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Experiences with census users: who they are, what they need, how they are involved**Describing migration and integration processes using statistical registers. The Swiss experience****Note by the University of Geneva¹***Summary*

During the last decade, international migration has been the major driver of the rapid increase in the Swiss population. The acceleration of migratory flows, following the ratification of the Bilateral Agreement on the free movement of people in 2002, had highlighted the need for data able to monitor migration and the structural integration of migrants. In this context, a large programme of research on migration was initiated in 2013. This programme includes different research projects based on the Swiss Structural Survey and the Swiss Population Registers, two components of the new Swiss Census.

This contribution aims first at describing the building of a demographic longitudinal database which is being developed with the cooperation of the Swiss Federal Statistical Office using different population registers and the Swiss Structural Survey. On the basis of these statistics, information concerning the foreign population was organized in a longitudinal perspective using record linkage techniques.

The contribution describes the opportunities offered by the new Swiss Census to increase the knowledge and research perspectives regarding migratory flows, with a special focus on the structural integration of migrants. Moreover, the extent to which the data provides answers to the needs of the research programme on migration is evaluated.

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I. Introduction

1. During the last decade, international migration has been the major driver of the rapid increase in the Swiss population. In 2013, its annual growth rate was of 1.3%, one of the highest observed in Europe. According to the Swiss Federal Statistical Office (SFSO), 86% of this population increase is attributed to international migration and 14% to the natural increase. The migratory balance is positive since the middle of the 1990s, and has tended to increase with a peak in 2008.

2. The acceleration of migratory flows follows the ratification of the Bilateral Agreement on the Free Movement of Persons between Europe and Switzerland in 2002 and takes place in a context of a rapid economic development, in particular in the agglomerations of Geneva and Zürich. It raises some political issues which refer either to the integration of foreigners or to the limits of the population growth. In February 2014, the Swiss citizens expressed through a popular ballot the wish to limit immigration, a result that was seen as “anti-foreigner”. This result not only constrains the Federal Council to examine ways to restrict migration within the Free Movement of Persons Agreement or to renegotiate the Agreement with the European Union. It also questions society on the place of migration in society and on the failure of integration policies, which aim at building bridges between migrants and natives.

3. In this general context, a demand for accurate data on migration emerged leading five years ago to the development of a monitoring of integration which is published by the SFSO. This demand also led to the development of longitudinal analyses, in particular among the refugees, but also among the foreigners arrived in the context of the bilateral Agreement²

4. As far as scientific research is concerned, scholars working on migration are confronted to the rapid change in the composition of flows (in terms of skills, motivations for migration, country of origin for instance) that complicates the description and interpretation of the phenomenon, as well as the identification of the determinants of migration and integration. These complications highlight the need for appropriate data to study migration and the structural integration of migrants in a longitudinal perspective.

5. In this context, a large programme of research on migration was initiated in 2013 and funded by the Swiss National Science Foundation. The National Center of Competence in Research – NCCR – On the Move includes 17 teams of researchers working over 4 years on different research projects based on either quantitative data or qualitative approaches. Four of these teams adopt a quantitative approach based on longitudinal data obtained through linkages of different registers (in particular the Swiss Structural Survey and the Swiss Population Registers, two components of the new Swiss Census). The first team aims at following the professional trajectories of Southern migrants arriving in Switzerland as students; the second focuses on the integration of labour migrants. The third studies the mobility of foreigners within the territory in a longitudinal perspective, and the fourth aims at comparing the cross-sectional and longitudinal measures of structural integration. This paper describes data used in these projects and illustrates the interest of linking different data for research on migration.

² Swiss Parliament (2013), Evaluation zum Aufenthalt von Ausländerinnen und Ausländern unter dem Personenfreizügigkeitsabkommen. Bern, 316 p. <http://www.parlament.ch/d/organe-mitglieder/kommissionen/parlamentarische-verwaltungskontrolle/Documents/bx-bericht-pfz-d.pdf>.

II. Data selected

6. Table 1 contains a non-exhaustive list of registers, selected for the first step of the project according to their relevance for the description of migration and structural integration. The main criteria that were used to select the statistics or registers were the following:

(a) Exhaustiveness: the registers contain information on the whole of the target population. The Structural Survey, which replaces the traditional Census since 2010, and which is based on a sample of approximately 200,000 permanent residents, presents the only exception.

(b) Availability of a PIN, the so-called “NAV13 number” (Social Security Number), at least since 2010.

(c) Information on the migratory status of the population (place of birth, citizenship) and/or structural integration (labour market participation, education, etc.).

(d) Complementarity: the selected registers provide information that is complementary.

7. Altogether, these registers provide useful information regarding the migration and integration processes, including the context of migration (administrative reason for migrating, country of origin, kind of permit, etc.) and the professional and social status in Switzerland (profession, level of education, kind of job, wages, etc.). The information originates from different sources and the added value of the project is to link these sources in order to increase the information regarding every inhabitant in Switzerland. For instance, the wage (which is provided by the register of insured persons – first pillar insurance) is a variable that is not very useful without information regarding the educational background of the person. When matching this register with the Structural Survey, it is then possible to measure discrimination practices regarding the salary. Another example: emigration of foreign persons is documented through the Population Register (STATPOP statistics), which provides official statistics regarding the departure of foreigners. However, to understand the determinants of emigration, information on the immigration processes (available in the Register of foreigners) and on the structural integration (available on the Structural Survey) are needed. The linkage of these sources then allows a better comprehension of the motivations to settle or to leave Switzerland.

8. Even if our focus refers to the migrant population, the linkage was done for all inhabitants and not only for those born abroad or with foreign citizenship. This enables the comparison of distinct groups defined according to their migratory status.

III. Linkage procedures

9. The demographic longitudinal database was developed with the cooperation of the Swiss Federal Statistical Office. Two developments in the Swiss statistics made it technically possible to link different registers.

10. First, in 2008, a new Social Security Number entered into effect. This number is totally anonymous – contrary to the previous one which provided information on the gender, the date of birth and (partially) the surname – and has progressively been incorporated in administrative registers as well as in some surveys. The introduction of this number (the so-called NAVS13 number) facilitated the linkage between different sources of statistics. Before 2008, probabilistic record linkage techniques had to be used to do the same exercise, with a lower linkage quality.

Table 1
A Selection of Population Registers in Switzerland

<i>Description</i>	<i>Available since</i>	<i>Legal Basis</i>	<i>Statistical Unit</i>	<i>Main Variables</i>
Population and households statistics (STATPOP)	2010	Swiss Federal Law of 22 June 2007 on the Federal Population Census (CC 431.112). Swiss Federal Ordinance on the Federal Population Census (CC 431.112.1)	Individuals, households within the permanent and non-permanent resident population	Individuals: date of birth, gender, marital status, citizenship, place of residence, place of birth, residence permit, duration of stay. Movements: births, deaths, arrivals, departures, acquisitions of the Swiss citizenship. Household's composition
Central Migration Information System (ZEMIS)	ZAR since 1982, AUPER since 1985	Swiss Federal Ordinance (142.513) 12 April 2006	Foreign population	Date of birth, gender, marital status, citizenship, place of residence, permit, duration of stay
Structural Survey (RS)	2010	Swiss Federal Law of 22 June 2007 on the Federal Population Census (CC 431.112). Swiss Federal Ordinance of on the Federal Population Census (CC 431.112.1)	Persons aged 15 or more of the permanent resident population living in private households	Language, religion, education, work and employment, mobility of commuters, types of households and families, status of occupation of the dwelling and rent to be paid
Buildings and Dwellings Statistic (BDS)	2009	Federal Law of 22 June 2007 on the Federal Population Census (SR 431.112). Ordinance on the Federal Population Census (SR 431.112.1). Ordinance on the Conduct of Federal Statistical Surveys (SR 431.012.1). Ordinance on the Federal Register of Buildings and Dwellings (GWR-VO, SR 431.841)	Residential buildings and dwellings	Geo-coordinates, building category, period of construction, type of heating, power source for heating and warm water, number of floors, number of rooms, floor space
Central Register of Insured Persons	1948	Federal Act of 20 December 1946 on retirement insurance	Persons aged 15 and more working in Switzerland	Wages

Source: SFSO online, amongst others: <http://www.bfs.admin.ch/bfs/portal/en/index/themen/00/05.html> and <http://www.admin.ch/opc/de/classified-compilation/20050566/index.html>, consulted in January 2015.

11. Second, in 2010, the Population Register was introduced at the national level. Previously, every city or canton managed their own population registers without harmonization in terms of contents or in terms of content and management. The harmonization of the registers at a national level provides therefore a statistical database containing standardized information for all persons living in Switzerland – i.e. more than 8 million.

12. This exhaustive population register is the basis of the linkage procedure, which aims at merging different kind of information or variables coming from other sources for each individual living in Switzerland and recorded in the Population Register. In particular, in order to better understand the integration processes, a development of the longitudinal perspective is necessary. Therefore, the use of the Register of foreigners (which is part of the Central Migration Information System – ZEMIS), which provides individual information from 1981 for every foreigner living in Switzerland, makes it possible to document administrative procedures (changes in the residence permit) or spatial mobility (changes in the place of residence) for the 30 years preceding the creation of the Population Register.

13. Another important objective of this linkage is to document the sociocultural and professional dimensions of foreigners using the Structural Survey undertaken every year since 2010, a large survey documenting language skills, profession, education and family dimensions. This survey concerns more than 200,000 individuals. As the sample is based on the Population Register, the linkage is quasi-automatic.

14. On the basis of these statistics, information concerning the foreign population (and since 2010 the Swiss population) is organized in a longitudinal perspective using record linkage techniques. The process enables tracking every foreign individual living in Switzerland during a 15 year period of time. Even with the NAV13 number, some difficulties remain.

15. In particular, the Central Migration Information System groups two different registers, the Register of Foreigners (ZAR) and the Register of Asylum Seekers (AUPER) which previously had their own personal identification numbers - PIN (respectively ZAR PIN and AUPER PIN). These PIN were replaced by a common PIN (the ZEMIS PIN) only in 2008. Before 2008, when obtaining refugee status and a residence permit, an asylum seeker was deactivated in the AUPER register and assigned with a new PIN number in the ZAR register, leading to difficulties to follow the trajectory of such foreigners before and since the recognition of his/her refugee status. The introduction of ZEMIS, which integrates both registers, improved this situation. Since 2010, ZEMIS also includes the new Social Security Number. STATPOP also contains this NAV13 number. Due to the absence of a common PIN number before 2008, probabilistic linkage techniques based on non-modifiable (such as date of birth, sex) or rarely-modifiable (citizenship) variables were used to track the life course of foreigners arrived in Switzerland through asylum procedures.

16. For the present project, SFSO provided the extraction of different files including the PIN, which had been recoded and anonymized again in order to increase security. This extraction was based on STATPOP 2010 to 2013 and contains the NAV13 number, and, for foreigners, the AUPER, ZAR and ZEMIS numbers. In a first step, the extractions were reorganized in order to obtain a file (called “key file”) with one record per individual containing the different PINs at the close of different years (2010-2013). For the foreign population, this file contains 2,749,788 records. Normally, the PIN numbers should be the same whatever the year, but it was not systematically the case, the PIN number showing a change for 0.5% of the persons considered, for instance when they left Switzerland for some years. This situation led to different procedures in order to guarantee a correct linkage.

17. Table 2 shows the numbers persons after the linkage and the number of observations that were linked. For the whole period under study, the number of individuals included in the SDD reaches 15 million representing more than 73 million records, and there are 16 million events (such as migration, change of status) concerning 4.7 million inhabitants.

Table 2
Number of observations and persons in the different data sets, by origin

Source	Year	Observations			Inhabitants		
		Foreigners	Swiss	Total	Foreigners	Swiss	Total
Flows							
ZAR	1997-2010	10'861'392	-	10'861'392	3'079'723	-	3'079'723
STATP	2011/2012	2'652'713	2'408'556	5'061'269	1'052'445	1'124'673	2'177'118
Total	1997-2012	13'514'105	2'408'556	15'922'661	3'540'500	1'124'673	4'665'173
Stocks							
ZAR	1997-2010	24'345'519	-	24'345'519	3'437'758	-	3'437'758
STATP	2010-2013	7'770'778	25'094'611	32'865'389	2'443'559	6'350'448	8'794'007
Total	1997-2013	32'116'297	25'094'611	57'210'908	4'073'518	6'350'448	10'423'966
Total		45'630'402	27'503'167	73'133'569	7'614'018	7'475'121	15'089'139

Source: author's calculation

III. Utility of the database for the measure of the integration of foreigners

18. As mentioned before, this database aims at opening the way to new research on migration and integration based on a longitudinal point of view. Until now, most of the researches in the field focused on cross-sectional approaches, aiming at measuring integration issues at one point in time without taking into account the life course of migrants or the duration of stay. The current situation is explained by the lack of longitudinal data, most of the statistical system being built on data gathered at one point in time. Moreover, the size of panel data impedes longitudinal analyses on small populations (such as migrants of specific origins). These longitudinal surveys suffer from attrition problems, in particular among mobile population such as migrants communities. Therefore, the use of large databases contributes to a better description of the life course of migrants.

19. Population registers and large-scale surveys are not as informative as specific surveys. For instance, the Population Register provides basic administrative information on the demographic characteristics of the inhabitants, but does not contain information referring to the socioeconomic status, the education level or the language skills. The linkage of different sources increases the available information (for instance, education level, occupation or family structure, as well as spoken languages at home or at work are available in the structural survey), but this information stays at a very general level. No information is available on the family or professional trajectories, discrimination experiences or migratory expectations, subjective evaluation of the success or failure of migration, to mention some of the dimensions referring to migration and integration. Despite this limitation, the elaboration of the longitudinal database increases the range of possible analyses and the understanding of structural integration processes.

20. Structural integration among foreigners is defined as the “the acquisition of rights and the access to position and status in the core institutions of the host society: the economy and labour market, education and qualification systems, the housing system, welfare state institutions (including the health system), and full political citizenship. These are ‘core’ institutions as participation in them determines a person’s socioeconomic status and the opportunities and resources available to them, in a modern market society.” Domains of measure of structural integration can be very diverse with for instance the position in the labour market, the housing conditions or the health level. The indicators of integration are also very diverse: for instance, when the Swiss Federal Statistical Office was requested to design a monitoring of the integration of migrants in 2010, it retained 68 indicators on the basis of international experience and in particular of the recommendations of the European Union. None of

these indicators – 58 have been computed – is actually based on longitudinal data. All are cross-sectional measures: they are computed at a given point in time for different groups of migrants and compared to that of natives.

21. In reality, it is expected that the situation of migrants compared with that of natives varies according to the duration of residence. For some structural dimensions such as employment rates, education level or wages, the gap between migrants and natives is expected to diminish according to the time spent in Switzerland. This is also true for more cultural dimensions such as fertility behaviour or health. Therefore, cross-sectional indicators are sometimes difficult to interpret and to compare as they are influenced by the structure of the migrant population in terms of duration of residence.

22. The design of the database allows the computation of indicators of integration that control this duration of stay effect and also to compute indicators for cohorts of migrants that are followed during their stay in Switzerland.

IV. The specific case of return migration

23. Another example of analysis which is specifically built in the linkage approach refers to the return migration. Traditionally, information describing emigrant population is relatively scarce and difficult to work with. For administrative and political reasons, statistical systems focused on measuring the immigration flows of foreigners. The absence of an internationally harmonized population register renders the precise measurement of emigration problematic. In this context, the linked databases allow new approaches in the research on emigration, in particular the analysis of the factors influencing the phenomenon. Such analysis is made possible by the linkage of the Population Register, which provides information on the migratory status, with data previously gathered such as by the Structural Survey. The aim is to identify, among inhabitants that were surveyed, who left Switzerland the years following the survey and who stayed.

24. The comparison of the two groups provides information on the factors of emigration and permits the validation of the determinants mentioned in the literature. The life course and the age of the potential migrants are considered as two critical markers that influence the timing and the determinants of emigration. Moreover, several studies also underline the selectivity in the emigration process: whereas marriage or having children in school decreases the probability to emigrate, being highly educated, young, single and childless increases it. Citizenship and the migratory background are two further characteristics explaining emigration. Other factors are mentioned by the return migration selection model suggested by Borjas and Bratsberg (1996), which states that migrants leave the host country either when their migratory trajectory does not reach the anticipated goals (failure in the migrant's initial plans) or when they achieve their targeted objectives.

25. The linkage that was undertaken/ designed in the context of the Swiss project allowed the comparison of probabilities to leave Switzerland among inhabitants surveyed in 2010 or 2011 (Structural Survey) and observed until the end of 2012 (Population Register). Descriptive results were the following: Swiss-born residents (0.26%, N=1654) present lower emigration rates than the foreign-born (1.83%, N=4339). Moreover, emigration rates of naturalized individuals (0.6%, N=651) are lower than for foreign citizens (2.1%, N=3741). Regarding the latter, on the one hand the propensity to be internationally mobile is significantly lower for citizens from European countries that are not part of the EU/EFTA compared to all other nationalities. On the other hand, citizens from OECD countries other than Switzerland's neighbouring countries show the highest propensity to emigrate. These results underline the different migratory strategies according to citizenship as well as the selectivity in the access to international mobility.

26. In conclusion, the linkage of registers and surveys that are part of the new census methodology in Switzerland provides new opportunities for researchers on migration. It will certainly also provide new topics for statistical research in other fields such as labour market, family and households and more generally for research in social science. There is no doubt that approaches based on data matching will be multiplied in the future.
