	Residents in self employment - total/male/female	A
EC1028-30V	Residents in paid employment - total/male/female	A
EC1034-36V	Full-time employment - total/male/female	A
EC1088-90V	Part-time employment - total/male/female	A
EC1160-62V	Full-time employment 15-24 - total/male/female	A
EC1163-65V	Full-time employment 55-64 - total/male/female	A
EC1166-68V	Part-time employment 15-24 - total/male/female	A
EC1169-71V	Part-time employment 55-64 - total/male/female	A

* only A, L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EC1201I	Annual average change in employment over 5 years	EC1001V(t) - EC1001V(t-n)	nSQR (EC1001V - C1001V)(t-n)	A,L,S
EC1010I	Number of unemployed	EC1010V	-	A,L,S
EC1020I	Unemployment rate	EC1010V	EC1001V	A,L,S
EC1011I	Unemployment rate – male	EC1011V	EC1002V	A,L
EC1012I	Unemployment rate – female	EC1012V	EC1003V	A,L
EC1148-53I	Proportion of residents unemployed in age groups 15-24, 55-54 – total/male*/female*	EC1148-53V	EC1142-47V	A,L,S
EC1154-56I	Proportion of long term unemployed (>6 months) aged 15-24 - total*/male*/female*	EC1154-56V	EC1148-50V	A,L
EC1157-59I	Proportion of long term unemployed (>1 year) aged 55-64 - total*/male*/female*	EC1157-59V	EC1151-53V	A,L
EC1202I	Proportion of unemployed who are under 25	EC1148V	EC1010V	A,L,S
EC1034I	Ratio of employment to population of working age	EC1034V + EC1088V	DE1046V + DE1049V + DE1052V + DE1025V	A
EC1035I	Ratio of employment to population of working age – male	EC1035V + EC1089V	DE1047V + DE1050V + DE1053V + DE1026V	A

EC1036I	Ratio of employment to population of working age – female	EC1036V + EC1090V	DE1048V + DE1051V + DE1054V + DE1027V	A
EC1025-27I	Self-employment rate (residents) – total/male/female	EC1025-27V	EC1001V	A
EC1001I	Activity rate	EC1001V	DE1046V + DE1049V + DE1052V + DE1025V	A,L
EC1002I	Activity rate – male	EC1002V	DE1047V + DE1050V + DE1053V + DE1026V	A,L
EC1003I	Activity rate – female	EC1003V	DE1048V + DE1051V + DE1054V + DE1027V	A,L
EC1142I	Activity rate 15-24	EC1142V	DE1046V + DE1049V	A,L
EC1143I	Activity rate 15-24 – male	EC1143V	DE1047V + DE1050V	A,L
EC1144I	Activity rate 15-24 – female	EC1144V	DE1048V + DE1051V	A,L
EC1145I	Activity rate 55-64	EC1145V	DE1025V	A,L
EC1146I	Activity rate 55-64 – male	EC1146V	DE1026V	A,L
EC1147I	Activity rate 55-64 – female	EC1147V	DE1027V	A,L
EC1088I	Proportion in part-time employment	EC1088V	EC1088V + EC1034V	A
EC1089I	Proportion in part-time employment – male	EC1089V	EC1089V + EC1035V	A
EC1090I	Proportion in part-time employment – female	EC1090V	EC1090V + EC1036V	A
EC1166I	Proportion in part-time employment, 15-24	EC1166V	EC1166V + EC1160V	A
EC1167I	Proportion in part-time employment, 15-24 – male	EC1167V	EC1167V + EC1161V	A
EC1168I	Proportion in part-time employment, 15-24 – female	EC1168V	EC1168V + EC1162V	A
EC1169I	Proportion in part-time employment, 55-64	EC1169V	EC1169V + EC1163V	A
EC1170I	Proportion in part-time employment, 55-64 – male	EC1170V	EC1170V + EC1164V	A
EC1171I	Proportion in part-time employment, 55-64 – female	EC1171V	EC1171V + EC1165V	A

* only A, L

Remarks

The Urban Audit requests data on people living in the town / city, irrespective of their work place. In this way, all variables under the heading of Labour Market are **residence based,** not work-place based. Since the Labour Force Survey is, in general, designed for NUTS level 2, some estimations were necessary.

Economically Active: all resident persons in employment and unemployed (and looking for work) above 15 and under 65, in accordance with Labour Force Survey (*Ref.: Eurostat (2003): The European Union Labour Force Survey - Methods and Definitions - 2001*). "Persons in **employment**" includes employers, self-employed (own account workers), employees and unpaid family workers.

Employment: For the Urban Audit, a person, aged 15 years and over and living in private households, is considered as having an employment if he or she did any work for pay or profit for at least one hour dur-

ing the reference week, or was not working but had a job from which he/she was temporarily absent.

Economically Inactive: all residents over 15 and under 65, who are not economically active (students, long term sick, permanently disabled, retired people, national armed services and those not seeking to enter the labour market), in accordance with LFS.

Unemployment (ILO definition): In accordance with the ILO Standards and the Community Labour Force Survey definition, unemployed persons comprise all resident persons above 15 and under 75 who, during the reference period, were:

(a) without work, i.e. neither had a job nor were not at work (for one hour or more) in paid employment or self employment;

(b) available for work, i.e. were available for paid employment or self employment;

(c) actively seeking work, i.e. had taken specific steps to seek paid employment or self employment.

Full-time employment: the number of persons (not Full Time Equivalents !) according to the national definition, e.g. employment requiring 30 or more hours a week.

Part-time employment: the number of persons (not Full Time Equivalents !) according to the national definition, e.g. employment requiring less than 30 hours a week.

Continuously unemployed: unemployed for more than 6 months without interruption, following the LFS obligations.

Regarding the national level data that is presented in conjunction with the urban level data, the average from the data available from NewCronos on a quarterly basis has been taken.

Economic Activity (EC2)

Variables

Code	Variable	Spatial Unit
EC2001V	Gross Domestic Product of city/region/country (Euro)	A,L
EC2002V	Total resident population of area [country] relating to reported GDP	A,L
EC2015V	Total employment of area [country] relating to reported GDP	A,L
EC2021V	All companies	A
EC2003V	Companies quoted on the national stock exchange with headquarters within the town / city [country]	A
EC2004V	New business that have registered in the reference year	A
EC2014V	Companies that have gone bankrupt in the reference year	A
EC2006V	Total net office floor space 1st January (in 1 000 m^2)	A
EC2013V	Vacant net office floor space 1st January (in 1 000 m^2)	A
EC2020V	Total employment (jobs) (work-place based)	A
EC2008V	Employment (jobs) in agriculture, fishery (NACE Rev.1: A-B) & ESA95 A3	A
EC2009V	Employment (jobs) in mining, manufacturing, energy (NACE Rev.1: C-E)	A
EC2022V	Employment (jobs) in construction (NACE Rev.1: F)	A
EC2010V	Employment (jobs) in trade, hotels, restaurants (NACE Rev.1: G-H)	A
EC2023V	Employment (jobs) in transport, communication (NACE Rev.1: I)	A
EC2011V	Employment (jobs) financial intermediation, business activities (NACE Rev.1: J-K)	A
EC2012V	Employment (jobs) in public admin., health, education, other (NACE Rev.1: L-P)	A
EC2016V	Employment (jobs) in NACE Rev.1 C-F (ESA95 A3)	A
EC2017V	Employment (jobs) in NACE Rev.1 G-P (ESA95 A3)	A
EC2018V	Employment (jobs) - employees	A
EC2019V	Employment (jobs) – self-employed	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EC2001I	GDP per head of resident population	EC2001V	EC2002V	A,L

EC2015I	GDP per employed person	EC2001V	EC2015V	A,L
EC2003I	N° of companies with HQs in city quoted on stock market	EC2003V	-	A
EC2008I	Proportion of employment in agriculture and fisheries	EC2008V	EC2020V	A
EC2016I	Proportion of employment in mining, manufacturing, energy and construction	EC2016V	EC2020V	A
EC2017I	Proportion of employment in industries G-P (NACE Rev.1)	EC2017V	EC2020V	A
EC2009I	Proportion of employment in industries C-E (NACE Rev.1)	EC2009V	EC2020V	A
EC2022I	Proportion of employment in construction	EC2022V	EC2020V	A
EC2010I	Proportion of employment in trade, hotels and restaurants	EC2010V	EC2020V	A
EC2023I	Prop. of employment in transport and communication	EC2023V	EC2020V	A
EC2011I	Prop. of employment in financial and business services	EC2011V	EC2020V	A
EC2012I	Prop. of employment public admin., health and education	EC2012V	EC2020V	A
EC2018I	Proportion of employment (jobs) – employees only	EC2018V	EC2020V	A
EC2019I	Proportion of employment (jobs) – self-employed only	EC2019V	EC2020V	A
EC2020I	Average employment per company	EC2020V	EC2021V	A
EC2014I	Proportion of companies gone bankrupt	EC2014V	EC2021V	A
EC2004I	New businesses registered as a proportion of existing companies	EC2004V	EC2021V	A
EC2013I	Net office space that is vacant	EC2013V	-	A
EC2033I	Proportion of net office space that is vacant	EC2013V	EC2006V	A

Remarks

In contrast to the previous domain, all the variables in domain 3.2 on economic activity are measured at the **work-place**, not at the 'place of residence.

Gross Domestic Product: Output-based GDP is the sum of the gross value-added at basic prices of all resident producers, plus all taxes less subsidies on products. *Source: Eurostat, CODED, SNA95.* – Often for sub-national levels the income approach is used. EC2002V refers to the total population (all ages, working or not) resident in the *area* to which the reported GDP is related. This *area* may be different from the area of the Urban Audit spatial unit (City or LUZ). It enables the GDP per capita for the *area* to be calculated. EC2015V refers to the total employment (jobs) in the *area*, so including residents of the *area*, in-commuters from outside the *area* and excluding out-commuters. This enables regional GDP per employed person to be calculated.

Companies = Enterprises

"The enterprise is the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit." (*European Union, Council Regulation (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community (Official Journal of the European Communities No L 076, 30/03/1993, p. 1), Section III A of 15.03.1993 on the statistical units for the observation and analysis of the production system in the Community)*

Quoted on Stock Market: a company's share price must be quoted on the national stock market.

Company Headquarters: the head office of a company refers to the main administrative establishment of an enterprise, possibly without any production unit located there.

New business registered in reference year (EC2004):

"A count of the number of births of enterprises registered to the population concerned in the business register corrected for errors. A birth amounts to the creation of a combination of production factors with the restriction that no other enterprises are involved in the event. Births do not include entries into the population due to: mergers, break-ups, split-off or restructuring of a set of enterprises. It does not include entries into a sub-population resulting only from a change of activity". (*Business Demography, Methodological Guidelines, Version 2, April 2002 - Guidelines for the Harmonised Data Collection*).

The number of employees is not a criterion here, i.e. even one-employee companies or self-employment companies are counted. A change in only the name of a company does not create a new business.

Moving into the city of an already existing company: This is regarded as a new company in that city, and reduces the number of companies in the municipality from where the company left. It is therefore included.

Business Register: Registers in the European Union are harmonised according to the Council Regulation (EEC) No. 2186/93 of 22/07/93 on Community Coor-

dination in drawing up business registers for statistical purposes (Official Journal 196 of 5/08/93) and should contain all enterprises, the legal units responsible for them and local units depending on them, carrying out economic activities contributing to gross domestic product (GDP).

Companies gone bankrupt in reference year (EC2014) = legal units

Legal units include:

- legal persons whose existence is recognised by law independently of the individuals or institutions which may own them or are members of them.
- natural persons who are engaged in an economic activity in their own right.

The legal unit always forms, either by itself or sometimes in combination with other legal units, the legal basis for the statistical unit known as the 'enterprise'.

(Council Regulation (EEC) No 696/93 of 15 March 1993)

Bankrupt: a company declared (according to bankruptcy law) as unable to pay its debts.

Regarding the national level data that is presented in conjunction with the urban level data for this variable, there is data available in NewCronos for "normal deaths" of companies, not separately for reason of bankruptcy. Note that these figures are always one year later than other "economic" figures, because if a company restarts business within one year, it is not a "death".

Net Office Floor space: floor space vacant but available for commercial use on first day of the reference year. Net floor space excludes pillars, stairwells, etc. Not included: warehouses and factories. This also includes offices in dwellings and offices converted on the sly (without official permission).

Employment in 3 large industries (EC2008V, EC2016V, EC2017V): These variables refer to the A3 breakdown in National Accounts (but are independent of any calculations for national accounts).

NACE Rev. 1 is a Statistical Classification of Economic Activities from Eurostat. The use of the Rev. 1 version of the classification of economic activities has been obligatory since 1993. For more information: http://europa.eu.int/comm/eurostat/ramon. The main categories are listed in the following Table.

Table 8: NACE Rev.1 Main categories

A	Agriculture, hunting and forestry
B	Fishing
C	Mining and quarrying
D	Manufacturing
E	Electricity, gas and water supply
F	Construction
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
H	Hotels and restaurants
I	Transport, storage and communication
J	Financial intermediation
K	Real estate, renting and business activities
L	Public administration and defence; compulsory social security
M	Education
N	Health and social work
O	Other community, social and personal service activities
P	Private households with employed persons
Q	Extra-territorial organisations and bodies

Jobs: "A job is defined as an explicit or implicit contract (relating to the provision of labour input, not to supplying output of a good or service) between a person and a resident institutional unit to perform work (activities which contribute to the production of goods or services within the production boundary) in return for compensation (including mixed income of self-employed persons) for a defined period or until further notice.

In that definition, both employee and self-employment jobs are covered: that is, an employee job if the person belongs to another institutional unit than the employer and a self-employment job if the person belongs to the same institutional unit as the employer.

The concept of jobs differs from the concept of employment:

- It includes second, third, etc. jobs of the same person. Those second, third, etc. jobs of a person may either successively follow one another within the reference period (usually, a week) or, as when someone has an evening job as well as a daytime job, run in parallel.
- On the other hand, it excludes persons temporarily not at work but who have a 'formal attachment to their job' in the form, for instance, of 'an assurance of return to work or an agreement as to the date of return'. Such an understanding between an employer and a person on lay-off or away on training is not counted as a job in the system."

European System of Accounts – ESA 1995, Office for Official Publications of the European Communities, Luxembourg, 1996, [11.22-23]

In the Urban Audit, employed and self-employed persons are counted at the work place in the specified spatial unit.

Income Disparities and Poverty (EC3)

Variables

Code	Variable	Spatial Unit
EC3039V	Median disposable annual household income (Euro)	A,L,S
EC3045V	Household income: Quintile 4 (income with 20% households above, 80% below)	A,L
EC3048V	Household income: Quintile 3 (income with 40% households above, 60% below)	A,L
EC3051V	Household income: Quintile 2 (income with 60% households above, 40% below)	A,L
EC3054V	Household income: Quintile 1 (income with 80% households above, 20% below)	A,L
EC3057V	Total number of households with less than half of the national average income	A,L,S
EC3060V	Total number of households reliant on social security benefits (>50%)	A,L,S
EC3063V	Individuals reliant on social security benefits (>50%)	A,L,S

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EC3039I	Median disposable annual household income	EC3039V	-	A,L,S
EC3054I	Ratio of first to fourth quintile earnings	EC3054V	EC3045V	A,L
EC3057I	% households with less than half national average income	EC3057V	DE3001V	A,L,S
EC3060I	Proportion of households reliant upon social security	EC3060V	DE3001V	A,L,S
EC3063I	Proportion of individuals reliant on social security	EC3063V	DE1001V	A,L,S

Remarks

Household Income: annual income (in Euro) from all sources for the reference year. Current prices relating to each reference year are collected.

According to the European Community Household Panel (ECHP) survey – *Eurostat European Community Household Panel (ECHP) - Selected indicators from the 1995 wave*, Office for Official Publications of the European Communities, Luxembourg, 1999 – "total income" is defined as the total net monetary annual income in the year prior to the survey. It covers the following components:

- **Income from work** consists of:

  Wages and salaries include normal earnings from work as an employee or an apprentice and extra earnings for overtime work, commissions or tips. Additional payments such as the 13th and 14th months' salary, holiday pay or allowance, profit sharing bonus, other lump-sum payments and company shares are covered as well.

  Self-employment income such as own business, profession or farm is collected as the pre-tax profit, that is the profit after deducting all expenses and wages paid, but before deducting tax or money withdrawn for private use. This pre-tax profit is converted into net profit on the basis of a net/gross ratio (The net/gross ratio is estimated using a simple statistical procedure on the basis of reported ratios for income from employment, for which both the net and the gross amounts are solicited.)

- **Private income** consists of:

  Property income. This is rental income after the deduction of mortgage / repairs / maintenance / insurance. The value before tax is collected and converted into net on the basis of a net/gross ratio (The net/gross ratio is estimated using a simple statistical procedure on the basis of reported ratios for income from employment, for which both the net and the gross amounts are solicited.). Property income is collected at household level and divided equally among all adult members (persons aged 16 or more) of the household.

  Capital income covers interest on saving certificates, bank deposits and dividends from shares.

  Private transfers includes any financial support or maintenance from relatives, friends or other persons outside the household.

- Social transfers consist of:

  Old-age and survivors' **pensions** covering pensions or benefits relating to old-age or retirement from the following schemes: basic (first pillar), supplementary (second pillar), personal (third pillar), means tested welfare, early retirement and other old-age related schemes. It also includes widow's pensions from the three pillars and from the means tested welfare scheme, and other widow's benefits, and orphan's pensions or allowances.

  Other social transfers cover

  - **Unemployment benefits** covering any benefit related to unemployment, job creation or training. These include: unemployment insurance benefits, unemployment assistance, training/retraining allowance, and placement, resettlement and rehabilitation benefits or other.
  - **Family related benefits** including child allowance, allowance for care of invalid dependants, maternity allowance, birth allowance, unmarried mother's allowance, deserted wife's allowance and other family related benefits.
  - **Sickness / Invalidity benefits** regrouping income maintenance benefits in case of sick-

ness and injury, other sickness benefits and compensations for occupational accidents or diseases, and invalidity pension and other invalidity benefits.

- **Education related benefits** that are scholarships or study grants.
- **Housing allowanc**e consists of subsidies or other payments from public schemes for housing costs. It is collected at household level and divided equally among all adult members (persons aged 16 or more) of the household.
- **Social assistance** consists of payments from the welfare office. It is collected at household level and divided equally among all adult members (persons aged 16 or more) of the household.
- **Other benefits** regroups the sub-categories not mentioned individually.

In this Urban Audit data collection, income is defined as annual **disposable** income in Euro (i.e. including transfer payments). If disposable income is unavailable, the fiscal income or whatever is available may be used instead with a clear mark in the footnote (free-format text).

Median: the middle value, i.e. 50% of all observations are below the median value and 50% above it.

In general, individual data are rarely available so income classes are used. Knowing the number of households in each class, the class of the median income is known. The "exact" amount of median income can be approximated by replacing the steps (caused by the classes) in the cumulative frequency curve by a smooth curve of distribution, at least for the class in which the median is situated.

Quintile: ranking of households by income and division into 5 (high to low) size bands with equal number of households in each size band.

The 1st quintile is the exact amount of income where 20% are below and 80% are above it. And so on. The 4th quintile is the exact amount of income where 80% are below and 20% are above it. The 5th quintile is the amount of income of the household with the highest income in the whole population. For confidentiality reasons, the 5th quintile is not reported.

If household incomes by quintile are unavailable, the nearest approximation is reported, stating clearly the distribution (e.g. quartiles, deciles), or fiscal data, with the relevant meta-data being marked clearly.

Regarding the national level data that is presented in conjunction with the urban level data, the data available from NewCronos refer to persons, not to households. As it is incorrect to multiply simply the data per person by the average household size (household size varies over different income level classes), the equalized data (with a footnote) will be used.

Households receiving social security benefits depends on national practices. Here such households are reported where more than 50% of income is social security benefit.

If the **number of individuals** (EC3062V) is unavailable, an estimate is provided.

3.5 Civic Involvement (CI)

Civic Involvement (CI1)

Variables

Code	Variable	Spatial unit
CI1001V	European elections: total electorate (eligible)	A
CI1002V	European elections: total electorate (registered)	A
CI1003V	European elections: total votes counted	A
CI1004V	National elections: total electorate (eligible)	A
CI1005V	National elections: total electorate (registered)	A
CI1006V	National elections: total votes counted	A
CI1007V	City elections: total electorate (eligible)	A
CI1008V	City elections: total electorate (registered)	A
CI1009V	City elections: total votes counted	A
CI1011V	City elections: electorate aged less than 25	A
CI1010V	City elections: total votes counted by voters aged less than 25	A
CI1016-18V	Number of elected city representatives – total/male/female	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
CI1003I	Prop. of registered electorate voting in EU elections	CI1003V	CI1002V	A
CI1006I	Prop. of registered electorate voting in national elections	CI1006V	CI1005V	A
CI1009I	Prop. of registered electorate voting in city elections	CI1009V	CI1008V	A
CI1002I	Prop. of eligible electorate registered for EU elections	CI1002V	CI1001V	A
CI1005I	Prop. of eligible electorate registered for national elections	CI1005V	CI1004V	A
CI1008I	Prop. of eligible electorate registered for city elections	CI1008V	CI1007V	A
CI1010I	Proportion of young people (<25 yr) voting in city elections	CI1010V	CI1011V	A
CI1016I	Number of elected city representatives	CI1016V	-	A
CI1026I	No of elected city representatives per 1 000 residents	CI1016V*1000	DE1001V	A
CI1018I	Percentage of elected city representatives who are women	CI1018V	CI1016V	A

Remarks

Electorate: those entitled to vote (i.e. registered); can be different for European, national and city elections.

Eligible / registered to vote: This distinction only makes sense in countries where people have to register (actively) in order to be allowed to vote. For all other countries eligible and registered are identical!

National election: voting to return representatives to the national parliament / assembly.

City election: voting to return representatives to the city (municipality) council.

European election: voting to return representatives to the European Parliament

Local Administration (CI2)

Variables

Code	Variable	Spatial Unit
CI2001V	Total municipal authority income (Euro)	A
CI2002V	Municipal authority income derived from local taxation (Euro)	A
CI2003V	Municipal authority income transferred from national or regional government (Euro)	A
CI2004V	Municipal authority income derived from charges for services (Euro)	A
CI2005V	Municipal authority income derived from other sources (Euro)	A
CI2006V	Total municipal authority expenditure (Euro)	A
CI2007V	Total number of persons directly employed by the local administration	A
CI2008V	Number of persons directly employed by the local administration in central administration	A
CI2009V	Number of persons directly employed by the local administration in education	A
CI2010V	Number of persons directly employed by the local administration in health and social services	A
CI2011V	Number of persons directly employed by the local administration in public transport	A
CI2013V	Number of persons directly employed by the local administration in other	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
CI2006I	Annual expenditure of the munic. authority per resident	CI2006V	DE1001V	A
CI2101I	Annual expenditure of the munic. authority per city GDP	CI2006V	EC2001V	A
CI2002I	Proportion of munic. authority income from local taxation	CI2002V	CI2001V	A
CI2003I	Proportion of municipal authority income from national and regional transfers	CI2003V	CI2001V	A

CI2004I	Prop. of munic. authority income from charges for services	CI2004V	CI2001V	A
CI2005I	Proportion of munic. authority income from other sources	CI2005V	CI2001V	A
CI2007I	Residents employed by local admin. / labour force	CI2007V	EC2020V	A
CI2008I	Employees in local admin. (central) / labour force	CI2008V	EC2020V	A
CI2009I	Employees in local admin. (education) / labour force	CI2009V	EC2020V	A
CI2010I	Employees in local admin. (health) / labour force	CI2010V	EC2020V	A
CI2011I	Employees in local admin. (transport) / labour force	CI2011V	EC2020V	A
CI2013I	Employees in local admin. (other) / labour force	CI2013V	EC2020V	A

Remarks

These variables intend to provide an idea of the scope of influence or "Marge de manoeuvre" (governance) of the municipal government. Therefore, privatised enterprises that need to report to the City Council (directly or indirectly) are included if they are owned >50% by the local authority.

Total municipal income / expenditure (CI2001, CI2006): in these variables, capital revenue / investment expenditure is not included, if not mentioned otherwise in the metadata (free-format text). It includes services that fall under the responsibility of the municipality, i.e. excluding state employees and outsourced tasks (where not otherwise mentioned) , also excluding regional government.

The responsibilities are very different between countries, even between cities in the same country. Education, health, police, transport might be private or covered by the central state. In this way, it should be understood that results are not comparable. The same applies for municipality employment. Nevertheless, these variables are considered important, and have been kept within the Urban Audit. However, users need to bear in mind the above mentioned lack of comparability.

Persons directly employed in the "central" administration of the city / municipality: all persons directly employed by the municipal authority in their "central" administration operations. This excludes central state employees.

Persons directly employed in education: all persons directly employed by the municipal authority in the educational establishments for which the authority is responsible.

Persons directly employed in health and social services: all persons directly employed by the municipal authority in the provision of health and social services for which the authority is responsible. Services contracted out to private enterprises should be included here.

Persons directly employed in public transport: all persons directly employed by the municipal authority in public transport provided by the local authority. This includes transport companies wholly owned or controlled by the city.

Persons directly employed in other activities: all persons directly employed by the municipal authority in activities not covered by the above categories.

3.6 Training and Education (TE)

Education and Training provision (TE1)

Variables

Code	Variable	Spatial Unit
TE1001-3V	Number of children 0-4 in day care – total/in private/in public	A,L
TE1029V	Number of children 0-4 in other day care e.g. church	A,L
TE1005V	Total students registered for final year of compulsory education	A,L
TE1030V	Students leaving compulsory education without having a diploma	A,L
TE1017-19V	Students continuing education after completing compulsory education – total/male/female	A,L,S
TE1031-33V	Students in upper and further education (ISCED level 3-4) – total/male/female	A
TE1026-28V	Students in higher education (ISCED level 5-6) – total/male/female	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
TE1001I	Children 0-4 in day care (public and private) per 1 000 children	TE1001V * 1000	DE1040V	A,L
TE1003I	Proportion of children 0-4 in public day care	TE1003V	TE1001V	A,L
TE1002I	Proportion of children 0-4 in private day care	TE1002V	TE1001V	A,L
TE1029I	Proportion of children 0-4 in other day care (e.g. church)	TE1029V	TE1001V	A,L
TE1030I	Proportion of students not completing compulsory educ.	TE1030V	TE1005V	A,L
TE1017I	Proportion of students continuing education after compulsory education	TE1017V	TE1005V	A,L
TE1026I	Students in higher education per 1 000 resident population	TE1026V * 1000	DE1001V	A

Remarks

All educational data are workplace based (= study-place based).

Day care institutions: includes all the institutions, public or private, which look after children during the day. The aim is to measure the demand and not the supply of day care (for all children aged <5 years old and not at home during the day). Child minders should be included.

Regarding the national level data that is presented in conjunction with the urban level data for this variable, there are not yet any data at national level available at Eurostat. Such data will be collected in the framework of the EU-SILC project (Statistics on Income and Living Conditions in EU) in 2005. The definition presented here might be reviewed in the future to comply with SILC.

Students not completing compulsory education at institutions offering it within the specified boundaries ("workplace based"): all students of any age, leaving compulsory education before completion (in the reference year) or without any diplomas. This comprises both private and public education. The term "compulsory education" has to be adapted to the institutional arrangements of the country. Students moving from one to another school to fulfil compulsory education will have done compulsory education at the end. This phenomena is assumed to be small and might be neglected if necessary.

International Standard Classification for Education (ISCED):

Level 0: Pre-primary education;

Level 1: Primary education or first stage of basic – compulsory – education;

Level 2: Lower secondary or second stage of basic education; Corresponds to the first cycle of secondary education. In countries with no system break between lower secondary and upper secondary education and where lower secondary education lasts more than three years, only the first three years following primary education are counted as lower secondary education. Lower secondary education may either be "terminal" preparing students for entry directly into working life and or "preparatory" preparing students for upper secondary education.

Level 3: Upper secondary education; Includes general, technical or vocational education for students who have completed their first cycle of secondary education. Apprenticeship programmes are included. This may be "terminal" preparing students for entry directly into working life and or "preparatory" preparing students for tertiary education.

Level 4: Post-secondary non-tertiary education; programmes leading to the award of a qualification not equivalent to a first university degree, but admission to this level usually requires the completion of a programme at the upper secondary level (ISCED 3).

Level 5: First stage of tertiary education (not leading directly to an advanced research qualification); Programmes leading to the award of a first or second university degree or a recognised equivalent qualification, e.g.

- **First degree**
  - A. (Bachelor of Arts)
  - B.S. or B.Sc. (Bachelor of Science)
  - B.Ed. (Bachelor of Education)
  - B.Com. (Bachelor of Commerce)
  - B.Eng. or B.Tech. (Bachelor of Engineering or Technology)
  - L.L.B. (Bachelor of Law)
  - M.B., B.S. (Bachelor's degree in Medicine and Surgery)
  - Programmes leading to a licence, a degree awarded after completion of a first cycle of two years study leading to a diploma, followed by a second one-year cycle at an advanced level in France and some other French speaking countries.
  - Diplomatura universitaria in Spain (Diploma, Diplome in other countries).
  - Diplome or Magister qualification in Germany and other countries having a similar system.
  - Licenciado arquitecto or ingeniero and similar qualifications such as Bacharelado or
  - Licenciatura in Spanish speaking countries.
- **Second degree**
  - M.A. (Master of Arts)
  - M.S. or M.Sc. (Master of Science)

- M.E., M.Eng., or M.Tech. (Master of Engineering or Technology)
- M.B.A. (Master of Business Administration)
- M.L.S. (Master of Library Science)
- M.Ed. (Master of Education) and
- L.L.M. (Master of Laws).
- Programmes leading to post-graduate qualifications or "specialist" degrees in professional fields such as Medicine, Engineering and Architecture, for which completion of a first degree is the minimum entrance requirement. These programmes may have some research component but not of the level or type, that meets the requirement of Level 6.
- Programmes leading to qualifications equivalent to Master's level in other countries, such as Maitrise in France and other French speaking countries.

Level 6: Second stage of tertiary education (leading to an advanced research qualification). Programmes leading to the award of an advanced research qualification: e.g. PhD's, etc.

Students in upper secondary education (ISCED 97 level 3): the number of students attending programmes leading to the award of a qualification equivalent to ISCED 97 level 3.

Students in further education (ISCED 97 level 4): the number of students attending programmes leading to the award of a qualification equivalent to ISCED 97 level 4.

Students in higher education (ISCED 97 levels 5-6): the number of students attending programmes leading to the award of a qualification equivalent to ISCED 97 levels 5 or 6.

Educational Qualifications (TE2)

For more information see http://portal.unesco.org/uis/TEMPLATE/pdf/isced/ISCED_A.pdf

Variables

Code	Variable	Spatial Unit
TE2016V	Total number of residents qualified at ISCED level 1	A,L,S
TE2017V	Number of male residents qualified at ISCED level 1	A,L
TE2018V	Number of female residents qualified at ISCED level 1	A,L
TE2001V	Total number of residents qualified at ISCED level 2	A,L,S
TE2002V	Number of male residents qualified at ISCED level 2	A,L
TE2003V	Number of female residents qualified at ISCED level 2	A,L
TE2019V	Total number of residents qualified at ISCED levels 3 and 4	A,L,S
TE2020V	Number of male residents qualified at ISCED levels 3 and 4	A,L
TE2021V	Number of female residents qualified at ISCED levels 3 and 4	A,L
TE2022V	Total number of residents qualified at ISCED levels 5 and 6	A,L,S
TE2023V	Number of male residents qualified at ISCED levels 5 and 6	A,L
TE2024V	Number of female residents qualified at ISCED levels 5 and 6	A,L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
TE1001I	Children 0-4 in day care (public and private) per 1 000 children	TE1001V * 1000	DE1040V	A,L
TE2016-18I	Proportion of population qualified at level 1 ISCED - total/male/female	TE2016-18V	DE1001-3V	A,L,S
TE2001-3I	Proportion of population qualified at level 2 ISCED - total/male/female	TE2001-3V	DE1001-3V	A,L,S
TE2019-21I	Proportion of population qualified at level 3-4 ISCED - total/male/female	TE2019-21V	DE1001-3V	A,L,S
TE2022-24I	Proportion of population qualified at level 5-6 ISCED - total/male/female	TE2022-24V	DE1001-3V	A,L,S

3.7 Environment (EN)

Climate/Geography (EN1)

Variables (= Indicators)

Code	Variable	Spatial Unit
EN1003V	Average temperature of warmest month (degrees Celsius)	A
EN1004V	Average temperature of coldest month (degrees Celsius)	A
EN1005V	Rainfall (litre/m^2)	A
EN1001V	Number of days of rain per annum	A
EN1002V	Total number of hours of sunshine per day	A

Remarks

Days of rain: any day during which rainfall is recorded (in the reference year).

Rainfall: measured in litre/m^2 = mm

Total number of hours of sunshine per day in the reference year: total number of hours of sunshine in (each) reference year divided by the total number of days in the reference year (365 or 366 in a leap year).

Several points of measurement: if there is more than one meteorological station within the specified spatial unit, the one most representative of local conditions is to be selected (no average of values from different stations to be used).

Air Quality and Noise (EN2)

Variables (=Indicators)

Code	Variable	Spatial Unit
EN2001V	Winter smog: Number of days sulphur dioxide SO2 concentrations exceed 125 µg/m^3	A
EN2002V	Summer smog: Number of days ozone O3 concentrations exceed 120 µg/m^3	A
EN2003V	Number of days nitrogen dioxide NO2 concentrations exceed 200 µg/m^3	A
EN2005V	Number of days particulate matter PM10 concentrations exceed 50 µg/m^3	A
EN2006V	Concentration of lead Pb in ambient air in µg/m^3	A
EN2007V	Number of residents exposed to outdoor day noise levels above 55 dB(A)	A
EN2008V	Number of residents exposed to sleep disturbing outdoor night noise levels above 45 dB(A)	A
EN2014V	Total carbon dioxide CO2 emissions (tons)	A
EN2009V	Total carbon monoxide CO emissions (tons)	A
EN2010V	Total methane CH4 emissions (tons)	A
EN2011V	Total non-methane volatile organic compounds NVOC emissions (tons)	A
EN2012V	Total sulphur dioxide SO2 emissions (tons)	A
EN2013V	Total nitrogen dioxide NO2 emissions (tons)	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EN2007I	Proportion of residents exposed to day noise >55 dB(A)	EN2007V	DE1001V	A
EN2008I	Proportion of residents exposed to night noise >45 dB(A)	EN2008V	DE1001V	A
EN2024I	CO2 emissions per capita	EN2014V	DE1001V	A

Remarks

For the variables of this domain, some meta-information is provided, e.g. the number of monitoring stations and their geographical spread within the boundaries of the town / city or larger administrative unit, i.e. degree of coverage of the busiest roads as well as of the most densely populated areas. If there is more than one station within the specified spatial unit, the one most representative of local conditions is to be selected (no average of values from different stations to be used but rather the value from a "typical" station). The definitions harmonised at EU level were applied.

Relevant legislation:

- Council Directive 99/30/EC relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air
- European Common Indicators (2 and 5), see www.sustainable-cities.org/indicators/
- Proposal for Council Directive 99/0067 on the national emission ceilings for certain atmospheric pollutants
- Proposal for Council Directive 99/0068 relating to ozone in ambient air
- Proposal for Directive 6660/01 relating to the assessment and management of environmental noise
- Council Directive 2002/49 on environmental noise

In the framework of the European Monitoring and Evaluation Programme of Air Pollution (www.emep.int), a harmonised European database of air quality data has been established. This database has been suggested for use when no other data are available: www.emep.int/areas/index.html. This data is based on modelling that breaks down the national data into a square grid, which should be borne in mind by users in any analysis.

For **Noise**, the L_{day} indicator (EN2007V) and the L_{night} indicator (EN2008V) that are defined in Council Directive 2002/49, are suggested:

Definition of the day-evening-night level L_{den}:

The day-evening-night level L_{den} in decibels (dB) is defined by the following formula:

$$L_{den} = 10 \lg \frac{1}{24}\left(12*10^{\frac{Lday}{10}} + 4*10^{\frac{Levening+5}{10}} + 8*10^{\frac{Lnight+10}{10}}\right)$$

in which:

- L_{day} is the A-weighted long-term average sound level as defined in ISO 1996-2:1987, determined over all the day periods of a year,
- $L_{evening}$ is the A-weighted long-term average sound level as defined in ISO 1996-2:1987, determined over all the evening periods of a year,
- L_{night} is the A-weighted long-term average sound level as defined in ISO 1996-2:1987, determined over all the night periods of a year;

in which:

- the day is 12 hours, the evening four hours and the night eight hours. The Member States may shorten the evening period by one or two hours and lengthen the day and/or the night period accordingly, provided that this choice is the same for all the sources and that they provide the Commission with information on any systematic difference from the default option,
- the start of the day (and consequently the start of the evening and the start of the night) shall be chosen by the Member State (that choice shall be the same for noise from all sources); the default values are 07.00 to 19.00, 19.00 to 23.00 and 23.00 to 07.00 local time,
- a year is a relevant year as regards the emission of sound and an average year as regards the meteorological circumstances;

and in which:

- the incident sound is considered. This means that no account is taken of the sound that is reflected at the façade of the dwelling under consideration (as a general rule, this implies a 3 dB correction in case of measurement).

The height of the L_{den} assessment point depends on the application:

- in the case of computation for the purpose of strategic noise mapping in relation to noise exposure in and near buildings, the assessment points must be 4,0 ±0,2 m (3,8 to 4,2 m) above the ground and at the most exposed façade; for this purpose, the most exposed façade will be the external wall facing onto and nearest to the specific noise source; for other purposes other choices may be made,
- in the case of measurement for the purpose of strategic noise mapping in relation to noise exposure in and near buildings, other heights may be chosen, but they must never be less than 1,5 m above the ground, and results should be corrected in accordance with an equivalent height of 4 m,
- for other purposes such as acoustical planning and noise zoning other heights may be chosen, but they must never be less than 1,5 m above the ground, for example for:
  - rural areas with one-storey houses,
  - the design of local measures meant to reduce the noise impact on specific dwellings,
  - the detailed noise mapping of a limited area, showing the noise exposure of individual dwellings.

Definition of the night-time noise indicator

The night-time noise indicator L_{night} is the A-weighted long-term average sound level as defined in ISO 1996-2:1987, determined over all the night periods of a year;

in which:

- the night is eight hours as defined in paragr. 1,
- a year is a relevant year as regards the emission of sound and an average year as regards the meteorological circumstances, as defined in paragraph 1,
- the incident sound is considered, as laid down in paragraph 1,
- the assessment point is the same as for L_{den}.

Water (EN3)

Variables

Code	Variable	Spatial Unit
EN3001V	Total number of annual tests (on all parameters) on drinking water quality	A
EN3002V	Number of annual determinations which exceed the prescribed concentration values	A
EN3003V	Total consumption of water in m^3	A
EN3004V	Number of dwellings connected to potable drinking water system	A
EN3006V	Number of dwellings connected to sewerage treatment system	A
EN3008V	Number of water rationing cases, days per year	A
EN3009V	Number of scheduled water cuts, days per year	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EN3003I	Consumption of water (m^3 per annum) per capita	EN3003V	DE1001V	A
EN3004I	% of dwellings connected to potable water system	EN3004V	SA1001V	A
EN3006I	% of dwellings connected to sewerage treatment system	EN3006V	SA1001V	A
EN3008I	Number of water rationing cases, days per year	EN3008V	-	A
EN3009I	Number of scheduled water stoppages, days per year	EN3009V	-	A

Remarks

Relevant legislation: **Council Directive 98/83/EC** on the quality of water intended for human consumption**:** the directive lays down sixty-two water quality standards and guidelines for water quality monitoring.

Prescribed concentrations values: according to the water quality standards as specified in the Council Directive 98/83/EC.

Sewerage treatment: connection to central sewerage network excluding individual cesspools.

Rationing cases: the number of days during which the consumption of water was rationed due to shortage (including hosepipe bans), for the reference year; a high number of days influencing quality of life.

Water cuts: the number of days where there was a cut in the central provision of water.

Dwellings: refers to conventional dwellings.

Total number of annual tests on drinking water quality samples taken from within the specified boundary in the reference year **(**EN3001V): refers to the total number of tests (according to the Council Directive 98/83/EC Annex II Table B1 and B2) that were carried out

Number of annual determinations exceeding the concentration values (EN3002V) refers to the number of tests exceeding the thresholds fixed in the Council Directive 98/83/EC.

Total consumption of municipal water (cubic meters per annum) by all users (EN3003V): excluding leakage; consumption by industries with own water sources is not included, nor is sea water for cooling)

Number of water rationing cases, days per year (EN3008V): includes scheduled water cuts due to shortage, e.g. hosepipe bans; excluding cuts due to maintenance or repair which are highly infrequent and seldom impact on quality of life.

Number of water cuts, days per year (EN3009V): includes water cuts due to repair and maintenance.

Waste Management (EN4)

Variables

Code	Variable	Spatial Unit
EN4001V	Annual amount of solid waste (domestic and commercial) in tonnes	A
EN4002V	Annual amount of solid waste (domestic and commercial) processed by landfill sites, in tons	A
EN4003V	Annual amount of solid waste (domestic and commercial) processed by incinerators, in tons	A
EN4004V	Annual amount of solid waste (domestic and commercial) that is recycled, in tons	A
EN4006V	Annual amount of solid waste (domestic and commercial) given to other disposal units, in tons	A
EN4005V	Annual amount of toxic waste in tons	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EN4001I	Collected solid waste per capita per year	EN4001V	DE1001V	A
EN4002I	Proportion of solid waste processed by landfill	EN4002V	EN4001V	A
EN4003I	Proportion of solid waste processed by incinerators	EN4003V	EN4001V	A
EN4004I	Proportion of solid waste processed by recycling	EN4004V	EN4001V	A
EN4006I	Proportion of solid waste processed by other methods	EN4006V	EN4001V	A
EN4005I	Annual amount of toxic waste per capita	EN4005V	DE1001V	A

Remarks

The data only refer to the waste flows managed (collected and treated) under the responsibility of the local administration including waste collected on behalf of the local authority by private companies or regional associations founded for that purpose.

Municipal waste according to the definition in the **OECD/Eurostat questionnaire on waste** includes household and similar wastes:

The definition also includes:

- bulky waste (e.g. white goods, old furniture, mattresses); and
- garden waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if managed as waste.

It includes waste originating from:

- households,
- Commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings).

It also includes:

- waste from selected municipal services, i.e. waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste.

It includes collected waste from these sources:

- door-to-door through traditional collection (mixed household waste), and
- fractions collected separately for recovery operations (through door-to-door collection and/or through voluntary deposits).

For the purpose of the Urban Audit, municipal waste refers to waste defined as above, **collected by or on behalf of municipalities**.

The definition also includes waste from the same sources and similar in nature and composition which:

- are collected directly by the private sector (business or private non-profit institutions) not on behalf of municipalities (mainly separate collection for recovery purposes),
- originate from rural areas not served by a regular waste service, even if they are disposed by the generator.

The definition excludes:

- waste from municipal sewage network and treatment,
- municipal construction and demolition waste.

Hazardous waste defined according to Council Directive 91/689/EEC on hazardous waste separately collected from households, small enterprises and services in homogeneous fractions by public services, non-profit organisations and private enterprises acting in the field of “organised” (under license from municipal authorities) waste collection.

Landfill shall mean a waste disposal site defined according to Council Directive 1999/31/EC on the landfill of waste: landfill is defined as the deposit of waste into or onto land, including specially engineered landfill, and temporary storage of over one year on permanent sites. The definition covers both landfill in internal sites (i.e. where a generator of waste is carrying out its own waste disposal at the place of generation) and in external sites.

Incineration shall mean thermal treatment of waste in an incineration plant according to Council Directive 2000/76/EC on the incineration of waste:

An 'Incineration plant' means any stationary or mobile technical unit and equipment dedicated to the thermal treatment of wastes with or without recovery of the combustion heat generated. This includes the incineration by oxidation of waste as well as other thermal treatment processes such as pyrolysis, gasification or plasma processes in so far as the substances resulting from the treatment are subsequently incinerated. Regarding the national level data that will be presented in conjunction with the urban level data, the data available from NewCronos presents the capacity for processing, not the amount of waste actually processed.

Recycling: Recycling is defined as any reprocessing of material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product or for different purposes should be included. Direct recycling within industrial plants at the place of generation should be excluded.

Other waste treatment operations under the control of municipal authorities.

Land Use (EN5)

Variables

Code	Variable	Spatial Unit
EN5003V	Total land area (km^2) according to cadastral register	A,L,S
EN5015V	Water and wetland (km^2)	A,L
EN5012V	Green space area (km^2)	A,L,S
EN5016V	Land used for agricultural purposes (km^2)	A,L
EN5017V	Land area in mineral extraction (km^2)	A,L
EN5018V	Land area in industrial and manufactory use (km^2)	A,L
EN5019V	Land area in road network use (km^2)	A,L
EN5020V	Land area in rail network use (km^2)	A,L
EN5008V	Land area in ports use (km^2)	A,L
EN5009V	Land area in airports use (km^2)	A,L
EN5021V	Land area in water treatment use (km^2)	A,L
EN5022V	Land area in waste disposal use (km^2)	A,L
EN5023V	Land area in commerce, finance and business use (km^2)	A,L
EN5011V	Land area in recreational, sports and leisure use (km^2)	A,L
EN5004V	Land area in housing/residential use (km^2)	A,L
EN5013V	Unused areas, including contaminated or derelict land areas (km^2)	A,L
EN5014V	Urban area subject to special /physical planning conservation measures (km^2)	A,L
EN5001V	Green space to which the public has access (hectares)	A,L,S
EN5002V	Population within 15 minutes walking distance of urban green areas (number)	A,L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EN5003I	Total land area (km^2) – from the cadastral register	EN5003V	-	A,L,S
EN5001I	Green space to which the public has access per capita	EN5001V * 10 000	DE1001V	A,L,S
EN5002I	Prop. of population within a 15 min. walk of green space	EN5002V	DE1001V	A,L
EN5012I	Proportion of the area in green space	EN5012V	EN5003V	A,L,S
EN5016I	Proportion of the area used for agricultural purposes	EN5016V	EN5003V	A,L
EN5017I	Proportion of the area in mineral extraction	EN5017V	EN5003V	A,L

EN5018I	Proportion of the area in industrial and manuf. use	EN5018V	EN5003V	A,L
EN5019I	Proportion of the area in road network use	EN5019V	EN5003V	A,L
EN5020I	Proportion of the area in rail network use	EN5020V	EN5003V	A,L
EN5008I	Proportion of the area in ports use	EN5008V	EN5003V	A,L
EN5009I	Proportion of the area in airports use	EN5009V	EN5003V	A,L
EN5021I	Proportion of the area in water treatment use	EN5021V	EN5003V	A,L
EN5022I	Proportion of the area in waste disposal use	EN5022V	EN5003V	A,L
EN5023I	Proportion of the area in commerce and business use	EN5023V	EN5003V	A,L
EN5011I	Proportion of the area in sports and leisure use	EN5011V	EN5003V	A,L
EN5004I	Proportion of the area in housing/residential use	EN5004V	EN5003V	A,L
EN5013I	Prop. of the area unused, including contaminated land	EN5013V	EN5003V	A,L
EN5014I	Prop. of urban area under special conservation measures	EN5014V	EN5003V	A,L
EN5101I	Population density: total resident population per km^2	DE1001V	EN5003V	A,L,S
EN5102I	Net residential density – pop. per land area in housing	DE1001V	EN5004V	A,L

Remarks

Total land area: refers to the land area concept – territorial units: "It is recommended that the statistical definition of surface area is harmonised and that the area concept used be the land area concept, excluding lakes, rivers, and coastal seas. Mountainous regions, glaciers, forests, wetlands and other more or less uninhabitable regions should be included in the land area". (see *Eurostat definition of LAND, Recommendations for a harmonised definition of calculation of surface area of territorial units, 1999 Edition*, p.13, 15, 17). The variable EN5003V applies this land area concept to the specified spatial unit, i.e. the land area of the city, larger urban zone or sub-city.

LUCAS nomenclature

The nomenclature of the "Land Use / Cover Area statistical Survey (LUCAS)" is a multi-purpose statistical nomenclature established following statistical principles of building nomenclatures (see *Eurostat 2001: Manual on Concepts on Land Cover and Land Use information systems.- Luxembourg p.22 ff*).

This nomenclature has been drafted in the framework of the Eurostat LUCAS pilot project. This pilot survey (currently financed by DG AGRI) applies a two-stage, systematic area frame point sampling design (10 000 Primary Sampling Units that are segments with 10 Secondary Sampling Units that are points) and collects data in situ at around 100 000 observation points. It aims to provide representative data at the EU level on areas of the main agricultural crops in Europe (objective: CV < 2%).

In the framework of this pilot project, data was first collected in 2001 and then in 2003 for a second time. As a pilot project, minor changes in the survey and the nomenclature were made after analysis of the results from the first collection. Due to its pilot character the survey is not yet implemented by towns / cities.

The nomenclature is divided into a Land COVER classification and a Land USE classification. The Land Cover part describes the bio-physical characteristics of the land while the Land Use categories describe the socio-economic functions of the land. This means that each observed land unit (area, linear or point feature) is described by two characteristics. This separation provides for multi-purpose applications of the nomenclature e.g. in agriculture statistics there is interest in crop areas using mainly *cover* characteristics and in urban statistics using mainly *use* characteristics. For the establishment of agri-environmental indicators, for example, a post-classification might be defined according to user requirements. For more information on the LUCAS nomenclature refer to the LUCAS Technical Reference Documentation, especially Document 2 "LUCAS: The Nomenclature" (updated version available on the Eurostat CIRCA site http://forum.europa.eu.int/Public/irc/dsis/landstat/library?l=/lucas/reference_documentation&vm=detailed&sb=Title).

In the framework of the Urban Audit project, the previously defined land use variables (in the Urban Audit pilot phase) have been described applying the LUCAS land cover and land use categories. The contents of these variables have hardly been changed. As these variables describe in some cases a mixture of land cover and use aspects, the sum of the different areas may differ from the total area of the specified spatial unit (EN5003V).

If data is unavailable according to the proposed definitions, the CORINE Land Cover nomenclature may be applied as an approximation, as was possible during the Urban Audit Pilot Phase.

Table 9 establishes a compliance matrix for the variables.

Table 9: Land cover / use correspondance

Urban Audit Variable Definition	Corresponds to LUCAS class(es)	Corresponds approximately to CORINE Land Cover class(es)
EN5015V: Water and wetland: Inland or coastal areas covered by water and flooded surfaces or likely to be so over a large part of the year	Land cover category G - Water and Wetland	4. Wetlands and 5. Water bodies
EN5012V: Green space area: Vegetated area within the total urban area	Land cover categories B – Cropland, C – Woodland, D – Shrub land, E – permanent grassland	1.4.1 Green Urban Areas 3. Forests and semi-natural areas but excluding 3.3. Open Spaces with little or no vegetation
EN5016V: Land used for agricultural purposes: Areas utilised for agricultural purpose	Land use category U11 Agricultural use	2. Agricultural Areas
EN5017V: Land area in mineral extraction	Land use category U14 Mining and Quarrying	1.3.1. Mineral extraction sites
EN5018V: Land area in industrial and manufactory use	Land use category U22 Industry and Manufacturing	1.2.1 Industrial or commercial areas
EN5019V: Land area in road network use:	Land use category U31.2 Roads	In the CORINE Land Cover there are no linear features with less than 100m in width that are recorded. No data on linear transport features, therefore, are available. Class 1.2.2. "Road and rail networks and associated land" should be used as an approximation.
EN5020V:Land area in rail network use: (If the data concerning the railway network cannot be separated from the road network data, these variables might be estimated by using a fixed coefficient.)	Land use category U31.1 Railways	Already included in EN5019V (1.2.2. Road and rail networks and associated land)
EN5008V: Area utilised for transport on water:	Land use category U31.3 Water transport	In the CORINE Land Cover there are no linear features with less than 100m in width that are recorded. No data on linear transport features, therefore, are available. Ports etc. are already included in 1.2 3. Ports
EN5009V: Land area in airports use:	Land use category U31.4 Air transport	1.2.4. Airports
EN5021V: Land area in water treatment use:	Land use category U32.1 Water supply and treatment	Already included in 1.3.2. Dump sites
EN5022V: Land area in waste disposal use:	Land use category U32.2 Waste treatment	1.3.2. Dump Sites
EN5023V: Land area in commerce, finance and business use:	Land use category U34 Commerce, Finance, Business	1.1.1. Continuous Urban Fabric
EN5011V: Land area in recreational, sports and leisure use:	Land use category 36 Recreation, Leisure, Sport	1.4.2. Sport and leisure facilities
EN5004V: Land area in housing/residential use:	Land use category U37 Residential	1.1.2. Discontinuous Urban Fabric
EN5013V: Unused areas, including contaminated or derelict land areas: **Contaminated land**: any land whose inland waters appear to be polluted and/or significant harm has been	Land use category U40 Unused including	1.3.3. Construction Sites 3.3. Open spaces with little or no vegetation

caused to it due to the substances that it contains. **Derelict land:** land so damaged by industrial or other developments that it is incapable of beneficial use without treatment		

Regarding the national level data that is presented in conjunction with the urban level data, the data available from NewCronos (environment section) were used if no other (and "better") data from the European projects LUCAS, CORINE 2000 or from national level sources were available.

EN5001V: **Green space to which the public has access (hectares)** refers to public parks and gardens, open-air sports facilities, and private agricultural areas and parks accessible and free of charge.

EN5002V: Population within 15 minutes walking distance of urban green areas: This may also be assessed by the number of people living within 300 metres ("as the crow flies") of publicly accessible (i.e. without charges/fees) green areas, including forested areas.

EN5014V: Special physical/planning conservation measures: land use planning measures which restrict development in the urban area, based on a conservation rationale (e.g. natural reserves, cultural heritage, protected areas for ground water use etc.). Urban Parks do not belong a-priori to this category, unless they are subject to a special order e.g. protected area for nature conservation etc. as mentioned above.

Energy Use (EN6)

Variables

Code	Variable	Spatial Unit
EN6030V	Total petrol and gasoline use for private heating (Mio Tonnes of Oil Equivalents, Mtoe)	A
EN6031V	Total petrol use for private and commercial transport (Mtoe)	A
EN6010V	Total electricity use (1 000 kWh)	A
EN6011V	Total electricity use by the transport sector (1 000 kWh)	A
EN6012V	Total electricity use by the industrial sector (1 000 kWh)	A
EN6013V	Total electricity use by the domestic sector (1 000 kWh)	A
EN6014V	Total electricity use by the commercial (service) sector (1 000 kWh)	A
EN6015V	Total natural gas use (Mtoe)	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EN6010I	Electricity consumption per capita (1 000 kWh)	EN6010V	DE1001V	A
EN6015I	Gas consumption per capita (Mtoe)	EN6015V	DE1001V	A
EN6011I	Share of electricity use in transport sector	EN6011V	EN6010V	A
EN6012I	Share of electricity use in industry sector	EN6012V	EN6010V	A
EN6013I	Share of electricity use in domestic sector	EN6013V	EN6010V	A
EN6014I	Share of electricity use in commercial sector	EN6014V	EN6010V	A

Remarks

Sector: a sector is a homogenous group of productive economic activities.

Private and commercial transport (EN6031V): all passenger and goods vehicles registered within the designated area.

Transport sector: all transport and supporting activities by companies located within the designated area.

Industrial sector: industry (production of goods) located within the designated area.

Domestic sector: domestic residential premises (private households) located within the designated area.

Commercial (service) sector: commercial and public sector premises, e.g. shops, offices, warehouses, etc, located within the designated area.

Mtoe: million tonnes of oil equivalent. One tonne of oil equivalent (toe) is defined as 10^7 kilocalories (41.868 gigajoules). This quantity of energy is, within a few per cent, equal to the net heat content of 1 tonne of crude oil.

1 barrel (=159 litres) of gasoline (petrol) corresponds to 0.12 tonnes of oil equivalent (see http://www.iea.org/stats/files/units.htm)

1 litre of gasoline (petrol) = 0.12 / 159 = 0.00075471698 toe

1 000 litre = 0.7547 toe

Regarding the national level data that is presented in conjunction with the urban level data for this variable, the data available from NewCronos includes the preparation of hot water as it is assumed that it was probably not possible for the NSIs to separate the fuel used for "room heating" from that used for "domestic hot water". In the UK, kerosene is also included because it is the main source of fuel heating in the UK.

3.8 Travel and Transport (TT)

Travel Patterns (TT1)

Variables

Code	Variable	Spatial Unit
TT1064V	People commuting into the city (number)	A
TT1065V	People commuting out of the city (number)	A
TT1066V	Length of public transport network (km)	A,L
TT1068V	Total kilometres driven in public transport (per day)	A
TT1067V	Public transport supply: Number of places multiplied by the kilometres driven (places*km)	A
TT1057V	Number of private cars registered	A,L
TT1058V	Road accidents resulting in death or serious injury (number)	A,L

Variables (= Indicators)

Code	Variable	Spatial Unit
TT1002V	Percentage of journeys to work by rail/metro	A,L
TT1003V	Percentage of journeys to work by car	A,L
TT1004V	Percentage of journeys to work by bus	A,L
TT1005V	Percentage of journeys to work by tram	A,L
TT1006V	Percentage of journeys to work by motor cycle	A,L
TT1007V	Percentage of journeys to work by bicycle	A,L
TT1008V	Percentage of journeys to work by foot	A,L
TT1009V	Percentage of journeys to work by other modes	A,L
TT1059V	Average number of occupants of motor cars	A
TT1019V	Average time of journey to work (minutes)	A,L
TT1062V	Average speed of inner-city car traffic (km/hour) during the rush hour	A
TT1063V	Average waiting time for a bus (minutes) in the rush hour	A,L
TT1071V	Accessibility by air (index, EU27=100)	A,L
TT1072V	Accessibility by rail (index, EU27=100)	A,L
TT1073V	Accessibility by road (index, EU27=100)	A,L
TT1074V	Multimodal accessibility (index, EU27=100)	A,L

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
TT1057I	Number of registered cars per 1 000 population	TT1057V * 1000	DE1001V	A,L
TT1058I	Road accidents (death or serious injury) per 1 000 population	TT1058V * 1000	DE1001V	A,L
TT1064I	Proportion of those employed in the city who are in-commuters	TT1064V	EC2020V	A
TT1065I	Proportion of those living in the city who are out-commuters	TT1065V	EC1034V + EC1088V	A
TT1066I	Length of public transport network as a proportion of land area	TT1066V	EN5003V	A,L
TT1076I	Length of public transport network per capita	TT1066V	DE1001V	A,L
TT1101I	Ratio of day-time to night-time population	EC2020V	EC1034V + EC1088V	A
TT1068I	Total km driven in public transport per capita per day	TT1068V	DE1001V	A

Remarks

Transport: in general intra-urban and commuter transport is reported, not long distance trains for example.

Journey to work: refers to shortest trip (from place of residency to the work place, including change of transport mode) by commuters travelling to work places located within the boundary and should include trips by commuters not resident within the boundary but working within.

Average time: average time in minutes taken to travel between place of residence and work place. The work place must be located within the specified boundary while the place of residency might be anywhere, including across borders.

Average speed of inner city traffic: the average speed during the morning rush hour (8-10 am) is to be reported. This is information enables key policy impacts to be monitored e.g. fostering public transport (increase of average speed ? decrease of energy consumption ? etc.).

People commuting into the city area (TT1064V): residents of areas outside the city, whose employment location or client premises are within the city area.

People commuting out of the city area (TT1065V): residents of the city area, whose employment location or client premises are outside the city area.

Public transport: a network of buses, trains, tram etc. that run according to a planned time schedule and that anyone can use. The provider of the above mentioned services may be either the municipal authority or privately owned enterprises.

Average waiting time for a bus (TT1063V) refers to the waiting time for a bus (not: tram or metro) during the rush hours (8-10 am) and reflects the frequency of scheduled bus trips within the specified boundary (City level: at main bus station; LUZ: at terminal station to city centre). A practical estimate for this variable is division by two of the average time between two bus trips. This information enables the quality of service of public transport offered to the citizens to be monitored, using the example of buses.

Length of public transport network (TT1066V): sum of public transport lines taking care top avoid double counting, for example when several lines use the same road / track. If data with double counting is supplied, it is clearly marked in a footnote.

Public transport supply (TT1067V): Number of places multiplied by kilometres driven (=TT1068V)": "Places" includes seats and standing places. The variable aims at knowing about the total volume of public transport available.

Total kilometres driven in public transport per day (TT1068V): sum (km) of all lines of public transport (with double counting).

Motor Car: in the Urban Audit the definition of the "passenger car" should follow that of the Eurostat "Glossary for transport statistics" but exclude cars registered by enterprises (*Eurostat (2003): Glossary for transport statistics - Document prepared by the Intersecretariat Working Group on Transport Statistics, p34*)

Passenger car: Road motor vehicle, other than a motor cycle, intended for the carriage of passengers and designed to seat no more than nine persons – including the driver. The term "passenger car" therefore covers micro-cars (need no permit to be driven), taxis and hired passenger cars, provided that they have fewer than ten seats. This category may also include pick-ups.

Car registrations: total number of private passenger cars registered (by natural persons, not business, enterprises, so no taxis or hire cars registered by enterprises) to addresses within boundary on the 1st of January of the reference year. This is the total stock of cars, not just new registrations.

Injury Accident: the definition of Injury Accident follows that of the Eurostat "Glossary for transport statistics"**:**

Any accident involving at least one road vehicle in motion on a public road or private road to which the public has right of access, resulting in at least one injured or killed person.

Included are: collisions between road vehicles ; between road vehicles and pedestrians; between road vehicles and animals or fixed obstacles and with one road vehicle alone. Included are collisions between road and rail vehicles. Multi-vehicle collisions are counted as only one accident provided that any successive collisions happen at very short intervals. Injury accident excludes accidents incurring only material damage.

Serious injury: an injury for which a person is detained in hospital as an "in-patient" or any of the following injuries whether or not the injured person is detained in hospital: fractures, concussion, internal injuries, crushing, severe cuts and lacerations, severe general shock requiring medical treatment and injuries causing death 30 or more days after the accident.

Regarding the national level data that is presented in conjunction with the urban level data for this variable, the data available from NewCronos refers to number of persons, not to the number of accidents. It has been decided to use this data with a footnote.

Occupants: simple count of number of occupants.

Accessibility : Data source for this variable is the European Spatial Planning Observation Network (ESPON). The data correspond to the Potential Accessibility Indicators proposed by the Study Programme on European Spatial Planning (*ESKELINNEN, H., FÜRST, F., SCHÜRMANN, C., SPIEKERMANN, K., WEGENER, M. (2002): Indicators of Geographical Position.- Final Report of the Working Group "Geographical Position" of the Study Programme on European Spatial Planning.- Dortmund, IRPUD*).

Potential accessibility is based on the assumption that the attraction of a destination increases with size, and declines with distance, travel time or cost. Destination size is usually represented by population or economic indicators such as GDP or income. Accessibility to population is seen as an indicator for the size of market areas for suppliers of goods and services; accessibility to GDP as an indicator of the size of market areas for suppliers of high-level business services. Potential accessibility is founded on sound behavioural principles but contains parameters that need to be calibrated and their values cannot be expressed in familiar units." That is why the indicators are standardized to the average accessibility of the ESPON space (= EU15 + 12 Candidate Countries). The method is described in more detail in BAPTISTE, H et. al. (2003) p. 163ff.

3.9 Information Society (IT)

Users and Infrastructure (IT1)

Variables

Code	Variable	Spatial Unit
IT1001V	Number of households with a computer	A
IT1002V	Percent of population over 15 years who regularly use the Internet	A
IT1004V	Number of telephone main lines within the city [country for national data]	A
IT1010V	Households with broadband access	A

Variables (= Indicators)

Code	Variable	Spatial Unit
IT1005V	Percentage of households with Internet access at home	A
IT1006V	Computers per 100 pupils at primary education level	A
IT1007V	Computers per 100 pupils at secondary education level	A
IT1008V	Number of students of Information, Communications Technology (ICT) at university level or equivalent	A
IT1009V	Number of Public Internet Access Points (PIAPs)	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
IT1001I	Proportion of households with a computer	IT1001V	DE3001V	A
IT1010I	Proportion of households with access to broadband	IT1010V	DE3001V	A

Remarks

Telephone lines (IT1004V): number of telephone lines / cables within the city boundaries (private and business lines into buildings, not number of phone access points). Public pay telephones are excluded.

Number of computers (T1006V – IT1007V): only computers available to students are to be counted (not those used for administration). The same computers might be used by both levels, so the number should be estimated e.g. by doubling the number in relation to the lower secondary level and in relation to the upper secondary level. ISCED: "International Standard Classification for Education" (see above).

Students of ICT at University level (IT1008V): the naming of branches at universities is not harmonised. A good indication is given by the documentation on "Generic ICT Skills Profiles" (http://www.career-space.com/downloads/index.htm) that resulted from an EU project funded by DG Enterprise. The document provides for job descriptions in the ICT sector including the skills required. Students in the relevant branches should be counted.

PIAPs: Public Internet Access Points are publicly provided centres providing access to the Internet regardless of their public and/or private provider and whether access is free or not though excluding fully private Internet cafés. Examples: libraries, universities, museums.

For more information regarding the indicators in this domain, please refer to http://europa.eu.int/information_society/eeurope/2005/all_about/benchmarking/index_en.htm

International Statistical Review. Volume 71 Number 1 April 2003. DESCRPITION OF THE INFORMATION SOCIETY. Editors: Elja Arjas and Asta Manninen. Guest Editors: Lea Parjo and Heli Jeskanen-Sundström. The International Statistical Institute.

Local e-Government (IT2)

Variables (= Indicators)

Code	Variable	Spatial Unit
IT2001V	Official city Internet website (Yes/No)	A
IT2002V	Number of visits to official city Internet website	A
IT2003V	Number of administrative forms available for download from official website	A
IT2004V	Number of administrative forms which can be submitted electronically	A

Remarks

Official city Internet website (IT2001V): any website provided by the local government to promote the city and/or provide services to the residents.

Website Visits (IT2002V): the number of pages viewed (sum of all).

Administrative forms (IT2003V, IT2004V): forms that have to be filled in by the residents in order to request specific services/documents provided by their local government such as birth certificates, planning permissions, etc.

ICT sector (IT3)

Variables

Code	Variable	Spatial Unit
IT3001V	Number of local units manufacturing ICT products	A
IT3002V	Number of persons employed in the manufacture of ICT products	A
IT3003V	Number of local units providing ICT services	A
IT3004V	Number of persons employed in the provision of ICT services	A
IT3005V	Number of local units producing content for the Information Society	A
IT3006V	Number of persons employed in production of content for the Information Society	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
IT3001I	Proportion of local companies that produce ICT products	IT3001V	EC2021V	A

IT3002I	Percentage of labour force manufacturing ICT products	IT3002V	EC2020V	A
IT3004I	Percentage of labour force providing ICT services	IT3004V	EC2020V	A
IT3006I	Percentage of labour force producing ICT content	IT3006V	EC2020V	A

Remarks

Information and Communication Technologies (ICT): the technologies involved in the recording, storage and sending out of information (using computers, telecommunication devices, etc)

Local units: the local unit is an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place (for our purposes within the specified boundary). Economic activity is carried out by one or more persons (even if only part-time) for one and the same enterprise at or from this place – save for certain exceptions. It is difficult to use different data sources for IT3001V (number of local units manufacturing ICT products) and IT3002V (number of persons employed in manufacturing ICT products). Detailed descriptions of the definitions applied are given in footnotes.

ICT products, services and content: the activities of the enterprises that are involved in the ICT sector as well as of those creating the information (the so-called "content" enterprises) are classified according to NACE Rev. 1. . For "Content production" the broad description has been applied, as in Statistics Finland: "On the Road to the Information Society II" (1999).

Table 10: Classification of the activities of the ICT industries using the NACE rev. 1

Production of information goods	
30	Manufacture of office machinery and computers
313	Manufacture of insulated wire and cable
32	Manufacture of radio, television and communication equipment and apparatus
3320	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
3330	Manufacture of industrial process control equipment
Production of information services	
5143	Wholesale of electrical household appliances and radio and television goods
5164	Wholesale of office machinery and equipment
5165	Wholesale of other machinery for use in industry, trade and navigation
642	Telecommunications
	Renting of office machinery and equipment including computers
72	Computer and related activities
Content production	
22	Publishing, printing and reproduction of recorded media
73	Research and development
7413	Market research and public opinion polling
7414	Business and management consultancy activities
744	Advertising
7483	Secretarial and translation activities
921	Motion picture and video activities
922	Radio and television activities
923	Other entertainment activities
924	News agency activities
925	Library, archives, museums and other cultural activities

3.10 Culture and Recreation (CR)

Culture and Recreation (CR1)

Variables (= Indicators)

Code	Variable	Spatial Unit
CR1001V	Concerts (per year)	A
CR1002V	Concert attendance (per year)	A
CR1012V	Number of concert seats	A
CR1003V	Number of cinema seats (total capacity)	A
CR1005V	Cinema attendance (per year)	A
CR1006V	Number of museums	A
CR1007V	Number of museum visitors (per year)	A
CR1008V	Number of theatres	A
CR1013V	Number of theatre seats	A
CR1009V	Theatre attendance (per year)	A
CR1010V	Number of public libraries (all distribution points)	A
CR1011V	Number of books and other media loaned from public libraries (per year)	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
CR1005I	Annual cinema attendance per resident	CR1005V	DE1001V	A
CR1003I	Number of cinema seats per 1 000 residents	CR1003V* 1000	DE1001V	A
CR1001I	Number of concerts per 1 000 residents	CR1001V* 1000	DE1001V	A
CR1002I	Annual attendance at concerts per resident	CR1002V	DE1001V	A
CR1008I	The number of theatres	CR1008V	-	A
CR1009I	Annual attendance at theatres per resident	CR1009V	DE1001V	A
CR1006I	Number of museums	CR1006V	-	A
CR1007I	Annual visitors to museums per resident	CR1007V	DE1001V	A
CR1010I	The number of public libraries	CR1010V	-	A
CR1011I	Total loans of books and other media per resident	CR1011V	DE1001V	A
CR1012I	Number of concert seats per capita	CR1012V	DE1001V	A
CR1013I	Number of theatre seats per capita	CR1013V	DE1001V	A

Remarks

Concerts: events presenting live music of any type (classical, popular, etc.) taking place within the specified boundary and for which tickets are sold. For open air concerts without seating, the number of tickets sold is reported.

Museums: public and private museums.

Theatres: public or private registered venue (not street theatre, school theatres etc.). If multiple purpose venues are included, this is marked in the footnote (free-format text). The intention of this variable is to know about the number of locations within the city, not the individual halls/scenes (one theatre may have a musical/opera scene, intimate play scene etc.).

Books and/or other media loaned: the number of books and/or other media (CD, DVD, Videos etc) issued for loan by public libraries located within the specified boundary.

Number of public libraries (CR1010V) includes counting of all distribution points, even if there are several libraries in the same building. Target of this variable is to know about the publicly accessible general libraries, where you do not need to be a member of an association or to be a student. Libraries of very specific subjects or subject related research libraries are not included. A source for information is *INTAMEL Metro* = International Association of metropolitan Libraries, that is part of IFLA = International Federation of Library Associations and Institutes (www.ifla.org).

Tourism (CR2)

Variables (= Indicators)

Code	Variable	Spatial Unit
CR2001V	Total annual tourist overnight stays in registered accommodation	A
CR2009V	Number of available beds	A
CR2004V	Number of air passengers using nearest airport	A
CR2005V	Number of air passengers using nearest airport: Total arrivals	A
CR2006V	Number of air passengers using nearest airport: Domestic arrivals	A
CR2007V	Number of air passengers using nearest airport: Total departures	A
CR2008V	Number of air passengers using nearest airport: Domestic departures	A

Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
CR2001I	Tourist overnight stays in reg. accommodation per year	CR2001V	-	A
CR2011I	Tourist overnight stays per resident population	CR2001V	DE1001V	A
CR2014I	Number of air passengers per resident	CR2004V	DE1001V	A
CR2101I	Average occupancy rate of accommodation	CR2001V	CR2009V	A
CR2009I	Number of available beds	CR2009V	-	A
CR2004I	Number of air passengers using nearest airport	CR2004V	-	A
CR2005I	Share of non-domestic departures from nearest airport	CR2007V-CR2008V	CR2007V	A

Remarks

Tourist Overnight Stays: business and recreational overnight stays by tourists in registered accommodation, located within the specified boundary.

Number of available beds: determined by the number of persons that can stay overnight in the beds set up in the registered accommodations; not in camp grounds.

Air Passengers: air origin/destination passengers using the nearest airport to the City. For national figures, total air passengers using airports in the Member State are reported. Domestic departures/arrivals refer to passengers travelling to or from destinations within the Member State, transit passengers are excluded.

Nearest airport: the aim of the variables CR2004V to CR2008V is to know about the accessibility of the city for businessmen and tourists. Small airports are included if there is regular air traffic run by commercial airlines. The "distance" in terms of time to get there is taken into account (about 1 hour), not the distance in kilometres. If the city can be reached by more than one airport within this range, the number of passengers from all airports is summed up. The city is the object of observation, not the airport.

3.11 Perception Indicators

The citizen's perception of quality of life within "their" city is important information. Perception indicators are the result of opinion polls among a representative random sample of inhabitants of the city in question.

Collecting information on perception indicators remains a costly operation despite the adoption of a sample survey and the use of telephone interviews as the data collection method. This explains why the perception survey was limited to a selection of interesting topics for the Urban Audit. It is also the reason why only some 31 Urban Audit Cities could be chosen. This situation may change in the future if close co-operation with the cities is established, because this data is also of importance to them.

The following perception indicators are reported in the Urban Audit:

- Perception of integration of foreigners
- Perception of housing market
- Perception of health services
- Perception of safety in the city
- Perception of employment opportunities
- Perception of financial well-being
- Perception of the quality of local administration services
- Perception of education quality
- Perception of education facilities
- Perception of air quality
- Perception of green space provision
- Perception of the public transport quality
- Perception of the quality of the ICT infrastructure
- Perception of the quality and quantity of cultural facilities
- Perception of the quality and quantity of cultural events
- Perception of the quality and quantity of sports facilities

As already mentioned, the data are the result of telephone interviews with a representative sample of citizens in the 31 cities (see

Table 11). The interviews were carried out by GALLUP institutions in the 15 EU-Member States during the period 5th to 16th January 2004.

The **questions** asked during the interview are listed below.

The questionnaire began with some general characteristics before moving on to the specific questions for each topic. This general information helped to ensure that the overall responses were representative of the total population of the city.

D1. Sex (Male/Female)

D2. Exact Age

D3. As far as your current occupation is concerned, would you say you are self-employed, an employee, a manual worker or would you say that you are without a professional activity ?

(only one answer was allowed, examples given as follows)

- Self-employed (i.e. farmer, forester, fisherman; owner of a shop, craftsman; professional [lawyer, medical practitioner, accountant, architect,…]; manager of a company; other (specification)
- Employee (i.e. professional [employed doctor, lawyer, accountant, architect]; general management, director or top management; middle management; civil servant; office clerk; other employee (salesman, nurse, etc…); other (specification);
- Manual worker (i.e. supervisor / foreman [team manager, etc …]; manual worker; unskilled manual worker , other (specification);
- Without a professional activity (i.e. looking after the home; student (full time); retired; seeking a job; other (specification);

D4. How long have you been living in the city? [Years]

The questions to citizens concerning the perception indicators listed above required gauged responses on their general satisfaction, their agreement with predefined statements and the frequency with which they feel concerned about a certain subject.

The questions are listed in the following.

Q1. Generally speaking, please tell me if you are very satisfied, rather satisfied, rather unsatisfied or not at all satisfied with each of the following services in *your city*:

a. Public transport in the city, for example the bus, tram or metro
b. Schools
c. Health care services offered by hospitals
d. Health care services offered by doctors
e. Green spaces such as public parks and gardens
f. Sports facilities such as sport fields and indoor sport halls
g. Cinemas
h. Cultural facilities such as concert halls, theatres, museums and libraries
i. Public Internet access such as internet cafes or libraries
j. Internet access at home

Q2. I will read you a few statements. Please tell me whether you strongly agree, somewhat agree, somewhat disagree or strongly disagree with each of these statements?

a. In your city , it is easy to find a good job
b. Foreigners who live in your city are well integrated
c. In your city, it is easy to find good housing at a reasonable price
d. When you contact the administrative services of your city, do they help you efficiently
e. In your city , air pollution is a big problem
f. In your city, noise is a big problem
g. Your city is a clean city
h. Your city spends its resources in a responsible way
i. You are satisfied to live in your city
j. In the next five years, it will be more pleasant to live in your city

Q3. For each of the following statements, please tell me, if this always, sometimes, rarely or never happens to you?

a. You have difficulty paying your bills at the end of the month
b. You feel safe in the neighbourhood you live in
c. You feel safe in your city

Results of the perception survey were received in February 2004 and are currently being analysed.

Table 11: Urban Audit Cities in the perception survey

Code	Name of City	Sample size
AT001C	Wien	300
BE002C	Antwerpen	300
BE001C	Bruxelles - Brussels	308
BE005C	Liège	303
DE001C	Berlin	301
DE010C	Dortmund	300
DE008C	Leipzig	300
DE003C	München	300
DK001C	Kobenhavn	300
ES002C	Barcelona	302
ES001C	Madrid	302
ES006C	Malaga	300
FI001C	Helsinki	300
FR203C	Marseille	301
FR001C	Paris	305
FR013C	Rennes	304
GR001C	Athinai	300
GR004C	Irakleio	300
IE001C	Dublin	297
IT003C	Napoli	300
IT001C	Roma	300
IT004C	Torino	300
LU001C	Luxembourg	300
NL002C	Amsterdam	300
NL003C	Rotterdam	300
PT003C	Braga	300
PT001C	Lisboa	300
SE001C	Stockholm	301
UK004C	Glasgow	300
UK001C	London	301
UK008C	Manchester	303
TOTAL		**9328**

4 Estimation Methods

4.1 General Introduction

In the Urban Audit project, the statistical indicators that are described in Chapter 3 have been produced for the Core Cities, Sub-City Districts and Larger Urban Zones. It is important that indicators produced for these spatial units are based on reliable data sources and they are obtained by using appropriate statistical techniques. In most cases, data obtained from Censuses, different administrative and statistical registers and national and local databases are used in a given country or a spatial unit. A benefit of this approach is that sufficient data are available to calculate indicators even for small spatial units, and indicators can be obtained without any sampling error. In some cases, data are only available in a sample survey, or data are not necessarily readily available for some indicators according to the required definitions and covering the required spatial unit. For these situations, statistical estimation methods need to be applied using the available data to overcome the problems of gaps in the database. A variety of estimation methods for such cases are discussed in this chapter.

In the Urban Audit project, different estimation methods have been used, with different levels of technical complexity. In many cases, **"pragmatic" methods** with a low technical complexity have been used. For these methods, expert knowledge on local conditions has been incorporated within the estimation procedure for a given indicator.

One pragmatic approach has been that of "*borrowing strength*". This uses expert knowledge of a situation where data is unavailable for small spatial units to make decisions using reliable data from larger units. By way of a concrete example (in Germany), a pragmatic approach to the estimation of income levels at Sub-City District level has been to base it on reliable data for a larger region that is available. In the estimation of statistics for the Sub-City District, the main contribution has thus come from additional knowledge (given by the National Urban Audit Coordinator and partner at local level) about data describing the relation of the smaller area to the bigger region.

A **pragmatic approach** using expert knowledge is also required when data for a given variable from various data sources (for example, official sample surveys, local registers and micro-censuses) vary. Thorough understanding of the national, regional or local situation and the availability of data (e.g.: as for ICT and land use in Germany), the reasons for the disparities or similarities between results from the various sources enable the expert to apply a method of estimation.

In some cases, such pragmatic approaches can be supplemented by more technical methods of "borrowing strength", by using specific methods and computational tools for **statistical estimation for the required spatial units.** There are several types of statistical methods for estimation for domains and small areas that are currently applied and further developed. In this chapter, methods are discussed for estimation problems at geographic levels corresponding to those used in the context of the Urban Audit (Core City, Sub-City District, Larger Urban Zone) or even at lower levels or small domains (e.g. specific sex-age groups within the spatial unit). These methods are applied whilst bearing in mind the specific conditions of data availability in the framework of the Urban Audit. Thus, in choosing an appropriate method for a given situation, the availability of survey data and auxiliary data from different registers and other sources is important.

It should be noted that there are **no general or overall solutions** that are valid for all small area estimation problems under all circumstances. The expert team has taken this fact into account. Methodological support and the development of solutions, rather than case-specific solutions, have been provided by the experts in close collaboration with the National Urban Audit Coordinators. The main input from the expert team has been – in addition to the presentation of pragmatic and statistical estimation methods – to ask the right questions and to promote a creative atmosphere, in order to learn from each other and share experiences.

A key principle in the "**Output Harmonization**" approach, which is applied in the Urban Audit project, has been the use of standard definitions of the basic concepts behind the indicators. Given this, the production of the indicators has been based on the so-called **Current Best Methods** (CBM) that are available in a given country. A CBM for a given indicator in a given country depends on the statistical infrastructure, data availability, the availability of computational tools and expertise, and similar conditions. In this way, it was assumed that there would not be a standard overall methodology that could be used for each special case in each country. In the course of the data compilation process, the feasibility of the estimation methods was assessed by the expert group when possible, and alternative methods proposed where relevant. Thus, coordination of the methodology has been an important goal, and similar solutions have been proposed for relevant countries wherever possible. Here, the active role of the National Urban Audit Coordinator has been important. The methods proposed were tested, to some extent, and applied by the National Urban Audit Coordinators or the teams of local experts where appropriate. In most cases, the results were checked with the local level results.

This chapter is organised in the following way:

Section 4.2 describes the way in which a framework for the data sources is conceptualized.

Section 4.3 describes some of the statistical estimation methods for domains and small areas (Särndal 2001, Rao 2003, Lehtonen, Särndal and Veijanen 2003, Lehtonen and Pahkinen 2004). This broad set of statistical tools includes model-assisted methods for domain estimations, model-dependent small area estimation techniques and methods of spatial econometrics, among others.

Section 4.4 presents some selected case studies, including an application of spatial econometrics in Spain, a pragmatic solution to a small area estimation problem in Austria, and an example on the use of data extracted from statistical registers in producing small-area statistics in Finland.

4.2 Framework for Data Sources

A schematic presentation of the different options for the basic data structures in the production of indicators for the spatial units is given in Table 12.

In this table, data sources are classified according to data collection mode and the coverage of data with respect to the target population.

Three data collection modes are distinguished: direct, indirect and mixed mode data collection.

Using sample surveys only allows a partial coverage of the population, whilst a Census provides full coverage of the whole of the target population. Under this two-way classification, four special cases (or options) seem relevant in the context of the Urban Audit: Option 1a (sample survey data using direct data collection), Option 3a (combined use of sample survey data and register data), Option 1b (Census data using direct data collection) and Option 2b (Census data using indirect data collection methods). In many cases, different combinations of these data sources have been applied depending on the spatial unit of interest and the target variable (see Chapter 4). In addition to the national databases, account has also been taken of the harmonized data available in Eurostat databases (NewCronos, REGIO, SIRE) for several variables at the relevant spatial unit level (NUTS3, NUTS4 or NUTS5).

In the Urban Audit, where small spatial units are of interest, Census data (Options 1b and 2b) has often proved to be the most reliable. By contrast, national sample surveys are usually designed to produce reliable statistics for large areas, such as the whole country or large regions. In this way, Option 1a cannot usually be used for small areas as such. An exception is the case where a sufficient sample size even for a small (but important) area has been guaranteed by using stratification and a suitable allocation scheme in the sampling design. Typically, however, an estimation procedure for a small area is built on a method that borrows strength from the bigger areas. By combining features of Options 1a with 1b and/or 2b, Option 3a serves this purpose. When using this option, the sample survey data available are strengthened by auxiliary data obtained from a larger area, and these combined data are incorporated in an estimation procedure for the small spatial unit of interest. This type of data often provides the basic materials for an estimation methodology for domains and small areas.

EXAMPLES

The use of different data sources (see Table 12).

(a) Use of sample survey data.

The estimation of the total number of ILO unemployed for Core City areas using unit-level data from a national Labour Force Survey, strengthened by data taken from a Micro Census (Option 1a). Indicators that use sample survey data are subject to some sampling errors. This option has been used in Germany and Austria.

(b) Use of Census data.

The estimation of disposable income per OECD consumer unit for Core City sub-regions using data from a Census register (options 1b and 2b). This option is available in most of the Urban Audit countries. Indicators based on Census data have no sampling error.

(c) Combined use of register data and sample survey data.

The estimation of the total number of ILO unemployed for Core City regions using data from the Labour Force Survey, strengthened by auxiliary data taken from a register of unemployed job-seekers or claimant count figures (Option 3a). Indicators that use sample survey data are subject to some sampling errors, but in this combined manner sampling errors are likely to be smaller than in case (a). This option is available for example in Denmark, Finland and Sweden, and in general, in countries where registers are commonly used for official statistics.

Table 12: Scheme of the different data options, by data collection mode and coverage with respect to the target population

DATA COLLECTION MODE	COVERAGE WITH RESPECT TO TARGET POPULATION	
	A. PARTIAL COVERAGE: SAMPLE SURVEY	B. FULL COVERAGE: CENSUS SURVEY
1. DIRECT DATA COLLECTION **Interview survey** Mode examples: - Computer Assisted Personal Interview (CAPI) – Computer-Assisted Telephone Interview (CATI) - Computer-Assisted Self-interview(CASI) - Paper-and-Pencil Interview (PAPI) **Mail survey** **Internet survey, Web survey, Web panel, eSurvey**	**Option 1a. Sample survey using direct data collection mode** This survey type is a traditional one. Examples: - Micro Census - Labour Force Survey LFS - European Community Household Panel ECHP - Statistics on Income and Living Conditions EU-SILC - Household Budget Survey HBS	**Option 1b. Full-coverage Census survey using direct data collection mode** This survey type is a traditional one. Examples: - Population Census covering the whole population with direct data collection using short form (Census) and long form (sample) questionnaires - Register data collected for statistical purposes or as part of an administrative procedure
2. INDIRECT DATA COLLECTION **Data source:** **Register** - Full coverage of the relevant target population - Continuous updating **Administrative register** - By-product of an administrative procedure **Statistical register** - Compiled by a statistical agency	**Option 2a. Administrative register with partial coverage of the relevant target population** This survey type is seldom met in practice.	**Option 2b. Full-coverage Census survey using data compiled from administrative and/or statistical registers** This survey type is becoming increasingly popular in the scope of Official statistics. Examples: - Register-based Population Census - Business Register - Taxation register - Claimant count register - Register on the use of social security benefits - Register of old-age pensioners
3. MIXED-MODE DATA COLLECTION **Data source:** Combination of direct and indirect data collection modes	**Option 3a. Sample survey using micro-merged interview data and register data** This survey type is becoming increasingly popular in the scope of Official statistics Examples: - Joint use of LFS and Claimant count data - Joint use of HBS and Census data - Joint use of Business survey and Business Register data	

4.3 Estimation Methods for Domains and Small Areas

In this section, the statistical estimation methods for population subgroups or domains, and small areas are presented. Cities, Sub-City Districts and Larger Urban Zones are examples of such subgroups.

There are three important aspects to the estimation of statistics for domains and small areas:

(a) the availability of powerful additional or auxiliary data that correlates strongly with the variable of interest (similarly as in the more pragmatic methods),

(b) a statistical model which is used to incorporate the auxiliary data into the estimation procedure, and

(c) an estimator (and the corresponding variance estimator) of the desired statistic or indicator.

The kind of statistic that may need to be estimated is a total (such as the number of ILO unemployed) in a domain or small area.

Examples of estimators of domain totals are :

- a **Horvitz-Thompson estimator** (a weighted sum over the sample of the values of the study variable, where the weights are inverses of inclusion probabilities)
- a **generalised regression (GREG) estimator** (a sum over the population of fitted values and a sample-dependent bias adjustment, where the fitted values are calculated using a linear model, for example)
- a **synthetic estimator** (similar to the GREG estimator but without a bias adjustment term).

The Horvitz-Thompson estimator does not use any auxiliary information, whereas the generalised regression estimator and the synthetic estimator rely heavily on the use of auxiliary information. These estimator types are discussed in more detail later in this section. Of the data source options listed in Section 4.2, Option 3a provides the most effective option for a small area estimation procedure. Focus here, however, is given to the structures of the models used in the construction of the estimators of the desired regional statistics and the construction of the estimators of the chosen statistics.

Several different estimation methods for domains and small areas are available. All methods assume good auxiliary data and the use of statistical models. Consider for example the estimation of ILO unemployment rates for sub-regional areas. A small area estimation procedure can be implemented using aggregated Census or administrative register-based auxiliary data (e.g. sex-age breakdowns), which are assumed to be available at a sub-regional level, and estimates of ILO unemployment rate for sex-age groups that are available at a higher regional level, based on a sample survey. An area-level linear model can be constructed that incorporates the aggregate-level data in the estimation procedure of the unemployment rates for the sub-areas. If disaggregated data are available, more flexible and effective unit-level modelling methods can be used. First, the total number of unemployed and the size of labour force are estimated in the sub-areas by using the available unit level data on the study variable and the auxiliary variables that relate to the study variable. In this procedure, the chosen model is used in building a relationship between the study variable and the auxiliary predictor variables (a linear model or a nonlinear model such as a logistic model, for example). Using these figures, the unemployment rate is calculated for the desired spatial units of interest as the ratio of the estimated total number of unemployed and the estimated size of labour force. In both the area-level case and the unit-level case, successfulness (small standard error reflecting good estimation accuracy) of the small area estimation effort depends on the availability of powerful and reliable additional auxiliary data and a proper choice of models and estimators. If these conditions are met in a given situation, borrowing strength can be realized successfully.

To be more specific, the estimation methods for regional areas (large and small) can be divided into two broad categories, the design-based model-assisted methods (where the term “design” refers to the sampling design and “model” to a statistical model) and the model-dependent methods. In a typical survey, some domains of interest (such as NUTS 3 regional areas) are large enough, and the auxiliary information strong enough, so that the design-based model-assisted estimators will be sufficiently accurate. Estevao and Särndal (1999), Särndal (2001), Lehtonen, Särndal and Veijanen (2003) and Lehtonen (2004) give a general outline of estimation for domains under the **design-based model-assisted approach**, where the use of auxiliary data and unit-level modelling play a crucial role. The **generalised regression estimator** (Särndal, Swensson and Wretman 1992) and different **calibration estimators** (Deville and Särndal 1992) are the most popular members of the family of the design-based estimators.

The design-based approach is used extensively for domain estimation in many National Statistical Offices. Several NSOs have in recent years constructed software that routinely handles domain estimation within the design-based, model-assisted framework. Examples of such software include Bascula (Bethlehem and Keller 1987) by Statistics Netherlands, CLAN97 (Andersson and Nordberg 1998) by Statistics Sweden, GES (Estevao, Hidiroglou and Särndal 1995) by Statistics Canada, g-CALIB-S by Statistics Belgium and CALMAR (Sautory 1993) by INSEE, France.

The type of domain is an important concept in the context of design-based estimation for domains and small areas. The domains are defined *unplanned*, if the domain sample sizes are not fixed in the sampling design. This is the case where the desired domain structure is not a part of the sampling design.

Thus, the domain sample sizes are random quantities introducing an increase in the variance estimates of domain estimators. In addition, an extremely small number (even zero) of sample elements in a domain can be realised in this case, if the domain size in the population is small. For *planned* domains, on the other hand, the domain sample sizes are fixed in advance by stratification. In this case, the strata themselves constitute the domains of interest. Stratified sampling in connection to a suitable sample allocation scheme into the strata is often used in practical applications of domain estimation in National Statistical Offices. For example, Singh et al. (1994) illustrates the benefits of the planned domain approach for domain estimation. They presented compromise sample allocation schemes for the Canadian Labour force survey to satisfy reliability requirements at the provincial level as well as sub-provincial level. An example of the benefits of the planned domains approach is presented in Lehtonen and Pahkinen (2004, Chapter 6). However, for practical reasons it is usually not possible in a given country to define all desired domain structures as strata. This holds often for example for the spatial units in the context of the Urban Audit.

When using the unplanned domain structure, the domains of interest can become very small (contain a small number of sampled units). A sub-division of the population by sex-age groupings within Core City regions using data from a Labour force survey provides an example. The design-based estimates can be too erratic in this case, because overly large standard errors can be obtained, reflecting poor estimation accuracy. The statistical agency may then decide to suppress the publication of any statistics for such domains. The **model-dependent methods** provide an option for these situations. For small areas, model-dependent estimates tend to be less volatile than the design-based estimates. Thus, standard errors of model-dependent estimates can be much smaller than those of the design-based estimates. But an unattractive feature of the model-dependent estimates is their unknown bias (see e.g. Lehtonen et al. 2003).

An example of model-dependent estimators is the **synthetic estimator**, which has been popular in small area estimation since about 1970. The synthetic estimator relies strongly on the specified statistical model. Simple models, such as linear models involving only fixed effects, were used as early variants of the synthetic estimator. Being very sensitive to a correct model specification, more flexible variants have been proposed. Typically, synthetic estimators involve models that include domain-specific random effects in addition to the fixed effects. Examples are estimators built on nested error regression models, random regression coefficients models and simple random effects models (Fay and Herriot 1979). Various **composite estimators**, constructed as weighted combinations of a model-dependent estimator and a design-based estimator, have also been proposed. The famous **EBLUP estimator** (Empirical Best Linear Unbiased Predictor, see Rao 2003) provides a good example of these estimators.

Today, the methodology of model-dependent small area estimation draws on a variety of established statistical arguments and principles, such as **generalised linear mixed models**, composite estimation, empirical Bayes estimation, hierarchical Bayes, and so on. Many of the methods designed for small area estimation can be applied with standard software products for generalised linear mixed models (such as the SAS procedures MIXED and NLMIXED, and the MLwiN software and similar software for fitting hierarchical models). The SAS-based software produced in the context of the EURAREA project (an EU-funded research project running under the 5th Framework Programme) can be expected to be very useful for small area estimation purposes in the future.

Many National Statistical Offices use model-dependent methods for small area estimation in the cases where the design-based methods tend to fail. Good examples are Heady et al. (2003), who describe an Office for National Statistics (ONS, UK) project on model-dependent small-area estimation where synthetic estimation is used, and Yar, Hennell and Clarke (2001), who report ward estimates for England of childhood mental disorders, also relying on synthetic estimation. The application of spatial econometrics in Spain provides another useful approach for model-dependent small area estimation.

An example of model-dependent estimation for small areas is the estimation of the ILO unemployment rate for Core City regions by using an EBLUP estimator with area-level survey data aggregated at the sample level from a Labour Force Survey and at the population level from an available auxiliary register. In addition, for the estimation of the total numbers of ILO unemployed and ILO employed, separately, again for Core City regions but now by sex-age groupings, one might use unit-level sample survey data taken from a Labour force survey and unit-level population data taken from an available auxiliary register, and calculate a synthetic estimate with a linear (or logistic) mixed model involving small-area specific random intercept terms.

The methodology of model-dependent small area estimation relies strongly on the idea of “borrowing strength” (see for example Ghosh and Rao 1994, Rao 1999 and Rao 2003). **Borrowing strength** (or information) via modelling is generally understood to mean that the estimator in use depends on data on the study variable from "related areas" or more generally from a larger area, in an effort to improve the estimation accuracy for the small area. The resulting estimator is called *indirect*, in contrast to the one that uses data for the study variable strictly from the domain itself, in which case it is called *direct*. A careful choice of the statistical model is a crucial point in a model-dependent estimation. A good model (that fits well with the given data) is a necessary condition for small bias and good accuracy. But with a poor model, large bias and poor accuracy can be obtained.

There is an extensive recent literature on small area estimation from a Bayesian point of view, including **Empirical Bayes** (EB) and **Hierarchical Bayes** (HB)

techniques (see for example Ghosh 2001 and Rao 2003). At least recently, the use of Bayesian methods for small area estimation seems to be a rare issue in the context of official statistics.

More detail is now given about three estimator types: the Generalised Regression (GREG) estimator (which is design-based), the Synthetic (SYN) estimator (which is model dependent) and the Composite estimator with Empirical Best Linear Unbiased Predictor EBLUP as a special case (which also is model dependent).

By construction, each type has its own particular features. For example the generalised regression estimator is constructed to be design unbiased (meaning that the expectation of the estimator coincides with the parameter to be estimated). The model dependent estimators are not usually design-unbiased. An unattractive feature is that the variance (and standard error) of the generalised regression estimator can be very large for a small domain if the effective sample size in the domain is small. The synthetic estimator is usually design biased, and the bias does not approach zero with increasing sample size. The variance of the synthetic estimator is usually smaller than that of the generalised regression estimator. The EBLUP estimator is design consistent (meaning that the expectation of the estimator approaches the parameter with increasing sample size), but EBLUP is design biased for any fixed finite sample size. The variance of the EBLUP estimator ordinarily falls between that of the generalised regression estimator and that of the synthetic estimator. These properties have been examined and reported for example in Lehtonen, Särndal and Veijanen (2003).

The chosen model underlying a given estimator specifies a hypothetical relationship between the study variable and the set of predictor or auxiliary variables, and makes assumptions about its perhaps complex error structure. For every specified model, one generalised regression estimator, one synthetic estimator and one composite estimator can be derived by observing the respective construction principles. An improved model will influence all of the estimators, usually so that the accuracy (measured by the MSE, Mean Squared Error) decreases. In other words, if Model A is better than Model B, the synthetic estimator for Model A is usually better than the synthetic estimator for Model B. The same is usually the case for the generalised regression estimator.

Model choice has two aspects: (i) the mathematical form, or the type, of the model, and (ii) the specification of the parameters and effects in the model. For a given variable of interest, some models are more appropriate than others. Model improvement can result either from a more appropriate model type, or from a better parameterization, or both. For example, linear models are often used for a continuous study variable, and logistic models are used for a binary or polytomous study variable. For example, Lehtonen and Veijanen (1998) introduced the logistic generalised regression estimator and studied it for the estimation of the total number of unemployed for regional domains in the context of the Finnish Labour Force survey.

The second aspect of model choice is the specification of the parameters and effects in the model. Some of these may be defined at the fully aggregated population level, others at the level of the domain (area specific parameters), yet others at some intermediate regional level. Using a **multilevel model** or a **mixed model** type, we can introduce random effects that recognize domain differences, as for example in Goldstein (1995) for the synthetic estimator and by Lehtonen, Särndal and Veijanen (2003) for the generalised regression estimator. Generally, model improvement occurs when more parameters or effects are added to the model, as for example when it is formulated to include area specific effects reflecting local variation. However, fixed-effects models have been more common in model-assisted generalised regression estimators whereas, mixed models have most often been used in model-dependent estimators such as the EBLUP estimator.

EXAMPLE

The target is to estimate the ILO unemployment (UE) rate for a number of regional areas or domains. For large domains (where the number of sampled units is large), the standard statistical techniques usually apply. These include the design-based Horvitz-Thompson estimator and the standard design-based model-assisted generalised regression estimator with a fixed-effects linear model as the assisting model, fitted separately for each large regional area. For small domains (where the number of sampled units is small), special small area estimation techniques are required. These include the model-dependent estimators such as the synthetic estimator that relies on a linear mixed model, and the EBLUP estimator.

Technical description of the estimation problem:

Indicator: ILO unemployment rate
Concepts: ILO unemployed
ILO employed
Definitions: "A person who…" (see ILO definitions)
Data set: Labour Force Survey (LFS), pooled annual data at unit level
Variables:

First study variable y_1:

Being ILO unemployed (0: No, 1: Yes)

Second study variable y_2:

Being ILO employed (0: No, 1: Yes)

Population parameters:

Population totals T_{1d} (the total number of unemployed) and T_{2d} (the total number of employed) for the regional areas d of interest, $d = 1,\ldots,D$.
Population unemployment rates:
$R_d = T_{1d} / (T_{1d} + T_{2d})$.

(a) Direct methods

Direct methods can be used for sufficiently large domains where the standard errors of estimated domain totals do not become too large, or coefficients of variation of estimates remain reasonably small (less than 25%, say).

An example of direct methods is the Horvitz-Thompson (HT) estimator of totals for the regional areas $d = 1,\ldots,D$. These estimators use data on the study variable from domain d only:

The number of ILO unemployed is estimated by calculating the weighted sum over the sample elements k in domain d of the first study variable y_1:

$$\hat{t}_{1d} = \sum_{k \in s_d} y_{1k} / \pi_k \ .$$

The number of ILO employed is computed similarly, but now for the second study variable y_2

$$\hat{t}_{2d} = \sum_{k \in s_d} y_{2k} / \pi_k \ ,$$

where π_k denotes the sample inclusion probability for population element k.

The indicator to be calculated is the ILO unemployment rate in spatial unit d:

$$\hat{R}_d = \frac{\hat{t}_{1d}}{\hat{t}_{1d} + \hat{t}_{2d}}$$

Note that the estimator for the ILO unemployment rate is of nonlinear type and thus requires approximation techniques for variance estimation (such as Taylor linearization, jack-knife or bootstrap). Variance and standard error estimation are omitted here and it is suggested that readers consult Särndal et al. (1992), Lehtonen and Pahkinen (2004, Chapters 3, 5 and 6) or Wolter (1985).

In situations where strong auxiliary data are available, more effective direct methods can be used in the estimation of the two totals, such as a ratio estimator, a regression estimator or a post-stratified estimator (Table 35).

Some features of the traditional direct methods are summarized in Table 13 below (see Rao 2003, Chapter 2; Lehtonen and Pahkinen 2004, Chapters 3 and 6).

Table 13: Traditional Direct Estimators

Estimator of a total	Use of models	Use of auxiliary data
Horvitz-Thompson (HT) estimator	No	No
Post-stratified estimator	Yes*	Yes**
Ratio estimation	Yes*	Yes**
Regression estimation	Yes*	Yes**

* Modelling separately for each area
** Use of auxiliary data from the given area only

(b) Indirect methods in the case of small domains

In the estimation of a statistic for a given domain (such as the total numbers of unemployed and employed, or unemployment rate, for the spatial units), the indirect methods also use data on the study variables from other domains. This is the case of "borrowing strength" by using auxiliary data and a statistical model. An example is a unit-level EBLUP estimator that uses micro-level data, or an area-level Fay-Herriot estimator, also of EBLUP type, that uses data at the aggregate level (see for example Rao 2003, Chapter 7). The concept of "unit-level data" refers to the case where the data are available at the element (or unit of observation) level, such as at person level in an interview survey or population register, or at business firm level in a business survey or business register. The concept of "area-level data" refers to the case where the data are available at an aggregate level, such as at Sub-City District level, Core City level or NUTS3 level. These data are often obtained from official surveys and Censuses.

Some features of the traditional indirect methods are summarized in Table 14.

Model-dependent methods have been selected as an example (see Rao 2003 Chapter 3).

Table 14: Traditional Indirect Estimators

Estimator of a total	Use of models	Use of auxiliary data
Demographic methods SAT - Symptomatic Accounting Techniques	Yes/No	Yes
- Vital Rates method	No*	Yes
- Components method	No*	Yes
- Regression symptomatic estimation	Yes**	Yes
Classical synthetic estimator	Yes***	Yes
Composite estimators	Yes***	Yes
James-Stein estimator	Yes***	Yes
SPREE - Structure Preserving Estimation	Yes****	Yes

* No explicit modelling. Simple calculation by using past data/ data from other areas
** Explicit modelling and use of past data/data from other areas
*** Use of models and data from larger area
**** Explicit modelling and use of past data/data from other areas. Raking Ratio method

(c) Recent methods for domain and small area estimation

In the recent methods for small area estimation, key features are the use of (complex) statistical models (such as models in the family of generalised linear mixed models), the incorporation of efficient auxiliary data into the estimation procedure and borrowing strength (if possible) in two dimensions: In temporal dimension and in spatial dimension. Use of unit-level data and unit-level models are encouraged whenever possible. Recent design-based model-assisted methods are described in Lehtonen, Särndal and Veijanen (2003) and in Lehtonen and Pahkinen (2004, Chapter 6). The model-dependent methodology is described in Rao (2003; Chapters 5-10). Borrowing strength in time and space dimensions is discussed in the context of the EURAREA RTD project.

As a technical illustration, the construction of a generalised regression (GREG) estimator, a synthetic (SYN) estimator and a composite (EBLUP) estimator for the estimation of domain totals are discussed briefly. For illustration, a disaggregated approach where the data are available at micro or unit level is used here. The estimators of domain totals are constructed in the following three phases:

(a) The parameters of the designated model are estimated, using the sample data set.
(b) Using the estimates of the model parameters and the auxiliary information, the fitted values are computed for all population elements, including elements belonging to the sample and also elements that are not sampled.
(c) For obtaining an estimate of the total in a domain, the fitted values and the sample observations are incorporated into the respective formula for the generalised regression estimator, the synthetic estimator and the composite estimator.

As a technical example, an illustrate is given below of the domain estimation procedure in the context of linear models. Consider a *fixed-effects linear model* specification, such that for the study variable value for element *k*, a model $y_k = \mathbf{z}_k'\boldsymbol{\beta} + \varepsilon_k$ can be written, where $\boldsymbol{\beta}$ is an unknown parameter vector requiring estimation, $\mathbf{z}_k$ are vectors of known values of the auxiliary z-variables, and ε_k are the residual terms. The model fit yields the estimate (i.e. a numerical value) $\hat{\boldsymbol{\beta}}$. The supply of fitted values given by $\hat{y}_k = \mathbf{z}_k'\hat{\boldsymbol{\beta}}$ is computed for all elements of the population. Similarly, for a *linear mixed model* involving domain-specific random effects in addition to the fixed effects, the model specification is given by $y_k = \mathbf{z}_k'(\boldsymbol{\beta} + \mathbf{u}_d) + \varepsilon_k$, where $\mathbf{u}_d$ is a vector of *random effects* defined at the domain level. Using the estimated parameters, fitted values given by $\hat{y}_k = \mathbf{z}_k'(\hat{\boldsymbol{\beta}} + \hat{\mathbf{u}}_d)$ are computed for all elements in the population. In more general terms, models used in the construction of generalised regression estimators and synthetic estimators of domain totals are special cases of *generalised linear mixed models,* such as a linear mixed model and a logistic fixed-effects model (see for example McCulloch and Searle 2001)

The values of the study variable fitted by the model differ from one model specification to another. For a given model specification, an estimator of domain total $T_d = \sum_{k \in U_d} y_k$ has the following structure for the three estimator types:

Synthetic estimator (SYN): $\hat{t}_{dSYN} = \sum_{k \in U_d} \hat{y}_k$

Generalised regression estimator (GREG):

$$\hat{t}_{dGREG} = \sum_{k \in U_d} \hat{y}_k + \sum_{k \in s_d} w_k (y_k - \hat{y}_k)$$

Composite estimator (EBLUP):

$$\hat{t}_{dCOMP} = \sum_{k \in U_d} \hat{y}_k + \hat{\gamma}_d \sum_{k \in s_d} w_k (y_k - \hat{y}_k)$$

where $w_k = 1/\pi_k$, $s_d = s \cap U_d$ is the part of the full sample s that falls in domain U_d, and $d = 1,\ldots,D$. Note that the synthetic estimator $\hat{t}_{dSYN}$ uses the fitted values given by the estimated model, and thus relies on "truth" of the model and, therefore, can be biased if the model is badly misspecified. On the other hand, the generalised regression estimator $\hat{t}_{dGREG}$ has a second term that aims to protect against possible model misspecification (bias adjustment term). Note also that in the case where there are no sample elements in a domain then the generalised regression estimator reduces to the synthetic estimator for that domain. The model used in the estimation of the predicted *y*-values can be complex; for example, a model from the family of generalised linear mixed models such as a linear mixed model or multilevel model, or a nonlinear mixed model. In addition, the models can incorporate temporal data and/or spatial data by using appropriate parameterization.

In addition to the synthetic and generalised regression estimators, a *composite estimator* can be constructed, which is a weighted combination of the synthetic and generalised regression estimators (see for example Lehtonen, Särndal and Veijanen 2003). The domain-specific weight $\hat{\gamma}_d$ in the composite estimator $\hat{t}_{dCOMP}$ is appropriately constructed to meet certain optimality properties (the EBLUP estimator is a special case). The weight $\hat{\gamma}_d$ approaches unity for increasingly large domain sample sizes, so that the composite estimator $\hat{t}_{dCOMP}$ approaches the generalised regression estimator. At the other extreme, when the weight $\hat{\gamma}_d$ is near zero, $\hat{t}_{dCOMP}$

is close to the synthetic estimator corresponding to a proper small area estimation case.

A Horvitz-Thompson (HT) estimator

$$\hat{t}_{dHT} = \sum_{k \in s_d} w_k y_k$$

is often calculated as a reference when assessing the benefits of the more complex estimators. The Horvitz-Thompson estimator does not use auxiliary information. With strong auxiliary data, it is expected that the generalised regression estimator and the synthetic estimator behave better than the Horvitz-Thompson estimator, because estimates for the domains will be obtained that are more accurate than the Horvitz-Thompson estimate.

EXAMPLE

Recent developments in small area estimation methodology.

An example of current practical developments for the estimation for domains and small areas in the European context is provided by the **EURAREA Project - Enhancing Small Area Estimation Techniques to Meet European Needs.** EURAREA is a three-year project, funded by the European Community, which is being undertaken by a consortium of 6 European National Statistical Institutes and 5 universities, covering 7 European countries. The partners of the EURAREA project are the ONS, University of Southampton, Statistics Finland, University of Jyväskylä, SCB, ISTAT, University of Roma 3, Statistics Norway, INE, UMH, and University of Poznan. See EURAREA details at: www.statistics.gov.uk/methods_quality/eurarea/. The overall aim of the project is to improve small area estimation methods currently used within European National Statistical Offices. The project began in January 2001.

The objectives of the EURAREA project are:

(1) The first part of the project consists of assessing the effectiveness of 'standard' small area estimation techniques. 'Standard' techniques refer to the techniques of domain estimation (synthetic estimators, generalised regression estimators and composite estimators). In this part of the project the focus is put on up-to-date, but relatively straightforward, linear and logistic versions of these estimators. The project will be assessing their effectiveness in estimating European data, taking into account the survey designs used to collect the data.

(2) In the theoretically innovative part of the project, the aim is to enhance the 'standard' techniques in four major ways which reflect the requirements, and strengths, of European statistical systems. The four major themes for the innovative research are:

(a) Borrowing strength over time - using time series data.

(b) Borrowing strength over space (i.e. taking account of spatial correlation and allowing for the modifiable area unit problem).

(c) Investigating the effect of complex sample designs and developing sample design criteria that are optimal for small area estimation.

(d) Providing improved estimates of cross-classifications (using a modified version of the SPREE approach).

To ensure that the results of the project can be implemented by third parties, the project will be producing fully documented and tested pieces of program code written in SAS language to accompany the theory and results. In addition, a project reference volume will be produced at the end of the project containing all the outcomes from this project.

Summary of estimation methods for domains and small areas

The current model-dependent methods for small area estimation include:

- Generalised linear mixed models
- Composite estimators
  - Empirical Best Linear Predictor, EBLUP and "Pseudo" EBLUP incorporating sampling weights
- Methods of spatial econometrics
- Methods of disease mapping
- Space-Time modelling methods
- Bayesian techniques
  - Empirical Bayes (EB) procedures and Hierarchical Bayes procedures (HB)
  - Markov Chain Monte Carlo MCMC techniques.

The current design-based model-assisted methods for estimation for domains and small areas include:

- Extended family of generalised regression (GREG) estimators
  - Multilevel-model assisted GREG estimators
  - Multinomial logistic GREG estimators.

Computational tools for design-based techniques include for example:

SAS procedures and macros:

- PROC SURVEYMEANS – HT estimation for domains
- PROC SURVEYREG – Direct GREG with linear models
- Macro CLAN – Direct GREG estimation with linear models, and calibration
- Other programs developed within NSOs

Other software products: Sudaan, Stata, S+ and R programs.

Computational tools for model-dependent techniques include for example:

SAS procedures:

- PROC MIXED – Linear mixed models, EBLUP and "Pseudo" EBLUP type estimators
- PROC NLMIXED – Generalised linear mixed models

MLwiN, HLM – Multilevel modelling

WinBUGS – Bayesian techniques, MCMC

Other software products: Stata, S+ and R programs.

SAS macro library developed within the context of the EURAREA project (for both model-dependent and design-based methods)

4.4 Selected National Case Studies

Small-area estimation by spatial econometric models (selected case study of Spain)

(Contribution by Coro Chasco Yrigoyen and Ana López García, University of Madrid and L. R. Klein Institute)

This case study illustrates the use of model-dependent techniques of spatial econometrics for small area estimation in a situation where aggregated data are available at different regional levels.

ESTIMATION OF DISPOSABLE PERSONAL INCOME OF THE 18 SPANISH CENTRAL-CITIES

In this short overview, the main lines of the Lawrence R. Klein Institute methodology to estimate the personal disposable income for Spanish municipalities is presented. Personal disposable income estimation can be carried out by both direct and indirect methodologies (see above). The former method requires a considerable information database, which is generally difficult to establish and not always precise. The direct methodology is also unable to reflect the underground economy of Spanish municipalities, which is why the use of indirect proceedings has also been required to find out the statistical relationship between personal disposable income and a group of socio-economic indicators for all the geographic units considered, i.e. Spanish municipalities and provinces.

There is a basic problem of ecological inference or spatial econometrics prediction – extrapolation - which consists of predicting municipal data through an ecological model estimated for the provincial level, with the following scheme:

(1) **Exploratory spatial data analysis** for the ecological and disaggregated level to find good explicative indicators of disposable income in both geographic scales, as well as to detect spatial autocorrelation or spatial regimes.

(2) **Confirmatory spatial analysis** to select the best spatial econometric model, usually a single-equation regression or, if possible, a space-time model, with the following structure:

- Use of the provincial income data, provided by INE for the 1995-2000 period, as an **endogenous variable** in the model.
- Selection of those **exogenous variables** best related with the disposable income, not only at the ecological-provincial level, but also at the disaggregated municipal level.

(3) **Spatial extrapolation** of municipal disposable income.

This type of estimation is part of the ecological inference problem and, for that reason, it is always a risky task that requires a great amount of information and encourages, therefore, caution to be observed. Nevertheless, indirect methods are essential, despite some possible inaccuracies, because the resulting estimations enable comparisons to be made between municipalities from different regions.

These estimations pretend to overcome some deficiencies of indirect methods – certain biased income values from middle-sized localities with (or without) a special generating economic activity, respectively. Therefore, instead of being a generating income indicator –production- this kind of disposable income data are closer to the estimation of the municipal average family income.

It should also be noted that the INE regional accounts data used by the Klein Institute conditions in a greater extent the obtained results. In effect, our income estimations differ from others made with other statistical fonts.

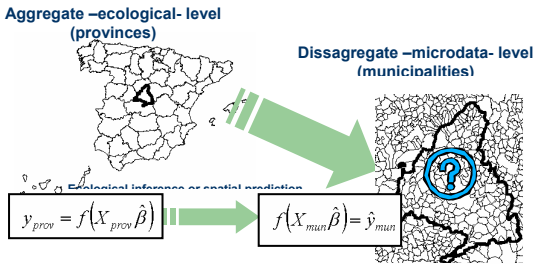
TECHNICAL DESCRIPTION OF THE SPATIAL PREDICTION PROCEDURE

The success of the spatial prediction procedure depends heavily on the availability of statistical data. In our case, we use the Official data of INE, the National Statistical Office of Spain:

- INE supplies the provincial income data in the Regional Accounts, for the period of 1995-2000
- INE supplies the socio-economic indicators.

The process of spatial prediction is illustrated in the graph below.

Figure 3: The Spatial Prediction Process



The phases of the spatial extrapolation process are as follows:

- The basis: theoretical principles
- Selection and manipulation of explicative data
- Exploratory spatial data analysis
- Econometric estimation of the ecological model
- Spatial extrapolation of small-area data
- Analysis and validation

In this case we are interested in income statistics. Explicative variables of household income in small areas are as follows:

(1) Educational qualifications

(2) Professional category

(3) Economic activity

(4) Employment

(5) Location factors

(6) Historical factors

(7) Sex and age

(8) Public sector investment

The variable of household disposable income is defined as follows:

Household income = wages + non-wages earnings - taxes - social security contributions

The following variables and indicators are used as the household income explanatory variables when building the spatial models:

(1) Consumption/saving indicators

(2) Employment
- Unemployment rates
- Occupation rates
- Activity rates
- Professional category

(3) Economic activity
- Retailing outlets
- Tourism outlets
- Industry outlets

(4) Others
- Educational qualifications
- Distance to service centres
- Telephone lines
- Cars
- Total electricity use
- Bank offices
- Average price for a house/m^2

In the exploratory spatial data analysis, the interest is in examining and interpreting the spatial autocorrelations and spatial heterogeneity (spatial regimes). In the confirmatory phase, the estimation and the testing of spatial effects in the fitted spatial regression models is conducted. Finally, the selected model is used for the spatial extrapolation of the required statistics for the spatial units desired (such as the municipalities).

Use of register-based Census data for small area statistics (selected case study of Finland)

(Contribution by Riitta Koskinen, Statistics Finland)

Introduction

In this case study, techniques are introduced to illustrate the production of regional statistics (including the Urban Audit spatial units) on the basis of the Register-based Population Census of Finland. The case study thus provides an example of the use of Census data based on indirect data collection (Option 2b in Table 34). As an example, figures on employment and unemployment calculated from the Labour Force Survey and Register-based Employment Statistics database are compared. The reasons for preferring the Register-based Employment Statistics in connection with the Census in the production of regional figures relating to Finnish towns and other small areas will be explained.

In Finland, employment and unemployment statistics are compiled from different data sources. Relying on ILO standards, the Labour Force Survey is the most relevant data source for international comparisons between countries. The LFS figures are produced by the Labour Force Survey on a monthly and quarterly basis from which an annual average is calculated. The data are mainly collected using the CAPI method.

The Employment Statistics register is based on administrative registers and has been compiled annually since 1987. Statistics on employment and unemployment that refer to the situation at the end of each year are compiled for the whole of the working-age population. It is obvious that by using these Census data, statistics on employment and unemployment for small spatial units (for example mu-

nicipalities and even sub-regions of them) are more reliable when compared to a sample survey. Thus, Sub-City Districts can also be covered reliably, in addition to the Core Cities and Larger Urban Zones.

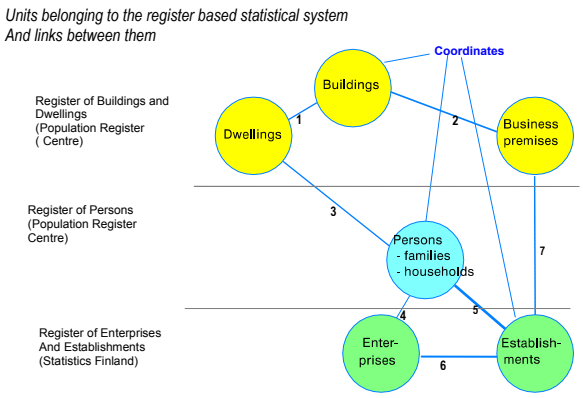
Small area statistics based on administrative records and registers

Since 1987, all Census data have been produced annually based on combining data extracted from different administrative registers. Each year, Statistics Finland produces demographic and employment statistics, building, dwelling, household and family statistics and statistics on housing conditions. The most important of these registers are the Central Population Register, the Register of Buildings and Dwellings, and the Register of Enterprises and Establishments. Additional registers used include registers of work pensions, taxation, the unemployed, pensioners, and students.

An important feature is that statistical units, such as persons, buildings, dwelling establishments, from the different register databases are linked together as a combined database by using unique identification codes. This is illustrated in Figure 4.

All dwellings and premises (Links 1 and 2) are linked to a building via a Building Code maintained by the Central Population Register. The Building Code provides the coordinates for the respective unit. Persons (3) and dwellings (buildings and map coordinates) are linked via Domicile Codes.

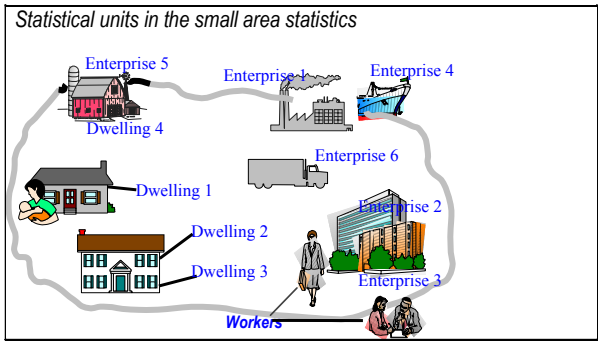
Figure 4: Linking units of register-based statistics



Working persons are annually "linked" (Links 4 and 5) with employment organisations and their establishments.

We are able to link the data about the exact location of an individual's residence and workplace, which enables us to run statistics on whether or not people work within the same city in which they live. This is illustrated in Figure 5.

Figure 5: Statistical Units in Small Area Statistics



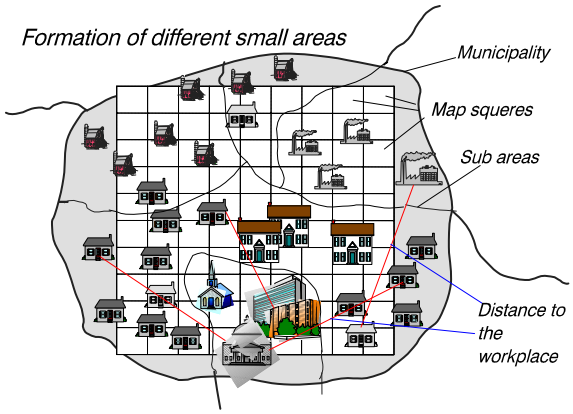
Essentially, there are three ways to produce small area statistics on the basis of the Register-based Employment Statistics database (see Figure 6):

The first way is based on ***Administrative areas***, that is, municipalities, provinces etc. The Dwelling Numbers are used to link the statistical units to the correct municipality, and by combining several municipalities, to higher level areas.

The second one is based on the ***Sub-areas defined by the municipalities***. Here persons, workplaces, buildings, dwellings, etc. are linked to them using the map coordinate data.

The third way is a ***Map square procedure***: The map can be analysed by choosing the preferred grid square from 1 km by 1 km or even smaller (0.5 km x 0.5 km, or 0.25 km x 0.25 km) and selecting the number of squares to be analysed.

Figure 6: Compilation of different Small Areas



Comparison of Labour Force Survey and Register-based Employment Statistics

In the Labour Force Survey of Finland, all concepts and definitions correspond to the recommendations of the International Labour Organisation (ILO) of the United Nations, which are also applied in the European Union's official employment statistics. In the Register-based Employment Statistics, data on employment and unemployment are derived by using all the available relevant information on a person's status in the labour market. The data are produced yearly and their reference period is the last week of the year. Importantly, all employers in Finland must take out pension insurance for their employees, which provides information which is used, together

with other relevant registers covering the entire population of Finland, by the Employment Register.

In the following graphs and tables, the Labour Force Survey figures are compared with those calculated from the Register-based Employment Statistics database. Figure 7 shows that the number of employed has been slightly higher in the Labour Force Survey than in the Employment Statistics register. This is due to a slight definitional difference in the concepts used in the data sources. The Labour Force Survey defines as employed all those who have been in some paid employment or worked in a family business. Even if no payment is received from the work in a family business, the person is still classified as employed in the Labour Force Survey.

In the Employment Statistics register it is concluded that a person is employed if he or she has a valid, insured employment relationship. The Employment Statistics contain information only on official work, that is, work from which pension accumulates and income taxes are paid. The person is thus defined as employed if he or she has an employment relationship.

Figure 7: Employment according to the Labour Force Survey and Register-based Employment Statistics 1989-2001

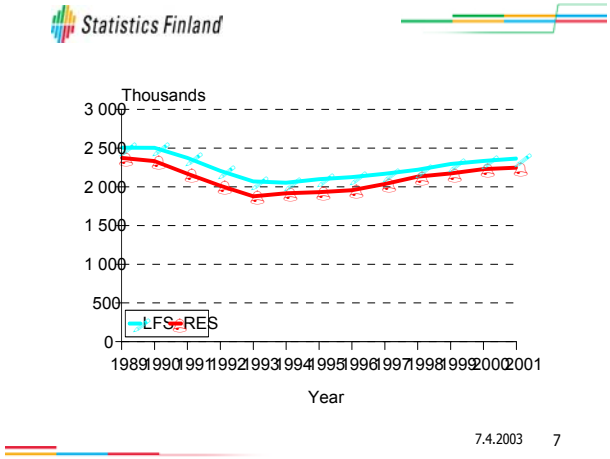
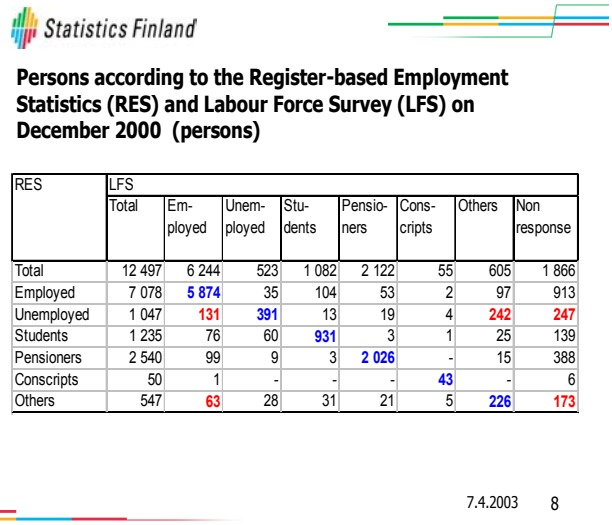


Table 15 shows a cross-tabulation of the Labour Force Survey data and the Register-based Employment Statistics data. The table was obtained by finding the main type of activity for the persons of the Labour Force Survey sample in December 2000 from the Employment Statistics database. (The proportion of persons interviewed was 0.3 per cent of those aged 15 to 74, i.e. 12 497 from a total of 3 904 373).

Table 15: Comparison of Labour Force Survey and Register-based Employment Statistics data

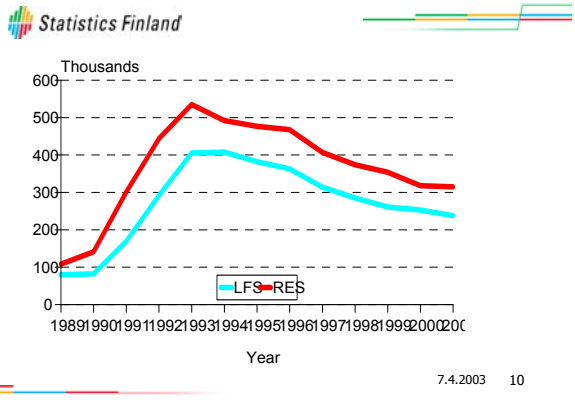


RES	LFS							
	Total	Em-ployed	Unem-ployed	Stu-dents	Pensio-ners	Cons-cripts	Others	Non response
Total	12 497	6 244	523	1 082	2 122	55	605	1 866
Employed	7 078	**5 874**	35	104	53	2	97	913
Unemployed	1 047	131	**391**	13	19	4	242	247
Students	1 235	76	60	**931**	3	1	25	139
Pensioners	2 540	99	9	3	**2 026**	-	15	388
Conscripts	50	1	-	-	-	**43**	-	6
Others	547	63	28	31	21	5	**226**	173

The persons in the diagonal cells of the table have the same activity in both statistics, or are employed in both, amounting to 5 874 persons within the sample. Of the respondents in the Labour Force Survey, 6 244 or 50 per cent of the sample were classified as employed. The non-response rate, or those from whom no interview was obtained, was 15 per cent.

Figure 8 shows the number of unemployed persons in the Labour Force Survey database and in the Register-based Employment Statistics database. In the statistics based on the register, the number of unemployed is somewhat higher. This is because of a slight definitional difference (active job search is required for an unemployed person in the Labour Force Survey), but in general, the difference is not large.

Figure 8: Unemployed according to the Labour Force Survey and Register-based Employment Statistics 1989-2001



The difference between the employment statistics and Labour Force Survey statistics is somewhat larger in the case of elderly people. This is understandable because the Labour Force Survey expects active job search measures from unemployed persons. The

job search rate of the elderly is often lower than that of young people.

In contrast, youth unemployment may rise and in fact, in the Labour Force Survey it does rise, particularly in the spring. A student fulfilling the criteria of the LFS (such as being willing to receive work) is classified as unemployed.

Conclusion

In Finland, the two data sources, the Labour Force Survey and the Register-based Employment Statistics, give a fairly similar picture on the dynamics of employment and unemployment. The population of towns in Finland is typically fairly small. Only the population of Helsinki exceeds half a million. As the Labour Force Survey sample size for the whole country is about 0.3 per cent of the persons aged 15 to 74, town-specific estimates tend to be very inaccurate.

The Register-based Employment Statistics provides a better data source for the production of small-area statistics on employment and unemployment for cities and their sub-areas, because the data come from a Census and the indicators can be obtained without any sampling error. In addition, all units singled out in the Census and the data describing those units can be tied down to a system of map coordinates. With this system it is possible to generate printouts for marked-out areas, for population centres and for map grids as well as various calculations of distances between units.

Use of Census data and sample survey data for a pragmatic solution to a small area estimation problem (case study of Austria)

This case study illustrates the application of pragmatic estimation in the case where both sample survey data and Census data are available (Options 1a and 1b of Table 34). The following data sources for Graz are available:

- data at NUTS 3 level from Micro Census with the LFS definitions (average 2001)
- data at NUTS 3 level from Census with the national definition of unemployment (employment could be compared with the LFS definition) (2001)
- data at City-level from Census with the national definition of unemployment (employment could be compared with the LFS definition) (2001)

Problem description: There are more employed women (age 55-64) in Graz at the City-level than in Graz at the NUTS 3 level. Despite comparable employment definitions, the data do not fit. The National Urban Audit Coordinator relies on the Census more than on the Micro Census. However, in Vienna, the National Urban Audit Coordinator took the employed and the unemployed figures from the Micro Census. If the National Urban Audit Coordinator would take the employed in Graz from the Census and estimate the unemployed, these two cities could not be compared. Thus, there is a need for estimation of the unemployed in Graz.

In the estimation of the ILO unemployment figures for the spatial units of interest, a problem is that distributions in the Micro Census have not been calibrated against the corresponding Census distributions. Usually, this is resolved by applying certain calibration methods under selected model assumptions for the available unit-level data (Micro Census 2001 in the case of Austria). Calibration would be carried out against selected marginal distributions from an auxiliary data source (Census 2001 in the case of Austria); examples of marginal frequency distributions are the distribution of economically active people by sex and age group in a given regional area. Standard statistical software would then be used, such as the SAS macro CLAN. Model assumptions would consider assumptions on the relationship of ratios of rates based on ILO concepts and the corresponding national concepts, in different population subgroups.

In the case of Austria, only aggregate data are available. This causes a restriction because, for example, appropriate standard errors of estimates cannot be properly calculated. However, a pragmatic solution is proposed to fix the problem. In the method, calibration and a simple model assumption will be used.

Technical summary of the estimation problem:

Data sources:

- Graz/NUTS 3/ILO/Micro Census
- Graz/NUTS 3/National/Census
- Graz/City/National/Census.

Variables: Sex-age group breakdown for the number of employed/unemployed/economically active people in the 15-64 years old population.

The following two simple calculation tasks would be useful:

(1) Calibration of Micro Census data for the number of employed and unemployed by using Census data.

A reasonable assumption might be that, the figures for the economically active population (the number of employed plus the number of unemployed) in the Census data are close to the "truth", both for Graz-NUTS3 and Graz-City. So, these figures are used to calibrate the Micro Census figures of the number of economically active people with the following breakdown into population subgroups:

(a) 15-64 years old economically active males

(b) 15-64 years old economically active females

(c) 15-24 years old economically active males

(d) 15-24 years old economically active females

(e) 55-64 years old economically active males

(f) 55-64 years old economically active females.

For example, the ratio of the corresponding figures in the Micro Census data and in the Census data for the first subgroup must be calculated. Then, this ratio is applied for the Micro Census figures to obtain updated figures for the number of ILO employed and the number of ILO unemployed. This procedure, of course, reproduces the same number of economically active people for Micro Census data as in the Census data, in each population subgroup 1-6. When completing this task, more reliable figures for the number of employed and the number of unemployed will be obtained. The corresponding ILO unemployment rates will of course remain the same as the original ones.

(2) Approximating ILO employment and unemployment figures for Graz City

The problem is that in the Micro Census, there are only a small number of sample elements in certain subgroups of the population. Therefore, direct estimation of the ILO employment and unemployment would be too unreliable for such subgroups. Thus, figures based on the Census could be used instead, but the problem is that in the Census, the national concepts are used. To resolve this problem, a model assumption might be useful. Let us assume that the ratio of the ILO unemployment rate (UE-ILO) and the national unemployment rate (UE-National) is the same in Graz City as it is at Graz-NUTS 3 level. Now, data are available for the following unemployment rates, for each subgroup in (1):

UE-National-Graz-NUTS 3

UE-ILO-Graz-NUTS 3

UE-National-Graz-City

and what is needed is the rate UE-ILO-Graz-City. Under the stated model assumption on the equality of the ratios, this rate can be easily calculated and used as an adjustment factor in calculating updated figures for the number of unemployed in Graz-City (and the number of employed, because we assume that the Census figures for the number of economically active people is reliable for Graz-City). Because of the limited sample size in Graz-NUTS 3 in the Micro Census, a single adjustment factor calculated for the whole 15-64 years old population could be used for all the subgroups in question in the Graz-City data.

By completing the tasks (1) and (2), ILO based approximate figures can be obtained for Graz-NUTS 3 and GRAZ-City that are comparable with the figures from other cities in Austria.

5 Available information on data sources per country

This chapter describes briefly the main sources of the data compiled by the National Urban Audit Coordinators.

The meta-information is taken from the available reports (at the time of drafting this Handbook – February 2004) on the work carried out by National Urban Audit Coordinators in the framework of the Urban Audit and from the free-text column in the Urban Audit Database at Eurostat.

Austria

The main sources of data in Austria are the "Bund" and the Micro Census.

More information on the data sources was unavailable at the time of reporting (February 2004).

Belgium

The main source of data in Belgium is the INS. Some additional data come from the "Banque National Arrondissements"

Table 16: Sources used in Belgium

- INS
- SPF Santé Publique
- RIZIV
- Police Federale
- ONERVA
- Banque Nationale
- EURONEXT
- Registre National
- KINDENGEZIN
- ONE
- Region Flamande
- Communaute Francaise
- Conseil Des Recteurs
- IRM
- IRCELINE
- Vlaams Milieumaatschappij
- IBGE
- Region Wallonne
- CIBE
- AWW
- TMVW
- AQUASAMBRE
- SWDE
- CILE
- Ville d'Anvers
- IVAGO
- ICDI
- Action Environnement
- IVBO
- Administration Centrale Du Cadastre
- BFE-FPE
- ELECTRABEL
- Association Liegeoise D'electricite
- STIB
- DELIJN Antwerpen
- DELIJN Gent
- DELIJN Ostende
- TEC Charleroi
- TEC Liege
- Service Public Federal Mobilite Et Transport
- Villes (Anvers, Gand, Charleroi, Liege Et Bruges)
- Region de Bruxelles-Capitale
- Conseil Bruxellois des Musees
- Promotion & Valorisation des ESF
- Aeroports : Bruxelles + Anvers+ Charleroi + Liege + Ostende
- SABAM
- La Bellone

Germany

In Germany there are 3 levels of statistical offices: the Federal Statistical Office (Statistisches Bundesamt), the State Statistical Offices (Statistische Landesämter) and the Statistical Bureaus/Offices/Departments of the municipalities / city administrations.

The city network "KOSIS-Verbund" is in charge of data collection for the Urban Audit in Germany, closely co-operating with the federal and state statistical offices. All data on sub-city districts (SCD) originate from the cities, who also provide a considerable proportion of the data for the administrative cities. The data collected contribute to the German Urban Audit of the KOSIS-Verbund to which all participating cities have free access.

Without a national Census, there is a considerable need for estimates. Statisticians at all three levels were contacted to find out the best base data for estimation and the most appropriate methods as regards the different variables. Production of base data for estimates was supported by the Federal Statistical Offices, the State Statistical Office of Bavaria representing the other State Statistical Offices and the cities. Most estimates were made by sub-contracted senior experts.

Table 17:
German data from the Federal Statistical Office

- National population statistics
- Micro Census (as basis for estimates)
- National housing stock statistics
- National statistics on death causes
- National hospital statistics
- Official health statistics
- National statistics on business registrations
- National statistics on bankruptcies
- National statistics on municipal budgets
- National statistics on national, state and municipal personnel
- National statistics on water supply
- National statistics on land use
- National statistics of public transport companies
- National statistics on road accidents
- National statistics on aviation

Table 18: German data from other organisations

- National register of foreigners (as basis for estimates)
- Federal register of employees (as base for estimates) from the Federal Labour Agency
- City statistics from city administrations
- Students register of state statistical offices (Statistische Landesämter) and city statistical bureaus
- National weather service
- Waste management agencies
- Land use information form aerial photo interpretation
- Federal register of motor vehicles
- National museum institute
- National institute of libraries
- Crime statistics of police authorities
- City statistics on elections
- State statistics and city statistics on children's day care
- School statistics of state statistical offices
- Statistics from city and state environment agencies
- Cadastre information on land use
- Statistics from electricity providers
- National association of cinemas
- National association of theatre stages

Denmark

Information on data sources was unavailable at the time of reporting (February 2004).

Greece

Information on data sources was unavailable at the time of reporting (February 2004).

Spain

The sources for data in Spain are listed below.

Table 19: Sources used in Spain

Data from AENA
Data from Airport of Santander
Data from CREM. Culture Department of Murcia
Data from Eustat
Data from FECSA-ENHER Company
Data from Galicia Government Health Department
Data from Gas natural.
Data from Government of Cantabria
Data from Government of Cantabria, Education Department
Data from Government of Catalunya.
Data from Government of Cataluya. Health Department
Data from IAEST
Data from IBE and GESA
Data from IBE and INM
Data from IEA
Data from IECM and INE
Data from IEN
Data from IGE. Directory of Companies
Data from INE
Data from INE Census 2001

Data from INM
Data from INM and IDESCAT
Data from Instituto L.R. Klein
Data from ISTAC
Data from La caixa Yearbook. Telefonica
Data from Ministry of Public Administration.
Data from municipality of Canarias
Data from municipality of Madrid
Data from municipality of Oviedo
Data from municipality of Zaragoza
Data from municipality registers
Data from municipality registers of Santander
Data from municipality registers of Santiago de Compostela
Data from municipality registers of Sevilla
Data from municipality registers of Valencia
Data from municipality registers of Vitoria.
Data from municipality registers. Culture Department of Barcelona
Data from municipality registers. Culture Department Santiago de Compostela
Data from municipality registers. Department of Environment of Santiago de Compostela
Data from municipality registers. Health Department of Santiago de Compostela
Data from Newspaper El País, I Radiografia de las WEBS Municipales
Data from SADEI
Data from Spanish Public Works Ministry
Data from Statistical Yearbook of Spain. INE
Data from Telefonica Company
Data from Unión Fenosa
MCA
Medical association of A Coruña

Finland

Statistics Finland and the City of Helsinki "Urban Facts" department collaborated closely in this exercise. Statistics Finland has provided data on the population, housing, labour market and economy. The City of Helsinki Urban Facts was then responsible for checking, quality controlling and making amendments where needed to the data on these characteristics. The City of Helsinki Urban Facts was also in charge of data collection in the fields of land use, waste management, travel, local e-government, energy, culture and climate and air quality and particularly the various data at the sub-city level. Data was compiled under joint responsibility for the variables on users and informatics infrastructure, local administration and education.

Statistics Finland compiles annual data on urban areas in the framework of the Census. Since 1987, all Census data have been produced annually based on data in administrative registers. Each year, Statistics Finland produces demographic and employment statistics, building, dwelling, household and family statistics and statistics on housing conditions. The most important of these registers are the Central Population Register, the Register of Buildings and Dwellings and the Register of Enterprises and Establishments. Additional registers used include registers of work pensions, taxation, the unemployed, pensioners and students.

In the case of Finland, there are some special conditions and assets to be reported. A **Finnish Urban Indicators System** was established as part of the national urban policy actions in the late 1990´s. Statistics Finland has been responsible for the maintenance of the Urban Indicators System. The service was opened in 2000 and it contains data in 50 tables on 13 different subject areas. The time series start in 1987. The various data suppliers are Statistics Finland, the Housing Fund of Finland, the Ministry of Education, STAKES (National Research and Development Centre for Welfare and Health), the Ministry of Labour, and the University of Jyväskylä. This system provides many of the UA2 variables that are requested. (See: www.stat.fi). The comprehensiveness of Finland's social security system means that each permanent resident is entitled to certain allowances paid by the State. **STAKES**, a **research institute specialising in social and health issue**s, operating under the Ministry of Social Welfare and Health, supplied data for the Urban Audit on day care and hospital beds, for example. **NORDSTAT** is a network of the capitals and the 2 - 3 largest cities of each of the five Nordic countries. It compiles and provides comparative urban statistics about the Nordic major cities and their FURs (see: http://helm03.novogroup.com/nordstat/). For Helsinki, statistics on sub-city level are annually updated and released on the Internet in three languages, Finnish, Swedish and English (see: www.hel.fi/tietokeskus).

Other helpful and supportive city networks to mention are the **Eurocities**, the network of major European cities (www.eurocities.org), the International Statistical Institute (**ISI**) and its section on developing official statistics, i.e. the International Association of Official Statistics (IAOS) and the Standing Committee on Regional and Urban Statistics and Research (SCORUS) (www.cbs.nl/isi), the United Nations, UNCHS and Global Urban Observatory (see: www.unchs.org).

Table 20: Statistics available at Statistics Finland

- Annual Census data based on administrative registers
- Central population register
- Register of buildings and dwellings

- Register of enterprises and establishments
- Registers of work pension, taxation, the unemployed, pensioners and students
- Urban and regional indicator service
- Labour Force Survey

Table 21: Finnish data from other organisations

- National Research and Development Centre for Welfare and Health (STAKES).
- City of Helsinki "Urban Facts" department
- NORDSTAT

France

Most data come from INSEE. More information on data sources was unavailable at the time of reporting (February 2004).

Italy

Most of the Italian data come from Censuses, surveys and data elaboration projects carried out within the framework of the National Statistical Programme. The National Statistical System (Sistan) assures the uniformity of direction, the homogeneity of methods and the rationalization of the processes of official statistics production through an organizational and functional coordination plan, involving the entire public administration at central, regional and local levels. The task of coordinating the Sistan is statutorily held by ISTAT, the Italian National Statistical Institute. Besides ISTAT, other bodies belong to the National Statistical System, namely the statistical offices of: ministries, national agencies, regions and autonomous provinces, provinces, municipalities, chambers of commerce, local governmental offices, some private agencies and private subjects who have specific characteristics determined by law. Further information can be obtained from the following web sites www.sistan.it, www.istat.it.

Here a list of the main sources of the Italian data.

Table 22: Sources used in Italy

Istat - "13° Censimento generale della Popolazione e delle Abitazioni" 20 ottobre 1991
Istat - "Popolazione e movimento anagrafico dei comuni" Anno 2000 - Collana Annuari
Istat - "Popolazione per sesso, età e stato civile nelle province e nei grandi comuni" Anno 2001 - Collana Informazioni
Istat - "Tavole di mortalità della popolazione italiana per provincia e regione di residenza" Anno 1998 - Collana Informazioni
Istat - "Decessi: caratteristiche demografiche e sociali" Anno 1999 - Collana Annuari
Istat - "Struttura ed attività degli Istituti di cura" Anno 2000 - Collana Informazione
Agenzie del territorio (Uffici provinciali del catasto)
Istat - "Statistica degli incidenti stradali" Anno 2001 - Collana Informazioni
Istat - "Statistiche del turismo" Anno 2001 - Collana Informazioni
Istat - "Statistiche del trasporto aereo" Anno 2001 - Collana Informazioni
Istat - "Finanza locale: entrate e spese dei bilanci consuntivi" Anno 2000 - Collana Annuari
Istat - "Forze di Lavoro-Media 2002" Anno 2003 - Collana Annuari
Istat - "Statistiche delle scuole secondarie superiori Anno Scolastico 1998/99" Anno 2002 - Collana Annuari
Istat - "Statistiche della scuola materna ed elementare Anno Scolastico 1996/97" Anno 2000 - Collana Annuari
Istat - "Statistiche della scuola media inferiore Anno Scolastico 1997/98"
Anno 2001 - Collana Annuari
Istat - ASIA (Archivio Statistico Imprese Attive)
Istat -"L'ambiente nelle città" Anno 2002 - Indicatori Statistici
Aci, Automobile Club - "Studi e ricerche: autoritratto 2001"
Siae - "Il Quaderno dello Spettacolo in Italia" - Statistiche 2000-2001
Ministero dell'Interno - Direzione Generale dei Servizi Elettorali

Data collected directly from "Statistical offices" of Municipalities and from other Sistan offices are not mentioned above.

Ireland

Sources for the data are listed below.

Table 23: Sources used in Ireland

Estimates based on garda regional data proportioned using Census population data
Estimates based on HBS data, NUTS III region value

More information on data sources was unavailable at the time of reporting (February 2004).

Luxembourg

Sources for the data in Luxembourg are listed below.

Table 24: Statistics used in Luxembourg

Etude John Long Lasalle basée sur un code de mesurage
G.D. of Luxembourg
Source : carte sanitaire 2000 (data annuels disponibles depuis 1998) ne concerne que les patients hospitalisés dans les 1
Various sources: FLCM

More information on the data sources was unavailable at the time of reporting (February 2004).

The Netherlands

Sources for the data are listed below.

Table 25: Statistics available at the CBS

- Register of dwellings
- Housing demand survey
- Business Register
- Specific tax register for persons with entrepreneurial income
- Digital Land Use Map of Statistics Netherlands
- Municipal population register
- Labour Force Survey
- Survey on employment and earnings
- Waste survey at the municipalities
- Basic Survey on moving behaviour

Table 26: Dutch data from other organisations

- "Gemeentelijke Basisadministratie Persoonsgevens" (Interconnected municipal population register)
- "Official Register of Medical Professions (BIG Register)" of the Chief Medical Department of Public Health
- Unemployment Register of the Public Employment Department
- Sample for income records from the Tax Department of the Ministry of Finance
- National Institute of Public Health and the Environment (RIVM)
- District Water Boards and Sewage Treatment Boards
- Automated register of vehicle badges (RDW)
- City authorities
- Estimation of Household statistics based on "Gemeentelijke Basisadministratie Persoonsgevens" by imputation of a logistic regression using a linked dataset from the municipal population registers and the Labour Force Survey.
- "Prismant" register on hospital beds and patients, Dutch Centre for Health Care Information
- "Kantorenatlas" available through the Dutch City network of Departments for Research and Statistics
- Royal Dutch Meteorological Service (KNMI)
- Data warehouse Emission registration of the Ministry for Housing Spatial Planning and the Environment (VROM)
- Passenger Transport Companies
- Dutch Cinematographic Federation

Portugal

Information on data sources was unavailable at the time of reporting (February 2004).

Sweden

Information on data sources was unavailable at the time of reporting (February 2004).

United Kingdom

Information on data sources was unavailable at the time of reporting (February 2004).

Bulgaria

Sources for the data are mainly

Table 27: Data from the National Statistical Institute of Bulgaria

- Population and Housing Census 2001
- Statistical Business Register
- Regular demographic statistics
- BulStat (administrative data on companies, maintained by NSI)

Table 28: Data from other organisations in Bulgaria

- Ministry of the Interior
- Municipal authorities databases
- Executive Environmental Agency at the Ministry of Environment and Waters
- Ministry of Transport and Communication
- Ministry of Finance
- Institute of Meteorology and Hydrology at the

Bulgarian Academy of Science
- Cadastral Agency at the Ministry of Regional Development and Public Works
- Bulgarian Telecommunication Company (BTC)

Cyprus

Information on data sources was unavailable at the time of reporting (February 2004).

Czech Republic

The main source for the current Urban Audit data in the Czech Republic is the "Population and Housing Census 2001". More details on the Census are available at:

http://www.czso.cz/eng/redakce.nsf/i/population_and_housing_census.

The data were "manually" extracted from the basic dissemination database (internal), being aggregated from districts (NUTS4/LAU1) level (for cities and LUZ), municipalities (for the city Usti-nad-Labem) and from "basic settlement units" (for SCDs and enlarged territory of the city of Plzen – more below).

The other sources used are:

- regional database KROK (for internal use by the CzSO) – mainly for variables of land use, services, health, crime, GDP, transport, etc.
- demographic database, based on registered births, deaths, etc.
- database RES (Register of Businesses)
- database of electoral results

As a supplement - sources outside of the CzSO:

- data of the Town Halls (budgets)
- one city (Brno) made a pilot survey of the local demographic database and obtained further detailed figures for deaths by age and cause; immigration; data for climate, water and waste management, internet, etc.

Estonia

Sources for the data are mainly

Table 29:
Data from the Statistical Office of Estonia

- Population Census 1989
- Estonian Labour Force Survey
- Household Budget Survey
- Population and Housing Census 2000
- Business Register for Statistical Purposes

Table 30: Data from other organisations in Estonia

- Registry offices of counties and local governments
- Central Database of the Police Board
- Ministry of Education and Research
- Ministry of Environment
- Traffic Security Department of the National Road Administration
- Medical Statistics bureau of the Ministry of Social Affairs
- Monthly local budget accounts from the Ministry of Finance
- Estonian Institute of Meteorology and Hydrology
- National Motor Vehicle Registration Centre
- National Library of Estonia

Hungary

Table 31:
Data from the Hungarian Central Statistical Office

- Population and housing Census 1990
- Population and housing Census 2001
- Labour Force Survey (for Budapest)
- Household Budget Survey (or Budapest)

More information on data sources was unavailable at the time of reporting (February 2004).

Lithuania

More detailed information on data sources is available from the country report.

Table 32: Data from the Statistics Lithuania

- Population and housing Census 2001
- Labour Force Survey
- Survey on bankrupt enterprises
- Annual Survey on Earnings
- Annual Survey on Pre-School establishments
- Annual Surveys on non-public schools, vocational schools, professional colleges, Colleges (non-university education) and Universities
- Annual Surveys on electricity distribution and energy balance
- Annual Survey on length of local roads
- Annual Survey on telecommunication services
- Survey on cinema showings

- Survey on air passengers
- Survey on hotels and similar accommodation establishments
- Survey on rest and health establishments

Table 33: Data from other organisations in Lithuania

- Department of Migration
- Municipalities
- Civil register office
- Health Information Centre
- Ministry of Interior
- Ministry of Economy
- Tax Inspection
- Social Security Fund
- Administrative Business Register
- Central Electoral Committee
- Registers on municipal budgets of the Ministry of Finance
- Ministry of Education and Sciences (Annual Survey on General Schools, Computers in schools)
- Lithuanian Hydro-meteorological Service
- Environment Protection Agency (Air quality, noise, water, waste)
- National Land Service (Ministry of Agriculture)
- Centre of Registers (state enterprise, cadastral service)
- Regitra (state enterprise, passenger vehicle register)
- Police Department (Ministry of Interior)
- Ministry of Culture (data only for public institutions available)

Latvia

Sources for the data are listed below.

Table 34:
Data from the Central Statistical Bureau of Latvia

- Population and Housing Census 2000
- Labour Force Survey
- Annual Structural Survey for Institutions
- Current demographic statistics
- Annual Structural Survey for Enterprises

More information on data sources was unavailable at the time of reporting (February 2004).

Malta

Information on data sources was unavailable at the time of reporting (February 2004).

Poland

Detailed information on data sources is available from the country report.

Table 35:
Data from the Central Statistical Office of Poland

- Population and housing Census 2002
- Statistical Business Register (BJS) 2002

Table 36: Data from other organisations in Poland

- Registry offices of Civil Status
- Ministry of Health and Social Welfare – Notification of births data
- Reports from general hospitals
- Annual report SG-01 "Gminas statistics in 2001" part 1 – Local administrations
- Report of Ministry of Finance concerning the budget of local self-government entities
- Annual report for 2001 (ZD-6 Nursery report and S.01 Kindergarten report)
- Energy Market Agency – G-10.8 report on sales and electricity use and GAZ-1 - GAZ-3)
- K-08 form - report on cinemas
- K-02 form - museum and other such activities
- K-03 use of tourist accommodation establishments

Romania

Table 37: Data from the National Institute of Statistics

- Population and Housing Census 2002
- Household Budget Survey 2001
- Business Survey
- Local and central databases

Table 38: Data from other organisations in Romania

- Civil situation registers of each local council
- National Institute for Meteorology and Hydrology
- County Environmental Protection Inspectorate
- Telephony subscriptions (local database)

More detailed information on data sources is available from the country report.

Slovenia

The statistical system in Slovenia is mostly register-oriented and many statistical surveys cover the whole population (of inhabitants, enterprises or public services). There are no sample surveys, conducted by the national statistical office, which might produce data at the level of municipalities. For a few variables in the domains of Housing (prices), Users & Infrastructure (computers at schools) and Travel patterns (waiting times, speed and car occupancy), where data are based on samples, the survey was made by the city statistical department.

Data was compiled from different sources (outputs of statistical surveys) for relevant spatial units and prepared in the specified format in which there were some metadata described (data source, restriction concerning the use of data, statistical basis). There is a quality report available for the Population Census 2002. The Census provided data for most UA2 variables – all or most of the available data in the domains Population, Nationality, Household structure, Housing, Educational Qualification, Travel patterns, Water. The data for the Urban Audit were prepared even though the final data for the Population Census 2002 will only be published in April 2004.

Other sources are stated and described briefly, and a comparison of methodologies is given in the detailed quality report.

Slovak Republic

Sources for the data are listed below.

Table 39: Data from the Statistical Office of the Slovak Republic

- Population and housing Census 2001 (SODB)
- Regular annual statistical survey
- Business register

Table 40: Data from other organisations in the Slovak Republic

- Information System of the Ministry of Health of the Slovak Republic (MZ SR)
- Data from Municipal information systems
- Slovak Hydro meteorological Institute (SHMU)
- Ministry of Transport, Post and Telecommunication of the Slovak Republic (MDPT SR)
- Ministry of Culture of the Slovak Republic (MK SR)
- Statistical Survey of the Ministry Of Interior of the Slovak Republic (MV SR)
- Statistical survey of the Ministry of Education of the Slovak Republic (MS SR)
- Office of Land Surveyor, Cartography and Cadastre of the Slovak Republic (UGKK)
- Slovak Telecom (ST)

6 Data quality check

One result of the experience of the Urban Audit Pilot Phase was that the quality of data needed to be improved. DG REGIO entrusted Eurostat and the European Statistical System with this responsibility, in carrying out the Urban Audit. The involvement of official statisticians in the data compilation process of the UA2 should now guarantee a certain quality of the data. This is achieved through the use of official sources by the National Urban Audit Coordinators with the application of the quality standards of the national statistical services.

In the framework of coordinating the flow of data from the National Urban Audit Coordinators to Eurostat and creating the UA2 database, a number of checks were applied in order to find potential errors in the data. The experts entrusted with this work set-up ranges for indicators - where possible - against which the data were checked. These ranges were just a first approach to the checking process and have been reviewed. For some indicators it was not possible to set such ranges in advance but rather during data analysis. All the data were reviewed for anomalies. Together with the National Urban Audit Coordinators concerned, any anomalies were either validated or corrected. More details on these checks are available upon request from Eurostat. Table 41 presents the predefined ranges.

Table 41: Ranges applied to check the accuracy of Indicators

Code	Indicator	Suggested Ranges
DE1040I	Proportion of total population aged 0-4	4%-7%
DE1043I	Proportion of total population aged 5-14	11%-15%
DE1046I	Proportion of total population aged 15-19	4%-7%
DE1049I	Proportion of total population aged 20-24	5%-8%
DE1052I	Proportion of total population aged 25-54	32%-45%
DE1025I	Proportion of total population aged 55-64	10%-14%
DE1029I	Proportion of total population aged 65-74	5%-12%
DE1055I	Proportion of total population aged 75 and over	4%-10%
DE1003I	Proportion of females to males in total population	? -3% to +15%
DE1057I	Proportion of females to males in age 75 and over	? +20%-+150%
DE1061I	Total population change over 1 year (by sex and age)	.+/- 4%
DE1062I	Total annual population change over approx. 5 years (by sex and age)	.+/- 4%
DE1058I	Demographic Dependency Index new def.: (lt 20 years + gr 65 years) / 20-64 years	40-65 per 100
DE1059I	Demographic young age Dependency Index: (lt 20 years) / 20-64 years	30-40 per 100
DE1060I	Demographic old age Dependency Index: (gt 65 years) / 20-64 years	15-30 per 100
DE2001I	Nationals as a proportion of total population	48%-100%
DE2002I	EU nationals as a proportion of total population	80%-100%
DE2003I	Non-EU nationals as a proportion of total population	3%-21
DE2004I	Nationals born abroad as a proportion of total population	0%-20%
DE3001I	Average size of households	1.8-3.7
DE3002I	Percentage of households that are one-person households	5%-55%
DE3005I	Percentage of households that are lone-parent households	0.0-0.3%
DE3008I	Percentage of households that are lone-pensioner households	1%-30%
DE3011I	Percentage of households with children aged 0-17	20%-38%
DE3012I	Nationals that have moved to the city during the last two years as a proportion of total population	5%-30%
DE3013I	EU Nationals that have moved to the city during the last two years as a proportion of total population	5%-30%

DE3014I	Non-EU Nationals that have moved to the city during the last two years as a proportion of total population	5%-30%
SA1015I	Number of homeless people as a percentage of total resident population	0%-5%
SA1018I	Percentage of dwellings lacking basic amenities	0%-15%
SA1011I	Percentage of households living in owned dwellings	7%-82%
SA1012I	Percentage of households living in social housing	8%-59%
SA1013I	Percentage of households living in private rented housing	42%-65%
SA1007I	Percentage of households living in houses	23%-84%
SA1008I	Percentage of households living in apartments	16%-95%
SA1025I	Empty conventional dwellings in percent of total No. of dwellings	0%-10%
SA2004I	Infant mortality rate : 0-1 year per 1 000 births	0%-0.1%
SA2013I	Mortality rate for individuals under 65 from heart diseases and respiratory illness.	200 per 100 000 population?
SA2014I	Mortality rate for males under 65 from heart diseases and respiratory illness.	200 per 100 000 population?
SA2015I	Mortality rate for females under 65 from heart diseases and respiratory illness.	200 per 100 000 population?
SA2022I	Number of hospital beds per 1 000 residents	1 to 7 per 1 000
SA2023I	Number of doctors (FTE) per 1 000 residents	1 to 6 per 1 000
SA2024I	Number of dentists (FTE) per 1 000 residents	0.1-1.0 per 1 000
SA3001I	Total number of recorded crimes per 1 000 population per year	15-200 per 1 000
SA3005I	Number of murders and violent deaths per 1 000 population per year	0 to 1 per 1 000
SA3006I	Number of car thefts per 1 000 population per year	1 to 50 per 1 000
EC1201I	Annual average percentage change in employment over approx. 5 years (household-based)	. -3% to +5%
EC1010I	Unemployment rate (%)	1.0 to 25%
EC1011I	Unemployment rate Male (%)	1.0 to 35%
EC1012I	Unemployment rate Female (%)	1.0 to 20%
EC1148I	Percentage of residents Unemployed 15-24, (ILO Definition)	10-40%
EC1149I	Percentage of male residents Unemployed 15-24, (ILO Definition)	10-40%
EC1150I	Percentage of female residents Unemployed 15-24, (ILO Definition)	10-40%
EC1151I	Percentage of residents Unemployed 55-64, (ILO Definition)	8%-45%
EC1152I	Percentage of male residents Unemployed 55-64, (ILO Definition)	8%-45%
EC1153I	Percentage of female residents Unemployed 55-64, (ILO Definition)	8%-45%
EC1154I	Percentage of unemployed aged 15-24 who have been unemployed continuously for more than six months	8%-45%
EC1155I	Percentage of long term young unemployed males	8%-45%
EC1156I	Percentage of long term young unemployed females	8%-45%
EC1157I	Percentage of unemployed aged 55-64 who have been unemployed continuously for more than one year	8%-45%
EC1158I	Percentage of long term old unemployed males	8%-45%
EC1159I	Percentage of long term old unemployed females	8%-45%
EC1202I	Percentage of unemployed who are under 25	10-30%
EC1034I	Employment/Population (of working age) Ratio	50%-80%

EC1035I	Male Employment/Population (of working age) Ratio	50%-80%
EC1036I	Female Employment/Population (of working age) Ratio	50%-80%
EC1001I	Activity Rate (%)	50%-80%
EC1002I	Male Activity Rate (%)	50%-80%
EC1003I	Female Activity Rate (%)	50%-80%
EC1142I	Activity Rate 15-24 (%)	50%-80%
EC1143I	Activity Rate 15-24 (%), male	50%-80%
EC1144I	Activity Rate 15-24 (%), female	50%-80%
EC1145I	Activity Rate 55-64 (%)	50%-80%
EC1146I	Activity Rate 55-64 (%), male	50%-80%
EC1147I	Activity Rate 55-64 (%), female	50%-80%
EC1088I	Proportion of people in part-time employment	10-30%
EC1089I	Proportion of males in part-time employment	10-30%
EC1090I	Proportion of females in part-time employment	10-70%
EC1166I	Proportion of people aged 15-24 years in part-time employment	10-30%
EC1167I	Proportion of males aged 15-24 years in part-time employment	10-30%
EC1168I	Proportion of females aged 15-24 years in part-time employment	10-70%
EC1169I	Proportion of people aged 55-64 years in part-time employment	10-30%
EC1170I	Proportion of males aged 55-64 years in part-time employment	10-30%
EC1171I	Proportion of females aged 55-64 years in part-time employment	10-70%
EC2014I	Percentage of companies gone bankrupt	1%-5%
EC2004I	New businesses registered in percent of existing companies	2%-5%
EC2013I	Proportion of net office space that is vacant	5%-15%
EC3054I	Ratio of first to fifth quintile earnings	1:10 to 1:25
EC3057I	Percentage of the households receiving less than half of the national average household income	10%-40%
EC3060I	Proportion of households reliant upon social security – national definition	6%-49%
EC3063I	Proportion of individuals reliant on social security	6%-49%
CI1003I	Percentage of registered electorate voting in European elections (for each of the last three European Parliament Elections).	23%-94%
CI1006I	Percentage of registered electorate voting in national elections (for each of the last three national elections).	53%-88%
CI1009I	Percentage of registered electorate voting in city elections (for each of the last three city elections - nearest dates to the last three national elections).	21%-94%
CI1002I	Percentage of the eligible electorate registered to vote in European elections	23%-94%
CI1005I	Percentage of the eligible electorate registered to vote in national election	53%-88%
CI1008I	Percentage of the eligible electorate registered to vote in municipal elections	21%-94%
CI1010I	Percentage of young (aged less than 25 years) eligible electorate voting in city elections	21%-94%
CI1018I	Percentage of elected city representatives who are women	5%-45%
CI2006I	Annual expenditure of the Municipal Authority per resident	50-15000

CI2002I	Proportion of Municipal Authority income derived from local taxation	10%-50%
CI2003I	Proportion of Municipal Authority income derived from transfers from national, regional, provincial and state government.	10%-50%
CI2004I	Proportion of Municipal Authority income derived from charges for services.	10%-50%
CI2005I	Proportion of Municipal Authority income derived from "other" sources.	10%-50%
CI2007I	Residents directly employed by the local administration as a percentage of the jobs	1%-10%
CI2008I	Residents directly employed by the local administration in central administration as a percentage of the Labour Force	1%-5%
CI2009I	Residents directly employed by the local administration in education as a percentage of the Labour Force	1%-10%
CI2010I	Residents directly employed by the local administration in health and social services as a percentage of the Labour Force	1%-10%
CI2011I	Residents directly employed by the local administration in public transport as a percentage of the Labour Force	1%-10%
CI2013I	Residents directly employed by the local administration in other services as a percentage of the Labour Force	1%-15%
TE1001I	Number of children 0-4 in day care (public and private provision) per 1 000 children 0-4	2 to 50 per 1 000
TE1003I	Children 0-4 in day care - proportion in public provision day care	20% to 80%
TE1002I	Children 0-4 in day care - proportion in private provision day care	20% to 80%
TE1029I	Children 0-4 in day care - proportion in other provision, e.g. church	20% to 50%
TE1030I	Percentage of students not completing their compulsory education	1% to 10%
TE1017I	Percentage of the age cohort (i.e. total number of students registered for the last year of compulsory education in the reference year) that continues education and training after leaving compulsory education	5%-17%
TE1026I	Number of students in universities and further education establishments located within the above specified boundary per 1 000 resident population	2 to 20 per 1 000
TE2016I	Percentage of resident population qualified at level 1 ISCED (International Standard Classification for Education) 97	4%-30%
TE2017I	Percentage of resident male population qualified at level 1 ISCED (International Standard Classification for Education) 97	4%-30%
TE2018I	Percentage of resident female population qualified at level 1 ISCED (International Standard Classification for Education) 97	4%-40%
TE2001I	Percentage of resident population qualified at level 2 ISCED 97	4%-65%
TE2002I	Percentage of resident male population qualified at level 2 ISCED 97	4%-65%
TE2003I	Percentage of resident female population qualified at level 2 ISCED 97	4%-70%
TE2019I	Percentage of the resident population qualified at levels 3-4 ISCED 97	5%-52%
TE2020I	Percentage of the resident male population qualified at levels 3-4 ISCED 97	5%-52%
TE2021I	Percentage of the resident female population qualified at levels 3-4 ISCED 97	5%-52%
TE2022I	Percentage of the resident population qualified at levels 5-6 ISCED 97	1%-23%
TE2023I	Percentage of the resident male population qualified at levels 5-6 ISCED 97	1%-30%
TE2024I	Percentage of the resident female population qualified at levels 5-6 ISCED 97	1%-23%
EN2007I	Number of residents exposed to outdoor day noise levels above 55 dB(A) (12 hour day, normally 07-19)	0.5% to 2%
EN2008I	Number of residents exposed to sleep disturbing outdoor night noise levels	0.5% to 2%

	above 45 dB(A) (8 hours night, normally 23-07)	
EN3003I	Consumption of water (cubic metres per annum) per inhabitant	50 to 200 m3
EN3004I	Percentage of dwellings connected to potable drinking water supply infra-structure	80% to 100%
EN3006I	Percentage of dwellings connected to sewerage treatment systems	60% to 100%
EN4001I	Amount of solid waste collected within the boundary (domestic and com-mercial) tonnes per capita per annum	150 - 1800
EN4002I	Proportion of solid waste (domestic and commercial) arising within the boundary processed by landfill	10% to 70%
EN4003I	Proportion of solid waste (domestic and commercial) arising within the boundary processed by incinerator	10% to 70%
EN4004I	Proportion of solid waste (domestic and commercial) arising within the boundary processed by recycling	10% to 70%
EN4006I	Proportion of solid waste (domestic and commercial) arising within the boundary processed by another method	10% to 70%
EN5001I	Green space to which the public has access (sq metres per capita)	24 000m^2 to 5 671 000m^2 (2.4 ha-567.1 ha)
EN5002I	Percentage of the population within 15 minutes walking distance of urban green areas	5% to 15%
EN5012I	Percentage of the area in green space	1% to 15%
EN5016I	Percentage of the area used for agricultural purposes	0% to 1%
EN5017I	Percentage of the area in mineral extraction	0% to 1%
EN5018I	Percentage of the area industrial and manufactory use	5% to 15%
EN5019I	Percentage of the area in road network use	1% to 3%
EN5020I	Percentage of the area in rail network	1% to 3%
EN5008I	Percentage of the area in ports use	0% to 15%
EN5009I	Percentage of the area in airports use	0% to 5%
EN5021I	Percentage of the area in water treatment use	0% to 5%
EN5022I	Percentage of the area in waste disposal use	0% to 5%
EN5023I	Percentage of the area in commerce, finance and business use	10% to 50%
EN5011I	Percentage of the area in recreational, sports and leisure use	10% to 20%
EN5004I	Percentage of the area in housing/residential use	30% to 70%
EN5013I	Percentage of the area unused, including contaminated or derelict land areas	0% to 5%
EN5014I	Percentage of the urban area subject to special physical plan-ning/conservation measures	0% to 5%
TT1057I	Number of cars registered within the specified boundary per 1 000 popula-tion	20 to 500 per 1 000
TT1058I	Road accidents resulting in death or serious injury per 1 000 population	0 to 10 per 1 000
TT1064I	Proportion of in-commuters of persons employed in the city	2% to 15%
TT1065I	Proportion of out-commuters of employed persons living in city	2% to 15%
TT1068I	Total km driven in public transport per capita	0 to 20
IT1001I	Percentage of households with a PC	2% to 80%
IT1010I	Percentage of households with broad band access	0% to 25%

7 Bibliography

Ambiente Italia Research Institute (2003): European Common Indicators Final Project Report: Development, Refinement, Management and Evaluation of European Common Indicators Project (ECI).- Milano

ANDERSSON, C. & NORDBERG, L. (1998): A User's Guide to CLAN. Örebro: Statistics Sweden

BAPTISTE, H., BUGUELLO, J.-B., DECOUPIGNY, C., FONT, M., GUIMAS, L., L'HOSTIS, A., MANFREDINI, F., MATHIS, P., PUCCI, P., REYNAUD, C., SPIEKERMANN, K., ULIED, A., WEGENER, M. (2003): Transport Services and Networks: Territorial Trends and Basic Supply of Infrastructure for Territorial Cohesion.- ESPON Project 1.2.1 Third Interim Report.

BETHLEHEM, J. G. & KELLER, W. J. (1987): Linear Weighting of Sample Survey Data. Journal of Official Statistics. Vol. 3. No. 2. 141-153

DEVILLE, J.-C. & SÄRNDAL, C.-E. (1992): Calibration Estimators in Survey Sampling. Journal of the American Statistical Association. Vol. 87. No. 418. 376-382

ESKELINNEN, H., FÜRST, F., SCHÜRMANN, C., SPIEKERMANN, K., WEGENER, M. (2002): Indicators of Geographical Position.- Final Report of the Working Group "Geographical Position" of the Study Programme on European Spatial Planning.- Dortmund

ESTEVAO, V., HIDIROGLOU, M. A. & SÄRNDAL, C.-E. (1995): Methodological Principles for a Generalised Estimation System at Statistics Canada. Journal of Official Statistics 11 181–204

European Commission (1997): Communication from the Commission, COM(97) 197 Towards an Urban Agenda in the European Union.- Brussels

European Commission (1998): Communication from the Commission, COM(98) 605Final Sustainable Urban Development in the European Union: a Framework for Action.- Brussels

European Commission (1999): Proposal for a Council Directive of the European Parliament and of the Council 99/0068 of 09.06.1999 Relating to Ozone in Ambient Air.- Brussels

European Commission (1999): Common Position adopted by the Council with a View to the Adoption of a Directive of the European Parliament and of the Council Relating to the Assessment and Management of Environmental Noise.- Brussels

European Commission (1999): Proposal for a Council Directive of the European Parliament and of the Council 99/0067 of 09.06.1999 on the National Emission Ceilings for Certain Atmospheric Pollutants.- Brussels

European Commission (2002): Communication from the Commission to the Council and the European Parliament COM(2002) 655 Final of 21.11.2002: eEurope 2005: Benchmarking Indicators.- Brussels

European Communities (2000): The Urban Audit – Towards the Benchmarking of Quality of Life in 58 European Cities.- Final Report in 3 Volumes, Brussels

European Environment Agency & DG JRC (2002): CORINE Land Cover update 2000 – Technical Guidelines.- Technical Report 89, Copenhagen

European Monitoring and Evaluation Program of Air Pollution (www.emep.int)

European Union (1991): Council Directive 91/689/EEC of 12 December 1991 on Hazardous Waste.- OJ L 377 , 31/12/1991 pp. 20–27

European Union (1993): Council Regulation (EEC) 2186/93 of 22 July 1993 on Community Coordination in Drawing up Business Registers for Statistical Purposes.- OJ L 196 05/08/1993 p.1

European Union (1998): Council Directive 98/83/EC of 3 November 1998 on the Quality of Water Intended for Human Consumption.- OJ L 330 5/12/1998 pp. 32–54

European Union (1999): Council Directive 1999/31/EC of 26 April 1999 on the Landfill of Waste.- OJ L 182/1 16/6/1999

European Union (1999): Council Directive 99/30/EC of 22 April 1999 Relating to Limit Values for Sulphur Dioxide, Nitrogen Dioxide and Oxides of Nitrogen, Particulate Matter and Lead in Ambient Air.- OJ L 163 29/6/1999 pp. 41-60

European Union (2000): Council Directive 2000/76/EC of 4 December 2000 on the Incineration of Waste.- OJ L 332/94 28/12/2000

European Union (2002): Council Regulation (EEC) 696/93 of 15 March 1993 on the Statistical Units for the Observation and Analysis of the Production System in the Community.- OJ L 076 30/3/1993

European Union (2002): Council Directive (EEC) 2002/49 of 25 June 2002 Relating to the Assessment and Management of Environmental Noise.- OJ L 189 18/7/2002 pp. 12-25

European Union (2002): Council Regulation (EC) 2150/2002 of the European Parliament and of the Council of 25 November 2002 on Waste Statistics.- OJ L 332/1 9/12/2002

Eurostat (1993): System of National Accounts 1993.- Office for Official Publications of the European Communities, Brussels/Luxembourg

Eurostat (1996): European System of Accounts – ESA 1995.- Office for Official Publications of the European Communities, Luxembourg

Eurostat (1999): European Community Household Panel (ECHP) – Selected Indicators from the 1995 Wave.- Office for Official Publications of the European Communities, Brussels/Luxembourg

Eurostat (1999): Recommendations for a Harmonised Definition of Calculation of Surface Area of Territorial Units.- Luxembourg

Eurostat (2001): Choice of Spatial Units.- Working Party Doc. E4/Urban/2001/08.- Luxembourg

Eurostat (2001): Manual on Concepts on Land Cover and Land Use Information Systems.- Luxembourg

Eurostat (2001): Organisational Set-up.- Working Party Doc. E4_Urban_2001_09.- Luxembourg

Eurostat (2001): Selection of Cities.- Working Party Doc. E4_Urban_2001_05.- Luxembourg

Eurostat (2002): Business Demography – Methodological Guidelines Version 2 (April 2002) – Guidelines for the Harmonised Data Collection.- Luxembourg

Eurostat (2003): GICSO Database Manual.-Luxembourg

Eurostat (2003): Glossary for Transport Statistics – Document prepared by the Intersecretariat Working Group on Transport Statistics.- Luxembourg

Eurostat (2003): Regions – Nomenclature of Territorial Units for Statistics – 2003.- Luxembourg

Eurostat (2003): Technical Reference Documentation of the LUCAS pilot project N° 2: The Nomenclature.- Luxembourg

Eurostat (2003): The European Union Labour Force Survey – Methods and Definitions – 2001.- Luxembourg

FAY, R.E. and HERRIOT, R. (1979): Estimates of Income for Small Places: An Application of James-Stein Procedures to Census Data. Journal of the American Statistical Association, 74, pp. 269-277

g-CALIB-S (Statistics Belgium): http://www.statbel.fgov.be/studies/paper03.pdf

GHOSH, M. (2001): Model-Dependent Small Area Estimation: Theory and Practice. In Lehtonen R. and Djerf K. (eds.) Lecture Notes on Estimation for Population Domains and Small Areas. Helsinki: Statistics Finland, Reviews 2001/5, pp. 51-108

GHOSH, M. and RAO, J.N.K. (1994): Small Area Estimation: an appraisal. *Statistical Science*, 9, pp. 55-93

GOLDSTEIN, H. (1995). Multilevel Statistical Models. 2nd edition. London: Arnold; New York: Wiley

HEADY, P., CLARKE, P., et al. (2003): Small Area Estimation Project Report. National Statistics, Model-Based Small Area Estimation Series, No. 2.

LEHTONEN R., SÄRNDAL C.-E. and VEIJANEN A. (2003): The Effect of Model Choice in Estimation for Domains, Including Small Domains. Survey Methodology, 29, pp. 33-44

LEHTONEN, R. and PAHKINEN, E. (2004): Practical Methods for Design and Analysis of Complex Surveys. Second Edition. Chichester: John Wiley & Sons Ltd.

LEHTONEN, R. and VEIJANEN, A. (1998): Logistic Generalised Regression Estimators. Survey Methodology Journal, 24, pp. 51-55

McCULLOCH, C.E. and SEARLE, S.R. (2001): Generalised, Linear, and Mixed Models. New York: John Wiley & Sons Ltd

MYRSKYLÄ, M. and RUOTSALAINEN, K. (1997): Annual System of Small Area Statistics Based on Administrative Records and Registers

RAO, J.N.K. (1999): Some Recent Advances in Model-based Small Area Estimation. Survey Methodology, 25, pp. 175-186

RAO, J.N.K. (2003): Small Area Estimation. New York: John Wiley & Sons, Ltd.

SÄRNDAL, C.-E. (2001): Design-based Methodologies for Domain Estimation. In Lehtonen R. and Djerf K. (eds.) Lecture Notes on Estimation for Population Domains and Small Areas. Helsinki: Statistics Finland, Reviews 2001/5, pp. 5-49

SÄRNDAL, C.-E., SWENSSON, B. and WRETMAN, J. (1992): Model Assisted Survey Sampling. New York: Springer

SAUTORY, O. (1993): La macro CALMAR. Redressement d'un échantillon par calage sur marges. (The macro CALMAR. Calibration on known marginal frequencies in sample surveys). I.N.S.E.E. Série des documents de travail n° F 9310. INSEE working papers. Paris: I.N.S.E.E.

SIHTO, M. and MYRSKYLÄ, M. (xxxx): Työllisyyden ja työttömyyden tilastoinnista (In Finnish only; About compilation of statistics on employment and unemployment)

SUNDSTRÖM, H.J. (2003): ICT Statistics at the New Millennium —Developing Official Statistics—Measuring the Diffusion of ICT and its Impact.- in International Statistical Review (2003), 71, 1, pp. 5–15

UN-ECE & Eurostat (1998): Recommendations for the 2000 Census of Population and Housing in the ECE Region.- New York & Geneva

UNESCO (1997): International Standard Classification for Education.-

Virtual Laboratory in Survey Sampling (University of Jyväskylä): http://www.stat.jyu.fi/mpss/VLISS/

WOLTER, K. M. (1985): Introduction to Variance Estimation New York: Springer

YAR, M., HENNELL, S. and CLARKE, P. (2001): Childhood Mental Disorders in England. National Statistics, Model-Based Small Area Estimation Series, No. 1.

Index

Acronyms and Abbreviations

A	Administrative City
CAPI	Computer Assisted Personal Interview
CASI	Computer Assisted Self Interview
CATI	Computer Assisted Telephone Interview
CC	Candidate Country
CBM	Current Best Methods
CIRCA	Communication & Information Resource Centre Administrator
CODED	Eurostat Concepts and Definitions Database
CORINE	CORdination of INformation on the Environment
DG AGRI	Directorate-General for Agriculture
DG ESTAT	Statistical Office of the European Communities
DG JRC	Directorate-General for Joint Research Centre
DG REGIO	Directorate-General for Regional Policy
EB	Empirical Bayes
EC	European Community
ECHP	European Community Household Panel
EBLUP	Empirical Best Linear Unbiased Predictor estimator
ED	Enumeration Districts
EEA	European Environment Agency
EMEP	European Monitoring and Evaluation Programme of Air Pollution
ESA	European System of Accounts
ESPON	European Spatial Planning Observation Network
EU	European Union
Eurostat	Statistical Office of the European Communities
EU-SILC	Statistics on Income and Living Conditions
FTE	Full Time Equivalents
FUR	Functional Urban Regions
GDP	Gross Domestic Product
GREG	Generalised Regression estimator
HB	Hierarchical Bayes
HBS	Household Budget Survey
ICT	Information & Communication Technologies
ILO	International Labour Organisation
ISCED	International Standard Classification for Education
ISO	International Standard Organisation
LAU	Local Administrative Unit
LFS	Labour Force Survey
LUCAS	Land Use / Cover Area statistical Survey
LUZ, L	Larger Urban Zone
MS	Member State
MSE	Mean Squared Error
NACE	Statistical Classification of Economic Activities in the European Community
NewCronos	Eurostat's Database on Macroeconomic and Social Statistics
NSO	National Statistical Offices

NUAC	National Urban Audit Coordinators
NUTS	Nomenclature of Territorial Statistical Units
OECD	Organisation for Economic Co-operation and Development
PAPI	Paper And-Pencil Interview
PC	Personal Computer
RAMON	Eurostat's Classification Server
SCD, S	Sub-City-District
SNA	System of National Accounts
UA	Urban Audit
UA 2	Urban Audit 2003 data collection
UAPP	Urban Audit Pilot Phase
UN	United Nations
UN-ECE	United Nations – Economic Commission for Europe
WHO	World Health Organisation