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INDICE

LONGITUDINAL ANALYSIS OF ITALIAN GRADUATES EMPLOYMENT PATHS THROUGH INTEGRATION AMONG DIFFERENT ADMINISTRATIVE SOURCES

Claudio Ceccarelli, Silvia Montagna, Francesca Petrarca

1. Introduction

A general plan of modernization which includes the Italian Statistical Institute (Istat 2016) and other National Statistical offices has the purpose to produce the best possible estimates to meet user needs from multiple data sources, from surveys, administrative archives and new sources such as big data, and moreover to reduce burden and costs. Of course the problem of the integration of administrative archives to produce useful statistics is an issue also addressed and discussed in the rest of the world, (see, CES2014, 2014; Citro, 2014).

Until now, many experiments were carried out that considered different segments of the Italian population with higher qualifications (high school graduates, graduates, Phd), see e. g. Petrarca (2014) and UNICOGroup (2015).

The employment problem for graduates lies not only in the difficulty of getting a job but also in the quality of the demand expressed by the Italian system of goods production and services (Ciriaci and Muscio, 2011). A widespread problem in this period is the nature of short-term job contracts very often characterised by low professional qualifications and which are not coherent with the educational curriculum, as shown the standard sample survey (see AlmaLaurea, 2015; CENSIC, 2012; Istat, 2015a; Istat, 2015b; Capecchi et al., 2012). These studies gain benefits from the characteristics of administrative data and allow us to develop improvements in statistical methodologies..

2. Data source

The new production model envisages the centralization of all data acquisition by processing a special recognition and integration system: the Microdata Integration System (SIM). The SIM main operations are:
- Secure acquisition of administrative data;
- Secure acquisition of statistical data (e. g. data coming from sample surveys);

- Identifying objects and relationships that link between them and assigning a unique and anonymous code (shared among the various sources and stable over time) to individuals and economic units;
- Encoding variables according to Istat classification;
- Handling SIM information to construct specialized sistems and Registers concerning families, individals, and economic units to be delivered in specific sectors.

For more details about SIM see Runci et al. 2016.

2.1. Education database

Ministry of Education University and Research (MIUR) delivers the archive National Register of Students, which provides: a National registry of university students and students of schools, databases of school structures and university structures, and of university and school teaching staff. In particular, to the aim of education studies MIUR provides, for each individual, personal data and its university career from enrolment to graduation.

In this paper, we consider all the graduates who got their university degree in the year 2011. Table 1 reports the number of graduates recorded in the year 2011 for different levels of Italian University degrees.

Table 1 − *Numbers of graduates in the 2011 for different levels of Italian University degree*

	Graduates
First cycle degree (bachelor)	169,232
Second cycle degree (master)	86,593
Single-cycle master degree	43,624
All	299,449

2.2. Job database

The Istat job database, called Integrated Base of Administrative Sources, contains information on the employment status of the Italian population collected from various archives: tax data, social security data, chamber data, etc.. (over 10 primary administrative sources).

This administrative archive records all the business relationships of the Italian population. Hence, in order to identify a business relationship, it is necessary to have in the database an administrative record confirming a relationship with an employer (evidence of type LEED-Linked Employer Employee Dataset or Database). The administrative record must be related to a contributory position

(INPS source) or a social security position (INPDAP source), or other events associated with the worker and recorded in one of other archives on employment available at the time of the analysis.

In this case the employment status of the graduates is given through their contributory position or social security position. These information are recorded for each month of the year. This feature characterizes the job administrative data. An example of job administrative information for a graduate in the year 2012 is reported in Table 2. In this table we report all the contributory positions for this graduate. The working positions are very varied: the graduated has obtained 99 one-day contracts, 2 with a duration of 4 months and 2 of 2 months.

Table 2 - *Example of job information coming from the administrative database: contributory position in the year 2012 of a graduate. (1 means that the graduate has worked at least one day of the corresponding month.)*

MONTH											
1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	1	0
0	0	1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
0	0	0	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	1	0
1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0

In the case of sample survey, the employment definition applied by ISTAT has been harmonized at European level in such way to be consistent with the international one defined by International Labor Organization (ILO).

The main feature of the worker definition: people aged 15 years and over who during the reference time intervals (e. g. the week the information refers to) had at least one of the following characteristics:

- • worked for pay or profit in a job or business for at least one hour;
- • worked unpaid in the family enterprise where they usually work;
- • did not work as they were temporarily away from their jobs (for holidays or sickness).
- • etc.

It is clear that this definition cannot be directly applied to administrative data, as we can see from Table 2. Therefore, the main issue with administrative data is that we must define a proper definition of graduate employed .

In this study, we define worker a graduate for whom the administrative archive records at least a contributory position in a month of the considered year.

2.3. *The survey-system on the study-to-work-transition*

The Istat carries out the sample survey on university graduates' vocational integration by interviewing a sample of graduates who attained the university degree four years before. The survey, aiming at detecting graduates' employment conditions about four years after graduation, is part of the survey-system on the study-to-work-transition, which also includes the survey on doctorate holders' vocational integration (Istat 2015c; Istat 2015d) and the one on the upper secondary school graduates' transition (Petrarca 2014) to university and labour market.

Table 3 - *Percentage of Italian graduates who work at the moment of the degree, after one year and after four year for different levels of Italian University degree.*

	At the moment of graduation	1 year from graduation	4 years from graduation
First cycle degree (bachelor)	28.7	37.4	72.8
Second cycle degree (master)	34.7	55.7	84.5
Single-cycle master degree	27.0	40.3	80.3

A large number of information is gathered through the survey: educational experience, access to the labour market, job search, family situation, referring both to the family of origin and to the current one at the time of the interview. For more details see (Istat 2015a) and (Istat 2015b). The 28.7% of the first-cycle degree graduates already work at the time of the graduation and after the first year this figure is 37.4%. Very different situation for the second cycle master degree graduates who, one year after graduation, are employed in 55.7% of cases.

3. Data linkage

We consider the population of Italian graduates with the degree obtained in 2011 (see Table 1), in order to study their employment status in the years: 2011, 2012, 2013, 2014. To this aim, we analyzed all the records coming from the job database regarding the contributory positions of these graduates.

In Table 4, we reported the number of graduates obtained from administrative database with at least one record in at least a year of the four years considered .

We identify as single record the case of a graduates with only one record in the job administrative database and as pluri-records the case with more than one record. This table shows an increasing trend for the single record graduates in the three years after graduation while the number of pluri-records graduates moderately oscillates.

Table 4 - *Number of graduates with at least one record from administrative database in the years 2012, 2013 and 2014*

	2012	2013	2014
Single record	93,331	99,179	118,358
Pluri-records	61,024	69,430	61,407

We report in Table 5 data for the employment of the graduates in the year of graduation and after graduation. Looking at the year 2014, first cycle degrees have less chance of getting an employment respect to the other kind of degrees. The variation of employment, in the four years, can be seen in Figure 1; this shows a similar behavior for the curve of the second cycle and single-cycle master degree.

Table 5 - *Percentage of Italian graduates who work in the four years after graduation for different levels of Italian University degrees*

	In the year of graduation	1 year after graduation	2013	2014	From 2011 to 2014
First cycle degree (bachelor)	33.41	44.07	47.66	55.54	22.22
Second cycle degree (master)	42.33	63.58	69.58	69.56	31.77
Single-cycle master degree	36.13	59.25	62.16	62.16	28.11

The two curves increase up to the year 2013 and then there is a saturation. In the case of the first cycle degree, the curve grows almost linearly. In the last column of Table 5 are reported the percentage of graduates who have an employment for each

year of the subsequent four years after graduation. Also for this type of graduates, the first cycle degrees are the less favored.

Figure 1 - *Behaviors of employment in the subsequent four years after graduation for different levels of Italian University degrees coming from the administrative archive.*
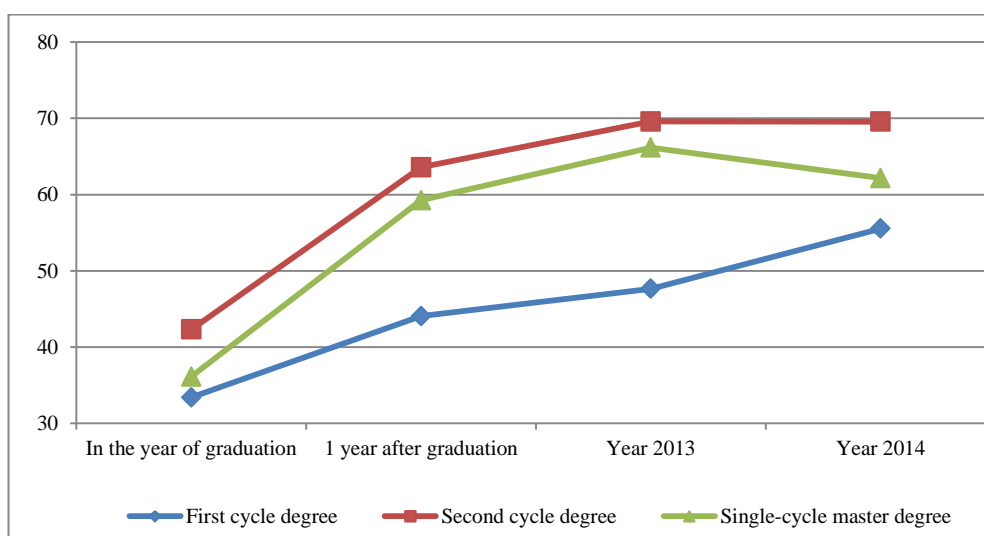
Thanks to the administrative data, it is possible to perform a preliminary longitudinal study of the employment status in the years from 2012 to 2014.

In Table 6 is reported the number of graduates who got their university degree in the year 2011 with at least one record for each of all three subsequently years from 2012 to 2014.

In this table, the single-record row shows an increasing trend, particularly pronounced, in the year 2014 which is due to the flow of pluri-records graduates towards single-record graduates. The same table shows in the subsequent rows that the number of contracts with duration from 1 to 11 months decrease in the years after graduation, in particular the number of one-month and two-months contracts decreases considerably. On the other hand, there is a very clear trend of an increase in the number of contracts lasting 12 months as of 2013. This scenario can be interpreted as an indication of contractual stabilization of "senior" graduates after four years from graduation.

Table 6 - *Number of graduates who got their university degree in the year 2011 with least one record for all three years from 2012 to 2014*

	2012	2013	2014
single-recod	37,752	39,673	47,397
pluri-recods	37,946	36,025	28,301
1 month	14,344	9,512	8,728
2 moths	11,688	10,674	7,428
from 3 to 6 months	26,718	21,325	20,088
from 7 to 11 months	26,947	26,524	22,505
12 months	35,585	43,552	43,672

Number of graduates who got their university degree in the year 2011 with least one record for all three years from 2012 to 2014	75.698

3.1. Not matching data

The reason for the lack of matching of the graduates (83,821-28%) who got their university degree in the year 2011 with the administrative job database may be the following:
- alumni who have not had a job experience
- alumni who went abroad
- alumni with an undeclared work.

We called these graduates not-matching graduates.

In this section, we present a brief profile of the not-matching graduates.

Figure 2 - *Number of the not-matching graduates for gender and for different levels of Italian University degree*
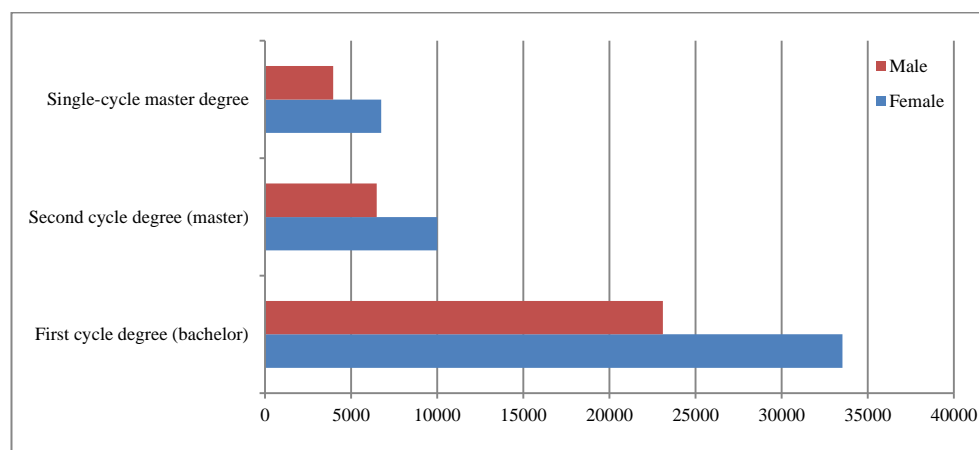
Figure 2 reports the number of not-matching graduates for gendere and for different levels of Italian degree. This figure shows that the not-matching graduates concering mainly the female sex.

Figure 3 - *Percentage of the not-matching graduates for disciplinary sectors*
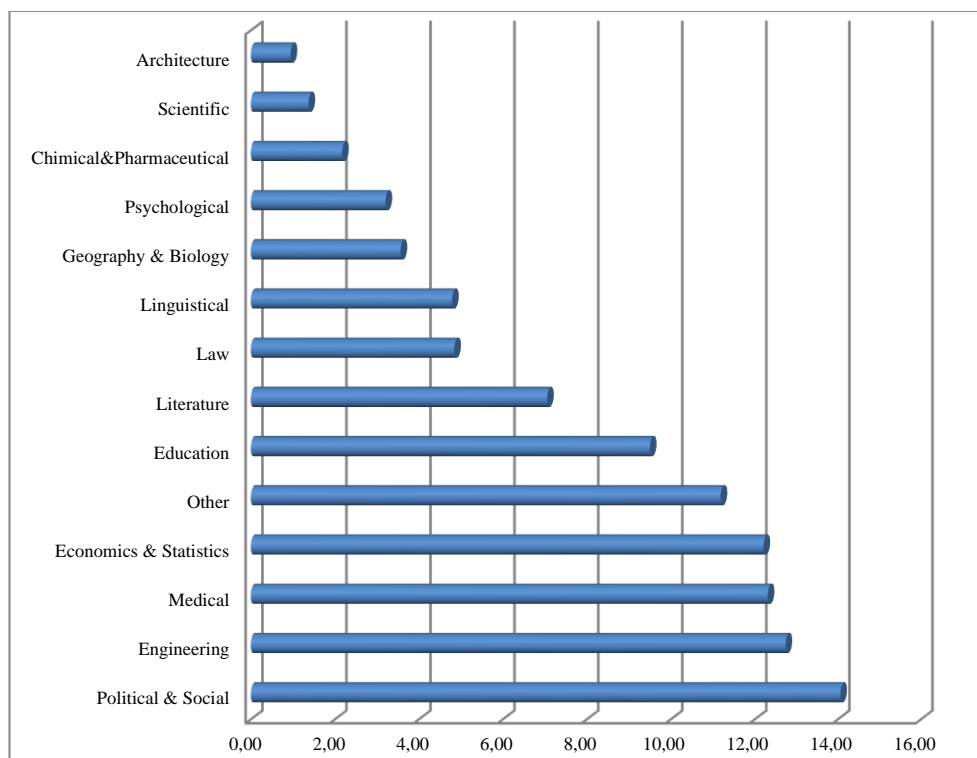
Figure 3 reports the percentage of the not-matching graduates for disciplinary sectors. The disciplinary sectors with a higher percentage of not-matching graduates are: political science and social science, engineering, medical and economics and statistics. The disciplinary sectors with a lower percentage are: scientific, chimical and pharmaceutical.

4. Comparison between administrative data and sample survey

The statistical sample of the graduates in the 2011 (58,400 units) is merged with the Integrated Base of Administrative Sources with the aim to compare the

percentage of working graduates. In the following of this paper, we call this data combined. In first column of Tab. 7, we show the percentage of graduates which are recognized as working graduates at one year from graduation by analysing combined data. These percentages are obtained by analysing the administrative information contained in the combined data records. For the sake of comparison, in the second column of Tab. 7 are reported the percentages obtained by the sample survey information contained in the combined data records.

Table 7 - *Comparison between the percentage of Italian graduates who work at one year from graduation*

	Combined data	
	Administrative information	Sample survey information
First cycle degree (bachelor)	37.86	37.40
Second cycle degree (master)	56.70	55.70
Single-cycle master degree	40.89	40.30

We observe small differences in the results: the administrative information of the combined data are slightly higher. This was expected because the use of administrative data reduces the possibility to loose units, in fact the results of the sample survey are subjective and over dependent on the memory of the interviewee. Moreover, sometime, during the interview, people do not declare employments which are not coherent with the educational path or of short duration. It is worth nothing that in the case of administrative data the indicator of working graduates is able to get a better classification of the working units.

5. Conclusion

We underline the importance of using administrative data for the study of the entrance of graduates into the Italian labour market. We have briefly shown that an administrative archive is flexible and rich enough to analyse the work paths of graduates in the years following graduation. Moreover, the administrative data allow us to study the evolution of graduates after the graduation and therefore to analyse changes in their job position.

We presented the preliminary longitudinal analysis based on new synthesis indicators. We plan to perform the evolution of the contract types, actual duration and professional qualifications through statistical longitudinal models. The analyses on the Integrated database could be adopted as a permanent monitor of the

entrance of graduates into the Italian labour market over the years which may be accompanied from the sample survey.

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SUMMARY

Longitudinal analysis of Italian graduates employment paths through integration among different administrative sources

This paper discusses the issues and the appropriate methodologies for the analysis of the employment status of Italian graduates. The study is based on data obtained by the integration of various administrative archives together with the sample survey on university graduates' vocational integration (Istat). From this integration a very complex situation has emerged that needs to be analysed and correctly interpreted. In order to show the power and flexibility of this archive an example of the longitudinal analysis of the entrance into the labour market at one, two or three years after graduation is presented. Moreover, the comparison among different sources and the methodology to construct proper indicators are discussed.

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A NEW ESTIMATE OF HOURS WORKED BASED ON INTEGRATION OF SURVEY AND ADMIN DATA

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1. Introduction

The Italian National Institute of Statistics (Istat) has improved the use of administrative data to support the production of Official Statistics, through the implementation of statistical registers. In this context, it has developed a new process for the production of the estimates on economic accounts of businesses for the SBS regulation (Reg. EU 58/1997 and 295/2008). The so called FRAME SBS is an integrated system based on fiscal and social security data as primary sources at firm level and, for the required variables not available in the administrative data, it also makes use of direct surveys and estimation strategies which exploit the increased amount of auxiliary information available from admin data (see Luzi and Monducci, 2016, and Luzi et al., 2014).

Since the reference year 2014, in order to enhance this system, a new methodology has been introduced for the estimation of the annual amount of hours worked by employees at enterprise level. The measurement of this variable is considered challenging. In fact, in the administrative data there are no variables directly linked to the statistical definitions. Furthermore, hours worked are not easily measured through business surveys as there is no unique way to register them in the business accounts systems. Therefore, a mixed-source statistical process has been implemented, that is based on the integration of both structural and short-term surveys data on hours worked and the information gathered by the new register on wages, hours and total labour cost at employee-employer level (hereafter RACLI). This register covers the entire population of enterprises and supplies a measure of hours paid, which is strongly correlated with the target variable hours worked. The estimate of hours worked is obtained modelling the relationship between hours worked and hours paid on the units observed by the surveys and using the estimated relationship parameters to produce an estimate of the target variable value on the unobserved units through the independent variable value. These estimates, together with the direct survey measures, give a measure of the target variable value for each population unit.

This paper describes the new methodology used for the SBS estimates of hours worked and focuses on the identification of the main features that are relevant in the profiling of enterprises with respect to the modeled relationship. The main reasons for a very different estimation level in comparison with the previously released one are investigated, to show how the integrated use of data from surveys, specifically designed for the measurement of the target variable, and the huge amount of information from a register can lead to a more accurate identification of specific patterns of the target variable.

2. Data sources and how they are used

In Istat, four business surveys are designed to collect data on hours worked. There are two annual structural surveys, whose main aim is to produce the data required by the SBS Regulation, which release many variables on the economic accounts, and among the others collect data also on hours worked. They are the PMI survey with a sample of around 100,000 enterprises with less than 100 persons employed; and the SCI survey, that is a census of the 11,000 enterprises larger than the given threshold. Both surveys cover Nace Rev. 2 sections from B to S (Industry and Services), with the exclusion of K (Financial and insurance activities) and the public sector. Until the data release for 2013, these two surveys produced jointly the annual estimate of hours worked by employees transmitted to Eurostat for the SBS Regulation and published also nationally.

The other two surveys are short-term ones and their data are used jointly to produce quarterly indicators on hours worked, both for the STS EU Regulation (Regulation EC n. 1165/1998 of the Council and its revisions and amendments) and for national release. The GI survey is a monthly census of approximately 1,600 enterprises with at least 500 employees, while VELA is a quarterly survey with a sample of around 15,000 enterprises with 10-499 employees. Both surveys cover Nace Rev. 2 sections from B to S, with the exclusion of the public sector.

All the four surveys microdata have been linked to those of the RACLI register, which is an extension of the Istat Statistical Employment-Business Register (ASIA) on persons employed to wages, labour cost and labour input (in particular, to a proxy of hours paid). This register covers all the employees in enterprises, excluding agriculture and the public sector. It has a Linked Employer Employee Data (LEED) structure, with information at job/enterprise level, based on the monthly data at worker level that employers have to send to the National Social Security Institute.

The surveys and RACLI register data have been used to build an integrated dataset of microdata containing all available information about hours on the target

population, defined by the active enterprises with employees of the ASIA register belonging to the Nace economic activities covered by the SBS regulation. The integration between register and survey data has been carried out through a record linkage procedure, based on the ASIA code of the enterprises and on the difference in recorded jobs. This latter criterion is necessary to ensure the coherence of the linked short-term survey and structural register data. As a result, the integrated dataset contains a set of variables from the RACLI register for each enterprise of the target population, including all the available information on the characteristics of employees, type of contract (i.e. job-on-call), events of absence (i.e. short-time-working) and the measure of hours paid that is used as auxiliary variable for hours worked. Hours paid are derived from the input of work declared to the social security system in different units of measure, depending on the type of employee contract. The information on paid time and the proxy variable of hours paid, derived through the contractual working time of the job set in the collective labour agreements, do not include overtime hours. Nevertheless, because the relation between overtime hours and total hours worked is quite specific to economic activities and enterprise sizes, modelling the relation between hours worked and hours paid in strata based on these variables protects against a possible bias. In the final integrated data set variables from the ASIA business register such as the economic activity and the enterprise size based on the number of employees are also included.

Furthermore, the integrated dataset contains a survey based measure of hours worked for each of the population's enterprises for which: data on this variable were collected in at least one of the above mentioned four surveys; and the linkage between survey and register data passed the above mentioned criterium based on recorded jobs. If more than one survey source on hours worked was available for a given enterprise and a given year, data from GI and VELA were preferred to those from SCI and PMI. In this regards, many analyses have been carried out to evaluate the discrepancies in the data recorded by the several surveys, and the much greater relevance of the hours worked variable in the short-term surveys has been found to imply better suited editing, imputation and validation procedures. In particular, a self-selection phenomenon has been identified in each survey, but the short-term business surveys (GI and VELA) are much less affected by it due to their substantially higher response rates. Furthermore, per capita hours worked enter in the sample design of the VELA survey.

As shown in Table 1 for 2012 (the results are similar also for the following years), in the integrated dataset the share of population employees for which survey data on hours worked are available increases sharply with enterprises' size class, due to the census nature of the GI and SCI surveys. Furthermore, the larger reliance on the short-term surveys than on the structural ones is apparent.

Table 1 – *RACLI register population and linked enterprises by survey and size - Year 2012*

Size (number of employees)	RACLI population (thousands employees)	Linked units (thousands employees)	Employees coverage (percentage)	Linked units by survey (percentage of employees)		
				VELA-GI	PMI	SCI
< 1	414.7	0.9	0.2	-	100.0	-
1-9	2,722.6	28.1	1.0	27.4	72.6	-
10-99	3,560.0	377.1	10.6	49.4	50.5	0.1
100-249	1,107.9	304.6	27.5	27.0	-	73.0
250-499	697.3	267.7	38.4	40.6	-	59.4
>= 500	2,793.3	2,360.1	84.5	88.2	-	11.8
Total	**11,295.7**	**3,338.4**	**29.6**	**73.9**	**6.3**	**19.8**

3. Estimation model

The final aim is to estimate the total amount of hours worked for the domains required by the SBS regulation. In model-based sampling theory, the estimation of a finite population total from a sample is represented as the prediction of the total of the non-sample values (Valliant et al., 2000). In this context, the target variable is available on a subset of units, observed by several surveys, while the auxiliary variable, strongly correlated with the target one, is available for each enterprise in the target population from an administrative source.

Hours worked could be estimated within this scheme. The above described integrated dataset contains the hours worked survey based measure for a subset of units *s* and the hours paid administrative measure on all the units of the target population.

The following general linear model between target and auxiliary variable was tested and estimated on the units in the subset *s* of the population:

$$M : Y = \beta X + \varepsilon \tag{1}$$

where

$$\mathrm{E}(Y_i) = \beta x_i \tag{2}$$

$$\mathrm{var}(Y_i) = \sigma^2 \gamma_i, \tag{3}$$

$$\mathrm{cov}(Y_i, Y_j) = 0, \ i \neq j \tag{4}$$

and Y is the total amount of hours worked for each enterprise, X the total amount of hours paid and

$$\gamma_i = x_i \tag{5}$$

The best linear unbiased predictor (BLUP) $\widehat{\beta}$ of β under model M is:

$$\hat{\beta} = \sum_s y_i / \sum_s x_i \tag{7}$$

which was calculated on the observed units.

The estimation of the hours worked population total for each of the SBS domains was solved as follows:

$$\hat{T} = \sum_s y_i + \sum_r \hat{y}_i = \sum_s y_i + \sum_r \widehat{\beta} \, x_i \tag{8}$$

where *r* indicates the subset of population units for which no survey measure of hours worked is available.

The model is estimated on strata defined on the basis of jobs and firms characteristics.

The richness of the RACLI register information has proved very useful to distinguish different enterprises' structures and events that influence the actual input of work and to study their effects on the relationship between hours worked and hours paid. Many aspects have been taken into consideration, suggested by both subject matter expertise and the data.

A regression tree method has been used to test for the factors affecting more significantly the relation between hours worked and hours paid, represented by the parameter β of the model above.

In this view, it is important to underline the possibility to identify clearly within the RACLI register the jobs with contracts that have peculiar working time arrangements which characterize the labour input in enterprises using them extensively. For example, a relevant presence of job-on-call contracts in an enterprise in general tends to reduce per capita hours worked and to affect the relationship with hours paid (Congia and Pacini, 2010).

Furthermore, very useful information is also available in the RACLI register on the use of short-time working (STW) schemes by some enterprises in many economic sectors, in particular during the recent economic crisis (Congia and Pacini, 2014), another phenomenon that is expected to affect the relationship under study.

Four types of sub-populations have been identified as those to be considered before defining the strata on the basis of economic activity and size.

First of all, enterprises with at most half an employee in annual average have to be distinguished. These very small enterprises are difficult to be surveyed, showing a low response rate in the PMI survey. In this group, the hypothesis that hours worked are equal to hours paid has been accepted for enterprises without events of a defined kind of absence, while for the remaining part a specific model has been estimated.

Furthermore, different profiles of STW use could be delineated thanks the very detailed information on the phenomenon in the RACLI register and pre-defined thresholds. In this way, four groups of enterprises were identified which were classified separately for model estimation.

Finally, enterprises with a high incidence of job-on-call employees have been studied for the peculiarities of this type of contract that lead to a close relationship between hours paid and hours worked, and because they resulted to be particularly affected by response bias. For units with an incidence of job-on-call employees above a pre-defined threshold, hours worked have been estimated as equal to hours paid. While for those below the threshold, hours worked have been estimated through the model together with other units.

For the remaining enterprises, a stratification on the basis of enterprise economic activity and size has been adopted. This stratification allows to estimate hours worked including the overtime component on the basis of the proxy of hours paid, even if the auxiliary variable does not include this component, because (as mentioned above) the incidence of overtime hours over total hours worked is strongly associated with the two stratification variables.

The stratification on each sub-population is carried out maximizing the number of strata under a constraint on a minimum number of units per stratum. When this constraint requires to aggregate neighbor strata, priority is given to keeping separate enterprises of different sizes, rather than different economic activities as it is more common. In fact, all the analyses show that hours worked are much more influenced by enterprise size rather than by its economic activity. This holds especially for very small enterprises, where the sensitivity to size is very high. The level of disaggregation of the strata thus varied across sub-populations, the finest being based on 2-digit Nace and 6 size classes.

4. Main results

The new estimates of hours worked are lower than the previous ones (based only on the two SBS surveys), in particular in enterprises with less than 10 employees (see Figure 1).

Figure 1 –*Annual hours worked per employee by economic activity and enterprise size – previous vs. new estimates–Year 2013.*
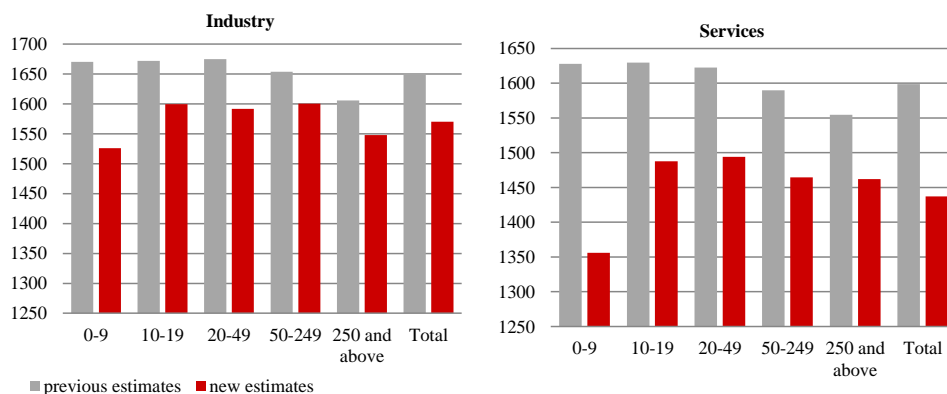
Note: Services do not include section K (Financial and insurance activities).

More specifically, the new estimates indicate that for the entire economy hours worked by employees are lower than the previously calculated figure by 8.0 per cent, respectively -4.9 per cent in industry and -10.1 per cent in services. The differences are strongly related to size and economic activity: the largest ones are recorded for smaller enterprises and the services sector. Moreover, in the new estimates annual hours worked are lower in enterprises with less than 10 employees than in larger ones, in both industry and services. This was not the case in the previous estimates and it could have an impact on economic indicators such as those for productivity and labour cost.

To explain such differences, it is useful to keep in mind a number of aspects. As shown in Table 1, the sample coverage of the target population is increasing with size, together with the use of short-term data. This means that for the biggest size class, the differences can be explained mostly as a substitution effect between the SBS surveys and the STS ones, in the light of the fact that the short-term surveys have always produced lower hours worked levels than the structural ones. As mentioned before, the STS surveys are considered as better suited to accurately measure hours worked than the SBS ones.

On the other side, for the smaller size class enterprises, the sample coverage is consistently due to the SBS surveys, hence the differences can be ascribed to the model estimation scheme. As described above, register data have allowed to identify relatively small sub-populations of enterprises with specific characteristics implying peculiar patterns of hours worked. The measurement of hours worked in these sub-populations presents additional difficulties and the small sizes of the sub-populations make it difficult to represent them adequately through a sample survey.

This concerns in particular small and micro-enterprises, firms with a significant share of low labour input employment contracts (e.g. jobs-on-call) or absence events, or units operating in specific economic activities such as Arts, entertainment, recreation and Other service activities (sections R and S of the Nace Rev.2 classification).

Table 2 – *SBS annual hours worked per employee by economic activity – Years 2013-2015 (number and percentage).*

Sections Nace Rev.2	2013	2014	2015	Change 2014/13	Change 2015/14
Industry	**1,570**	**1,596**	**1,614**	**1.6**	**1.1**
B - Mining and quarrying	1,580	1,603	1,655	1.5	3.2
C - Manufacturing	1,567	1,597	1,615	1.9	1.1
D - Electricity, gas, steam and air conditioning supply	1,643	1,606	1,578	-2.3	-1.7
E - Water supply; sewerage, waste management and remediation	1,593	1,585	1,598	-0.5	0.8
F - Construction	1,572	1,591	1,614	1.2	1.4
Services	**1,440**	**1,444**	**1,456**	**0.3**	**0.9**
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	1,526	1,522	1,538	-0.3	1.1
H - Transportation and storage	1,546	1,555	1,569	0.6	0.9
I - Accommodation and food service activities	1,250	1,287	1,296	3.0	0.7
J - Information and communication	1,545	1,564	1,592	1.2	1.8
L - Real estate activities	1,450	1,478	1,463	1.9	-1.0
M - Professional, scientific and technical activities	1,532	1,526	1,528	-0.4	0.1
N - Administrative and support service activities	1,363	1,334	1,354	-2.1	1.5
P - Education	1,076	1,117	1,082	3.8	-3.1
Q - Human health and social work activities	1,289	1,304	1,306	1.2	0.2
R - Arts, entertainment and recreation	1,299	1,315	1,381	1.2	5.0
S - Other service activities	1,344	1,358	1,339	1.0	-1.4
Total	**1,493**	**1,504**	**1,518**	**0.8**	**0.9**

Note: Services and Total do not include section K (Financial and insurance activities).

Finally, the prediction approach allows to take into account every kind of units, also the ones that in any regards are more difficult to be reached by the direct surveys and for which information is available in the register. Therefore, the

identification of specific sub-populations and the prediction on each enterprise of the target population help avoiding the distortion effect of the non response bias on the parameter estimation.

The estimates produced with the new method on the years 2013-2015 show a remarkable consistency over time (see Table 2). In 2015, on the entire considered population, employees worked on average 1,518 hours. In industry, working hours were substantially longer than in services (respectively, 1,614 and 1,456). Furthermore, the variability of hours worked was much lower across industrial sections than across services ones. In the tertiary sector, much lower values were measured in the large majority of sections, with a minimum of 1,082 in Education. The only exceptions were Transportation and storage and Information and communication, where hours worked were similar to those in industry (respectively 1,569 and 1,592).[1]

5. Final remarks

The availability of new administrative data and their exploitation through the implementation of statistical registers are changing the way statistical data are produced. This implies a new role for survey data and their integrated use with register ones. In the Italian SBS estimation of hours worked for each enterprise, a mixed-source approach has been applied for the first time for the 2014 release. The availability of estimates based on this method on three subsequent years (2013, produced for the method development, and, starting from 2014, for dissemination) has allowed to verify the stability of the method across time. The new methodology has produced lower estimates of hours worked with a far greater variability across economic activity and size class of enterprise than those based only on the SBS surveys (SCI and PMI). These differences, which increase as the enterprise size decreases, are due to: the use of STS surveys (VELA and GI) data, where hours worked are measured quite differently (and more accurately) than in the two structural ones; and the extensive use of the detailed information available for all the target population enterprises in the RACLI register.

In the near future, this estimation method could be improved due to: the evolution of the informative contents of the social security source and the RACLI register on working time; and the enlargement of VELA target population to enterprises with less than 10 employees.

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[1] It is worth reminding that these figures do not include the non observed hours worked, which can affect to different degrees the various economic activities.

Furthermore, the availability of more extensive statistical registers could be used increasingly to redesign questionnaires and samples of the direct surveys, so as to avoid unnecessary statistical burden and at the same time exploit the possibilities the surveys offer to measure phenomena on which administrative data do not supply enough information.

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SUMMARY

A new estimate of hours worked based on integration of survey and admin data

The Italian National Institute of Statistics (Istat) has developed a new statistical system for the production of estimates on economic accounts of businesses for the SBS regulation (Reg. EU 58/1997 and 295/2008), based on a massive use of administrative data, both as primary and auxiliary source of information. The system releases microdata for the main variables, mostly covered by the administrative data, and aggregate estimates for the remaining variables, based on an integration of administrative and direct survey data.

Since 2014, a new estimate of the variable 'total amount of hours worked by employees' has been released. The methodology is based on a mixed-source statistical process, that integrates the microdata obtained by several direct (short-term and structural) surveys and a statistical register (on Wages, Hours and Labour Cost). Through a record linkage process a consistent dataset is produced that covers the complete SBS target population and contains the target hours worked variable on the sample of directly surveyed units and, for all the population units, a proxy of hours paid and information on several characteristics of the enterprises.

Under the assumption that there is a strong relation between hours worked and hours paid, a model based method has been developed to estimate this relationship on the units on which hours worked have been measured through the surveys and to impute them on all the other population units, for which the all the covariates contained in the register are available. This new methodology has produced hours worked estimates that are lower than those based only on the SBS surveys and that show far greater variability across economic activity and size class of the enterprises.

This paper aims at describing the new methodology and analyzing the results, to highlight how the new estimation method is able to more accurately describe the great variability across enterprises' sub-populations.

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STIMA DEL COSTO DEL LAVORO A LIVELLO INDIVIDUALE:UN APPROCCIO DA REGISTRO[1]

Claudio Ceccarelli, Francesca Ceccato, Silvia Pacini, Francesca Rossetti

1. Introduzione

L'Istat come altri istituti nazionali di statistica europei partecipa attivamente alla modernizzazione delle statistiche ufficiali per l'implementazione della Vision 2020 di Eurostat (ESS, 2014) anche attraverso un processo di revisione e innovazione interno che annovera tra i punti cardine la costruzione di un sistema integrato di registri statistici basati sull'utilizzo congiunto di una pluralità di fonti amministrative e statistiche (Istat, 2016). Questo percorso, reso possibile anche dall'evoluzione delle fonti amministrative disponibili, in termini di ricchezza informativa e di tempestività, ha lo scopo di ampliare l'offerta di informazioni per gli utenti e per il Paese e, nel contempo, contenere i costi delle indagini statistiche grazie sia alla massimizzazione e razionalizzazione dell'uso di molteplici fonti di dati sia all'integrazione e alla coerenza tra i processi statistici.

In tale contesto generale, l'analisi sperimentale presentata in questo lavoro è volta a valutare la possibilità di integrare e armonizzare due importanti processi statistici a partire dalla stessa fonte amministrativa, le dichiarazioni mensili che le imprese inviano all'INPS per il pagamento dei contributi previdenziali, sfruttando il miglioramento negli ultimi anni in termini di tempestività e di arricchimento informativo a livello di singolo individuo dei dati amministrativi utilizzati. Si sperimenta qui il passaggio da una stima degli oneri sociali con informazioni a livello di impresa (modello DM) effettuata dalla rilevazione trimestrale su Occupazione, Retribuzioni, Oneri Sociali e costo del lavoro (Oros), ad una stima con informazioni a livello di singola posizione lavorativa dell'individuo (modello UniEmens[2]) che rappresenta l'unità di analisi del Registro Annuale su retribuzioni, ore e Costo del Lavoro a livello di Individuo e di Impresa (RACLI).

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[1] Questo documento è frutto del lavoro congiunto degli autori. Tuttavia i paragrafi possono essere attribuiti come segue: Ceccarelli C. § 1 e 6, Ceccato F. § 2, Pacini S. § 3 e 5, Rossetti F. § 4.

[2] Dal 2010 la nuova dichiarazione UniEmens, con scadenza il 30 del mese successivo a quello di riferimento, ha unificato i precedenti modelli DM, per il calcolo degli oneri contributivi a livello (di posizione contributiva) d'impresa, ed Emens, per i contributi pensionistici del singolo lavoratore dipendente. Più precisamente il dettaglio informativo UniEmens è a livello di singola posizione

In prospettiva futura, il passaggio ad una stima gli oneri sociali a livello di singola posizione lavorativa, consentirebbe di utilizzare la sola fonte UniEmens per finalità statistiche sia congiunturali sia strutturali garantendo una maggiore efficienza e coerenza. Questo rappresenta uno dei tasselli fondamentali di un progetto più ampio ovvero un registro del lavoro che ambisce a riunire in un unico processo la stima di occupazione, redditi da lavoro, sia al lordo sia al netto delle imposte, e costo del lavoro esteso a tutte le relazioni lavorative nel settore pubblico e privato.

Questa fase di integrazione e armonizzazione dei processi Oros e RACLI richiede l'analisi di due aspetti fondamentali: il primo è legato alle variabili e il secondo alle tempistiche. Per quanto riguarda il primo aspetto, la variabile più complessa da definire e misurare è rappresentata dagli oneri contributivi[3] che sono oggetto di studio in questo lavoro. Una delle principali difficoltà è legata al fatto che il sistema di metadati necessari per l'individuazione dei contributi non è organizzato in modo strutturato, completo e storicizzato e va pertanto ricostruito a partire da una molteplicità di informazioni. In secondo luogo, dopo aver verificato la riproducibilità di tutte le variabili statistiche del processo Oros, vanno affrontate le questioni legate alle tempistiche.

Prima di entrare nel dettaglio della sperimentazione (§ 4) e dei risultati (§ 5), sono illustrate di seguito le principali caratteristiche dei due processi considerati che utilizzano la fonte UniEmens, indirettamente come nel caso di Oros attraverso il DM virtualmente ricostruito a livello di impresa dall'INPS (§ 2), oppure direttamente come nel caso di RACLI (§ 3).

2. La rilevazione Oros

La rilevazione Oros produce indicatori trimestrali su occupazione dipendente, retribuzioni, oneri sociali e costo del lavoro[4]. Progettata alla fine degli anni '90

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lavorativa e ogni individuo può avere una o più posizioni lavorative contestualmente. Tali due concetti, pur essendo differenti, in questo lavoro per comodità espositiva e senza compromettere i risultati della sperimentazione, saranno utilizzati indifferentemente.

[3] Le informazioni su occupati e retribuzioni non presentano particolari difficoltà di misurazione se si utilizzano dati a livello di singola posizione lavorativa piuttosto che di impresa.

[4] Nel dettaglio, vengono prodotti indici su retribuzioni, oneri sociali e costo del lavoro per Unità di lavoro equivalenti a tempo pieno (Ula) e indici su posizioni lavorative dipendenti, per le imprese e le istituzioni private con dipendenti dei settori industria e servizi, diffusi in ambito nazionale tramite il comunicato stampa "Il mercato del lavoro" e la banca dati I.Stat. Le posizioni lavorative in livello sono, invece, rilasciate nella "Nota trimestrale congiunta sulle tendenze dell'occupazione", redatta congiuntamente da Ministero del lavoro e delle politiche sociali, Istat, INPS, Inail e Anpal. Per la diffusione europea, vengono calcolati gli indicatori di costo del lavoro espressi in termini di ore

rappresenta un primo esempio di statistiche ufficiali in Italia basate sullo sfruttamento intensivo di dati di fonte amministrativa a scopi congiunturali (Istat, 2008).

La principale fonte amministrativa su cui si basa la rilevazione Oros è rappresentata dai moduli DM dell'Inps a livello di impresa. Fino al 2009 i datori di lavoro presentavano all'INPS, entro l'ultimo giorno del mese successivo a quello di competenza, tali moduli per denunciare le retribuzioni corrisposte ai dipendenti, i contributi dovuti e l'eventuale conguaglio delle prestazioni anticipate per conto dell'Istituto di Previdenza, le agevolazioni e gli sgravi. Dal 2010 l'obbligo del datore riguarda la presentazione di dati dichiarati su base individuale (modello UniEmens) e non più su base aziendale come avveniva in passato.

Per gli scopi dell'indagine Oros, è stato possibile continuare ad usare dati aggregati a livello d'impresa, grazie ad un'operazione di virtualizzazione che l'INPS effettua mensilmente, per scopi amministrativi, con proprie procedure informatiche e attraverso cui le *poste retributive* e *contributive* dei flussi individuali UniEmens vengono ricostruite su base aziendale (DM-virtuale). Il flusso mensile dei dati così ricostruiti viene acquisito trimestralmente dall'Istat in una versione "provvisoria" e in una "definitiva", rispettivamente a 45 giorni e a 1 anno e 30 giorni dall'ultimo mese del trimestre di riferimento. Quest'ultimo insieme di dati è sostanzialmente una rappresentazione della popolazione totale, ossia non vi sono dichiarazioni mancanti. A completamento dei dati forniti, vengono acquisite trimestralmente dall'INPS anche informazioni di tipo anagrafico che consentono di classificare le unità secondo caratteristiche contributive e vengono utilizzate, oltre che per il calcolo di alcune componenti di costo del lavoro, anche per la selezione delle unità amministrative nel campo di osservazione della rilevazione[5].

2.1 La Banca Dati Normativa Oros

Le variabili attualmente prodotte con il processo della rilevazione Oros derivano dallo sfruttamento di tutte le informazioni presenti nei dati INPS, con l'ausilio dei metadati organizzati nella Banca Dati Normativa Oros (BDN) costruita *ad-hoc*. L'assenza di un sistema di metadati centralizzato e standardizzato presso

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lavorate per le imprese e istituzioni, private e pubbliche, operanti in tutti i settori di attività economica da B a S, inclusa O (*Labour Cost Index, EC Regulation n.450/2003 e n.1893/2006)*, nonché gli indici grezzi sul numero totale di persone occupate - posizioni dipendenti e indipendenti - e sui monti retributivi dei lavoratori dipendenti *(Short Term Statistics, EC Regulation n.1165/98)*.

[5] Tra queste vi sono il Codice Statistico Contributivo (CSC) che identifica il settore di attività economica in cui opera l'azienda a scopi contributivi e il codice Ateco (nel formato Ateco91) che consentono di dedurre la caratterizzazione economica ed istituzionale dell'unità.

l'INPS ha reso necessario, fin dal primo impianto della rilevazione Oros, rintracciare, acquisire e conservare non soltanto i metadati relativi alla dichiarazione contributiva, che vengono periodicamente rivisti sulla base degli aggiornamenti normativi, ma anche quelli indispensabili per la stima di alcune componenti del costo del lavoro non rilevate nei DM. La BDN Oros è organizzata per rendere disponibili i metadati in un formato facilmente accessibile per la traduzione delle variabili amministrative in variabili statistiche. Nei DM le informazioni di carattere retributivo e contributivo totali (a carico del datore di lavoro e del lavoratore), sono distinte per una variabile amministrativa che identifica la tipologia occupazionale e/o la tipologia contributiva dei lavoratori. In particolare, in corrispondenza dei codici occupazione[6] si ricavano il numero delle posizioni lavorative dipendenti retribuite, le giornate/ore retribuite, la retribuzione imponibile e la parte dei contributi di base a debito, che sono collegati a specifici fondi previdenziali e assicurativi cui sono iscritti i lavoratori, mentre in corrispondenza dei codici contribuzione si determinano le particolarità contributive aggiuntive, a debito (ad es. contributi di solidarietà) o a credito (ad es. specifiche riduzioni contributive per assunzioni agevolate), rispetto ai contributi di base già registrati con i codici occupazione. Per il corretto sfruttamento della fonte amministrativa, non è sufficiente disporre dell'elenco dei codici occupazione e/o contribuzione ammissibili ma è necessario anche verificare la loro appartenenza alle giuste componenti dell'occupazione e del costo del lavoro. Ad esempio, le indennità o le compensazioni anticipate dal datore di lavoro per malattia, maternità, etc. non sono costo del lavoro per l'impresa e quindi vanno esclusi dal calcolo. Anche l'insieme delle regole di inclusione/esclusione dalle variabili *target* vengono documentati e archiviati trimestralmente nella BDN.

Accanto ai codici già richiamati, la BDN mantiene l'aggiornamento dell'elenco e del significato di altre variabili amministrative relative all'attività svolta dall'azienda[7] e attribuite dall'INPS a livello di impresa per determinare la caratterizzazione contributiva dell'azienda e, quindi, l'aliquota che deve essere applicata per versare i contributi in rapporto agli adempimenti cui l'azienda è tenuta nei confronti dell'INPS. Per calcolare correttamente il costo del lavoro, è necessario scorporare dai contributi totali versati dall'azienda all'INPS la quota a carico del lavoratore, in quanto questa parte è già inclusa nella retribuzione imponibile e bisogna evitare una sua duplicazione. Poiché questa parte di

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[6] I dipendenti vengono dichiarati aggregati in codici che tengono conto della qualifica e del tempo di lavoro.

[7] Si tratta del Codice Statistico Contributivo (CSC), codice di cinque caratteri che individua le caratteristiche contributive di un gruppo omogeneo di aziende in base alla loro attività economica, e del Codice Autorizzazione (CA), che rappresenta una o più particolarità contributive che contraddistinguono l'azienda a integrazione del CSC.

contribuzione non è rilevata direttamente sui DM, se ne determina una stima applicando le opportune aliquote a carico del lavoratore alle retribuzioni imponibili rilevate dalle dichiarazioni in corrispondenza dei codici occupazione validi, tenendo conto congiuntamente di tutte le informazioni sull'azienda (CSC, CA, dimensione occupazionale dell'azienda, etc.). L'insieme dei metadati conservati nella BDN vengono utilizzati per la corretta trasformazione dei microdati amministrativi in microdati statistici per singola unità economica e costituiscono la base per aggregazioni di posizioni lavorative dipendenti, retribuzioni di fatto per qualifica e tempo di lavoro e, infine, oneri sociali.

3. Il registro RACLI

Il registro RACLI su retribuzione e input di lavoro dei lavoratori dipendenti è stato progettato per la prima volta, contestualmente al registro sull'occupazione del settore privato (DBOccupazione), in occasione del 9° Censimento dell'Industria e dei Servizi del 2011 (Istat, 2015). In questa circostanza fu studiata e utilizzata a scopi statistici la dichiarazione UniEmens dell'INPS che è alla base dei due registri ed è caratterizzata da una struttura di tipo Linked Employer-Employee Database (LEED) con informazioni sia a livello di posizione lavorativa che di impresa. Tali due registri, che stanno confluendo nel registro tematico sul lavoro, si basano per la parte dei lavoratori dipendenti prevalentemente sulla fonte UniEmens per la quale, ad oggi, sono disponibili in Istat due forniture annuali, una provvisoria e una definitiva rispettivamente con un ritardo di 4 e 10 mesi dalla fine dell'anno di competenza, con riferimenti temporali diversi a seconda della variabile osservata (mensile, settimanale, giornaliero). Per la copertura totale del campo di osservazione, tale fonte è integrata con altri archivi INPS come quello relativo ai lavoratori dipendenti dello sport e dello spettacolo[8], delle aziende agricole[9] e ai lavoratori con indennità di cassa integrazione a pagamento diretto da parte dell'INPS.

Il registro RACLI, inizialmente utilizzato come informazione ausiliaria in una pluralità di processi di produzione dell'Istat, ha rappresentato lo strumento e l'occasione per rivedere interamente il processo di due indagini quadriennali Istat sul mercato del lavoro: la rilevazione sul costo del lavoro degli anni 2012 e 2016 a livello di impresa e quella sulla struttura delle retribuzioni del 2014 a livello di posizione lavorativa[10] (Baldi et al., 2016). Il primo rilascio ufficiale di dati tratti dal

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[8] Il fondo ENPALS è confluito nell'UniEmens nel 2015, pertanto a partire da tale anno di riferimento dei dati l'integrazione non è più necessaria.
[9] Il DMAG è la Denuncia della Manodopera Agricola.
[10] Regolamento del Consiglio 530/99 e dal Regolamento attuativo della Commissione 1738/2005.

registro RACLI sulle retribuzioni orarie per caratteristiche del lavoratore, del datore e del rapporto di lavoro è stato effettuato relativamente all'anno di competenza 2014 per le posizioni lavorative dipendenti delle unità economiche del settore privato extra-agricolo (Istat, 2016).

Il registro RACLI produce informazioni annuali su retribuzioni e ore retribuite[11] con un elevato dettaglio informativo con riferimento al rapporto lavorativo (regime orario, durata del contratto, qualifica contrattuale, etc..), all'individuo (sesso, età, paese di nascita, titolo di studio grazie all'integrazione con la base dati sugli individui) e all'unità economica (attività economica, classe dimensionale, unità locali, etc.. grazie all'integrazione con il registro delle imprese). Tale registro produce, inoltre, per adesso solo a livello di impresa e non di singola posizione lavorativa, la variabile costo del lavoro totale aggiungendo alle retribuzioni lorde una stima del trattamento di fine rapporto (TFR) e degli oneri sociali comprensivi dei contributi previdenziali e assistenziali. Quest'ultima componente di costo, stimata dalla rilevazione Oros, viene integrata nel registro RACLI a livello di impresa.

Il processo di produzione del registro RACLI, per il ruolo che svolge nella realizzazione del Registro del Lavoro, è in continua evoluzione, anche grazie ai cambiamenti della fonte amministrativa utilizzata e ha l'obiettivo di sperimentare ulteriori usi dei dati amministrativi al fine di ampliare l'offerta informativa statistica e di migliorarne la tempestività. La sperimentazione che si sta documentando in questo lavoro è relativa alla stima dei contributi previdenziali a livello di singola posizione lavorativa, sapendo che una parte dei contributi è comunque per definizione relativa all'impresa e non imputabile ai singoli lavoratori[12].

4. **Sperimentazione**

In questa prima fase la sperimentazione si concentra esclusivamente sulla stima dei contributi previdenziali che vengono pagati all'INPS, dichiarati nell'UniEmens e ricostruiti a livello di impresa nei DM-virtuali, mentre si rinvia la stima degli oneri assistenziali versati all'INAIL e del TFR, voci di costo del lavoro che vengono stimate anche dalla rilevazione Oros sulla base di informazioni esterne alla fonte principale.

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[11] Prima dell'anno di competenza 2014 veniva prodotta solo una stima proxy di ore retribuite ma tale stima è stata migliorata grazie alla disponibilità di ulteriori informazioni e all'integrazione con altre fonti, tra cui anche indagini statistiche.

[12] Per una precedente sperimentazione di grande interesse sulla stima del costo del lavoro totale a livello di rapporto di lavoro si veda Grant e Quaranta, 2013.

La sperimentazione ha previsto una fase preparatoria in cui sono state analizzate le caratteristiche della fonte amministrativa e il contesto normativo e definitorio, e una fase applicata ai dati i cui risultati vengono presentati nel § 5. La prima attività è stata quella di estrapolare dall'UniEmens tutte le informazioni utili per il calcolo degli oneri previdenziali ossia il *mapping* tra il formato dei dati forniti dall'INPS, descritto nei documenti tecnici (INPS, 2017), e le informazioni di interesse statistico.

Come già detto, la maggior parte delle voci contributive vengono dichiarate con riferimento alla singola posizione lavorativa ma esistono anche delle voci, sia a credito sia a debito, dichiarate a livello di impresa perché pertinenti all'impresa stessa e non alle singole posizioni.

Le voci contributive generali relative alla singola posizione lavorativa, individuate utilizzando i metadati della fonte UniEmens, sono: il contributo base[13], l'importo dei contributi dovuto per mese corrente; il contributo eccedente il massimale relativo alla parte di imponibile retributivo che supera il massimale fissato annualmente dall'INPS[14]; il contributo al fondo integrativo; il contributo per il fondo sostitutivo[15] e il contributo per l'assegno al nucleo familiare (ANF)[16].

Il contributo base include anche la parte di contributo a carico del lavoratore, che il datore trattiene in qualità di sostituto d'imposta, e che deve essere scorporata al fine di evitare una duplicazione in termini di costo del lavoro, in quanto già compresa nella retribuzione imponibile, come specificato anche nel § 2.1. Nel caso generico la quota a carico del lavoratore è pari al 9,19% dell'imponibile, ma al caso generale si affiancano più particolarità contributive in base alle caratteristiche dei lavoratori, dell'azienda e del rapporto di lavoro. Tali informazioni, già sistematizzate nel processo Oros, sono state applicate anche in questa sperimentazione ma ad un livello di dettaglio micro di singola posizione lavorativa.

Nel flusso UniEmens inoltre ci sono delle voci di conguaglio a credito o debito la cui causale è sintetizzata attraverso un codice identificativo. Alcuni di questi codici fanno riferimento ai singoli individui perché la natura dei contributi è legata alle caratteristiche personali (es. portatori d'handicap, giovani etc..), altri sono riportati nella parte aziendale della dichiarazione perché la loro applicazione è legata alle caratteristiche d'impresa (es. regione d'appartenenza, numero di

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[13] Tale importo costituisce il contributo per invalidità, vecchiaia e superstiti (IVS) che, nel caso generico, è determinato dall'applicazione dell'aliquota del 33% all'importo del reddito imponibile.

[14] L'art. 2, comma 18 della Legge n. 335 del 1995 stabilisce un massimale di retribuzione oltre il quale non sono dovute le aliquote contributive IVS (l'attuazione è definita nella circolare INPS 177/1996 e successive).

[15] Importo dei contributi IVS dovuti per fondi speciali (es. ferrotranvieri, poste etc..)

[16] I contributi per gli assegni familiari, interamente a carico dei datori di lavoro, sono calcolati in misura percentuale sulla retribuzione imponibile senza limite di massimale. L'aliquota contributiva è stabilita dall'art. 3, comma 23 della legge 8 agosto 1995 e successivi aggiornamenti.

dipendenti, settore d'attività economica). Al fine di identificare le voci contributive da includere nella stima degli oneri previdenziali e scorporare la parte a carico del lavoratore, si è resa necessaria un'approfondita analisi dei metadati estrapolati sotto forma di tabella dal documento tecnico per la compilazione della dichiarazione UniEmens, supportata dalla BDN per le decisioni sull'inclusione o meno delle singole voci. Particolarmente importante a tal fine è stato il lavoro di individuazione delle corrispondenze tra gli elementi riportati nell'UniEmens e quelli previsti nel DM- virtuale e riportati nella BDN.

Di seguito vengono riportati i risultati del confronto tra i due processi, RACLI e Oros, per valutare la qualità delle stime dei contributi previdenziali ottenute in questa fase sperimentale.

5. Primi risultati

Con riferimento all'anno 2014, in cui sono presenti in Italia oltre 1,5 milioni di imprese con circa 11,1 milioni di lavoratori dipendenti medi annui, le stime ottenute con i processi RACLI e Oros sulle retribuzioni presentano un'ottima convergenza: il 98% delle imprese che occupano il 99% dei dipendenti totali presenta una differenza nulla per la stima annuale di questa variabile. Escludendo le imprese allocate nelle code di questa distribuzione, ovvero che hanno una differenza nella stima delle retribuzioni tra i due processi superiore al 10%, di seguito (Figura 1) viene riportato il confronto tra la stima dei contributi previdenziali ottenuta utilizzando i dati INPS individuali (RACLI) e quelli d'impresa (Oros).

La distribuzione delle imprese, ponderate per i relativi dipendenti medi annui, in base alla quota percentuale degli oneri contributivi sul totale delle retribuzioni, secondo i due processi di stima, mette in evidenza un profilo analogo e livelli molto simili con riferimento ai singoli percentili.

La distribuzione delle differenze percentuali tra le due stime mostra per l'85% delle imprese (ossia quelle tra il 10° e il 95° percentile) una differenza di ±1%.

L'analisi delle differenze nelle stime, che caratterizza le imprese localizzate nelle code della distribuzione, ha individuato una serie di cause. Tra queste ci sono i conguagli contributivi legati alle variazioni retributive[17]: il processo Oros tratta ed include nel costo del lavoro i conguagli dichiarati in mesi successivi a quello di competenza mentre il processo RACLI in questa fase sperimentale non ha ancora

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[17] Contengono informazioni relative alle variabili retributive che hanno determinato l'aumento o la diminuzione dell'imponibile del mese corrente, ma di competenza di periodi pregressi. Di norma si riferiscono ad eventi del mese di dicembre, quali compensi per lavoro straordinario, ecc., dichiarati nel mese di gennaio.

inserito queste variabili che possono comportare l'aumento o la diminuzione dell'imponibile, e quindi dei contributi, dell'anno di riferimento. Altro elemento di differenza è il trattamento degli incentivi a favore dell'occupazione[18]. Tali benefici, che hanno un alto impatto sugli oneri contributivi, si configurano come rimborso per gli importi versati e non sono ancora stati inseriti nel processo RACLI.

Figura 1 – *Percentili della distribuzione delle imprese* per la quota dei contributi previdenziali sull'imponibile stimata in RACLI e in Oros (figura di sn) e per la differenza tra le due stime (figura di dx). Anno 2014 (valori percentuali)*
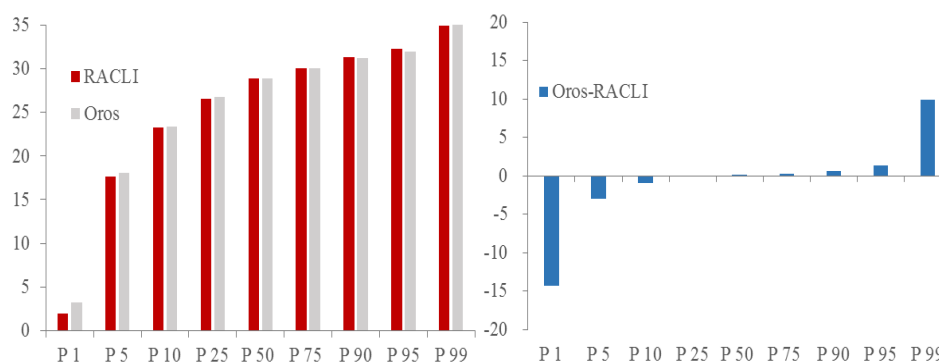
* Le imprese sono ponderate per i relativi dipendenti medi annui.

Fonte: elaborazione su dati RACLI e Oros.

C'è inoltre da sottolineare che la differente unità statistica delle fonti comporta delle differenze inevitabili e difficili da quantificare. Nel processo Oros, ad esempio, le aliquote per la stima dei contributi a carico del lavoratore vengono applicate alla retribuzione complessiva di ciascuna categoria di dipendenti dell'impresa, mentre nel processo sperimentale tali aliquote vengono applicate all'imponibile della singola posizione lavorativa, dettaglio informativo che rappresenta la ricchezza aggiuntiva della dichiarazione UniEmens utilizzata nel processo RACLI.

La sperimentazione qui descritta è in fase preliminare, i risultati sono estremamente positivi e incoraggianti e sono state individuate alcune tra le principali cause delle differenze tra i diversi metodi. Le variabili necessarie per la stima degli oneri contributivi sono tutte disponibili nei dati UniEmens forniti dall'INPS ma non sono state ancora inserite integralmente nel processo; la loro

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[18] A titolo di esempio: l'incentivo sperimentale per l'assunzione di under 30, ai sensi del D.L. 76/2013 e circolari INPS n.131/2013 e 138/2013; gli incentivi per l'assunzione di lavoratori con disabilità, che trovano applicazione a partire dal 1° gennaio 2016 (circolare INPS 99/2016).

completa mappatura e il relativo aggiornamento sono fondamentali per il corretto utilizzo a fini statistici della fonte amministrativa.

6. Prospettive future

L'analisi sperimentale esposta rappresenta una prima valutazione di ottimizzazione nell'uso delle fonti amministrative INPS disponibili nell'ottica di una convergenza di processi diversi che utilizzano le stesse fonti di input, al fine di garantire una maggiore coerenza tra i dati prodotti, ridurre le forniture richieste, utilizzare le stesse basi dati per più scopi statistici.

I risultati preliminari ottenuti sono molto promettenti con una stima degli oneri previdenziali sperimentale, basata sulle fonti individuali UniEmens dell'INPS, pressoché identica per un gran numero di imprese (circa l'80% di quelle con dipendenti nel settore privato non agricolo) a quella ottenuta a partire dalle fonti DM di impresa dello stesso istituto di previdenza. Nel contempo, però, sono necessari approfondimenti delle particolarità contributive evidenziate dalle imprese che presentano differenze importanti fra i due metodi di stima.

L'opportunità di utilizzare la fonte UniEmens al posto dei DM-virtuali deve rappresentare un valore aggiunto proporzionale alla ricchezza informativa dell'UniEmens stesso. L'utilizzo, infatti, di una fonte con una unità di analisi più dettagliata (la posizione lavorativa) al posto di una più aggregata (l'impresa), deve avere come scopo il miglioramento delle stime soprattutto in termini di rappresentatività della realtà che le fonti e gli indicatori devono descrivere. A questo va aggiunto che i DM-virtuali sono realizzati per fini amministrativi (e non statistici) e sono il risultato di un trattamento dei dati eseguito direttamente dall'ente fornitore. L'utilizzo di una fonte più disaggregata, inoltre, grazie anche alla struttura LEED, porta altri vantaggi in termini informativi perché il dettaglio a livello di posizione lavorativa consente un arricchimento delle analisi con informazioni specifiche su tipologia e caratteristiche del rapporto di lavoro, sia dal lato dei singoli individui sia dal lato del datore di lavoro.

Altro aspetto fondamentale è la tempestività delle stime. Il passaggio da una fonte all'altra deve garantire il rispetto delle scadenze degli output attualmente prodotti e rilasciati. Questo implica che l'UniEmens dovrebbe essere fornito al posto del DM-virtuale con una cadenza trimestrale e con una tempistica tale da consentire tutte le elaborazioni in tempi utili. Ciò richiede ovviamente una *governance* forte dei rapporti con gli enti fornitori e dei processi intermedi necessari al trattamento in breve tempo di grandi moli di dati.

Ringraziamenti

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SUMMARY

Estimation of the other labour cost variable at job level: a register approach

One of the key points of the Istat modernization program is the construction of an integrated system of statistical registers to increase their integrated use for different statistical processes and to contain the costs of the traditional survey. The evolution of the available administrative sources, both in terms of information and timeliness, has been stimulating the production of new registers and the rethinking of entire statistical processes in a context of increasing integration and harmonization. In these work an analysis on the possible unification of two Istat statistical processes is under evaluation considering that they are based on the same administrative sources but at different level of details. The first process is the RACLI register, based on the UniEmens social security declaration with information at employer-employee level, which produces annually information on wages and hours paid at job level in the private sector. Here we are investigating the extension of these register also to labor cost considering that this variable is currently produced only at enterprise level through the integration with the Oros quarterly process. This latter process uses administrative data at enterprise level since 2002 to produce quarterly indicators on employment, wages and total labour cost. Following the evolution in the administrative data, it is now based on the "DM virtual declaration" that is a summary at enterprise level done by the social security authority starting from the same UniEmens declaration at job level used by the RACLI process. The reunification of the RACLI and Oros process is link to possibility of producing the same output form one source respecting the timeliness more urgent. In this work the first results of the experimental study to produce the other labour cost at job level and the comparison with the Oros output are presented.

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MIGRATION FLOWS IN THE EUROPEAN LABOUR MARKETS

Claudio Quintano, Antonella Rocca

1. Introduction

Over the past decades, European countries have become one of the main destinations of international migration. Northern European countries first and Southern European countries later on experienced the transition from emigration to immigration countries. In the years preceding the global financial and economic crisis, many immigrants were attracted by the European economic growth and increasing job opportunities, even if the majority of them had access only to low-skilled jobs. During the economic crisis, this process, rather than reducing, remarkably increased, due to the political instability in some extra-EU countries. Besides the immigration flows *to* EU countries, the free circulation of people and goods across EU countries favoured also the transition of huge flows of EU citizens *within* European countries, in reason of the differences in the European labour markets in terms of opportunities and rewards. Therefore, immigrants constitute a very heterogeneous population, including both people coming from non-EU countries and EU citizens. They strongly influence the economy of each host country and, even if in many cases this impact can only be estimated, it should be very high on consumptions, on the changes provoked on the labour market, as well as on the economy, especially with reference to highly-qualified immigrants (European Commission, 2006). If managed well, immigration has the potential to address many key challenges facing most European countries, including population ageing, the constantly changing demands of economies and increasing need for competitiveness in the global economy (European Commission, 2008).

However, immigrants constitute one of the most vulnerable segments of population and meet many obstacles to integrate into the host society, contributing to increase social and economic inequalities. European institutions and national governments have therefore to front new challenges and multiply their efforts in managing and favouring migrant inclusion. At this aim, many legislative initiatives have been promoted and immigrants inclusion has been transposed as integral part in the Europe 2020 strategies, because it impacts on the objectives of increase the

employment rates and the educational levels and on the reduction of poverty and social exclusion (Gros and Roth, 2012; Bettin and Cela, 2014).

Even if in a common framework of EU members, European countries show many differences in terms of incidence of immigrants on the local population but also for the difficulties to integrate them into the local society. In addition to the immigrants personal characteristics (language knowledge, skills, educational level, etc.), the severity of the barriers encountered by immigrants depends by the economic conditions characterizing each State member, in particular related to the labour market framework, and by the country capacity to receive and integrate strangers into their own society and institutions. This ability derives from social and political factors also related to the current welfare policies. Therefore, immigrants tend to choose the country where to move in relation to these aspects, even if for reasons of geographical proximity they could be obliged to pass in a country which is different from that they have chosen, remaining sometimes there for various reasons. Many countries are indeed defined "accession countries" because immigrants reach them only as "entrance door" in order to reach richer countries. This is for example the case of Italy, Greece, Spain, and many Eastern and border EU countries.

In this paper, we want to analyze the economic inequalities *within* and *across* European countries, focusing in particular on immigrants, which represent a very vulnerable segment of the population, verifying their potential in terms of labour force and their level of integration into the labour market. In order to discover similarities across countries, a hierarchical cluster analysis allows identifying groups of countries sharing the same characteristics. In a second step, the main determinants of countries heterogeneity in the capacity to integrate migrants and to offer good economic prospects to local population too, have been addressed through a principal component analysis applied to the same indicators. This study could help policy makers of each country to understand their own specific issues, contextualize them in the global European labour market and identify the most efficacious actions and policies to adopt in order to improve immigrants integration, contrasting social exclusion (Esser, 2004).

Results highlight the existence of a very complex framework, due to the high heterogeneity of immigrants' characteristics and labour market capacities to integrate migrants and favour good conditions also for native-born.

2.   The data and the methodological framework

European countries show very different scenarios in relation to their capacity to attract and integrate foreign citizens, as well for the general characteristics of their labour markets. In order to analyze this framework, the indicators chosen include

some immigrants' human capital characteristics and some measures of labour market vulnerability calculated on migrants and in terms of gap with native-born (Tab. 1). Data refer to the year 2014 and come from the Labour Force Survey (LFS), currently the main European source for comparable multidimensional socio-economic statistics on employees and working conditions. The 2014 LFS wave contains an ad hoc module on the situation of immigrants. Further, with the aim to analyze the changes occurred in the years of economic crisis on the migrants conditions, the same indicators have been calculated also with reference to the 2008 wave of LFS, including the same ad hoc module on immigrants. It should be interesting to verify which countries gain resources in terms of human capital by the mobility of workers and which countries instead lose. Unfortunately, data allow to identify the immigrant's origin only for macro-groups of countries. Anyway, we can compare the characteristics of migrants coming into each EU country in relation to their education level and to the education level attained by their parents (indicators 1.1 and 1.2). As suggested by Damas de Matos and Liebig (2014), labour market outcomes tend to improve with higher levels of educational attainment. However, the improvement is weakest among immigrants – irrespective of gender – who arrived as adults, since they have educational credentials from abroad which host-country employers have trouble assessing and labour markets substantially downgrade. In order to analyze the performance reached by immigrants on the labour market, the indicators selected are the unemployment rate and, for working immigrants, the employment rates, the share of them with a temporary contract and the share of immigrants working part-time but which would work full time. These indicators are also calculated in terms of the gap in relation to the corresponding values for the local population, which represents the benchmark for the assessment of their inclusion (OECD, 2015). Indeed, there would be countries were the conditions of migrants on the labour market is not satisfactory but in line with that of the native-born and countries where, instead, they could experience better global conditions, but with high gaps with respect to the native-born citizens. A high gap could indeed reveal the hostility or the incapacity of the host country to integrate immigrants. Conversely, as highlighted by the European Commission (2016), for some labour market indicators, there are countries where the foreign-born population has outcomes that are similar or better than the native-born. Finally, as integration implies the full substitutability of workers with the same characteristics, regardless their origins, we compare European countries in relation to the levels of horizontal and vertical segregation on the labour market. Segregation is a labour market outcome, which contrasts with the concept of integration. Horizontal segregation attains to the different distribution of employees across the economic sectors while vertical segregation to the clustering of a vulnerable category of workers (immigrants) at

the bottom of occupational hierarchies. While in the field of the gender gap, segregation measures the consolidated perpetuation of stereotypes linked to the gender roles, in the immigration studies the information on the occupational distribution and its changes over time allows to understand how immigrants affect economic growth and how they adjust to a host country both in economic and social terms (Green, 1999). The measure of segregation is based on the Gibb's index (1965), which allows the comparison across countries with different distribution of workers across the economic sectors and occupations:

$$DS= \sum_{i=1}^{J}\left\|\left[(M_j/T_j)\Big/\sum_{j-1}^{J}(M_j/T_j)\right]-\left[(F_j/T_j)\Big/\sum_{j-1}^{J}(F_j/T_j)\right]\right\|\frac{1}{2} \tag{1}$$

where for horizontal segregation, M_i and F_i are, respectively, the numbers of males and females working in the j_{th} economic sector and $T_j = M_j + F_j$ while in the vertical segregation index the professional qualifications are considered.

Table 1 – *Indicators on the migrants' condition on the labour market and basic descriptive statistics.*

Indicators	2008[*]		2014	
	Mean	Std	Mean	Std
Human capital characteristics				
1.1 % of high-educated migrants	24.43	9.07	29.84	11.04
1.2 % of migrant with at least 1 high-ed. parent	18.07	8.57	24.96	12.81
Labour market condition				
2.1 % of unemployed migrants	5.65	3.02	9.93	5.75
2.2 % of employed migrants	64.18	12.22	63.42	9.04
2.3 % of migrants with a temporary contract	17.35	13.98	17.30	12.10
2.4 % of migrants in involuntary part-time (%)	29.28	23.98	41.88	25.27
Labour market conditions in comparison with native-born				
3.1 Gap in unemployment rates (migrants/native-born)	1.54	0.65	1.57	0.59
3.2 Gap in employment rates (migrants/native-born)	0.98	0.16	0.97	1.26
3.3 Gap in temporary contracts (migrants/native-born)	1.51	0.79	2.01	1.46
3.4 Gap in involuntary part-time (migrants/native-born)	1.46	0.99	1.66	0.94
Work segregation				
4.1 Horizontal segregation index	30.85	13.04	26.39	11.72
4.2 Vertical segregation index	-	-	29.06	12.90

[*] The 2008 data exclude Croatia, Finland, Iceland and Malta because of lack of information on these countries. Also the information for the vertical segregation index for 1998 is missing.
Source: Authors' ad hoc elaborations on Labour Force Survey (years 2008 and 2014).

The comparison of the average values for indicators in Tab. 1 in the 2008-2014 years highlights a pronounced increase in the unemployment and involuntary part-time rates and in the share of high educated immigrants. However, unemployment rates increased especially in the Mediterranean countries, while in Germany and Slovakia they decreased. Mostly stationary the immigrants' condition in

comparison to the native born, even if an increase in the share of migrants with temporary contracts can be highlighted.

The statistical methodology considered more appropriate in order to compare European countries and discover similarities and contraposition across them is the hierarchical cluster analysis and the Principal Component Analysis (PCA) applied to the same set of indicators[1]. PCA is here used to complete the analysis, because it allows the user, on the one hand, to visually find variables that are characteristic for specific sample groups and, on the other hand, to get other information on the country proximity in relation to the more relevant factors driving the groups formation (Lattin et al., 2003). Cluster analysis is a method for ordering samples in a dendrogram ("tree diagram"), where samples with the highest correlations are grouped together while samples with small correlations are widely separated. The choice to put cluster analysis before PCA derives from the consideration that cluster analysis in its groupings considers all the variance in the dataset, as compared to the 60–90% variance typically represented by the first few PCs of a PCA (Middleton, 2000; Xue et al., 2011). The multivariate measure used for country-pair comparisons is the Euclidean distance while as agglomeration method between clusters we used the average between linkage method, which is based on a central measure of location accounting for all elements within each cluster (Sneath and Sokal, 1973). Through PCA, the dataset is re-expressed in a rotated coordinate system in which as much variance as possible is explained by the first few dimensions. PCA is particularly useful in examining correlations among variables in the original dataset, since it chooses the new axes to lie along directions of highest correlation (Gotelli and Ellison, 2004). The varimax rotation allows identifying the most important factors on the basis of the country grouping (for more details see for example Zani and Cerioli, 2007).

3. Results

Eurostat defines a migrant as "a person who is outside the territory of the State of which they are nationals or citizens and who has resided in a foreign country for more than one year irrespective of the causes, voluntary or involuntary, and the means, regular or irregular, used to migrate" (European Commission, 2014). This classification includes both EU and extra-EU citizens, as well as asylum seekers and refugees. European countries show very different patterns in relation to the consistence of migrants and their personal characteristics. Their impact on the native-born population is very high in accession countries like Cyprus and Estonia,

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[1] Similar results were obtained applying the cluster analysis to the principal components obtained through PCA. For sake of brevity, these results are not reported but eventually available on request by authors.

but also in little countries like Austria, Switzerland, Latvia and Ireland. Particular is the case of Belgium and Luxembourg, where the majority of migrants are citizens of other European countries, which in the most of cases work for the Communitarian organisms. Excluding Spain, Portugal, Estonia and Latvia, the comparison 2008-2014 in the share of immigrants on total population shows a pronounced increase everywhere. The same trend concerned the share of migrants moved to study or work. The increase results very high in Germany, Denmark and Norway – exerting a strong attraction for the solidity of their economies and the effectiveness of their welfare systems – but also in countries like Italy and many Eastern Countries. Those requiring asylum have instead a not negligible incidence on total immigrants in Croatia, Sweden, Belgium and Finland (Fig. 1). Anyway, the flows of these immigrants change quickly in relation to the government orientation, the militarisation of the route through Europe and the development in Turkey, Greece and Macedonia.

Figure 1 – *Descriptive statistics on immigrants consistence, provenience and reason to migrate*[*].
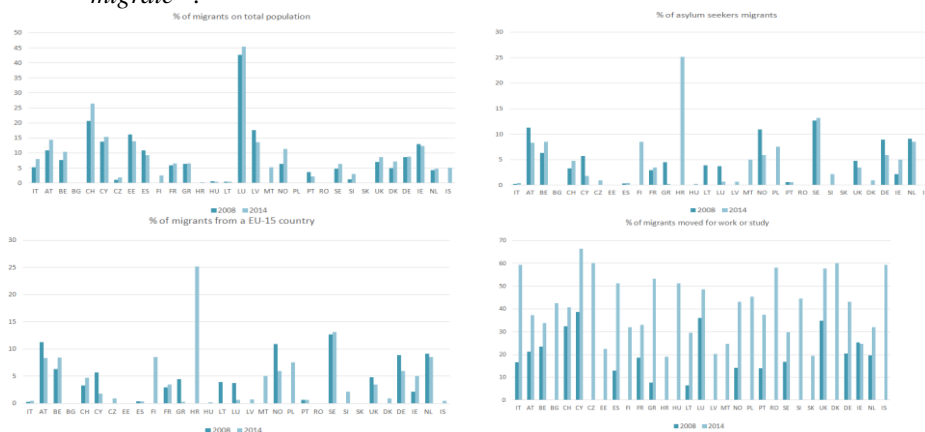
(*) *No information is available for Croatia, Finland, Iceland and Malta for 2008.*
Source: Authors' ad hoc elaborations on Labour Force Survey, years 2008-2014.

It is important to mention that the populations of some new EU member states (such as Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia) show high percentages of people which are classified as foreign-born only as a result of border changes or nation-building in the late 20th century, mainly related to the fall of the Iron Curtain. Consequently, the foreign-born are an aging group and the share of nationals among the foreign-born tends to be high. The overall size of the foreign-born population in 2014 differs widely, ranging from 3% in the Slovak Republic and Poland to 15% and above in Estonia, Slovenia, and Latvia. These facts should also explain why the

asylum seekers represent more than the 25% of total immigrants in Croatia.

The hierarchical cluster analysis applied to 31 European countries for 2014 clearly highlights the existence of four groups, while other two countries remain isolated from each other because their characteristics in terms of migrants are totally different from the others, i.e. Croatia and Luxembourg (Fig. 2).

Figure 2 - *Dendrogram of the hierarchical cluster Euclidean distance – average linkage (between groups) method.*
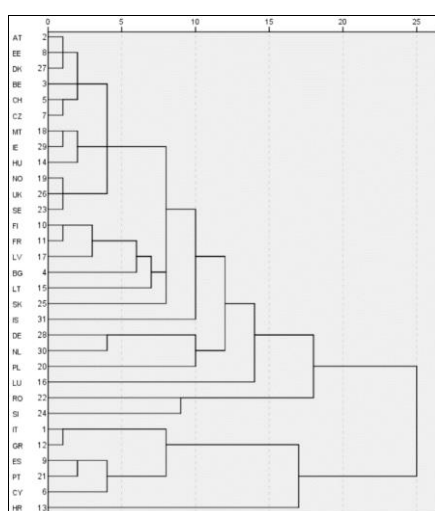
Source: Authors' ad hoc elaborations on Labour Force Survey, year 2014.

While Luxembourg is a small country where the incidence of high-educated non native-born mainly working for the communitarian bodies is high, in Croatia – a very young nation state, part of the former Yugoslavia – migrants come mainly from neighbouring countries such as Serbia, often as refugees and asylum seekers. In the most of cases, they show low human capital characteristics and live in extremely misery conditions. The Southern European countries of Italy, Greece Spain, Portugal and Cyprus are mainly "accession countries" for immigrants coming mainly from Mediterranean countries. Due also to the bad labour market conditions suffered by the local population, immigrants experience high unemployment rates and low human capital characteristics, even if the gap with the locals is low (see for example Castellano and Rocca, 2017).

The strongest integration of migrants on the local labour market concerns the most numerous group 2 (Tab. 2), whose countries show low levels of horizontal and vertical segregation and unemployment, but high gaps with the local population. Finally, the group formed by Poland, Germany and the Netherlands

show intermediate levels of integration in relation to the levels of segregation and global labour market conditions while Romania and Slovenia highlight the highest gap against migrants in temporary contracts. The indicators which mainly contributed to these results, according to the ANOVA test and Eta index, are the segregation indexes, the involuntary part time and unemployment rates.

Table 2 – *Groups of countries derived from the hierarchical cluster analysis. Mean values for the variables included into the analysis. Year 2014.*

Groups of countries	Variables codes											
	1.1	**1.2**	**2.1**	**2.2**	**2.3**	**2.4**	**3.1**	**3.2**	**3.3**	**3.4**	**4.1**	**4.2**
1.IT-CY-ES-GR-PT	18.7	14.3	17.6	58.2	31.1	74.4	1.36	1.03	.88	2.07	38.2	36.0
2.AT-BE-BG-CH-CZ-EE-FI-FR-HU-LT-LV-MT-NO-SE-SK-UK-DK-IE-IS	33.1	25.3	8.1	66.3	12.3	39.4	1.61	.97	2.34	1.50	21.0	23.4
3.HR	21.9	22.6	22.2	42.3	9.0	90.0	1.71	.77	.54	4.90	50.1	71.1
4.LU	46.8	37.4	6.1	68.7	9.4	19.8	2.46	1.08	.89	1.18	19.6	61.2
5.PL-DE-NL	29.5	45.2	6.5	64.5	32.0	18.9	1.33	.93	1.63	1.53	24.3	21.5
6.RO-SL	22.9	13.4	8.6	55.7	16.1	0.05	1.50	.88	3.54	1.02	42.8	39.1
Statistical significance groups (ANOVA)	.048	.007	.001	.036	.003	.000	.643	.384	.148	.004	.000	.000
Eta index (association groups)	.587	.673	.750	.602	.708	.866	.346	.425	.515	.695	.767	.897

[*] *The variable codes are defined in Tab. 1.*
Source: Authors' ad hoc elaborations on Labour Force Survey, year 2014.

Through ACP, the projection of variable-points on the first two components, which together account for more than a half of the total variability, show the contraposition, on one side, of the segregation indexes, unemployment and involuntary part-time rates with the migrants' human capital characteristics and the gap in temporary contracts and in the unemployment rates (Fig. 3). On the other side, the unemployment indicators are opposed to the employment rates. Therefore, the first axis accounts for the different levels of migrants integration, because it is lower in countries with the highest segregation and unemployment rates and higher in countries where immigrants have higher human capital characteristics. According to the II axis, the employment indicators are opposed to the unemployed ones. The projection of the country-points on the first two components widely confirms these highlights. The first axis opposes in fact countries where immigrants experience the worst conditions, such as Croatia and the other Mediterranean countries (with the exception of France) to the main attractors as Norway, Switzerland, Sweden the United Kingdom and Germany. According to the II axis, countries with the highest unemployment rates (as Croatia) and/or the highest gaps with with local population (as Austria) are in contraposition with the countries with the opposite characteristics (mainly Slovakia, Poland, Hungary and

Cyprus). In the right side, at the bottom of the plot we find therefore countries where immigrants experience globally the worst conditions, i.e. Croatia and the group of Mediterranean countries.

Figure 3 – *Indicators and countries projection on the first two components obtained through the Principal component analysis on the indicators listed in tab. 2. Test KMO significant at .000. Varimax rotation.*
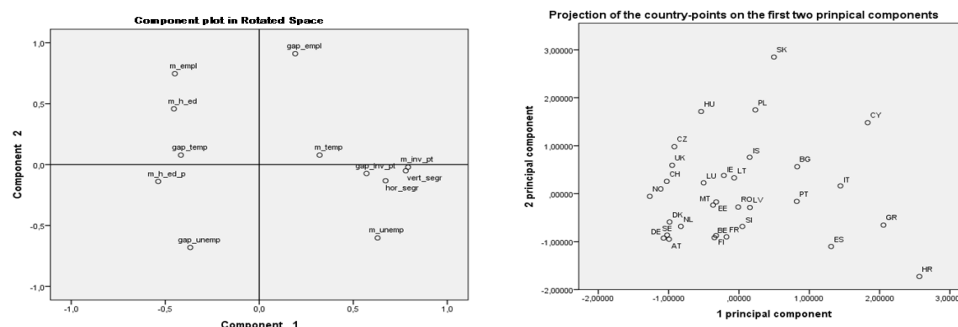
Source: Authors' ad hoc elaborations on Labour Force Survey, year 2014.

4. Conclusions

In the last decade, European labour markets were invested by two main shocks: the global financial and economic crisis and the huge flows of migrants. These facts are also strictly connected, because the economic crisis exacerbated the economic inequalities across European countries, favoring migration within them. On the other side, the increase in the local unemployment rates should have contributed to the decrease in the migrants' expectation to find a job and then to move. However, the contextual political instability which characterized many Middle East and African countries favored, despite the economic crisis, an increase in the immigrants flows. Actually, around 25 million persons born in a third country (TCNs) are currently living in the European Union (EU), representing 5% of its total population. They contributed to increase the multi-ethnicity and richness in diversity of cultures of European societies opening to new opportunities and challenges. In this paper an analysis of the potentials and conditions of immigrants in the labour markets of 31 European countries has been made. The results highlight very different scenarios across countries and very different degrees of labour market vulnerabilities involving both immigrants and the local population. While in countries like Luxembourg immigrants are in most of cases high-educated EU citizens working for the European Union Offices, in Croatia they are above all asylum seekers from the neighbouring countries, living in very precarious conditions (Gregurović and Mlinarić, 2012). However, even in these cases

immigration could contribute to the local development.

Many European countries result hardly involved for a great consistency of immigrants only for their geographical positioning. This is the case of the Southern European countries, particularly hit by the crisis and therefore chosen by migrants especially as accession countries to the most richer countries of central Europe. Sometimes they remain locked there or sited elsewhere. In many cases, however, they move to Mediterranean countries with the aim to stay. Indeed, more than a half of them moved to Mediterranean countries to study or to work. Anyway, even in the EU framework, the economic disparities across countries are in many cases significant. For example, in 2014, the unemployment rate and the share of involuntary part-time of Italian local workers were higher than the corresponding rates for UK and German immigrants. These facts explain way many EU countries continue to be, besides immigration countries, also emigration countries. Very different the workers' economic condition in UK, Sweden, Hungary, Switzerland and the Netherlands. The solidity of their economies made these countries particular attractive for many types of immigrants, especially the high-qualified and high educated coming from other developed European countries. In some countries immigrants continue to live in very precarious conditions, experiencing different forms of discrimination. The high segregation on the labour market could be a clear signal, but this data should be interpreted also in light of the migrants' human capital characteristics. At the same way, a high gap in the unemployment and temporary work rates should represent the clearest evidence of different treatment received by immigrants and native-born.

It is therefore necessary to focus on the integration of immigrants, accepting the possibilities they create and sustain transnational social spaces linking them to the countries of origin or other migrant communities abroad, either European or overseas (Kuti 2012). Indeed, in countries where the integration policies are inspired to consider immigrants as a source of labour and as a way of solving labour shortage, their outcomes on the labour market are better and immigrants result also better settled into the host society (Eydal and Ottósdóttir, 2009).

A better management of labour market migration promises greater gains for migrants, countries of origin and countries of destination.

Integrating migrants means allowing them to participate in the host society at the same level as natives, is an active, not a passive, process that involves two parties, the host society and the immigrants, working together to build a cohesive society.

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SUMMARY

Migration flows in the European labour markets

In the last decades, European countries were invested by huge flows of immigrants, attracted by the economic prosperity and the free circulation of people and goods, which stimulated also consistent movements of EU citizens within EU. The aim of this paper is to analyze the levels of inequalities and the conditions of immigrants and native born in the European labour markets after the global economic crisis. Through some multivariate statistical techniques, we compare 31 European countries (28-EU countries more 3 EFTA countries, i.e. Norway, Iceland and Switzerland) in relation to various labour market indicators observed in 2014. Data come from the Labour Force Survey. In 2014, the ad hoc module was devoted to the situation of migrants. The main results are also compared with that corresponding for 2008. Results highlight different levels of vulnerabilities and inequalities between immigrants and local population but also across European countries.

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IMPATTI DELL'AUTOMAZIONE SUL MERCATO DEL LAVORO. PRIME STIME PER IL CASO ITALIANO

Massimiliano Bruno, Alessandro Polli

1. Introduzione

Esistono crescenti timori legati all'impatto sul mercato del lavoro provocato dalla diffusione delle più recenti innovazioni tecnologiche (Forrester 2016; MIT Initiative on the Digital Economy 2016), sebbene sia ampiamente dibattuto l'effettivo contributo di tali innovazioni nel determinare la perdita di posti di lavoro. «È notoriamente difficile determinare quali fattori contribuiscono alla creazione di posti di lavoro e reddito», osserva Rotman (2015), «in particolare se si tratta di distinguere lo specifico effetto della tecnologia da quello della globalizzazione, della crescita economica, dell'accesso all'istruzione o delle politiche fiscali. Ma l'avanzamento della tecnologia offre una spiegazione plausibile, per quanto parziale, del declino della *middle class*». Il Forrester Institute (2016) stima in circa il 6% la perdita netta di posti di lavoro negli Stati Uniti entro il 2021, mentre in analisi di lungo periodo Bowles (2014) sostiene che il 54% della forza lavoro europea rischia nei prossimi decenni di essere sostituita da processi automatizzati.

Secondo Stiglitz (2015), già la Grande Depressione del 1929 può essere ricondotta ai mutamenti tecnologici, con il passaggio da un'economia agricola ad una manifatturiera e la conseguente espulsione di lavoratori dal settore primario. Interrogandosi sul gap tra gruppi sociali che continuano ad arricchirsi ed altri che non hanno più mezzi di sostentamento, Lipson (2013) ipotizza che «automazione e tecnologia digitale possano modificare profondamente i processi di produzione industriale, così come a conti fatti l'avanzamento tecnologico distrugga posti di lavoro più di quanti ne riesca a creare». Preoccupante il recente parere delle Nazioni Unite (2016), secondo cui l'impatto dei robot sul mercato del lavoro risulterà più rilevante nei PVS, dove tradizionalmente il costo del lavoro è un vantaggio comparato.

La circostanza per cui le innovazioni tecnologiche favoriscano i lavoratori qualificati su quelli meno qualificati, come anche i possessori dei nuovi robot su chi non ne ha accesso, è ripresa da Brynjolfsson e McAfee (2014), che riferiscono come «l'attuale progresso tecnologico stia avanzando troppo rapidamente per

permettere al mercato del lavoro di tenere il passo e da questo, in termini economico-finanziari, solo un ristretto numero di persone abbia tratto vantaggi sproporzionati. La Silicon Valley insegna che la tecnologia possa risultare motore di crescita ma moltiplicatore di disparità reddituale». Evidente l'effetto sui salari: Acemoglu e Restrepo (2017) stimano che negli Stati Uniti «un robot in più per mille lavoratori riduce l'*employment-to-population* ratio dello 0.18-0.34% e gli stipendi dello 0.25-0.5%».

Di segno opposto le considerazioni di Michaels e Graetz (2015), che ammettono come i robot abbiano rimpiazzato lavori a bassa specializzazione, ma il progresso tecnologico stia accrescendo la produttività delle fabbriche, creando ulteriori posti di lavoro di maggiore qualità. «Non si registra un significativo impatto sui lavori impiegatizi: l'Intelligenza Artificiale sostituirà il lavoro, ma non necessariamente i posti di lavoro. Se uno strumento di IA può occuparsi della parte più noiosa del lavoro di analisi dei dati, la gente si sentirà libera di occuparsi degli aspetti più sofisticati».

Il Boston Consulting Group (2015), valutando gli impatti della robotica sul sistema produttivo tedesco, afferma che «i produttori sono in grado di aumentare la competitività e dunque di espandere la forza lavoro interna, sia perché la produzione *capital-intensive* rende meno vantaggiosa la delocalizzazione del lavoro, sia per soddisfare la domanda che deriva da nuovi prodotti e servizi». Secondo Freeman (2016), «la robotizzazione […] divide la società tra proprietari di robot da una parte e lavoratori che competono con i robot dall'altra. Dovremmo preoccuparci meno del potenziale trasferimento di lavoro umano ai robot, rispetto invece a come condividere equamente nella società la prosperità che i robot producono».

2. L'automazione entra in fabbrica. Il caso italiano

È di un certo interesse ripercorrere alcuni precedenti storici che hanno riguardato l'ingresso dell'automazione nell'impresa italiana. Il più dibattuto è il caso Fiat: l'introduzione dei primi strumenti di automazione flessibile risale agli anni Settanta, i robot Unimate che si servivano di sistemi elettronici di controllo per effettuare lavorazioni non prefissate. Nel 1974 il Digitron genera i primi dubbi sull'indispensabilità della catena di montaggio: è un sistema di accoppiamento automatico tra scocca e gruppo meccanico che automatizzava fasi cruciali, alleggeriva il montaggio e rendeva meno faticose le lavorazioni più scomode per l'operatore: allo stesso tempo lasciava però intravedere le potenzialità della tecnologia e l'effetto nella sostituzione del lavoro umano, per via della messa in opera di impianti a flusso di sequenza.

È la premessa a quanto sta per avvenire nel decennio Ottanta: i *robot* di saldatura ed i mascheroni automatici conducono all'automazione dell'80% della fase di assemblaggio dei veicoli. La trasformazione irrompe anche nel montaggio dei motori: nel 1985 viene inaugurato a Termoli lo stabilimento per la produzione dei motori Fire, un esperimento fortemente innovativo che automatizza le applicazioni di collettori e carburatori, consentendo la produzione di circa 2500 motori al giorno.

Altro caso degno di nota è rappresentato dall'Olivetti: la crescita della dimensione d'impresa induce a percorrere le vie dell'automazione e della flessibilità di impiego già dagli inizi degli anni '70, quando vengono sviluppati i robot Sigma, presto rinnovati nel '75 e denominati di seconda generazione, e la serie Inspector, utilizzata per operazioni di montaggio e finalizzati ad una nuova linea di prodotti. Lo sviluppo è guidato dalla OSAI, Olivetti Sistemi per l'Automazione Industriale, e procede spedito negli anni '80 con i nuovi modelli Horizon ed Auctor.

Non si tratta di casi isolati, ma paradigmatici di una tendenza che, dalla metà degli anni Settanta, coinvolge tutta la grande impresa del nostro Paese, e che si caratterizza da un lato dall'espulsione di forza lavoro dai grandi impianti industriali (la Fiat annuncia nel 1980 il licenziamento di 14.400 dipendenti, salvo poi ricorrere alla cassa integrazione a zero ore per 23.000 lavoratori, che diventano oltre 33.000 nel giro di pochi anni; la Olivetti dal 1970 al 1980 perde 19.944 dipendenti complessivi, passando dai 73.283 del 1970 ai 53.339 del 1980, e 6.507 lavoratori nel solo territorio italiano, dai 34.687 del 1970 ai 28.180 del 1980), dall'altro dalla nascita di una galassia di piccole e medie imprese, orbitanti attorno alle precedenti attraverso il sistema della produzione su commessa, dove si riproduce, in forme nuove, uno schema di lavoro essenzialmente a cottimo.

3. Tecnologia e mercato del lavoro. Prime valutazioni per il caso italiano

Un aspetto particolarmente interessante − e relativamente trascurato nell'attuale dibattito − riguarda la dimensione spaziale degli impatti legati alla diffusione dell'automazione. Una ricerca recentemente pubblicata dal MIT Media Lab (Frank *et al.* 2017) evidenzia, con riferimento agli Stati Uniti, che l'automazione potrebbe avere impatti dirompenti soprattutto nei piccoli centri urbani con popolazione inferiore ai 100 mila abitanti, dove si concentrano i lavori più suscettibili di essere rimpiazzati da soluzioni tecnologiche.

La ricerca mostra anche come la diffusione dell'automazione non impatta solo ed esclusivamente sul mercato del lavoro ma, attraverso le connessioni che

collegano tale mercato alle dinamiche sociali e territoriali, si traduce in processi di mobilità sociale e territoriale.

L'analisi proposta intende rispondere, con una nuova metodologia, all'obiezione avanzata da Rotman (2015, *cit.*) e già riportata all'inizio della presente trattazione, secondo cui è complesso separare l'effetto specifico derivante dalla diffusione della tecnologia sul mercato del lavoro da altri fattori, quali per esempio i processi di delocalizzazione.

È tuttavia possibile capovolgere l'ottica con cui affrontare il precedente problema: disponendo di una qualche misura di probabilità dell'evento «perdita del posto di lavoro a seguito della diffusione di nuove tecnologie nel processo produttivo», distinta per tipologia occupazionale, tale misura potrebbe essere utilizzata in una prima analisi esplorativa, per valutare gli impatti che si verificherebbero nei vari comparti produttivi se tali tecnologie fossero già disponibili e adottate oggi.

Un tentativo in questo senso è stato presentato in un *paper* di Frey e Osborne (2013), in cui si stima, con riferimento a 702 figure professionali, la probabilità che esse siano «potenzialmente automatizzabili». Tali probabilità, applicate al mercato del lavoro statunitense, mostrerebbero che il 47% dei posti di lavoro risulterebbe vulnerabile alla tecnologia.

L'elenco di tali figure professionali è stato ricondotto alla classificazione CP2011 adottata dall'Istituto nazionale di statistica (ISTAT 2013) per il mercato del lavoro italiano e che, sostanzialmente, recepisce le innovazioni introdotte dalla nomenclatura ISCO 2008 del Bureau International du Travail.

L'armonizzazione delle due classificazioni ha consentito misure di probabilità descritte in precedenza, mentre dal Registro statistico dell'occupazione delle imprese (ASIA Occupazione) sono noti i livelli occupazionali medi per codice ATECO e per macro-ripartizione geografica al 2015.

Preliminarmente, le 663 figure professionali sono state attribuite alle sezioni di classificazione ATECO. L'attribuzione si rende necessaria in quanto l'archivio ASIA Occupazione contiene informazioni sulla tipologia occupazionale (distinta in interna − dipendente e indipendente − ed esterna, quando il lavoratore ha un contratto di collaborazione o somministrazione) e sulla qualifica (dirigente, quadro, impiegato, operaio, ecc.), ma non sulla figura professionale.

Tale attribuzione è nella gran parte dei casi univoca, poiché la descrizione della figura professionale della nomenclatura ISCO è molto dettagliata anche con riferimento al settore di attività: valga per tutti il caso degli «Imprenditori e amministratori di grandi aziende nei servizi di alloggio e ristorazione», che ha univoca collocazione nelle sezioni G-I della classificazione ATECO. Solo in un numero estremamente limitato di casi l'attribuzione è stata svolta applicando un criterio di prevalenza.

Tabella 1 – *Distribuzione delle figure professionali per sezioni di classificazione ATECO 2007, probabilità media di perdita del posto di lavoro a seguito della diffusione delle nuove tecnologie ($\bar{p}_u$), probabilità dell'evento complemento ($1 - \bar{p}_u$).*

ATECO 2007	Figure professionali censite	$\bar{p}_u$	$1 - \bar{p}_u$
b-d	179	0,664	0,336
e	36	0,709	0,291
g-i	133	0,665	0,335
j-s [1]	315	0,397	0,603
Totale	663	0,540	0,460

(1) *Escluse le sezioni di classificazione O (Amministrazione pubblica e difesa; assicurazione sociale obbligatoria) e S, divisione 94 (attività di organizzazioni associative)*

Una volta attribuite le figure professionali alle sezioni di classificazione ATECO, la probabilità media di perdita del posto di lavoro a seguito della diffusione delle nuove tecnologie è data dalla media semplice delle misure di probabilità associate alle figure professionali attribuite a ciascuna sezione di classificazione (Tabella 1). Naturalmente, ove l'archivio ASIA Occupazione riportasse informazioni analitiche anche sulle figure professionali, sarebbe possibile pervenire ad una misura di probabilità media più accurata.

Da un sommario esame dei dati riportati nella precedente tabella, appare evidente la sostanziale concordanza tra i risultati del presente studio e quelli ottenuti da Bowles (2014, *cit.*) con riferimento ai 28 paesi dell'UE. In sintesi, con riferimento alle 663 figure professionali individuate, si registrerebbe un rischio medio di perdita del posto di lavoro a seguito della diffusione delle nuove tecnologie pari al 54%.

Ovviamente, la reale perdita di posti di lavoro imputabile all'automazione dipenderà, a livello territoriale, dalla loro distribuzione tra settori produttivi e dalle figure professionali prevalenti in ciascun comparto di attività.

Nella Tabella 2 è riportata l'occupazione registrata nell'anno 2015 nelle imprese appartenenti alle sezioni di classificazione ATECO 2007 del registro ASIA Occupazione, distinte per macro-ripartizioni geografiche.

Tabella 2 – *Occupati per sezioni di classificazione ATECO 2007 e macro-ripartizioni geografiche. Italia 2015.*

Ripartizione geografica	ATECO 2007				Totale
	b-d	e	g-i	j-s [1]	
Nord-Ovest	1.545.406	420.774	1.763.678	1.984.679	5.714.537
Nord-Est	1.202.557	311.163	1.302.512	1.158.909	3.975.142
Centro	753.599	267.398	1.324.141	1.330.881	3.676.019
Sud	453.912	245.551	997.393	735.668	2.432.524
Isole	136.590	100.803	436.864	329.362	1.003.619
Totale	4.092.064	1.345.689	5.824.589	5.539.499	16.801.841

(1) *Vedi Nota Tabella 1*

Fonte: Ns elaborazioni su Istat, ASIA Occupazione 2015

Dall'esame della precedente tabella appare evidente la diversa specializzazione produttiva caratterizzante le 5 macro-ripartizioni geografiche in cui si articola il territorio italiano. Gli occupati censiti nell'Archivio ASIA Occupazione ammontavano nel 2015 a 16,8 milioni di unità, di cui il 24,3% nei settori estrattivo e manifatturiero (sezioni B-D della classificazione ATECO 2007), l'8% nel settore delle costruzioni (sezione E), il 34,7% nel commercio, trasporto, magazzinaggio, alloggio e ristorazione (sezioni G-I) e il restante 33% negli altri servizi (sezioni J-S ad eccezione della sezione O e della divisione 94 della sezione S, come chiarito in precedenza).

Con riferimento alle macro-ripartizioni, la distribuzione dell'occupazione fra settori produttivi si differenzia in maniera relativamente netta, con un'occupazione nei comparti estrattivo e manifatturiero superiore alla media nazionale nel Nord-Ovest e nel Nord-Est − pari rispettivamente al 27% e al 30,2% − mentre si verifica il viceversa nelle restanti macro-ripartizioni (20,5% al Centro, 18,7% al Sud e 13,6% nelle Isole).

Una situazione speculare si registra nel comparto delle costruzioni, con un livello di occupazione superiore a quello medio nazionale nelle macro-ripartizioni meridionali − 10,1% al Sud e 10% nelle Isole – e inferiore nelle restanti − 7,4% nel Nord-Ovest, 7,8% nel Nord-Est e 7,3% al Centro.

Una situazione sostanzialmente analoga caratterizza la sezione di classificazione riferita al commercio, trasporti, magazzinaggio, alloggio e ristorazione, con le regioni centro-meridionali che presentano un'occupazione superiore a quella media nazionale – 36% al Centro, 41% al Sud e 43,3% nelle

Isole – mentre una situazione opposta caratterizza le restanti macro-ripartizioni – 30,9% nel Nord-Ovest e 32,8% nel Nord-Est.

In ultimo, con riferimento agli altri servizi, il Nord-Ovest (34,7%) e il Centro (36,2%) presentano un'occupazione superiore a quella media nazionale, mentre un livello inferiore contraddistingue le restanti macro-ripartizioni (29,1% nel Nord-Est, 30,2% al Sud e 32,8% nelle Isole).

L'applicazione del vettore di probabilità stimato nello studio di Frey e Osborne alla distribuzione delle figure professionali per sezioni di classificazione ATECO 2007 nelle macro-ripartizioni geografiche consente, come si è chiarito in precedenza, di quantificare l'impatto sul mercato del lavoro che si verificherebbe se le nuove tecnologie fossero già applicate nei comparti produttivi.

I principali risultati sono riportati nella Tabella 3.

Tabella 3 – *Stima dell'occupazione in uno scenario di piena operatività delle nuove tecnologie per sezioni di classificazione ATECO 2007 e macro-ripartizioni geografiche. Base Italia 2015.*

Ripartizione geografica	ATECO 2007				Totale
	b-d	e	g-i	j-s [1]	
Nord-Ovest	1.124.274	213.484	1.012.778	2.756.762	5.107.296
Nord-Est	608.141	105.077	484.106	649.758	1.847.081
Centro	201.473	74.157	503.627	936.611	1.715.868
Sud	64.049	61.086	257.376	201.887	584.399
Isole	4.933	8.677	40.042	28.932	82.584
Totale	2.002.869	462.480	2.297.930	4.573.950	9.337.229

(1) *Vedi Nota Tabella 1*

Fonte: Ns elaborazioni su Frey e Osborne (2013) e Istat, ASIA Occupazione 2015

Naturalmente, tali risultati, come chiariscono sia Frey e Osborne, sia Bowles, «dovrebbero essere interpretati in modo ampio ed euristico», anche se, come del resto negli studi citati, sono non meno impressionanti.

Infatti, se le nuove tecnologie fossero state già disponibili nel 2015, si sarebbero registrate rilevanti perdite occupazionali in tutti i comparti, ad eccezione di quello degli altri servizi nel Nord-Ovest. In particolare, a livello nazionale, gli occupati si sarebbero attestati a poco più di 9,3 milioni di unità, di cui il 21,4% nei settori estrattivo e manifatturiero, il 4,9% nel settore delle costruzioni, il 24,6% nel commercio, trasporto, magazzinaggio, alloggio e ristorazione e il restante 49% negli altri servizi.

Naturalmente, le perdite occupazionali, che interessano tutti i comparti produttivi e tutte le macro-ripartizioni, con l'eccezione di cui si è detto, colpirebbero con particolare severità le regioni più deboli del Paese, come appare immediato desumere esaminando i tassi di variazione percentuale riportati nella seguente Tabella 4.

Tabella 4 – *Tassi di variazione percentuale dell'occupazione in uno scenario di piena operatività delle nuove tecnologie per sezioni di classificazione ATECO 2007 e macro-ripartizioni geografiche. Confronto con scenario base Italia 2015.*

Ripartizione geografica	ATECO 2007				Totale
	b-d	e	g-i	j-s [1]	
Nord-Ovest	-27,25	-49,26	-42,58	38,90	-10,63
Nord-Est	-49,43	-66,23	-62,83	-43,93	-53,53
Centro	-73,27	-72,27	-61,97	-29,62	-53,32
Sud	-85,89	-75,12	-74,20	-72,56	-75,98
Isole	-96,39	-91,39	-90,83	-91,22	-91,77
Totale	-51,05	-65,63	-60,55	-17,43	-44,43

(1) *Vedi Nota Tabella 1*

Fonte: Ns elaborazioni su Frey e Osborne (2013) e Istat, ASIA Occupazione 2015

In un quadro di drastico e generalizzato calo dell'occupazione in tutti i comparti produttivi, ad eccezione di quello relativo agli altri servizi, e in tutte le macro-ripartizioni geografiche, infatti, sono proprio le regioni del Centro-Sud e Isole che registrerebbero, nei settori estrattivo, manifatturiero e delle costruzioni, gli impatti più rilevanti, con contrazioni comprese tra il 72,3 e il 96,4%. Nel complesso, la perdita di posti di lavoro si attesterebbe, in questo scenario di diffusione dell'automazione, al 44,4%, in linea con le valutazioni presentate in altri studi.

Come si diceva, l'unico comparto che registrerebbe un notevole aumento dell'occupazione, nella misura del 38,9%, è quello degli altri servizi nella macro-ripartizione del Nord-Ovest. È appena il caso di notare che è in tale ripartizione che si concentrano, da un lato, le figure professionali meno suscettibili di essere automatizzate, in quanto maggiormente caratterizzate da capacità analitiche e creative in senso lato, dall'altro almeno due centri urbani (Milano e Torino) di grandi dimensioni.

Come nel caso di San Francisco, gli impatti dell'automazione potrebbero essere mitigati dalla presenza di poli d'innovazione già consolidati, con ciò confermando i

risultati ottenuti da Bowles (2014, *cit.*) e, recentemente, dal National Academies of Sciences, Engineering and Medicine (2017), con riferimento agli Stati Uniti.

4. Principali conclusioni

In primo luogo, appare evidente l'esistenza di un rilevante effetto territoriale. Gli impatti sul mercato del lavoro sono ampiamente differenziati a livello ripartizionale, a causa dei modelli di specializzazione produttiva che caratterizzano i diversi ambiti territoriali e della dislocazione dei grandi impianti industriali, così come dei poli logistici e dell'innovazione.

Accanto all'eterogeneità dei modelli di specializzazione produttiva, che sembrerebbe fornire una convincente spiegazione dell'effetto territoriale, anche la presenza di centri urbani di grandi dimensioni, con la relativa concentrazione di posti di lavoro difficilmente automatizzabili, concorrerebbe, accanto ad altre condizioni, alla mitigazione degli impatti, sostanzialmente negativi, derivanti dalla diffusione dell'automazione.

In termini di mobilità sociale e territoriale, non è arduo ipotizzare che la scomparsa pressoché completa di posti di lavoro nel comparto industriale delle regioni meridionali, oltre a determinare la scomparsa dei lavori a bassa specializzazione (e di gran parte della *middle class*, così come paventato da molti degli Autori citati), potrebbe incrementare i flussi migratori interni e verso altri Paesi.

Naturalmente, tali risultati sono stati ottenuti tramite l'applicazione di uno schema puramente aritmetico. E poiché l'analisi esplorativa ha fatto emergere alcuni aspetti di estremo interesse, risultano immediatamente chiare le future direzioni della ricerca.

In primo luogo, in linea con i più recenti indirizzi emersi a livello internazionale, per sopperire alle evidenti lacune dell'informazione statistica ufficiale, gli Autori intendono ricorrere ad un approccio incentrato sui c.d. *new data* (cioè informazioni statistiche raccolte con tecniche di *web scraping* o provenienti dai canali *social*, quali Linkedin), che consente di ottenere un'informazione caratterizzata da elevata granularità.

Inoltre, su un piano più strettamente economico, è convinzione degli Autori che l'adozione di processi produttivi fortemente automatizzati è legata alla capacità di investimento dell'impresa, che in un tessuto produttivo come quello italiano, caratterizzato da imprese di piccola e piccolissima dimensione, è estremamente limitata e, comunque, potrebbe condurre alla ridefinizione delle figure professionali all'interno delle singole imprese, più che alla perdita di posti di lavoro, un'ipotesi che sarà oggetto di futuri approfondimenti.

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SUMMARY

Impact of automation in the labor market. First estimates for Italy

The causes of the present decline of demand in labor markets in developed countries are subject to considerable theoretical debate. More specifically, according to some authors, globalization and offshoring together with technological innovation, could lead to further negative impacts on real employment.

Some studies estimate that the contribution of automation is the actual cause of job loss: in the US the introduction of robots by 2021 could lead to a cut of more than 6% of the workforce (FORRESTER 2016), and as much as 54% in Europe in the coming decades (Bowles 2014), although the greatest impact would occur in developing countries, where automation could weaken the traditional comparative advantages in terms of labor costs (UN 2016).

The Italian case is particularly interesting, as the automation was introduced in large enterprises over three decades ago, determining a deep impact in terms of loss for low skilled jobs.

This paper aims to provide a first quantification of the impacts on Italian labor market determined by the spread of latest technological innovations, both in terms of employment levels and social/territorial mobility, by differentiating its effects per macro-geographical breakdown of the country.

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GENDER DIFFERENCES IN ENTREPRENEURIAL ACTIVITIES IN ITALY

Thaís García-Pereiro, Ivano Dileo

1. Introduction

Women's entrepreneurship has been recognized as a booster of economic development and job creation (Verheul et al., 2006). Although the number of women entrepreneurs is on the rise, the majority of entrepreneurs are still men (Arenius & Minniti, 2005; Malach Pines et al., 2010; Koellinger et al., 2013; Hundt & Sternberg, 2014; Sarfaraz et al., 2014). Women's contribution to employment is potentially huge in terms of socio-economic development, productivity, efficiency and gender equality. Women's participation in productive activities could also generate a significant multiplier effect in local labor markets by demanding specific occupational profiles, usually fulfilled by other women, in activities related to home-and-child care.

Despite the growing literature on the subject, few studies have investigated female entrepreneurship in Italy which has the lowest female activity and employment rates in the EU (Calamo & García-Pereiro, 2014 (a); Calamo & García-Pereiro, 2014 (b); Patimo et al., 2015). Women-headed new businesses could be extremely important in finally reversing this trend. However, evidence from the Global Entrepreneurship Monitor (GEM) microdata shows important gender differences in entrepreneurship in Italy. The percentage of nascent, young and established entrepreneurs between 2001 and 2010 was found to be always higher among males, but the greatest gender gaps were found in the last stage (established entrepreneurship).

This paper analyzes the differences between female and male entrepreneurship focusing on socio-economic, demographic and attitudinal characteristics of nascent, young and established entrepreneurs: age, educational attainment, work status, income level and perceptual variables (opportunity perception, fear of failure, skills and experience in terms of entrepreneurship and being personally acquainted with an entrepreneur). For the empirical analyses, we used microdata on Italy from the Adult Population Survey (APS) of the Global Entrepreneurship

Monitor (GEM) and tested our hypothesis by estimating binary logistic regressions on the pooled sample 2001-2010 between 2001-2010.

2. Some empirical highlights

Empirical evidence on gender and entrepreneurship has resulted in mixed findings (Haus et al., 2013). Although the prevalence of males among entrepreneurs is well documented (Arenius & Minniti, 2005; Ahl, 2006; Malach Pines et al., 2010; Koellinger et al., 2013; Hundt & Sternberg, 2014), the reasons of this predominance remain inconclusive. In this section we focus on some of the specific socio-economic and perceptual factors influencing gender differences in entrepreneurial activities.

Regarding age, Langowitz and Minniti (2007) highlighted an inverted U-shaped relationship between age and the setting up of new businesses: the most entrepreneurially active period is between 25 and 34 years (Reynolds et al., 2004).

Wagner (2007) did not find any significant differences in age effects between women and men, although family background had an influence on the capacity to start a business.

Different opinions emerge regarding the relationship between educational level and entrepreneurship. Uhlaner & Thurik (2007) found that entrepreneurial activity increases with tertiary education and decreases with secondary education, while Greene et al. (2003) showed that education had the same impact on both female and male entrepreneurs.

One of the most important characteristics emerging in the literature is that employed individuals are more likely to start new businesses (Blanchflower & Oswald, 1998). No clear evidence has yet been found on the relationship between gender, employment status and entrepreneurship, however women tend to have less access to financial resources (Verheul & Thurik, 2001) and exploit fewer social networks (Brush et al., 2006). Some studies have demonstrated a historical lack of a positive female entrepreneurial role model. Dunn & Holtz-Eakin (1995) and Delmar & Holmquist (2004) found that the influence of entrepreneurial role models was gender related. It follows that, even though women know entrepreneurs personally, they are often considered as being less entrepreneurial compared to men.

Research comparing female entrepreneurs' fear of failure with their male counterparts suggest that women are more risk averse than men (Sexton & Bowman–Upton, 1990; Powell & Ansic, 1997) albeit no general consensus has yet been found on this.

In terms of entrepreneurial perceptions, Verheul et al. (2003) showed that female entrepreneurs tend to underestimate their personal performance compared to male business owners. Such underestimation seems to be an important determinant for the decision to start up a business. Malach Pines et al. (2010) found that necessity entrepreneurship rates were higher among women in less developed countries. Research in Italy has suggested that women become self-employed when driven by necessity, while men tend to do so to improve their career prospects (Rosti & Chelli, 2005).

3. Data and methods

For the multivariate analyses of Italian cases, data were drawn from the microdataset of the Adult Population Survey (APS) of the Global Entrepreneurship Monitor (GEM). GEM is an academically-driven worldwide cross-sectional survey designed to describe and explain entrepreneurship. In each country, GEM data examines the entrepreneurial behavior, attitudes and aspirations of individuals by interviewing a minimum sample of 2.000 adults in each country. The Italian GEM National Team is responsible for data collection and country reports[1].

The dataset for each year was downloaded, filtered and merged into a single file, containing the available Italian samples for a ten-year observation period (2001-2010). The Italian Adult Population Surveys, pooled for ten successive years, includes 23.853 individuals: 511 classified as nascent entrepreneurs, 363 as young entrepreneurs and 1.045 as established Entrepreneurs.

The variables used are part of the core model of the GEM APS questionnaire which includes several socio-economic, demographic and perceptual characteristics of the respondents. The GEM survey recognizes entrepreneurship as a complex and evolving process which needs be measured at different stages (Reynolds et al., 2005). Therefore, we analyzed gender differences in: nascent, young and established entrepreneurs (Table 1). The methodological framework was divided into two parts. The first part focused on the measurement of gender differences in nascent, young and established entrepreneurs. A pooled binomial logistic regression for each stage was computed using gender as the only dependent variable (Table 2). The second part compared the profiles of nascent, young and established entrepreneurs to look for important gender differences in their profiles.

For each stage, four pooled binary logistic regression models were estimated disaggregated by gender: one partial model and one general model built separately for males and females (Tables 3-5). The partial specification only included socio-

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[1] The team was led by two important universities: University of Padua and Marche Polytechnic University.

economic and demographic characteristics, while the general model added perceptual variables to the former. We controlled for temporal variation in our dependent variables by including time dummy variables (García-Pereiro & Dileo, 2015).

Table 1 –*Definition of the variables included in the analyses.*

Variable	Definition
Dependent variables	
Nascent entrepreneur	Actively involved in start-up effort, owner, no wages yet.
Young entrepreneur	Manages and owns a business that is up to 42 months old.
Established entrepreneur	Manages and owns a business that is older than 42 months.
Independent variables	
Socio-economic and demographic	
Age	Individual's age grouped in 5 intervals: <24; 25-34; 35-44; 45-54; 55+.
Education attainment	Categorical. Coded 1 for individuals with secondary education or less, 2 for those with a bachelor degree and 3 for individuals with Master or PhD.
Work status	Categorical. Coded 1 for individuals working full and part time, 2 for those who were not working and 3 for retired/students/housewife.
Income level	Categorical. Coded 1 for individuals of the upper 33% income level, 2 for those of the middle 33% and 3 for lower levels.
Perceptual	
Opportunity perception	Dummy. Coded 1 for individuals who declare that there will be good opportunities for starting a business where they live and 0 for those who do not.
Fear of failure	Dummy. Coded 1 for individuals who declare that fear of failure would prevent them from starting a business and 0 for those who are not afraid.
Entrepreneurial skills and experience	Dummy. Coded 1 for individuals who declare having the knowledge, skill and experience required to start a new business and 0 for those who do not.
Personally know an entrepreneur	Dummy. Coded 1 for individuals who know someone personally who started a business in the past 2 years and 0 for those who do not.

4. Gender differences in entrepreneurship

Women's empowerment in the labor market through the development of entrepreneurial activities could boost gender and social equality as well as foster sustainable and inclusive economic growth. This could be particularly important in Italy, which is one of countries in the world with the oldest population and the lowest female employment rate in Europe (Calamo & García-Pereiro, 2014 (a); Calamo & García-Pereiro, 2014 (b); Patimo et al., 2015). As shown in Table 2, entrepreneurship is predominantly male-headed, irrespectively of the stage. The greatest gender difference was observed in established entrepreneurship: females

were found to be 57% less likely to be established entrepreneurs than males. The R^2 value indicates a higher percentage of variance explained by gender in established entrepreneurship if compared to the other stages considered in the analyses.

Table 2 – *Results of the pooled binary logistic regression models (Exp(B)= Odds Ratio).*

		Nascent		Young		Established	
		Exp(B)	**Sign.**	**Exp(B)**	**Sign.**	**Exp(B)**	**Sign.**
Gender	(Male)						
	Female	0,54	***	0,53	***	0,43	***
Constant		0,03	***	0,02	***	0,07	***
N		23923		23923		23923	
R2 Nalgerkelke		0.10		0.10		0.23	
-2 log likelihood		4896,82		3726,34		8417,00	

Source: own elaboration, APS-GEM Italian datasets 2001-2010. Statistical significance = ***: p < 0.0001.

Table 3 shows the factors affecting the probability of being a nascent entrepreneur rather than not being a nascent entrepreneur in Italy for 2001-2010 for both men and women. The results show that the perceptual characteristics mediate the influence of socio-economic and demographic factors on nascent entrepreneurs.

In fact, when adding perceptual variables: the age effect disappears but only for males (Model 2, male), the influence of some graduate experience loses significance, the importance of the working status increases and the impact of a lower income level increases for men and decreases for women. The influence of perceptual variables on nascent entrepreneurs are almost identical for males and females; the only exception regards the proxy of social capital (personally know an entrepreneur). This indicates that the largest gender differences were found in terms of the socio-economic and demographic profiles, and not in the perceptual characteristics. As for the results of the covariate relating to the work status, the probability of being a nascent entrepreneur was higher for those not working and lower for retired/students compared to males working either part or full time. The effects of income levels on the dependent variable shows that nascent entrepreneurs have a 1.75 times higher probability for the lower income class compared to the upper class. These results demonstrate that men are more likely to begin a start-up driven by necessity (they were not working and belonged to the lower 33% income level), while nascent entrepreneurs women, even with a low household income, are more likely to start their new entrepreneurial activities

driven by opportunity (they have been working full or part-time). Regarding young entrepreneurship, the inclusion of perceptual characteristics does not mediate the influence of socio-economic and demographic factors (Table 4). The only substantial variation regards having a Master's/PhD, which is no longer significant for the likelihood of young entrepreneurs (Model 2, male). Here, important gender differences also emerge. In fact, the probability is higher for females between 25 and 34 years old, and lower for males over 45 compared to the middle age group (35-44). Women young entrepreneurs are more likely to not have a fear of failure, and have experience and skills from personally being acquainted with other entrepreneurs than those who are not young entrepreneurs. The only significant perceptual variable for men regards having the skills and experience required to be an entrepreneur.

Table 3 – *Results of the pooled binary logistic regression models for Nascent Entrepreneurs (Exp(B)= Odds Ratio).*

		Male				Female			
		Model 1		Model 2		Model 1		Model 2	
SOCIO-ECONOMIC CHARACTERISTICS		**Exp(B)**	**Sign.**	**Exp(B)**	**Sign.**	**Exp(B)**	**Sign.**	**Exp(B)**	**Sign.**
	<24	1,45	*	1,26		1,01		0,98	
	25-34	1,26		1,06		1,17		1,07	
Age groups	(35-44)								
	45-54	0,79		0,99		0,40	***	0,43	***
	55+	0,51	**	0,56		0,36	***	0,42	*
	(Secondary or less)								
Educational attainment	Bachelor	1,23		0,97		1,72	*	1,49	
	Master/PhD	1,57	**	1,21		1,08		0,65	
	(Working PT/FT)								
Work status	Not working	1,74	**	1,86	***	0,50	***	0,57	*
	Retired/students	0,18	***	0,26	***	0,37	**	0,38	*
	(Upper)								
Income	Middle	0,87		1,01		0,85		0,84	
	Lower	1,45	*	1,75	***	2,00	***	1,83	**
ENTREPRENEURIAL CHARACTERISTICS									
Fear of failure	(Yes)								
	No			1,96	***			1,72	*
Skills for entrepreneurship	(Yes)								
	No			0,15	***			0,21	***
Personally know an entrepreneur	(Yes)								
	No			0,51	***			1,10	
Business opportunity in the near future	(Yes)								
	No			0,44	***			0,51	***
Constant		0,28	***	0,82	***	0,21	***	0,59	***
N		11435		11435		12488		12488	
R2 Nalgerkelke		0.06		0.19		0.06		0.14	
-2 log likelihood		1527,51		1214,81		918,01		713,03	

*Source: own elaboration, APS-GEM Italian datasets 2001-2010. Statistical significance = *: p < 0.05; **: p < 0.01; ***: p < 0.001.*

Table 4 – *Results of the pooled binary logistic regression models for Young Entrepreneurs (Exp(B)= Odds Ratio).*

		Male				Female			
		Model 1		**Model 2**		**Model 1**		**Model 2**	
SOCIO-ECONOMIC CHARACTERISTICS		Exp(B)	Sign.	Exp(B)	Sign.	Exp(B)	Sign.	Exp(B)	Sign.
	<24	1,21		0,98		1,23		1,01	
	25-34	1,48		1,30		3,63	***	4,04	***
Age groups	(35-44)								
	45-54	0,50	***	0,56	**	0,52		0,56	
	55+	0,34	***	0,37	**	0,59		0,69	
	(Secondary or less)								
Educational attainment	Bachelor	0,93		0,89		0,86		0,76	
	Master/PhD	1,81	***	1,51		1,45		1,19	
	(Working PT/FT)								
Work status	Not working	0,39	**	0,43	*	0,09	***	0,11	***
	Retired/students	0,07	***	0,10	***	0,02		0,03	
	(Upper)								
Income	Middle	0,32	***	0,41	***	0,34	**	0,39	*
	Lower	0,78		0,84		0,76		0,89	
ENTREPRENEURIAL CHARACTERISTICS									
Fear of failure	(Yes)								
	No			1,39				1,77	*
Skills for entrepreneurship	(Yes)								
	No			0,21	***			0,32	***
Personally know an entrepreneur	(Yes)								
	No			0,79				0,49	***
Business opportunity in the near future	(Yes)								
	No			0,70				0,88	
Constant		0,04	***	0,09	***	0,02	***	0,06	***
N		11435,00		11435,00		12488,00		12488,00	
R2 Nalgerkelke		0.10		0.15		0.14		0.20	
-2 log likelihood		1204,24		1022,36		611,40		525,76	

*Source: own elaboration, APS-GEM Italian datasets 2001-2010. Statistical significance = *: p < 0.05; **: p < 0.01; ***: p < 0.001.*

As for young entrepreneurs, adding perceptual variables does not affect the influence of other individual characteristics when considering established entrepreneurs (Table 5). Regarding the profiles of male and female established entrepreneurs, the sign and magnitude of the coefficients are very similar. There are just two exceptions: 1- men over 55 have a higher probability of being established entrepreneurs, while women are more likely to be between 35 and 44 years old; 2- not having a fear of failure remains an important perceptual variable in established entrepreneurs only for women.

Table 5 – *Results of the pooled binary logistic regression models for Established Entrepreneurs (Exp(B)= Odds Ratio).*

		Male				Female			
		Model 1		Model 2		Model 1		Model 2	
SOCIO-ECONOMIC CHARACTERISTICS		Exp(B)	Sign.	Exp(B)	Sign.	Exp(B)	Sign.	Exp(B)	Sign.
	<24	0,49	***	0,39	***	0,95		0,81	
	25-34	0,19	***	0,16	***	0,24	*	0,28	
Age groups	(35-44)								
	45-54	0,98		1,04		1,15		1,20	
	55+	1,40	*	1,69	***	1,16		1,23	
	(Secondary or less)								
Educational attainment	Bachelor	0,81		0,76		0,64	*	0,60	*
	Master/PhD	1,23		0,96		0,79		0,68	
	(Working PT/FT)								
Work status	Not working	0,17	***	0,17	***	0,04	***	0,06	***
	Retired/students	0,06	***	0,04	***	0,09	***	0,11	***
	(Upper)								
Income	Middle	0,65	***	0,60	***	0,65	*	0,65	*
	Lower	0,66	**	0,68	**	0,42	***	0,51	*
ENTREPRENEURIAL CHARACTERISTICS									
Fear of failure	(Yes)								
	No			1,18				1,41	*
Skills for entrepreneurship	(Yes)								
	No			0,24	***			0,10	***
Personally know an entrepreneur	(Yes)								
	No			0,60	***			0,66	***
Business opportunity in the near future	(Yes)								
	No			0,90				1,17	
Constant		0,13	***	0,37	***	0,02	***	0,24	***
N		11435		11435		12488		12488	
R2 Nalgerkelke		0.12		0.23		0.18		0.30	
-2 log likelihood		2882,64		2240,98		1679,44		1240,46	

Source: own elaboration, APS-GEM Italian datasets 2001-2010. Statistical significance = *: p < 0.05; **: p < 0.01; ***: p < 0.001.

5. Discussion and policy implications

Our results demonstrate that are clear differences with regard to entrepreneurship: entrepreneurs differ from non-entrepreneurs and female entrepreneurs differ from their male counterparts, irrespectively of the stage. Our findings also demonstrate that in Italy perceptual variables also play a significant role in entrepreneurship (Koellinger et al., 2013), however gender differences strongly depend on the socio-economic and demographic profiles. Subjective perceptions preserve a positive influence on young and established entrepreneurship mostly among women. This highlights the importance of the

inclusion of tailored-made policies to foster and support female-headed entrepreneurial activities.

In order to increase the participation of women in different stages of the entrepreneurial process (nascent, young and established entrepreneurship), measures are needed that help women to consider entrepreneurship as a valid occupational option. This involves the creation of policies focused on the differences between women in-and-out of entrepreneurship without necessarily considering female-male diversities.

Our results have shown that today several barriers and constraints impede a clear entrepreneurial start up process for women. In Italy, most women would be empowered by the availability of credit. Also education, especially in terms of business training and management, could play a key role in both the implementation and success of women-headed businesses. In addition, to strengthen women's entrepreneurial skills, it could help women to get into economic sectors traditionally managed by men.

Through specific traineeships, support around business management, networking and the use of technological tools, unemployed and inactive women can become potential entrepreneurs, thus increasing the diversity of economic actors so much needed in a society to achieve sustainable and inclusive growth. We were unable to consider the influence of either the marital status or the presence of dependent children in the household. However, it is well known that entrepreneurship policies also need to be family friendly (i.e. bonuses to pay for childcare) in order to eliminate the obstacles that women face in reconciling childrearing and employment decisions.

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SUMMARY

Gender differences in entrepreneurial activities in Italy.

Women's active participation in the labor market increases productivity, efficiency and gender equality and is one of the essential engines of sustainable and

inclusive growth in modern societies. Women's participation in entrepreneurial activities could also generate a significant multiplier effect in local labor markets by demanding specific occupational profiles, usually fulfilled by other women, in activities related to home-and-child care.

This paper analyzes the differences between female and male entrepreneurship focusing on the socio-economic, demographic and attitudinal characteristics of nascent, young and established entrepreneurs. The principal aim is to measure and understand gender differences in the Italian entrepreneurial process. For the empirical analyses, we used the Italian data from the Global Entrepreneurship Monitor (GEM) and tested our hypothesis by estimating binary logistic regressions on the pooled sample between 2001-2010. The results confirm the male-headed nature of entrepreneurship, but show that the greatest gender differences in the profiles of entrepreneurs are concentrated in the start-up phase.

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TRACKING THE FACTORS THAT INFLUENCE FEMALE EMPLOYMENT: THE ALBANIAN CASE

Thaís García-Pereiro, Ivano Dileo

1. Introduction

Women's employment is considered as one of the essential engines of sustainable and inclusive growth in modern societies. Its contribution is potentially huge in terms of socio-economic development, productivity, efficiency, effectiveness and gender equality. Moreover, women participation in productive activities might generate a significant multiplier effect in local labour markets by demanding specific employment figures, usually fulfilled by other women, in activities related to home-and-child care.

In Albania, along the forty-five years of the socialist regime, the implementation of government's full employment policy somehow forced women to be actively involved the labour market. The relative success of the massive female incorporation to paid work was linked to the implementation of complementary policies such as the universalisation of education, the availability of free health care and the diffusion of child-care facilities to reconcile work and family life (Gjonca et al., 2008). Despite these, women's empowerment process was limited by the maintenance of an unbalanced division of care and domestic duties within families, with gender roles typical of traditional patriarchal societies (Kapllanaj et al., 2016).

During the transition to a market economy, female labour force participation dramatically dropped. According to Gjonca et al. (2008) rates of female labour market participation have declined from 47.4% in 1989 to 40.7% in 2001. New opportunities for employment generated by market liberalization led to unstable employment (Beluli, n.d.), and for women it has been hard to re-enter in paid work after unemployment or childbearing periods. Despite important educational improvements in Albania, neither women's participation in the labour market has increased nor have wage gaps been reduced.

Women's disadvantages in the labour market indicate that national employment programmes have failed in guarantying equal access and opportunities (EU/SDC, 2014).

The aim of this paper is twofold. On the one hand, to describe the evolution of labour market indicators in Albania highlighting observed gender gaps, and on the

other, disentangling individual and household socio-demographic, economic and cultural factors that influence women's recent employment choices in the country.

In the first part of the analyses, labour market indicators –interpreted within the European context- are drawn from the INSTAT data-warehouse, while the second part makes use of the Albanian micro-data of the 6th Round of European Social Survey conducted between 2012 and 2013.

2. Theoretical background

The decision to participate in paid labour market activities is opposed to full involvement in other kind of activities, such as housework, education, or retirement. At an aggregated level, this decision influences the size and composition of employment, having an important effect also on household activities, further education, and retirement programs (in terms of contribution to pension funds).

The neoclassical economic theory suggests that female decision of entering the labour market is the result of changes in the cost-benefit relationship of wage relative to activities such as domestic labour, home production and leisure time (Pettit and Hook, 2005). The cost-benefit analysis is influenced by both demand and supply sides of the labour market. On the supply side, individuals are considered rational actors who act to maximise benefits. As a consequence, the decision to enter the labour market is aimed at reaching an optimal allocation of time, considering that: a) a higher amount of time spent working is translated into higher earnings but also into lower levels of satisfaction and non-market utility from leisure time; b) more time spent on leisure activities increases its indirect utility but reduces income. In Gary Becker's theory (1981), the family is the central decision-making unit. Family is the joint agent that decides how to allocate time of each its members in one of the following three activities: household consumption, household production and paid job. In order to increase family income and minimise opportunity costs, families allocate their time applying a sort of specialization rule based on the differentiation of roles among household members. By applying this rule, families maximise both income and indirect utility from household productions. Becker's New Home Economics explain gender differences through the comparative advantages that women could obtain when concentrating their time in household production. This implies a clear division of roles within the family, in which men specialise in paid work and women in housework. Female labour supply strongly depends on her husband labour resources: if these resources are high, it is more convenient for women to specialise in household production. Moreover, education and employment choices of women are robustly linked to their reproductive and care roles.

Mincer and Polachek (1974) build a Human-Capital Earning Function, in which women's earnings are discontinuous due to a particular life course that is frequently interrupted by marriage, childbearing and childrearing. Authors stated that participation in labour market activities differs by number of children, marital status, age and other characteristics. Moreover, woman's chances to be engaged in paid work increase along with her human capital accumulation.

The theoretical perspective set out in this paper shifts from the classic economic theories regarding labour supply to more recent developments that link gender and development: from the initial Women in Development (WID) to the Gender and Development (GAD) approaches. Even if both frameworks are more institutional than theoretical in nature, this paper treats them as essential to widen the efficiency and utility economic concepts towards a more comprehensive scheme of sustainable and inclusive development in transition economies.

The WID approach emerged during the 70's in the discourses of international organizations and the third sector, which considered women as important subjects for economic development with equal levels of productivity than men. Therefore, WID strategies aimed at investing in women's productivity to obtain both economic and social returns. One of the more important critics made to WID has been its unique focus on women, without considering the key role played by gender as a social relationship. Thus, gender relations must be read looking beyond the productive sphere to bring about empowerment. This is the gap that the GAD approach aimed at closing (Rathgeber, 1990). It emerged in the 80's from socialist feminists, adding to the former women's focus the concept of equity and socially and culturally constructed gender relations. According to this framework, women's status heavily depends on their resources and their position within societies, particularly when the mainstream is patriarchal. Therefore, the final goal is to reduce socio-economic disparities between men and women by promoting access to employment and income (Parpart, 2003; Parpart and Barriteau, 2000).

A rich body of literature has examined the determinants of female labour force participation around the globe, but in Albania the role played by social, economic, cultural and regional factors has largely been ignored

3. Data and methods

The central aim of this paper is to analyse factors that influence female employment in Albania using the relative country dataset of the 6th Round of the European Social Survey (ESS6-2012/13). The ESS is an academically-driven cross-sectional social survey designed to chart and explain the interaction between Europe's changing behaviour patterns of its diverse populations. The project is directed by a "Central Coordinating Team" led by Roger Jowell at the Centre for

Comparative Social Surveys, City University, UK. The dataset corresponds to the most recent round, conducted in 2008. The national team comprised the Open Society Foundation for Albania, as the data collector, and Alban Nelaj, as the National Coordinator.

The cross-national character of the ESS allows making accurate comparisons between the countries subject of these research. The variables that will be use are part of the core model of the questionnaire which includes socio-demographic and economic characteristics of the respondent and some concerning its parents and partner. The Albanian sampling procedure followed a two stages frame and a stratified three-stage probability sampling design.

The first attempt was to use other national data sources, but due to diverse important limitations the analyses were ran using Albanian ESS6 data. Unfortunately, all public available datasets (downloadable from INSTAT's apposite website) lack of some essential information for the analysis of female employment in Albania. For example, in the dataset of 3% sample of the last Census (2011) variables regarding activity and employment status are missing, while a similar situation can be found in the dataset of the 2013 Labour Force Survey with regard to the presence of children in the household.

The analysis of women's employment in Albania three focuses on two possible employment situations: employed or not employed in the seven days prior to the survey. To study the socio-economic and demographic profiles of women who were employed or not employed, the paper first analyses the percentage distribution of 11 independent variables (see Table 1) in relation to the dependent variable (working or not at the time of the survey). Table 2 includes the percentage distribution of the employment status of male population in order to highlight some important gender differences of employment in Albania.

Table 1 –*Descriptive measures of the variables used in the analyses of the determinants of female employment.*

Variable Name	Description
Employed	A dummy variable that assumes value=0 if women are not employed, and =1 if women are employed (Dependent variable).
Age	Ratio variable. Comprises individuals aged 15-64 years old.
Age2	Ratio variable. Comprises individuals aged 15-64 years old. It is computed as age2=age*age.
Married	A dummy variable that takes on the value=1 if women are married, and =0 if women are not married.
Without children hh	A dummy variable that takes on the value=1 if women are not living with children in the household, and =0 if they are.
Household size	Ratio variable. Number of individuals living in the household.
Tertiary education	A dummy variable that assumes value=0 if women achieved less than tertiary education, and =1 if women achieved tertiary education.

Income	A dummy variable that assumes value=1 if the level of the household income pertains to the highest five deciles of the distribution (6th to 10th deciles) and =0, otherwise (1st to 5th deciles).
Secondary and tertiary education (father)	A dummy variable that assumes value=0 if respondent the father achieved less than secondary education, and =1 if he achieved secondary and tertiary education.
Secondary and tertiary education (mother)	A dummy variable that assumes value=0 if respondent the mother achieved less than secondary education, and =1 if she achieved secondary and tertiary education.
Not employed mother	A dummy variable that takes on the value=1 if the mother was working when respondent was 14 years old, and =0 if she was not.
Tiranë	A dummy variable that takes on the value=1 if respondent resides in Tiranë, and =0 if resides in another prefecture.

To evaluate the results of the descriptive analysis in a multivariate setting, it was computed a binary logistic regression model that measures a woman's likelihood (interpreted by the odds ratio) to be employed (against being not employed) at the time of the survey, controlling for the eleven independent variables considered. Only individuals between 15 and 64 years old were selected from the Albanian ESS6 sample. Given that not all individuals in the population aged 15+ had precisely the same chance of selection, the design weight was applied to correct these slightly different probabilities of selection.

The econometric analyses started with applying appropriate econometric methods on the sample dataset. Predicted employment probabilities were computed to measure gender differences in employment. While the probability of female employment was examined by a multivariate logistic regression, a binomial logistic regression was applied to account for gender differences in employment probabilities. Making use of the same mathematical equation, one partial and one general econometric model were built separately. The partial regression includes socio-demographic, economic and regional variables. The general model includes also the cultural proxies and analyses the effects of each explanatory variable on the odds of being employed.

4. Recent evolution of labour market indicators in Albania

One of the mains goals of the Lisbon Strategy for the 2000-2010 period in the labour market field was to increase European male and female employment rates to 70% and 60%, respectively, by the end of the reference period (Calamo & García-Pereiro, 2014). As shown in Figure 1, European countries do not reach the expected value on female employment rates. The newest strategy Europe2020 does not specifically mention employment gender goals. Instead, countries are called to concentrate their efforts in rising comprehensive employment rates to 75% by 2020.

In Albania, male employment rates remained over 60% until 2012. The impact of the crisis in the Albanian labour market started one year before, and both total

and male employment rates have not reached their pre-crisis levels again. The evolution of the female employment rate has not followed a clear pattern. Between 2007 and 2009, the rate decreased from 49.3% to 43.6%, then raised reaching its maximum value in 2011 (51.8%) to drop again to 43.4% in 2014.

Regarding unemployment rates (Figure 2), the evolution in EU-28 countries displays an increase after the economic crisis, reaching its maximum value in 2013 (near 11%). However, gender differences in this context are almost inexistent. The Albanian case greatly differs from the European trend.

Since the end of the communist regime, unemployment rates have been traditionally higher among females than among males (UNICEF, 2007). However, this trend reverses after 2011: when, for the first time, unemployment rates are higher among males, and gender gaps are becoming even more evident than before. Unemployment in Albania is on the rise since 2012, its total figures have grown from 13.8% to 17.9% in 2014.

Figure 1 – *Albania and EU-28. Evolution of employment rates by gender. Years 2007-2014.*
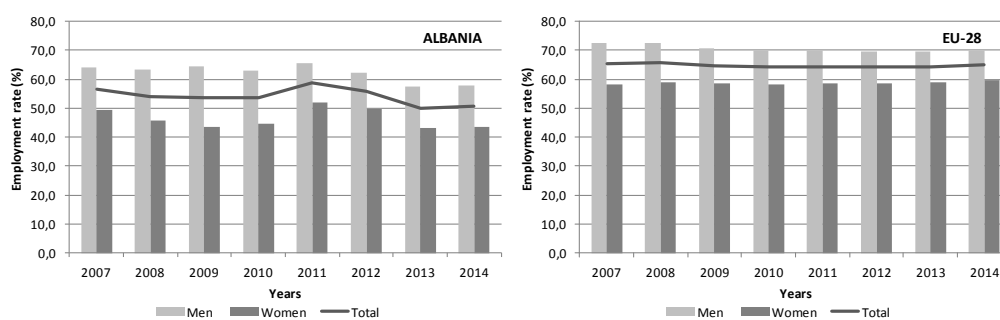
Source: own elaboration, INSTAT and EUROSTAT on-line databases.

Figure 2 – *Albania and EU-28. Evolution of unemployment rates by gender. Years 2007-2014.*
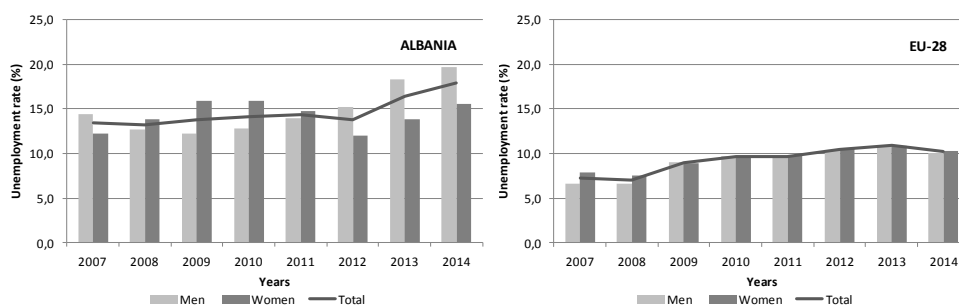
Source: own elaboration, INSTAT and EUROSTAT on-line databases.

5. Gendered employment profiles in Albania

It has been illustrated the recent downward trend in employment rates during the last years in Albania, considering its main gender differences and reading the observed trends through a European lens. The purpose of this section is to shed further lights on the employment profile differences between men and women. Table 2 shows percentage distribution of the socio-demographic, economic, cultural and regional characteristics of both employed and not employed individuals by gender in Albania.

The first box of Table 2 displays the values of the socio-demographic characteristics of the sample. The mean age of not employed individuals is gender balanced: around 26 years for both men and women. Instead, employed women are approximately 3 years older than their male counterparts, with a mean age of 42 years old. More than half of the individuals are married, but there are some important differences that diverse to be highlighted. First, the lowest percentage of married individuals regards those who are not employed. Second, among employed the share of married women is larger (76.3%) than men (69.5%). A similar distribution is observed among people living with children. This common feature might be attributable to the strong and direct relationship that still exists between marriage and fertility in Albania (Gjonca et al., 2008). The size of the household is slightly higher among the not employed categories.

Table 2 – *Percentage distribution of socio-demographic, economic, cultural and regional characteristics of employed and not employed individuals by gender. Albania, 2012/2013.*

Sample characteristics	Employed (%)		Not employed (%)	
	Women	Men	Women	Men
Socio-demographic characteristics				
Age (mean)	41,80	39,04	35,86	35,45
Married	76,30	69,52	61,36	51,68
Children	72,76	64,90	57,14	44,00
Household size (mean)	4,25	4,42	4,68	4,72
Economic characteristics				
Tertiary education	39,85	22,53	10,05	4,82
Income (6th to 10th deciles)	46,33	23,41	9,56	10,92
Culture proxies				
Secondary and tertiary education (father)	84,51	72,38	68,91	67,30
Secondary and tertiary education (mother)	65,61	66,99	67,66	63,16
Not employed mother	10,85	41,68	43,65	50,03
Regional characteristics				
Big city	65,24	44,78	33,21	23,46
Tiranë	39,99	24,79	19,96	14,80

Source: own elaboration, ESS6-Albania.

Regarding economic characteristics, the highest educational level attained shows consistent differences between employed and not employed individuals. The percentage of those with tertiary education is significantly higher for the first group. Moreover, there is a difference of seventeen percentage points that favours women: almost 40% of them attained tertiary education. There are not income divergences between unemployed men and women, but they hold lower income levels than those employed. Within the last group, 46.3% of employed women have an income level between the 6th and 10th deciles, while the figure for employed men is 23 percentage points lower.

Three variables have been included as proxies of the cultural determinants of employment, and all of them regard human capital of the household of origin. The first two measures mother's and father's level of education. The highest percentage of fathers that achieved secondary and tertiary education is found among employed individuals, especially among women (84.5%). The third proxy regards the employment status of the mother when the respondent was 14 years old. It is important to note that only 10.9% of employed women declared that their moms were not employed, being the lowest value of the sample.

The last group of determinants are the regional ones. The percentage of individuals that declared to live in a big city or in the suburbs of a big city is much higher for those employed than for those not employed. Again, the highest value pertains to employed women (65.2%). This situation repeats when considering those who live in Tirana.

6. Determinants of women's employment in Albania

The former section demonstrates that there are some important gender differences regarding employment in Albania, but it does not tell anything about the magnitude of such gaps. It is possible to know how employment probabilities differ by running a binary logistic regression model that considers gender as one of the covariates and computing the predicted employment probabilities for each level of gender. The results show that a man in Albania in 2012/2013 had a 46% chance of being employed, while a woman had a 22% chance. According to these values, a man in Albania was almost 2 times as likely to be employed as a woman (46.1% compared with 22.2%).

These predicted probabilities are strong indicators of gender imbalances in employment. But it is important to highlight that, after controlling for the eleven covariates considered in these analyses, the observed gender gap becomes even larger. In fact, in 2012/2013 the chance of being employed of an "average" man in Albania was almost the same (around 47%), while an "average" woman had much

lower chance (16.4%). This means that an average man in Albania was 3 times as likely to be employed as an average woman.

Table 3 presents the results of a binary logistic regression (odds ratio) that allows you to compare the factors that influence women's probability of being employed at the time of the survey. Female employment determinants considered are the same independent variables studied in the descriptive analysis.

Table 3 – *Results of the binary logistic regression models (Exp(B)= Odds Ratio).*

Covariates	Spec. 1 Exp(B)		Spec. 2 Exp(B)	
Socio-demographic characteristics				
Age	1,57	***	1,52	***
Age (square)	0,99	***	0,99	***
Married	0,85		0,70	
Without children hh	0,99		1,14	
Household size	0,87		0,89	
Economic characteristics				
Tertiary education	6,04	***	5,47	***
Income hh (6th to 10th deciles)	6,81	***	6,38	***
Culture proxies				
Secondary and tertiary education (father)			3,37	**
Secondary and tertiary education (mother)			0,58	
Not employed mother			0,43	**
Regional characteristics				
Tiranë	2,01	**	1,84	**
N	576		576	
Pseudo R2	0,26		0,30	
Log likelihood	-206,74		-216,68	

Source: own elaboration, ESS6-Albania.
Statistical significance = **: p < 0.05; ***: p < 0.01.

The first specification shows the effects of eight covariates, excluding the cultural proxies. The effect of age on females' chance of being employed is considerably positive. Age is squared and included in the models to see the diminishing return of increasing of age, this demonstrates that age has a non-linear effect in women's employment, first positive and then negative. Neither the dummy for married women nor the ones indicating the presence of children in the household and the household size have a statistical significant effect on women's employment.

Both economic variables introduced in the specifications are the variables that influence the most female employment in Albania. Woman likelihood of being employed is more than six times higher if she had achieved tertiary education, relative to those with secondary education or less. It is also more likely for a woman to be employed rather than not employed if her household income level pertains to the highest deciles of the distribution (6th to 10th).

When examining regional characteristics, the probability of being employed is higher for women who were living in Tirana if compared to those living in other Albanian prefectures.

Including the effects of the three cultural proxies in the second specification increases the proportion of the total variability of women's employment that is accounted for by the model. In this specification, the direction and magnitude of the other covariates do not significantly change, only the effects of the economic covariates decrease slightly.

There are two cultural proxies that have a significant impact on female employment chances. The first, and most important, is the employment status of the mother when the respondents were 14 years old. The odds of being employed are 57% lower for woman whose mother was not working than for those who had working moms. The second regards father educational attainment: the employment likelihood is more than 3 times higher for women who had a father that achieved secondary or tertiary education compared to those whose fathers achieved primary education (or less).

7. Concluding remarks and policy implications

The results of this paper show that cultural proxies are important determinants, thus, to increase women's employment in Albania it is necessary to gradually change the traditional division of gender roles within the household. This is not an easy goal to achieve, but important efforts need to be done in this field. Expanding child and elder care services might help, but it won't be sufficient if traditional structures prevail. It is crucial to raise social awareness by promoting gender equality in the Albanian society and tackling all faces of discrimination. Regarding women's employability, important results could be achieved by hardly investing in further education and training programmes, and in women's entrepreneurship.

Female employment is positively associated with higher levels of education and household income, a result that must be undoubtedly accompanied by the creation of jobs for educated women. However, this measure needs to be only complementary to a more inclusive programme aimed at reducing not only gender inequality but also socio-economic inequalities among subpopulations of women. Following this line, it might be useful to track young women in their educative choices, guiding them towards more effective educational paths that offer higher employment chances and salaries.

To increase the demand of female employment, public policies can act not only supporting women's entrepreneurial activities, but also creating comparative advantages for private enterprises that hire women in their reproductive ages (García-Pereiro & Dileo, 2015). Working women have a greater expenditure

capacity and tend to delegate their household duties (housework, child and elder care) to other subjects. Therefore, it would be also important to create subsides or benefits for employed women that decide to hire caregivers, institutionalising such figure in the formal labour market. Further research on the subject should examine the effects of macro-level determinants on female employment (Patimo et al., 2015) and its interactions with micro-level determinants.

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SUMMARY

Tracking the factors that influence female employment: the Albanian case

During the socialist regime in Albania the government policy of full employment boosted female participation and, consequently, employment rates were higher than in most part of OECD countries. Other set of policies, such as the investments in childcare facilities and education, undoubtedly stimulated women to enter and remain in the labour market. Since the beginning of the transition to a market economy, women's participation in the labour market has consistently decrease, as confirmed by the reduction of the number of employed women, the higher number unemployed and the larger share of housewives. The gap between men and women in productive activities has become larger than during the socialist period, negatively influencing gender equality in the country.

The purpose of this paper is to identify and measure the effects of some social, economic, demographic, cultural and regional determinants that influence female employment in Albania. Data are drawn from the last micro-dataset of the European Social Survey (2012). Logistic regression techniques are employed on survey data to estimate the odds ratios of female employment. The econometric findings will be extremely useful to feed knowledge-based policies aimed at increasing female labour force participation in Albania.

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VERTICAL MISMATCH:
STIME ED EVIDENZE EMPIRICHE[1]

Giovanna Di Castro, Valentina Ferri, Andrea Ricci

1. Introduzione

Il *mismatch*, inteso come la discrasia tra competenze possedute dall'individuo e quelle necessarie per il ruolo lavorativo ricoperto dallo stesso, produce effetti negativi sulla competitività delle economie, comporta costi economici e sociali elevati e agisce in maniera negativa sulla motivazione al lavoro. Dallo studio REFLEX emerge che l'educational mismatch in Italia è uno dei più elevati tra i paesi europei (McGuinness e Sloane 2010) e che l'Italia è terza dopo Spagna e Gran Bretagna. A livello nazionale capita sempre più frequentemente che l'azienda prediliga l'assunzione di una figura maggiormente qualificata e non viceversa, anzitutto perché l'offerta è maggiore: sono molti gli individui che hanno un livello elevato di studi e non lavorano; in secondo luogo perché potrebbe essere più semplice rintracciare determinate competenze in un individuo con un livello più alto d'istruzione che, nella maggior parte dei casi si accontenta di uno stipendio più basso di quel che meriterebbe. Il suddetto squilibrio nel mercato del lavoro, genera un fenomeno che nel più generale quadro del "*mismatch*" si identifica come "*overeducation*"[2].

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[1] Sebbene il paper frutto della collaborazione dei tre autori, l'introduzione, la letteratura di riferimento e le statistiche descrittive vanno attribuite a Giovanna Di Castro, le analisi econometriche e i risultati a Valentina Ferri e le conclusioni ad Andrea Ricci.

[2] Si parla di educational mismatch quando si rileva una mancata corrispondenza tra il titolo di studio e la posizione del lavoratore all'interno dell'organizzazione, diversamente, si parla di skill mismatch per ciò che attiene alle competenze e cioè alla mancata corrispondenza tra competenze e abilità di un individuo rispetto a quelle necessarie per il lavoro che svolge. A questa definizione piuttosto generica se ne aggiungono molte altre utilizzate in letteratura che definiscono e circoscrivono meglio questi fenomeni di discrepanza e di non corrispondenza tra livelli di istruzione, formazione e lavoro. Per vertical mismatch, s'intende un livello di istruzione o formazione inferiore o superiore a quello richiesto, per horizontal mismatch s'intende, invece, una tipologia d'istruzione o competenze inappropriata per il ruolo che si svolge. Termini che identificano concetti simili, con un livello di dettaglio maggiore, sono overeducation e undereducation: si definisce overeducation il caso in cui i lavoratori hanno più anni d'istruzione rispetto a quanto richieda la posizione che rivestono, viceversa trattasi di undereducation.

Nel presente paper si intende stimare la probabilità che un giovane italiano possa trovarsi in una condizione di *overeducation*, al fine di comprendere quali variabili contribuiscano a favorire tale probabilità. In particolare si intende studiare approfonditamente quanto incidano gli indirizzi di studio dell'ultimo titolo conseguito sulla probabilità di essere sovra-istruiti (*overeducated*), inoltre si indagherà su altre caratteristiche socio-economiche e sulla loro influenza nel determinarsi dello stato di *overeducation*. L'analisi si basa sui dati della *Rilevazione Transizioni Scuola Lavoro* condotta dall'INAPP (ex Isfol) nel 2014 su un campione rappresentativo di ca. 45.000 individui di età compresa tra i 20 e i 35 anni. In questo contesto si considerano comunque solo gli individui che hanno terminato il percorso di studio. Una volta operata tale selezione ed eliminato le osservazioni che presentano valori mancanti nelle variabili oggetto di studio, il campione di riferimento si riduce a circa 14.000 individui.

Il paper è così organizzato: nel paragrafo che segue si approfondisce la letteratura inerente alle determinanti e agli effetti del fenomeno dell'overeducation, nel paragrafo 3 si analizza il quadro descrittivo ponendo in evidenza le variabili che saranno utilizzate nell'analisi. Nel quarto paragrafo si sviluppa l'analisi econometrica e si discutono i risultati, seguono le conclusioni.

2. Gli studi sull'Italia in termini di overeducation

La letteratura tende a considerare in maniera sempre più dettagliata il *mismatch* come under o over education, in particolare perché le determinanti e le conseguenze si ritengono differenti. Sull'*overeducation*, dal punto di vista della domanda si rileva una differenza tra settori (Manacorda e Petrangolo, 2000). Per esempio, nel caso del manifatturiero - essendo quest'ultimo legato a processi *labour intensive* - l'impresa propende per una domanda meno qualificata (Cainarca, Sgobbi, 2009). Sul fronte dell'offerta invece, diversi sono i contributi in letteratura che ripropongono l'interpretazione della peggiore qualità dei livelli d'istruzione dei giovani italiani rispetto ai loro coetanei europei (Checchi, 2003; Franzini, Raitano, 2009). Si è sviluppato, di fatto, un ampio dibattito rispetto alla questione dell'inefficienza del nostro sistema di istruzione e formazione e a quanto le scelte inefficienti dal punto di vista universitario generino successivamente *overeducation*. Ad aumentare la probabilità di essere in condizione di *mismatch* interviene sicuramente il problema delle competenze. Le evidenze fornite dall'indagine PIAAC OCSE (2013) dimostrano come vi siano scelte formative, modelli di apprendimento e indirizzi disciplinari più funzionali di altri all'acquisizione di abilità e competenze cognitive maggiormente richieste dal mercato e, dunque, capaci di influenzare più incisivamente l'inserimento

lavorativo, i percorsi di carriera e le performance salariali di chi le possiede (cit. OCSE 2014). Da questo punto di vista è chiaro che l'analisi della relazione tra scelte di istruzione e condizione occupazionale dei giovani e quindi molto probabilmente anche l'eventuale probabilità di essere in condizione di mismatch, non si può limitare ai titoli di studio ma dovrebbe considerare anche le performance durante gli studi, le discipline di specializzazione, gli eventuali momenti formativi e alcune variabili demografiche, psicologiche e sociali che potrebbero contribuire al fenomeno del disallineamento.

Anche per il caso specifico italiano sono stati realizzati diversi studi relativi alle differenze salariali che si verificano a seguito del *mismatch*. Ciò che viene messo in evidenza in tali analisi è che effettivamente l'impresa ha maggior interesse ad avere un laureato *overeducated* nella sua azienda, in quanto i rendimenti degli *overeducated* risultano positivi anche se inferiori a quelli del personale giustamente inquadrato. Inoltre bisogna considerare che i laureati italiani sono tra quelli più inoccupati in Europa e questo aumenta di gran lunga la loro disponibilità a svolgere mansioni diverse da quelle per cui hanno studiato.

Dal contributo basato sui dati ISTAT sui laureati del 1998 (Cutillo e Di Pietro 2006), emerge che la penalizzazione salariale è del 40% e sono le lauree in Scienze Politiche, Lettere e Lingue a determinare maggior rischio di penalizzazione. Inoltre, considerando le differenze che caratterizzano il Paese tra Nord e Sud, ci si aspetterebbe di rintracciare il problema come maggiormente significativo nelle regioni meridionali. Un'evidenza contraria spiega invece che il fenomeno sembrerebbe colpire meno il Mezzogiorno anche in termini di differenze salariali in quanto risulta più elevata la quota di lavoratori nel settore pubblico (Franzini e Raitano, 2012). Emigrare diminuirebbe i rischi di *overeducation* secondo un altro studio sul tema, tra i laureati, coloro i quali emigrano, sono in genere meno *overeducated* di coloro che restano nel territorio (Croce e Ghignoni, 2015).

Stime empiriche relative a cause e conseguenze dell'*overeducation*, basate sui dati Almalaurea (Caroleo e Pastore, 2013), mostrano alcuni interessanti risultati. In particolare sulla base dei dati relativi alle interviste fatte a 5 anni dalla laurea, vengono analizzate le determinanti considerate "permanenti" dell'*overeducation*. Le variabili utilizzate per la regressione probit, ricavate dal dataset Almalaurea, considerando ben 4 rilevazioni longitudinali, permettono di verificare se la sovraistruzione è *"to do* o *to get"*, come definita da Dolton e Silles (2008). La prima, *"to do"*, riguarda le qualifiche acquisite durante la carriera universitaria e se esse risultino necessarie per svolgere le mansioni affidate all'intervistato. Con la seconda definizione, *"to get"*, si vuol intendere che il titolo di studio possa essere condizione necessaria e sufficiente per ottenere il lavoro, indipendentemente dalle competenze proprie e acquisite dall'individuo.

Secondo i dati descrittivi ad un anno dalla laurea, risultano *overskilled* e *overeducated* il 16,5% e il 13,2% dei laureati occupati (Caroleo e Pastore, 2013). Le percentuali, dopo 5 anni rimangono consistenti pur riducendosi: 11,4% e 8,0%. I gruppi di laurea maggiormente *overskilled* e *overeducated* sono i laureati in Lettere, Lingue, Scienze motorie, Scienze politiche, Psicologia, Geologia e Biologia. Secondo le stime probit, nello stesso lavoro, emerge che le donne hanno maggiore probabilità di essere *overskilled*. Influenzano maggiormente lo stato di *overskilling* rispetto a quello dell'*overeducation* i seguenti fattori: il rendimento durante l'università, espresso dal voto di laurea, gli anni spesi per conseguire la laurea in ritardo rispetto al percorso curriculare, il tipo di facoltà, il voto finale di laurea. La differenza tra gruppi di laurea emerge in modo significativo ancorché nelle stime probit, mettendo in evidenza che l'occupazione può essere più o meno di qualità anche rispetto al gruppo di laurea da cui si proviene. C'è una differenza importante tra le macroaree, in particolare coloro che lavorano o da emigrati o da autoctoni nel Nord Italia hanno una bassissima probabilità di *mismatch*, rispetto a chi trova lavoro nel Mezzogiorno, in accordo con le risultanze delle analisi di Croce e Ghignoni (2015).

Tra gli studi empirici realizzati sul *mismatch*, un approccio proposto da alcuni recenti contributi vede come principale metodo la regressione logistica multinomiale, il modello equivale allo sviluppo di due modelli logit: uno per la sottoistruzione e l'altro per la sovraistruzione, ciascuno rispetto alla categoria della pari-istruzione. Si riportano alcune importanti caratteristiche e risultati dello studio ISTAT sul *mismatch* realizzato sulla base dei dati dell'indagine multiscopo del 2009 "Famiglia e soggetti sociali", al fine di comprendere la probabilità dell'individuo di trovarsi in condizione di *mismatch* al primo lavoro (ISTAT, 2014). Attraverso tale modello, individuando come variabile dipendente la condizione di *mismatch* e come categoria di riferimento l'assenza di *mismatch*, è stato analizzato l'impatto di alcune variabili esplicative. In particolare: il sesso, la coorte di nascita, la ripartizione geografica di residenza, la classe di origine sociale e alcune *dummy* come ad esempio l'uscita dalla famiglia di origine, la formazione di un'unione o un matrimonio e la nascita di figli. Al fine di non creare fonti di distorsione per le stime, nel medesimo modello non sono state incluse tra le covariate il livello di scolarità e la professione, essendo queste ultime variabili alla base della definizione del *mismatch*.

Secondo le stime al crescere dei livelli d'istruzione della popolazione tra le generazioni considerate, risulta un aumento di probabilità di essere sovraistruiti e non sottoistruiti. Le donne inoltre, rischiano di essere maggiormente sottoistruite rispetto agli uomini. Più è elevata la classe sociale, più il figlio è protetto rispetto al rischio di entrare nel mondo del lavoro in una condizione di sottoistruzione. Inoltre quando si proviene da famiglie borghesi, del ceto medio impiegatizio e della

borghesia urbana, aumentano le probabilità di avere un primo lavoro da sovraistruito. Le uniche differenze territoriali in termini di *mismatch*, secondo lo studio ISTAT, emergono per la più elevata probabilità di sottoistruzione al Nord. Per di più, considerando alcuni eventi di vita rilevanti, chi è uscito dalla famiglia d'origine, si sposa, convola a nozze e mette al mondo un figlio ha maggiori probabilità di essere sottoistruito; la probabilità di sovraistruzione aumenta invece solo per coloro che escono dalla loro famiglia di origine.

L'urgenza della ricerca di un primo lavoro contribuisce al rischio di sottoistruzione e il protrarsi dei tempi di studio prima del conseguimento del titolo espone al rischio di non trovare una professione adeguata al proprio percorso formativo e quindi di essere sovraistruiti o sottoistruiti.

Un recente contributo ISFOL infatti dimostra come il conseguimento di un titolo di studio universitario aumenti sempre la probabilità di trovare un lavoro a tempo indeterminato e di intraprendere un'attività imprenditoriale rispetto al rischio di rimanere non occupato (Di Castro, Ricci, 2014). Il tessuto produttivo italiano non garantisce da tempo adeguata valorizzazione del capitale umano, lo testimonia il tasso che misura il "Fields of study mismatch" cioè il *mismatch* orizzontale, ovvero la mancata corrispondenza tra l'ambito disciplinare del percorso di studio e il tipo di occupazione trovata, che in Italia è di circa il 50%, tra i più elevati registrati nella media OCSE del 39% (OECD, 2015).

Sempre in tema di ambiti di specializzazione si evince come il conseguimento di una laurea in materie scientifiche si accompagna ad un incremento del 25.9% della probabilità relativa di avere un lavoro stabile e di circa il 10% di trovarsi in un'attività autonoma, riduce invece di quasi il 14% la possibilità di avere un contratto atipico e/o di apprendistato. Per le lauree professionali i vantaggi occupazionali si concentrano soprattutto nel mondo del lavoro autonomo (+18%) e quindi nei rapporti a tempo indeterminato (+15%), si rivelano statisticamente irrilevanti per contratti a tempo determinato o irregolari e diventano negativi quando l'alternativa alla disoccupazione sono le assunzioni in posizioni atipiche e di apprendistato (-12%) (Di Castro, Ricci, 2014).

Alla luce delle differenze emerse in termini di tipologia di istruzione e sulla scorta dei precedenti contributi INAPP (ex ISFOL) si analizzerà le probabilità di risultare in condizione di *mismatch* prendendo in considerazione gli ambiti in cui sono specializzati gli individui a qualsiasi livello di istruzione, dando ovviamente per scontato che a seconda della tipologia di diploma/laurea conseguita il programma di studi sia abbastanza simile, pur sapendo delle possibili differenze tra istituzioni formative.

3. Statistiche descrittive

Nel paper si definisce un individuo in una situazione di *overeducation* nel caso in cui egli ritenesse di possedere un livello di istruzione più elevato rispetto a quanto richiesto per svolgere le mansioni e le attività professionali nella posizione lavorativa occupata[3].

Tabella1. - *Statistiche descrittive. Caratteristiche dell'occupazione*

Ultimo Titolo Di Studio	Obs	Mean	Std Dev	Min	Max
Sc elem e media	26.858	0,11	0,31	0	1
Qualifica scuola sec di II grado (rispetto a sc elem e media)	26.858	0,05	0,22	0	1
Diplomi professionali	26.858	0,10	0,31	0	1
Diplomi tecnici	26.858	0,29	0,45	0	1
Diploma quinquennale magistrale	26.858	0,02	0,15	0	1
Diploma istruzione sec superiore liceale	26.858	0,07	0,26	0	1
Diploma istruzione artistica	26.858	0,01	0,11	0	1
Dipl acc belle arti, istituto d'arte, conservatorio, acc di danza	26.858	0,00	0,07	0	1
Laurea e oltre scientifica/chimico farm/geo biolog	26.858	0,05	0,21	0	1
Laurea e oltre gruppo medico	26.858	0,04	0,19	0	1
Laurea e oltre ingegneria e architettura	26.858	0,05	0,23	0	1
Laurea e oltre econ stat/politico-soc/giuridico	26.858	0,10	0,31	0	1
Laurea e oltre letterario/ling/insegnam/psicolog	26.858	0,08	0,27	0	1
Laurea e oltre educ fisica	26.858	0,00	0,06	0	1
Laurea e oltre AFAM	26.858	0,01	0,08	0	1
Dip. permanente	17.318	0,45	0,50	0	1
Dip. temporaneo	17.318	0,27	0,44	0	1
Collaboratore	17.318	0,07	0,26	0	1
Autonomo imprenditore	17.318	0,03	0,17	0	1
Autonomo professionista	17.318	0,05	0,22	0	1
Autonomo lavoratore in proprio	17.318	0,13	0,33	0	1
overeducation	17.596	0,49	0,50	0	1
componenti	28.366	2,48	1,13	0	9
female	28.366	0,46	0,50	0	1
Peso della propria figura	25.580	9,23	1,58	0	10
stage	25.197	0,57	0,49	0	1
annodaltititolo	23.991	6,21	4,47	0	22
Nord	28.366	0,42	0,49	0	1
Centro	28.366	0,21	0,41	0	1
Sud	28.366	0,37	0,48	0	1
train	28.297	0,15	0,36	0	1
orfani	28.366	0,06	0,23	0	1

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[3] La domanda del questionario TSL a partire dalla quale è stato costruito l'indicatore è la seguente: "Per svolgere tale lavoro, quale titolo di studio è necessario possedere?". Dunque nel presente contributo si utilizza uno dei tre metodi privilegiati dalla letteratura sul tema, per la valutazione dell'overeducation.

Sulla base di tale definizione, il 49% degli individui risulta *overeducated*. Il 33% del sub-campione in analisi ha conseguito come ultimo titolo di studio la laurea, il 51% ha invece conseguito il diploma. Le lauree sono state associate a percorsi post-lauream come master e dottorati per evitare un'eccessiva frammentarietà delle stime. Il 30% ca. ha un diploma tecnico, una quota molto rilevante tra gli ultimi titoli conseguiti, così come rilevante è il gruppo che ha terminato la scuola elementare e media. Il raggruppamento della tipologia di studi ha ripreso i raggruppamenti previsti nell'indagine, il gruppo più rilevante nel campione è economico-statistico politico giuridico sociale e rappresenta il 10% (Tab.1). Sulle caratteristiche dell'occupazione è importante sottolineare che sono dipendenti permanenti il 45% dei lavoratori, dipendenti temporanei il 27% e il 13% autonomi. Il 16% lavora nel settore manifatturiero e il 15% nel commercio all'ingrosso e al dettaglio. Il 42% proviene dal Nord e il 37% dal Sud (Tab. 1). Mediamente sono passati poco più di sei anni dal conseguimento del titolo.

4. Analisi econometrica

L'analisi empirica si sviluppa sui dati dell'Indagine sulle transizioni scuola lavoro (TSL), condotta dall'INAPP (ex ISFOL) nel 2014. Si tratta di un'indagine che raccoglie informazioni su un campione rappresentativo di oltre 45.000 individui, di età compresa tra i 20 e i 34 anni, composto per circa il 40% da studenti. La numerosità del campione si riduce a circa 11.000 osservazioni, avendo eliminato tutti coloro che sono coinvolti in percorsi di istruzione e formazione. In questo contesto le informazioni contenute del dataset TSL consentono di mettere in relazione l'eventuale condizione di *overeducation* di tutti i giovani individui presenti nel campione indipendentemente dal titolo di studio conseguito, ad una serie di variabili riguardanti la tipologia del percorso di studi, le caratteristiche personali e demografiche e la tipologia dell'occupazione e dei luoghi di lavoro. Questo paragrafo è dedicato all'analisi di regressione per stimare in che misura il percorso di studio e una serie di altri aspetti demografici possano incidere sulla probabilità che un individuo tra i 20 e i 34 anni si trovi in una condizione di *overeducation*. Di seguito si riporta l'equazione di regressione (1), si indica con P (overeducation) la probabilità che l'individuo i abbia delle competenze e conoscenze considerate eccessive rispetto alle mansioni professionali richieste:

$$P \text{ (over-education)}_i = \alpha \cdot \text{LevTipo\_Istr}_i + \beta \cdot X_i + \delta \cdot Z_i + \varepsilon_i \tag{1}$$

dove la variabile esplicativa LevTipo_Istr_i identifica la tipologia e il livello dell'ultimo titolo conseguito, il vettore X_i rappresenta altre caratteristiche legate al percorso formativo e Z_i include informazioni relative ai tratti demografici, al

background familiare e all'area di residenza, nonché alle caratteristiche produttive e contrattuali dell'occupazione. I parametri α, β e δ sono i coefficienti da stimare, il termine ε_i rappresenta un disturbo idiosincratico con media nulla e varianza finta. L'equazione (1) viene poi stimata usando un modello di regressione non lineare di tipo Probit e l'applicazione di un metodo di massima verosimiglianza. La probabilità di essere in una condizione di *overeducation* richiede necessariamente che il giovane tra i 20 e i 34 anni abbia un'occupazione e ciò potrebbe generare fenomeni di selezione non casuale del campione che incidono sulla correttezza delle stime. Al fine di tenere in considerazione un'eventuale distorsione, l'equazione (1) viene stimata anche applicando metodi di sample selection two-stage à la Heckman su modelli di regressione Probit (Heckman, 1979). Tale approccio evita il problema dell'autoselezione dovuto alla selezione non-causale degli *overeducated*. [4]

5. Risultati

Nella tabella 2 sono riportati i risultati delle stime probit e dell'approccio two-stage con sample selection (Heckman, 1979). La significatività dell'arthrho rileva l'adeguatezza dell'approccio à la Heckman, correttivo delle distorsioni del campione. Il ricorso a variabili strumentali (Cameron e Trivedi, 2009) consente di ottenere stimatori consistenti, le stesse permettono di confermare le stime probit, consolidando così i risultati senza sortire cambiamenti sostanziali. Le variabili utilizzate sono la bocciatura e una variabile psicometrica: la propensione al rischio. Si sottolinea che le altre variabili rintracciate in letteratura (background familiare, essere figlio unico, numero componenti famiglia) non avevano alcuna significatività nell'equazione.

Non sono degni di nota i risultati relativi alla condizione occupazionale del padre e della madre, anche se con la Heckman selection si rilevano alcune correzioni delle stime, per esempio il padre in cerca di prima occupazione diminuisce la probabilità che il figlio sia in condizione di mismatch.

Tabella 2. - *Analisi econometrica con stime probit ed Heckman selection*

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[4] Formalmente si tratta di stimare dopo la prima regressione probit, una seconda equazione (2) in cui si descrive la probabilità di trovarsi in una condizione di *overeducation*, considerando contemporaneamente la probabilità di partecipazione al mercato del lavoro.

(1) $P(\text{overeducation})_i = \alpha \cdot \text{LevTipo\_Istr}_i + \beta \cdot X_i + \delta \cdot Z_i + \rho\lambda(Z\vartheta) + \varepsilon_i$

Oltre alle covariate già considerate nel primo stadio, tra i regressori sono stati inseriti i parametri lnsigma e athrho, la prima è la deviazione standard del residuo dell'equazione dell'occupazione, la seconda invece, athrho, è la correlazione tra i residui dell'equazione dell'overeducation e quello della occupazione che consentono di tener conto della distorsione nelle stime legate alla selezione non casuale degli overeducated.

Variabili	Probit Overeducation	Heckman selection Overeducation	Heckman selection Employment
female	-0.0257**	-0.0329***	-0.150***
	(0.00887)	(0.00943)	(0.0205)
Qualifica scuola sec di II grado (VS sc elem e media)	-0.234***	-0.277***	-0.198
	(0.0582)	(0.0584)	(0.125)
Diplomi professionali	-0.329***	-0.380***	0.0155
	(0.0565)	(0.0561)	(0.120)
Diplomi tecnici	-0.397***	-0.453***	0.0983
	(0.0557)	(0.0554)	(0.118)
Diploma quinquennale magistrale	-0.376***	-0.444***	-0.185
	(0.0602)	(0.0610)	(0.130)
Diploma istruzione sec superiore liceale	-0.327***	-0.383***	-0.160
	(0.0573)	(0.0572)	(0.122)
Diploma istruzione artistica	-0.348***	-0.414***	-0.239
	(0.0659)	(0.0672)	(0.142)
Dipl acc belle arti, istituto arte, conservat, acc.danza	0.224*	0.141	-0.370*
	(0.106)	(0.0861)	(0.174)
Laurea e oltre scientifica/chimico farm/geo biolog	0.0914	0.102	0.231
	(0.0582)	(0.0574)	(0.123)
Laurea e oltre gruppo medico	-0.182**	-0.220***	0.107
	(0.0596)	(0.0597)	(0.125)
Laurea e oltre ingegneria e architettura	0.0966	0.111	0.283*
	(0.0583)	(0.0575)	(0.123)
Laurea e oltre econ stat/politico-soc/giuridico	0.150**	0.147**	0.220
	(0.0571)	(0.0562)	(0.119)
Laurea e oltre letterario/ling/insegnam/psicolog	0.0892	0.101	0.225
	(0.0568)	(0.0562)	(0.120)
Laurea e oltre educ fisica	-0.0118	0.00700	0.146
	(0.0861)	(0.0850)	(0.189)
Laurea e oltre AFAM	0	0	0
	(.)	(.)	(.)
stage	-0.0401***	-0.0361***	0.103***
	(0.00881)	(0.00914)	(0.0208)
Anno dal titolo	-0.00580***	-0.00217	0.0822***
	(0.00125)	(0.00226)	(0.00290)
CENTRO (rispetto al Nord)	0.0431***	0.0289*	-0.252***
	(0.0106)	(0.0124)	(0.0284)
SUD (rispetto al Nord)	0.0445***	0.0128	-0.582***
	(0.0107)	(0.0187)	(0.0292)
bocciatura			-0.172***
			(0.0243)
pr_risk			-0.954***
			(0.260)
Altri controlli	sì	sì	sì
Constant		0.814***	0.445*
		(0.0805)	(0.200)
athrho		0.210*	
		(0.103)	
lnsigma		-0.845***	
		(0.0129)	
Observations	11395	19185	

Wald test of indep. eqns. (rho = 0): chi2(1) = 3.85
Prob > chi2 = 0.0498

Standard errors in parentheses * p<0.05, ** p<0.01, *** p<0.001; Altri controlli:condi . condizione occupazionale padre; condizione occupazionale madre; settore economico; regione comune di nascita; peso propria figura; componenti familiari; train; orfani

I diplomi che assicurano una inferiore probabilità di essere in condizione di *mismatch* sono i diplomi tecnici e il diploma magistrale, ca. il 40% in meno di chi ha la licenza media o elementare. E' importante sottolineare che gli indirizzi di studio sono suddivisi in modo da far riferimento al periodo pre-riforma del 2010, quando il diploma degli istituti tecnici in molti casi risultava abilitante ad una

professione (ragioniere, geometra, perito informatico, perito chimico etc). Tra tutte le lauree emerge come molto significativa la minore probabilità di essere *overeducated* nel gruppo medico e la probabilità elevata di essere in condizione di *mismatch* ed *overeducation*, se laureati in scienze politiche, statistica, economia, giurisprudenza e scienze sociali. Lo stage diminuisce il rischio del 3,61% di essere *overeducated*, favorendo un miglior inquadramento. Di fatto è ampiamente riconosciuta in letteratura la valenza di uno stage non solo dal punto di vista formativo, ma anche dal punto di vista dell'orientamento al lavoro. L'anno dal titolo nella regressione probit risulta significativo, più aumentano gli anni, meno aumenta il rischio di *overeducation*, elemento non confermato con l'approccio two-stage. E' più alta la probabilità di essere *overeducated* al Centro rispetto al Nord (28% in più), sul Sud, in accordo con la letteratura, non si trova conferma della significatività dei risultati dopo aver eliminato il problema dell'autoselezione.

Rispetto ai settori in cui si lavora è decisamente meno probabile essere *overeducated* nelle attività immobiliari, nella sanità, nelle attività amministrative, attività finanziarie e assicurative e nei servizi di informazione e comunicazione. Tali settori assicurano probabilmente un miglior *match* tra istruzione e lavoro, o quantomeno un miglior *match* percepito dal lavoratore.

6. Conclusioni

Il lavoro evidenzia le differenze in termini di probabilità di essere in condizione di *overeducation*, rispetto alla tipologia di titolo e livello di studio conseguito. Secondo i raggruppamenti utilizzati, sono le lauree economico statistiche giuridico sociali ad evidenziare una maggiore probabilità di *overeducation*, rischio che diventa meno basso per coloro i quali posseggono una laurea in medicina. Non c'è significatività alcuna per le altre lauree prese in considerazione.

La probabilità di essere *overeducated* si riduce di gran lunga nel caso dei diplomi tecnici, probabilmente coloro che svolgono professioni legate al proprio ambito di studi tecnici percepiscono un miglior *match* con la mansione ricoperta. Altra spiegazione potrebbe risiedere nella vera e propria evoluzione normativa nell'ambito delle secondarie di II grado, prima del riordino del 2010 infatti gli istituti tecnici rilasciavano in molti casi un diploma di per sé abilitante ad una professione. Dopo il riordino delle secondarie di II grado quelle professioni risultano in crisi perché soppiantate da un più alto livello d'istruzione e in secondo luogo perché il sistema distorsivo dell'overeducation fa preferire per esempio all'assunzione di un ragioniere quella di un laureato in economia e commercio che pur di avere uno stipendio, si accontenta dello stipendio più adatto ad un diplomato.

Si ritiene fondamentale mettere l'accento sul risultato significativo relativo allo stage, lo stage è momento formativo *(learning by doing)* e di orientamento, nonché di avvicinamento all'ambito lavorativo e probabilmente per questo riduce le probabilità di mismatch. Si ritiene importante questo risultato perché dà valore alle implementazioni realizzate con la 107 sulla Alternanza Scuola Lavoro (cd Buona Scuola) basate su un maggior numero di ore di attività nel contesto lavorativo, già dalle secondarie di II grado. Inoltre è rilevante la differenza tra le tipologie contrattuali, purtroppo i contratti temporanei favoriscono anche altri tipi di distorsioni, tra i quali un giusto inquadramento dei lavoratori rispetto al loro livello e alla loro tipologia del titolo di studi conseguito.

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SUMMARY

Vertical mismatch for young workers: empirical evidence from Italy.

This paper investigates the relationship between fields of study and the overeducation of young workers in Italy. At this aim, we use a unique source of information derived from the Survey Transizioni Scuola-Lavoro, conducted by INAPP in 2014 on a large representative sample of individuals aged between 15 and 34 years. Applying non linear regression models and sample selection techniques we find the following results. First, investing in education always reduces the probability of being overeducated, whatever fields of study (educational track) is chosen. Second, the occurrence of overeducation is significantly reduced for young workers with a technical diploma; as well a good match is found for graduated in medical fields. Finally robustness check allows us to verify that over-education is higher in central area of Italy than in northern regions.

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FEMALE EMPLOYMENT
AND REPRODUCTIVE BEHAVIOR IN ITALY[1]

Francesco D. d'Ovidio, Pietro Iaquinta

1. Introduction

In Europe, female employment performance is generally worse than male one, but in Italy this gap is much greater. Eurostat highlights that the total employment rate in 2011 was 64.2% (women: 58.2%) within the EU, while in Italy it was 57.2% (women: just 46.7%). According to ISTAT, a lack of support services for families (kindergartens, nursery schools, etc.) is a barrier imposed on access to the labour market for nearly 500,000 unemployed women. Indeed, in 2011 less than 1.4% of Italian GDP was allocated to households' contributions, services and tax deductions: far lower than 1.8% of the other OECD countries with low fertility[2].

The evolution of fertility in Italy was characterized by significant structural changes, which led to the current situation. Assuming the aftermath of World War II as a baseline for modern fertility, it is easy to observe severely conflicting periods of time, associated with many socio-economic changes.

Starting with the economic boom, a time characterized by a strong development, fertility gradually increased in our country until it reached a peak (the so-called *baby-boom*) in the mid-sixties, where economic and social factors led to a significant growth in terms of births and a drastic reduction of infant mortality, inducing the Total Fertility Rate to reach a value of 2,69 (1964).

This phase was followed by a long period of crisis, known as lowest-low fertility, associated with both *i)* the stormy economic changes that led to the great oil crisis of the seventies and eighties, and *ii)* factors of social nature, including a new role for women in the labour market, a higher education level, and a radical change in lifestyle in the post-oil crisis society. These changes have prompted a strong delay in the entrance of women in their reproductive life, causing a collapse of the reproduction rate.

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[1] The Authors jointly designed and realized the work here described. However, P. Iaquinta wrote sections 1, 3 and 4, while F. D. d'Ovidio wrote the section 2.
[2] Cf. Senato della Repubblica Italiana, 2014, p. 5.

In this context, a very interesting question arises: is it realistically possible for women to reconcile their family expectations with their socio-economic reality?. Although cross-sectional analysis can provide a negative response, noting a systematic reduction of the TFR with a level of 1.2 children per woman (1.18 in 1995), the longitudinal analysis shows that the collapse of the synthetic index of fertility is the result of the later entry into reproductive life of Italian women and not a real deterioration of their breeding perspective, as in other countries (see, by example, Sobotka 2004).

Indeed, by observing the specific fertility rates by age from 1952 to 2015 (ISTAT, referring to all orders, without discrimination on birth order), the figures clearly show how Italian women's entry into the reproductive life has shifted forward, showing at the same time a recovery of fertility in adult age.

On the other hand, since the early 1980s in Italy Nora Federici, Carla Bielli and other scholars have worked on the Easterlin Theory (1968) on the reverse relationship between female work and fertility.

Is this relationship still working? And if it is, does it work in the same way for all ages? In this study, the most recent data (available by ISTAT data warehouse, May 2017) will be used in the attempt to answer these questions.

## 2. Relation between Occupation and Fertility

Depending on the data availability, the first analysis proposed in this paper ranges between the years 1975 to 2015. Figure 1 shows clearly that the Female Occupation Rate (FOR) increases in quite constant way from 33% in 1975 to 48% in 2015, while the Total Fertility Rate quickly decreases from 2.18 in 1975 to its minimum value (1.18) in 1995 (see the right scale in Figure 1); in the last two decades, TFR fluctuates slightly over this minimum, but no more than 1.46 (2010), and in 2015 it is worth approximatively 1.35. Therefore, apparently the Easterlin theory is still current… but the relationship shown may be spurious, depending by the different kind of the underlying phenomena.

We must analyze data series after eliminating their trends. Excluding polynomial functions (that are the best, determining R^2 indices around 97%, but may also eliminate the cyclic part of the time series), best interpolation functions are shown in the same Figure 1: the identified trends are given by a linear function in the case of FOR data and by a logarithmic transformation for TFR.

After the trends elimination (by simple difference), cyclic dynamics of the residual series result very different each other (see Figure 2), and this seems to exclude any relationship, direct as well as inverse, between the series.

However, some strange behavior of the cyclic dynamics persists.

Figure 1 – *TFR and FOR in Italy, 1975-2015, and their interpolating functions.*
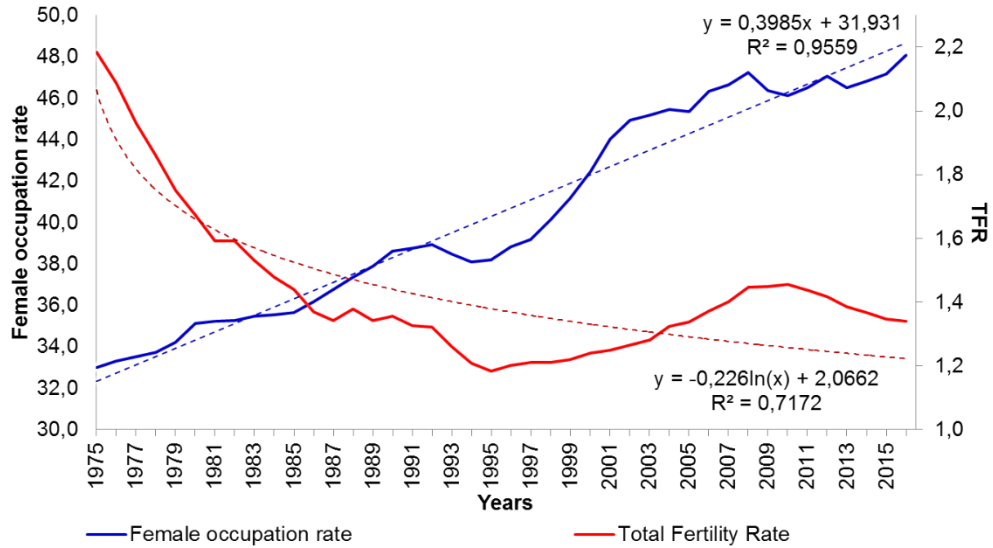
Source: Authors' elaborations on Istat data

Figure 2 – *Time series of FOR and TFR with no trends, Italy 1975-2015.*
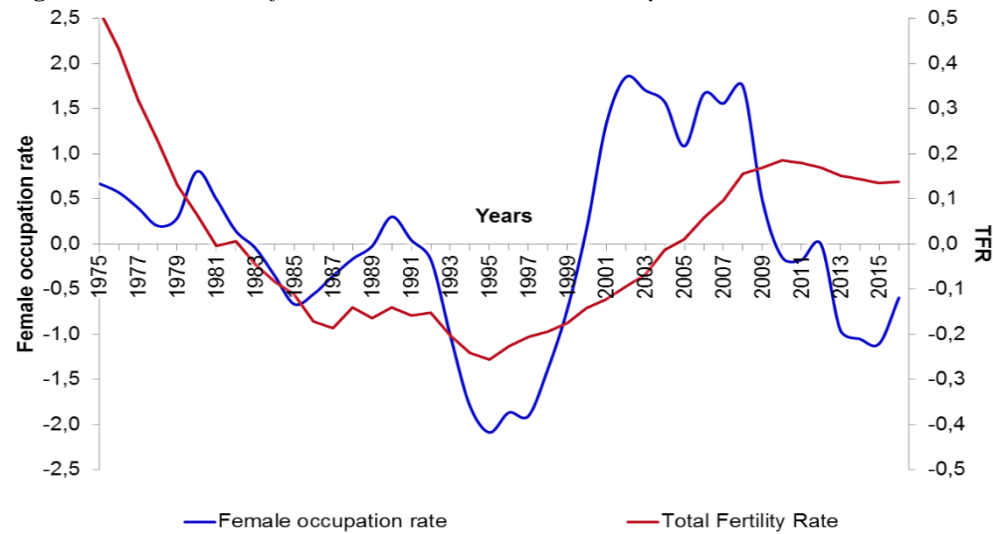
Source: Authors' elaborations on Istat data

In order to explore the joint behavior of the cyclic time series, Pearson correlation coefficients between them were computed, lagging from 0 up to 9 years in two ways: first under the hypothesis that Female Occupation Rate at time *t* is influenc-

ing TFR at time $t+k$, then under the opposite – that is, TFR at time t influencing FOR at time $t+k$. Table 1 shows that the 1st relationship increases for time gaps up to 4 years, while the 2nd becomes irrelevant. Because data are not from samples, inference tests cannot be applied, but R^2 (easy computable) highlights that at lag 0 just 14% of variability of one variable is explained by the other, while at lag 4 this percent becomes almost 20%.

Table 1 - *Pearson cross-correlation coefficients between FOR and TFR, lagged from 0 to 9 years.*

k	$r(FOR_t;TFR_{t+k})$	Std.err.	$R^2(FOR_t;TFR_{t+k})$	$r(TFR_t;FOR_{t+k})$	Std.err.	$R^2(FOR_t;TFR_{t+k})$
0	0.375	0.154	0.141	0.375	0.154	0.141
1	0.405	0.156	0.164	0.284	0.156	0.081
2	0.430	0.158	0.185	0.192	0.158	0.037
3	**0.433**	0.160	**0.187**	0.103	0.160	0.011
4	**0.436**	0.162	**0.190**	0.038	0.162	0.001
5	0.402	0.164	0.162	-0.032	0.164	0.001
6	0.373	0.167	0.139	-0.125	0.167	0.016
7	0.339	0.169	0.115	-0.189	0.169	0.036
8	0.284	0.171	0.081	-0.218	0.171	0.048
9	0.193	0.174	0.037	-0.238	0.174	0.057

Source: Authors' elaborations

Figure 3 – *Gain of FOR and TFR in Spectral Analysis, Italy 1975-2015.*
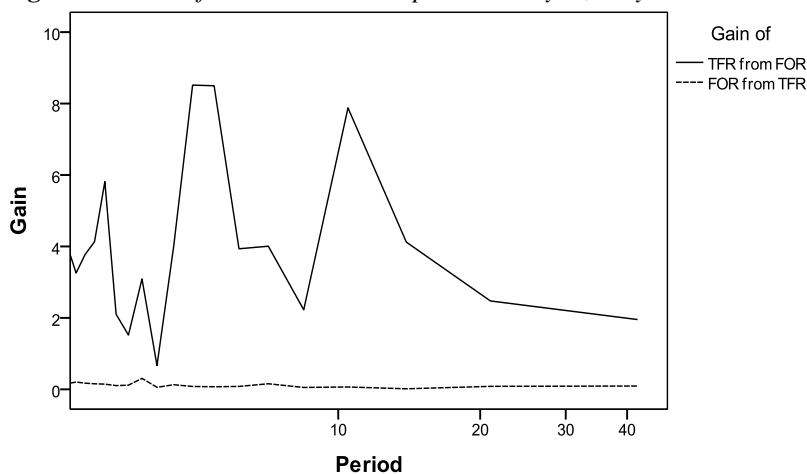
The co-spectral analysis of the two series leads to similar conclusions (Figure 3). The gain of FOR from TFR is very close to zero in all periods, while the gain of TFR from FOR is high in almost every period. Unfortunately, results from spectral

and co-spectral analysis are much too long and complicated to be reported here, but they highlight that the higher phase peak is located at lag of 4 years between FOR and "subsequent" TFR variations, followed by harmonics at lag of 9 and 15 years[3].

3. Age specific analysis

Further step of this analysis is the study of the female occupation rate, specific by age group, as well as the age specific TFR. Indeed, labour market dynamics act in very different ways for young women than they do for mature ones, and this could have some reflect on specific fecundity.

The trend in female occupation at young ages is decreasing or stable between 1993 and 2016 (Figure 4.a), while occupation rates of older ages increase almost constantly until 2006 (Figure 4.b). The overall FOR increase that was shown in the previous section is therefore due ony to the older age dynamics.

The analysis by age group of fecundity dynamics (measured by the sum of age specific quotients of fecundity, divided by 100) leads to similar conclusions. Fecundity in young ages is stable or decreases between 1993 and 2015, but increases in the group aged 30-34 and still more in that aged 35-39 (as shown in Figure 5.a-5.b).

Additionally, the late fecundity rates increase by a small percentage fraction.

Figure 4.a – *Female specific occupation rate for younger age groups, Italy, 1993-2016*
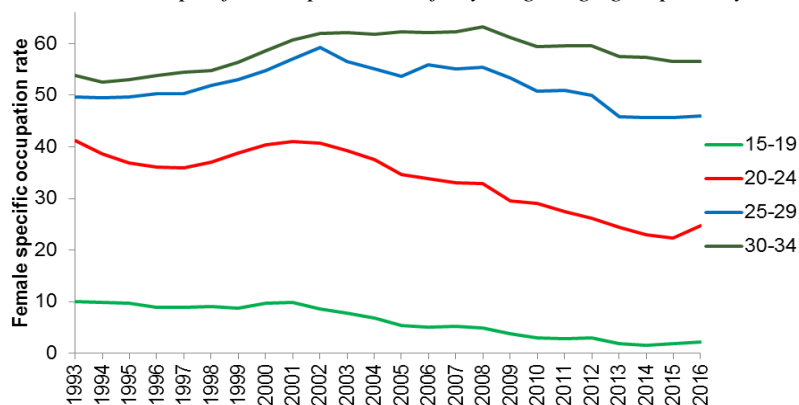
Source: Authors' elaborations on Istat data

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[3] Spectral analysis allows estimating the variance of one or more time series, explained by various cycles of different frequency, whose combination generates the series. It acts within the so-called "frequency domain", far different from the "temporal domain" in which data are defined. See, for example, Malinvaud, 1971; Vajani, 1980; Delvecchio. 1974.

Figure 4.b – *Female specific occupation rate for older age groups, Italy, 1993-2016*
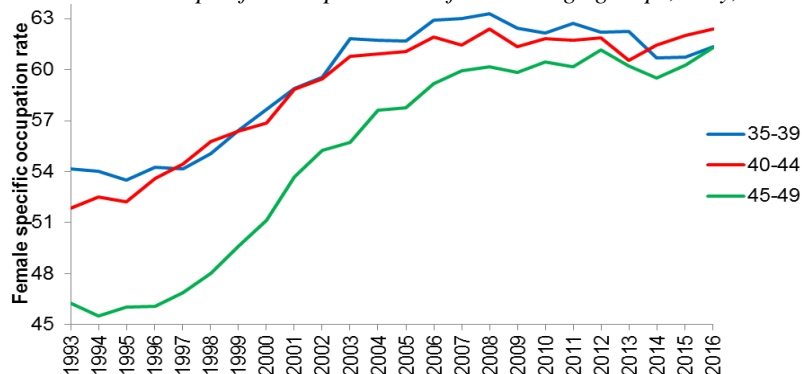
Source: Authors' elaborations on Istat data

Figure 5.a – *Total fertility rate for younger age groups, Italy, 1993-2015*
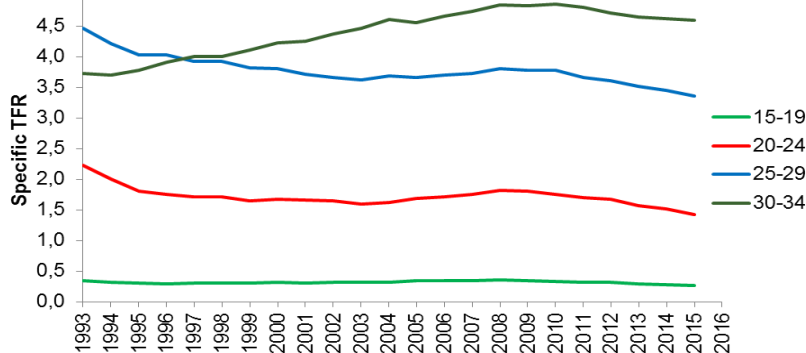
Source: Authors' elaborations on Istat data

Figure 5.b – *Total fertility rate for older age groups, Italy, 1993-2015*
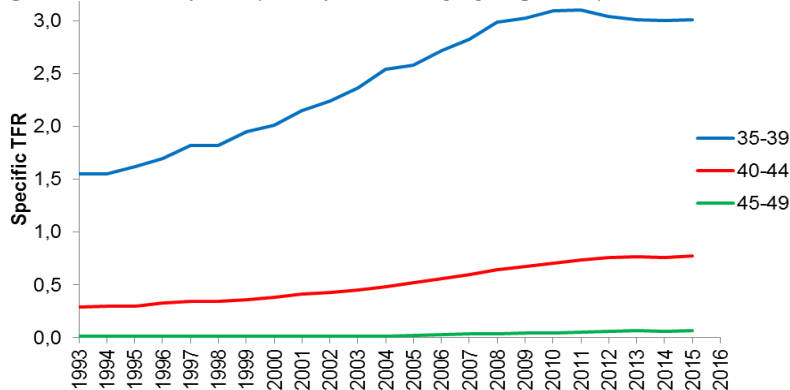
Source: Authors' elaborations on Istat data

Figure 6 – *FOR and TFR cycles for 15-19 age groups, Italy, 1993-2015.*
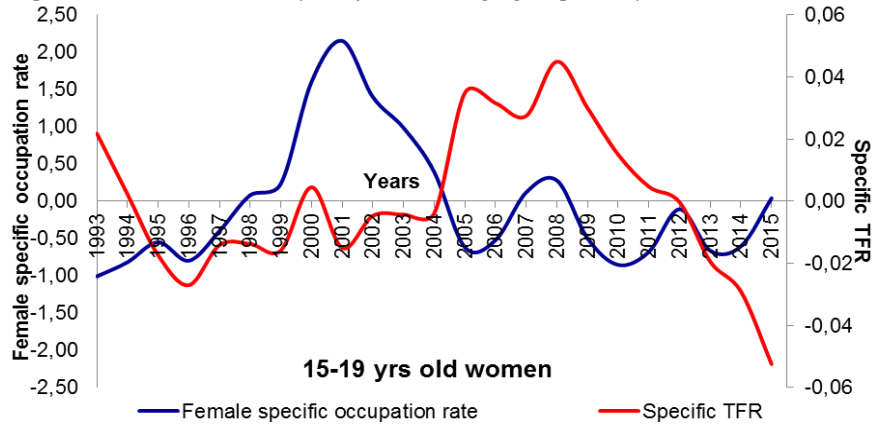
Source: Authors' elaborations on Istat data

Figure 7 – *FOR and TFR cycles for 20-24 age groups, Italy, 1993-2015.*
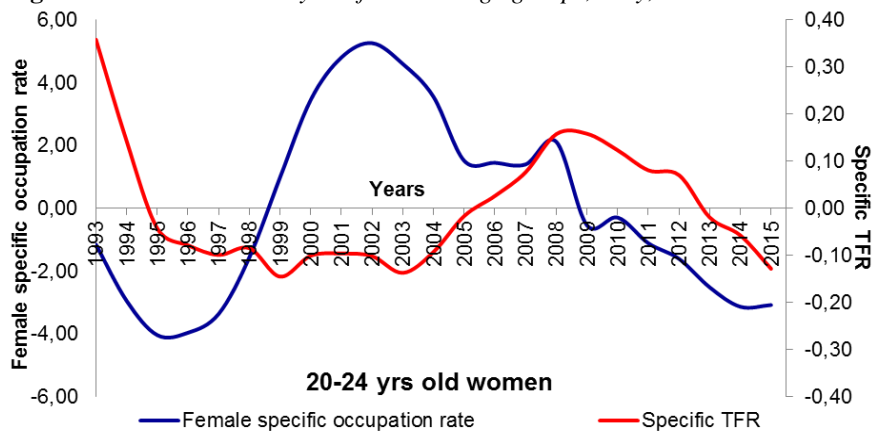
Source: Authors' elaborations on Istat data

Removing trends by the data series, the residual series show various composi-tions and some similarity in the behaviour of cyclic elements: indeed, curves in groups of 15-19 yrs and 20-24 yrs follow paths somewhat similar, particularly in the positive cusps of occupation rate as well as those of TFR. These classes show minimum TFR when occupation rate is maximum, and vice-versa (Figures 6-7).

Cyclic dynamics of women in the 25-29 yrs group seem to be similar to those of the previous series, but with more relevant fluctuations (Figure 8). The previous observations suggest that, at younger ages, job tasks often exclude or reduce fecun-dity (as Easterlin hypotized). Moreover, this phenomenon is more evident in the

groups where both variables have a higher number of observations, while the lower number of cases in the group 15-19 yrs seems less reliable, since small absolute variations can imply an overestimate of the phenomenon itself.

Figure 8 – *FOR and TFR cycles for 25-29 age groups, Italy, 1993-2015.*

Source: Authors' elaborations on Istat data

Instead, cyclic dynamics of occupation rate and TFR in groups of 30-34 yrs and 35-39 yrs seem to be similar each other: both show their minimum values in the first and in last years, and maximum values in their median section. Indeed, in this figure we can see that increase and decrease of TFR appear some year later than those of occupation rates (Figures 9-10).

Figure 9 – *FOR and TFR cycles for 30-34 age groups, Italy, 1993-2015.*
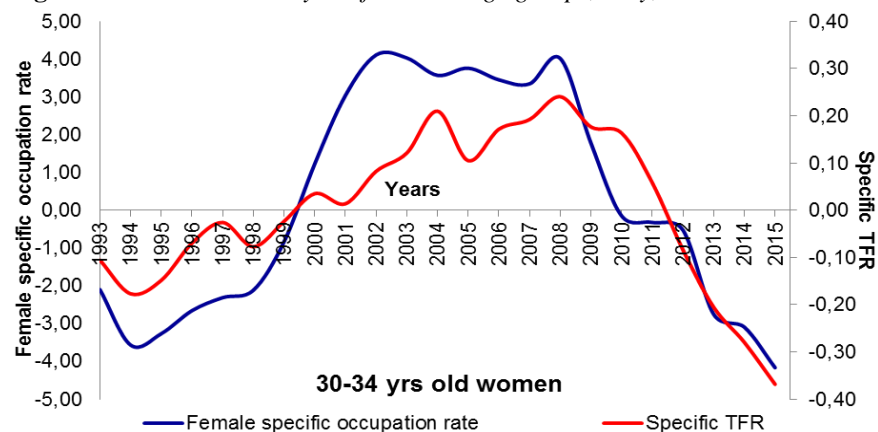
Source: Authors' elaborations on Istat data

Figure 10 – *FOR and TFR cycles for 35-39 age groups, Italy, 1993-2015.*
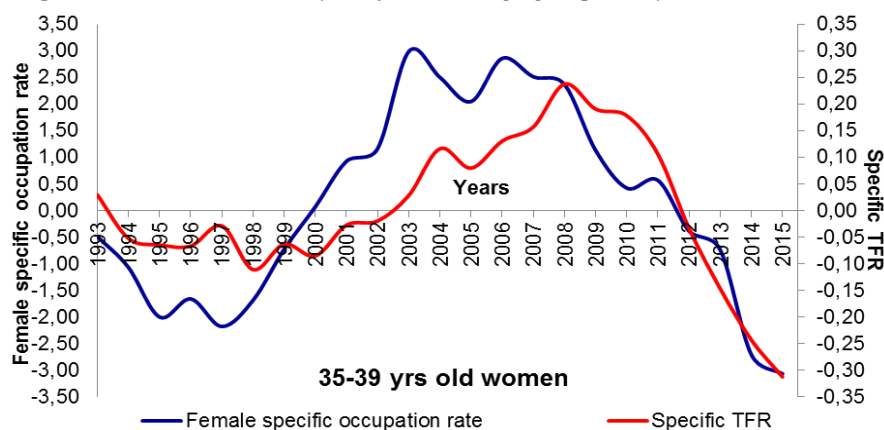
Source: Authors' elaborations on Istat data

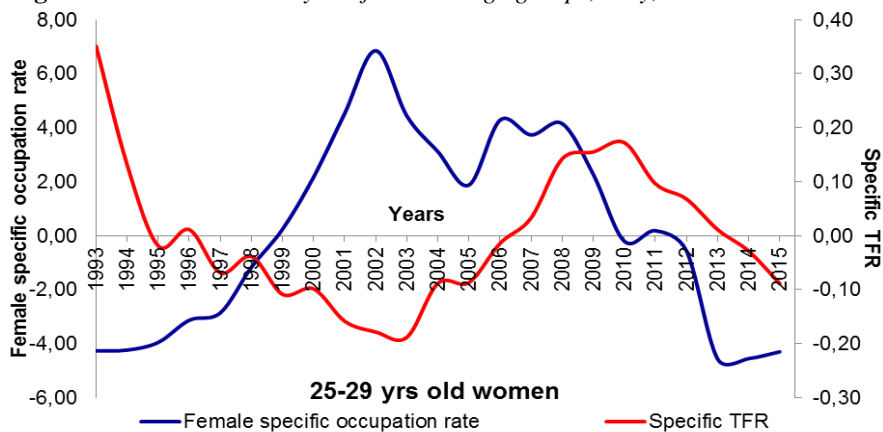**Figure 11** – *FOR and TFR cycles for 40-44 age groups, Italy, 1993-2015.*
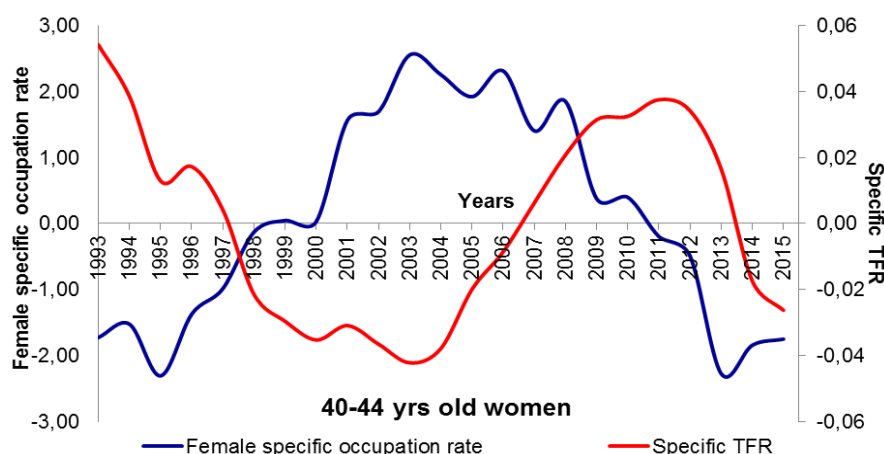
Source: Authors' elaborations on Istat data

In the age group 40-44, cyclic dynamics of TFR and occupation rate approximately replay those of one of younger groups: 20-24 years old (cf. Figure 11 and Figure 7).

Additionally, the group of older women (45-49 yrs) seems to repeat the same dynamics, as shown in Figure 12. However, we must keep in mind that the specific TFR values are very low in this age group, and therefore the variations shown seem stronger than their real relevance, as well as in the 15-19 yrs age group.

Figure 12 – *FOR and TFR cycles for 45-49 age groups, Italy, 1993-2015.*
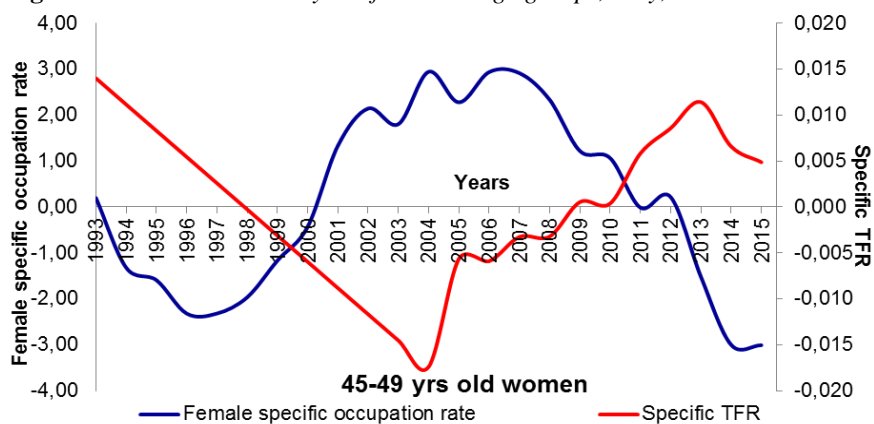
Source: Authors' elaborations on Istat data

4. Conclusions and next steps

In this study a simple explorative analysis was performed, highlighting the different behavior of women in different age groups facing problems related to keeping a job and having/raising children at the same time.

Obviously, for contemporaries this analysis could just be a proxy of the real behavior of women, but the co-variation dynamics of feminine occupation rates and TFR (particularly by age) seem to be quite telling.

Further steps will require an analysis of the available data by transposing them from the time domain to the frequency domain by using spectral analysis (with Fourier transform).

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SUMMARY

Female employment and reproductive behavior in Italy

In Italy in 2011, the employment rate for women between the ages of 25 and 54 was 64%, compared with an average of almost 76% in the EU-27. Furthermore, in the EU the total employment rate was 64.2%, with women at 58.2% - while in Italy the total employment rate was 57.2% and only 46.7% for women (Eurostat). Female employment performance in Europe is worse than the male one, but data shows in Italy this gap is significantly larger.

According to ISTAT, the lack of family support services (kindergartens, nursery schools, etc.) is an obstacle to the entry into the labor market for nearly 500,000 unemployed women. In Italy, less than 1.4% of the GDP is allocated to households' contributions, services and tax deductions: far lower than 1.8% of the other low fertility countries in OECD. An additional potential obstacle comes from Nora Federici's study (dated 1980s), which indicates that among the causes of the already substantial reduction in fertility, the objective necessity for women to choose between work and family plays a large role. This study hypothesizes a reverse relationship between feminine work and fertility, and this relationship has since found various experimental confirmations.

Is this relationship still working, in this new millennium undergoing heavy changes in the world of work? And if it is, does it work in the same way for all women? Some recent remarks suggest discordant behaviors: for example, a recent survey showed a greater employment of female graduates with children than those without children and women with lower or lower grades. This shows that the study of fertility, as well as of its determinants, must try to understand many different mechanisms. This essay (concerning the relationship between female occupation and fertility by age group) is a preliminary analysis to a much more complex and ambitious study, the completion of which will involve numerous analyzes of data from different sources - but already the results provide food for thought.

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SOME REMARKS ON THE CAUSAL RELATIONSHIP BETWEEN FAMILY BACKGROUNDS AND NEET STATUS

Andrea Ciccarelli, Marco Di Domizio, Elena Fabrizi

1. Introduction

Literature is progressively focusing on the analysis of the features of so-called NEETs, that is those young people who, besides being not employed, are not involved in any education or training activities.

In the past, we have also investigated the role played by personal characteristics (age, gender, qualification, residence) as well as by context factors (in particular, related to the families of origin in determining the above status). On the one hand, a very complex situation arises, in which Italy shows a distinctive profile compared to other European countries; on the other hand, empirical evidence, while clearly suggests some features as closely linked to the probability of being NEET (such as "economic transfers from family") do not always clarify the cause-effect relationship between these explanatory variables and the dependent variable.

In such a context, the aim of this paper is to study the causal relationship between family characteristics and NEET status. This analysis will allow us to highlight whether economic transfers from families to younger generations should be intended as intergenerational welfare activities, thus representing the necessary support for those who in certain age groups struggle to find jobs or pursue education / training processes, or whether such transfers can even trigger "effort resetting" mechanisms that push young people towards NEET position.

2. NEETs in Europe: an overview

In 2015 more than 17 million young people in EU-28 area, aged 20-34, were unemployed, inactive, neither enrolled in a school course nor in a training course (Mihai, 2015). This category of young people aged between 20 and 34, named by literature NEET (Neither in Employment nor in Education or Training), has considerably increased going from 16.5% in 2008 to 18.9% in 2015 (Eurostat, 2016) out of the whole corresponding population. Such dynamics is mainly due to

the specific impact made on young people by the world economic crisis arisen in 2008 (Ghoshraya et al., 2016).

In this rather critical framework, there are elements of serious concern also for Italy, where almost one third of young people in the age range above-mentioned are in a NEET status, with substantial heterogeneity as to gender, education and geographical location; such differentiations do not reduce and, if anything, emphasize, the extent of the severity of this phenomenon (Table 1).

Table 1 – *NEETs in some European Countries, aged between 20 and 34, by sex (Year 2015 – percentage values).*

Country	Male	Female	Total
Austria	8,8	13,6	11,2
Belgium	16,2	20,0	18,1
Bulgaria	21,4	29,1	25,2
Croatia	22,7	25,0	23,8
Czech Republic	7,9	27,8	17,6
Denmark	9,1	11,3	10,2
Estonia	8,3	22,2	15,1
Finland	13,1	18,0	15,5
France	15,9	22,1	19,0
Germany	8,4	16,2	12,2
Greece	27,7	37,2	32,4
Hungary	12,7	27,4	19,9
Ireland	17,4	22,7	20,1
Italy	26,8	36,4	31,6
Latvia	13,8	21,0	17,3
Lithuania	13,3	17,5	15,3
Luxembourg	6,8	12,7	9,7
Netherlands	7,8	12,4	10,1
Poland	14,0	23,9	18,8
Portugal	15,1	17,1	16,1
Romania	16,5	31,4	23,7
Spain	22,4	26,1	24,2
Sweden	7,8	9,3	8,5
United Kingdom	10,0	20,2	15,1
EU-28	14,9	23,0	18,9

Source: Eurostat

As highlighted in Table 2, NEET status is strongly influenced by the age range. If we identify two different age groups, 20-24 and 30-34, it is clear how profile typologies dramatically change.

In the youngest age group, a slight majority of NEETs is represented by unemployed (51.7%), whereas this percentage drops considerably in the age group 30-34 (37.6%), where NEETs are concentrated among inactive people (62.4%). Wide differences are connected to sex, since both in 20-24 and 30-34 age groups, females are strongly characterised as "inactive", showing an average of 58% and 72.6% respectively, compared with 38.2% and 41.5% of males.

Table 2 – *NEETs in some European Countries, by activity status, age group and sex (Year 2015 – percentage values).*

Country	20–24						30–34					
	Unemployed			Inactive			Unemployed			Inactive		
	Tot	M	F	Tot	M	F	Tot	M	F	Tot	M	F
Austria	49,0	58,8	39,8	51,0	41,2	60,2	34,1	53,8	25,8	65,9	46,2	74,2
Belgium	56,3	65,2	47,1	43,7	34,8	52,9	39,1	50,0	31,8	60,9	50,0	68,2
Bulgaria	30,0	35,9	23,9	70,0	64,1	76,1	30,2	43,1	21,2	69,8	56,9	78,8
Croatia	74,4	76,0	71,9	25,6	24,0	28,1	63,8	81,1	51,1	36,3	18,9	48,9
Czech Republic	44,4	68,0	31,9	55,6	32,0	68,1	20,6	57,0	12,5	79,4	43,0	87,5
Denmark	38,7	43,5	33,3	61,3	56,5	66,7	39,0	47,1	33,9	61,0	52,9	66,1
Estonia	37,7	62,2	21,4	62,3	37,8	78,6	24,0	58,9	12,6	76,0	41,1	87,4
Finland	49,0	55,7	40,6	51,0	44,3	59,4	31,1	48,0	21,8	68,9	52,0	78,2
France	59,3	67,9	50,6	40,7	32,1	49,4	42,3	63,5	30,4	57,7	36,5	69,6
Germany	39,8	55,0	28,0	60,2	45,0	72,0	28,1	57,0	15,9	71,9	43,0	84,1
Greece	75,9	76,0	75,8	24,1	24,0	24,2	71,5	87,4	60,9	28,5	12,6	39,1
Hungary	45,7	62,3	32,1	54,3	37,7	67,9	23,9	46,8	16,0	76,1	53,2	84,0
Ireland	53,3	64,5	41,0	46,7	35,5	59,0	33,5	59,9	18,7	66,5	40,1	81,3
Italy	47,4	52,9	41,6	52,6	47,1	58,4	33,8	50,0	24,9	66,2	50,0	75,1
Latvia	51,3	66,7	38,9	48,8	33,3	61,1	38,0	60,4	26,9	62,0	39,6	73,1
Lithuania	50,0	57,5	43,5	50,0	42,5	56,5	33,6	43,3	-	66,4	56,7	-
Luxembourg	53,4	57,0	50,0	46,6	43,0	50,0	33,3	Nd	32,0	66,7	-	68,0
Netherlands	40,3	42,9	37,0	59,7	57,1	63,0	28,6	42,7	21,2	71,4	57,3	78,8
Poland	51,1	63,4	38,5	48,9	36,6	61,5	29,9	48,6	22,0	70,1	51,4	78,0
Portugal	69,1	68,9	69,4	30,9	31,1	30,6	59,6	62,0	57,2	40,4	38,0	42,8
Romania	37,8	54,7	25,8	62,2	45,3	74,2	22,6	48,5	10,7	77,4	51,5	89,3
Spain	74,8	79,1	69,8	25,2	20,9	30,2	69,4	81,9	60,5	30,6	18,1	39,5
Sweden	48,4	56,7	38,9	51,6	43,3	61,1	39,5	52,5	30,9	60,5	47,5	69,1
United Kingdom	40,3	57,7	27,7	59,7	42,3	72,3	18,8	36,7	12,8	81,2	63,3	87,2
EU-28	51,7	61,8	42,0	48,3	38,2	58,0	37,6	58,5	27,4	62,4	41,5	72,6

Source: Eurostat

Furthermore, it has to be underlined that only 4 out of 28 Countries report a female inactivity rate lower than 50% in the upper age group, while in some Countries marked by a different economic framework – such as the Czech Republic, Germany, Estonia, Ireland, Hungary, Romania and the United Kingdom), the female inactivity rate in the upper age group goes beyond 80%. Broadly speaking, NEETs in search of a job prevail among males, whereas the inactivity component prevails among females. In such a context, Italy seems to fall into the European average with reference to female inactivity rates, while it is characterized by markedly higher percentages of inactive males, that are higher by 8.9% and 8.5% respectively, in the two age groups here considered.

Further significant elements regarding NEET status are linked to the education level and geographic location (due to space reasons, we don't report such data in table format). With reference to the former, it is clear there is an inverse relationship between the education level and NEET status: on average, in EU-28, in

20-24 age group 38.1% of young people having at least lower secondary education are in NEET status, compared to 13.6% of young people having higher education.

In Italy such percentages are definitely higher, reaching 52.3% and 26.7% respectively. In immediately upper age group (25-29), NEET percentage among young people having a poor education level is 43.2%, dropping to 18.5% and 11.1% respectively for those having higher secondary or tertiary education. Also in this respect, Italy's percentages are worse than European average, since NEETs having a poor education level are 51.5%, whereas those having higher secondary or tertiary education are 29.1% and 26.4% respectively. In the last age group investigated (30-34), average EU-28 percentages do not vary so much compared to the previous age group – respectively 39.6%, 18.8% and 10.9% related to the different education levels – while in Italy such percentages are absolutely better than those of the previous age group – 45.1%, 26.5% and 20.1%, with a considerable decrease in absolute and relative terms for young people having tertiary education.

With reference to urban location, differences in percentages are not as marked as for education. As expected, the percentage of young NEETs is lower for those who live in big cities (17.1%) than rural areas (21.1%). For Italy, such percentages are significantly higher and are within a maximum of 32.2% in rural areas and 30.8% in small towns and outskirts. With reference to geographical location, in our Country a duality in the concentration of NEETs between North, Centre and South Italy has to be highlighted. From the BES Report published by ISTAT in 2016, on 2015 data, it appears that in the age group 15-29, NEET percentages are 18.4%, 21.5% and 35.3% respectively for the North, Centre and South Italy, compared to an estimated national average of 25.7%.

3. Some preliminary remarks

The acronym NEET dates back to the early '90s, particularly in British press. Peter Kingston, in an article published by "The Guardian" on November 2, 2004, introduced some aspects which the scientific literature would focus on later. By comparing British and Japanese contexts, the article already highlighted one of the topics that would be most investigated by literature, that is, whether this phenomenon was the product of an economically-developed society where young people are allowed to "take time" before making their choices clear, or it is the result of an economic and social discomfort that drives young people to exclude themselves from education, training and work.

If the first contributions were focused on trying to identify a shared definition of NEET (Instance et al., 1994), a term subject to different interpretations (Furlong,

2006), over time the attention has shifted towards identifying the potential causes able to change the probability of belonging to such status. These factors trace back to both strictly personal aspects (referring to characters, aptitudes) and to the most general ones related to macroeconomic variables and policies implemented by the various governments (Pemberton, 2008; Mendolia and Walker, 2014; Alfieri et al. 2015; Driouchi and Harkat, 2017).

Among the most significant factors, family background emerges surely. It can affect the likelihood of being NEET in a variety of ways. In a recent contribution Berloffa et al. (2016) have highlighted the multiple "parental" transmission channels through which an influence on the (non-)working youth status is exerted by providing extensive literature. On the one hand, parents' experiences affect the working status of their children indirectly, through the effects triggered by the intergenerational transmission of inequalities, as to social mobility and income, which, by influencing the processes of school education and relational aspects, are transmitted on the potentialities/opportunities of young people (Franzini et al., 2013; Raitano and Vona, 2014), hence on their ability to become NEET or not.

On the other hand, as recently pointed out (Ciccarelli and Fabrizi, 2017), direct effects on the probability of being NEET, related to the family's economic transfers, could emerge. In particular, in the aforementioned contribution, in Italy the probability of being NEET for a young person up to 35 years old, would be about 1.5 times compared to those who do not receive transfers. This data could be interpreted in different ways. On the one hand, family transfers could be interpreted as a mechanism that substitutes welfare which, due to fiscal policies developed over the last few years by Italian governments, is no longer able to support the medium-term effects of the 2008 economic crisis. On the other hand, the ability to draw on family transfers could lead young people reduce their urge to start or complete a course of study, training or work.

In addition to this, further findings emerged in the work abovementioned, which deserve reflections. Women seem to be more penalized; qualifications bring rewards, though in Italy less than elsewhere; NEETs are usually married rather than single, live in a property house, get economic transfers from their family (in our country) rather than from the state (in the other countries analysed). Careful analysis highlights a matter of primary importance: while for some characteristics (such as gender or educational level) the cause/effect relationship would be clear, for others the causal link seems far less obvious, which is a serious problem as to interpretation. For example, NEETs are in such a status because they are supported by their family of origin (through money transfers), or economic support is offered to those young people who are NEETs and, without the economic transfer of their family members, would not be able to take care of their own needs?

4. The incidence of family background on NEET status

The following analysis is based on the findings previously reported, focusing on those aspects for which the direction of the action is less ambiguous. To this end, it seems useful to highlight the association between some features of parents, such as economic status (measured in terms of income level) and their educational background on the likelihood of being NEET. This choice is based on the fact that parents' peculiarities/abilities are necessarily "before" compared to "child" conditions and make it easier to establish the relationship between cause and effect: time, in fact, follows a natural order, thus making it immediately identifiable what is "before" and what is "after", the former causing – potentially – the latter, since the opposite is obviously not possible.

In order to retrieve information on both young people investigated and their parents, and to be able to make international comparisons, it was considered necessary to use cross-section data of the EU-SILC survey: this is, as is well known, a sample survey, annually carried out in different EU Member States. The wave used is that of the year 2012. In this study we focused on the family background of the young NEETs and, in order to analyse the family profiles these young people come from, we focused on the age group 16-25; such a choice, which could seem a limiting factor especially in some contexts such as the Italian one – where young people tend to enter labour market at a later time on average – is needed to include those young people still living at home with their parents. Of course, as the age grows, young people tend to break away from their family of origin to form their own family unit (thus, losing information about their parents). In the estimated model, NEETs were compared with the employed and students of the same age group.

From a methodological point of view, being the dependent variable a multinomial (being employed or being students in comparison with being NEETs), GLM models and the family of binomial distributions with logit link function were considered. To estimate model parameters, the method of maximum likelihood was considered (Agresti, 2013).

Data processing highlights a rather complex situation, and we will try to bring out the most salient features. First of all, regarding the comparison with the employed, the likelihood of being NEET grows when family income declines; furthermore, young people coming from poorer families experience a probability 7.7 times greater in Italy than those coming from richer families; European trends are similar, with a peak in Germany, where the same probability is 16.6 times (Table 3). Similarly, even the age group seems to affect NEET status – that is, younger people risk more of being NEET (with a probability more than twice higher in Italy, Spain and the UK). This seems quite understandable: in the age

group 16-20 there are those who came out or are coming out of the educational system and are therefore looking for their own living and working dimension, albeit in progress; furthermore, some inconsistencies in the answers of those who – being both minors and workers – may be reluctant to disseminate information about their often "informal" employment status could also be present. Also the number of family members seems to increase the odds of being NEET, although its effect is not so high (1.2 higher in Italy, 1.4 in France, 1.3 in Germany and UK).

By contrast, there are no significant differences referred to the parents' working status (the probability of being NEET halves in Italy only in the case a mother is self-employed) as to the level of parental education (we will soon focus on such point more precisely). Also father and/or mother age seem not to affect significantly children's status.

With reference to the comparison with the student group (Table 4), the influence of income on the likelihood of remaining NEET is confirmed, although the impact appears lower, in terms both of incidence and of significance in the differences between groups (except for Germany, especially for lower incomes). In addition, the effect of the age group (in this case reducing the odds of re-entering NEET status) and the importance of gender are confirmed: womanhood seems to be generally a "protection" in this case, and this is not a surprise, given that females tend to get higher education levels on average; such element, well-established in Italy, France and Spain (where the probability of being NEET almost halves for women) seems not to have a significant incidence in Germany and the United Kingdom.

Some more precise reflections should be made, instead, on parental education levels that, as can be seen in comparing NEETs and students, tend to protect, when such levels are higher, from the probability of being in the state of inactivity. This is especially true in Italy, where this phenomenon is particularly widespread: for example, father's degree, compared to the middle school qualification, reduces the probability of being NEET of his child to about a quarter. Such trend develops also in other countries, with the exception of Germany (where differences are not significant) and the United Kingdom, where only mother's education level, if it is a university level, seems to affect NEET status.

The most interesting aspect is the fact that qualifications, as previously underlined, do not appear to affect the chances of belonging to the NEET group, when compared with the group of employed people. Essentially, a sort of "imitation effect" appears to occur as long as young people are students while, on the contrary, in the transition to the labour market, the family environment seems less influential. In fact, economic differences arise overwhelmingly, which obviously imply also a social relationship system that allows young people an easier transition to the employed status.

Table 3 –   *Logit Model: Probability of being included in "NEET" vs "Employed" group – context factors (Odds ratio- young people aged 16-25)*

	Italy		France		Spain	
Income: Low vs High	7.679	***	5.398	***	6.573	***
Income: Medium-Low vs High	3.510	***	5.018	***	2.675	***
Income: Medium-High vs High	1.833	***	1.907	***	1.409	*
SEX: Female vs Male	1.049		1.371		1.177	
Age: 16-20 vs 21-25	2.351	***	1.494	*	2.422	***
Number of family members	1.206	***	1.389	***	1.173	**
PC: YES vs NO	0.876		0.467		0.809	
Father's educ. level: University vs Middle school	1.298		1.365		1.112	
Father's educ. level: High school vs Middle school	0.732	**	0.798		0.804	
Mother's educ. level: University vs Middle school	1.240		1.239		1.027	
Mother's educ. level: High school vs Middle school	1.225		0.839		0.998	
Father job: Self-employed vs outside the lab. market	0.863		0.466		0.520	***
Father job: Employee vs outside the labour market	1.186		1.261		0.915	
Mother job: Self-employed vs outside the lab. market	0.553	***	0.512		1.613	
Mother job: Employee vs outside the labour market	1.010		1.001		1.129	
Father Age	1.086		0.947		0.968	
Mother Age	0.801		1.337		1.392	
Father Age^2	1.002		0.998		0.997	
Mother Age^2	0.999		1.001		1.000	
	Germany		U. K.			
Income: Low vs High	16.563	***	4.964	**		
Income: Medium-Low vs High	7.141	***	2.563	**		
Income: Medium-High vs High	3.703	***	1.476			
SEX: Female vs Male	1.225		0.797			
Age: 16-20 vs 21-25	0.646		2.085	**		
Number of family members	1.328	*	1.376	*		
PC: YES vs NO	0.438		0.378			
Father's educ. level: University vs Middle school	1.652		2.978	**		
Father's educ. level: High school vs Middle school	1.531		1.941			
Mother's educ. level: University vs Middle school	1.193		0.850			
Mother's educ. level: High school vs Middle school	1.140		0.789			
Father job: Self-employed vs outside the lab. market	0.311	*	0.281	**		
Father job: Employee vs outside the labour market	0.731		0.409	**		
Mother job: Self-employed vs outside the lab. market	3.177		0.157	*		
Mother job: Employee vs outside the labour market	1.610		1.143			
Father Age	0.736		1.097			
Mother Age	0.981		0.592	*		
Father Age^2	1.001		1.006	*		
Mother Age^2	1.003		0.999			

Source: Our estimates on Eurostat data – EU statistics on income and living conditions (EU-SILC), 2012
   *, **, *** show a significance level respectively equal to 0.10, 0.05, 0.01.

Table 4 – *Logit Model: Probability of being included in "NEET" vs "Student" group – context factors (Odds ratio- young people aged 16-25)*

	Italy		France		Spain	
Income: Low vs High	1.651	***	1.945	*	1.801	***
Income: Medium-Low vs High	1.528	***	0.955		1.420	*
Income: Medium-High vs High	1.126		1.177		1.260	
SEX: Female vs Male	0.580	***	0.598	***	0.658	***
Age: 16-20 vs 21-25	0.237	***	0.160	***	0.197	***
Number of family members	1.238	***	1.249	***	1.305	***
PC: YES vs NO	0.276	***	0.294	**	0.354	***
Father's educ. level: University vs Middle school	0.246	***	0.492	**	0.413	***
Father's educ. level: High school vs Middle school	0.455	***	0.680	*	0.549	***
Mother's educ. level: University vs Middle school	0.439	***	0.271	***	0.491	***
Mother's educ. level: High school vs Middle school	0.586	***	0.606	**	0.617	***
Father job: Self-employed vs outside the lab. market	0.909		0.342	**	0.600	***
Father job: Employee vs outside the labour market	1.050		0.854		0.878	
Mother job: Self-employed vs outside the lab. market	0.598	**	0.887		0.867	
Mother job: Employee vs outside the labour market	0.777	**	1.102		0.870	
Father Age	1.056		0.799		0.986	
Mother Age	1.046		1.502	*	1.125	
Father Age^2	1.000		0.997		0.999	
Mother Age^2	0.999		1.002		1.000	
	Germany		U. K.			
Income: Low vs High	11.810	***	0.559			
Income: Medium-Low vs High	2.927	**	0.989			
Income: Medium-High vs High	1.843		0.871			
SEX: Female vs Male	0.905		0.672			
Age: 16-20 vs 21-25	0.311	***	0.093	***		
Number of family members	1.121		0.962			
PC: YES vs NO	0.064	**	0.351			
Father's educ. level: University vs Middle school	0.813		1.335			
Father's educ. level: High school vs Middle school	1.383		1.640			
Mother's educ. level: University vs Middle school	0.483		0.209	***		
Mother's educ. level: High school vs Middle school	0.895		0.528			
Father job: Self-employed vs outside the lab. market	0.757		0.728			
Father job: Employee vs outside the labour market	0.880		0.701			
Mother job: Self-employed vs outside the lab. market	2.816		0.076	**		
Mother job: Employee vs outside the labour market	1.373		0.708			
Father Age	0.801		1.231			
Mother Age	1.256		0.573			
Father Age^2	0.997		1.006			
Mother Age^2	1.002		0.998			

Source: Our estimates on Eurostat data – EU statistics on income and living conditions (EU-SILC), 2012
  *, **, *** show a significance level respectively equal to 0.10, 0.05, 0.01.

5. Some concluding remarks

Analysing accurately the features that most affect young people's (educational and working) inactivity is not easy, both because of the difficulty in summarizing the many variables that may potentially affect such status, and because of the

difficulty in having reliable databases that provide information not only about individuals' characteristics, but also about the context where they have lived and the cultural and economic environment of their family of origin.

Data processing shows interesting causes for reflection, especially as regards social and economic features of the families of origin. In particular, it is interesting to note that parents' qualifications or mothers' working activity strongly protect from the risk of being NEETs for those who may still choose to study: these ones, on average younger, seem to be pushed by the imitation effect towards the attempt to repeat the family model in which they have lived. Conversely, regarding the differences between NEETs and the employed, the biggest discriminant seems to be income level, entailing a combination of relational fabric and greater working possibilities for young people.

Another noteworthy element is that, although with appropriate differences in intensity, the main characteristics (both family and personal) analysed seem to affect the probability of being NEET in substantially the same way in all Countries, as a proof of the fact that all the areas analysed share the same issues.

To conclude our analysis, to come back to the original question, that is, the definition of the causal link between family transfers and NEET status, it seems surely not easy to give a unambiguous and "certain" answer; mostly because available databases do not enable us to estimate a model comprising all the data useful to verify such relationship.

Essentially, are NEETs so because they are backed by their family of origin or are they backed by their family because they have become NEET?

However, by putting together the results of previous works (Ciccarelli, Fabrizi, 2017) with current findings, a situation seems to occur, that is the greatest probability of experiencing educational and simultaneously working inactivity status involves those who come from a lower economic and social background; this element suggests us that the family of origin seems to be more like a NEETs' protective network rather than as a context in which they "wallow" by avoiding to work and study, thus leading to exclude those efforts resetting mechanisms which also some fear.

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SUMMARY

SOME REMARKS ON THE CAUSAL RELATIONSHIP BETWEEN FAMILY BACKGROUNDS AND NEET STATUS

Literature is progressively focusing on the analysis of the features of so-called NEETs, that is those young people who, besides being not employed, are not involved in any education or training activities.

In the past, we have also investigated the role played by personal characteristics (age, gender, qualification, residence) and by context factors (in particular, related to the families of origin in determining the above status). On the one hand, a very complex situation arises, in which Italy shows a distinctive profile compared to other European countries; on the other hand, empirical evidence, while clearly suggests some features as closely linked to the probability of being NEET (such as "economic transfers from family") do not always clarify the cause-effect relationship between these explanatory variables and the dependent variable.

In such a context, the aim of this paper is to study the causal relationship between family characteristics and NEET status. This analysis will allow us to highlight whether economic transfers from families to younger generations should be intended as intergenerational welfare activities, thus representing the necessary support for those who in certain age groups struggle to find jobs or pursue education / training processes, or whether such transfers can even trigger "effort resetting" mechanisms that push young people towards NEET position.

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A RIF REGRESSION APPROACH TO EVALUATE WAGE CHANGES: A FOCUS ON ITALY

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1. Introduction

The recent structural changes in the European labour markets and in their income distribution are being encouraged by the ongoing economic crisis (see Acemoglu 1999; Autor 2003; Goos et al. 2009 among others). In Italy, the effects of the crisis have been made more serious because of the political instability and geographical disparities (Ballarino et al. 2014). Moreover, its impact on politics and society has been as relevant as its impact on the economy (Di Quirico, 2010).

In this context, our paper aims at investigating the dynamics and the strength of changes in wage and wage inequality in Italy in the years of the Great Recession by analysing the role of individuals' skills and of countries' labour markets in rewarding employees. In line with the aim of identifying the driving forces of income changes over time and their intensity, we perform the *Recentered Influence Function* (hereafter, RIF) regression (Firpo et al., 2007; 2009; 2011) of Gini, variance, median and the two extreme deciles (q10 and q90) on log-wage. The RIF methodology is an extension of the Oaxaca-Blinder decomposition (Blinder, 1973; Oaxaca, 1973). However, unlike the latter can be applied only to the mean, the RIF decomposition is suitable to different distributional statistics. This allows us to explore the primary factors of wage levels and wage inequality and to decompose their changes over time into the composition and wage structure effects and, finally, to evaluate the contribution each factor gives to the overall changes. While the first component refers to the effect attributable to workers' characteristics, the second captures the effect due to the capability of the country's labour market to valorise individual skills and endowments.

We use the Italian section of the EU-SILC data (European Union Statistics on Income and Living Conditions) with regard to two different years (2005 and 2013), which enables capturing the potential impact of the economic and financial crises on wage distribution and inequality. The paper is structured as follows. Section 2 offers a methodological overview and discusses some descriptive statistics of the crucial variables. Section 3 argues the results of the RIF regressions and decompositions. Section 4 concludes.

2. Methodology and Technical Choices

We perform RIF regression (Firpo et al., 2007; 2009; 2011) of several distributional statistics on the logarithm of individual gross wage. Yearly gross wage has been computed starting from the monthly gross wage and considering the months during which the employee has experienced a paid employment[1]. This methodology replaces the dependent variable (Y_i) with the RIF of the generic distributional statistic to study, which is denoted by $v(F_y)$. Y_i denotes the observed wage, which is supposed to be a function of some observed and unobserved components, X_i and ε_i, respectively:

$$Y_{ti} = f_t(X_i, \varepsilon_i), \qquad for \quad t = 0, 1 \tag{1}$$

with $t = 0$ if individual i was an employee in 2005 and $t = 1$ if he/she was an employee in 2013. Mathematically, the influence function $IF(Y,v)$ is the first-order directional derivative and measures the relative effect of a small perturbation in the underlying outcome distribution on the statistic of interest (Hampel, 1974).

The RIF regression is defined as follows:

$$RIF(Y; v) = IF(Y; v) + v(F) \tag{2}$$

and assuming having mean zero by construction (Firpo et al. 2011).

The RIF regression can be written for some distribution statistics (Firpo et al., 2007) and consequently for all the quantiles (Firpo et al., 2011). Here we adopt a mix approach; that is, we introduce the RIF regression for Gini, Variance and Median (as in Firpo et al., 2007) and also for two quantiles of the distribution to understand what it the behaviour in the extreme of the distribution, namely q10 and q90.

Consequently, for the Gini index, the RIF regression can be written as follows:

$$RIF(y; v^{GC}) = 1 + 2\mu^{-2}R(F_y) - 2\mu^{-1}\big[y[1 - p(y)] + GL(p(y); F_y)\big] \tag{3}$$

and for the variance $RIF\left(y; v^{\sigma^2}\right)$ and quantiles $RIF\left(y; Q_p\right)$ we have:

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[1] The incidence of the missing data on the gross monthly wage is little more than 7%. We consider this value reasonable given the high sample sizes for Italy (14,996 employees in 2005 and 11,670 in 2013). Notwithstanding the deletion of missing data, the sample sizes of Italy are still higher than in some of the major European countries (e.g., France: 9,077 and 8,935 in 2005 and 2013, respectively; Germany: 11,047 and 10476; the United Kingdom: 7,418 and 8,130). We also controlled for missing values on covariates whose proportions are rather negligible and, in any case, lower than 1%. However, given the low presence of missing data and based on other simulations, we can consider the relative generating process as missing at random and the potential bias due to their deletion negligible.

$$RIF(y; v^{\sigma^2}) = (y - \int z dF_y(y))^2 = (y - \mu)^2 \tag{4}$$

$$RIF(y; Q_p) = Q_p + [p - \mathbb{1}(y \leq Q_p)]/f_y(Q_p) \tag{5}$$

where $f_y(Q_p)$ is the marginal density, Q_p is the sample quantile and $\mathbb{1}(y \leq Q_p)$ is an indicator function that allows one to include employees in a specific quantile where the outcome variable is smaller or equal to Q_p (Firpo et al., 2011).

As anticipated, we estimate the RIF regression for Gini index, variance, median, q10 and q90. Once the estimates have been obtained for each measure, the changes in these distributional statistics between 2005 and 2013 are decomposed into the composition effect and wage structure. Then, we compute the two components by covariate to quantify their contribution to gaps over time.

Let us denote the gap between period $t = 0$ and $t = 1$ of the five distributional statistics – $v(F)$ – with $\Delta_t^{v(F)}$. The next step consists in decomposing $\Delta_t^{v(F)}$ into the two terms of the wage structure ($\Delta_s^{v(F)}$) and composition effect ($\Delta_x^{v(F)}$). In general, for a given measure, we have:

$$\widehat{\Delta_O^v} = \bar{X}_1(\hat{\gamma}_{1,v} - \hat{\gamma}_{0,v}) + (\bar{X}_1 - \bar{X}_0)\hat{\gamma}_{0,v} = \hat{\Delta}_S^v + \hat{\Delta}_X^v \tag{6}$$

Assuming that for $t = 1$ the distribution of (X, ε) is constant, we get the wage structure, that is, the effect on v of a change from $f_1(\cdot,\cdot)$ to $f_0(\cdot,\cdot)$. Instead, assuming the return effect $f_0(\cdot,\cdot)$ fixed, the effect of changes from $(X, \varepsilon)|_{t=0}$ to $(X, \varepsilon)|_{t=1}$ represents the composition effect.

In this work, we focus on adult employees between 16 and 64 years old. Previously, we classified them into the three groups of high-, middle- and low-skilled according to their average level of education. In fact, since it is well known the strong correlation between the average educational levels and the skills required to a given job (Eurostat, 2010), we use education as a proxy of the level of skills required.

Since in EU-SILC interviews, individuals can report more than one labour activity, we consider the main employment, which is the activity with the largest number of hours usually worked. We consider the employees' wage in the gross form (composed of cash, near cash and non-cash wages) before any deductions for tax or social transfers. The explanatory variables of the RIF regression are classified into the three groups of individual characteristics (gender, couple, health), human capital (work experience, educational attainment), and job characteristics (type of contract, economic status, type of occupation). Table A1 in the Appendix shows the complete list with a detailed description of these variables.

3. Main Results

As argued by Castellano et al. (2017) and by Punzo and Ciommi (2017), while the most European labour markets are characterised by upgrading of occupations[2] or job polarisation[3], Italy sketched a *hybrid pattern* of structural changes over the years 2005-2013. In other words, it is not possible to define which employment structure prevails in Italy because the share of employees decreased for each of the three groups even though the decline in high-skill jobs was less marked than in low- and middle-skill counterparts (Garofalo et al., 2017).

Table 1 – *Sample measures on wages.*

	Gini	Variance	Median	q10	q90
2005	0.27488	1.77e+08	18,722	9,943	32,256
2013	0.31290	5.77e+08	26,742	10,225	48,478

*Wages are adjusted for inflation to guarantee their comparability over time in real terms.

Table 2 – *Occupation level by education, percentage, 2005.*

Education\Occupation	Low	Middle	High	Total
Low	17.40	19.82	2.65	39.87
Medium	7.64	26.39	10.49	44.53
High	0.54	4.65	10.41	15.60
Total	25.58	50.87	23.55	100.00

Table 3 – *Occupation level by education, percentage, 2013.*

Education\Occupation	Low	Middle	High	Total
Low	11.02	15.85	2.68	29.55
Medium	8.65	25.00	16.04	49.68
High	0.78	4.91	15.07	20.76
Total	20.45	45.76	33.79	100.00

Table 1 collects summary statistics on the measures involved in our analysis. In particular, we estimate the Gini index, the variance, the median and two quantiles of the wage distribution (q10 and q90) for both 2005 and 2013 with the aim of evaluating their evolution over time.

[2] Upgrading of occupations occurs when there is a growth in the demand of high skills that is accompanied by a reduction of low- and middle-skill activities.
[3] Job polarisation occurs if there is a contraction of middle-skill activities in favour of high- and low skills jobs.

Table 4 – *RIF regression estimates. Year 2005.*

	Gini	Variance	Median	10th perc	90th perc
Male	-0.0015**	0.0359***	0.1641***	0.1462**	0.2750***
	(0.0005)	(0.0109)	(0.0090)	(0.0299)	(0.)
Never married	0.0008	0.0061	-0.1019***	-0.1288***	-0.1121***
	(.0005)	(0.0122)	(0.0106)	(0.0313)	(0.0230)
Other married	-0.0013	-0.0453**	-0.0458***	-0.0566	-0.0620*
	(0.0009)	(0.0195)	(0.0160)	(0.0509)	(0.0355)
Good health	0.0013**	0.0082	0.0236**	-0.0124	0.0806***
	(0.0005)	(0.0119)	(0.0099)	(0.0276)	(0.0234)
Experience	-0.0001	0.0006	0.0209***	0.0254***	0.0263***
	(0.0001)	(0.0019)	(0.0017)	(0.0052)	(0.0038)
Experience squared	3.62e-06*	0.00002	-0.0003***	-0.0004***	-0.0003***
	(2.10e-06)	(0.00005)	(0.00003)	(0.0001)	(0.0001)
Medium education	-0.0076***	-0.1633***	-0.1285***	-0.1468***	-0.4565***
	(0.0008)	(0.0169)	(0.0139)	(0.0317)	(0.0477)
Low education	0.0070***	-0.1506***	-0.2747***	-0.3410***	-0.6834***
	(0.0008)	(0.0184)	(0.0157)	(0.0407)	(0.0493)
Permanent job	-0.0148***	-0.2856***	0.1514***	0.7048***	0.1258***
	(0.0007)	(0.0153)	(0.0128)	(0.0618)	(0.0195)
Full time	-0.0261***	-0.4184***	0.2586***	1.5253***	0.1292***
	(0.0007)	(0.0167)	(0.0111)	(0.0732)	(0.0180)
Senior Official	0.0191***	0.4426***	0.3857***	0.5064***	1.2189***
	(0.0015)	(0.0344)	(0.0207)	(0.0751)	(0.1003)
Managers small	-0.0088***	-0.1547***	0.1695***	0.4627***	0.1423
	(0.0027)	(0.0594)	(0.0467)	(0.1213)	(0.1798)
Professionals	0.0033**	0.0728**	0.3103***	0.6099***	0.8638***
	(0.0013)	(0.0295)	(0.0238)	(0.0789)	(0.0808)
Teaching Professional	-0.0162***	-0.2795***	0.3075***	0.5216***	-0.2563***
	(0.0015)	(0.0332)	(0.0255)	(0.0862)	(0.0667)
Technicians	-0.0109***	-0.1639***	0.2763***	0.6339***	0.1028***
	(0.0010)	(0.0224)	(0.0194)	(0.0740)	(0.0363)
Clerks	-0.0101***	-0.1575***	0.1754***	0.6028***	0.1070***
	(0.0008)	(0.0180)	(0.0162)	(0.0711)	(0.0215)
Service workers	-0.0054***	-0.0803***	0.1268***	0.4213***	0.1206***
	(0.0010)	(0.0219)	(0.0183)	(0.0840)	(0.0284)
Skilled agricultural	-0.0040*	-0.0828*	0.0275	0.1715	-0.0321
	(0.0021)	(0.0466)	(0.0490)	(0.2070)	(0.0550)
Machine operator	-0.0118***	-0.1895***	0.1445***	0.5794506***	0.0011
	(0.0009)	(0.0207)	(0.0186)	(0.0740)	(0.0259)

In brackets, Standard Errors estimates. (***), (**) and (*) denote significance at 0.01, 0.05 and 0.1, respectively

Between the eight-year period, Italy showed a large increase in wage inequality. The Gini index, for instance, grew from 0.27 to 0.31, whereas the variance of wages in 2013 was more than three time greater than the value achieved in 2005. Looking at the main percentiles of wage distribution, we find that the wage levels had widened rapidly along the entire distribution. In particular, Italian high-paid

employees (q90) experienced the greatest wage growth (almost 50%). The median wage also substantially increased (42.83%), whereas low-paid employees (q10) showed a more modest increase (2.83%).

Table 2 and Table 3 report the percent changes in 2005-2013 according to both the levels of education (low, medium, high), which is based on the ISCED-97 classification, and the categories of low-, middle- and high-skilled employees, which is based on the ISCO-08 classification. Between 2005 and 2013 there was a decrease in the share of low- and middle-skill occupations in favour of the high ones. If we look at the conditional distributions, there was an increase in the share of employees with a high level of education that perform low-skilled jobs. The greater negative percent variation was recorded for employees with a low level in both education and occupation (-6.38%), whereas the greater positive percent variation corresponds to medium level of education with a high level in occupation (5.55%).

Results from the RIF-regressions of the five statistics on log-wage are displayed in Tables 4 and 5. It is worth to note that for each statistic considered, gender, education and work experience play a crucial role in determining wage levels and inequality. More specifically, the evidence shows how better education and more experience in the labour market can reduce wage inequality.

Wage differentials are also associated with job characteristics, such as the economic status, the type of contracts and, above all, the different typologies of occupation. The most professions improve wage levels and reduce wage inequality compared to the more elementary jobs. Having a permanent contract and being a full-time employee are crucial to personal earnings. Their effect is negatively sloped – it is smaller at the 90th than at the 10th percentile – and well-structured workers tend to increase wages for the low quantiles. Being a service worker or machine operator has a stronger effect on the wage-generating process than being an elementary worker at the lower quantiles. The magnitude of the effect decreases at the right side of the wage distribution. This means that the advantage of being a service worker or machine operator rather than an elementary worker becomes irrelevant as they move up the pay distribution.

The differences in 2005-2013 of the five statistics are decomposed into the composition effect (endowment) and the wage structure (return effect). Table 6 summarizes the results. As stressed above, in 2013, all the statistics are increased. On the one hand, the five statistics confirm that for Italy the greater weight is associated with the return effect. The latter contributes from 86.68% for q90 and 98.62% for the variance to the total gaps. This implies that the total differentials in wage and wage inequality depend on the capacity of the Italian labour market to transform inputs into job opportunities and earnings

Table 5 – *RIF regression estimates. Year 2013.*

	Gini	Variance	Median	10th perc	90th perc
Male	-0.0030***	0.0985***	0.1765***	0.0300	0.2234***
	(0,0007)	(0.0215)	(0.0127)	(0.0338)	(0.0240)
Never married	-0.0003	-0.0021	-0.0046	-0.0307	-0.0798***
	(0.0008)	(0.0238)	(0.149)	(0.0358)	(0.0257)
Other married	0.0038***	0.1143**	0.0038	-0.1463***	0.0193
	(0.0012)	(0.0357)	(0.0195)	(0.0538)	(0.0395)
Good health	0.0009	0.0065	0.0290*	0.0069	0.1077***
	(0.0008)	(0.0246)	(0.0151)	(0.0389)	(0.0238)
Experience	-0.0010***	-0.0247***	0.0290***	0.0497***	0.0270***
	(0.0001)	(0.0038)	(0.0023)	(0.0074)	(0.0036)
Experience squared	0.00002***	0.0005***	-0.0004***	-0.0009***	-0.0004***
	(2.85e-06)	(0.0001)	(0.0001)	(0.0002)	(0.0001)
Medium education	-0.0032***	-0.0882**	-0.1657***	-0.1087**	-0.3146***
	(0.0009)	(0.0282)	(0.0171)	(0.0371)	(0.0406)
Low education	0.0025**	-0.0949**	-0.3138***	-0.2432***	-0.5020***
	(0.0011)	(0.0341)	(0.0217)	(0.0523)	(0.0431)
Permanent job	-0.0262***	-0.6185***	0.2510***	0.9511***	0.0544***
	(0.0010)	(0.0311)	(0.0167)	(0.0783)	(0.0203)
Full time	-0.0230***	-0.4127***	0.3392***	0.9090***	0.1114***
	(0.0009)	(0.0288)	(0.0144)	(0.0690)	(0.0184)
Senior Official	0.0160***	0.4328***	0.3071***	0.4215**	1.1933***
	(0.0035)	(0.1061)	(0.0628)	(0.1807)	(0.1929)
Managers small	0.0374***	-1.0107***	0.4765***	0.6554***	2.1695***
	(0.0044)	(0.1325)	(0.0493)	(0.0985)	(0.2006)
Professionals	-0.0037**	-0.0571	0.4296***	0.6559***	0.8588***
	(0.0016)	(0.0497)	(0.0287)	(0.0916)	(0.0695)
Teaching Professional	-0.0158***	-0.3155***	0.2721***	0.6027***	-0.0716
	(0.0016)	(0.0493)	(0.0293)	(0.0947)	(0.0471)
Technicians	-0.0115***	-0.2022***	0.4186***	0.6900***	0.3008***
	0.0013	(0.0403)	(0.0241)	(0.0869)	(0.0396)
Clerks	-0.0150***	-0.2938***	0.2199***	0.70467***	0.0540**
	(0.0012)	(0.0354)	(0.0214)	(0.0833)	(0.0237)
Service workers	-0.0100***	-0.2099***	0.10134***	0.5194***	0.0514**
	(0.0013)	(0.0388)	(0.0230)	(0.0961)	(0.0255)
Skilled agricultural	-0.0014	-0.584	-0.0383	-0.1803	0.0472
	(0.0037)	(0.1124)	(0.0650)	(0.3028)	(0.0921)
Machine operator	-0.0170***	-0.3403***	0.1952***	0.7188***	-0.0470641*
	(0.0015)	(0.0607)	(0.0288)	(0.0874)	(0.)

In brackets, Standard Errors estimates. (***), (**) and (*) denote significance at 0.01, 0.05 and 0.1, respectively

In particular, the increase in wage inequality might be almost fully explained by the low efficiency of the Italian labour market structure in contrasting it with adequate labour policies and support measures.

To complete the analysis, it could be interesting to identify which are the factors that more contribute to the differentials over time. Table 7 reports the results for a

selection of variables. For both composition and wage structure effects, high-skilled employees with a permanent contract have an equalising effect in wage inequality in that they contribute to increase wage levels. High-educated employees reduce wage inequality and dispersion only in the wage structure.

Instead, in the composition effect, employees with a medium level of education contribute in increasing inequality less than their high-educated counterparts. Finally, the RIF-regression decomposition confirms that being female increases wage inequality, essentially due to their lower average salaries, reinforcing the role of composition effect in generating the observed gaps over time in wage levels and inequality.

Table 6 – *RIF decompositions for the five statistics. Gap 2005-2013.*

	Gini	Variance	Median	10th perc	90th perc
Total Gap	0.0064***	0.1879***	0.5305***	0.2021***	0.5814***
Composition Effect	0.0004	0.0026	0.0593***	0.0209*	0.0774***
	(6.25%)	(1.38%)	(11.18%)	(10.34%)	(13.32%)
Wage structure	0.0060***	0.1853***	0.4712***	0.1812***	0.5039***
	(93.75%)	(98.62%)	(88.82%)	(89.66%)	(86.68%)

*Significant at 10%; **Significant at 5%; ***Significant at 1%. Percentages (share) are in brackets.

4. Conclusions

The analysis of wage inequality has been conducted for five statistics, namely the Gini index, the variance, the median and the two extreme deciles (q10 and q90) on log-wage. Applying the so called Recentered Influence Function regression, we have analysed the main drivers of the logarithm of individual gross wage and decomposed the changes occurred over time in the income inequality. In addition, the decomposition into composition effect, which captures the impact due to individual attributes, and the wage structure that depends on the characteristics of the country highlights which are the factors that contribute the more to the inequality over time.

The analysis reveals what are the main weakness of Italian labour market and it could be used by policy makers to address more efficient policies voted at reducing wage inequalities among Italian employees.

In this work, we carried out the twofold (wage structure and composition effect) decomposition. It is well suited to our objective because it allows us to decompose the temporal gap in the share due to the role of employees' individual endowments and the share that captures how endowments are rewarded by the labour market. Our future goal may be to perform the threefold decomposition introducing the

specification error (Firpo et al., 2011), which detects the simultaneous leverage produced by both effects. In the same way, we also should explore the role of other covariates (e.g., activity sector) to the changes of wages and wage inequality over time.

Table 7 – *RIF decomposition of the five statistics on log-wage by some variables.*

Variables	Measures	Composition effect		Wage structure	
		parameter	p-value	parameter	p-value
Gender (male)	Gini	-0.00009***	(0.00003)	0.00083*	(0.00050)
	Variance	-0.00320***	(0.00093)	0.03621***	(0.01401)
	Median	-0.00574***	(0.00116)	0.00721	(0.00901)
	Q10	-0.00097	(0.00113)	-0.06741***	(0.02620)
	Q90	-0.00726***	(0.00158)	-0.02995	(0.01837)
Experience	Gini	-0.00065***	(0.000012)	-0.00902***	(0.00130)
	Variance	-0.01534***	(0.00350)	-0.23370***	(0.03670)
	Median	0.04064***	(0.00271)	0.10229***	(0.02394)
	Q10	0.04682***	(0.00642)	0.22133***	(0.07883)
	Q90	0.03890***	(0.00380)	-0.00986	(0.04321)
Medium Education	Gini	-0.00015***	(0.00005)	0.00199***	(0.00053)
	Variance	-0.00425***	(0.00148)	0.03337**	(0.01464)
	Median	-0.00798***	(0.00131)	-0.01655*	(0.00979)
	Q10	-0.00524***	(0.00192)	0.01690	(0.02168)
	Q90	-0.01515***	(0.00276)	0.06304**	(0.02783)
Low Education	Gini	0.00026**	(0.00012)	0.00177***	(0.00056)
	Variance	0.00995***	(0.00362)	0.02215	(0.01541)
	Median	0.03290***	(0.00291)	-0.01554	(0.01066)
	Q10	0.02550***	(0.00567)	0.03890	(0.02635)
	Q90	0.05263***	(0.00538)	0.07216***	(0.02605)
Permanent job	Gini	-0.00023**	(0.00011)	-0.00979***	(0.00107)
	Variance	-0.00549**	(0.00259)	-0.28782***	(0.02997)
	Median	0.00223**	(0.00106)	0.08608***	(0.01821)
	Q10	0.00844**	(0.00403)	0.21293**	(0.00403)
	Q90	0.00048	(0.00030)	-0.06174**	(0.02439)
Full time	Gini	0.00108***	(0.00011)	0.00279***	(0.00107)
	Variance	0.01937***	(0.00222)	0.00501	(0.02958)
	Median	-0.01592***	(0.00159)	0.07159***	(0.01619)
	Q10	-0.04267***	(0.00505)	-0.54725***	(0.00505)
	Q90	-0.00523***	(0.00099)	-0.01576	(0.02284)

*Significant at 10%; **Significant at 5%; ***Significant at 1%. Percentages (share) are in brackets.

Appendix

Table A1 – List of variables

Dimension	Variables	Description
Individual Characteristics	Gender	*Dummy for gender (ref.: male)*
	Couple	*Dummy for marital status (ref.: married):* *- Never married: value 1 if employee has never been married and 0 otherwise* *- Other married: value 1 if employee has experienced marriage in the past and 0 otherwise*
	Health	*Dummy for General health (ref.: suffer)* *- Good health: value 1 if employee do not suffer from any chronic illness or condition and 0 otherwise*
Human Capital	Working experience	*Number of years since starting the first regular job that a person has spent at work*
	Education	*Dummies for high level of education (ref.: higher levels):* *- low- and medium-level (ISCED97: from pre-primary to, post-secondary non-tertiary education)* *- high-level (first and second stage of tertiary education)*
Job characteristics	Type of contract	*Dummies for type of contract:* *- Permanent job: value 1 if employee has permanent contract and 0 otherwise*
	Economic status	*Dummies for employment status:* *- Full time: value 1 if employee is full time and 0 otherwise*
Occupation	Professional status	*Ten dummies for professional status (ISCO classification)* *- elementary workers (ref); Senior official; Manager of small enterprise; Professionals; Teaching professional; Technicians; Clerks; Service Workers; Skilled Agricultural; Machine Operators.*

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SUMMARY

A RIF regression approach to estimate the structural changes in the Italian employment composition

This paper investigates how microeconomic characteristics affect wage levels and wage inequality in Italy, before and during the economic crisis. We use EU-SILC (European Union Survey on Income and Living Conditions) data at individual level (the unit of analysis are employees aged 16-64) for 2005 and 2013.

After analysing how the structure of employment has changed between 2005 and 2013 in Italy, we perform the Recentered Influence Function (RIF) regression of Gini index, variance, median and two extreme deciles (q10 and q90) on (log of) gross individual wage.

The RIF regression allows us to estimate the impact of changes on covariates on the whole unconditional distribution of the measures of interest. Thus, the changes in wage inequality are decomposed into two components: the composition effect, which captures the impact due to individuals' endowments, and the wage structure that depends on the labour market characteristics of the Country. Finally, the composition effect and the wage structure are computed for each covariate, highlighting the factors that contribute the more to the inequality over time.

The five statistics confirm that the greater weight is associated with the return effect. In particular, the analysis reveals that the increase in wage inequality might be almost fully explained by the low efficiency of the Italian labour market structure in contrasting it with adequate labour policies and support measures.

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