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Transformations in population statistics

### **Which came first: register-based census or register-based population statistics?**

Note by the Statistical Office of the Republic of Slovenia\*

#### *Summary*

The register-based approach to all population statistics in Slovenia has a very long history. With the switch to a completely register-based census in 2011, the Statistical Office of the Republic of Slovenia (SURS) started producing data on what were once solely decennial census topics more frequently, some as often as annually. Some variables are also used as input data for sample surveys as core social variables. Census and annual population statistics have been completely harmonized and very much integrated – so much so, that the census is no longer disseminated separately. The completely register-based approach, however, does come with its own challenges and some adaptations are needed to mitigate these issues. As census and population statistics are produced by essentially the same team from the same data sources, any changes are always thought through with both aspects in mind. They feed into one another – conceptually, source-wise and methodologically. While we do not use the term annual census, we can say that harmonized register-based annual population statistics, together with some additional topics initially derived in the register-based census and produced annually since then, now comprise a mini annual census.

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## I. Introduction: A brief history of register-based population statistics in Slovenia

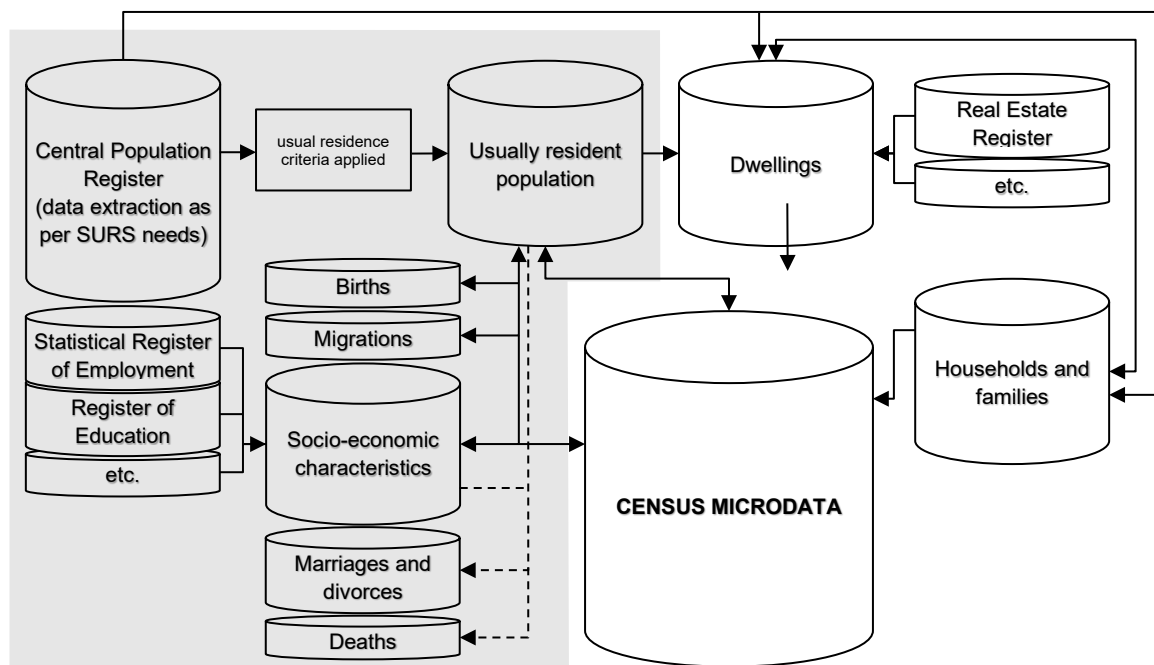
1. In 1970, following suit from the Nordic countries, the then-Statistical Office established the Basic Register of Population. After the 1971 census, the Central Population Register (CRP) was established. Also at that time, a statistical cadastre was organized, which was the basis for the Register of Territorial Units at the Statistical Office.
2. More registers were established in the 1970s. In 1980, unique personal identification numbers (PINs) were introduced, allowing for management of the Central Population Register. The 1981 census, although traditional, already used the newly assigned PINs. PINs became widely used in everyday life and especially in all dealings with the state.
3. In 1986, the then-SURS started publishing register-based data on population stocks and migration. The 1991 census was still conducted in the field, but with some pre-printed data: PINs, names and addresses. In a way, the 1991 census was already partly register-based.
4. In 1998, the Central Population Register was taken over by the Ministry of the Interior. Due to excellent relations and the constant flow of knowledge and information, the change was not felt in the production of statistics. At the same time, other registers established by SURS were taken over by ministries and government agencies. The reason for this was that they were being used as official registers, and our legislation does not allow for data collected for statistical purposes to be used for any other purposes (e.g. taxation or similar). Even after these changes, SURS was able to access data from these registers, thanks to the provisions of the National Statistics Act, and official agreements between SURS and entities that maintain/keep these registers and databases.
5. The 2002 census, the first in independent Slovenia, made more use of registers. The fundamental premise was that content that could be collected from various administrative and statistical sources should not be collected by fieldwork. To streamline the enumerators' work, a pre-census database was set up. From there, personalized questionnaires were printed. They included the PIN, name and address of the respondent, as well as an indicator for the enumerator of whether other information on the person had already been collected from other sources (mostly registers) or whether they needed to ask the corresponding questions. The pre-collected data could be those pertaining to migration, school attendance, activity status, occupation, and industry. The idea was not to collect data that are particularly difficult to collect in the field, such as field of education, occupation, usual working hours, or status in employment. Because of this, we considered the 2002 census a combined one.
6. Since the mid-2000s all population statistics in Slovenia have been completely register-based. Some of these surveys use additional data from other sources, but the basis is the CRP. Thus we regularly receive data from the Institute of Public Health (on births and deaths), and from district courts (on divorces). The use of PINs ensures that data linking is simple and efficient.
7. Since 2008, our population base is the usually resident population, using the 12-month actual/intended stay criteria. Perhaps in contrast to most register-based countries, we are able to calculate the intended duration of stay for persons with registered temporary residence since we get the exact dates of validity of such registrations. The usually-resident concept is applied to all population statistics: population stocks, migration, births, deaths, and dual events.

## II. Convergence of census and population statistics

### A. Convergence in concepts and production

8. With the complete switch to the usually resident concept based on the register, the regularly produced data on population was fit to act as the base for our first fully register-based census in 2011. With the establishment of the Real Estate Register (2008), all conditions to conduct a fully register-based census were met. This represented an important milestone in the development of Slovene statistics. Population statistics and census were integrated at that point.
9. New processes were established the framework of the 2011 census. More than 20 different data sources were integrated to produce all the necessary data. Some of these sources were administrative registers, some statistical registers, some were results of register-based statistical surveys. Among them was also the census 2002 microdata database. All these sources had one thing in common: unique identifiers, PINs, which enabled simple linking of data.
10. The more streamlined processes developed in 2011 now allow for more frequent production of data on certain topics. Data on households and dwellings are produced multi-annually (the production of these data is still very complex and time-consuming), which we estimate is frequent enough.
11. Since 2011 we have been publishing data on socio-economic characteristics of population and international migrants annually, as part of a separate statistical survey. It is to be noted that this register-based survey also existed prior to the 2011 census, but it integrated fewer data sources and had only partial coverage. Since 2011, we have been linking together approximately 15 different data sources to produce annual data on activity status and educational attainment of all population and international migrants aged 15 years and above. Since the 2011 census, data sources have changed somewhat, but the main principles have remained the same.
12. Data on educational attainment and activity status are published about 11.5 months after the reference date. The data are very detailed and available at a low territorial level. They are highly sought-after, and linking them to annual migration data brings a lot of added value. With migration being such a significant part of our demographic balance, having frequent and timely data on its key characteristics is vital.
13. As previously implied, register-based (census?) population data also inform other register-based surveys. Socio-economic variables are also included in other population statistics (migrations, deaths, births, marriages and divorces), and also act as input data for some sample surveys with core social variables, reducing the respondent burden. The sample survey sampling frame is also based on the usually resident population.

Figure 1  
The inter-connectedness of register-based population statistics and census (simplified, non-exhaustive). The part in grey is done at least annually, while the rest is done multi-annually.



## B. Convergence in dissemination

14. The decennial census is considered just one of the many register-based statistical surveys conducted by SURS. There is no separate census-specific legislation; the census is just one of the surveys in the Annual Programme of Statistical Surveys. The word census only appears a few times in dissemination: in the methodological note under the releases/online database data points pertaining to the decennial census reference dates, in (mostly historical) database tables, on the 2002 and 2011 census web pages (no longer maintained, but still available), and in methodological explanations.
15. The dissemination of post-2011 census data is completely integrated among other data; there is no topic or subtopic on our website or online database referring specifically to the census other than archived data. The publication of what are also census results is barely distinguishable from other regular population statistics releases.

Figure 2  
Methodological note referring to the census

### METHODOLOGICAL NOTE

Data on population as of 1 January 2021 in Slovenia are produced also according to the Commission Regulation (EU) No. 2017/712 of 20 April 2017 establishing the reference year and the programme of the statistical data and metadata for population and housing censuses provided for by Regulation (EC) No 763/2008 of the European Parliament and of the Council.

16. There are possible downsides to such complete convergence. In the past, censuses were a trademark of the statistical office. Older generations still remember field enumerators visiting them at home decades ago. While most data users understand that such costly operations are no longer needed, they might still expect to be able to look up the term census and find census-specific data. Also, some users might prefer to have all census-type data together in one place; with very different periodicities and changing concepts and approaches, this makes less and less sense.
17. All this is easily mitigated by a good user relations team and excellent communication. All our data releases also contain links to exact tables in the online database, enabling quick access for users.

### III. You win some, you lose some

18. With complete convergence of the census and population statistics, this also means a complete switch to a register-based approach across the board. All the statistics are harmonized and all use the same principles. Users get only one figure for one data point, meaning there is less confusion. The costs of a register-based census are minimal, especially once the majority of the procedures are up and running, as there is only regular maintenance needed.
19. While we consider the complete switch to the register positive, there are also some challenges. For example, assessing over- and under-registration could be more difficult, or there might be changes in our source data over which we have no control. Furthermore, data on certain topics might simply not exist in any of the registers. In general, administrative registers are just that – they are intended for administrative use and do not necessarily conform to statistical definitions or include data only needed for statistics.
20. A change in administrative sources may affect both population statistics and the census. And making a methodological change in the census may affect population statistics. ‘Signs of life’ methods have become the go-to approach in many register-based countries. Small changes in legislation or practice could lead to under- or over-registration. This means that statisticians must keep in touch with all the developments in the existing data sources, as well as be on the look-out for potential new ones. Reliable data from sample-based surveys could also be a good additional data source in some cases. In the last few years, we have had to develop several different procedures to mitigate the impacts of what may appear as small administrative changes.
21. One example was the enforcement of the provisions of the Residence Registration Act, i.e. cessation of temporary residence abroad. The Residence Registration Act, which entered into force in August 2016, stipulated that temporary departure from the territory of the Republic of Slovenia ceased four years after the introduction of the Act (unless it had ceased before then). That is, temporary departures abroad were registered without time limits before 13 August 2016, while after this date the registration of a temporary address abroad could last a maximum of four years. In view of the above, on 13 August 2020, temporary addresses abroad ceased for 22,248 individuals ex officio. According to the existing statistical methodology, 18,500 of these individuals would be included in the population count on 1 October 2020. Using different additional data sources, especially those that define a person's activity status, and using which we assume that a person is actually present in Slovenia, SURS eventually included fewer than 7,500 of these persons in the final

population count (among them 97 per cent Slovenian citizens and 3 per cent foreigners). The majority of these residents had most likely returned to Slovenia years or even decades ago, but had failed to register their return for whatever reason.

22. New data sources may appear over the years. When we conducted our first register-based census, the Register of Education did not yet exist. Therefore we initially detected too few upper secondary school students (we were able to determine their activity status with other methods later in the process). Once the register was established and we gained access to it, we incorporated it into our procedure and were able to produce more reliable data on upper secondary school students, and the process became much more streamlined.
23. An excellent example of the just how connected register-based population statistics, census and also sampling (and thus sample-based surveys) are, is the practice of detecting institutional households. In preparation for the 2011 census, we created a list of addresses with collective households, mostly based on different directories (for example lists of nursing homes, prisons etc.). Ever since the derived usually resident population has been used as the basis for SURS' sampling frame of persons, we have been updating the list every quarter – institutional households are generally excluded from the sampling frame so the list must be as up-to-date as possible. Every time we derive full data on dwellings, households and families, i.e. every 3-5 years, the list is scrutinized and updated more thoroughly.
24. These examples are positive because all parties involved are in constant communication and understand the procedures well. That is the good side of a very small population/census team. On the other hand, it may also mean many key processes may depend on only a few people, possibly too few at times.
25. Data sources may also disappear. Against SURS' wishes and despite our protests, the Household Register was discontinued at the end of 2020. It had been one of the key data sources for our census. It included data on relations between household members for a large majority of the population. We are currently not yet sure how we will tackle the discontinuation of this register. We have conducted some studies, but in the end it seems we might have to switch from using the housekeeping concept to using the household-dwelling concept. In so doing we encounter another problem: although data on the number of dwellings in the CRP has improved immensely over the years, they are still often incomplete and thus hinder the statistical assembly of households. We can say that this is the main challenge for us going forward.

## IV. Conclusion

26. It is difficult to say which came first, register-based population statistics or the register-based census. The data from the census were once used to set up the register and today the data from the register are used in the census. The circle is thus closed. Census and population statistics have been tightly linked since the very beginning and it only makes sense to converge the two.
27. It should be clear, however, that having a register-based system does not mean that all data are produced at the push of a button. As mentioned earlier, registers and other administrative sources mostly exist for their own purposes, not for statistics, and they are rarely interlinked with one another. A lot of work is needed to mould what they give us into a shape that fits our needs. That includes talking to entities that maintain these sources, developing and adjusting how data are processed, and seeking new sources. A good legal basis is needed, a

common unique identifier is preferable, but the real work begins when data from different sources do not match or when they even contradict each other. This is where good knowledge of the data sources, how their data are collected, checked etc. comes to good use.

28. What we should keep in mind at the end of the day is that we are statisticians. We use register data for statistical purposes. Raw register data and final statistical microdata might not always match. However, as long as we investigate the reasons for this and can assess the impact on data quality as minimal, we can say that we produce quality statistics.

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