

Census taking in Europe: how are populations counted in 2010?

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It is essential to count the population so that necessary levels of service provision for schools, transport, healthcare, etc. can be determined in each municipality. But census taking is costly, and a growing number of people are reluctant to participate. To address these problems, the industrialized countries have developed new, less expensive methods based on existing data obtained from surveys and population registers. Paolo Valente describes the methods employed by European countries for the population censuses scheduled in 2010 and beyond.

The population census can be defined as a statistical operation designed to count the entire population of a country and to collect information on its main demographic, social and economic characteristics. It is a key instrument for assessing the needs of local communities (education, health, transport, etc.) and is even more useful when associated with other data sources, such as housing or agricultural censuses, or sample surveys. The United Nations recommend that countries take a census at least once every ten years.

In a "traditional" census, all individuals are enumerated directly and their characteristics are registered through the completion of census forms. However, in some countries, the statistical agencies responsible for conducting population censuses face growing challenges and difficulties: pressure to make greater use of information available elsewhere, lower public cooperation and participation, changing user demand and the need to control or reduce costs. For these reasons, they are now considering alternative methodologies.

Many countries have departed from the traditional data collection methods (see Box 1) and introduced a new census approach. Individual information is increasingly collected from administrative registers (see Box 2), and from ad hoc or existing sample surveys. For the 2010-2011 census round, almost half of all European countries have

opted for an alternative census approach, in most cases based on population registers, either exclusively or in combination with other data sources.

◆ Alternative approaches to the traditional census

• Long form and short form

A long form is filled in by a sample of the population to collect detailed information on individuals and households, while a short form is filled in by the majority, or all, of the population. The short form is used for the population count and to collect information on basic characteristics such as place of usual residence, sex, age and household membership status. It has the advantage of increasing the range of content while reducing overall respondent burden and the cost of data processing. It may complicate field operations, however, and it reduces the amount of information produced for small geographic areas. This method is used in Canada, for example, and was applied in the United States up to the 2000 census.

• Register-based censuses

Some Northern European countries, such as Denmark and Finland, use administrative registers for statistical purposes and conduct their census on the basis of information in the registers, rather than through field enumeration. This approach places no burden on individuals and, once registers are established, is less costly

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to implement. Data are available from registers on a continuous basis, so the census could potentially be taken every year. The population characteristics considered are limited to those available in the registers, so statistical agencies may combine data from different registers by linking data at the individual level in order to expand the range of data. This demands close cooperation between the statistical agency, register authorities and the public administration, and strict legislative oversight.

More generally, establishing and maintaining a high quality register-based statistical system requires significant resources and societal will.

• **Combination of register data with complete enumeration**

Some of the characteristics of interest for individuals and households may not be available on existing registers. For this reason, the census is sometimes conducted using

Box 1

The “traditional census”: challenges and drivers for change

In a “traditional” census, all individuals are enumerated directly and their characteristics are registered through the completion of census forms. The information is collected in the field at the same time across the whole country, usually over a period of a few days or weeks. In many western European countries, census forms are delivered and collected by designated census enumerators, but are filled in by the respondents. In Eastern Europe, census forms are generally filled in by the enumerators, who act as interviewers. In an increasing number of countries, census forms are delivered and/or collected by mail – or, more recently, via the Internet – and not by enumerators. In 2011, people in 13 countries will be able to respond to the census via a Web questionnaire.

Although simple in concept, the traditional census has always been difficult to conduct and poses challenges in terms of organization and implementation, but also in terms of public cooperation. The census is an elaborate and complex operation that involves huge costs concentrated within a short period. The most significant cost item is enumeration, mainly due to the need to recruit a very large number of temporary staff for the field operations; this item alone represents 50-60% of census costs, with planning and preparations, logistics, printing of forms, equipment and data processing accounting for the rest. The distribution of census costs is cyclical, with a peak around the census year, and very low costs in the intercensal periods. The cyclical nature of the traditional census make it difficult for statistical agencies to retain experienced census staff and to make use of the knowledge they have acquired from one census to the next. Likewise, the large-scale selection, recruitment and training of temporary personnel is a highly challenging task.

The census is a complex operation requiring a great deal of cooperation and coordination with local and national administrations and, above all, full awareness and participation of the public. Public willingness to cooperate is vital for the quality

of census results, yet in recent years many countries have experienced growing difficulties in this respect. Respondents are increasingly reluctant to open their doors, especially when they are older, living alone or residing in large cities or neighbourhoods where security is a concern. The growing number of singles with mobile lifestyles and multiple residences also make the enumeration very difficult. In addition, the respondents may be reluctant to provide information which is already available from other sources, such as administrative registers. In fact, some countries have specific laws or administrative provisions to prevent the statistical office from requesting information that is available in registers.

At the same time, there is increasing demand for detailed, high quality data covering new areas and emerging phenomena. Yet, because of the complexity of collecting and processing such large amounts of data, and because censuses are generally organized only once every ten years, the census results may quickly become out of date for certain purposes or for users needing very recent information. Finally, the range of information collected in the census needs to be continually adjusted and expanded to take account of rapid changes in society. This is only partially possible with the traditional census, not only because of its weight and complexity, but also because of a concern to ensure the historical comparability of results.

Over the last decades, these difficulties and challenges have convinced many countries in Europe and North America to consider alternative methodologies to the traditional census approach. From the 1970s, the use of the long form and short form was adopted in the United States and Canada, while the Scandinavian countries started moving towards the register-based census (see Box 2) pioneered in Denmark in 1981. More recently, several countries have developed alternatives based on different combinations of field enumeration, data from existing registers, ad hoc sample surveys, or existing sample surveys.

Box 2

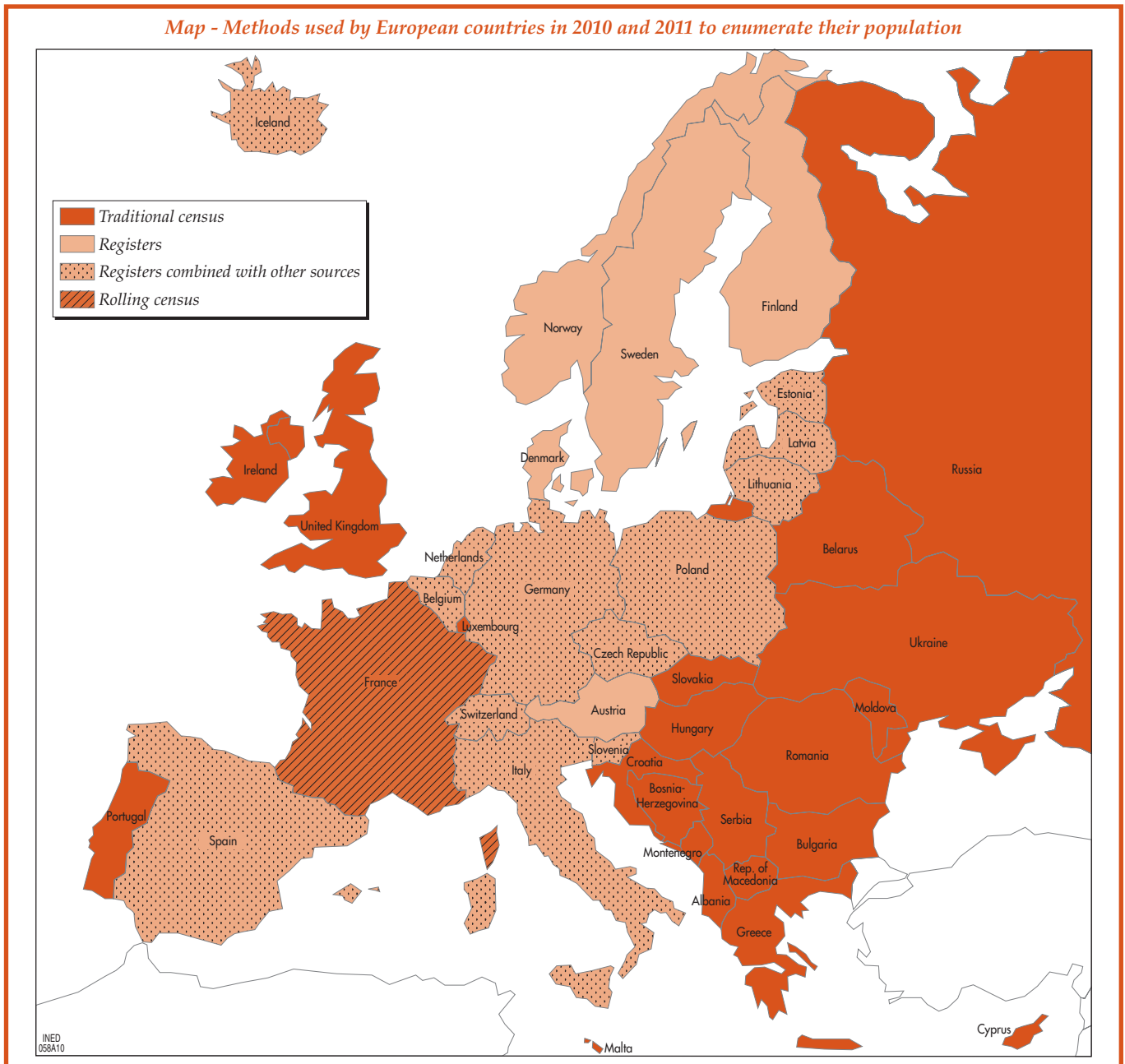
Population registers

Municipal population registers were introduced in the eighteenth and nineteenth centuries in several European countries (in 1749 in Sweden, in 1847 in Belgium, in 1850 in the Netherlands). In 2010 they exist in 20 of the 27 EU countries. These registers give information on each individual living in the municipality: most often their name, first name, sex, date and place of birth, address, marital status, nationality, and in some cases occupation, previous place of residence, relationship with head of household, etc. Organized by household and dwelling unit, the registers are created by means of an initial population census. They are updated more or less continuously and, in principle, all individual changes of situation – birth, death, change of residence, marriage, divorce or change of occupation –

are recorded either through an obligatory declaration or through linkage with other data files. In particular, all persons moving to a new municipality must report their arrival so that they can be added to the register. Likewise, they must report their departure when they leave. The administrative rules vary from country to country, however.

In some countries, the initial system of manually maintained local registers has been expanded to form a national register, through the computerization and centralization of municipal data. The linkage of local and national registers improves data quality and, in particular, helps to eliminate double counts. Linkage with information from other administrative registers (housing, social security) is also possible.

Map - Methods used by European countries in 2010 and 2011 to enumerate their population



registers and field enumeration simultaneously. This approach helps to improve the precision of the count and the quality of the registers. Compared to a register-based census, this approach is more expensive, more complex to apply and places a burden on the public. But compared to the traditional census, it can be more efficient in field operations. It will be used in 2011 by several European countries including the Czech Republic, Estonia, Italy, Latvia, Lithuania and Spain.

- **Combination of register data with existing surveys**

This is a variant of the previous approach which does not require field operations. Registers are used to provide a total enumeration of the population, and results from existing surveys provide individual characteristics that are not available in registers, provided that information from the different sources can be linked at the unit record level. This approach ensures that census results are consistent with survey results for common variables. It is relatively inexpensive and places no burden on respondents, but the

information linking process can be complex. This method was adopted by the Netherlands for the so-called “virtual census” conducted in 2001 and will be used again by the Netherlands and by Slovenia in 2011.

- **Register data and ad hoc surveys**

Instead of relying on existing surveys, data from registers can also be used in combination with results from sample surveys conducted ad hoc for the census, either to evaluate the accuracy and completeness of the registers or to include new variables (like in a long form). Israel adopted this approach for the 2008 census, enabling the country to evaluate the accuracy of its population registers and to adjust the register-based population counts accordingly.

- **Traditional enumeration with yearly updates of characteristics on a sample basis**

This method was developed in the United States for the 2010 census. It comprises full field enumeration every

Table - Distribution of European countries by census methods used in 2000 and 2010*

Census method					
	Traditional	Mixed**	Register	Rolling	Total
in 2010					
in 2000					
Traditional	20	5	1	1	27
Mixed**		6			6
Register			3		3
No census	1	2	1		4
Total	21	13	5	1	40

* List of countries: Albania, Austria, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, the Former Yugoslav Republic of Macedonia, Ukraine, United Kingdom.

** Use of register data combined with other sources, such as total enumeration or sample surveys.

ten years using a short form, combined with a large household sample survey conducted on an annual basis. The survey provides detailed demographic, social and economic data about households, like in a long form but updated annually. In the United States, the annual American Community Survey covers approximately 2% of the population, which totalled 320 million inhabitants in 2010. Despite the size of the survey, for some small areas there may be insufficient information in each single year to produce estimates. For this reason, information for small areas is aggregated over several years and released only in the form of moving averages (1). However, the concept of moving averages could be difficult to explain to public officials and to the general public.

• Rolling census

The notion of a moving average over five consecutive years is applied for the rolling census introduced in France in 2004. Small municipalities (fewer than 10,000 inhabitants) are divided into five groups, and a full census is conducted each year in one of the groups. In all large municipalities, a sample survey covering 8% of dwellings is conducted each year. After five consecutive years, the entire population in small municipalities and about 40% of the population in large municipalities has been surveyed. In all, about 70% of the French population is covered in the course of the five-year cycle. This is enough to guarantee robust information at the

(2) Fluctuations in an indicator from one year to the next – that may be partly due to a small sample size – are smoothed out by a moving average so that only multi-year trends are visible. To obtain a value for the year n , the moving average can be determined over a three-year period by calculating the mean of years $n - 1$, n and $n + 1$, or over a five-year period by calculating the mean of years $n - 2$, $n - 1$, n , $n + 1$ and $n + 2$.

municipality and neighbourhood levels. The census results are based on moving averages calculated over the five-year cycle, and are updated yearly. This method was developed mainly to improve the frequency of the data releases, and to spread over time the financial and human burden associated with the census. It is unique to France.

◆ The situation in other European countries

A growing number of countries are moving away from the traditional census (see Box 1) and looking with increasing interest at alternative approaches. According to a joint survey conducted by the United Nations Economic Commission for Europe (UNECE) in cooperation with the United Nations Statistics Division (UNSD), among 40 European countries, around half (21) are conducting a traditional census in the 2010 round, 5 are conducting a census based on registers, and 13 other are adopting a mixed approach using data from registers and from other sources. France, for its part, adopted the rolling census in 2004 (Table and Map).

Countries applying the traditional census method include Russia and the whole of eastern and south-eastern Europe (Map). But some countries of western and southern Europe – Greece, Portugal and the United Kingdom – are also concerned.

The Scandinavian countries and Austria are conducting a register-based census, while the countries adopting a mixed approach combining registers and other sources include the Baltic countries, several central European countries and some countries of southern Europe, such as Spain and Italy.

Since the 2000 census round, the number of countries using traditional census methods has decreased. Among the 27 countries that used them in 2000, 7 countries have adopted a different approach for the 2010 round. They include France, which has opted for a rolling census, and 6 other countries which have switched to register-based census or a mixed approach (Table). In 2000, only 9 countries used their registers. For the 2010 census round, their number has doubled.

ABSTRACT

A growing number of countries are moving away from the traditional census and looking with increasing interest at new approaches. For example, in countries where they exist, population registers are often used as an alternative information source. Among the 40 European countries, 5 are conducting a census in 2010 based exclusively on registers (the Scandinavian countries and Austria), around half (21) are conducting a traditional census (Russia, practically all countries of eastern and south-eastern Europe, the United Kingdom, Ireland, Greece and Portugal), and most of the others (13) are adopting a mixed approach using data from registers and from other sources, such as total enumeration or sample surveys. France is the only country to have adopted a rolling census, introduced in 2004.