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THE STATISTICIAN AND THE DATA OWNER

The use of permits to stay to check the local population registers undercount

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I. INTRODUCTION

1. The strategy adopted for the 2011 Italian population Census is based on the *register-supported* enumeration using the list of registered household of municipalities (MAL¹). This new Census plan has the aim, among the others, to facilitate the municipalities in the comparison between Census questionnaires and registered household of population archive so to improve both quality of Census returns and updating process of population register.

2. The population-registration system works in a consistent legal framework, setting out terms and conditions to register eligible people within a specific municipality with the aim of establishing their identity and place of residence. To this purpose the actual presence of individuals is checked by local authorities. Anyway, it is well-known that the overall efficiency of population-registration system usually suffers in quality if information is not continuously updated by the Municipal Register Offices. This implies that administrative staff has to maintain direct contact with every subjects in order to update information pertaining to certain events which are very critical to verify, especially for migrants who are not interested to notify their changes in place of residence. For this reason, population registers are affected by under coverage as far as migration events do not involve a formal registration and, similarly, they are affected by over coverage whenever events of emigration do not cause a deletion from the administrative archive. In this context, Census returns play an important role for population register coverage evaluation and control, since population archives can be extensively updated every ten years as results of their comparison with Census records.

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¹ Municipal Anagrafe List.

3. The utilisation of MAL during the fieldwork survey has the advantage to it easier to individuate those people who have to be deleted from the municipal population register as untraceable at the Census reference day and to be considered not usual residents on the municipality territory. At the same time, the *register-supported* Census implies problems due to the eventual undercount data, constituted by usual resident persons in the municipality, at the Census time, but not enlisted into the population register. This brings the 2011 Census plan the need to implement auxiliary administrative sources in supporting municipal population register, above all to the survey of the foreign citizens whose figure, during the last 10 years, have reached such a size not to be considerate negligible, and whose population register coverage can be easily lacking.

4. The 2011 Census plan has foreseen that ISTAT will provide to each municipality an auxiliary list (Lifas²) of foreign household to be contacted during fieldwork enumeration for their inclusion into the central archive of “Permits of stay” which give evidence of their existence on the municipal territory³.

5. Due to the new informative potentialities, the 2011 population Census can't lose the opportunity to give an important contribute to the knowledge of the foreign population in Italy, using every strategy to improve the fieldwork survey and the quality of the information collected about the foreign citizens. About this point, ISTAT has made suitable experiments referred to 12 Italian municipalities, stipulating with some of them *ad hoc* conditions for the supply of personal population register data (Brescia, Bologna, Florence, Padua, and Salerno) and, regarding the others using the personal population register information provided by municipalities for the pilot survey of the 2011 Census made in the last months of the 2009 (Genoa, Latina, Messina, Naples, Palermo, Prato and Rome). The experimentation was based in comparing the individual records of the Municipal Anagrafe List (MAL) with those of the Permits of Stay Archive (PSA) provided by the Ministry of Interior.

6. The general goal is to evaluate if the information of the PSA can be an useful source to create auxiliary checking lists of the personal data lists at a municipality level, to allow the return of the population register's undercount and to improve the quality of the Census results referring to the foreign population that shows greater coverage problems, above all in the Italian metropolitan municipalities⁴.

7. This paper has been done in two main parts: in the first have been carried out the *record linkage* between the 2 archives to check the quality of the personal data lists as support instrument in the fieldwork survey; in the second have been analyzed the unsuccessful matches of every source as level marks of over-coverage of population register (residuals MAL) and as a measure of the possible under coverage of population register for foreign population regularly present into the municipality but not enlisted in the population register (residuals PSA). In the first part of this report are described the base archives features that have been used (section 2), the *record linkage* methodology adopted for the MAL and the PSA data matching and its preliminary results (section 3). In the second part are instead explained the most meaningful returns obtained from the *record*

² Lista integrativa di fonte ausiliaria sugli stranieri.

³ According to Italian administrative law foreigners Non EU citizens should demonstrate possession of valid Permits to stay in order to be enlisted into the population register.

⁴ The under coverage ratio of foreigners at 2001 population Census has been estimated equal to 25 per cent for the large size municipalities.

linkage operations and the analysis about residuals of the source MAL and the source PSA (section 4). In the end have been discussed the main critical point noticed and presented some final evaluations about the using of PSA data as auxiliary source supporting the municipality personal data list (section 5).

II. DATA DESCRIPTION AND PRELIMINARY ANALYSIS

8. The individual MAL records on foreigners, in the 12 municipalities examined as sample, were about 550,000 at the end of the 2007. The MAL variables required have been the following: Tax code, name and family name, gender, date of birth, family or cohabitation residence, number of family members, degree of kinship, family personal data code and Census area code. The popular register data have put before a screening above all with reference to the matching variables with the PSA data (name, family name, tax code, gender, date and place of birth) and the information connected to the Country of “foreign” citizenship. In particular, have been counted 2,199 records with missing information about the country of citizenship (all of them regarding municipality of Rome) and about 43,500 records without ISTAT codes regarding the place of birth (more than 19,000 referred to Palermo, almost 17,000 to Prato and more of 7,000 to Rome).

8. Furthermore, the information about the tax code is missing or incorrect for about 53,000 records, referred to the personal data of Rome (about 41,000), Naples (more than 10,000 cases and, in lesser proportion, Genoa and Palermo (less than a thousand records for each of the two cases). In general it has been noticed that the quality of the personal data variables (name, family name, gender and year of birth) is satisfactory, with the exception of a few records having presumably out of range values regarding the birth year (70 individuals resident in Rome are more than 120 years old) and the registration year, in this last case, only Palermo has shown some blanks.

9. The permits of stay archive is supplied by the Minister of Interiors and made of about 3 millions records at national level. It contains the permits valid until the end of 2007, and those expired between January 1st, 2006 and December 31st, 2007. For the statistic usage of the source, it has to be taken into account that, starting from 2007, it is no more integrated for the foreign citizens having citizenship of a country member of the European Union. In fact, from 2007 they are no more asked to have a permit of stay even for periods longer than 3 months.

10. It has also to be considered that foreign population under the age of 18 years is scarcely represented in the PSA archive, because for the younger people to be charged to an adult is not foreseen the release of an individual permit. In the end, it must be considered that although the Ministry of Interiors archive contains the identification data (name and family name) and the address list indicated by the foreigners as dwelling place, these information are not sent to ISTAT, which, from the beginning of the '90 uses the archive making elaborations after a detailed revision job. This limit in the supply should be overcome if the archive has to be used with efficacy for the Census in order to indicate to every municipality a list of foreign individuals with their addresses to support the municipality personal data list.

11. For the experimentation, from the national archive have been extracted about 470,000 records referred to foreigners registered as living in the 12 selected municipalities, referring to the

following variables, already evaluated by ISTAT for other analysis: tax code, gender, civil status, country of birth, country of citizenship, date of entry in Italy, municipality of dwelling and police headquarter of reference of the permits. The quoted variables are in all the PSA records, with the exception of the tax code missing in more than 72,000 cases but substituted in almost 10,000 cases by the VAT number. The missing tax code is often present in old permits and is for the larger part concentrated in Rome (49,000 cases, Florence (7,400), Naples (5,300) and Bologna (4,000).

III. TECHNIQUES FOR THE CREATION OF THE MUNICIPALITY AUXILIARY LIST OF FOREIGNERS (LIFAS) AND PRELIMINARY RESULTS OF DATA MATCHING.

12. In this section is illustrated the methodology used in the linkage operations between the MAL and the Ministry of Interiors data. By experimentation, have been chosen 12 municipalities, taking the archives MAL and PSA at the date of 31 December 2007, with the exception of Padua, Bologna and Florence that have the personal data information referred to the end of March 2007, so the PSA data have been considered at the same reference date.

13. As key variable of record linkage it has been used the tax code of every individual. But not always has been possible to use the tax code as unambiguous key, because this information was missing in some MAL and more frequently PSA records and because the tax code of the permits of stay not always correspond to the exact one released by the Tax Agency. These gap PSA regarding the variable referred to the tax code and the lack of name and surname of the foreigner in the supply of the PSA to ISTAT, have required more passages with the usage of more extended keys. In these cases, to the tax code, only partially assumed, have been associated the personal data of the foreigner available in the single records. In prospect 1 have been reported in sequence the different steps that, acting time by time on records not yet matched of both the archives and modifying the matching key, have allowed the reaching of the results shown in table 1.

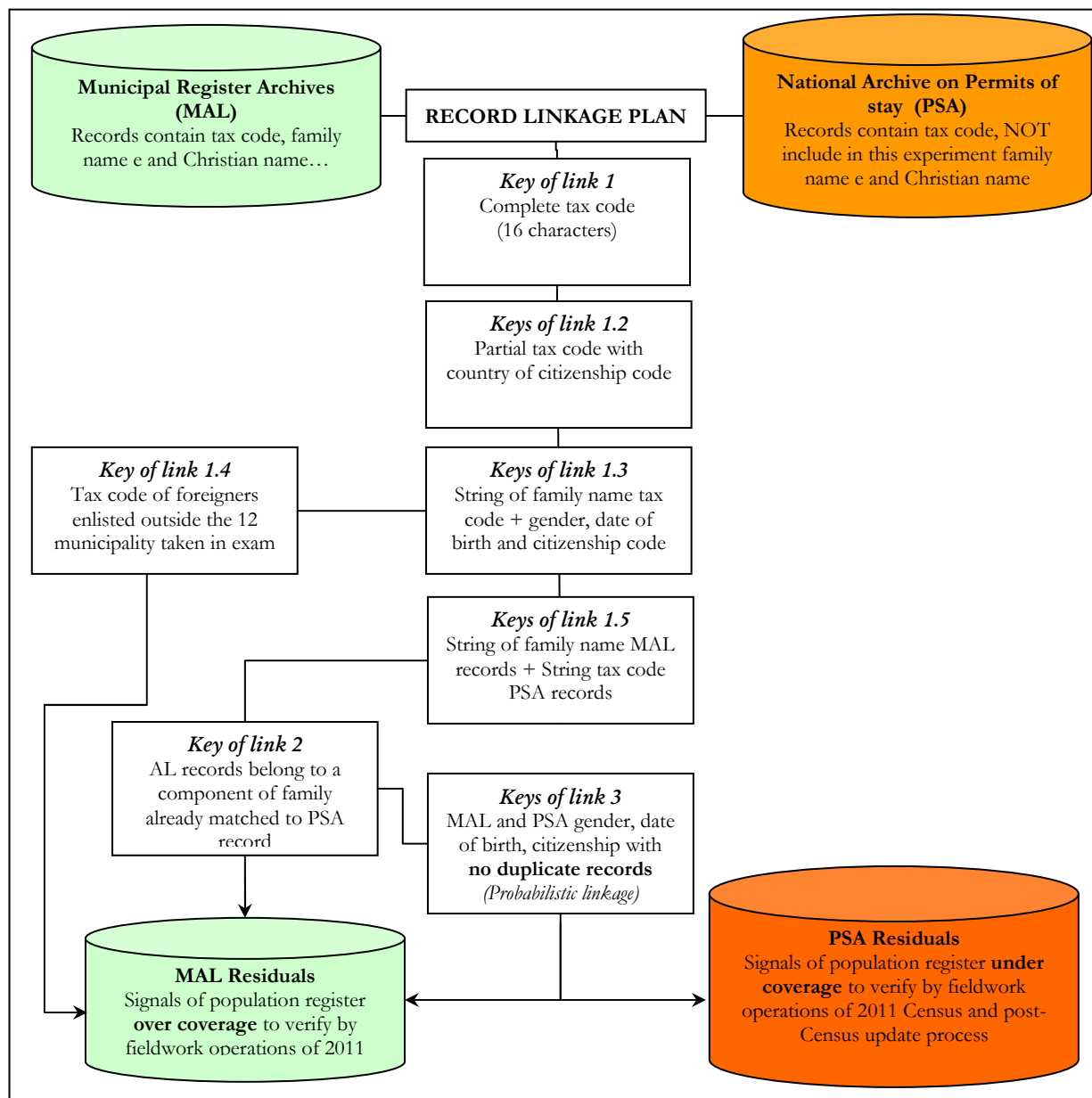
14. In the experimentations made with the simple use of the tax code (16 characters) has allowed, for the twelve municipalities altogether, the matching of more than 68% of the MAL records with the PSA (*link 1* of table 1). In the next phase, as many records showed, in the comparison between the 2 archives, the tax code with the indication of the different or lacking place of birth, the tax code has been used excluding the place of birth substituted by the citizenship indicated both in MAL and in PSA records (*link 1.2*).

15. To avoid the cases for which the name string indicated in the tax code were not homogeneous in the two registers, above all for the cases of double name, the next matching step (*link 1.3*) has been made using as *linkage* key the three letters of the tax code that identify the family name of the individual and the personal data inferable from the corresponding record: gender, date of birth and citizenship. The two procedures have produced the matching of the PSA of a part corresponding to 2.7% to the total MAL records of the examined municipalities (*link 1.2* and *link 1.3*).

16. A further operation was the research, through the complete tax code of the residual MAL records of every municipality among the PSA records referred to foreigner registered as staying outside the examined municipality (*link 1.4*). In this way it has been found, in average in the 12 municipalities, 4.6% of the foreigners registered in the MAL (Table 1). In particular, for 8 examined municipalities about 1 foreigner out of 2 of this contingent appears registered in the PSA of a

municipality of the same district; for Naples, Rome, Messina and Palermo it was prevalent the number of individuals with permit of stay registered in municipalities of other districts (about 65% of the cases for Naples and Rome, the 85% for Messina and Palermo).

Prospect 1 - Linkage plan of the individual MAL and PSA records referred to foreign citizens registered at the end of 2007



17. Furthermore, particular attention was dedicated to the information referring to Naples and Rome municipalities whose results have shown an high number of MAL records without tax code that, as such, haven't allowed any match with the PSA data. To face this problem has been elaborated a new linkage key made of the personal data of every record (gender, date of birth, citizenship), of the first 3 consonant of the family name and of the first consonant of the Christian

name, information available in MAL but not in PSA (*link 1.5*). For the PSA records, lacking in name and family name of foreigners with permit of stay placed in Rome and Naples, the matching research has been limited within the residual records with tax code and has been done using the correspondence between name and family name consonant in MAL and the tax code in PSA. The result was particularly satisfactory for Naples (about 24% MAL records matched with PS, compared with 1% in Rome) where 40% of MAL records is lacking in the tax code (Table 1).

18. Afterwards, for each of the 12 municipalities and through the household code variable, has been matched a meaningful part of foreigners registered in the personal data archive, not to be found in PSA but belonging to a registered household code of MAL with at least a component already matched with PSA records (*link 2*). In this way it has been matched about 18% of the MAL records (with percentage fluctuating between 33% in Palermo and 10% in Salerno) mainly referred to foreign minors who in most cases do not compare in the permits of stay archive (Table 1).

Table 1 – Preliminary results of the matching procedures between MAL and PSA records according to linkage typology and municipality taken in exam.

MUNICIPALITIES	Records of Municipal Anagrafe List		Records of Municipal Anagrafe List linked to Permits of Stay Archive's records							Total matched records
			Linkage typologies (a)							
			<i>Link 1</i>	<i>Link 1.2</i>	<i>Link 1.3</i>	<i>Link 1.4</i>	<i>Link 1.5</i>	<i>Link 2</i>	<i>Link 3</i>	
Bologna	Abs.	31,437	17,894	695	282	1,733	..	6,307	927	27,838
	Perc.		64.3	2.5	1.0	6.2	..	22.7	3.3	100.0
Brescia	Abs.	27,471	16,281	612	470	1,642	..	6,730	418	26,153
	Perc.		62.3	2.3	1.8	6.3	..	25.7	1.6	100.0
Florence	Abs.	35,406	22,165	854	552	1,626	..	6,783	890	32,870
	Perc.		67.4	2.6	1.7	4.9	..	20.6	2.7	100.0
Genoa	Abs.	37,394	25,075	265	353	909	..	7,594	997	35,193
	Perc.		71.2	0.8	1.0	2.6	..	21.6	2.8	100.0
Latina	Abs.	6,937	2,744	56	36	214	..	1577	151	4,778
	Perc.		57.4	1.2	0.8	4.5	..	33.0	3.2	100.0
Messina	Abs.	8,636	3,937	68	52	165	..	1,684	178	6,084
	Perc.		64.7	1.1	0.9	2.7	..	27.7	2.9	100.0
Naples	Abs.	26,410	8,252	1,260	333	569	4,810	3,457	884	19,565
	Perc.		42.2	6.4	1.7	2.9	24.6	17.7	4.5	100.0
Padua	Abs.	20,183	13,862	139	137	1,193	..	3,588	170	19,089
	Perc.		72.6	0.7	0.7	6.2	..	18.8	0.9	100.0
Palermo	Abs.	22,939	8,110	..	163	940	..	4,778	456	14,447
	Perc.		56.1	..	1.1	6.5	..	33.1	3.2	100.0
Prato	Abs.	20,639	13,680	221	175	830	..	4,775	173	19,854
	Perc.		68.9	1.1	0.9	4.2	..	24.1	0.9	100.0
Rome	Abs.	307,583	126,422	1,020	2,364	7,346	1,730	20,801	11,335	171,018
	Perc.		73.9	0.6	1.4	4.3	1.0	12.2	6.6	100.0
Salerno	Abs.	2,963	1,774	..	62	196	..	250	102	2,384
	Perc.		74.4	..	2.6	8.2	..	10.5	4.3	100.0
Total	Abs.	547,998	260,196	5,190	4,979	17,363	6,540	68,324	16,681	379,273
	Perc.		68.6	1.4	1.3	4.6	1.7	18.0	4.4	100.0

Notes:(a) Linkage typologies

Link 1 : MAL records matched to PSA records dwelling into the municipalities; key variable: complete tax code (16 characters);

Link 1.2: MAL residuals records matched to PSA residual records dwelling into the municipalities; key variable: tax code (without country code of birth place) + country code of citizenship;

Link 1.3: MAL residuals records matched to PSA residual records dwelling into the municipalities; key variable: tax code (only 3 letters of family name) + gender, date of birth and country code of citizenship;

Link 1.4: MAL residuals records matched to PSA records dwelling outside the municipality taken in exam; key variable: complete tax code (16 characters);

Link 1.5: MAL residuals records matched to PSA residual records dwelling into the municipalities; key variable: MAL sting of 3 consonants of family name + 1 consonant of Christian name +gender, date of birth and country code of citizenship; for PSA records being lacking family name and Christian name, has been extracted the corresponding matching letters from tax code;

Link 2 : MAL residuals records no matched to PSA residual records but belong to an already matched record; key variable: family code of MAL;

Link 3 : MAL residuals records matched to PSA residual records dwelling into the municipalities; key variable: gender, date of birth and country code of citizenship by assuming only unambiguous matched cases;

19. The last matching procedure (*link 3*) has been made for the records lacking in both archives; in this case have been used the following variables as *probabilistic record linkage*: gender, date of birth, citizenship of the individuals registered in MAL and PSA. Yet, considering the very little selectivity of the *linkage* key and of the following risk of duplication, for each of the 12 municipalities, has been taken again the MAL contingent already matched through the complete tax code (*link 1*), searching a new verification among all the foreigners registered in the PSA as staying in the municipality, using as matching key only the quoted variables. The experiments has produced for every single municipality, a limited number of duplicated records (*matching of one record with more records of the other*), indicating then a reduced risk of wrong matches produced by identical names; furthermore about 99% of the unambiguous matches had an identical tax code in both the archives taken in exam, confirming the validity of the *linkage* key. This matching procedure has found a solution about 4% of the MAL records highly concentrated in Rome.

IV. MEANINGFUL RESULTS OF THE *RECORD LINKAGE* OPERATIONS AND THE ANALYSIS ABOUT RESIDUALS

20. The main results of the experimental matching procedures have generally produced satisfactory results. The permits of stay archive proves to be a precious source for the population register’s coverage check of the non EU citizens reputedly usual residents in Italy.

21. In the 12 examined municipalities, over 71% of the MAL records has been matched with the PSA records (Table 2). Yet, appear differences among municipalities that seem to be conditioned by the degree of accuracy adopted by the Municipal Offices in charge of managing the personal data lists. In particular from last column of table 2, it can be observed that “The MAL matched records” percentage reaches and exceed 90% in the municipalities that have provided for the post Census update of population register data. On the contrary, the analysis of the results obtained for Rome, Latina, Naples, Messina and Palermo (*non – aligned municipalities*) shows that many records haven’t found any matching in the PSA source (in particular, in Rome more than 40% of the MAL records). This result, on the other hand, is proved by the difference, still relevant in 2007, between the foreign registered population and that referring to the foreign computing population account⁵.

Table 2 – Final results of the *record linkage* between MAL and PSA records of foreign citizens registered at the end of 2007 in the 12 municipalities taken in exam.

MUNICIPALITIES	MAL records at the end of 2007(a)	MAL Matched records				of which (%) expired permits of stay	Not matched MAL records(c)	Absolute gap between MAL records and computing population data(d)
		MAL Records Matched to PSA	MAL records of EU Citizens(b)	Total	Percentage values			
Bologna	31,437	27,838	412	28,250	89.9	9.4	3,187	Aligned
Brescia	27,471	26,153	319	26,472	96.4	5.3	999	Aligned
Florence	35,406	32,870	34	32,904	92.9	8.4	2,502	Aligned
Genoa	37,394	35,193	456	35,649	95.3	9.8	1,745	Aligned
Latina	6,937	4,778	1,091	5,869	84.6	12.4	1,068	1,075
Messina	8,636	6,084	307	6,391	74.0	14.8	2,245	1,588
Naples	26,410	19,565	753	20,318	76.9	5.5	6,092	6,111
Padua	20,183	19,089	89	19,178	95.0	5.4	1,005	Aligned

⁵ This computation is obtained by updating previous Census population counts at municipal level with annual balancing equation for natural and migratory events of foreign population.

Palermo	22,939	14,447	11	14,458	63.0	13.6	8,481	6,120
Prato	20,639	19,854	343	20,197	97.9	6.2	442	Aligned
Rome	307,583	171,018	8,167	179,185	58.3	15.0	128,398	110,700
Salerno	2,963	2,384	214	2,598	87.7	6.6	365	Aligned
Total	547,998	379,273	12,196	391,469	71.4	11.4	156,529	

Notes: (a) MAL records are referred at 31 December 2007, with the exception of Padua, Bologna and Florence whose reference day is the of March 2007.

(b) Have been added to matched records citizens of EU countries enlisted into MAL during 2007. Since they are dispensed with permits to stay have been not found into PSA records and they have to be considered usual residents in Italy.

(c) Among not matched MAL records more than 62,000 are referred to registrations happened before 1980, of which 52,200 into the municipal population registers of Rome, 6,200 at Palermo and 1,571 at Naples.

(d) See note 5.

22. The lower coherence of the population register data in the municipalities where it hasn't been done any alignment, between census returns and population register has been confirmed by the higher percentage of MAL records matched with PSA referred to foreigners with expired permit of stay, information inferable from the source PSA: in average, 14% compared with the 8% of the other seven more virtuous or "aligned" municipalities (Table 2). This evidence would confirm in an indirect way, in the five non-aligned municipalities, the over coverage of the population archive already noticed, during the last Census rounds.

23. Yet, if we add to the "non matched MAL records" the MAL matched with permits of stay expired at the end of 2007, it can be observed that the problem of over coverage population register's is present, even if in different measure, also in the municipalities that had provided for the post Census update of their population register. This is due to the effects of new "wrong" personal data positions produced in the inter-censal period. This circumstance is due to the difficulties proper of the management of a phenomena characterized by a meaningful internal and international mobility of foreigners, by occasional or periodical stays, by a lesser interaction between individuals and population register. In different cases in fact, the lacking communication from the foreign citizen who changes his usual residence obstacles or delays the update process of the population register (i.e. foreigners still registered but no more present, at least regularly, in the municipality area).

24. To conclude, the procedures used in the linkage experimentations between the MAL and the PSA data allows to determine the residuals of both the archives that would represent, in the case of MAL, the figure of possible over coverage population register's and in the case of the PSA the possible undercount list of foreign citizens eligible to be included in the municipal population archive but haven't yet registered.

25. The analysis of the lacking matches between the MAL and PSA has great relevance both in evaluating the coverage levels of the population register data lists and to verify the validity of the Ministry of Interiors source to integrate the MAL with the foreigners not yet registered but usually dwelling in the municipality. Table 4 shows the distribution for, each municipality, of the absolute and relative values of the MAL and PSA lacking matches.

26. The 130.632 permits of stay, valid at the end of 2007 but not enlisted in MAL (here defined as PSA residuals), represent about 30% of the foreigners registered in the Ministry of Interior archive as staying in the 12 municipalities taken in exam (Table 4). High percentages can be observed in Brescia (almost 40%), Prato, Salerno (about 36%), Rome and Naples (about 33%); on the contrary in Genoa and Palermo the percentage of the not matched permits of stay goes under

20%, while the remaining 5 municipalities (Bologna, Padua, Florence, Latina, Messina) can be collocated in an intermediate position. The residual PSA amount is not counted in the MAL list but represent the figure of foreigners eligible to be considered usually residents in the municipality and therefore countable.

27. The analysis for citizenship shows a strong prevalence of extra EU foreigners; their size is higher than 90% in the municipalities of Brescia and Prato, while in Latina, Rome and Padua can be also observed a meaningful presence of EU Community citizens.

28. The younger foreigners, in general, represent a very limited number (in average about 4%), but it has been observed that in the permits of stay archive this contingent of foreigners is highly under esteemed because generally the children under 18 years are included in the parents documents. Very useful for our analysis is the information regarding the date of entry in Italy of the lacking MAL matches (last column of Table 4).

29. In the 12 municipalities taken in exam, in average about one foreigner out of 4 has obtained the permit of stay in the 2 years preceding the reference date of the PSA archive.

Table 4 - PSA residuals for municipality, citizenship, age and date of entry in Italy.

MUNICIPALITIES	Residual records of Permits of stay archive						
	Absolute values	Of which:		Percentage values			
		Non EU Citizens	Under 18 aged	On total PSA records	Non EU Citizens	Under 18 aged	Entry in Italy after 2005
Bologna	6,148	4,514	293	23.7	73.4	4.8	26.8
Brescia	11,501	10,708	407	39.3	93.1	3.5	32.0
Florence	10,871	7,843	339	30.8	72.1	3.1	20.6
Genoa	6,524	5,342	383	19.6	81.9	5.9	30.9
Latina	1,086	596	44	26.7	54.9	4.1	26.7
Messina	1,295	1,129	113	23.4	87.2	8.7	39.8
Naples	7,849	6,333	297	33.6	80.7	3.8	31.5
Padua	5,713	3,927	168	28.5	68.7	2.9	25.0
Palermo	1,898	1,571	134	17.9	82.8	7.1	24.8
Prato	8,128	7,659	458	36.3	94.2	5.6	14.1
Rome	68,501	41,764	2,623	32.4	61.0	3.8	21.1
Salerno	1,118	820	32	36.6	73.3	2.9	47.6
Total	130,632	92,206	5,291	30.8	70.6	4.1	23.6

30. Therefore it is possible to assume that, above all the more recent entrances, refer to foreigners that haven't yet provided for the registration in the MAL and, as such, would represent a good measure of the under coverage of the MAL registers. On the contrary the foreigners with an older permit of stay could hide defects in the matching key, and it is not to be excluded the presence of individuals registered in the MAL of other municipalities and not yet registered in the PSA archive as dwelling in the 12 sample municipalities.

31. Referring to the MAL data, the percentage of lacking matches with PSA records in the examined 12 municipalities touches lightly 30% (in absolute value, about 156,000 out of 548,000 MAL records). The distribution for municipality allows to identify a first group of municipalities where the MAL residuals result highly meaningful both in absolute and in relative terms (Table 5).

Table 5 - MAL residuals according to municipality, citizenship, age and registration date.

MUNICIPALITIES	Residual records of Municipal Anagrafe List							
	Absolute values	Of which:		Percentage values				
		Non EU Citizens	Under 18 aged	On total MAL records	Non EU Citizens	Under 18 aged	Enlisted after 2005	
Bologna	3,187	2,690	485	10.1	84.4	15.2	12.1	
Brescia	999	639	211	3.6	64.0	21.1	5.2	
Florence	2,502	1,848	254	7.1	73.9	10.2	9.3	
Genoa	1,745	1,365	228	4.7	78.2	13.1	14.7	
Latina	1,068	435	154	15.4	40.7	14.4	5.1	
Messina	2,245	1,359	157	26.0	60.5	7.0	0.8	
Naples	6,092	3,940	440	23.1	64.7	7.2	6.5	
Padua	1,005	723	97	5.0	71.9	9.7	6.4	
Palermo	8,481	5,762	1,040	37.0	67.9	12.3	0.0	
Prato	442	281	68	2.1	63.6	15.4	11.8	
Rome	128,398	92,322	6,146	41.7	71.9	4.8	3.3	
Salerno	365	256	31	12.3	70.1	8.5	4.4	
Total	156,529	111,620	9,311	28.6	71.3	5.9	3.7	

32. In particular, Rome and Palermo show high percentages of lacking matches (respectively, about 42% for the first municipality and 37% for the second); soon after Messina (26%), Naples (23 %) and Latina (little more than 15%). In this first group of municipalities the MAL residuals are due not only to the effects of the lacking comparison between last Census returns and population register list, but also to the lacking deletion of foreigners who have left the municipality without giving any communication to the Municipal Offices. In any case, these municipal Offices need a strong revision of their population archive, at least as far as it concern the foreign usual resident population.

33. A second group of municipalities (Brescia, Bologna, Florence, Genoa, Padua and Salerno) is characterized by a figure of MAL residuals highly lower than the average of the 12 examined municipalities (Table 5). The lacking matches of Prato, Brescia, Genoa and Padua do not exceed 5% of the MAL supply. Under relative terms, also Florence, Bologna and Salerno show limited enough residuals (about 10% in each municipality), showing, in general, a good maintenance of the population register. In fact, all the municipalities in this second group have provided for the MAL revision after the last Census returns.

34. The analysis for citizenship of the MAL residuals shows that, with the exception of Latina, where the proportion of EU citizens is higher, the lacking matches mainly interests the extra EU foreigners, with values that can vary for some municipalities between 60-65 % (Brescia, Messina, Naples and Prato) and, as far as it concerns Genoa and Bologna, go near or exceed 80% (Table 5). In general the lacking MAL matches concerns population registrations prior to 2005 (more than 96% of the cases in the 12 municipalities) and mainly involves the adult component of the foreign resident population.

V. FINAL CONSIDERATIONS

35. The permits of stay archive allows to find trustful signs about the presence of foreign citizens in the municipality territory. This implies that the Ministry of Interior source represents a useful instrument to identify, at the census day, foreign citizens “not regularly registered in the population register” but eligible to be usual residents at the Census first and then registered into the population list. At the same time, the lacking MAL matches with the PSA records represent, highly probably, “potentially untraceable” foreigners for the Census and to be deleted in the population list during the

2011 post-census updating procedures. In fact, these records haven't met any positive matching response in the Ministry of Interior archive and present a very long average permanence of registration in the population archive.

36. The analysis of *record linkage* results shows that Rome, Naples and the other municipalities of southern Italy taken in exam statistically represent highly risk areas as far as it concerns the register list coverage, and the managing difficulties of population register. In particular, we refer to the lacking carrying out of the "one by one" comparison between Census questionnaires and population register in the last Census rounds, to the lacking population register update in the intercensal periods, to the effects due to the temporal phase displacement of the bureaucratic *iter* for enlisting an increasing figure of foreign immigrants.

37. Yet, to use the PSA to carry out the 2011 Census as auxiliary source it must be considered that, starting from 2007, the mentioned archive has the limit to refer only to the extra EU component of the foreign population in Italy. To build up the municipal Lifas for the 2011 Census, it will be absolutely necessary to get from the Ministry of Interiors the identification data of the extra EU foreigners (family name, Christian name and address of individuals).
