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Sede Legale: C/O Studio Associato Cadoni, Via Ravenna n.34 – 00161 ROMA.
info@sieds.it, rivista@sieds.it

SIEDS
SOCIETÀ ITALIANA
DI ECONOMIA DEMOGRAFIA E STATISTICA

SEDE LEGALE:
C/O Studio Associato Cadoni, Via Ravenna n.34 – 00161 ROMA

info@sieds.it

rivista@sieds.it

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Invited paper to the 56th SIEDS Scientific Meeting – Ascoli Piceno 2019

THE GINI CONCENTRATION RATIO: BACK TO THE FUTURE

Giovanni Maria Giorgi

1. Introduction

On 29th May 1914, in the context of the Scientific Meeting of the Royal Venetian Institute of Sciences, Letters and Arts, Corrado Gini proposed a new synthetic measure of inequality which he called concentration ratio (*G*). Perhaps it will seem a bit strange that, more than a century later, scholars continue to discuss about *G*. Despite the weight of the years this index is still widely used not only in economics but also in fields that where unthinkable when it was originally proposed. In fact, new ways of using *G* actualize the past and form the basis for further future developments.

Inequality and its measurement are relevant because the perception of inequality itself influences both political and citizen choices.

One of the aspects of economic inequality that has negative repercussions on social status is, for example, the diversity of cognitive abilities of older people. That is, in other words, elderly people - in a weak socio-economic state and in poor health - show reduced intellectual capacity (Dal Bianco et al., 2013).

Aging is one of the main socio-economic problems of the 21st century. In this context the decline of cognitive abilities is relevant. Several factors have an impact on this decline, such as for instance retirement. Education also has a significant influence on the level of cognitive skills (Mazzonna-Peracchi, 2017).

The careful identification of these problems can be of great help for the health of the inhabitants of a country. In fact, if policies are promptly started to reduce the gender gap in education and the distribution of education among young people is improved, it is possible to reduce inequality of cognitive functions in the future (Oliveira et al., 2018). The information must be available quickly and at a cost that is not excessive and this leads to an increasing use of sample surveys. When the inequality is calculated on sample data, before generalizing the results, it is necessary to know and take into consideration the sample characteristics of the inequality index used, so that the information obtained constitutes a valid and reliable support for the

decisions of economic policy for reducing inequality (see, e.g., Giorgi, 1999; Giorgi and Gigliarano, 2017)

To preserve confidentiality, official statistical agencies publish the data in a grouped form. This aspect has also been taken into consideration by Gini (1914) who proposes various formulas for the calculation of his index and suggests different solutions to the problems that arise when the lower limit of the first class and / or the upper limit of the last class are not known. On the basis of some empirical tests, Gini also shows how the distortion of the estimate of his index increases with the increase in concentration and class size.

2. Genesis of the Gini concentration ratio

Now let us recall how Gini index was originally proposed. Between the end of the 19th century and the beginning of the 20th century, studies aimed at achieving a more equitable distribution of wealth characterize the political and economic debate. Vilfredo Pareto (1895, 1897) and Corrado Gini (1909) contribute to this type of study. The indices proposed by the two scholars give rise to a heated debate on their advantages and disadvantages, but Gini - despite considering his index better than that of Pareto - continues the studies on the subject, arriving in 1914 to the definition of the so-called concentration ratio also known in the literature as Gini coefficient, Gini ratio or simply as Gini index. He also highlights the connection with the Lorenz diagram (1905) and the mean difference (Gini, 1912), providing adequate empirical applications. In fact, he avoids excessive formalization and tries, first of all, to discover the underlying logic of events; only afterwards and for what is strictly necessary he uses mathematical tools. Gini's scientific production is not the result of a theoretical-formal elaboration as an end in itself, but comes from the need to solve concrete problems that arise in empirical applications ranging from economics to sociology, to demography and biology.

Despite the efforts of Gini and his collaborators to support the use of the concentration ratio, the index arouses the interest of non-Italian scholars only after some time its appearance in the literature. This can be deduced from an article by Gini (1921) published in the Economic Journal in which he points out that Dalton's (1920) proposal to measure inequality of economic welfare cannot be compared to the methods introduced by Italian scholars, including the concentration ratio.

In order to spread his index at an international audience, Gini (1926) publishes in the Journal of the Royal Statistical Society a paper in which he highlights the contributions of Italian scholars to modern statistical methods. Furthermore, his conferences abroad always underline the importance of *G* and the other results of the so-called Italian statistical school. One of the difficulties in spreading these results

is due to the fact that Gini and his collaborators wrote almost exclusively in Italian and, therefore, quite often published in journals with a limited audience. The synthesis of these results provided by Gini, also through prestigious journals, was not sufficient for a widespread diffusion and a thorough knowledge of these results. These syntheses were essentially–on Gini's work, since he believed his results coincided with Italian Statistics. At that time, almost all the main scientific results in Statistics by Italian scholars were achieved by him and his collaborators; and the latter limited themselves to developing and deepening Gini's suggestions (see, e.g., Giorgi and Gubbiotti, 2017).

3. New applications and extensions

The computational simplicity of Gini coefficient (G) have stimulated new applications and extensions (see, e.g., Giorgi, 2020) In fact, for example, G has been used in criminology for measuring and reporting crime concentration. Bernasco and Steenbeek (2017) suggested a generalized Lorenz curve and Gini coefficient in order to correct the bias when crimes are sparse, that is when there are fewer crimes than places. For further developments of the topic see also Bernasco et al. (2017). Very recently, an interesting application of this methodology has been made by Hasisi et al. (2019) for investigating the spatial characteristic of vehicular terror attacks in Israel. The authors analize the 71 vehicular attacks carried out in Israel between 2000 and 2017. They identify the "hot routes" at which attacks occurred as well as the estimated journey to attack routes.

Another application of G is to study the distribution of citations in scientific articles and therefore to evaluate the scientific productivity of departments, universities and countries from a qualitative and quantitative point of view (Rousseau, 1998). In particular, Zheng et al. (2008) use Gini coefficient to reflect the inequality degree of publications in China and other countries. Gini index is also used to measure the inequality of political representation among voters (Pretolani, 2014), as well as a tool to assess some aspects of a survival table (Shkolnikov et al., 2003).

Other interesting applications of the concentration ratio are in geology, where it is used to detect the damage caused by earthquakes to buildings thus providing an important contribution to the evaluation of disasters (Tu et al., 2017).

In robotics, the use of multi-robot systems in very dangerous and polluted environment allows the use of Gini coefficient for evaluating the available energy for robots (Wu et al., 2018).

Gini index is also applied to evaluate the impact of human activities on the hydrological cycle (Zhang et al., 2015). In other cases, G is used to investigate

insurance issues, for example to assess whether an alternative insurance score is useful for detecting differences between loss distributions and premiums (Frees et al., 2011; 2014).

The concentration ratio, according to some very recent studies (e.g., O'Hagan, 2018), may contribute to the development of biology and medicine, for example to study the distribution of proteins between different cells. Furthermore, Gini index also offers the possibility to analyze the collection of pharmacological data and the risk management strategy for new drugs (Torres-Garcia et al., 2017).

The rapid development of Internet has given a great contribution to the so-called big data era. In this case, it is relevant to understand which part of this huge information has to be considered to provide a correct interpretation of the data. To overcome this problem, it is possible to use systems that filter information and provide customized results to different users. These techniques are used by economic operators and social networks to have the user's contact information and help him/her to find new friends by connecting to various sites (such as Facebook). In this context, the crowding that occurs when some objects are recommended to many users can play a substantial role. A significant contribution to the solution of this problem is given by the Gini index that allows to evaluate the ability of an algorithm to avoid crowding (Ren et al., 2014).

4. Some further considerations on G

Gini index has aroused the interest of scholars of different disciplines such as, for example, economists, statisticians, biologists, sociologists and even mathematicians. This attention by scholars with different cultural backgrounds has inevitably given rise to a heated debate that starts from the appearance in the literature of *G*.

This debate was animated by scholars of the caliber of Antony Atkinson and Amartya Sen. The former (Atkinson, 1970) criticizes *G* and other indices of inequality because they do not rank income distributions according to strictly concave social utility functions. Sen (1972, 1973) points out that Atkinson's conclusions are framed in the utility functions context, the limits of which are known and highlighted by Sen himself. According to other scholars, the introduction of a utility function has replaced the choice of a measure of inequality, with another difficult problem to solve: the choice of a utility function. Furthermore, Atkinson’s distinction between objective and normative measures is not justified, as evidenced, for example, by Giorgi (1984), Giorgi and Pallini (1985) and Muliere (1987).

A criticism that is put forward to the Gini index is that it cannot be decomposed in an additive way (see, e.g., Giorgi, 2011), that is the decomposition is not of analysis of variance type (within + between). In fact, the breakdown of the Gini index

also includes a third component (overlapping) of residual type (i.e. within + between + overlapping). According to Dagum (1977), Lambert and Decoster (2005) and Sen (1999) the latter type of decomposition should be preferred to that of the "analysis of variance" type because it clarifies some of the aspects related to inequality between the groups, adapting rather well to the complex socio-economic reality in which we live. In this regard, Yitzhaki (1994) interprets the overlapping component as a measure of stratification between socio-economic groups.

The problem of decomposing the Gini index can be overcome by the Shapley decomposition. This method removes, one at a time, the contribution of all the possible combinations of each factor, so that the sum of these contributions gives the exact value of the index of inequality considered (Deutsch and Silber, 2007; Shorrocks, 1999)

Finally, when the Lorenz curves corresponding to different income distributions intersect and enclose concentration areas of the same size, the Gini index has the same value. Some researchers, among others Giurovich (1959), Hagerbaumer (1977) and Patimo (1977), proposed to overcome this stalemate with further information. The first considers an asymmetry index of the Lorenz curve (*LC*); the second integrates *G* with an index that measures the relative position of the poor and, the third suggests using together with *G* another index based on *LC* divided into two parts which takes into account both the difference in shape of these parts and the size of the difference (see, e.g., Giorgi 1992).

In conclusion we can say that the concentration ratio, after more than one hundred years since its appearance in the literature, is far from being enveloped by the mists of oblivion. Indeed, as highlighted above, the extensions, the new interpretations and above all the new applications that were unthinkable not only in 1914 but also twenty years ago make the Gini index extremely topical.

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SUMMARY

The Gini concentration ratio: Back to the future

The topicality of the Gini index, over 100 years after its appearance in the literature, is underlined by showing how it is currently used in fields other than economics, such as criminology, hydrology, insurance, biomedicine, geosciences and to evaluate scientific productivity of universities and departments**.**

Giorgi Giovanni MARIA, Department of Statistical Sciences, Sapienza University, giovannimgiorgi@gmail.com

INEQUALITIES IN SELECTED DIMENSIONS OF WELL-BEING: AN ANALYSIS ON THE ITALIAN REGIONS

Barbara Baldazzi, Miria Savioli, Alessandra Tinto

1. Introduction

In the analysis of well-being, according to the "beyond GDP" approach, it is important to combine measures of levels and trends over time, with the analysis of inequalities, i.e. how well-being is distributed in the territories and among the different groups that make up society.

In the 2009 Stiglitz report one of the 12 recommendations proposed by the Commission advised to extend the study of inequalities to all dimensions of quality of life (Stiglitz et al., 2009) and not only in the economic dimension (income inequality), and this became more and more possible thanks to the increasing availability of data in this area of research.

In the latest How's Life report, OECD proposed an analysis of inequalities in all dimensions of the framework used to measure well-being, highlighting how the inequality profiles of income do not always overlap with inequality profiles observed in other dimensions of well-being (OECD, 2017). The innovative aspect of this analysis is that inequalities are exhaustively studied, combining different types of measures: vertical and horizontal inequalities and deprivation measures.

In 2018 also the work of the High Level Expert Group on the Measurement of Economic Performance and Social Progress set up by OECD reiterated the importance of analysing inequalities (Stiglitz et al., 2018).

In Italy, since 2010, Istat set up the Bes project (Equitable and sustainable well-being) with the objective of proposing a multidimensional framework to measure the progress of the country and its evolution in the different dimensions (Istat, 2018).

From the beginning, the objective of the Bes project was to monitor not only the levels of well-being but also horizontal inequalities, by analysing the gap between population groups defined by specific characteristics: gender, region of residence, age group, in some cases also citizenship, level of education and professional status. The importance given to the issue of inequality is testified by the fact that of the total of 130 Bes indicators, over 93% are available by region, almost 59% by sex and 51% by age group.

Following the OECD approach, the aim of this work is to complement the analysis of horizontal inequalities usually presented in the Bes reports and based on the gap between population groups, with the analysis of vertical inequalities in selected dimensions of well-being in Italy and in the regions.

Specific attention was given to the territorial dimension, carrying out a joint analysis of the regional profiles of economic inequality and other dimensions of well-being, with the aim of verifying whether, also in the case of Italian regions, the profiles of vertical income inequality differ from the profiles of vertical inequality in the other dimensions of well-being (Wilkinson et al., 2010; Oishi et al., 2011).

2. Vertical inequalities

Measures of "vertical" inequalities address how, a specific phenomenon, is unequally spread across population, by looking at the size of the gap between people at the top of the distribution and people at the bottom.

In this work vertical inequalities were explored with reference to 3 domains of the Bes framework: Economic well-being, Education and training and Subjective well-being (Istat, 2017).

While the Bes Economic well-being domain includes a measure of vertical inequality calculated at regional level (inequality of disposable income), for the other two domains two new measures were built: inequality in the number of years in education (Education and training domain) and inequality in life satisfaction (Subjective well-being domain).[1]

Inequality of disposable income is calculated as the ratio between the total equivalent income received by 20% of the population with the highest income and that received by 20% of the population with the lowest income.

Inequality in education was computed as the ratio between the average number of years in education of the 20% of population aged 25-64 with the highest number of years of education and the average number of years in education of the 20% of population aged 25-64 with the lowest number of years in education.

Finally, inequality in life satisfaction was computed as the ratio between the average life satisfaction score of the 20% of population aged 14 and over with the highest satisfaction and the average life satisfaction score of the 20% of population aged 14 years and over with the lowest satisfaction.

Table 1 describes the selected Bes indicators and the measures of vertical inequality computed.

[1] The measurements of vertical inequalities can be calculated only on continuous variables and require the availability of microdata, and these bonds guided the choice of the measures to implement.

Table 1 – *Bes domains and indicators and vertical inequality measure.*

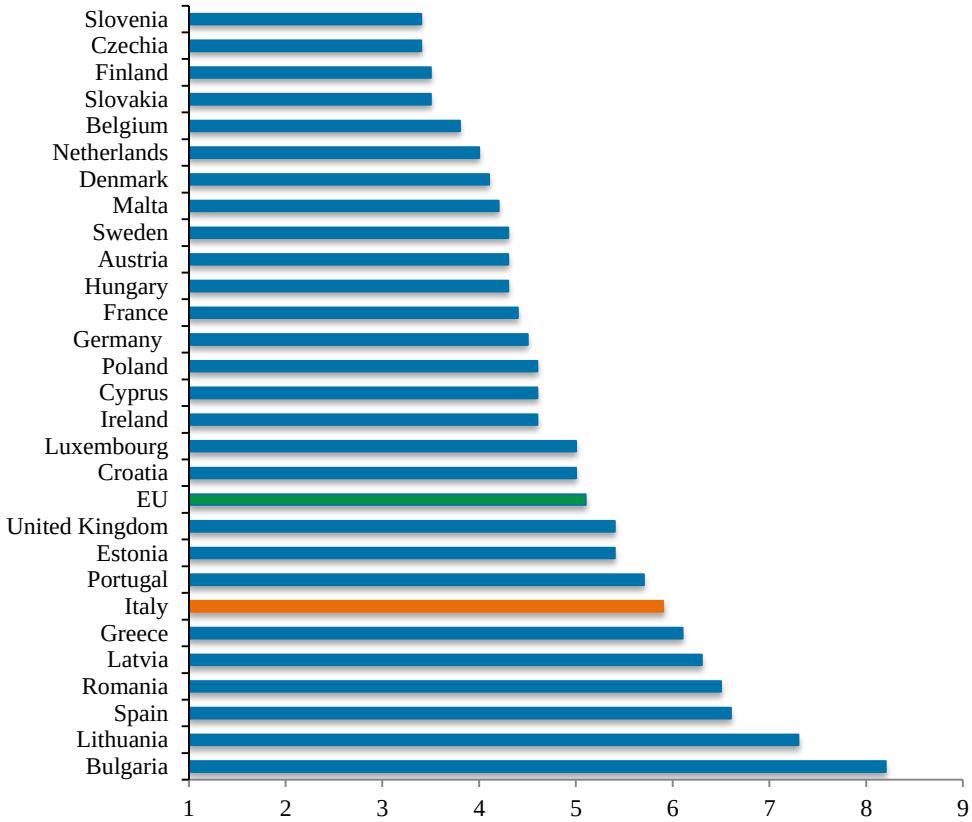
Bes domain	Bes indicator	Measure of vertical inequality
Economic well-being	Disposable income inequality: Ratio of total equivalised income received by the 20% of the population with the highest income to that received by the 20% of the population with the lowest income. Source: Istat, Eu-Silc survey	It is already a measure of vertical inequality
Subjective well-being	Life satisfaction: Percentage of people aged 14 and over with a level of life satisfaction from 8 to 10 on total population aged 14 and over. Source: Istat, Survey Aspects of daily life	Ratio between the average life satisfaction score of 20% of the population aged 14 and over with the highest satisfaction and the average life satisfaction score of 20% of the population aged 14 and over with the lowest satisfaction. Source: Istat, Survey Aspects of daily life
Education and training	People with at least upper secondary education level (25-64 years): Percentage of people aged 25-64 years having completed at least upper secondary education (ISCED level not below 3) on total people aged 25-64 years. Source: Istat, Labor Force Survey	Ratio between the average number of years of education of 20% of the population aged 25-64 with the highest number of years of education and the average number of years of education of 20% of the population aged 25-64 with the least number of years of education Source: Istat, Survey Aspects of daily life

3. Results

In 2016 in Europe, inequality of income distribution was equal to 5.1, meaning that the income received by the richest 20% of the population is more than 5 times that received by the poorest 20%. The countries in the lower part of Figure 1 are those in which the distance between the income possessed by the richest fifth and the poorest fifth is greater, and therefore the most unequal. These include Bulgaria, Lithuania, Spain and Romania. At the other extreme, the most equal countries, according to income distribution, are Slovenia, the Czech Republic, Finland and Slovakia, where the ratio between incomes is less than half compared to the most

unequal countries. Italy, with an index of 5.9, is above the European average (Figure 1).

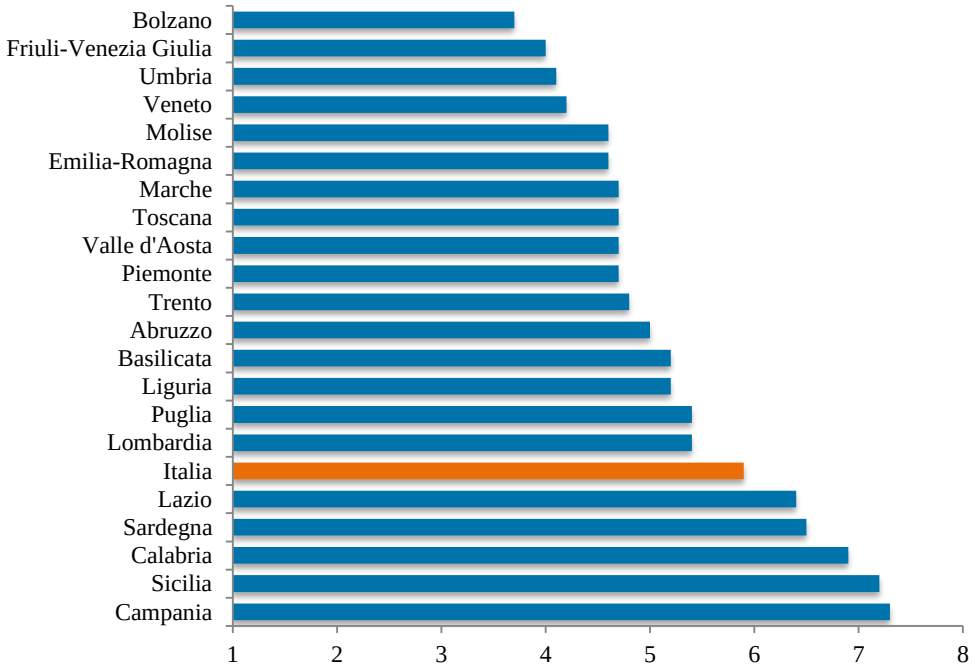
Figure 1 – *Inequality of disposable income in EU countries. Income referred to 2016.*



Source: Eurostat, Eu-Silc

The gap between the most unequal and the less unequal regions is quite wide also within the Italian territory: in Campania, Sicilia and Calabria the richest 20% of the population has an income about 7 times higher than the poorest 20%, while in Bolzano and in other regions in the central-northern area, such as Friuli-Venezia Giulia, Umbria and Veneto, this ratio drops to 4 (Figure 2).

Figure 2 – *Inequality of disposable income in Italian regions – Income referred to 2016.*

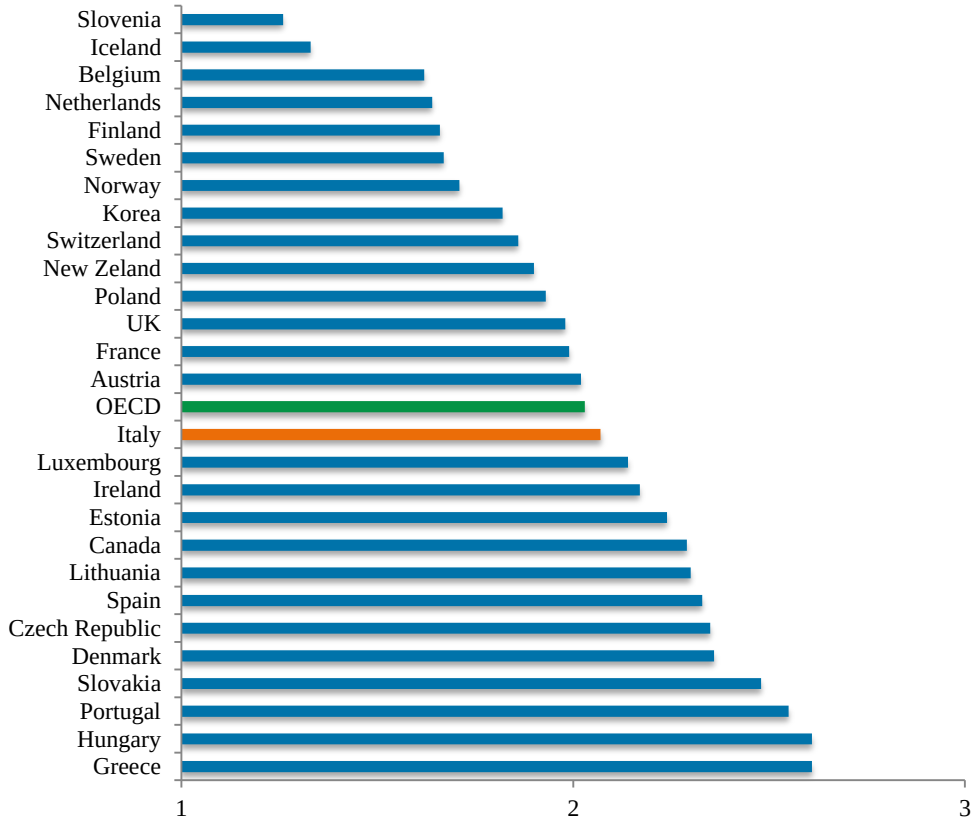


Source: Istat, Eu-silc

In 2016[2], in Italy the average score of life satisfaction referred to the 20% of population which are most satisfied with their life is about double than that of the 20% population which are least satisfied, a value in line with the OECD average. The highest levels of inequality with respect to this indicator are found in Greece, Hungary, Portugal (around 2.6) and in Slovakia (2.5). Slovenia and Iceland are the two countries OECD with the lowest inequality in life satisfaction (around 1.3) (Figure 3).

[2] The international comparison presented in the How's life report? is based on data referring, for Italy, to 2016.

Figure 3 - V*ertical inequalities in life satisfaction in selected Oecd countries. Latest available year.*



Source: Oecd, How's life? 2017

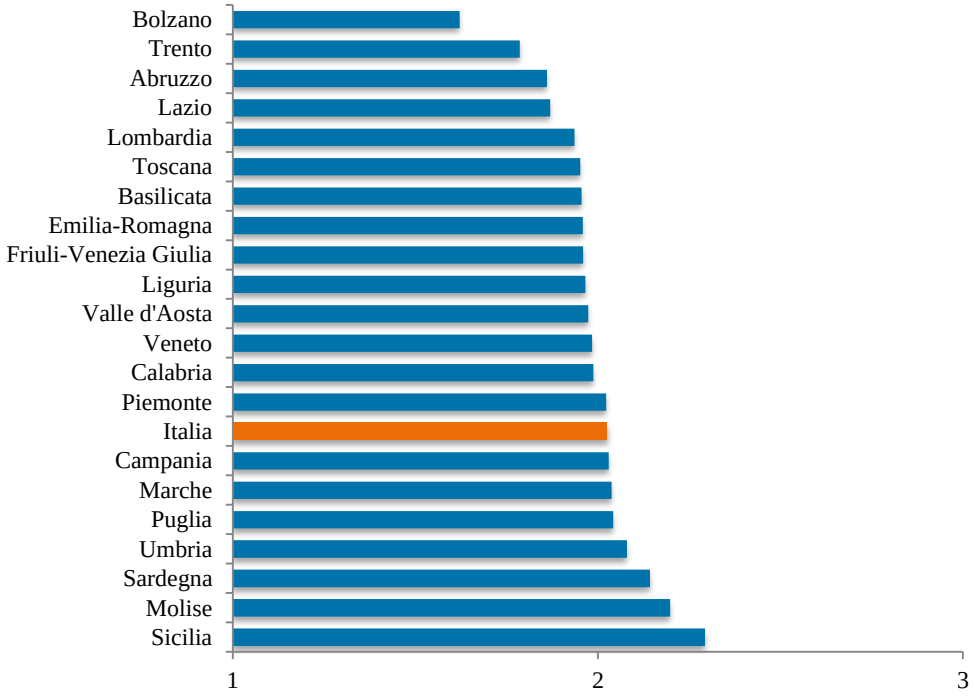
At the level of Italian regions, the geography of vertical inequality in life satisfaction does not strictly follow the North-South gradient: in 2017, in Italy, the highest levels are found in Sicilia, Sardegna and Molise; the lowest ones are in the autonomous provinces of Trento and Bolzano, in Abruzzo and in Lazio (Figure 4).

In Sicilia the average life satisfaction score referred to the top 20% of the population is 2.3 times greater than that declared by 20% of the population with the lowest life satisfaction scores, while in Bolzano the inequality index drops to 1.6.

In Italy, the results for the levels of vertical inequality in education show a less heterogeneous situation than that highlighted for life satisfaction, with three regions of the South expressing the highest levels of inequality (Calabria, Campania and Puglia) and Trento and Bolzano at the opposite end. In particular, in Calabria the ratio between the average number of years in education referred to the 20% of the

most educated population and that of 20% of the least educated population is 2.8, while in Trento the value drops to 2.3 (Figure 5).

Figure 4 – V*ertical inequalities in life satisfaction in Italian regions. Year 2017.*



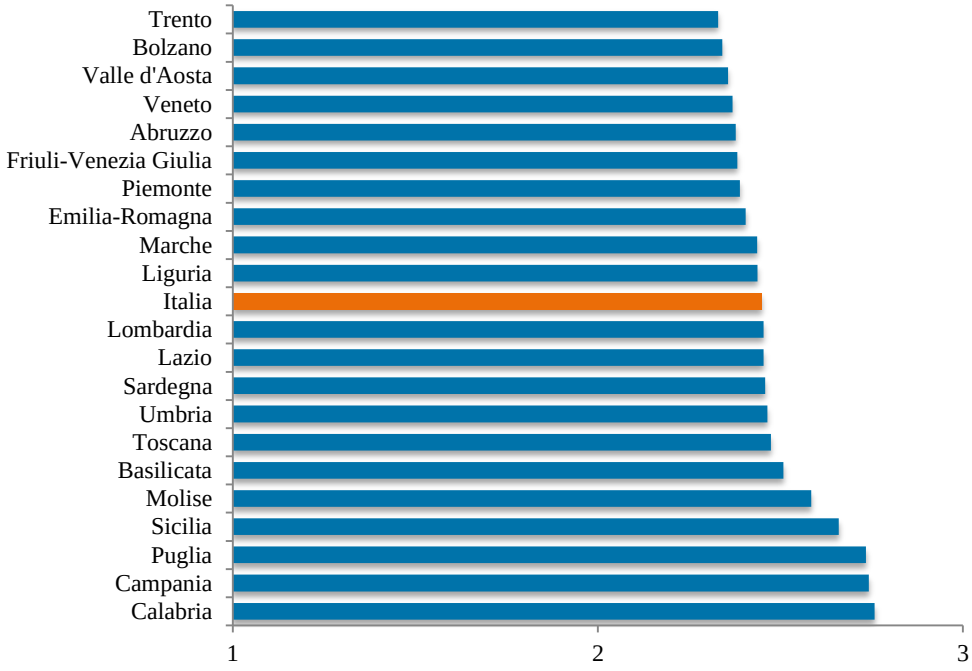
Source: Istat, survey on Aspects of daily life

To have a joint picture of inequalities in the three Bes domains considered (Education and training, Economic well-being and Subjective well-being), for each indicator the regions have been divided into three equally numbered groups, which classify them as regions with low, medium or high inequality (Table 2).

In this way it is possible to identify the regions with a more homogeneous profile, falling into the same group for all three indicators considered. The comparison between the regional rankings shows that in several cases the group to which regions belong, according to the relative level of inequality, differs depending on the indicator. This confirms the hypothesis that the profiles of economic inequality do not necessarily mirror those in the other two dimensions of well-being. Only 7 regions out of 21 have the same performance for the income inequality index and for life satisfaction. Considering instead the inequality of the level of education, the

concordance with income inequality increases, with 9 regions out of 21 falling into the same class.

Figure 5 - V*ertical inequalities in education in Italian regions. Year 2017.*



Source: Istat, survey on Aspects of daily life

Only 5 regions always fall within the same group, considering the three indicators jointly: 3 of them are characterized by the highest levels of inequality (Campania, Puglia and Sicilia), while the most favourable situation is that of the province of Bolzano, which is in the lowest level of inequality for all three measures considered.

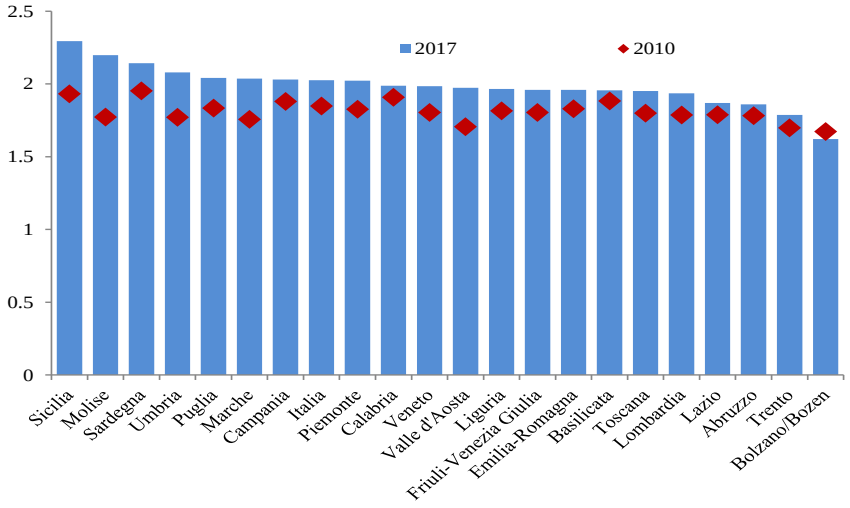
One of the great added values of the Bes Project is allowing to carry out time trend analysis for all well-being indicators. This makes it also possible to compare the evolution of inequalities in the Bes domains.

Table 2 – *Vertical inequalities in income, life satisfaction and years spent in education by region. Years 2016 and 2017.*

Vertical inequality measures					
Income (2016)		**Life satisfaction (2017)**		**Education (2017)**	
Bolzano	3.74	Bolzano	1.62	Bolzano	2.34
Trento	4.79	Trento	1.79	Trento	2.33
Abruzzo	5.02	Abruzzo	1.86	Abruzzo	2.38
Friuli-Venezia Giulia	4.05	Friuli-Venezia Giulia	1.96	Friuli-Venezia Giulia	2.38
Veneto	4.18	Veneto	1.98	Veneto	2.37
Piemonte	4.68	Piemonte	2.02	Piemonte	2.39
Emilia-Romagna	4.63	Emilia-Romagna	1.96	Emilia-Romagna	2.40
Valle d'Aosta	4.73	Valle d'Aosta	1.97	Valle d'Aosta	2.36
Liguria	5.24	Liguria	1.97	Liguria	2.44
Basilicata	5.20	Basilicata	1.96	Basilicata	2.51
Toscana	4.71	Toscana	1.95	Toscana	2.47
Lombardia	5.39	Lombardia	1.94	Lombardia	2.45
Lazio	6.39	Lazio	1.87	Lazio	2.45
Umbria	4.12	Umbria	2.08	Umbria	2.46
Marche	4.69	Marche	2.04	Marche	2.44
Molise	4.56	Molise	2.20	Molise	2.58
Sardegna	6.50	Sardegna	2.14	Sardegna	2.46
Calabria	6.87	Calabria	1.99	Calabria	2.76
Puglia	5.38	Puglia	2.04	Puglia	2.73
Campania	7.30	Campania	2.03	Campania	2.74
Sicilia	7.21	Sicilia	2.29	Sicilia	2.66
ITALY	**5.92**	**ITALY**	**2.03**	**ITALY**	**2.51**

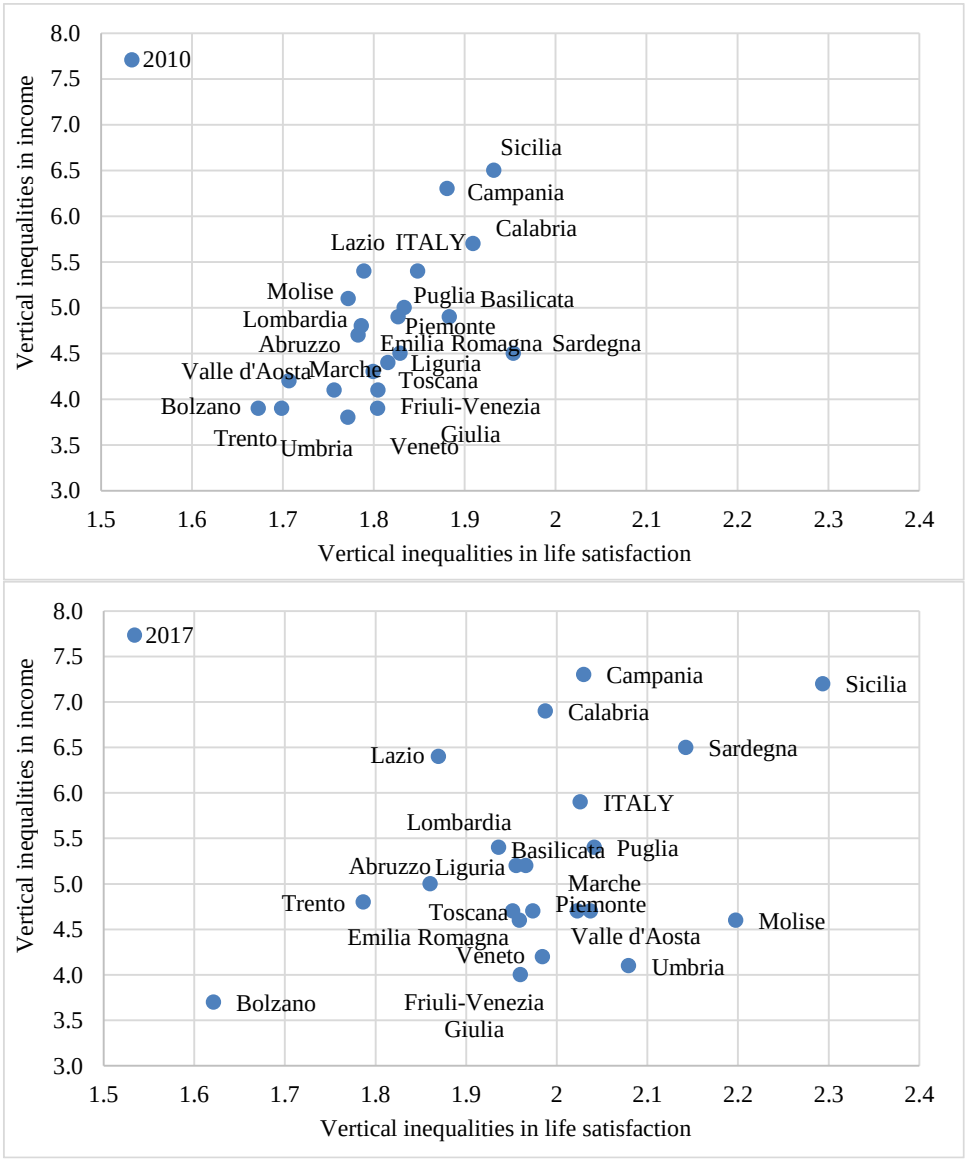
Lowest third of vertical inequalities | Middle third of vertical inequalities | Highest third of vertical inequalities

Figure 6 - *Vertical inequalities in life satisfaction in Italian regions. Years 2010 and 2017.*



Source: Istat, survey on Aspects of daily life

Figure 7 - *Vertical inequalities in life satisfaction and income in Italian regions. Years 2010 and 2017.*



Source: Istat, Eu-silc, Survey on Aspects of daily life.

Income inequality has increased in nearly all world regions in recent decades (Chancel et al, 2017). Also in Italy, inequalities measured by the income quintile share ratio increased, between 2010 and 2016, in all regions except in Bolzano, Molise, Friuli-Venezia Giulia and Piemonte. The greatest increases are found in Sardegna, Calabria, Campania e Lazio.

Between 2010 and 2017, also vertical inequality in life satisfaction increased in all regions, except Bolzano. The greatest increases are found in Molise, Sicily, Umbria and Marche (Figure 6).

When considering inequalities in life satisfaction and income jointly, the cloud of the coordinates of regions projected on a Cartesian graph (Figure 7) shows how, in the period of 7 years considered, vertical inequalities increased in both dimensions. In fact the 2017 cloud is much more spread both horizontally and vertically comparing to the 2010 cloud. In particular, increased the number of regions with the highest level of inequality both in income and in life satisfaction, with Sardegna joining the group in 2017, due to a particular increase in income inequality. At the other end, in 2017 Bolzano keeps his favourable position with low inequality in both dimensions, while in Trento the income inequality increased, and in Valle d'Aosta the life satisfaction inequality increased in the period considered.

4. Final remarks

In this study, a first set of measures was built to explore vertical inequalities by region, extending the analysis to additional non-material well-being domains, such as those of Subjective well-being and Education and training.

The measures considered show high levels of inequalities in disposable income but also in life satisfaction and education and the gap between the Italian regions is remarkable. The comparison between the regional rankings showed that in several cases the relative position of regions according to levels of inequality for the three indicators considered does not strictly follow the North-South gradient. Despite the highest levels of inequality are always found in the Southern regions and in the Islands, certain central and northern regions record high levels of inequality: Lombardy and Lazio for income, Marche and Umbria for life satisfaction, Tuscany for education.

Considering the evolution over time, between 2010 and 2017, vertical inequalities in life satisfaction and in income increased in all regions, except Bolzano, and the distance among the regions is much more spread in the most recent year. To interrupt the increasing trend at global level Governments would need to invest, targeting specific public policies and facilitating access to education.

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SUMMARY

ANALYSIS OF INEQUALITIES IN WELL-BEING

In this study, a first set of measures was built to explore vertical inequalities by region with respect to a few well-being domains. The measures considered show high levels of inequalities in disposable income but also in life satisfaction and education and the gap between the Italian regions is remarkable. The comparison between the regional rankings showed that in several cases the location of the regions for the three indicators considered does not strictly follow the North-South gradient. Despite the highest levels of inequality are always found in the Southern regions and in the Islands, certain central and northern regions record high levels of inequality: Lombardy and Lazio for income, Marche and Umbria for life satisfaction, Tuscany for education. Considering the evolution over time, vertical inequalities in life satisfaction and in income increased in all regions, except Bolzano, between 2010 and 2017, and the distance among the regions is much more spread in the most recent year.

Barbara BALDAZZI, Istat, baldazzi@istat.it
Miria SAVIOLI, Istat, savioli@istat.it
Alessandra TINTO, Istat, tinto@istat.it

INEQUALITIES IN ACCESS TO JOB-RELATED LEARNING AMONG WORKERS IN ITALY: EVIDENCE FROM ADULT EDUCATION SURVEY (AES)

Paolo Emilio Cardone

Equitable access to adult learning for all is a goal for European education, training and employment policies. In particular, all workers should be able to acquire, update and develop their skills over their lifetime. How is it possible to improve access to learning for older workers? This report provides a statistical picture of older workers participation in job-related training in Italy, investigating its variability and relevant inequalities. The analysis is carried out using Italian AES, provided by Eurostat. It analyses adults' learning activities and distinguishes formal, non-formal and informal learning. Using logistic regression model it is possible to estimate the learning-age gap between those aged 50 years and the general population more accurately. One principal finding of such an analysis is that people under 50 have a probability of participating in training 22% higher when compared to those aged 50 and more (OR=1.22). Secondly, women are less likely to take part in training than men. Overall the data confirm the existence of strong inequalities in access to job-related learning among workers: this requires policy attention, to increase the focus on job-related training as part of active labour market policies, to prevent skills' obsolescence.

1. Introduction

Demographic ageing is an irreversible process. The direct effect of population ageing is the increasing share of elderly people, who are in retirement age, compared to the decreasing share of young people.

Furthermore, the European Commission 2012 Ageing Report suggests that population ageing has been also affecting the age structure of population working age. Due also to the pension reform, this is extremely important in the overall context of labour force in the EU (particularly in Italy). On the labour market, the proportion of jobs that require medium and high-level qualifications is expected to increase. However, there is still an extremely high number of those of working age in Europe who have either low or no qualifications.

The nature of jobs is changing, necessitating changes in the skills that are required of workers and adapting lifelong learning systems to the needs of an

ageing workforce. The recent crisis has also highlighted the importance of education and training at all stages of life, in particular for older adults to avoid unemployment, vindicating the messages that "it is never too late to learn" (European Commission 2006) and learning must be for all. This requires older people to maintain and update the skills they have, particularly in relation to new technologies. Continuous learning and development of an ageing workforce are important for employers' survival in competitive markets, as well as for maintaining older people's employability.

Equitable access to adult learning for all is a goal for European education, training and employment policies promoted by Cedefop[1]. In particular, all workers should be able to acquire, update and develop their skills over their lifetime (Cedefop 2015). Also OECD[2], through the LEED[3] program, considers them as a key factor for increasing the productivity of older workers because it relies on using their strengths in terms of skills and competences and developing their skills (OECD 2015). Continuing training in general can temper any tendency to become less flexible as well as increase the capacity to deal with technological change.

However, despite the increasing need for learning later in life, participation and access to learning decrease with age. How is it possible to improve access to learning for older workers? This report provides a statistical picture of older workers participation in job-related training in Italy, investigating its variability and relevant inequalities due to key factors such as the influence of individual characteristics, jobs and workplaces.

2. Classification of Learning Activities (CLA)

Regular participation in learning activities does not include taking part in formal training only, but also learning in non-formal and informal learning settings. In particular, informal learning plays a greater role for older employees than formal learning because it facilitates the transfer of knowledge and know-how between generations (Cedefop 2012), allows practical skills to be gained quickly and ensures the inclusion, particularly for older workers, within the circles of relationships.

First of all, the organizing concept of the CLA (Classification of Learning Activities) is based on 3 broad categories: Formal Education (F), Non-Formal Education (NF) and Informal Learning (INF). The classification is intended to

[1] European Centre for the Development of Vocational Training, based in Thessaloniki (Greece). For more details: http://www.cedefop.europa.eu

[2] Organisation for Economic Co-operation and Development, based in Paris (France). For more details: http://www.oecd.org

[3] Local Economic and Employment Development. For more details: http://www.oecd.org/cfe/leed

cover all types of learning opportunities and education/learning pathways. It is intended to be universal in nature, applicable in countries irrespective of their level of development or systems of education and learning. It is designed to serve as an instrument for compiling and presenting comparable statistics and indicators on learning activities both within individual countries and across countries. It covers all intentional and organised learning activities for all age groups. The CLA is to be applied to statistical surveys to collect quantitative information on different aspects of participation of individuals in learning and it has been designed to cover and serve the scope of the European Union Adult Education Survey (AES). However, other EU household surveys (e.g. LFS[4], TUS[5]) as well as specific enterprise surveys (e.g. CVTS[6]) may use it if it is adequate for their needs (Eurostat 2006).

Learning activities is defined as "*the individual acquisition or modification of information, knowledge, understanding, attitudes, values, skills, competencies or behaviours through experience, practice, study or instruction. It is a deliberate activity in which an individual participates with the intention to learn*" (UNESCO-UIS 2012, 80).

Lifelong Learning (LLL) is defined as encompassing "*all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences, within a personal, civic, social and or employment related perspective*"[7] (European Commission 2002).

CLA provides relevant criteria for the classification of all learning activities: formal, non-formal education and informal learning. In doing so it remains coherent with ISCED 97. It is possible to classify all learning activities into these 3 categories using some general concepts and definitions.

Formal Education as "*education provided in the system of schools, colleges, universities and other formal educational institutions that normally constitutes a continuous "ladder" of full-time education for children and young people, generally beginning at age of five to seven and continuing up to 20 or 25 years old*". Formal education refers to institutionalised learning activities that lead to a learning achievement that can be positioned in the National Framework of Qualifications (NFQ).

Non Formal Education is defined as "*any organised and sustained educational activities that do not correspond exactly to the above definition of formal education. Non-formal education may therefore take place both within and outside*

[4] Labour Force Survey.

[5] Time Use Survey.

[6] Continuing Vocational Training Survey.

[7] The European Employment strategy definition of Lifelong Learning reads: "*all purposeful learning activities, whether formal or informal, undertaken on an ongoing basis with the aim of improving knowledge, skills and competences.*".

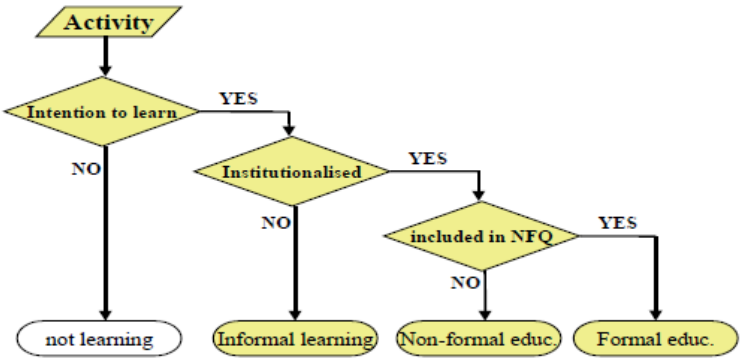
educational institutions, and cater to persons of all ages. Non formal education programmes do not necessarily follow the "ladder" system, and may have a differing duration". Non-formal education refers to institutionalised learning activities, which are not part of the NFQ.

Informal Learning is defined as "*…intentional, but it is less organised and less structured ….and may include for example learning events (activities) that occur in the family, in the work place, and in the daily life of every person, on a self-directed, family-directed or socially directed basis*". Informal learning activities are not institutionalised. There is one fundamental criterion that distinguishes Informal Learning from Education (formal and non-formal): this is whether the learning activity is institutionalised or not. Institutionalised learning activities occur when there is "*an organisation providing structured arrangements (which must include a student-teacher-relationship), especially designed for education and learning*" (Eurostat 2006, 13-14).

The National Framework of Qualification (NFQ) is defined as "*the single, nationally and internationally accepted entity*[8]*, through which all learning achievements may be measured and related to each other in a coherent way and which define the relationship between all education and training awards*" (Eurostat 2006, 15).

In synthesis, the process to allocate education and learning according to the broad categories is presented in the decision making flowchart shown in Figure 1:

Figure 1 – *Allocation of learning activities according to the 3 broad categories*



Source: Eurostat (2006). Classification of learning activities: manual

[8] The entity can take the form of an organization/body, or regulatory document. It stipulates the qualifications and the bodies that provide or deliver the qualification (awarding bodies) that are part of the National Framework of Qualifications.

3. Data and methods: Adult Education Survey (AES)

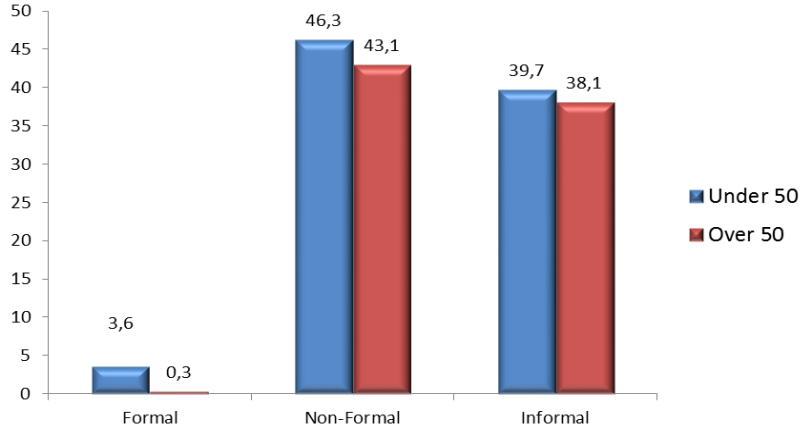
In order to achieve this goal, the analysis is carried out using microdata from the second and latest wave of Italian Adult Education Survey[9] (AES-2011), provided by ISTAT[10]. The survey analyses the learning activities of adults and distinguishes between formal, non-formal and informal learning, which takes place inside or outside the workplace. It investigates adult participation in training in depth in 2011 and includes a sample of 11.500 individuals, 6.000 of them are workers (if weighted they become 22 million, exactly the workers' amount in Italy).

Descriptive analysis does not evidence a gender gap (about under 50, participation is exactly the same value of 64%) but it indicates an age gap for both gender: 4,4% for men (under 50 = 64,0 vs over 50 = 59,6%) and 2,3% for women.

As shown in figure 2, there are strong inequalities between under and over 50 workers for all broad categories: formal, non-formal and informal.

The citizenship plays also an important role because the disadvantage, for both age groups, is more pronounced for european workers rather than italians: in particular, italian older workers' participation is double if compared to that of europeans (61,1 vs 30,0%).

Figure 2 – *Learning activities participation according to the 3 broad categories (% values)*



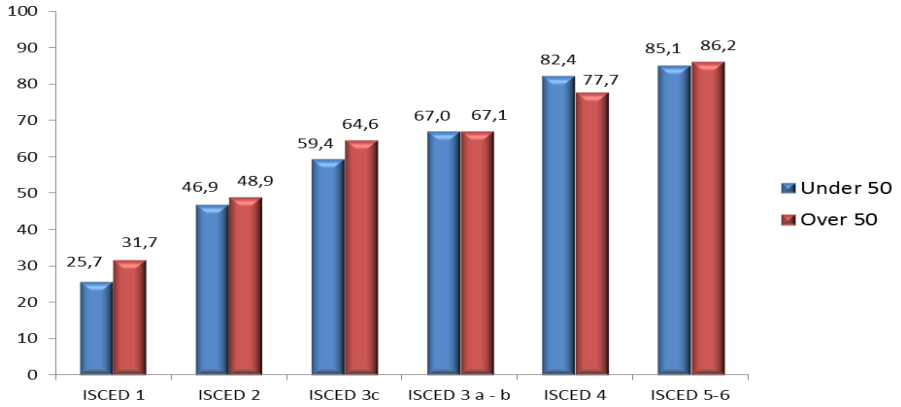
Source: own elaboration on AES data.

Regarding the education, there are not significant differences between under and over 50 (figure 3), but it is important to evidence how both participation rates in continuous vocational training are positively correlated to educational level,

[9] For more details: http://ec.europa.eu/eurostat/web/microdata/adult-education-survey
[10] Italian National Statistical Institute.

using the International Standard Classification of Education[11] (ISCED), which is a statistical framework for organizing information on education maintained by UNESCO, the United Nations Educational, Scientific and Cultural Organization. Reflecting the disadvantage of low-educated workers, the main result is the wide difference between workers' rates with tertiary education (85,1 and 86,2%) and those with only primary level (25,7 and 31,7%)[12].

Figure 3 – *Learning activities participation by age and education level (% values)*



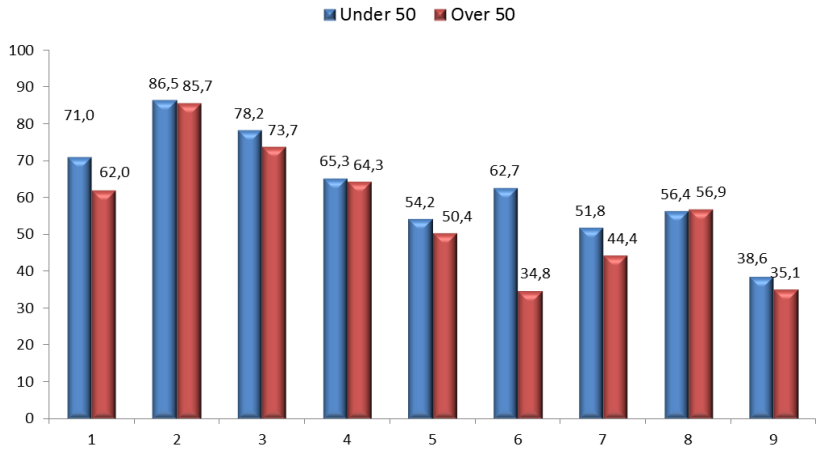
Source: own elaboration on AES data.

[11] The International Standard Classification of Education (ISCED) provides a comprehensive framework for organising education programmes and qualification by applying uniform and internationally agreed definitions to facilitate comparisons of education systems across countries. ISCED is a widely-used a global reference classification for education systems that is maintained and periodically revised by the UIS (UNESCO Institute for Statistics) in consultation with Member States and other international and regional organizations. For more details: http://uis.unesco.org

[12] ISCED 1: Primary level of education. Programmes normally designed to give students a sound basic education in reading, writing and mathematics.
ISCED 2: Lower secondary level of education. It generally continues the basic programmes of the primary level, although teaching is typically more subject-focused, often employing more specialised teachers who conduct classes in their field of specialisation.
ISCED 3C: Upper secondary level of education. These programmes lead directly to labour market.
ISCED 3A-B: Upper secondary level of education. The final stage of secondary education in most countries. Instruction is often more organised along subject-matter lines than at ISCED level 2 and teachers typically need to have a higher level, or more subject-specific, qualification that at ISCED 2.
ISCED 4: Post-secondary, non-tertiary education. These programmes straddle the boundary between upper secondary and post-secondary education from an international point of view, even though they might clearly be considered as upper secondary or post-secondary programmes in a national context.
ISCED 5-6: First and second stage of tertiary education. Programmes with an educational content more advanced than those offered at levels 3 and 4. Furthermore, level 6 is reserved for tertiary programmes that lead to the award of an advanced research qualification. The programmes are devoted to advanced study and original research.

The disadvantage of low-educated workers is also confirmed for those low-skilled and it is accentuated for olders (figure 4). Indeed, older workers' participation rates are lower than youngers' rates, for each professional category. Furthermore, those who are employed in elementary occupations have halved rates compared to high-skilled colleagues[13].

Figure 4 – *Learning activities participation by age and occupation (% values)*



1–Managers; 2–Professionals; 3–Technicians and associate professionals; 4–Clerical support workers; 5-Services and sales workers; 6–Skilled agricultural, forestry and fishery workers; 7–Craft and related; 8–Plant and machine operators and assemblers; 9–Elementary occupations
Source: own elaboration on AES data

Finally, both participation rates in continuous vocational training are also positively correlated to the size company[14] and younger workers' rates are always higher than olders' (fig. 5).

[13] ISTAT considers groups 1-2-3 as high-skilled; medium-skilled groups 4-5-6-7; finally, low-skilled groups 8-9.

[14] Micro (from 1 to 10 employees); Small (from 11 to 49 employees); Medium (from 50 to 249 employees); Large (250 employees and more).

Table 1 – *Logistic regression models (dependent variable: participation at least one training activity)*

Variables		Beta	ODDS	Sign.
• Gender				
Male (ref.)	Female	-0,10	0,91	0,17
• Citizen				
Italian (ref.)	EU	-0,58	0,56	0,02
	Extra EU	-0,56	0,57	0,00
• Size firm				
Micro (1-10) (ref.)	Small (11 - 49)	0,19	1,21	0,02
	Medium (50 - 249)	0,48	1,62	0,00
	Large (250 +)	0,59	1,81	0,00
• Job ISCO				
Elementary occupations (ref.)	Managers	1,24	3,44	0,00
	Professionals	2,24	9,44	0,00
	Technicians and associate professionals	1,53	4,61	0,00
	Clerical support workers	0,96	2,61	0,00
	Services and sales workers	0,66	1,94	0,00
	Skilled agricultural, forestry and fishery workers	0,84	2,32	0,00
	Craft and related trades workers	0,34	1,40	0,02
	Plant and machine operators and assemblers	0,55	1,74	0,00
• Age				
Over 50 (ref.)	Under 50	0,20	1,22	0,01
	Intercept	-0,65	0,52	0.000

Source: own elaboration on AES data.

Table 1 shows coefficients (*Beta*) and odds ratios of logistic model. This means that the coefficients in logistic regression are in terms of the log odds and it can be expressed in odds by getting rid of the natural log. This is done by taking the exponential for both sides of the equation, because there is a direct relationship between the coefficients produced by logit and the odds ratios produced by logistic: a logit is defined as the natural log (base *e*) of the odds (Liu 2016, 97).

This fitted model says that, holding covariates at a fixed value, the odds of participating at least one training activity for under 50 workers over the odds of participating at least one training activity for over 50 workers (reference category) is exp(0,20) = 1,22. In terms of percent change, we can say that the odds for youngers are 22% higher than the odds for older workers. In other words, the hazard to participate at least one training activity (formal, non-formal or informal) is higher for younger workers rather than olders.

Regarding citizenship, there is a strong disadvantage for both European and extra-European workers because the hazard of them is lower of 40% than the odds for Italians (both OR are less than 1). The size enterprise play an important role: with reference micro enterprises (1-10 employees), odds of small with 11-49 empl. (OR=1,21), medium with 50-249 empl. (OR=1,62) and large with 250 and more

empl. (OR=1,81) are higher. It means the odds increase as the size increases: small, medium and large firms have 21%, 62% and 81% hazard higher than micro firms (1-10 empl.) to participate at least one training activity respectively.

Furthermore, as shown in descriptive analysis, those who are employed in elementary occupations are disadvantaged with all those high and medium-skilled.

Table 2 – *Logistic regression models (dependent variable: only participation in informal learning activity)*

Variables		Beta	ODDS	Sign.
• Gender				
Male (ref.)	Female	-1,55	0,86	0,02
• Citizen				
Italian (ref.)	EU	-0,24	0,79	0,37
	Extra EU	-0,76	0,47	0,00
• Size firm				
Micro (1-10) (ref.)	Small (11 - 49)	-0,06	0,94	0,45
	Medium (50 - 249)	0,18	1,19	0,04
	Large (250 +)	0,16	1,18	0,11
• Job ISCO				
Elementary occupations (ref.)	Managers	1,05	2,86	0,00
	Professionals	1,66	5,24	0,00
	Technicians and associate professionals	1,11	3,04	0,00
	Clerical support workers	0,85	2,34	0,00
	Services and sales workers	0,69	1,99	0,00
	Skilled agricultural, forestry and fishery workers	0,91	2,48	0,00
	Craft and related trades workers	0,39	1,48	0,01
	Plant and machine operators and assemblers	0,43	1,54	0,01
• Age				
Over 50 (ref.)	Under 50	0,11	1,12	0,11
	Intercept	-1,35	0,26	0,00

Source: own elaboration on AES data.

To deepen the role of informal learning, it was fitted a second logistic regression model and it has used "Informal" as the dependent variable (Training = 1 if the worker has only participated in informal learning activity) using the same covariates of the previous model (table 2).

Findings are definitely interesting: first of all the age gap is lower because the odds of participating only in informal training activity for under 50 workers over the odds of participating in informal training activity for over 50 workers (reference category) is exp(0,11) = 1,12 (in the previous model was 1,22). Secondly, there is a gender gap (OR=0,86) because the female disadvantage is 14% (p value of first model gender variable was not significant because $p>0.05$) probably due to a lesser availability of free time that women workers have compared to fellow men.

4. Conclusions

Access to learning activities is essential when working life is extended. However, despite the increasing need for learning later in life, participation and access to learning decrease with age. Valuing experience is a key factor for ensuring inter-generational knowledge transfer and identifying tasks where older workers are productive.

There is a strong correlation between learning participation and the employment status of individuals, and education level too. Furthermore, access to learning increases with size company because among the Italian SMEs lifelong learning strategies are quite rare.

One principal finding of such an analysis is that people under 50 have a probability 22% higher (OR=1,22) of participating in training when compared to those aged 50 and more (table 1). Secondly, women are less likely to take part in informal training than men[15].

In addition to the age gap, overall the data confirm the existence of strong inequalities in access to job-related learning among workers that emerged from a Inapp survey[16]: foreing individuals, in micro and small enterprises and in occupations with lower skills, participate in job-related learning to a much lower extent (Cardone 2017). It would be better to reduce the age gap by increasing participation and access rates, rather than increasing the volume of training offered ("non learners"). In addition, the second logistic model shows how informal learning is crucial: a validation of non-formal and informal learning (VNFIL) can play an important role in future (European Commission 2016). Well-functioning labour markets rely on a match between the skills and formal qualifications of the workers and those that the jobs require and employers look for, but there is often a significant shortage of information on actual skill needs and skill supply in different occupations (European Commission 2010).

This requires policy attention, to increase the focus on job-related training as part of active labour market policies, to prevent skills' obsolescence. In addition, it

[15] Preliminary findings were presented at the Conference of the Italian Statistical Society "*SIS 2017 - Statistics and Data Science: new challenges, new generations*" held in Florence (29/06/2017) and during 61st World Statistics Congress of the International Statistical Institute (WSC 2017, 21/07/2017).
For more details: http://meetings3.sis-statistica.org/index.php/sis2017/sis2017 & http://isi2017.org

[16] The aim of the quantitative research "*Indagine campionaria presso gli attori del sistema produttivo sulla gestione della forza di lavoro matura*" was to study the relationship among the enterprises development strategies and the solutions adopted for the maintenance, the professional promotion and the possible reintegration of ageing workers, according to the recent pension reforms too.
For more details: http://www.isfol.it/Istituto/chi-siamo/dipartimento-mercato-del-lavoro-e-politiche-sociali/struttura-lavoro-e-professioni/invecchiamento-della-forza-lavoro.

is important develop a "learning culture". It is a key factor for increasing the productivity of older workers increasing e.g. the capacity to deal with technological change ("it is never too late to learn").

However, it will be crucial to increase the level of continuous vocational training for all workers in future.

This is (or should be) the real challenge.

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Paolo Emilio CARDONE, INAPP, p.cardone@inapp.org

METHODS AND MODELS TO EVALUATE TERRITORIAL INEQUALITIES IN WELL-BEING. WORK IN PROGRESS OF A THEMATIC RESEARCH PROJECT[1]

Barbara Baldazzi, Manuela Bartoloni, Monica Carbonara, Assunta L. Carulli, Paola Conigliaro, Roberto Costa, Lorenzo Di Biagio, Annalisa Pallotti, Miria Savioli, Stefania Taralli, Alessandra Tinto

1. The project's aims and goals

Istat provides a broad set of statistical indicators for measuring equitable and sustainable well-being at regional and sub-regional level (the Bes indicators). The equitable distribution of well-being is a very important aspect to study in itself, and also to meet the information needs of national and local policy makers.

At the local level several aspects mutually interact in determining well-being levels or in defining different profiles of well-being. Therefore, to assess territorial inequalities in well-being it is useful to consider at the same time the differences in well-being levels globally and the different role played by each well-being indicator, in order to identify the main foundations of inequalities and to summarize the information correctly.

Most methods of multidimensional analysis neglect these issues, looking only at the average of the distribution that is likely to be too reductive and potentially misleading. Therefore, when studying Bes at local level the trade-off between the need for synthesis and the sensitivity to differences needs to be overcome.

Based on these considerations, Istat has started, in its three-year plan for thematic research 2018-2020, a study on methods and models to outline the territorial profiles of inequalities in well-being. Two methods will be compared: Partial Least Square Path Modeling (PLS-PM), a cardinal approach that can be applied in a hierarchical modeling context (Lohmoller, 1989), and an ordinal one: the Partially Ordered Sets (PoSet). Both methods are consistent with the Bes framework because they allow data to be modeled in a formative way and do not require ex ante assumptions about the indicators weights or interrelations.

The paper describes the data used, the main foundations of PoSet, and the first steps of the analysis, focusing on the preliminary study aimed at identifying the most

[1] Disclaimer: Istat promotes the development of experimental, cross-sectorial, thematic research projects. This work presents the first advances of one of these projects and is the result of the scientific collaboration among the authors. Istat is not responsible for the contents.

suitable data transformation method and the minimum number of optimal classes to be used for measuring PoSet models at local level.

In fact, the preliminary transformation of data is not a trivial operation, when dealing with very different distributions, according to variability and shape (and sometimes number of cases). In a context of ordinal analysis, defining the sorting criteria, the method used to group cases, the minimum number of optimal classes for each distribution, evaluating and managing possible order reversal effects, are all fundamental steps in order to obtain undistorted results.

2. Bes indicators at local level

Since 2010, Istat set up the Bes project with the aim to propose a multidimensional framework to measure the progress of the Country and its evolution. In 2016 Istat also started the project "Bes measures at local level" to settle and regularly update a set of sub-regional indicators consistent with the Bes framework and useful for the local information and decision-making needs. The first edition was issued in June 2018.

The Bes framework consists of 130 indicators organized into 12 domains (ISTAT, 2017). The 96% of the indicators are available by geographic area (Nuts1) and approximately 95% by region (Nuts2), 44% by region and gender. The 12 Bes domains include outcome domains, that have a direct impact on human and environmental well-being (Health, Education and Training, Work and life balance, Economic well-being, Social relationships, Safety, Subjective well-being, Environment and Landscape and cultural heritage) and contextual domains, measuring the functional elements to improve well-being of the population (Politics and Institutions, Innovation, research and creativity and Quality of services). Time trend are measured mostly from 2004 onwards.

The 61 Bes measures at local level (ISTAT, 2018) are disaggregated at the NUTS3 level (provinces), broken down by gender whenever possible, and provided in time series consistently with the regional Bes indicators. The local indicators are divided into 11 domains, as subjective well-being is not measured, due to the lack of suitable data sources. Moreover proxy or additional measures are included.

The research project aims at assessing if it is possible and useful to apply a common model to regional and sub-regional Bes indicators. Therefore, in the first application, indicators which are common to the two datasets were selected (a total of 44, including proxy indicators), in order to measure two comparable PoSet and PLS-PM models at local level.

3. Partially ordered set methodology and well-being differences at local level: opportunities and constraints.

Within the Bes framework, we need synthesizing the overall level of well-being achieved by each territorial unit without neglecting their peculiarities, since the well-being multidimensionality generates incomparabilities (Qizilbash, 2006).

Although we know that some territories achieve better results in all domains, we experience cases where a region scores better according to one indicator and worse according to another. How should we consider the level of well-being in this region? Higher or lower than that of a region which gets a medium score in both indicators? The problem of comparability among different combinations of scores is better managed with the support of the partially ordered set (PoSet) methodology, which is an application of discrete mathematics. It is particularly useful dealing with ordinal variables referred to multidimensional indicators systems. A PoSet is a set X equipped with a partial order relation that is a binary relation satisfying the properties of *Reflexivity*, *Antisymmetry* and *Transitivity* (Fattore 2015).

Given k attributes of well-being v1, ..., vk, different well-being profiles ($p \in X$), result from the different combinations of ordinal scores on attributes. This set of profiles is the input space to evaluate the well-being differences at local level.

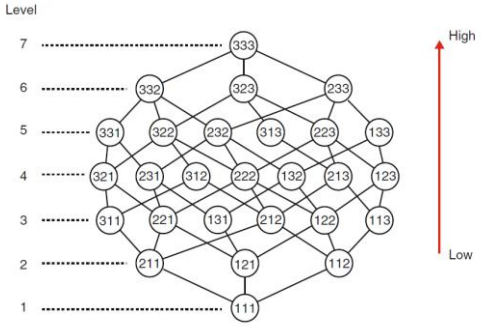
Applying Parsec, a package developed in R by Arcagni and Fattore (2014), it is possible to define all the potential profiles, (corresponding to the X set), and to identify the actual profiles recorded within the population observed. Actual or potential profiles can be (partially) ordered in a natural way, by the dominance criterion. A graphic representation of the relationships among profiles is the Hasse diagram. It is an oriented graph, which easily shows comparabilities and incomparabilities among profiles.

In the example shown in Figure 1, the 27 nodes are the potential profiles given by all the possible combinations of 3 ordinal variables with 3 modalities. The top node (3,3,3) gets the highest scores on all three variables. Conversely the bottom node (1,1,1) is the lower profile. The number of levels in the model depends on the scale of the distances from the two extreme nodes. In fact, all the profiles that are equally far from the top and the bottom nodes are put at the same level (co-level) of the Hasse diagram (denoted in the left hand side of the diagram): for example all the profiles at level 2 in Figure 1 score one point less than the top node and five points plus than the bottom, but each one scores worse or better on a different variable (note the different scores dispositions in the row).

The lines in the diagram connect the comparable profiles (i.e. the subset that satisfies the relation "<=") that form different chains, as they can be unambiguously sorted following the levels progression. We can also observe incomparable profiles,

that are not connected to each other (anti-chain), so they cannot be sorted unambiguously.

Figure 1 – *The Hasse diagram. A three variables-three modalities example.*



1 Visualization (Hasse diagram) of a tool for a 3 × 3 system (event space)

Source: Carlsen, L. and Bruggemann, R. (2017).

Starting from a definition of the comparabilities and incomparabilities (matrix of the incidences) of the profiles, the PoSet allows us to get a possible sorting of all the profiles and to measure the ordering uncertainty. In fact, the PoSet procedure determines the *probable* position of each profile with respect to other incomparable profiles. This transformation implies to define all the possible orderings, named linear extensions. As the number of variables and modalities increases, the number of potential profiles grows exponentially, and consequently the number of linear extensions becomes huge (Fattore and Arcagni, 2018). This makes the process very demanding for a normal computer.

Imposing a threshold to discriminate profiles in two opposing groups would simplify the sorting procedure, and could help to better qualify the ordering. However, in a context of official statistics, such a delicate operation must rely on solid theoretical foundations and on a broad agreement on what is the right distinction between the best and the worst cases, which the Bes framework does not currently provide. Therefore, in our case, the PoSet will be measured without defining a threshold, implicitly assuming that profiles established at the same co-level fall into a similar level of the synthesized Bes domain. Anyway, we need to transform each indicator into an ordinal variable without losing or distorting information and to manage the number of modalities (classes). It is worth highlighting that, given the number of indicators by domain, even if we choose a limited number of modalities, the number of theoretical profiles could significantly exceed the number of the actual observations (107 provinces - NUTS3; 22 regions - NUTS2).

4. Data transformation for PoSets. Methods and results

Regional and sub-regional Bes datasets contain numeric data. The first step for the PoSet is to switch to ordinal variables without distorting the information and choosing a classification of adequate sensitivity. The study is made by applying different classification methods to regional and sub-regional distributions of each common indicator in two Bes unrelated domains - Education and Environment - for the last year available in the datasets.

For the Education domain, the selected indicators are 8: (2.1) Participation in early childhood education; (2.2) People with at least upper secondary education level (25-64 years old); (2.3) People having completed tertiary education; (2.4) First-time entry rate to university by cohort of upper secondary graduates; (2.5) People not in education, employment, or training (Neet); (2.6) Participation in life-long learning; (2.7) Level of literacy (males and females); (2.8) Level of numeracy (males and females). For the Environment domain, the selected indicators are 7: (10.1) Water losses in urban supply system; (10.2) Landfill of waste on total collection; (10.3) Quality of urban air - PM10; (10.4) Quality of urban air - nitrogen dioxide; (10.5) Urban green; (10.6) Energy from renewable sources; (10.7) Separate collection of municipal waste.

There is a trade-off between the sensitivity of the classification and the synthesis of information. A high number of classes and indicators results in a larger number of combinations and levels which can then be not found in real distributions. Based on the efficiency of the classification and the features of the distributions, it will be assessed if the most appropriate number of classes to be considered in this study is 5 or less. The number of classes for the study was fixed to 3 or 5, in order to maintain a central class around the average of the distribution as a term of reference, and because with more than 5 classes PoSet computations could be unfeasible.

In general, given a group of n ordered observations to be divided into k classes and ensuring that the order is respected, there are $\binom{n-1}{k-1}$ possible classifications.

Indicators have positive or negative polarities with respect to Bes, so distributions were classified in a non-increasing sense if the indicator has negative polarity (the greater the value, the worse the well-being), in a non-decreasing sense otherwise, so that regions and provinces falling in the lowest class of each distribution are always those with "the worst" performance[2].

[2] *Missing data*: when data are not available for the 110 provinces, the classification is made on the real series, excluding missing cases. *Values equal to 0*: when the value 0 indicates a better situation than the others (significant information) the units with this value were enucleated from the rest of the distribution. The number of classes was consequently reduced but this lead to have groups of different sizes.

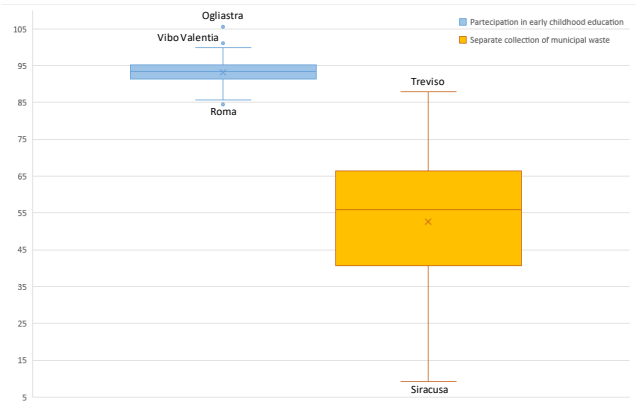
Four classification criteria were studied:

1. Quantiles: partition of the real distribution into *k* classes, ordered in an increasing sense, where each class groups an equal number of units. This classification does not depend on the actual values of the indicator, but just on its induced ordering on regions or provinces; so sometimes units with similar values fall into different classes.
2. Equally-spaced intervals: intervals of equal range of values calculated starting from the range (difference between minimum and maximum of a distribution). The lower and upper bounds of each class are fixed at the same distance but groups can have different sizes, units with similar values can fall into different classes and the number of non-empty classes might be different from the desired one.
3. Standard deviation classification: class breaks are fixed symmetrically around the central value and their range is a proportion of the standard deviation. In the first investigation, based on 3 class breaks, the values identifying the central class are fixed between the average national value and $\pm \sigma$, the upper and lower classes include values greater or lower than those falling in the central range. As a result, such classes are not equally sized and units with similar values fall into different classes. Moreover in the 5 breaks classification (average national value and $\pm 2\sigma$ to identify the extreme groups) sometimes the number of classes is not the desired one, mainly due to the high variability, dispersion and skewness of distributions.
4. Natural breaks: classes are determined by a natural clustering method designed to aggregate similar values, maximizing the variance between groups and minimizing the variance within groups (Jenks, 1977). In particular class breaks are chosen in order to minimize the sum of the squared deviations from the class means, thus classes might have very different ranges and/or sizes but they usually show a low internal variability. Our computations are made in R and based on the function classIntervals (with the option style="jenks") from the package classInt (Bivand at al., 2019).

The classification methods performances were compared by standard summary statistics and assessed by the sum of squared deviations from class means (SDCM) and by the *Goodness of Variance Fit* (GVF). GVF summarizes the total variability that could be explained by the classification as the percentage of the variance between groups out of the total variance; it was used also to evaluate if the number of classes is sufficient in order to grasp the variability of the indicators among regions or provinces.

Results for the indicators Participation in early childhood education[3] (2.1) and Separate collection of municipal waste[4] (10.7) are discussed here with reference to provinces and to 5 groups classification, as an exemplification of the work carried out.

Figure 2 – *Distribution of provinces for Participation in early childhood education (2.1) and Separate collection of municipal waste (10.7), Year 2016.*



Source: Ministry of Education and Ispra.

The indicator 2.1 ranges from a minimum of 84.5% (Rome province) to a maximum of 105.5% (Ogliastra province) (Figure 2); the distribution is concentrated around the average (average value 93.2%, standard deviation of 3.3), with few provinces dispersed on the lower end (Rome, Rimini, Olbia, Parma) and an upper outlier. The distribution of the indicator 10.7 is more dispersed around the average (52.6%) with a standard deviation of 18.2. The values range from about 10% in the Sicilian provinces of Siracusa and Palermo, and about 86% in the provinces of Mantova and Treviso.

Table 1 shows the summary statistics and the assessment indexes of the groupings obtained.

For both the indicators, the first and last classes defined by quantiles and natural breaks are more heterogeneous and the central class has greater homogeneity. This is not the case when considering the equally-spaced intervals and the standard deviation classification. Moreover, unlike all the other methods, the mean value of the central class produced by natural breaks is always close to the global average.

[3] Percentage of children aged 4-5 years participating in pre-primary education on total children aged 4-5 years.
[4] Percentage of municipal waste collected separately on the total collection of municipal waste.

The analysis of the 5-class histograms calculated on the distribution of the indicator 2.1 with the four methods considered returns different images (Figure 3).

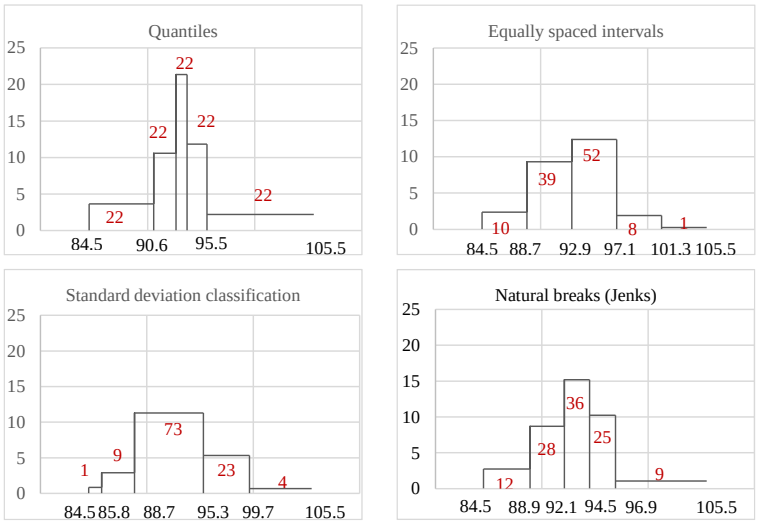
The method of equally-spaced intervals produces a very large central group (52 provinces) and a fifth group with a single province. Conversely, the standard deviation classification puts only one province in the first group and returns a central group with even more provinces (73). The same analysis of the groupings concerning the indicator on separate waste collection (10.7) also shows that when using the quantile or the natural breaks methods the first and the last classes are the least homogeneous ones.

Table 1 – *Comparing methods: summary statistics and assessment indexes for Participation in early childhood education and Separate collection of municipal waste (5 groups classification), Year 2016.*

Classification criteria	Class	2.1 - Participation in early childhood education					10.7 - Separate collection of municipal waste				
		N.	Mean	Standard deviation	SDCM*	GVF**	N.	Mean	Standard deviation	SDCM*	GVF**
Quantiles	1	22	88.5	1.8	196.7	83.6	22	23.9	8.9	2761.9	92.3
	2	22	91.7	0.5			22	44.2	3.9		
	3	22	93.3	0.3			22	56.0	2.7		
	4	22	94.6	0.6			22	64.5	2.2		
	5	22	97.6	2.3			22	74.1	5.6		
Equally-spaced intervals	1	10	86.9	1.2	143.0	88.1	12	17.7	5.4	2641.1	92.7
	2	39	91.3	1.1			17	35.0	5.4		
	3	52	94.6	1.2			27	49.6	4.7		
	4	8	99.0	1.1			44	64.7	4.6		
	5	1	105.5	0.0			10	78.7	5.1		
Standard deviation classification	1	1	84.5	0.0	235.8	80.3	4	11.3	1.9	7930.4	78.0
	2	9	87.2	1.0			16	25.3	5.5		
	3	73	92.5	1.6			74	55.6	9.7		
	4	23	96.5	1.0			16	75.9	5.4		
	5	4	101.5	2.4			0	-	-		
Natural breaks (Jenks)	1	12	87.2	1.4	106.6	91.1	17	20.6	6.7	2051.8	94.3
	2	28	91.0	0.8			20	40.3	3.8		
	3	36	93.4	0.5			29	54.3	3.9		
	4	25	95.7	0.7			35	66.7	3.5		
	5	9	99.7	2.4			9	79.4	5.2		

(*) Sum of Squared Deviations from Class Means (SDCM); (**)Goodness of Variance Fit (%).

Figure 3 – *Comparing methods: histograms for Participation in early childhood education (2.1), Year 2016.*



The standard deviation classification puts no province in the last class and returns a very wide central group (74 provinces).

The method of natural breaks (Jenks) seems to be the one returning the most appropriate partition in groups: no group is very large (the central class contains 36 provinces for indicator 2.1 and 29 provinces for indicator 10.7), no group is composed of a single province (the fifth class groups 9 provinces in both cases); the sum of the squares of deviations from the mean is lower comparing to the other methods (indicator 2.1: 106.6; indicator 10.7: 2051.8) and the percentage of the explained variance (GVF) is higher (indicator 2.1: 91.1% ; indicator 10.7: 94,3% - see Table 1). In general, for any distribution and number of classes, natural breaks provide a better GVF, even with respect of the more popular quantile classification. Besides, using GVF we can see that at the provincial level three natural classes usually suffice in order to reach a GVF greater than 80%. For the two domains under analysis (Education and Environment) only for the indicator 2.1 we need at least four classes to reach the fixed GVF threshold. For some of the environmental indicators (10.3, 10.4) two classes could be enough (GVF of 89,9% and 85,4%). Four classes explains more than the 90% of the variability in all the cases under analysis, except for indicators 2.1 and 10.1, where we need five classes. If we stick to regions, three classes always explain more than the 80% of the variability, to reach at least 90% we need four classes for some of the indicators (2.1,2.4,2.6,2.8,10.1,10.2,10.6,10.7).

The best method of assignment is the one which best discriminates against favourable and unfavourable situations, i.e., assigns the unfavourable provinces to classes 1 and 2 and the most favourable ones to classes 4 and 5. Methods based on standard deviation and on equally-spaced intervals often place less favourable or most favourable provinces in the central group. The most consistent results are produced by natural breaks. Also the number of units in the groups is more balanced compared to the other classification criteria applied.

5. Final remarks

When dealing with complex data systems such as well-being frameworks, it is not a trivial task to establish order relationships or rankings (a region/province is better or worse than another is). The partial order theory provides a robust method to treat ordered data referred to multidimensional phenomena, as the Bes.

In particular, the analysis based on PoSet aims at identifying groups of regions or provinces that share similar well-being profiles and territories that have specific profiles, to qualify and quantify groups of similar/dissimilar units, rather than determining a complete ordering of territories based on a single score.

The first step for the PoSet is to transform indicators into ordinal variables, and the preliminary study, which is described in this paper, concentrated on the identification of the optimal data transformation method, by comparing four different options: quantiles, equally-spaced intervals, standard deviation classification and the so called "natural breaks". We also assessed the minimum number of classes to obtain in order to efficiently summarize the information.

Results show that the most consistent results are produced by natural breaks even in presence of outliers and asymmetry. The number of groups to be obtained (set in the example at 5) in most cases can be reduced to 3 to avoid a very sharp differentiation of the profiles which will then emerge from the design of the PoSets still preserving much of the information. For some indicators, a reduction in a greater number of classes could be an improved solution in order to increase the sensitivity of the model in terms of explained variance. A PoSet experimentation based on the same number of classes for all the indicators compared to a PoSet based on different numbers of modalities, chosen, according to each indicator features, to maximize the variance explained, will allow us to assess the best choice in terms of information loss (or gain) and to study in more detail possible order reversal effects or border situations.

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SUMMARY

Methods and models to evaluate territorial inequalities in well-being. Work in progress of a thematic research project.

Istat provides a broad set of statistical indicators for measuring equitable and sustainable well-being at regional and sub-regional level (the Bes indicators). The equitable distribution of well-being is a very important aspect to study in itself, and Istat started, in its three-year plan for thematic research 2018-2020, a research project on methods and models to outline the territorial profiles of inequalities in well-being. Two methods will be compared: Partial Least Square Path Modeling (PLS-PM) and Partially Ordered Sets (PoSet).

In particular, the analysis based on PoSet aims at identifying groups of regions or provinces that share similar well-being profiles, to qualify and quantify groups of similar/dissimilar units.

The first step for the PoSet is to transform indicators into ordinal variables, and the first part of this research project, described in the paper, concentrated on the identification of the optimal data transformation method and the minimum number of optimal classes by comparing four different options: quantiles, equally-spaced intervals, standard deviation classification and the so called "natural breaks". All the regional and sub-regional indicators of Education and Environment for the last year available where processed.

The most consistent results are produced by natural breaks, which partitions the units to form the most homogeneous groups, and the ideal number of groups to be obtained can be set at 3 in most cases.

Barbara BALDAZZI, Istat, baldazzi@istat.it
Manuela BARTOLONI, Istat, mabartol@istat.it
Monica CARBONARA, Istat, mocarbon@istat.it
Assunta L. CARULLI, Istat, carulli@istat.it
Paola CONIGLIARO, Istat, coniglia@istat.it
Roberto COSTA, Istat, rocosta@istat.it
Lorenzo DI BIAGIO, Istat, lorenzo.dibiagio@istat.it
Annalisa PALLOTTI, Istat, palotti@istat.it
Miria SAVIOLI, Istat, savioli@istat.it
Stefania TARALLI, Istat, taralli@istat.it
Alessandra TINTO, Istat, tinto@istat.it

INIZIATIVE TERRITORIALI VOLTE AL MIGLIORAMENTO DEL BENESSERE ORGANIZZATIVO[1]

Patrizia Grossi, Fabrizio Monteleone

1. Benessere organizzativo e campo di applicazione

Il concetto di benessere organizzativo è assai ampio, già nel 1948 l'Organizzazione Mondiale della Sanità (OMS) aveva definito la salute come "lo stato di completo benessere fisico, mentale e sociale, non consistente solo in un'assenza di malattia o d'infermità".

Produrre benessere organizzativo significa, per una organizzazione, "promuovere e mantenere il più alto grado di benessere fisico, psicologico e sociale in ciascun lavoratore in ogni tipo di occupazione"[2].

La centralità dell'individuo è indispensabile per sostenere le motivazioni del personale e sviluppare consenso verso i valori e le strategie dell'organizzazione, aprendo la strada a processi che trovano campo di applicazione in iniziative che percorrono direttrici molto differenti:

- valorizzazione del ruolo dell'organizzazione e utilità sociale del lavoro;
- senso di appartenenza e clima organizzativo;
- condivisione e circolazione delle informazioni;
- valorizzazione e sviluppo del personale, anche nella logica dell'invecchiamento attivo;
- conciliazione vita/lavoro;
- pari opportunità (di genere, età, convinzioni).

Il manifestarsi di condizioni di scarso benessere organizzativo determina sul piano concreto fenomeni quali la diminuzione della produttività, assenteismo, bassi livelli di motivazione, ridotta disponibilità al lavoro, stress, carenza di fiducia, mancanza di impegno, aumento di reclami e lamentele. Questi ed altri indicatori di malessere non sono altro che il riflesso dello stato di disagio e disturbi psicologici di chi lavora.

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[1] Fabrizio Monteleone ha scritto il paragrafo 1 e il paragrafo 2. Patrizia Grossi ha scritto il paragrafo 3, 4, 5 e il paragrafo 6. Tuttavia, il presente documento è il risultato di un lavoro congiunto.

[2] Avallone e Bonaretti, *Benessere organizzativo. Per migliorare la qualità del lavoro nelle amministrazioni pubbliche*, 2003

La riduzione della qualità della vita lavorativa in generale e del senso individuale di benessere rende, pertanto, onerosa la convivenza e lo sviluppo dell'organizzazione.

Il modello ideale della relazione lavoratori-organizzazione vede i lavoratori come soggetti che possono ampiamente contribuire al successo della loro organizzazione, a patto che si creino le condizioni per la loro sicurezza, per il soddisfacimento dei bisogni e del riconoscimento, per la considerazione delle esigenze di apprendimento, informazione e giustizia.

Lo Sviluppo di una specifica politica di responsabilità sociale (CSR, dall'inglese *Corporate Social Responsibility*) inizia con la trasparenza e con la disponibilità a raccontare i valori che sono assunti a guida della propria gestione e prosegue con la disponibilità a misurare, in chiave sociale, la ricaduta sulla gestione economica. La responsabilità sociale si colloca, dunque, lungo la linea che va dal codice etico dell'ente alla rendicontazione sociale, ponendo la giusta attenzione ai bisogni prioritari dei lavoratori.

2. La legislazione

Il mutato quadro normativo di riferimento per effetto della legge n. 124 del 7 agosto 2015 recante "Deleghe al Governo in materia di organizzazione delle amministrazioni pubbliche" ha favorito e promosso il benessere organizzativo e la conciliazione dei tempi di vita e di lavoro.

In particolare, l'articolo 14 della legge 124 del 2015 prevede che le Pubbliche Amministrazioni adottino misure organizzative per l'attuazione del telelavoro e di nuove modalità spazio temporali di svolgimento della prestazione lavorativa, anche al fine di tutelare le cure parentali. Almeno il 10% dei dipendenti pubblici che ne abbiano fatto richiesta, avrebbero dovuto godere di queste misure, con la garanzia altresì di non subire penalizzazioni ai fini del riconoscimento della professionalità e della progressione di carriera.

Le finalità sottese alla legge sono quelle dell'introduzione, di nuove modalità di organizzazione del lavoro basate sull'utilizzo della flessibilità lavorativa, sulla valutazione per obiettivi e la rilevazione dei bisogni del personale, in tale senso assumono rilievo l'attuazione di politiche in merito alla:

- valorizzazione delle risorse umane;
- riprogettazione dello spazio di lavoro;
- promozione e più ampia diffusione dell'utilizzo delle tecnologie digitali;
- agevolazione della conciliazione dei tempi di vita e di lavoro.

Anche la Direttiva Funzione Pubblica n. 3 del 2017 in materia di lavoro agile emanata ai sensi della legge 124/2015, ha fornito indirizzi per l'attuazione della normativa attraverso una fase di sperimentazione. Le linee guida, contengono indicazioni inerenti l'organizzazione del lavoro e la gestione del personale per promuovere la conciliazione dei tempi di vita e di lavoro dei dipendenti, favorire il benessere organizzativo e assicurare l'esercizio dei diritti di lavoratrici e lavoratori.

A differenza delle realtà della PA per il settore privato il ritorno in termini di produttività è dato non solo dalla realizzazione di interventi "sociali" all'interno dell'azienda ma anche da un ritorno in termini di vantaggi fiscali, non soltanto per l'azienda. Oltre ai vantaggi comprovati in termini di produttività e motivazione dei collaboratori, è opportuno sottolineare che i benefici erogabili ai dipendenti possono essere inquadrati nel rinnovato contesto del welfare aziendale. Negli ultimi anni infatti, il Legislatore italiano ha reso sempre più conveniente a livello fiscale l'erogazione di benefit ai dipendenti da parte delle aziende.

In particolare, con la Legge di Stabilità 2016-2017 sono state introdotte alcune novità nel settore Privato dove i piani di welfare aziendali hanno l'obiettivo di identificare le agevolazioni fiscali derivanti dall'erogazione di determinati benefit, con vantaggi a livello di benessere lavorativo e di costi ottimizzati per l'azienda, infatti il ventaglio di interventi/servizi promovibili attraverso un piano welfare è stato ampliato (art. 51):

- nel pacchetto welfare sono stati inseriti nuovi servizi come baby-sitting, mensa scolastica, assistenza agli anziani e ai non autosufficienti;
- è stata introdotta la possibilità di poter convertire tutto, o in parte, il premio di produzione in welfare aziendale (per premi inferiori a €3.000 su RAL inferiore a €80.000 - accordi di II livello);
- è supportato lo sviluppo di strumenti, come i voucher, che facilitino la fruizione dei servizi.

A partire dal 1° giugno 2017, inoltre, sono diversi i Contratti Collettivi Nazionali del Lavoro, come ad esempio quello dei metalmeccanici e successivamente anche Orafi e Telecomunicazioni, che prevedono l'obbligatorietà per le aziende di erogare ai propri dipendenti strumenti di welfare (tra cui anche buoni shopping e spesa) per un valore differente per CCNL. Ad esempio per i metalmeccanici sono previsti 150€ nel 2018 e di 200€ nel 2019.

Perseguire la qualità della vita all'interno della propria organizzazione significa adottare una logica win-win per tutti gli attori coinvolti.

L'ente gode, infatti, dei benefici portati da livelli di motivazione e collaborazione più elevati all'interno dell'organizzazione; ottiene maggiore produttività senza un aumento delle risorse coinvolte, con vantaggi competitivi sul proprio mercato di riferimento; ricava un risparmio fiscale notevole su tutti i benefici erogati ai collaboratori, in particolar modo con l'attivazione di programmi di Welfare in azienda diminuisce i tassi di turn-over dei collaboratori legati a scarsa motivazione o ambienti di lavoro critici e riduce i tassi di assenteismo (anche questo si traduce in un indubbio vantaggio economico).

Per i dipendenti, invece, i vantaggi sono di sentirsi più motivati negli sforzi quotidiani per raggiungere gli obiettivi aziendali, percepire riconoscimenti concreti a fronte di comportamenti lavorativi positivi e proattivi, lavorando in un clima organizzativo più collaborativo, che abbassa il livello di stress, ottenendo vantaggi dalla valenza economica diretta o indiretta e godendo di una maggiore qualità della vita, anche al di fuori degli spazi lavorativi.

Nel settore della PA le esperienze dimostrano che in carenza di risorse finanziarie da dedicare a progetti di benessere organizzativo le azioni sono state indirizzate soprattutto verso iniziative volte a conciliare i tempi di vita e di lavoro.

Del resto lo stesso CCNL 2016-2018 del Comparto Conoscenza ha previsto il Welfare Integrativo non destinandovi però risorse aggiuntive.

Tra le iniziative vengono previste:

- sostegno al reddito della famiglia (sussidi e rimborsi);
- supporto all'istruzione e promozione del merito dei figli;
- contributi a favore di attività culturali, ricreative e con finalità sociale;
- prestiti a favore di dipendenti in difficoltà ad accedere ai canali ordinari del credito bancario o che si trovino nella necessità di affrontare spese non differibili;
- polizze sanitarie integrative delle prestazioni erogate dal servizio sanitario nazionale.

3. Analisi delle iniziative realizzate nel contesto europeo

Secondo il modello europeo, l'ambiente sociale e fisico di un luogo di lavoro è riconosciuto, come principale determinante della salute di una popolazione E rappresenta il contesto privilegiato in cui realizzare promozione della salute. Gli studi epidemiologici hanno ormai confermato che con uno stile di vita salutare è possibile prevenire molte patologie croniche quali cardiopatie, diabete di tipo 2 e cancro, responsabili tutt'oggi del 70% delle malattie della popolazione professionalmente attiva.

La ricognizione sul benessere organizzativo nei paesi europei ha messo in luce una forte eterogeneità sia in termini di documentazione disponibile sia, soprattutto, in termini di cultura del benessere organizzativo.

Il tema del benessere organizzativo è diventato oggetto di interesse e di studio in tutta Europa. Eurofound, un organismo dell'Unione europea istituito nel 1975 per contribuire alla pianificazione e all'instaurazione di migliori condizioni di vita e di lavoro, svolge le sue attività in partenariato con governi, datori di lavoro, sindacati e istituzioni dell'Unione europea.

L'obiettivo strategico di Eurofond è fornire conoscenze tempestive e politicamente pertinenti di elevata qualità, che forniscano un reale contributo per politiche meglio informate in quattro settori di interesse prioritario:

1. aumento della partecipazione al mercato del lavoro e lotta alla disoccupazione tramite la creazione di posti di lavoro, il miglioramento del funzionamento del mercato del lavoro e la promozione dell'integrazione,
2. miglioramento delle condizioni di lavoro e sostenibilità del lavoro nel corso della vita,
3. sviluppo di relazioni industriali per garantire soluzioni eque e produttive in un contesto politico in continuo mutamento,
4. miglioramento delle condizioni di vita e promozione della coesione sociale a fronte delle disparità economiche e delle disuguaglianze sociali.

La ricognizione condotta sui diversi istituti nazionali di statistica ha evidenziato che anche nei paesi in cui è più forte la cultura sul benessere organizzativo, sull'attenzione all'individuo e al suo diritto di trovare un equilibrio tra lavoro e vita privata, la diffusione dei risultati risulta ancora piuttosto carente, forse perché certi concetti sono ormai pienamente acquisiti o piuttosto non ancora maturi. Sui siti degli istituti di statistica sono pochi e generici, quando addirittura assenti, i riferimenti al benessere organizzativo in una qualsiasi delle sue realizzazioni. Presumibilmente la documentazione è presente nei siti interni, piuttosto che in quelli pubblici e in molti casi si rileva la presenza di documentazione esclusivamente in lingua originale e non in inglese.

Si distinguono, in tale rassegna, per la maggior accessibilità e chiarezza del materiale presentato, gli Stati Uniti, la Norvegia, il Regno Unito, l'Olanda, la Danimarca e Turchia, dove è stato possibile trovare informazioni chiare sulle iniziative finalizzate ad accrescere il benessere organizzativo direttamente sul sito o nei documenti di programmazione. In altri paesi sono presenti riferimenti alle politiche del personale sui documenti di programmazione, ma non vengono evidenziate in modo chiaro le azioni realizzate o da realizzare.

Emerge, dunque, che in alcuni paesi le azioni sono maggiormente rivolte alla creazione del senso di appartenenza e alla formazione tecnica e linguistica dei dipendenti, mentre in altri le azioni sono maggiormente legate alla conciliazione dei tempi di vita e lavoro e all'ambiente lavorativo in senso fisico.

4. Analisi delle iniziative realizzate nel contesto italiano

In Italia la legislazione favorisce e promuove politiche di benessere organizzativo basandosi sul principio che migliorando il benessere e la salute dei lavoratori si contribuisca ad incrementare la Responsabilità Sociale e si ottengano effetti[3] quali:

a) la riduzione dell'assenteismo;
b) l'aumento della motivazione;
c) l'incremento della produttività;
d) la facilitazione delle assunzioni;
e) la riduzione del ricambio di personale;
f) la promozione di un'immagine positiva e attenta ai bisogni del personale.

Puntare sulla promozione del benessere psicofisico sul lavoro determina la differenza fra un ente "sano" e un ente "malsano"[4]. Un ente si può definire "sano" se si è consapevoli che la sua maggiore ricchezza è costituita dalle "persone.

Per contro si può considerare "malsano" l'ente che ignora la connessione esistente fra salute (nella complessa totalità dei suoi aspetti) e produttività. Spesso, a causa di tale inconsapevolezza, si contribuisce a creare e a mantenere livelli elevati di stress e malattie nei dipendenti. L'inevitabile conseguenza che questo comportamento produce si manifesta nella bassa funzionalità della struttura organizzativa e nella conseguente riduzione della capacità produttiva.

L'organizzazione attenta al benessere psico-fisico dei propri lavoratori non solo guadagna in visibilità e immagine sociale, ma ne ottiene anche vantaggi economici. Numerose sono le analisi costi/benefici che indagano quest'area.

Nella ricognizione effettuata nel contesto italiano, è emerso che la quasi totalità delle amministrazioni considerate ha dato attuazione alla direttiva della Funzione Pubblica predisponendo una sezione dedicata al benessere organizzativo all'interno del loro sito ufficiale.

[3] www.who.int/occupational_health/topics/workplace/en/index1.html

4 Health Promotion in the Workplace by Michael P. O'Donnell and Thomas Ainsworth N.Y.: John Wiley and Sons, 1984

Alcune amministrazioni hanno somministrato un questionario per rilevare la soddisfazione dei propri dipendenti e successivamente redatto una relazione descrittiva dei risultati.

Altre amministrazioni (come per esempio l'Autorità nazionale anticorruzione, l'Antitrust, il Garante per la protezione dei dati personali) con un atto di regolamentazione interna, hanno stabilito di pubblicare i dati sulla produttività e sulla performance.

Altre ancora hanno costituito il Comitato Unico di Garanzia (CUG) e adottato il Piano triennale delle azioni positive.

Particolarmente significative sono risultate alcune esperienze:

- Il *Comune di Milano* ha attivato:

a) *"Fiocchi in Comune":* progetto rivolto ai dipendenti nel periodo di gravidanza. Alle mamme e ai papà adottivi, prima del congedo o al rientro al lavoro dopo la maternità, viene fornita una "Guida alla maternità e alla paternità" con le indicazioni normative e, attraverso colloqui individuali o di gruppo, vengono trattate le tematiche relative ai cambiamenti legati al parto e alle esigenze di conciliare il ruolo di genitore e di lavoratore.

b) *"Bimbe e bimbi in Comune":* progetto a sostegno del personale con figli dai 6 agli 11 anni, realizzato mediante un servizio gratuito di attività ludico-creative in alcune giornate di chiusura delle scuole.

c) *"Benessere Psicofisico*": progetto volto alla promozione della conoscenza e della pratica delle discipline bio-naturali e olistiche attraverso la realizzazione di iniziative gratuite da svolgersi durante la pausa del pranzo o al termine dell'orario di lavoro.

d) *"Sorteggio di biglietti gratuiti per eventi sportivi e culturali*.

- Il *Comune di Genova* ha attivato:

a) *"Progetto Eco dipendenti"* proponendo l'attuazione di piccoli interventi manutentivi del verde pubblico, in aree e luoghi significativi da restituire al decoro, per squadre di dipendenti comunali con l'obiettivo di migliorare il benessere psicofisico e attivare azioni di team building anche tra dipendenti di settori e direzioni differenti, aumentando la conoscenza e il rispetto per il verde pubblico e un ritorno d'immagine per l'Ente e i propri dipendenti.

b) *"Banca del tempo dei dipendenti"* ovvero "libera associazione fra persone che si auto organizzano e si scambiano del tempo per aiutarsi soprattutto nelle piccole necessità quotidiane" scambiandosi attività, servizi e sapere, utilizzando il tempo e non il denaro come unità di misura delle prestazioni;

c) *"Conferenze e laboratori di partecipazione":* si sostanzia in una serie programmata di conferenze d'informazione e confronto all'interno delle aree e dei settori per garantire un processo informativo generalizzato, al fine di rendere tutti consapevoli delle strategie, dei programmi, del piano obiettivi, creando un proficuo confronto per raccogliere suggerimenti, spunti di innovazione e critiche costruttive all'attuale organizzazione della struttura e dei processi.

- La *Provincia di Roma* ha attivato:

a) Asilo nido aziendale *"Chicchilandia"* gestito da un soggetto terzo, che consente l'accoglienza finalizzata allo sviluppo psico-pedagogico dei bambini da 3 a 36 mesi di età in vista del passaggio alla scuola dell'infanzia ed è attivo dal 1° settembre al 31 luglio dell'anno successivo.

b) Stipula di convenzioni con Centri ricreativi estivi nell'ottica di favorire la conciliazione dei tempi della vita lavorativa con i tempi della vita familiare.

c) Centri ricreativi pasquali dedicati ai figli dei dipendenti nel periodo di chiusura delle scuole in occasione delle festività pasquali.

d) Organizzazione di rassegne cinematografiche e giornate evento in agriturismi dislocati sul territorio provinciale al fine di aumentare i livelli di performance dei dipendenti incrementando il senso di appartenenza all'Ente e le relazioni tra colleghi.

5. Strategia

Per monitorare i benefici delle azioni realizzate si suggerisce di seguire il la ruota di Deming (o ciclo di PDCA, acronimo dall'inglese Plan–Do–Check–Act, in italiano "Pianificare - Fare - Verificare - Agire"), metodo di gestione iterativo in quattro fasi utilizzato per il controllo e il miglioramento continuo dei processi e dei prodotti. La strategia parte dalla pianificazione delle attività rilevate attraverso la somministrazione di un questionario per la valutazione del clima, ovvero la relazione esistente tra la "persona" e il contesto lavorativo.

Le indagini sul clima organizzativo hanno visto riconoscersi nel tempo un livello di attenzione crescente, riuscendo ad affermarsi come un interessante supporto per comprendere le organizzazioni, non solo dal punto di vista strutturale, ma soprattutto dal punto di vista psicosociale.

L'interesse mostrato verso gli studi sul clima è cresciuto parallelamente alla necessità di innovare le organizzazioni, modernizzarle e renderle più efficienti: effettuare una diagnosi del clima permette all'Ente di raggiungere più facilmente i

suoi obiettivi ed ottenere risultati in termini di efficienza (prestazione/costi), oltre che in termini di armonia interna.

L'importanza del clima organizzativo sul luogo di lavoro e i sui riflessi sul benessere percepito dei lavoratori, è stato evidenziato dalla letteratura inerente gli studi di organizzazione.

Gran parte degli studi economici-sociali si concentra su come il benessere organizzativo abbia un impatto sul miglioramento della performance e della produttività, ma la necessità di valutare il benessere di un'organizzazione nasce dall'esigenza di comprendere se l'organizzazione stessa sta adempiendo in maniera efficiente ai suoi compiti di "servizio" verso la comunità esterna e verso i propri dipendenti, mantenendo un grado di benessere fisico e psicologico adeguato e alimentando costruttivamente la convivenza sociale.

La novità che si propone è quella di incrociare i dati risultanti dalla rilevazione sul clima con il metodo MOHQ proposto dal Programma Cantieri[5] con quelli derivanti dall'indagine di valutazione dello stress lavoro correlato, eseguita su un campione ragionato di dipendenti, secondo la metodologia per la "Valutazione e gestione del rischio da stress lavoro-correlato-INAIL"[6].

La relazione clima-benessere rappresenta un tema di grande interesse e sempre più spesso viene indicato come uno dei fattori esplicativi del livello di qualità raggiunto dall'Ente. Agevolare la soddisfazione lavorativa è un aspetto fondamentale nella gestione delle risorse umane in quanto facilita contribuisce ad innescare processi virtuosi di generazione di valore. Essa può essere considerata come un indicatore di appagamento e di apprezzamento che i lavoratori utilizzano per segnalare la qualità della loro integrazione nell'organizzazione.

La non soddisfazione, viceversa, è da tenere costantemente sotto controllo perché pregiudica l'ottenimento dei risultati sperati, diventa necessario quindi monitorarne le possibili cause e mettere in atto azioni migliorative di benessere organizzativo.

[5] *Amministrazioni alla ricerca del benessere organizzativo. Esperienze di analisi del clima organizzativo nella Amministrazioni pubbliche - Analisi e strumenti per l'innovazione. Le esperienze*. Dipartimento della Funzione Pubblica – Presidenza del Consiglio dei Ministri –2005

[6] La valutazione dei rischi per la salute e la sicurezza dei lavoratori e obbligatoria ai sensi dell'art 28 del D.lgs 81/08

6. Conclusioni

In una prospettiva di moderna gestione delle risorse umane e di effettiva tutela dei lavoratori è estremamente importante tenere in considerazione il livello di benessere interno all'organizzazione, mettendo al centro la "persona", ovvero uomini e donne che nell'ambiente quotidiano di lavoro ci vivono, alcuni serenamente, altri con entusiasmo, speranza e fiducia, altri ancora con un senso di delusione, frustrazione, sfiducia.

Di seguito vengono riportate alcune *best practices* replicabili e realizzabili che possono essere orientate secondo alcune direttrici:

- *azioni rivolte alla creazione di un senso di appartenenza:*
  1. creazione di una bacheca che metta in contatto i dipendenti che chiedono di trasferirsi da una struttura all'altra per favorire una migliore allocazione delle risorse e garantire la valorizzazione del personale;
  2. realizzazione di una biblioteca virtuale per la condivisione tra i dipendenti di libri, poesie, musica e film;
  3. creazione di un'area relax da utilizzare anche per la "meditazione" intesa come strumento per facilitare la concentrazione dei dipendenti;
  4. erogazione di supporto al pendolarismo tramite il coinvolgimento sia del mobility manager e la costruzione di un sistema di supporto al car pooling (attività peraltro incentivata economicamente dall'Agenzia della Mobilità).

- *azioni finalizzate alla sanità:*
  5. istituzione di uno spazio dedicato al medico competente, ai sensi dell'art. 25 del d.lgs. 81/2008, per le visite obbligatorie, ma anche per visite su richiesta del dipendente, in modo da evitare al personale di doversi recare in luoghi distanti dalla propria sede di lavoro e il relativo impatto sulla giornata lavorativa;
  6. organizzazione di campagne di sensibilizzazione su particolari patologie mediche, consistente in una serie di incontri/conferenze a tema, con cadenza periodica, tenute da esperti;
  7. organizzazione di campagne di prevenzione di particolari patologie, prevedendo la possibilità per i dipendenti di sottoporsi a esami clinici e/o visite mediche specialistiche gratuitamente o a costi ridotti;
  8. attivazione di sistemi di tutoring: gruppi di accoglienza per chi ritorna in ufficio dopo un lungo periodo di assenza;

- *azioni finalizzate alla conciliazione tempi di vita e di lavoro*

9. attivazione di convenzioni con strutture scolastiche situate in prossimità delle sedi di lavoro;
10. stipula di convenzioni con strutture pubbliche/private per i campi estivi dei figli dei dipendenti;
11. organizzazione di giornate in cui è possibile portare i figli in ufficio in particolari giorni dell'anno (scioperi delle scuole, ecc…);
12. attivazione di telelavoro e lavoro agile.

Come già enunciato il ruolo centrale nella vita dell'organizzazione è rivestito dalle "persone", ovvero lavoratori e lavoratrici che, in cambio del proprio tempo da dedicare al lavoro, della messa a disposizione delle proprie competenze e della disponibilità ad apprenderne delle nuove, richiedono una remunerazione periodica, percorsi di carriera, un ambiente sociale stimolante, stabilità d'impiego, sicurezza sul luogo di lavoro, possibilità di apprendere nuove competenze e formazione.

Attraverso gli studi di economia e management si è andata via via consolidando l'idea che lo sviluppo del capitale umano, la condivisione di valori e la coesione tra i lavoratori siano fattori di potenziale vantaggio competitivo. Da questo nuovo approccio metodologico scaturisce un'azione manageriale che dedica tempo e risorse alle attività e pratiche legate al benessere organizzativo (rimozione di barriere architettoniche, attenzione all'ambiente, alla tutela della sicurezza e della salute e altri interventi di conciliazione tempi di vita e di lavoro).

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SUMMARY

Territorial initiatives aimed at improving organizational well-being

Organizational Well-being influences the effectiveness, efficiency, productivity and development of an organization; concerns, therefore, the way in which people live the relationship with the business unit/company in which they work and for its implementation, complex organizations have to promote and maintain the highest degree of physical, psychological and social well-being in every worker in each type of employment.

The Work proposes the analysis of the concrete organizational Welfare actions carried out both nationally and internationally.

The study about these initiatives has shown strong differences: the interventions in the field of organizational Welfare, carried out in the international context considered, has shown the predominantly economic nature of the same, while the measures adopted by bodies and institutions at national level are of a purely social nature.

The paper is innovative because it describes how much organizational Welfare has developed and how many bodies have implemented and made public initiatives with the will to implement actions for the benefit of the "person". All this to identify best practices that can be replicated and implemented in several organizations.

Patrizia GROSSI, ISTAT, grossi@istat.it
Fabrizio MONTELEONE, ISTAT, famontel@istat.it

SPECULATIVE BUBBLES IN AGRICULTURAL COMMODITY PRICES: DETECTION AND FORECASTING VIA MARKET INDICATORS

Clio Ciaschini, Kateryna Tkach, Francesca Mariani, Maria Cristina Recchioni

1. Introduction

Following the period of economic expansion starting in the early 2000s in developing countries, i.e., Brazil, Russia, India, China, and South Africa (BRICS), commodity prices were characterized by sharp increases and high volatility, achieving their peak at the beginning of 2011. However, the global financial crisis has affected industrial production with consequences for economic growth and financial asset returns. Thus, investors have started to use commodities to hedge their positions against inflation risk because of their low correlation with traditional assets such as stock and bonds. Such behavior by investors has led researchers and scholars to believe that commodities constitute an independent asset class (Radetzki, 2006; Daskalaki, 2011). The emergence of commodities as an independent asset class has also been encouraged by events such as the Internet bubble in the late 2000s, the financial crisis in 2008, and the sovereign debt crisis, which have encouraged investors to diversify portfolios to also include safer and more profitable alternatives. The sharp increase in trading volume of commodity futures in the 2000s and the increased volatility of spot prices has led to the "Financialization of Commodities" phenomenon. This occurs every time the growth in trading activity is linked to an increase in commodity spot prices and volatility (Chari, 2017). In addition, fluctuations in the trend of commodity prices seem to contrast with the dominant vision that non-emotive agents impose market prices of capital equal to the present value of expected future cash flows.

This contrast has led to an extension of this mainstream view that accounts for two findings: i) investors act following the sentiment (Delong et al., 1990); and ii) dealing with sentiment-driven investors is costly and risky (Shleifer & Vishny, 1997). Market sentiment is intended as the expectation of future cash flows and investment risks not justified by objective facts (Baker & Wurgler, 2007). Thus, empirical researchers began to focus on measuring and quantifying a sentiment index. The literature presents two main approaches.

The first is a "bottom up" approach based on the psychology of the individual investor (overconfidence, representativeness, conservativeness) and is aimed at detecting the reaction of a single investor to past returns or fundamentals. Hong & Stein (2007) and Shefrin (2008) analyze investors' misevaluations of stock prices while considering the differences of opinion across investors combined with some sales constraints.

The second is the "top down" approach (Baker & Wurgler, 2007): the focus is the empirical effect of the sentiment, which has exogenous origins. This work highlights the possibility of measuring investors' sentiment and analyzing its effect on the individual firm and the stock market.

This work aims to develop an index of commodity prices inspired by the Bull and Bear Indicator by Bank of America Merrill Lynch (henceforth BofAML Bull and Bear Indicator). Roughly speaking, this indicator is basically the ratio of the share of individuals with bullish sentiment to the share of individuals with bearish sentiment. Values of this ratio larger than one indicate a market where bullish sentiment is dominant, while values smaller than one indicate the prevalence of a bearish sentiment.

The paper is organized as follows. Section 2 presents a short literature review of the pioneering switching model known as the Kirman's ants model (Kirman, 1993) on which the indicator we propose is based. Section 3 is devoted to the definition of our index and a rough comparison of its trend with that of the BofAML Bull and Bear Indicator. Section 4 provides some descriptive statistics of the data used in the empirical analysis. Section 5 shows the results of the empirical analysis. Section 6 illustrates the combined use of the indicator and a correlation analysis to detect the presence of speculative bubbles and to forecast their presence in advance. Section 7 contains some concluding remarks.

2. Herding behaviour

Kirman's seminal paper in 1993 shows the herding, epidemics, and polarization of agents in financial markets using a simple stochastic model of information transmission. This is suggested by macroscopic behaviors observed in entomological experiments in ant colonies when foraging for food.

In Kirman's stochastic model, an environment is considered in which there are two sources of food — black and white — and a colony of N ants feeding on one source or the other. The number of ants feeding at the black source, k, represents the state of the system, $k \in (0,1, \dots N)$.

The author explains this phenomenon by introducing an interaction mechanism, i.e., exchange of information by pheromones, combined with an autonomous switching probability given by the stochastic search. In fact, when exploring a given searching area, *S*, ants may act as independent units or may signal the presence of food in the vicinity by exchanging pheromones with a companion met at random. The transmitted signal is more like "follow me" rather than information concerning the exact spatial position where the food is located. Furthermore, this signal may be caught with probability b by the other ant.

The ant can also decide independently to change the color of the source of food, with a given probability. The probabilities of the two sources can differ as proposed in Alfarano et al. (2005).

The exchange of information between ants constitutes the recruitment based on the herding behavior since the ant, after being informed, decides not to use its private information while following its companion's "suggestion". The model limits random meeting to pair-wise, excluding multiple encounters, so the density of the ants in area *S* is low. A further hypothesis is that ants lack memory, that is, the outcome of previous meetings does not influence either the probability of following the companion or the success in recruiting companions.

The transition probabilities of a single switch are:

$$p_1 = P(n+1, t+\Delta t|n,t) = \left(1-\frac{n}{N}\right)\left(a_1 + b\frac{n}{N}\right)\Delta t, \tag{1}$$

$$p_2 = P(n-1, t+\Delta t|n,t) = \frac{n}{N}\left(a_2 + b\frac{N-n}{N}\right)\Delta t \tag{2}$$

while the probability of not switching is:

$$p_3 = 1 - p_1 - p_2\ . \tag{3}$$

As the strength of the herding component increases, the stationary probability distribution of the model switches from unimodal, which implies an equal exploitation of both sources, to a bi-modal probability distribution following the model hypothesis and experimental observations.

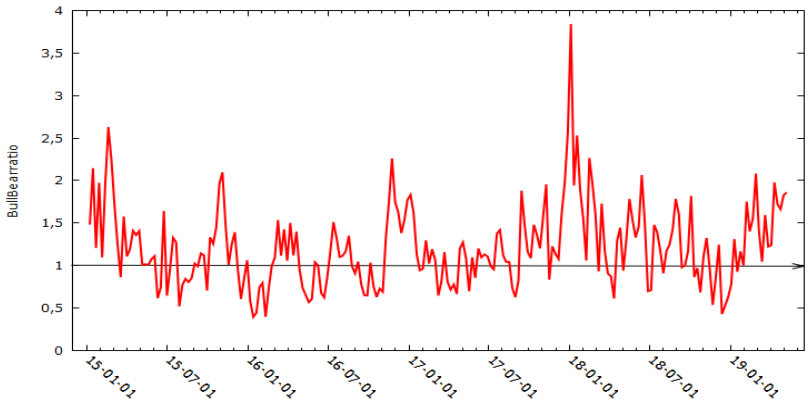
3. Implementation of the commodity sentiment index

Our aim is to implement an indicator to detect and forecast speculative bubbles inspired by sentiment indicators such as the BofAML Bull and Bear Indicator but based on more objective information than sentiment. In fact, the BofAML Bull and

Bear Indicator is based on market agents' opinion of market trends. Specifically, Investor Intelligence carries out a survey every week of over 100 top investment operators, questioning their sentiment regarding the market, (bullish, bearish or neutral). The BofAML Bull and Bear Indicator is, then, the ratio of bullish sentiment to bearish sentiment, but when the market is bullish, the indicator suggests behaving in a bearish way while the opposite is true when the market is bearish. For this reason, it is also called the "contrarian indicator."

Figure 1 shows the time series of the BofAML Bull and Bear Indicator from January 2015 to January 2019.

Figure 1 – *Trend of the Bull and Bear Index of Bank of America Merrill Lynch from January 2015 to January 2019.*



Our analysis aims to infer the sentiment of the agricultural commodity market from the co-movement of the prices of different commodities. This indicator is constructed by considering *N* commodities and their daily prices.

We use x^i_t to denote the logarithm of the price of the commodity *i* at time *t* and μ_t^i to denote its average, $i = 1,2,3, \dots N$, and $t > 0$.

We use as a proxy of the bullish sentiment the fraction of the commodities whose log-price is above its average. Specifically, for any time *t*, we use a time window of two-year back to compute the average price of each commodity. We then measure the bullish sentiment in the agricultural commodity market as the fraction, Z_t, of the commodities with observed log-price higher than the corresponding average. That is, we define Z_t as follows:

$$Z_t = \frac{1}{N}\sum_{i=1}^{N} \mathbf{1}\{x_t^i - \mu_t^i > 0\} \tag{4}$$

where **1** ·is the indicator function of the set in parentheses. The proposed indicator of market sentiment reads as:

$$i_t^{BB} = \frac{Z_t}{(1-Z_t)} \quad . \tag{5}$$

It is easy to see that, $0 \leq Z_t \leq 1$ so to prevent the indicator from exploding, we set the values of Z_t less than 0.1% to 0.001 and those larger than 99.9% to 0.999.

The index i_t^{BB} is a proxy for market sentiment since it is an odds ratio that measures the propensity to buy with respect to the propensity to sell a basket of a given agricultural commodity. When i_t^{BB} is significantly larger than one, the market experiences a sharp increase in the prices of many commodities, while the opposite occurs when $i_t^{BB}$is significantly smaller than one.

We now detail the dynamics of the ratio measuring bullish sentiment in the market. Following the generalization of the Kirman ant model proposed by Alfarano et al. (2005), the variable Z_t introduced above can be interpreted as the limit when the number of traders goes to infinity, while the fraction of bullish traders to the total number of traders, i.e., *n/N* in equations (1) - (2) is kept constant. Thus, the dynamics of Z_t reads as (see Alfarano et al. 2005):

$$Z_{t+\Delta t} = Z_t + (\varepsilon_1 - (\varepsilon_1 + \varepsilon_2)Z_t)b\Delta t + \sqrt{2bZ_t(1-Z_t)}\Delta t\lambda, \tag{6}$$

where λ is distributed as $\lambda \sim N(0,1)$ while the parameters ε_1 and ε_2 are related to the Kirman model parameters a_1 and a_2 as follows:

$$\varepsilon_1 b = a_1 \,, \qquad \varepsilon_2 b = a_2 \,. \tag{7}$$

Since the quantities $a_1\Delta t, a_2\Delta t$ are probabilities we should expect that:

$$(a_1 + a_2)\Delta t = (\varepsilon_1 b + \varepsilon_2 b)\Delta t \leq 1. \tag{8}$$

In our work, we start with Larsen and Sørensen (2007) and adopt their formulation in the continuous time of equation (6), which is the Jacobi equation to compute the expectation of Z_T given Z_t:

$$E(Z_T/Z_t) = \frac{\varepsilon_1}{\varepsilon_1+\varepsilon_2} - \left(\frac{\varepsilon_1}{\varepsilon_1+\varepsilon_2} - Z_t\right) e^{-b(\varepsilon_1+\varepsilon_2)(T-t)}. \tag{9}$$

Here, $b_t(\varepsilon_1 + \varepsilon_2)$ indicates the speed of mean reversion and defines how fast the price converges to its long term mean, i.e., $\frac{\varepsilon_1}{\varepsilon_1+\varepsilon_2}$. We use the expectation to forecast Z_t and then to forecast the indicator i_t^{BB}.

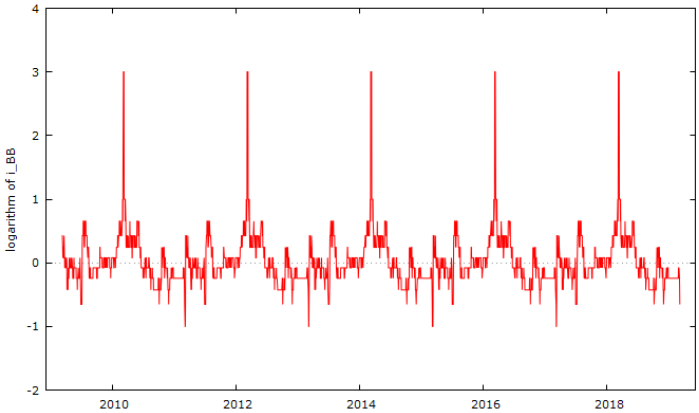
4. Description of the data

The empirical analysis proposed here uses the daily close prices of some agricultural and soft commodities gathered from the Thomson Datastream Database. Specifically, we deal with eleven commodities — cocoa, coffee, corn, cotton, oats, rice, soybean, soybean meal, soybean oil, sugar, and wheat — traded on the American CBOT and ICE_US markets from March 10, 2009 to March 6, 2019, i.e., a ten-year time series.

For calibration and estimation purposes, we use a two-year window of data, estimating the data using the indirect inference method (Gouriéroux and Valéry, 2004). Roughly speaking, we apply a regression that accounts for the heteroskedasticity of equation (6). As mentioned above, the weekly time series of Z_t is computed using a window of consecutive prices going back two years from date *t*. The rolling window moves along the panel data, discarding the oldest data and inserting the newest data.

Figure 2 shows the time series of the indicator, i_t^{BB}, which reveals a cycle in the market with peaks of bullish sentiment in the spring. In the next section, we distinguish seasonal peaks from market anomalies by using the parameters of the dynamics of Z_t (see equation (6)) estimated from the observed values of Z_t.

Figure 2 – *Time series of the logarithm of the indicator* $\boldsymbol{i_t^{BB}}$ *from March 2009 to January 2019.*



5. Results of the empirical analysis

In this section, we show the time series of the parameters appearing in equation (6), estimated using a two-year rolling window of data. These data are used first to compute the process Z_t as well as the indicator i_t^{BB} and then to estimate the model parameters in (6).

Table 1 shows the parameters estimated using the log-price average computed over the rolling window (changing average, or c.a., for short), and those obtained by computing the price average over the entire ten years (fixed average, or f.a., for short). From left to right, Table 1 shows the parameters ε_1, ε_2, b, the speed of mean reversion (s.m.r.) and the long-term mean (l.t.m.). The values of the parameters are rather similar except for ε_1 and the long-term mean. Specifically, Table 1 reveals that for short runs (i.e., computing the average of the log-price over the rolling window), the number of bullish and bearish traders are very similar (l.t.m. = 0.5174), while for long runs it can be seen that there are twice as many bullish traders as bearish traders, with a long term mean equal to 0.6155. Thus, in the long term, the market expectation on future sentiment is 60% in favor of bullish traders.

Table 1 – *Estimation of parameters of the indicator* $\boldsymbol{i_t^{BB}}$.

	ε_1	ε_2	b	s.m.r.	l.t.m.
M(daily_f.a.)	4.4651	2.62969	0.048406	0.06558	0.6155
M(daily_c.a.)	2.2297	2.30731	0.047961	0.06223	0.5174

Figure 3 – *Estimated values of the long term mean* $\varepsilon_1/(\varepsilon_1+\varepsilon_2)$ *as a function of time.*

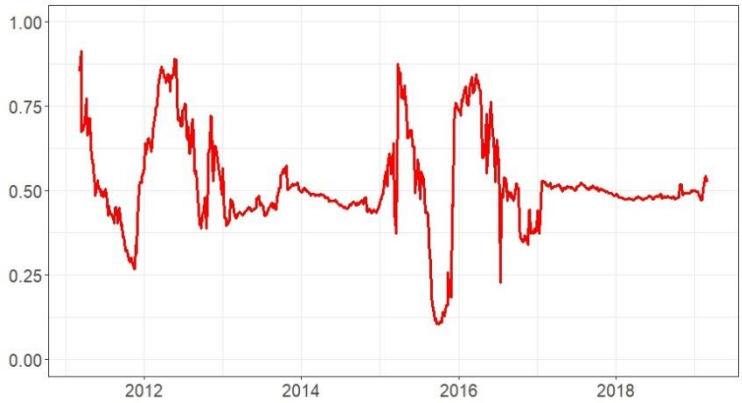
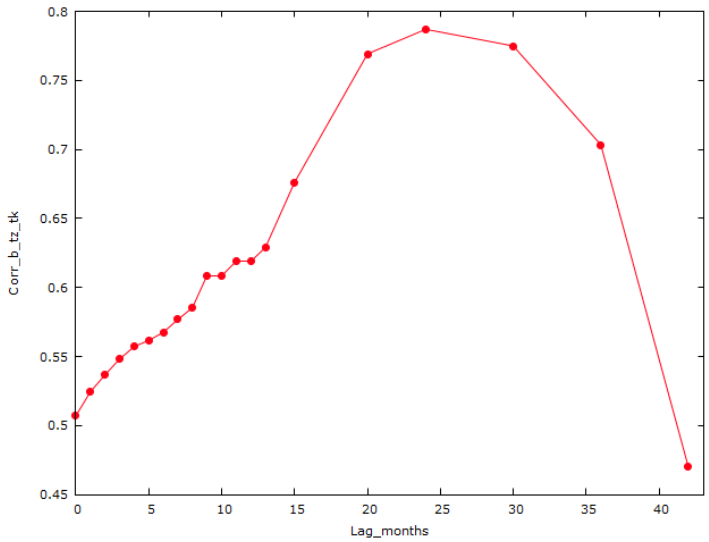


Figure 3 shows the time series of the long term mean $\varepsilon_1/(\varepsilon_1 + \varepsilon_2)$ as a function of time. No seasonality is evident, although four bubbles emerge: at the beginning of 2011, 2012, 2015, and 2016. From the beginning of 2017, the market sentiment is in equilibrium in that the fractions of bullish and bearish traders are equal. This equilibrium seems to persist today as confirmed by the signal the BofAML Bull and Bear Indicator.

Figure 4 – *Correlations between the herding parameter b_t and Z_{t+k} as a function of the lag k (expressed in months).*



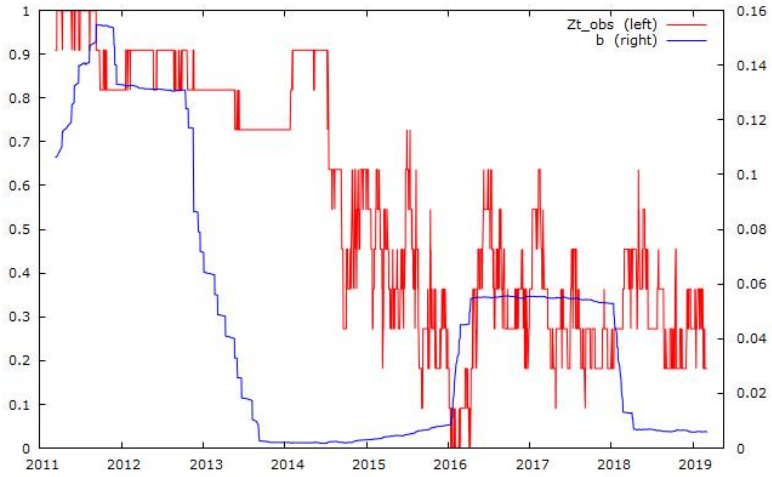
6. The detection and forecasting of speculative bubbles

The detection and forecasting of speculative bubbles in the agricultural commodity market seem to be revealed by the parameter b, which measures the herding behavior. In fact, in periods preceding high uncertainty, traders who are in a better position from the informational point of view show a tendency to herd. We try to capture this finding through the correlation analysis. Specifically, we compute the correlation between the time series of b and the share of traders belonging to the bull category lagged for different time periods, namely months (Figure 4). The analysis shows that there is an increase in correlation for a lag of one and a half years. This means that abrupt changes in the herding parameter reflect abrupt changes in the bullish sentiment in the market, Z_t. Hence, an increase

in *b* may imply an increase in the share of bull agents in the market about one and a half years later, thereby implying an increase in prices.

Figure 5 shows the time series of parameter *b* (blue line) and the time series of the fraction of bullish traders in the market Z_t (red line). This figure reveals the forecasting potential of the herding parameter *b* one and a half years ahead. As we can see from the figure, the parameter *b* starts to decrease in 2013, followed by the fraction Z_t in the second half of 2014. And then when *b* starts to increase in the second half of 2014, Z_t starts to increase in early 2016. From 2016 to 2018, *b* remains constant and the fraction Z_t displays oscillations around a fixed value. A decreasing trend is exhibited by parameter *b* starting in 2018, and we expect a decrease in the fraction Z_t in the middle of 2019.

Figure 5 – *Time series of the herding parameter b and the fraction of the bullish traders in the market (Z_t).*



7. Conclusions

In this work, our aim is to develop a composite indicator based on prices of agricultural commodities that could detect and forecast bubbles in the agricultural commodity market. Interest in Financialization of Agricultural Commodities has grown, especially since the crisis of 2007 (i.e. subprime mortgages crisis), the moment in which investors began to realize that agricultural commodities could be chosen as a safer investment than those in intangible assets. Our index was built based on the sentiment index by Bank of America Merrill Lynch, but estimating market sentiment from prices. The index is based on a fraction of bullish traders whose dynamics was described using a suitable stochastic model. The time series

of the model parameters estimated by the data panel with a suitable regression are the tools used to detect and forecast bubbles. Interestingly, despite the fact that no seasonality treatment is applied, the time series of the model parameters are not affected by seasonality, although bubbles are revealed. The most predictive model parameter is *b*, i.e., the parameter governing the herding behavior, since in periods of fear and uncertainty, the tendency to imitate is higher than in normal periods. Thus, the correlation analysis shows that an increase in *b* implies an increase in the fraction of bullish traders about one and a half years ahead.

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SUMMARY

Speculative bubbles in agricultural commodity prices: detection and forecasting via market indicators

Starting in the 2000s, commodity prices experienced a sharp increase and high volatility, reaching their maximum value in 2011. The hedging role of commodities and their low correlation with traditional assets such as stock and bonds means they can be defined as an independent and different asset class. The considerable increase of trading in agricultural commodity futures markets and the increased volatility of spot prices is known as the "financialization of commodities."

The aim of this paper is to detect and forecast speculative bubbles in the agricultural commodity market. Our framework models the ratio between two consecutive prices as the ratio between demand and supply of a certain commodity.

We model the demand as a Jacobi diffusion process to grasp its trend in continuous time and consequently the ratio of two consecutive prices as an odds ratio. Our approach belongs to agent-based modeling and is able to capture different market features such as herding behavior, the long-term mean (i.e., the expectation on the prices that agents have in the future), and the speed of mean reversion. In addition, the estimated model provides us with a tool to forecast prices.

We propose the sentiment indicator to summarize the behavior of market agents. Our proposal is inspired by the Bank of America Merrill Lynch indicator tied to market sentiment. This indicator is based on the deviations of each commodity price from its respective average, detecting extreme fluctuations and summarizing the behavior of market agents.

We model this indicator via a Jacobi diffusion process and estimate the parameters to investigate the presence of the excess of demand due to speculative behavior.

Clio CIASCHINI, Università Politecnica delle Marche, c.ciaschini@univpm.it;
Kateryna TKACH, Università Politecnica delle Marche, k.tkach@univpm.it
Francesca MARIANI, Università Politecnica delle Marche, f.mariani@univpm.it
Maria Cristina RECCHIONI, Università Politecnica delle Marche, m.c.recchioni@univpm.it

UN CASO DI SCORRETTA RAPPRESENTAZIONE NEL BILANCIO PUBBLICO COMUNALE[1]

Fabio Fiorillo, Federico Quaresima

1. Introduzione

Nel 2008, l'entrante governo Berlusconi realizzò la promessa elettorale di cancellare l'imposta che gravava sull'abitazione principale (ICI). Per compensare i Comuni della perdita di gettito furono previsti dei trasferimenti compensativi di pari ammontare.

Conseguentemente si modificò anche la rappresentazione del bilancio comunale, in aggiunta alle righe del TITOLO I (Entrate Tributarie) che permettevano di registrare l'ICI sull'abitazione principale (dopo il 2008 riservata alla sola registrazione dell'ICI sulle abitazioni di lusso) e altra ICI (o ICI secondaria) compariva una riga nel TITOLO II (trasferimenti) dove registrare i trasferimenti compensativi per L'ICI. Nonostante questo, oltre il 25% dei Comuni (il 38% nel 2008), non registrarono correttamente i trasferimenti ricevuti.

Tale scorretta rappresentazione ha una rilevanza statistica troppo elevata per essere considerata un puro errore casuale. È nostra opinione che questo comportamento derivi dalla volontà di segnalare agli stakeholder alcune informazioni in maniera non corretta. Nella prossima sezione riassumeremo la letteratura sul *bilancio creativo* e sulla trasparenza dello stesso. Nella sezione 3 descriveremo il fenomeno dal punto di vista statistico. Nella sezione 4 indicheremo alcuni risultati che permettono di approfondire le dinamiche di scorretta rappresentazione. La sezione 5 conclude.

[1] Introduzione, sezione 4 e conclusione sono frutto del lavoro comune, a Federico Quaresima la sezione 2, a Fabio Fiorillo si deve la sezione 3.

2. Trasparenza e bilancio creativo

Per un governo locale il bilancio ha una funzione autorizzatoria: determina il limite di spesa compatibile con le entrate. Errori nella scrittura dei bilanci consuntivi sono possibili (Flyvbjerg e al., 2002), tuttavia possono essere frutto di scelte deliberate fatte con l'obiettivo di fornire agli stakeholder informazioni differenti da quanto i veri dati di bilancio suggerirebbero (Larkey e Smith, 1989; Mayper et al., 1991; Van der Ploeg, 2010). Ad esempio, la sottostima delle entrate potrebbe garantire agli amministratori locali la disponibilità di un fondo per far fronte a spese impreviste o dare, a fine anno, l'idea di un governo locale virtuoso. La sovrastima, invece, può essere utilizzata per rimandare decisioni di innalzamento fiscale o di taglio dei servizi (Balduzzi e Grembi, 2011; Anessi-Pessina e Sicilia, 2015).

Il bilancio annuale può quindi essere utilizzato come uno strumento di promozione della città (Lee, 2002, 2006) e segnale per attrarre imprese e base imponibile; come sostengono Covaleski e Dirsmith (1988), il bilancio 'may be more of a social invention complicit in the construction of social reality, than a " rational " reflection of a technical rationality'.

La mancata realizzazione di alcune spese potrebbe mettere in moto delle pressioni da parte della cittadinanza per la riduzione delle imposte e quindi rendere politicamente non sostenibile la costituzione di fondi per far fronte a impegni imprevisti (ad esempio alla svalutazione dei crediti). Di fronte a questo, l'uso creativo del bilancio fornisce i margini di consenso politico necessari (Jones e Euske, 1991), permette di non presentare deficit eccessivi ma anche di non rivelare eventuali surplus (Tellier, 2006).

La mancata registrazione dei trasferimenti compensativi nella corretta riga di bilancio va inquadrata all'interno di questo quadro teorico di riferimento. Nel caso specifico, la registrazione di una entrata in una riga differente da quella preposta non è sanzionata normativamente.

3. I dati e le statistiche descrittive del fenomeno

Sono stati considerati i dati di bilancio dei 6701 Comuni italiani delle Regioni a Statuto Ordinario per gli anni dal 2006 al 2010; gli anni 2006 e 2007 sono considerati per avere informazioni sui Comuni prima della cancellazione dell'ICI sulla prima casa, dal 2008 al 2010[2] tale imposta rimane nei bilanci solo per gli

[2] A seguito della legge 42/2009, dopo il 2010, i dati non sono più comparabili.

immobili diversi dalla prima abitazione (c.d. ICI secondaria) e per le prime abitazioni di lusso[3].

Per ogni anno vengono calcolate le dummy illustrate in Tabella 1.

Tabella 1 – *Dummy per l'ICI: definizioni.*

Nome variabile	Definizione	Valore atteso prima del 2008	Valore atteso prima dal 2008
PRINCZERO	La dummy è uguale ad 1 se la riga di bilancio riporta valore 0 su entrate da ICI per abitazione principale	0. 1 indica che il Comune non ha neppure una abitazione principale; molto improbabile	1 per Comuni che non hanno abitazioni principali di lusso
PRINCTOT	La dummy è uguale a 1 se c'è gettito ICI e tutta l'ICI è rappresentata dall'ICI sull'abitazione principale e l'ICI	0. 1 indica un Comune che ha solo immobili utilizzati come abitazione principale.	0. 1 indica un Comune con solo immobili di lusso adibiti ad abitazione principale; molto improbabile
ICIZERO	La dummy è uguale ad 1 se non c'è gettito ICI	0. L'assenza di gettito ICI è molto improbabile.	0. 1 è possibile se prima del 2008 PRINCTOT=1
TRASF	La dummy è uguale a 1 se non sono registrati trasferimenti compensativi	1 i trasferimenti compensativi non ci sono	0. Dai dati del Ministero degli Interni risulta che solo 11 comuni su 6701 non ricevono trasferimenti compensativi

Prima della riforma non vi erano i trasferimenti compensativi, nessun Comune non riscuoteva l'ICI e pochissimi Comuni non avevano abitazioni principali.

Tabella 2– *Le dummies: frequenza dei valori pari ad 1.*

Variabile	2006	2007	2008	2009	2010
PRINCZERO	0.4 %	1.4 %	47.6 %	52.5%	54.2%
PRINCTOT	11.4 %	10.6 %	16.6 %	16.2 %	14.8 %
ICIZERO	0 %	0 %	0.4 %	2.0 %	2.2 %
TRASF			37.7 %	27.3 %	24.9 %

Elaborazioni su dati Ministero dell'Interno – Finanza Locale

Circa l'11% dei Comuni ricavava il gettito ICI solo dall'abitazione principale.

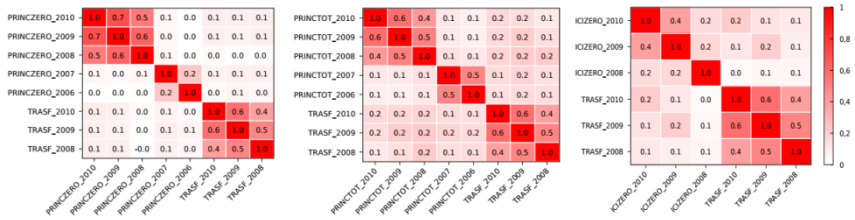
Dopo la riforma circa il 50% dei Comuni non iscrive a bilancio entrate ICI da abitazione principale, il che è coerente con la riforma. Sono molto pochi i Comuni (al massimo il 2.2%) che non iscrivono entrate da ICI. Rispetto alle attese indicate in tabella 1, tuttavia il numero di Comuni che non registrano trasferimenti

[3] Codici catastali A/1 - abitazioni di tipo signorile, A/8 - abitazioni in ville ed A/9 - castelli e palazzi di pregio.

compensativi è molto elevato, pari al 37.7% nel 2008 per ridursi al 24.9% nel 2010 che rappresenta un valore comunque elevato. Un comportamento anomalo, rispetto alle attese, emerge anche dal numero di Comuni che dopo la riforma registra un'entrata positiva da ICI e la attribuisce solo alle abitazioni principali (di lusso). La percentuale dei Comuni che registrano solo ICI da abitazione principale aumenta dopo la cancellazione dell'ICI sulle abitazioni principali non di lusso.

Informazioni interessanti possono essere ricavate dalle matrici di correlazione. La correlazione seriale di ciascuna dummy analizzata evidenzia due blocchi di correlazioni: prima e dopo la riforma. C'è una forte persistenza di comportamenti sia prima che dopo la riforma, ma non c'è correlazione nei comportamenti tra prima e dopo. Infatti, c'è persistenza anche nelle dummy che catturano il fatto che i Comuni non registrano entrate da ICI sull'abitazione principale (PRINCZERO) e che i Comuni registrano entrate da ICI solo dall'abitazione principale (PRINCTOT).

Figura 1 – *Le correlazioni tra dummies.*



Non c'è correlazione tra non avere entrate ICI da abitazione principale prima della riforma e mancati trasferimenti dopo la stessa. Si registra una correlazione positiva tra la mancata registrazione del trasferimento compensativo dell'ICI (dopo la riforma) e il fatto che tutta l'ICI sia registrata come ICI principale (dopo la riforma). Almeno in parte, i Comuni che non registrano trasferimenti compensativi registrano tutta l'ICI come ICI da abitazione principale. Correlazione anche tra il non registrare l'ICI e il non registrare trasferimenti compensativi. La mancata registrazione dei trasferimenti si accompagna ad altre due scritture anomale: tutta l'ICI dopo la riforma è registrata come ICI principale oppure come si vedrà nella sottosezione 3.1, si evidenzia una riduzione eccessiva delle risorse da ICI.

3.1. Analisi delle entrate compensate

Il meccanismo dei trasferimenti compensativi è volto a garantire ai Comuni le stesse entrate anche dopo la cancellazione dell'ICI sull'abitazione principale. Di conseguenza, non essendovi state altre modifiche normative, l'ammontare delle

entrate pari alla somma di ICI e trasferimenti compensativi non dovrebbe variare in maniera pronunciata negli anni considerati. Definiamo quindi due nuove variabili:

$$COMP = ICI.ab.princ. + altra.ICI + Trasf.Comp.ICI \quad (1)$$

pari alle entrate totali ICI sommate ai trasferimenti compensativi

$$PRINCOMP = ICI.ab.princ. + Trasf.Comp.ICI \quad (2)$$

pari alle entrate ICI da abitazione principale a cui si aggiungono i trasferimenti compensativi.

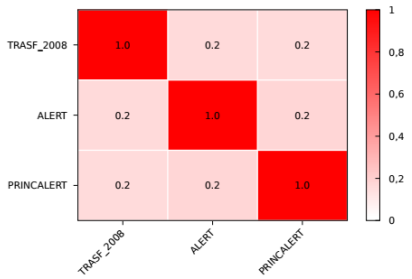
Per costruzione, la variazione da un anno all'altro di tali variabili non dovrebbe essere pronunciata. La riforma, cancellando l'ICI sull'abitazione principale, ha contestualmente previsto trasferimenti che avrebbero dovuto mantenere immutate le entrate. A partire da queste due variabili costruiamo due nuove dummy:

$$\text{se } \frac{COMP_{2007}}{COMP_{2008}} > 2 \text{ allora } ALERT=1 \text{ altrimenti } ALERT=0 \quad (3)$$

$$\text{se } \frac{PRINCOMP_{2007}}{PRINCOMP_{2008}} > 2 \text{ allora } PRINALERT=1 \text{ altrimenti } PRINALERT=0 \quad (4)$$

le dummy hanno valore 1 se le entrate compensate (le entrate da ICI sull'abitazione principale più trasferimenti compensativi nel 2008 dopo la riforma) sono meno della metà delle entrate ICI (ICI sulle abitazioni principali) prima della riforma.

Figura 2 – *Correlazione tra mancata registrazione dei trasferimenti compensativi e riduzione delle entrate dopo la riforma.*



In tal caso, la riduzione è considerata anomala. Per il 59.5% dei Comuni le entrate compensate dopo la riforma sono più basse della metà delle entrate ICI preriforma. Per il 62.9% dei Comuni le entrate da abitazione principale (di lusso) e trasferimenti compensativi sono minori della metà delle entrate ICI da abitazione

principale. Prevedibilmente, la riduzione delle entrate al lordo dei trasferimenti compensativi che si manifesta dopo la riforma è correlata con la mancata iscrizione nella corretta riga di bilancio dei trasferimenti stessi.

Per comprendere dove tali trasferimenti vengano registrati si definiscono tre nuove variabili. La prima variabile (ERR1) assume valore 1 se, contemporaneamente, nell'anno t non sono registrati i trasferimenti compensativi e l'ICI è registrata solo come ICI principale. La seconda variabile assume valore 1 se nell'anno t non \1sono registrati i trasferimenti compensativi e, contemporaneamente, tra il 2007 e il 2008 le entrate ICI da abitazione principale, al lordo dei trasferimenti, si riducono di oltre la metà. La terza variabile (ERR3) assume valore pari a 1 se assumono valori 1 entrambe le due variabili precedenti (distribuzione congiunta).

$$p = (ERR1) = p(TRASF = 1 \cap PRINCTOT = 1) \quad (5)$$
$$p = (ERR2) = p(TRASF = 1 \cap PRINCALERT = 1) \quad (6)$$
$$p = (ERR3) = p(TRASF = 1 \cap PRINCTOT = 1 \cap PRINCALERT = 1) \quad (7)$$
$$p(TRASF = 1) = p(ERR1 = 1) + p(ERR2 = 1) - p(ERR3 = 1) + \mu \quad (8)$$

con μ pari alla probabilità congiunta di avere scorretta registrazione nei trasferimenti non determinata da ERR1 **o** da ERR2. Dalla Tabella 3 le frequenze relative delle variabili appena indicate sono:

Tabella 3– *Le dummy: frequenza dei valori pari ad 1.*

Variabile	2008	2009	2010
TRASF	37.7 %	27.3 %	24.9 %
ERR1	10.2 %	7.9 %	6.2%
ERR2	26.9 %	17.4 %	15.7%
ERR3	1.5 %	3.1 %	2.5 %
□=TRASF-ERR1-ERR2+ERR3	2.1 %	5.1%	5.5%

Nell'anno della riforma, sul 37% dei Comuni che non registrano correttamente il trasferimento, solo il 2.1% lo fa per ragioni diverse dalla registrazione di tutta l'ICI come ICI principale, o perché nel 2008 ha visto una riduzione anomala delle entrate complessive da ICI al lordo del trasferimento compensativo. Nel 2009 e nel 2010, pur aumentando il numero di Comuni che registrano correttamente i trasferimenti, le registrazioni anomale rimangono molte e per 4/5 le registrazioni anomale sono classificabili come registrazione di tutte le entrate come ICI

principale o viene registrato in altre righe di trasferimenti non dedicate alla compensazione ICI.[4]

4. Le ragioni della scorretta registrazione

Per indagare le determinanti della scorretta registrazione abbiamo condotto una analisi Probit. La probabilità di non registrare nella riga corretta (TRASF) dipende (tabella 4) da variabili finanziarie ricavate dalla banca dati sui bilanci consuntivi dei Comuni del Ministero dell'Interno, da variabili elettorali, variabili socio-culturali del Comune e variabili che descrivono le caratteristiche del sindaco, ricavate dal database costruito da Repetto (2016). Dummy regionali e temporali (per il 2009 e il 2010) completano il modello.

Tabella 4 – *Variabili utilizzate e statistiche descrittive (continua).*

Variabile	Descrizione	Media	Dev. Stand.	Min	Max	Obs
Variabile dipendente						
TRASF	Dummy di scorretta registrazione	0.301	0.459	0	1	19523
Variabili finanziarie						
Dummy deficit	Dummy = 1, se il Comune è in deficit	0.575	0.494	0	1	19523
Deficit procapite	Deficit procapite, se il Comune è in avanzo = 0	0.033	0.089	0	3.766	19523
Avanzo procapite	Avanzo procapite, se il Comune è in deficit = 0	0.017	0.096	0	6.494	19523
Debito procapite	Debito procapite in migliaia di euro	1.357	23.646	-1.342	2290	19481
Patto di stabilità	Dummy = 1 se il Comune è soggetto al rispetto del patto di stabilità interno	0.303	0.46	0	1	19523
Variabili elettorali						
Dummy elezioni	Dummy = 1 se anno di Elezioni	0.283	0.45	0	1	19523

[4] Poiché alla mancata registrazione come trasferimento compensativo non corrisponde una riduzione delle spese correnti, si deduce facilmente che tale entrata è registrata in qualche altra riga di bilancio.

Tabella 4 – *Variabili utilizzate e statistiche descrittive (segue).*

Variabile	Descrizione	Media	Dev. Stand.	Min	Max	Obs
Anni da elezione	Distanza da anno elettorale, - 2, -1 anni prima delle elezioni. 1, 2 anni dopo le elezioni.	2.833	1.608	0	6	19523
Mandato	Numero di mandato	1.542	0.734	0	5	19523
Affluenza	Affluenza alle urne per l'elezione del Sindaco	0.762	0.105	0	0.99	19523
Caratteristiche del Comune						
Popolazione	Popolazione in migliaia di abitanti	7.635	44.579	0	2761.477	19523
Altitudine	Altitudine in 100 mt	3.371	2.781	0	20.350	19523
Comune turistico	Dummy = 1 se Comune turistico	0.094	0.292	0	1	32317
Percentuale istruiti	Percentuale di residenti con laurea	9.668	5.233	0	100	19523
Percentuale stranieri	Percentuale di stranieri su residenti	2.163	1.832	0	19.58	19523
Giornali locali procapite	Numero di copie di giornali lette procapite	3.582	2.21	.28	11.46	19523
Associazioni procapite	Numero di associazioni procapite	0.003	0.006	0	0.07	19523
Caratteristiche del sindaco						
Dummy non sindaco	Dummy = 1 se non c'è sindaco in carica , es. Comune commissariato	0.016	0.127	0	1	19523
Età	Età del Sindaco	50.381	12.394	0	87	19523
Sesso	Dummy = 1 se il sindaco è di genere maschile	0.872	0.335	0	1	19523
Livello di istruzione	Livello di istruzione del sindaco	3.139	0.994	0	4	19523
Centro destra	Dummy = 1 se sindaco di centrodestra	0.117	0.322	0	1	19253
Centro sinistra	Dummy = 1 se sindaco di centrosinistra	0.151	0.358	0	1	19253

La stima è un pooled Probit condotta per gli anni successivi all'abolizione dell'ICI sull'abitazione principale (Tabella 5).[5]

[5] Per ragioni di spazio la tabella 5 non presenta i valori delle stime delle dummy regionali e temporali. Tali stime sono disponibili dietro richiesta agli autori. Le dummy regionali mettono in luce come la scorretta specificazione sia un fenomeno più probabile nelle regioni meridionali e nel Lazio, meno probabile nel Nord-est e nelle regioni centrali, Lazio escluso.

Tabella 5 – *Analisi probit.*

TRASF	Coef.	t-value	
Dummy deficit	-0.085	-3.73	***
Deficit procapite	0.472	3.63	***
Avanzo procapite	0.332	2.18	**
Debito procapite	0.001	1.50	
Patto di stabilità	-0.074	-2.65	***
Dummy elezioni	0.081	2.02	**
Anni da elezione	-0.023	-1.95	*
Mandato	0.005	0.34	
Affluenza	-0.077	-0.63	
Popolazione	-0.002	-2.85	***
Altitudine	0.027	5.91	***
Comune turistico	0.154	2.97	***
Percentuale istruiti	-0.007	-3.61	***
Percentuale stranieri	0.018	2.84	***
Giornali locali procapite	0.015	1.90	*
Associazioni procapite	5.156	2.53	**
Dummy non sindaco	-0.335	-3.01	***
Età	-0.002	-1.92	*
Sesso	0.009	0.28	
Livello di istruzione	-0.016	-1.43	
Centro destra	-0.165	-4.59	***
Centro sinistra	-0.104	-3.22	***
Costante	-0.191	-1.39	

Mean dependent var	0.301	SD dependent var	0.459
Pseudo r-squared	0.057	Number of obs	18667.000
Chi-square	1206.573	Prob > chi2	0.000
Akaike crit. (AIC)	21620.527	Bayesian crit. (BIC)	21926.073

**** p<0.01, ** p<0.05, * p<0.1*

Comuni con meno competenze interne, come quelli più piccoli o a più elevata quota altimetrica, hanno maggior probabilità di rappresentare scorrettamente il trasferimento (Flyvbjerg et al., 2002). Maggiori competenze potrebbero essere legate anche alle caratteristiche del sindaco, in particolare sindaci più giovani guidano Comuni che hanno minor probabilità di commettere errori. Allo stesso modo, meno errori sono commessi da sindaci appartenenti ad uno dei due grandi schieramenti nazionali.

La probabilità di scorretta rappresentazione si riduce con la percentuale di individui istruiti mentre aumenta con la percentuale di stranieri[6]. Il maggior

6 Cittadini più istruiti sono più abili a ottenere le informazioni corrette dai politici (Gavazza e Lizzeri, 2011).

controllo da parte di una popolazione colta (da un lato) e la minor presenza di residenti che tendenzialmente hanno meno conoscenze del sistema istituzionale italiano, favoriscono una corretta rappresentazione dei trasferimenti compensativi. L'impatto del numero di giornali procapite e del numero delle associazioni invece sembra a prima vista controintuitivo: maggiori sono i giornali letti e maggiore il numero delle associazioni, maggiore è la probabilità di una scorretta rappresentazione. Una possibile spiegazione può essere avanzata: la presenza di associazioni e la lettura dei giornali dimostra una forte pressione dell'opinione pubblica sull'ente locale che di norma riguarda le richieste di spesa (Jones e Euske, 1991). Il non registrare correttamente il trasferimento compensativo permette all'ente locale la possibilità di fare maggiori accantonamenti prudenziali evitando di dover rispondere alle richieste delle categorie dei vari stakeholder (Van der Ploeg, 2010). La maggior probabilità di scorretta registrazione nei Comuni turistici potrebbe dipendere dalla volontà di non far percepire, ai contribuenti che pagano l'ICI sulle seconde abitazioni, il fatto che il Comune ha a disposizione altre somme con le quali ridurre le richieste ai non residenti.

Per quanto riguarda le variabili finanziarie, squilibri rispetto al pareggio aumentano la probabilità di scorretta rappresentazione sia che siano deficit che avanzi (Tellier, 2006). L'essere in deficit come l'esser soggetti al patto di stabilità riducono tale probabilità.[7] In tal caso le norme che prevedono il rientro dal deficit e l'applicazione del patto di stabilità possono essere opposte dall'ente alle richieste di maggior spesa degli stakeholder. Guardando alle variabili elettorali, prima delle elezioni e nell'anno di elezioni la registrazione scorretta è più probabile, mentre lo è meno passate le elezioni (Reischmann, 2016). Se il Comune non è retto da un sindaco (es. Comuni commissariati) la probabilità di errore è minore.

7 Le analisi di Balduzzi e Grembi (2011) e di Anessi-Pessina e Sicilia (2015), studiando differenti misure di window dressing arrivano a conclusioni differenti.

5. Conclusioni

L'abolizione dell'ICI sulla prima casa permette di analizzare se la rappresentazione del bilancio sia veritiera e per quali ragioni si propongano rappresentazioni scorrette. La percentuale di Comuni che commettono errori è infatti troppo alta per ritenere che si tratti di un mero errore casuale. L'analisi mostra come un contesto caratterizzato da stakeholder più attivi fa propendere l'ente verso una scorretta rappresentazione, molto probabilmente per far meglio fronte alle molteplici richieste di spesa. L'impatto positivo del ciclo elettorale conferma questa spiegazione.

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SUMMARY

Intergovernmental grants misrepresentation in the balance sheets of italian municipalities

In 2008 the incoming Berlusconi's Government cancelled out the taxation on main houses (ICI), substituting it with an intergovernmental grant of equal amount. The balance sheet representation changes consequently, but about the 38% of italian municipalities do not register such grants in the right budget line. Such misrepresentation is too high to describe it as a pure random error. Our research question is to investigate if such errors depends on lack in competencies of municipalities or they are somehow intentional due to municipalities will to signal distorted informations to stakeholders.

Fabio FIORILLO, Università Politecnica delle Marche DISES, f.fiorillo@univpm.it

Federico QUARESIMA, Università Politecnica delle Marche DISES, f.quaresima@univpm.it

SOCIAL CAPITAL AND SOCIAL ENTREPRENEURSHIP. CROSS-COUNTRY EVIDENCE FOR DEVELOPMENT AND COHESION[1]

Massimo Cermelli, Umberto Di Maggio, Giuseppe Notarstefano, Giuseppe Terzo

1. Introduction: towards a new European social model

According to the Council of the European Union[2], the social economy is a crucial driver of economic and social development in Europe, representing a different way of doing business which continuously associates general interest, financial performance, social considerations, and democratic operation. In 2015, according to Monzón and Chaves (2017), there were 2.8 million of social economy enterprises and organizations, employing 13.6 million people and representing around 8% of the EU's GDP. This emerging paradigm, that has gained momentum during the last years after the great recession, refocusing its attention on intangible values such as cooperation and sustainability in economic systems. The limits of the mainstream development model, based on privatization and the hegemony of the profitable private enterprises, has been unmasked by the increasing levels of inequality and poverty in the European Union (EU). In this context, a third institutional sector of economies emerged, taking into account a cooperative context and focusing on the importance of investigating the links between social relations and well-being (Becchetti and Cermelli, 2018).

Chaves and Monzón (2018) sustain that social economy, which represents the space between the public economy and the private for-profit economy, is a universe based on some structural criteria such as social aims, participatory structure, and distributive profit parameters based on the prevalence of people and labour factor over the capital. Thanks to these characteristics it could represent the way to recover the old pattern of social convergence in the EU, introducing an alternative paradigm trying to overtake the limits of the old economic model at a European level. Taken

1 Although the paper is the result of mutual work, the paragraphs can be attributed as follows: paragraph 1 to Massimo Cermelli, paragraph 2 to Umberto Di Maggio, paragraph 3 to Giuseppe Terzo, and paragraph 4 to Giuseppe Notarstefano. Lastly, the conclusions of paragraph 5 are the product of collective reflection of all authors.

2 The promotion of the social economy as a key driver of economic and social development in Europe - Council Conclusions (7 December 2015)

overall, its role in the EU is integrating private commercial initiatives with the specific benefits of the community itself and its social groups.

For this reason, exploring the connections between welfare models and social economy is particularly interesting for empirical research, although the available statistics are still insufficient. In this paper, trying to overcome the lack of available data that does not allow us to develop an empirical model, we perform, after a brief literature review, a descriptive analysis aimed to check whether the economic crisis marks a significant discontinuity point for this transformation. From an overall assessment, it seems that the crisis has interrupted a "virtuous path" convergence, creating a "crowding out" towards the social economy. It is, at least in part, confirmed by the overall reduction of Total Social Expenditure (TSE) in different EU countries; the austerity policies are forcing on national governments considerable downsizing welfare spending, with the risk of heightening social inequalities. Furthermore, it shows a significant influence on social capital, which explains the growing need for relationships between people. To show in detail the evidences emerged, and the subsequent reflections performed, the paper is organized as follows: in the second paragraph we propose a theoretical interpretative model, the third paragraph highlights the relation between social entrepreneurship and social capital, in the fourth paragraph we show the empirical evidence before and after the crisis, while the last paragraph contains some final considerations.

2. The sensible choice theory (SCT). Civil economic behaviour and social capital networks between trust and crisis.

According to the “Rational Choice Theory” (RCT), the maximization of subjective utility shapes economic behaviour. A choice would, therefore, be rational when we consider – from the macro-level (supra-individual) to the micro-level (inter-individual) and vice versa – the constraints and resources, the costs and benefits, choosing the combination allowing to obtain the maximum results. This theory assumes that in achieving specific goals, everyone can always have the most appropriate means to evaluate different alternatives of available choice. Therefore, there is an information assumption for all agents, indicating the best possible option for everyone, so that the costs and benefits of a given choice are precise. This approach is embedded within methodological individualism, considering the sum of individual rational choices as the aggregate economic behaviour of the society. The RCT has often been used by neoclassical theory to explain individual egoism and considered as an indispensable tool to pursue the total good – defined as the mere summation of the levels of well-being and, therefore, of the utility of individuals. Zamagni (2019) argues that the total good represents for classical economic theory

(political economy) the ultimate goal to be pursued, while for the civil economy this goal is the common good, which we can metaphorically think of as the product of individual goals. In the logic of the common good, it is not possible to sacrifice the good of someone to increase that of someone else, since trade-offs between people are not allowed.

Here we intend to revisit the RCT towards a "Sensible Choice Theory" (SCT), aimed to reinterpret economic rationality in reasonableness and decline the first one as intelligence for the common good, care, and custody of resources and relations. To do this, we use the concept of social capital proposed by James Coleman, who insists on the RCT to explain the need to root relational networks. In his seminal work, "Foundations of Social Theory" (1990), he gives a representation of rational actor based on two elements: a) the "self-object", oriented to maximize hedonistically the desires; and b) the "active-self", which works for the first one according to the resources and the information found in the environment. The agent, therefore, tries to maximize the benefits concerning a purpose, even adopting the behaviour of others through the mechanism of internalization. The stock and the quality of resources and information for Coleman can be such that the rationality of choices converges towards altruism and solidarity. The last mentioned are, therefore, convenient and not necessarily a cost or a burden. For Coleman, social capital is rationally functional. He says: «the function identified by the concept of social capital refers to the value of those aspects of the social structure that actors can use as resources to realize their interest» (Coleman, 1990, p.305).

This type of capital also has an extraordinary function of accumulation in the production process (and it is productive even a social process which has nothing to do with the use of tangible resources but which instead concerns, for example, mere relationship), it does not tends to the deterioration (as opposed to other types of capital), and it is an indispensable social resource for the achievement of objectives – even of economic nature – that would be unattainable or expensive to obtain. Capital is "capital" because it has repercussion on the economic sphere. Capital is "social" because it concerns the mutual action of several people (Coleman, 1994, p.175). In this sense, even civil behaviour can be considered part of a rational and reasonable choice. It would be institutionally conditioned and aimed to respect peaceful coexistence since based on reciprocity, fraternity, and trust. The rationality of the Colemanian actor depends on his tendency to interpersonal relations. Through relational investments, it is possible to free oneself from the atomistic and nihilistic tendencies that would relegate the subject to a mere bundle of individual desires and pleasures to be satisfied in absolute autonomy. Thus, only in a relationship with a certain civil quality, it is possible to have an advantage not only for economic operators and for the entire market, but also for citizens and the whole society.

3. Social Enterprises and social capital: between protection and innovation

Within the multifaceted universe of social economy - which is composed of a plurality of organizations of different nature - the figure of Social Enterprise (SE) is emerging powerfully. In general terms, it represents an organizational reality that combines social objectives and financial autonomy in a competitive business context (Young and Leacy, 2014). As underlined by a report of the European Commission (2015), a growing interest in SE is emerging in the political and academic debate, as it recognizes the ability to play a pivotal role in tackling societal and environmental challenges and fostering inclusive growth.

Despite this growing interest, there is the absence of a univocal definition of SE at the scientific level, making it difficult to identify its fundamental characteristics. Although a shared meaning is not present, it is still possible to identify common factors in all the definitions formulated in the literature that allow delineating the characteristic features of the SE. Urbano et al. (2012) showed how a common perspective emerges taking into consideration some fundamental elements such as the primary purpose of creating value rather than personal wealth (Zadek and Thake, 1997), the generation of social innovation rather than "economic innovation" (Kramer, 2005; Austin et al., 2006; Leadbeater, 2007), and the focus on social problems rather than individual needs (Harding 2006, Westall and Chalkley, 2007).

Bassi (2013) has effectively highlighted how these organizations, regardless of their heterogeneous nature, can generate four types of added value: 1) economic added value, which is given by the contribution provided in terms of material, economic, and financial wealth; 2) political added value, which is granted by the ability to influence the political agenda; 3) cultural added value, which is given by the specific contribution provided by the diffusion of values coherent with its missions (equity, tolerance, solidarity, mutuality), in the surrounding community; and 4) social added value, intended as the specific contribution in terms of production of relational goods and the creation of social capital.

The production of social, political, and cultural added value, representing one of the main elements of differentiation of SEs from traditional for-profit enterprises, is determined not only by the pursuit of objectives of general interest, but also by the multi-stakeholder nature characterizing most of social economy realities - embodied in forms of solidarity, participatory, and shared organization - and representing a potential virtuous model of gift, relationship, and reciprocity.

In the context of the crisis of the welfare state, SEs can represent potential innovative welfare actors. That is because, combining business and solidarity, they produce goods and services of social utility aimed to satisfy that demand, originated from increasingly complex and diversified social needs, not adequately intercepted by public intervention and traditional enterprises. However, they do not only

represent actors that play a residual and niche role aimed to remedy State and market failures, since producing a civic culture that fuels values such as trust, reciprocity, and cooperation, they could also represent the natural evolution of an economic system capable of rediscovering its original vocation (Zamagni, 2003; Pelligra, 2008; cited in Crivelli, Bracci and Avìles, 2012).

For the purposes of our analysis we believe it is essential to highlight the potential role of the SE as a generator of bridging and linking social capital, which, as highlighted by that vast literature fuelled by the seminal works of Coleman (1987) and Putnam (1993), assumes a significant importance in guaranteeing the stability and sustainability of economic development paths. To this end, therefore, they can be key players in strengthening countries' ability to deal with the perverse effects produced by external shocks. Taking into consideration the absence of a shared definition that does not allow to identify with precision which organizations can be qualified as SEs, we have taken into consideration all the organizational realities that take the cooperative form, in the awareness that a substantial part of SEs takes on this legal form.

4. Empirical evidence following the crisis

Looking at the trend of the GDP in the time 2001-2018, the sharp discontinuity that the crisis triggers appears, which cause a stable dispersion among the EU's economy whose growth seems significantly differentiated after 2008 (figure 1). In figure 2, it is possible observing the trend of the coefficient of variation both for GDP and Risk Poverty Ratio. It shows how the social costs of the crisis have been enormous, and the increase in poverty levels has affected almost all countries, with South Europe that reveals the most significant vulnerability. The risk of poverty for European citizens has increased in the decade after the crisis, as certified by Eurostat data, but the social investment of governments has not increased. Despite the diversity of welfare systems, which remains a relevant issue, social dynamics appear to be substantially similar to the EU. The differences in terms of distribution involve the recovery of the divergence between EU countries since the crisis itself marks a change in investment volumes in terms of Social Expenditure. Figure 3 shows the box plot of GDP and TSE (Total Social Expenditure) in some significant years, tracing the pre and post-crisis. Analysing the graph, it results quite clear the presence of a territorial and distributive inequality; the growing difference between mean and median hints an accentuation of the asymmetry over time. Furthermore, the differences between EU countries suffering the effects of the crisis are amplified, highlighting the fragility of the southern countries. A remarkable aspect concerns the fact that while the countries of Eastern Europe benefited considerably in terms

of growth of social investments in the post-entry phase, the same cannot result for the countries of Southern Europe that seem to have paid the most considerable social costs of the crisis (figure 4).

When there is a reduction of social investments, social vulnerability increases - as well as the differences between countries - and the intervention of the Third Sector takes place. We do not have adequate and articulated data, as already observed in previous works (Di Maggio, Notarstefano, 2019), nevertheless it is possible to obtain some substantial empirical evidence. Analysing the scatter plots of GDP per capita (index), SEs (measured through the endowment of cooperatives) and Total Social Expenditure (TSE), some considerations can be made, remaining in the interpretative framework offered by Eurostat data. A first observation is that the resilience of the European countries is bound to the growing role of SEs: the spread of the cooperative model supports the economic recovery, as well as presumably the presence of a density of these organizations mitigates the effects of weak economic growth. Otherwise, it seems complicated to interpret the relationship between TSE and SE: also, in this case, the connection in dynamic terms appears positive. In the continental countries and Eastern Europe, there is a marked positive relationship (also in this case we record an anomalous behaviour of Hungary), while it is weaker for most of the countries of Southern Europe. This evidence can, in some way, be interpreted in light of the differences existing between welfare models, highlighting the positive relationship between social investments and the growth of SEs. Therefore, it is possible to imagine that there are welfare models that value social entrepreneurship. This difference also suggests an interpretation of the different processes of accumulation of social capital, although this deserves further analysis: we used the 2013 EU-SILC cross-section data to highlight how "trust in others" prevails over other types of trust. It confirms the importance of social capital in the activation of networks, especially in countries where "civicness" is stronger (figure 6).

5. The role of the social economy: towards a new model of "civil" Welfare

We have seen how the social effects of the crisis have been significant, inducing a strong resilience at the territorial level. The spatial dynamics, in this sense, are strongly differentiated, confirming – with some attenuation – the fragility of the economies of Southern Europe. The crisis has acted in-depth both in the social systems and at the regulatory and institutional level. The resilience shown by European countries is deeply conditioned by the presence of different welfare models, as well as by different endowment of social capital attached to such systems. According to our opinion, it depends significantly on the degree of diffusion of social

and cooperative enterprise models that we have defined in a generic way as “Social Enterprises”, conscious of identifying with this term a variety of models and experiences.

The diffusion of such models appears connected to a paradigm shift in the study of economic behaviour, which is must indeed refer to as conversion systems for evaluation and statistical measurement. Not always the official statistics can deeply understand these transformations: because, for example, they do not provide an adequate measure of economic well-being as an alternative to GDP, and do not give us a broad representation of the social economy. Just the crisis revealed, sometimes triggering social networks, the potential of an alternative business model and, more generally, of an economy based on a new paradigm that we call “Sensible Choice Theory”, linking us to the civil economy tradition.

It is our opinion that the future of the EU is entrusted precisely to the need for a paradigm change. We need adequate regulatory tools able to support a "civil" welfare system; a more inclusive model which brings the socio-economic systems towards social innovation and targets public investments to the empowerment of people (capabilities). It could represent a widespread territorial model, capable therefore of use (or rather re-use) the resources often "dormant" or "ill-used", according to a typical enhancement logic of Non-profit but also typical of Profit efficiency and sustainability.

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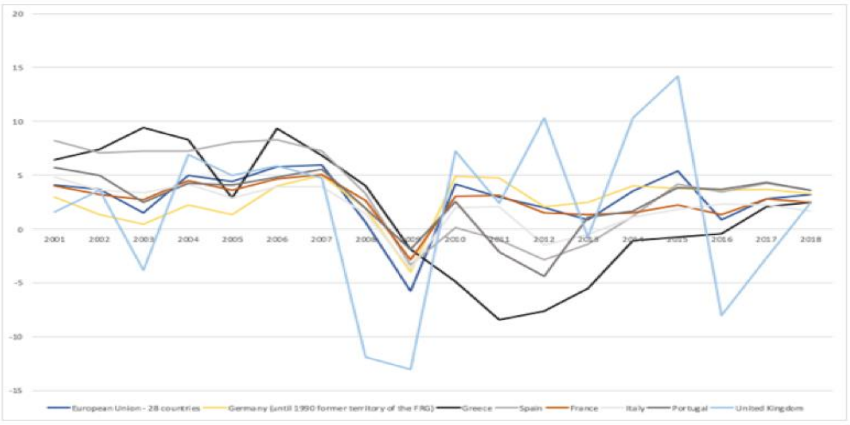
SUMMARY

Social capital and social entrepreneurship. Cross-country evidence for development and cohesion

The crisis revealed the potential of a social economy model capable of rethinking welfare through increased activation of networks and people. The present contribution intends to highlight how from an empirical point of view the social effects of the crisis have had a double expression: the increase of the vulnerability of people, and the growth of cooperative and social enterprise models. It represents a transformation that must also be led by a paradigm shift, for which the authors suggest a theoretical model.

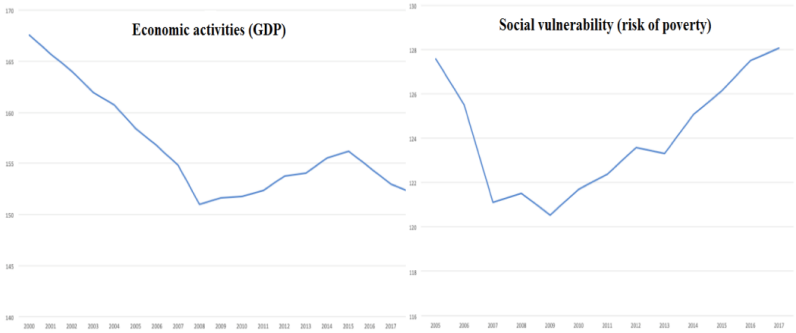
Appendix

Figure 1 – *Spatial gaps of EU countries: annual variations in GDP*.



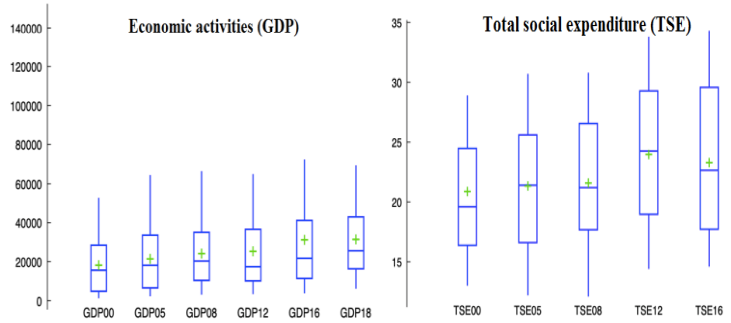
Source: own elaboration based on Eurostat data.

Figure 2 – *Differences between EU countries: variability over time (2000-2017).*



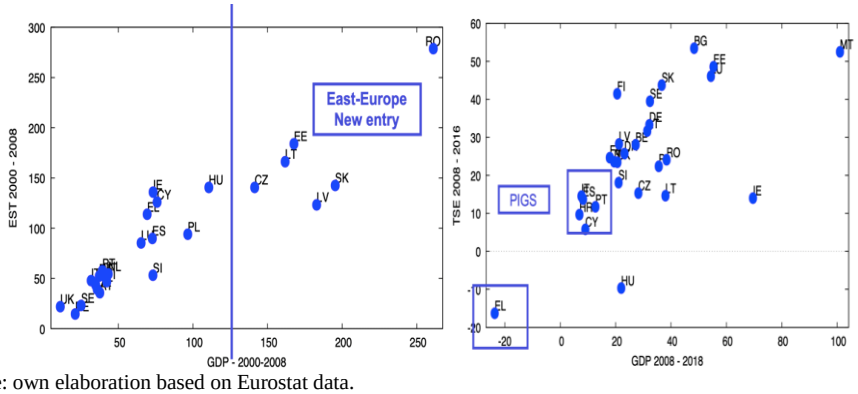
Source: own elaboration based on Eurostat data.

Figure 3 – *Differences between EU countries: box plot.*



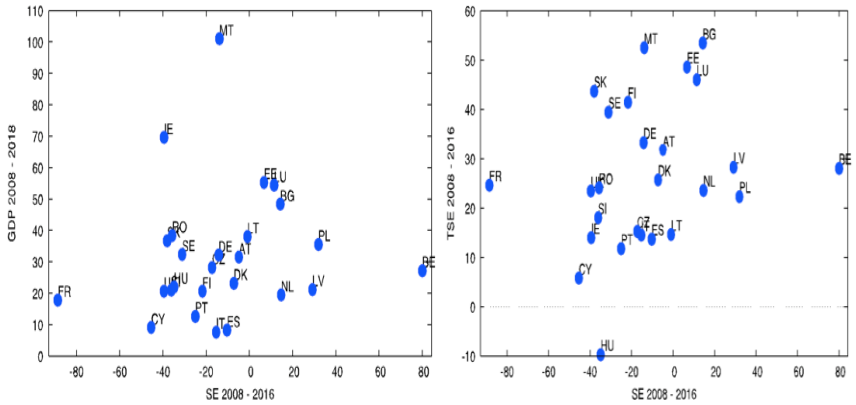
Source: own elaboration based on Eurostat data.

Figure 4 – *Total Social Expenditure vs GDP: pre and post-crisis.*



Source: own elaboration based on Eurostat data.

Figure 5 – *SE, TSE, and growth*.



Source: own elaboration based on Eurostat data.

Figure 6 – *Social capital: trust and civicness.*

Source: own elaboration based on Eurostat data.

Massimo CERMELLI, Universidad de Deusto, massimo.cermelli@deusto.es
Umberto DI MAGGIO, LUMSA Università, u.dimaggio@lumsa.it
Giuseppe NOTARSTEFANO, LUMSA Università, g.notarstefano@lumsa.it
Giuseppe TERZO, LUMSA Università, g.terzo@lumsa.it

CORPORATE SOCIAL RESPONSIBILITY, FAMILY FIRMS AND TERRITORIAL INSTITUTIONS IN ITALY: AN EMPIRICAL ANALYSIS

Marco Pini

1. Introduction

Corporate Social Responsibility (CSR) has been studied since the 1990s, following Bowen's original concept (Bowen, 1953), and has evolved towards the holistic and multipolar concept of a "social contract" between all actors (Del Baldo, 2010) within civil society (Bruni, 2008). According to the stakeholder theory, corporate management is driven by the need to balance the interests of all stakeholders (Freeman, 1984): both internal, such as employees (Hoffman *et al.*, 2006), and external such as suppliers, customers, and the local community (Adler and Kwon, 2002).

The CSR strategies of firms and their attitudes to social practices have not been fully researched (Berrone *et al.*, 2010; Walls *et al.*, 2012), and specific characteristics of small and medium enterprises (SMEs) (e.g., Jenkins, 2004; Tilley, 2000) such as family ownership should be considered, along with institutional factors (Cruz *et al.*, 2014).

This aim of this study is to investigate whether family firms are more or less socially responsible than non-family firms. The concept of territorial capital is an important factor for the Italian economy, from the point of view of both competitiveness and sustainable growth (e.g., Becattini, 1990, 2009; Becchetti *et al.*, 2007; Pini, 2017, 2019), so we study related issues including whether a firm's relationship with local institutions positively affects its adoption of social practices and whether the "local production culture" promotes the adoption of CSR practices. We also investigate firm's relationships with different stakeholders in the community such as school and universities, local banks, non-profit organizations, and cultural entities, from the CSR perspective.

The remainder of this paper is organized as follows. Section 2 provides a review of the related literature. Section 3 presents the econometric methodology and data. The results are discussed in Section 4, and Section 5 concludes.

2. Literature review

2.1 CSR and family firms

Currently, it is not clear whether family firms are more or less likely to adopt CSR practices (Cruz *et al.*, 2014; Dyer and Whetten, 2006), as well as how they pursue CSR initiatives towards internal and external stakeholders (Mitchell *et al.*, 2011). Family firms aim to protect and enhance their image and reputation, so they engage more closely with external stakeholders than non-family firms (Cennamo *et al.*, 2012; Berrone *et al.*, 2013), which positively affects their social practices (Whetten and Mackey, 2005). In these types of firms there is a strong linkage between the business – including the goods produced – and the individual identities of the founder, the family members and the shareholders, in addition to the family reputation (e.g., Foreman and Whetten, 2002). As there is an overlap between a firm's wealth and income and those of the family, a loss of reputation of the firm may also negatively reflect the economic conditions of the individual family members (Dyer and Whetten, 2006). Godfrey (2005) suggested that the positive image and reputation a firm projects to its external stakeholders represents a type of "positive moral capital" (or a reserve of "goodwill"), which acts as social insurance safeguarding the firm's assets (relational wealth and earnings streams), and those of the family, during a period of crisis. However, from the "amoral familism" (Banfield, 1958) viewpoint and that of mistrusting outsiders (Fukuyama, 1995), family firms are less socially responsible to external stakeholders because they only pursue their own interests (Morck and Yeung, 2004).

Conclusions about CSR behavior in terms of internal stakeholders have also been mixed. Many scholars have pointed out that family firms are more likely to pursue CSR practices in relation to their employees (e.g., Miller and Le Breton-Miller, 2006). To enhance their corporate reputation, family firms pursue further social initiatives, thus satisfying the needs of internal stakeholders (Miller and Le Breton-Miller, 2005) and simultaneously strengthening the legitimacy of the company (Mayo *et al.*, 2012). However, internal negative social behavior in family firms has also been identified, including an unfair compensation system (Chua *et al.*, 2009), a low level of peer appraisal (Fiegener *et al.*, 1994), managerial entrenchment (Gómez-Mejía *et al.*, 2011), and scapegoating of non-family executives and employees (Gómez-Mejía *et al.*, 2003). The potential reluctance to trust outsiders may also include employees who are not part of the family, and thus family firms may exhibit nepotistic behavior (Burkart *et al.*, 2003). In addition, family owners prefer to exert total power and authority, and primarily protect family members (Jones *et al.*, 2008) even at the cost of obstructing the firm's CSR social practices.

Cruz *et al.* (2014) studied 598 listed European enterprises and found that family firms were socially irresponsible in terms of internal stakeholders but no difference was found between any of the firms in terms of external stakeholders. Dyer and Whetten (2006) analyzed 261 listed firm in the S&P 500, and found that family firms are more socially responsible in terms of social concerns such as avoiding socially negative positions (controversies, environmental pollution, etc.) to protect their image, reputation and family assets, but for social initiatives no significant relationship was found.

2.2 CSR and the role of territorial institutions

The role played by local institutions in supporting the sustainable development of the community has been studied. These institutions encourage social initiatives by promoting CSR behaviors throughout the entrepreneurial system and strengthening the entrepreneurs' sense of belonging to the local community (Lepoutre, 2006; Del Baldo 2010). Local institutions such as those involved in the economy, trade unions, and civil society organizations can identify problems and find solutions and encourage local sustainable development, by working constructively with enterprises (European Commission, 2011). Indeed, the development of networks between different actors, such as firms and institutions, reinforces the social capital (Putnam, 1993a; 1993b) and the local economies becomes "relational goods" (Storper, 1997). In a territorial perspective, this relates to the issue of the "Territorial Social Responsibility" (Matacena and Del Baldo, 2009)

3. Empirical strategy and data

According to stakeholder theory (Freeman, 1984) we analyzed the firms' CSR behavior through the relationships with both internal and external stakeholders, (European Commission, 2011), in line with a previous empirically study (Cruz *et al.*, 2014). We considered a variable for internal stakeholders that takes the value of one if the firm invests in the health, safety, well-being and skills improvement of employees[1] (*Employees*). For external stakeholders we considered: i) if the firm made investments in environmental sustainability (*Green*); and ii) if it developed relations with customers through awareness campaigns, co-design, etc. to enhance their health and quality life (*Customers*) (binary variables). Concerning the relationship with the local community (always within external stakeholders), while

[1] Regarding the internal stakeholders, we did not consider the dimension of the governance (board independent and diversity, ethical leadership, etc.) as in Cruz *et al.* (2014), because we do not this have information from the questionnaire, and we must also consider that we mainly analyze small firms that may not have boards of governance.

Cruz *et al.* (2014) consider only one variable, we extend the issue by differentiating a firm's relationship with different actors living the community. We constructed the following binary variables that take a value of one if the firm has a relationship with: i) schools and universities, to improve the education level of the community (*School&University*); ii) local banks (*Local banks*); iii) non-profit organization (*Non-profit*); iv) and cultural entities (*Culture*). Thus, we have seven binary dependent variables, each of which takes a value of one if the firm adopts the corresponding social practice and zero otherwise. Due to the nature of the variables, we used probit models (Wooldridge, 2010). Therefore, for each *j* CSR dimension (*Employees*, *Green*, *School&University*, *Local banks*, *Non-profit*, *Culture*, *Customers*) the probability that firm *i* adopts the corresponding social practice *j* can be written as:

$$\mathrm{P}(CSR_{ji} = 1|F_i, S_i) = \mathrm{P}(\beta_0 + \beta_1 F_i + \beta_2 S_i + \varepsilon_i > 0) = \Phi(\beta_0 + \beta_1 F_i + \beta_2 S_i)$$

where F_i indicates if the firm is a family firm. In view of the many definitions of this type of firm (e.g., Chua *et al*., 1999), we defined family firms from the capital ownership perspective considering those firms where the founder and/or family members (regardless of who manages) are the owners (*Family*). S_i is a vector of all other explanatory variables including those referring to territorial factors. Concerning the latter, a value of one is given if the firm produces goods linked to local production culture[2] (*Made in Italy*) (Pini, 2017), or if the firm strengthened its relationships with territorial institutions, such as Chambers of Commerce, trade association and local authorities (*Terr. Institutions*).

The control variables include: technology regime (1 = if the firm belongs to a high- or medium-high technology intensive sector, HT); size (logarithm of numbers of employees); age (number of years since inception); geographical location (1 = if the firm is located in the *Southern*[3]); and declining performances (1 = if the firm has registered a decrease in turnover over the two-year period 2017-18: *Declining perf.*) since this last has been recognized as a potential factor negatively affecting CSR practices (e.g., Roberts, 1992). Finally, we also control for legal form using a dummy valued as one if the firm is a public limited company (*Plc*.) to account for the possibility that CSR initiatives may only be taken because they are required in formal reporting (as is often the case with this type of firms). The tables giving the variables description, summary statistics and correlation

[2] More specifically, "Local production culture" relates to all productions that stem from local manufacturing traditions and competences, which emphasize the quality and the originality of the Made in Italy goods.

[3] We chose the Southern to verify if the "amoral familism" exists (Banfield, 1958).

matrix are not reported due to space constraints. We exclude multicollinearity problems as the values of the Variance Inflation Factor are all less than 10: values over this threshold indicate problems (Yoo *et al.*, 2014). All tables are available upon request.

Returning to the probit models, Φ denotes the standard normal cumulative distribution. To assess the effects of any explanatory variable on the response probability $P(Y = 1|\mathbf{x})$ we calculated the marginal effects at the means (MEMs). Finally, ε_i is the normally distributed random error with zero mean and constant variance $N(0, \sigma^2)$, which captures any other unknown factors. We also applied an ordered probit model to measure the extent of CSR considering the number of the social practices adopted by the firm. Specifically, we constructed a variable ranging from zero if the firm does not adopt any social practice to four (if the firm adopts four or more social practices; we aggregated the firms from four to seven social practices due to the low frequencies).

The firm-level data used are derived from a survey conducted by Unioncamere (the Italian Union of Chambers of Commerce) in 2018. The data refer to a statistically representative sample of 3,000 Italian manufacturing firms that have at least 5 employees.

4. Results and discussion

Table 1 displays the results. Controlling for various firm characteristics, we find a positive effect of family ownership in adopting CSR practices with regard both internal and external stakeholders, including all types of stakeholders in the community. The magnitude of the marginal effects indicates that family firms are more socially responsible than non-family firms, particularly in terms of CSR practices towards employees, but also with reference to green investments, relationships with local banks and engagement in cultural activities. In all cases the marginal effects are significant at 1% with the exception being customers' relationship ($p = 0.053$). Our results are in line with some scholars (Miller & Le Breton Miller 2005; Mitchell *et al.*, 2011; Cennamo *et al.*, 2012), but contrary to others. In particular, recent empirical studies, such as those of Cruz *et al.* (2014), found that family firms are less likely to pursue CSR practices towards the internal stakeholders, while any significant effect was found concerning those towards the external stakeholders. As well Dyer and Whetten (2006) did not find a positive effect of family firms in pursuing social initiatives.

The territory is found to be a factor positively affecting social sustainability: firms more closely related to the local production culture (*Made in Italy*) are more likely to adopt CSR practices with regards to all types of external stakeholders, with a significance level of 1%. Our findings also show the importance of the role of territorial institutions: firms' relationships with Chambers of Commerce, trade

associations and local authorities (*Terr. Institutions*) increase the probability of adopting CSR practices with reference to both internal and external stakeholders, with a significant level of 1%. The results on the extent of CSR reported in Table 2 (columns C-G) confirm this. When a firm strengthens its relationship with territorial institutions (*Terr. Institutions*), in the face of a decrease in the probability of not adopting or adopting only one CSR practice (by 24.6% and 13.2%, respectively), there is a corresponding significant increase especially in the probability of adopting four or more CSR practices (CSR = 4) by 17.1% ($p<0.01$). Moreover, in comparison with all other independent variables, the variable *Terr. Institutions* shows the highest increase of the probability of adopting four or more CSR practices. This reinforces the suggestion that territorial institutions play an important role in supporting CSR behavior among the entrepreneurial system as a type of "CSR accelerator". For example, Italian Chambers of Commerce promote several activities aimed at spreading CSR knowledge and supporting firms in the implementation of social practices, such as one-stop-shops for businesses dedicated to CSR issues, producing documents, and organizing conferences, training courses and awards.

Furthermore, evidences of "CSR accelerator" were found also for the following cases: i) Made in Italy, confirming that territorial capital is an important driver of social sustainability; and ii) family firms, as the likelihood of them pursuing four or more social practices is almost 17% ($p<0.01$) higher than non-family firms. For a robustness check, we applied the Bootstrap method (500 replications) on ordered probit (Table 2, column B), which provides more precise standard errors. The results are confirmed and the standard errors change very little.

5. Conclusions

Our results show that family firms behave in a more socially responsible way towards both internal and external stakeholders than non-family firms. When firms have relationships with local institutions the likelihood increases that they will pursue social initiatives. In terms of the local dimension, the firms linked to the local production culture are more socially responsible. Policies often only focus on the sector or the size dimension, but these findings show that they should also consider other factors such as ownership. Specific policy measures can include i) identifying family firms that are examples of good business behavior in the field of social sustainability, hence increasing the awareness of the importance of CSR; and ii) supporting non-family firms in their adoption of social practices to achieve a "CSR convergence" across the entire entrepreneurial system. In addressing these issues, policies should involve territorial institutions that can leverage on their "bridge function" between national and local levels: this can ensure that the initiatives are developed in line with the features of the local entrepreneurial

system, and better suit the needs of the firms. Further research in this area can be of benefit. For example, the dynamics of CSR over recent years can be examined to establish if and how the last economic crisis changed the views of enterprises in doing business. The limitations of this work are that a cross-section analysis was used, and that it only focuses on the manufacturing. These issues can be addressed in future research.

Appendix

Table 1 – *Baseline results: CSR behavior by type of stakeholder.*

.	Internal stakehold.	External stakeholders					
		Green	Community				Customers
	Employees		School & University	Local Banks	Non-profit	Culture	
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Family	0.372***	0.195***	0.079***	0.180***	0.053***	0.142***	0.018*
	(0.022)	(0.025)	(0.017)	(0.022)	(0.012)	(0.021)	(0.009)
Made in Italy	0.029	0.103***	0.036***	0.140***	0.015**	0.085***	0.020***
	(0.018)	(0.019)	(0.012)	(0.015)	(0.007)	(0.014)	(0.006)
Terr. Institutions	0.413***	0.116***	0.149***	0.136***	0.076***	0.151***	0.098***
	(0.033)	(0.025)	(0.014)	(0.018)	(0.008)	(0.017)	(0.008)
Declining perf.	-0.040	-0.217***	-0.037	-0.098***	-0.018	-0.078***	-0.014
	(0.033)	(0.037)	(0.023)	(0.030)	(0.014)	(0.028)	(0.014)
HT	-0.056**	-0.003	-0.001	0.048**	0.011	-0.020	0.008
	(0.024)	(0.025)	(0.015)	(0.019)	(0.009)	(0.019)	(0.008)
Log(Size)	0.193***	0.152***	0.106***	0.027	0.021**	0.033*	0.022***
	(0.025)	(0.024)	(0.015)	(0.018)	(0.009)	(0.018)	(0.007)
Age	-0.000	0.001	0.000	0.001	0.000	0.001	-0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Plc.	0.013	0.037*	-0.010	0.022	-0.008	0.009	0.002
	(0.021)	(0.022)	(0.015)	(0.018)	(0.008)	(0.017)	(0.008)
Southern	-0.009	-0.018	-0.001	-0.005	0.012	0.020	0.006
	(0.025)	(0.026)	(0.017)	(0.021)	(0.009)	(0.020)	(0.009)
Obs.	3,007	3,007	3,007	3,007	3,007	3,007	3,007
Wald Chi-square	454.41***	241.30***	322.73***	258.90***	183.69***	211.15***	334.26***
Pseudo R^2	0.183	0.063	0.128	0.086	0.134	0.074	0.234

Table displays marginal effects at the means (MEMs.). The dependent variable is reported at the top of the column. Robust standard errors in parentheses. Wald test of the model specification is reported.
**** p<0.01, ** p<0.05, * p<0.1.*

Table 2 – *CSR extensive.*

	Ordered probit	Ordered probit Bootstrap	Marginal effects at the means				
			CSR = 0	CSR = 1	CSR = 2	CSR = 3	CSR = 4
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Family	0.928***	0.928***	-0.241***	-0.129***	0.082***	0.120***	0.168***
	(0.056)	(0.060)	(0.015)	(0.010)	(0.008)	(0.009)	(0.011)
Made in Italy	0.321***	0.321***	-0.083***	-0.045***	0.028***	0.042***	0.058***
	(0.040)	(0.041)	(0.010)	(0.006)	(0.004)	(0.006)	(0.007)
Terr. Institutions	0.945***	0.945***	-0.246***	-0.132***	0.083***	0.122***	0.171***
	(0.052)	(0.053)	(0.014)	(0.010)	(0.007)	(0.009)	(0.011)
Declining perf.	-0.389***	-0.389***	0.101***	0.054***	-0.034***	-0.050***	-0.071***
	(0.069)	(0.067)	(0.018)	(0.010)	(0.006)	(0.009)	(0.013)
HT	-0.038	-0.038	0.010	0.005	-0.003	-0.005	-0.007
	(0.054)	(0.054)	(0.014)	(0.007)	(0.005)	(0.007)	(0.010)
Log(Size)	0.481***	0.481***	-0.125***	-0.067***	0.042***	0.062***	0.087***
	(0.051)	(0.052)	(0.014)	(0.008)	(0.005)	(0.007)	(0.010)
Age	0.002	0.002	-0.001	-0.000	0.000	0.000	0.000
	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Plc.	0.061	0.061	-0.016	-0.009	0.005	0.008	0.011
	(0.049)	(0.048)	(0.013)	(0.007)	(0.004)	(0.006)	(0.009)
Southern	-0.021	-0.021	0.005	0.003	-0.002	-0.003	-0.004
	(0.057)	(0.057)	(0.015)	(0.008)	(0.005)	(0.007)	(0.010)
Observations	3,007	3,007					
Wald Chi-square	949.24***	927.71***					
Pseudo R^2	0.104	0.104					

*Table displays the estimated coefficients of the ordered probit and marginal effects at the means (MEMs.) for the five categories of CSR: CSR = 0 if the firm does not adopt any CSR social practice (CSR s.p.); = 1 if the firm adopts only one CSR s.p.; = 2 if the firm adopts two CSR s.p.; = 3 if the firm adopts three CSR s.p.; = 4 if the firm adopts four or more CSR s.p. Robust standard errors in parentheses. Wald test of the model specification is reported. *** p<0.01, ** p<0.05, * p<0.1.*

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Disclaimer

The views expressed in the article are those of the author and not of the institution he is affiliated with.

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SUMMARY

Corporate social responsibility, family firms and territorial institutions in Italy: an empirical analysis

Corporate Social Responsibility (CSR) has long been studied from different points of view. However, in terms of firm ownership, the relationship between family ownership and CSR is still unclear in the literature. The aim of this study is to test the extent to which family firms are socially responsible in Italy by analyzing the various issues of CSR related to internal stakeholders (a firm's relationship with those working in the company) and external stakeholders (the environment, local community, and customers) from several perspectives. We contribute to the literature by examining in detail a firm's relationship with different actors in the local community, such as schools and universities, local banks, non-profit organizations, and cultural entities.

We also test the role of territorial institutions (e.g., Chambers of Commerce) in supporting firms' adoption of CSR behaviors. The identity of Italian firms is often closely associated with the concept of Made in Italy, so we also link the issue of identity with the local production culture and test whether the latter promotes the adoption of CSR practices.

We use probit and ordered probit models on a dataset related to a survey carried out in 2018 on a sample of 3,007 Italian manufacturing enterprises. We control for several firm characteristics, some of which have not been previously considered in the literature.

We find that family ownership increases the probability of adopting CSR practices, in terms of both internal and external stakeholders. The results also highlight the significant role of territorial institutions in strengthening firms' social initiatives, and also more broadly in the simultaneous adoption of several social practices. Firms linked to a local production culture are more socially responsible towards external stakeholders contributing to enriching the territorial capital. Finally, policy implications are discussed.

Marco PINI, Unioncamere-Si.Camera, m.pini@sicamera.camcom.it.

CHURN, PROFESSIONI E TERRIRORIO[1]

Arianna Carra, Alberto Vitalini, Flavio Verrecchia

1. Introduzione

Il lavoro prende spunto da un saggio di McTeer (1992) che descrive un particolare esempio di *churn*: il caso di fallimento economico di aree degli Stati Uniti, dovuto a cambiamenti infrastrutturali conseguenti al *Federal-Aid Highway Act* avviato dal Presidente Eisenhower. Le *interstate*, infatti, modificarono la rete stradale federale sostituendo le direttrici dell'epoca (p. es. la nota *Route 66*) e isolando molti paesi.

L'obiettivo del lavoro, nonostante sia d'interesse anche il *churn* in termini di struttura settoriale che ha portato all'odierna economia terziarizzata - ad esempio per la crescita di alcuni settori di servizi alle persone a bassa produttività - riguarda lo studio del *churn* in termini di professioni con riferimento al *benchmark* europeo. L'attenzione sarà rivolta agli indicatori di struttura e dinamica delle professioni. L'approccio di Joseph A. Schumpeter (1942), che descrive il funzionamento di un'economia di mercato come un processo di *"distruzione creatrice"* e che vede l'innovazione quale motore di questo processo, può essere usato come riferimento per lo studio del *churn* delle professioni: necessaria creazione di nuove e innovative professioni a più elevata specializzazione e contestuale distruzione di quelle più elementari. L'essenza del processo di *churning* shumpeteriano è ben descritta dalla *"foto di famiglia"* regalata da McTeer che con semplicità racconta le due facce del progresso tecnologico -processo di cambiamento strutturale- con nuovi prodotti (che però rendono i vecchi obsoleti) e con nuove tecniche di produzione che richiedono nuove competenze (che però rendendo alcune qualifiche meno utili): *"Un bisnonno ed un nonno fabbro. Un padre che riforniva le automobili che avevano fatto fallire il nonno e che fallì a sua volta con l'arrivo delle interstate. Di conseguenza, queste ultime fecero anche svanire le prospettive di successo di McTeer"*.

[1] Il lavoro è di responsabilità comune degli autori. I paragrafi 3.2, 3.3, 3.4 sono da attribuire a Arianna Carra, mentre i paragrafi 2 e 3.1 sono da attribuire a Alberto Vitalini.

In quest'ottica, la domanda di ricerca, può così essere espressa: si osserva una crescita delle società e delle economie regionali in un'ottica *shumpeteriana* di «distruzione creatrice»? o, detto in altri termini, le professioni meno specializzate lasciano il posto alle professioni avanzate?

Seguendo *"The churn"*, lo studio delle professioni avrà luogo attraverso l'uso degli strumenti descritti nel paragrafo 2, che rispondono a differenti domande conoscitive e sono ritenuti particolarmente adatti per rappresentare l'intensità e la concentrazione o la dispersione dei fenomeni a livello territoriale.

2. Metodi

Nel lavoro, per le analisi, sono state utilizzate fonti di statistica ufficiale Eurostat[2] e Istat[3], considerando sia le professioni intermedie e avanzate[4] sia le professioni elementari[5] secondo lo standard ISCO - *International Standard Classification of Occupations*[6].

Per rappresentare graficamente ed intuitivamente dati di natura territoriale, il cartogramma è uno strumento particolarmente efficace. Per lo studio della distribuzione territoriale dell'incidenza delle professioni sono individuabili diversi strumenti cartografici che rispondono a differenti domande conoscitive. In particolare, in questo lavoro sono state ritenute adatte per rappresentare l'intensità e la modalità di concentrazione o dispersione di un fenomeno a livello territoriale le Box plot map, le Spatial empirical bayesian smoothed rate (SEBS) box plot map (Devine et al. 1994; Anselin, 2004) e le Local indicator spatial association (LISA) Cluster map (Anselin, 1995).

[2] Cfr. https://ec.europa.eu/eurostat/data/database.

[3] Cfr. http://dati.istat.it/.

[4] Dirigenti; Professioni intellettuali e scientifiche; Professioni tecniche intermedie (p. es. Ambasciatori; Ministri; Imprenditori; Amministratori; Notai, Magistrati, Docenti universitari; Ricercatori; Insegnanti; Fisici; Ingegneri; Piloti; Psicologi clinici; Psicoterapeuti; Fisioterapisti; Scultori; Giornalisti; Periti).

[5] Pulitori e aiutanti; Lavoratori agricoli, forestali e della pesca; Lavoratori nei settori minerario, edile, manifatturiero e dei trasporti; Assistenti alla preparazione dei cibi; Lavoratori ambulanti e addetti alle vendite e ai servizi correlati; Altri lavoratori elementari (p. es. Bidelli; Collaboratori domestici; Braccianti agricoli; Personale non qualificato addetto alla manutenzione del verde; Manovali e personale non qualificato dell'edilizia civile; Personale non qualificato addetto all'imballaggio e al magazzino; Addetti alla preparazione, alla cottura e alla vendita di cibi in *fast food*, ecc.; Venditori ambulanti; Operatori ecologici; Facchini, addetti allo spostamento merci).

[6] Cfr. https://www.ilo.org/public/english/bureau/stat/isco/.

Box-plot map

La cartografia *box-plot* si può considerare il corrispondente cartografico di un grafico *box-plot*. Il punto di partenza è una cartografia in quartili, in cui le quattro categorie sono estese a sei, per identificare separatamente i valori estremi inferiori (minori del valore del primo quartile meno 1,5 volte la distanza interquartile) e superiori (maggiori del valore del terzo quartile più 1,5 volte la distanza interquartile). In particolare, considerando i colori utilizzati, le cartografia presentate si possono considerare delle *temperature map* dove i colori arancione e rosso indicano zone "calde", ad elevata criticità, mentre i colori azzurro e blu indicano "zone fredde", a bassa criticità.

Spatial empirical bayesian smoothed rate (SEBS) box plot map

In questo caso i valori presentati nella cartografia tematica *box-plot* sono i valori *spatial empirical bayesian smoothed rate* (*SEBS*), calcolati per ogni area, al fine di tenere sotto controllo possibili situazioni di non omogeneità spaziale delle varianze.

La tecnica consiste nel calcolare, per ogni area, un valore dell'incidenza dell'occupazione nelle professioni di interesse dato dalla media ponderata tra i valori dell'incidenza della regione e la media dei valori dell'incidenza rilevata nelle (quattro) regioni più vicine (che presentano i valori delle distanze euclidee fra i centroidi di area più bassi), con pesi proporzionali alla popolazione a rischio.

In altre parole, nel caso di regioni europee con una limitata ampiezza demografica il valore regionale grezzo dell'incidenza dell'occupazione nelle professioni di interesse sarà modificato "trascinandolo" (*shrinkage*) verso il valore dell'intorno, mentre nelle regioni con un'elevata ampiezza demografica il valore grezzo dell'incidenza dell'occupazione nelle professioni di interesse sarà modificato poco o per niente (ovviamente se tutte le aree presentano ampiezze elevate il risultato sarà conforme a una *box-plot* dei valori grezzi).

Un *caveat*: i SEBS, poiché gli *smoothed rates* sono dipendenti fra loro per costruzione, non sono utili per l'analisi dell'autocorrelazione spaziale per verificare, in altre parole, se la presenza di una particolare intensità di un fenomeno in una determinata area implichi la presenza dello stesso fenomeno nelle regioni vicine.

Local indicator spatial association (LISA) Cluster map

Per studiare l'autocorrelazione spaziale abbiamo, pertanto, utilizzato le LISA *cluster map*. Queste cartografie consentono di quantificare la correlazione, individuare cluster di aree e verificare che la correlazione non sia dovuta al caso. In questa sede è stato calcolato l'indice LISA - *local indicator spatial association* - proposto da Luc Anselin (1995). La cartografia tematica LISA *Cluster map* è un modo intuitivo per rappresentare graficamente e contemporaneamente i valori LISA statisticamente significativi e l'informazione circa l'ordine di grandezza del

fenomeno della regione e dei suoi vicini. La *Cluster Map* è una cartografia tematica che mostra solo le regioni con valori statisticamente significativi di LISA, classificati secondo cinque categorie: Non significativo (aree che non sono significative al livello 0,05); *High-High* (alto valore dell'indicatore a aree vicine con alti valori dell'indicatore); *Low-Low* (basso valore dell'indicatore e aree vicine con bassi valori dell'indicatore); *Low-High* (basso valore dell'indicatore e aree vicine con alti valori dell'indicatore); *High-Low* (alto valore dell'indicatore e aree vicine con bassi valori dell'indicatore.

3. Risultati

3.1. Le professioni avanzate e intermedie e le professioni elementari: quadro europeo

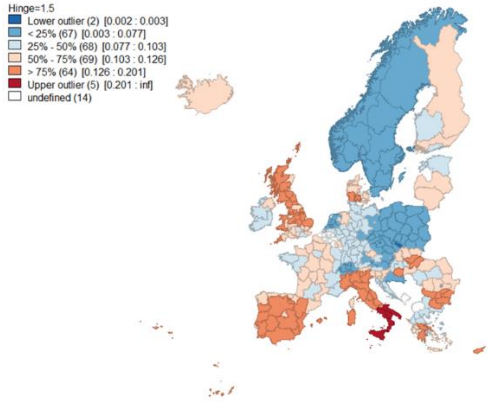
In questo paragrafo si considera l'incidenza sia delle professioni non specializzate sia di quelle avanzate e intermedie: in particolare si esamina la loro evoluzione, in Italia, osservando i valori nel tempo e, in Europa, confrontando i valori delle regioni italiane con quelli europei. L'obiettivo è raccogliere indizi utili a comprendere il tipo di *churn* strutturale nel quale è inserito l'Italia.

Considerando i dati censuari, il quadro che emerge non è di univoca interpretazione: infatti, in termini assoluti, si rileva che, tra il 2011 e il 2017 cresce sia il numero di professioni intermedie e avanzate (+350mila unità) sia il numero di professioni elementari (+260mila unità). L'ordine di grandezza della crescita delle professioni elementari è pari a quello di interi comparti di attività economica. La variazione assoluta di occupati non specializzati è, ad esempio, maggiore degli occupati dell'industria tessile (142mila unità) e della chimica (111mila unità).

Il confronto fra le regioni italiane con quelle europee rimanda, rispetto alla dinamica italiana, ad un quadro maggiormente definito. Se, infatti, osserviamo le cartografie (Figure 1 e 3) si può notare che le aree di criticità comprendono, tra le altre, sempre le regioni italiane, sia considerando l'incidenza delle professioni elementari sia quella delle professioni avanzate o intermedie[7]. In altre parole le regioni italiane si trovano, in Europa, sempre nel gruppo di regioni con la più elevata incidenza di professioni elementari o la più bassa incidenza di professioni avanzate ed intermedie, creando dei cluster di "zone critiche" (Figure 2 e 4).

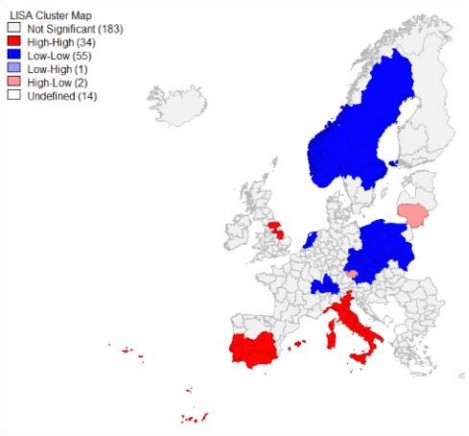
[7] In questo caso per rendere più immediata la lettura in termini di zone "calde" si è plottato il valore del complemento dell'incidenza delle professioni avanzate ed intermedie.

Figura 1 – *Occupati in professioni elementari, 2011(SEBS Box-plot map).*



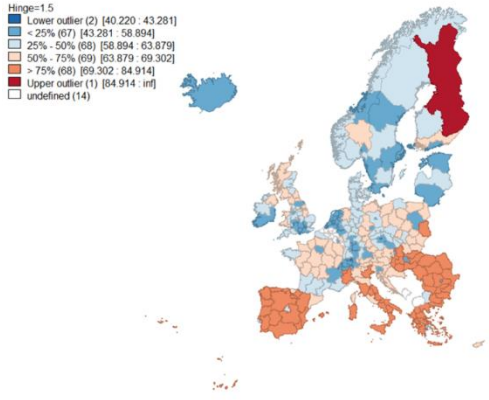
Note: nostre elaborazioni su dati Eurostat.

Figura 2 – *Occupati in professioni elementari, 2011 (LISA Cluster map).*



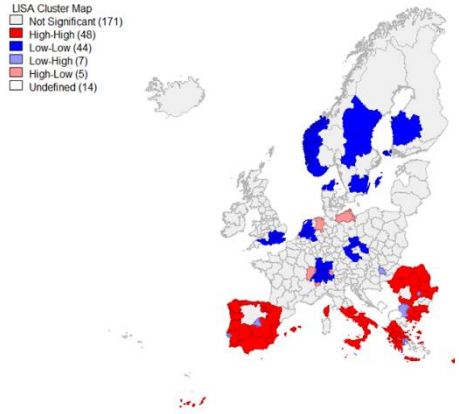
Note: nostre elaborazioni su dati Eurostat.

Figura 3 – *Occupati in professioni avanzate e intermedie, 2011 (SEBS Box-plot map).*



Note: nostre elaborazioni su dati Eurostat. Per rendere più immediata la lettura in termini di zone "calde" si è plottato il valore del complemento a uno dell'incidenza

Figura 4 – *Occupati in professioni avanzate e intermedie, 2011 (LISA Cluster map).*



Note: nostre elaborazioni su dati Eurostat. Per rendere più immediata la lettura in termini di zone "calde" si è plottato il valore del complemento a uno dell'incidenza.

3.2. Le professioni avanzate e intermedie e le professioni elementari: la dinamica

Negli ultimi decenni, l'Italia non sembra "brillare" particolarmente per tipo di professioni svolte (§ 3.1). I dati infatti, sembrano evidenziare una considerevole diffusione delle professioni elementari in tutte le regioni e province autonome.

Considerando la dinamica, nell'arco di un decennio, l'Italia peggiora significativamente rispetto alla media europea (EU15=100), con una contrazione relativa delle professioni avanzate e intermedie (-16%) e con l'aumento del peso (+20%) delle professioni elementari (Figura 5).

Ci si potrebbe chiedere quanto la storia demografica possa influenzare – o aver avuto influenza – sul fenomeno. Si potrebbe supporre, ad esempio, che ad una struttura per età più "anziana" corrisponda una maggior concentrazione di lavori meno qualificati (p. es. nei servizi alle persone) e che, viceversa, siano più diffusi lavori più qualificati in una popolazione più giovane o, addirittura di "nativi digitali", che ha avuto possibilità di raggiungere livelli di istruzione più elevati rispetto alle epoche passate. Per cercare di rispondere a questa domanda, può essere utile il paragone dell'Italia (Tabella 1) con la Germania quale *benchmark*. Osservando, infatti, i dati disponibili relativi agli ultimi tre censimenti, è possibile, innanzitutto, osservare come i due Paesi, nel tempo, siano "invecchiati" e con modalità molto simili. In entrambe le realtà, la proporzione di popolazione con almeno 65 anni di età è passata da circa 15% a poco più del 20%. Non solo: se, nel 1991, si contano poco più di 90 ultrasessantacinquenni per ogni 100 minori con età inferiore ai 15 anni sia in Italia sia in Germania, nel 2011 quest'indice (IV_2) raggiunge valori prossimi al 149% in Italia e al 153% in Germania.

Tabella 1 – *Indici demografici – Italia, 1991, 2001 e 2011.*

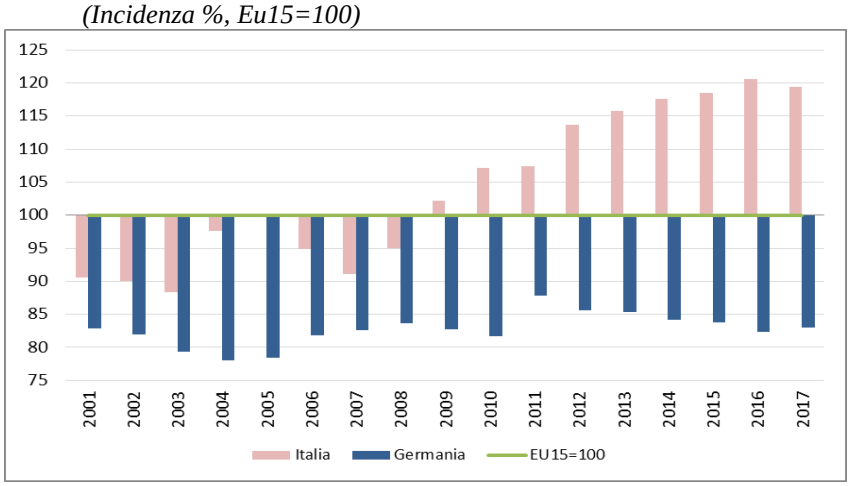
	IV_1	IV_2	ID	$ID_{giovani}$	$ID_{anziani}$	IS	IR
1991	15,3	96,6	45,3	23,1	22,3	82,6	76,5
2001	18,7	131,4	49,0	21,2	27,8	93,1	116,9
2011	20,8	148,7	53,5	21,5	32,0	120,7	130,3

Note: Nostre elaborazioni su dati Eurostat. ***Indici di vecchiaia IV_1 e IV_2****: numero di individui con almeno 65 anni rispettivamente ogni 100 individui e 100 individui con età inferiore ai 15 anni.* ***Indici di dipendenza****: per ogni 100 individui di età compresa tra i 15 ed i 64 anni esprimono, rispettivamente, il numero di individui di età inferiore ai 15 anni o di 65 anni o più (ID), il numero di individui di età inferiore ai 15 anni ($ID_{giovani}$) e il numero di individui con almeno 65 anni ($ID_{anziani}$).* ***Indice di struttura della popolazione in età attiva - IS****: numero di individui di età compresa tra i 40 ed i 64 anni per ogni 100 individui di età compresa tra i 15 ed i 39 anni.* ***Indice di ricambio della popolazione in età attiva - IR****: numero di individui con età compresa tra i 60 ed i 64 anni ogni 100 individui di età compresa tra i 15 ed i 19 anni.*

Nonostante i due Paesi presentino una struttura e una evoluzione demografica non così dissimili, la Germania tende, invece, a mantenere costante il miglior

posizionamento rispetto al dato europeo (Figura 5). Non sembra pertanto che la storia demografica abbia un ruolo determinante per la comprensione del fenomeno.

Figura 5 – *Occupati in professioni elementari, EU15, Italia e Germania, 2001-2017 (Incidenza %, Eu15=100)*

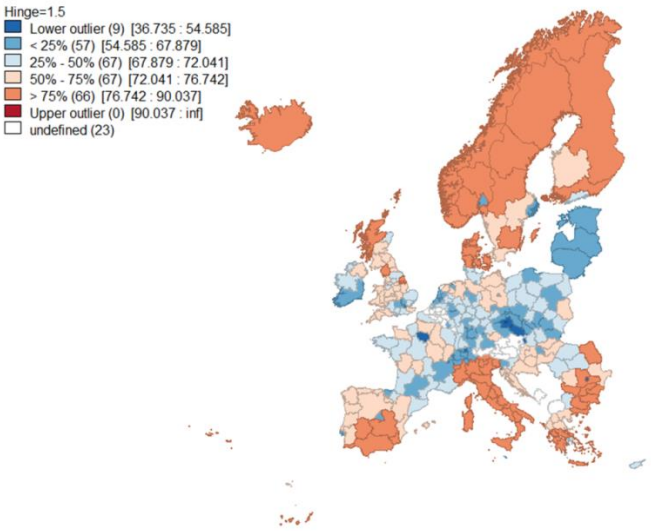


Note: nostre elaborazioni su dati Eurostat. Eu15: Unione Europea a 15 Paesi.

3.3. Le professioni avanzate e intermedie dei giovani lavoratori: quadro europeo

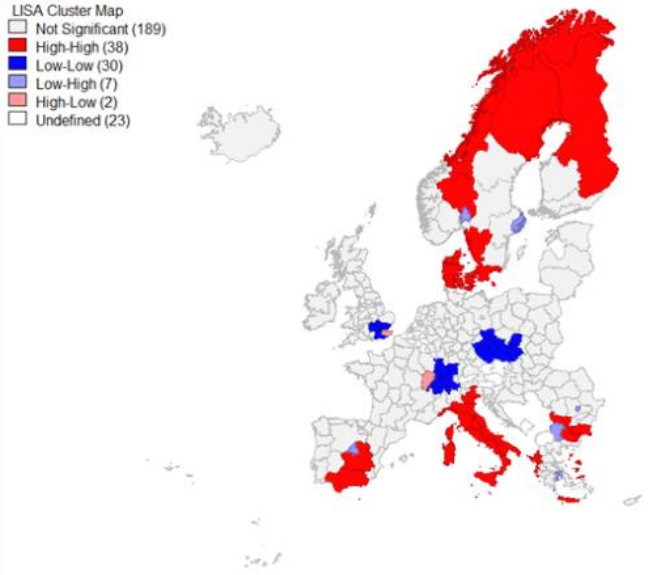
Se, da un lato, l'invecchiamento della popolazione può determinare specifiche conseguenze strutturali in termini di attività economica, dall'altro, considerando le professioni, sembrando poco plausibile che nelle regioni italiane ci siano problemi di carenza di abilità (*skill gap*) o di professioni (*skill shortage*), restano da indagare le ragioni del disallineamento delle competenze (*skill mismatch*) che sembra avere un impatto più significativo sui lavoratori più giovani. Infatti, nonostante gli indici di struttura (IS) e di ricambio (IR) della popolazione in età attiva sembrino "offrire un'occasione" ai giovani sotto il profilo dell'occupazione (Tabella 1), è evidente come invece i giovani "fatichino" a trovare impieghi qualificati in tutte le regioni italiane. La *Box-plot map* (Figura 6) mette in luce una scarsa incidenza delle professioni avanzate e intermedie - contestuale ad elevate incidenze di professioni elementari - per la popolazione con età compresa tra i 15 e i 29 anni. Dato confermato anche dai *cluster* definiti dalla *LISA Cluster map* (Figura 7). Sempre dall'esame delle cartografie, invece, vaste zone tedesche e il sud-est britannico spiccano, tra le altre, per le elevate incidenze di professioni avanzate ed intermedie per le fasce giovanili della popolazione, una caratteristica che potrebbe concorrere all'attrazione di una parte consistente di coloro che, proprio in Italia, raggiungono il massimo livello di istruzione (§ 3.4).

Figura 6 – *Giovani occupati in professioni avanzate e intermedie, 2011 (Box-plot map)*



Note: nostre elaborazioni su dati Eurostat. Per rendere più immediata la lettura in termini di zone "calde" si è plottato il valore del complemento a uno dell'incidenza.

Figura 7 – *I Giovani occupati in professioni avanzate e intermedie, 2011 (LISA map)*



Note: nostre elaborazioni su dati Eurostat. Per rendere più immediata la lettura in termini di zone "calde" si è plottato il valore del complemento a uno dell'incidenza.

3.4. Le professioni e la mobilità per chi consegue titoli ad elevata specializzazione formativa negli atenei italiani

Come si osserva dall'analisi dei paragrafi che precedono il presente, l'Italia si colloca fra le aree "in sofferenza" per quanto concerne le professioni avanzate ed intermedie. Per individuare altri segnali relativi al *churn* in atto in questi ultimi gruppi di professioni, si è ritenuto utile focalizzare l'attenzione su soggetti con elevatissima specializzazione e di numerosità piuttosto consistente, nella convinzione che, in questo gruppo "d'avanguardia", le dinamiche oggetto di studio si manifestino in modo più intenso e con anticipo rispetto a quanto potrebbe accadere per altri individui con titolo di studio universitario meno specialistico e che ambiscono a professioni elevate. Per questi motivi, sono stati considerati coloro che conseguono in Italia il dottorato di ricerca (circa 11mila all'anno), il titolo di studio più elevato tra quelli riconosciuti nel nostro Paese. L'Istat nel 2018 ha realizzato la terza indagine sull'inserimento professionale dei dottori di ricerca, osservandone le condizioni sotto il profilo occupazionale a quattro ed a sei anni dal conseguimento del titolo (ISTAT, 2018).

Da un primo esame, sembra incoraggiante il fatto che la grande maggioranza dei dottori di ricerca (circa il 94%) - considerando unitamente le coorti di coloro che hanno conseguito il titolo nel 2012 e nel 2014 - sia occupato. Peraltro quasi il 71% di questi ultimi ha iniziato l'attività dopo aver concluso il percorso di studi. Inoltre, considerando sempre globalmente i dati disponibili, dall'indagine risulta che la parte più consistente di coloro che lavorano - escludendo i titolari di borsa di studio e di assegno di ricerca - svolge professioni di elevata specializzazione o risulta essere dirigente o imprenditore (91%) e che un'altra parte comunque non trascurabile (6,2%) è impiegata in professioni tecniche. Si osserva comunque una parte residuale di dottori di ricerca dediti alle vendite e ai servizi (pari al 2,6%) e alle professioni manuali (0,2%).

Nonostante ciò, emerge che una parte consistente dei dottori di ricerca dichiari di vivere abitualmente all'estero. Non solo, in termini retrospettivi, da un raffronto dei risultati delle tre edizioni dell'indagine Istat (2009, 2014 e 2018), emerge che tale quota sia aumentata nel tempo. Infatti, se per le coorti del 2004 e del 2006 solo il 7% di quanti avevano conseguito il titolo in Italia dichiarava di vivere in un altro Paese (ISTAT, 2010), nel 2014, per le coorti 2008 e 2010, la corrispondente quota saliva al 12,9% (ISTAT, 2015) per poi raggiungere, nell'indagine del 2018, il 17,2%. Osservando nel dettaglio i dati sulla mobilità, appare evidente l'esistenza di una differenziazione per area disciplinare. Infatti, per tutte le tornate dell'indagine, la propensione a muoversi in un altro Paese è più elevata per i dottori specializzati nelle aree scientifiche. In particolare, al primo posto si collocano i dottori delle scienze fisiche: nell'indagine del 2009-2010, questi rappresentavano quasi un quarto della rispettiva categoria (23,7%), nell'indagine del 2014 avevano raggiunto

il 31,5% e, nell'indagine del 2018, la loro percentuale sale al 31,9%. Secondi ad essi sono i dottori nelle scienze matematiche e informatiche: la percentuale di quanti hanno dichiarato di vivere abitualmente all'estero è passata dal 9,5% (nel 2009-2010) al 22,4% nel 2014 ed ha superato il 27% nel 2018.

Secondo l'ultima indagine del 2018, i primi due Paesi europei che maggiormente attirano i dottori di ricerca delle università italiane sono il Regno Unito (scelto dal 21,2% degli intervistati) e la Germania (11,7%).

Le quote elevate di dottori di ricerca che si trasferiscono in altri Paesi, dinamici sotto il profilo di richiesta di capitale umano specializzato, sono coerenti sia con il quadro di sofferenza dell'Italia delineato nei precedenti paragrafi sia con l'ipotesi avanzata nel paragrafo 3.3, ed evidenziata, in particolare, nella Figura 7, ovvero quella secondo cui la Germania e il sud-est britannico concorrano all'attrazione di una parte consistente di coloro che, proprio in Italia, raggiungono il massimo livello di istruzione.

4. Conclusioni

L'assunto schumpeteriano di "distruzione creatrice" non sembra verificarsi in Italia, anzi i dati risultano compatibili con la tesi contraria. A livello europeo, invece, l'assunto pare tenere soprattutto nelle aree continentali. Infatti, se da un lato, in Italia, risulta evidente sul piano storico il susseguirsi delle diverse transizioni che hanno portato all'odierna economia terziarizzata, dall'altro, nel nostro lavoro, emergono segnali di de-specializzazione professionale. Questi risultati possono rappresentare segnali di nuovi fattori latenti del *churn* in corso. Per usare un'analogia, se l'Italia fosse sulla *Route 66* dopo l'introduzione delle *interstate* di Eisenhower, potrebbero risultare inutili le tradizionali "ricette" per il rilancio dell'imprenditorialità, dell'occupabilità e dell'occupazione, del consumo e degli investimenti. Senza perdita di generalità, il riferimento è di nuovo alla *"foto di famiglia"* dove si può osservare il padre di McTeer che deve e può far fronte alle conseguenze dell'innovazione tecnologica acquisendo nuove competenze e quindi cambiando professione rispetto ai suoi avi. McTeer tuttavia venne investito da un *churn* strutturale diverso e dovette trovare fortuna altrove.

In questa prospettiva, per meglio supportare opportune politiche, sembrano necessarie misure ancora più accurate e una migliore compressione delle cause alla base del *churn* professionale. I *churn* esogeni con impatti strutturali possono determinare la necessità d'interventi su scala differente. Pertanto, le politiche locali dovrebbero essere condizionate ai *churn* in atto. Il *churn*, se non adeguatamente compreso e considerato nelle politiche, non può che avere un impatto negativo sul benessere territoriale.

L'invecchiamento della popolazione, inoltre, che potrebbe contribuire a determinare specifiche conseguenze strutturali in termini di attività economica e di professioni, in altre realtà europee non sembra avere avuto alcun impatto. Infine, sembrando poco plausibile che nelle regioni italiane ci siano problemi di *skill gap* e s*kill shortage*, restano da indagare le ragioni del s*kill mismatch* che sembra avere un impatto più significativo sui lavoratori più giovani.

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SUMMARY

Churn, Jobs and Territory

This paper is based on an essay by McTeer describing a particular example of churn: the case of economic failure of areas of the United States, due to infrastructural changes as a result of the Federal-Aid Highway Act by President Eisenhower. Specifically, the introduction of interstates changed the federal road network by excluding entire countries from the main routes of the time - such as the famous Route 66. The aim of this work is the study of the churn in terms of professions both within the national territory and with reference to the European benchmark. Data from Eurostat were mainly used. The researchers have identified different tools, which respond to different cognitive questions, considered particularly suitable to represent the intensity and concentration or dispersion of phenomena at the territorial level (e.g. the SEBS Box-plot map). In our work, there are signs of professional de-specialisation and of a reduction in the incidence of highly and medium-specialised professions. The Schumpeterian assumption of "creative destruction" does not seem to occur in Italy, on the contrary, the data are compatible with the opposite thesis. At European level, however, the assumption seems to hold especially in continental areas. These results may represent signs of new latent factors in the current churn with negative effects on socio-economic well-being at the local level. To use an analogy, if Italy were on Route 66 after the introduction of interstates, the traditional *"recipes"* for the restart of entrepreneurship, employability and employment, consumption and investment could be useless. In this perspective, in order to better support appropriate policies, it would seem necessary to have a better understanding of the underlying causes of the churn occurring in Italy.

Arianna CARRA, Istat, carra@istat.it
Alberto VITALINI, Istat, vitalini@istat.it
Flavio VERRECCHIA, Istat, verrecchia@istat.it

STRATEGIE ED ESITI DELLA RICERCA DI LAVORO [1]

Boschetto Barbara, Marini Cristiano, Pontecorvo Maria Elena, Spizzichino Andrea

1. Introduzione

La ricerca di lavoro è sempre più una attività senza soluzione di continuità nella vita attiva delle persone. Lo spiazzamento tecnologico e le politiche di precarizzazione del mercato del lavoro comportano spesso la necessità di ricollocarsi con conseguenti cambi di settore, di attività o di territorio. Questa attività di ricerca si realizza attraverso canali formali e/o informali, che vengono attivati in base alla tipologia del capitale umano posseduto, al tipo di occupazione ricercata e alla possibile influenza della propria rete sociale e parentale.

La Rilevazione sulle forze di lavoro consente una lettura molto dettagliata del processo di incontro tra domanda e offerta di lavoro, soprattutto riguardo alla fase di ricerca (search) che ha portato a trovare un'occupazione.

In particolare, i dati a disposizione consentono di approfondire lo studio della fase di ricerca definendo delle vere e proprie strategie utilizzate dai disoccupati in base alla diversificazione della ricerca e al grado di formalità della stessa.

In questo contributo, si intende far luce sulle transizioni verso l'occupazione considerando vari piani di analisi. In primo luogo, in un'ottica trasversale, si esaminano le azioni di ricerca svolte dai disoccupati, classificandole in base alla strategia nella ricerca e alle caratteristiche degli individui. Successivamente, in un'ottica longitudinale, si analizza il grado di corrispondenza tra la tipologia di ricerca di lavoro utilizzata e i canali attraverso cui è stato trovato il lavoro (match). Infine, con un'analisi multivariata questo match viene messo in corrispondenza con le caratteristiche dell'individuo e del lavoro trovato, individuando le principali associazioni nel collocamento lavorativo.

[1] Sebbene il lavoro sia frutto di tutti gli autori, i paragrafi 1 e 4.3. sono da attribuire al dott. Andrea Spizzichino, i paragrafi 2 e 3 sono da attribuire alla dott.ssa Barbara Boschetto, il paragrafo 4.1 è da attribuire alla dott.ssa Maria Elena Pontecorvo, i paragrafi 4.2 e 5 sono da attribuire al dott. Cristiano Marini.

2. Letteratura

Nel panorama del mercato del lavoro numerosi studi affrontano il processo di incontro fra domanda e offerta, mettendo in luce la complessità e i meccanismi che lo regolano e analizzando le strategie e i canali di intermediazione utilizzati.

Petrongolo e Pissarides (2001) cercano di stabilire quali siano i fattori che influenzano il meccanismo di incontro fra domanda e offerta nel mercato del lavoro e propongono una funzione di match (matching function) data dal numero di disoccupati in cerca di lavoro, dal numero di posti vacanti e da poche altre variabili in un determinato intervallo di tempo. Da questa funzione si ricava la probabilità di trovare lavoro per un disoccupato e di riempire un posto vacante per un'impresa. Naturalmente l'eterogeneità dei disoccupati e dei posti di lavoro restituisce probabilità differenti di transizione. In particolare la funzione di matching può essere influenzata da due grandi gruppi di variabili: il primo è dato dalle caratteristiche individuali, ovverosia le azioni di ricerca, il secondo è dato da elementi di tipo socio-ambientale esterni agli individui.

Sulle azioni di ricerca e le differenti strategie messe in atto dai disoccupati vi è ampia letteratura anche per la disponibilità di dati dettagliati sull'argomento (da fonti diverse: Istat, Isfol, Banca di Italia). Una panoramica sui canali di intermediazione e sull'evoluzione che ha coinvolto i centri pubblici per l'impiego e le agenzie interinali nel primo decennio del 2000 è fornita da Mandrone (2011).

Reyneri (2017) individua cinque dimensioni della ricerca di lavoro: estensione (da chi fa un solo tipo di azione a chi li tenta tutti), intensità (frequenza con cui si compiono le azioni di ricerca), natura dei metodi (grado di formalità o tradizionalismo), durata della ricerca, selettività. In particolare vi sono molti contributi sulla dicotomia fra canali formali e informali, spesso volti ad affrontare due grandi questioni: l'efficacia dei metodi di ricerca (quali canali portano all'occupazione) e la qualità del lavoro che viene veicolato dai diversi canali (lavori buoni o mediocri).

Il dibattito si è sviluppato soprattutto intorno al ruolo delle reti informali nel mercato del lavoro, supportato dai dati che ne evidenziano il ricorso diffuso in Italia e altrove. A sostegno dell'efficacia dei canali informali di intermediazione vi è innanzitutto la riduzione di tempi e costi del processo di match, sia per il datore di lavoro che per il lavoratore, inoltre i canali informali sono ritenuti un viatico migliore per trasmettere informazioni tra candidati e datori di lavoro e dovrebbero quindi portare a un migliore abbinamento. Prandi (2000), riprendendo l'approccio relazionale di Granovetter (1998), differenzia il corredo sociale di un individuo fra legami forti e legami deboli, sostenendo che questi ultimi siano più efficaci per l'ottenimento di un'occupazione, in particolare favorendo l'ascesa sociale. I legami forti, rappresentati da parenti e amici, generalmente appartengono allo stesso status

sociale dell'individuo mentre i legami deboli, ossia frequentazioni e semplici conoscenze, riescono a fare da ponte fra reticoli sociali diversi, favorendo lo scambio di informazioni da una cerchia relazionale all'altra e fungendo quindi da ascensore sociale.

Sul fronte opposto vi sono numerosi contributi che evidenziano le ripercussioni negative dell'uso del canale informale, sia a livello individuale che sociale. L'informale riduce di fatto la concorrenza nel mercato del lavoro inibendo la reale possibilità di trovare il miglior candidato per un determinato posto soprattutto se di qualità (Mandrone 2011). Queste mancate opportunità hanno dunque un effetto di iniquità sociale oltreché rischiare di essere svantaggiose per l'intermediato (Meliciani e Radicchia, 2009; Bentolilla, Michelacci e Suarez, 2010).

Anche Pellizzari (2004) ritiene che non sempre i lavori veicolati da parenti amici e conoscenti siano migliori. Nel suo studio analizza differenziali salariali messi in relazione al canale più o meno formale con cui si è trovato lavoro (dati dell'indagine panel sulle famiglie europee ECHP e indagine europea sul costo del lavoro) e accende i riflettori sul diverso sforzo che fanno le imprese per reclutare personale in modo formale o informale. Le imprese decidono di investire di più, in termini di costi e tempi delle procedure di reclutamento, per lavori di alto profilo e alta produttività: una selezione più accurata anche se più costosa è ricompensata dal fatto di minimizzare il rischio di assumere un lavoratore inadeguato. Secondo l'autore mentre è ampiamente studiato il modo in cui si cerca lavoro, resta meno indagato il modo in cui le imprese cercano mano d'opera. Un contributo tuttavia viene dalle indagini panel grazie alle quali si riesce a rilevare sugli stessi individui come si è cercato lavoro e come lo si è trovato. In questa direzione si muove il presente lavoro: offrire una valutazione oggettiva sull'efficacia dei canali di intermediazione attraverso indicatori quali il tasso di transizione e l'analisi delle tipologie di lavoro trovato (per altri tipi di indicatori e per una valutazione soggettiva dei servizi per l'impiego Osservatorio Isfol, vari anni).

3. Dati e metodi

In questo lavoro si utilizzano i dati della Rilevazione sulle forze di lavoro[2]. Nel paragrafo 4.1, con riferimento ai dati di stock relativi all'anno 2017, si analizzano principalmente le variabili inerenti la condizione occupazionale, la ricerca di lavoro e le caratteristiche socio-demografiche. In particolare, riguardo alla ricerca di

[2] La Rilevazione sulle forze di lavoro, condotta dall'Istituto Nazionale di Statistica, è un'indagine campionaria e continua che fornisce le stime ufficiali dei principali aggregati dell'offerta di lavoro rappresentati da occupati e disoccupati, rilevando le principali caratteristiche socio-demografiche e lavorative (si veda la nota metodologica allegata al comunicato stampa del I trimestre 2019 https://www.istat.it/it/files//2019/06/Mercato-del-lavoro-I-trim-2019-1.pdf).

lavoro, si approfondisce l'informazione resa disponibile dall'articolata batteria di domande con cui si chiede alle persone in cerca di un'occupazione, quali azioni di ricerca attiva abbiano svolto nelle ultime quattro settimane.

A partire da queste informazioni si può analizzare la natura dei metodi utilizzati e l'estensione della ricerca (Reyneri 2017). Non è possibile invece misurare l'intensità della ricerca in quanto non si rilevano informazioni sul numero di volte in cui un'azione è stata svolta nelle quattro settimane.

Le azioni di ricerca sono state classificate in tre canali in base al tipo di intermediazione sotteso a ciascuna di esse: "formale istituzionale", "formale non istituzionale", "informale". Nel primo, l'intermediazione è strutturata e inclusiva e la selezione avviene secondo criteri oggettivi o dettati da esplicita norma proteggendo dal rischio di esclusione i soggetti meno dotati di capitale relazionale (Centri per l'impiego, Agenzie private, Concorsi pubblici). Nel secondo, l'intermediazione conserva il carattere di "pubblicità" e accessibilità (annunci o inserzioni su giornali e/o internet), ma è anche legata all'attivazione delle proprie capabilities e dei propri network nell'individuazione delle opportunità alle quali proporsi, e la selezione avviene secondo criteri scelti dall'inserzionista o dal datore di lavoro. Infine il canale "informale" è quello in cui l'intermediazione si svolge tutta all'interno delle reti personali, attraverso l'aiuto offerto da parenti, amici e conoscenti. Quest'ultimo canale, il meno costoso e più prossimo a chi cerca lavoro, come detto, non sempre risponde direttamente a criteri di efficienza e la selezione è affidata al rapporto fiduciario e all'interesse reciproco.

La combinazione della natura dei metodi di ricerca utilizzati e dell'estensione, ovvero del ricorso contestuale a più canali di ricerca, permette di individuare precise strategie lungo un continuum semplicità/economicità (solo azioni di ricerca di tipo informale) vs. complessità/costo (attivazione di tutti e tre i canali di ricerca). Ciò permette di distinguere, in gruppi mutuamente esclusivi, chi adotta una strategia di ricerca solo informale, chi usa una strategia solo formale (utilizzando uno o entrambi i canali formali), chi combina l'uso del canale informale con uno dei due canali formali, e chi nell'ultimo mese ha attivato tutti i tre canali.

La seconda parte dell'analisi (paragrafo 4.2) attinge invece alla componente longitudinale della Rilevazione sulle forze di lavoro (dati 2017-2018). I dati di flusso consentono di analizzare le dinamiche del mercato del lavoro attraverso il confronto della condizione professionale e delle sue caratteristiche, rilevate sullo stesso campione di individui a distanza di 12 mesi[3]. Tali dati offrono un'ottica privilegiata per studiare percorsi individuali all'interno del mercato del lavoro: lo

[3] È opportuno ricordare che non si tratta di un panel puro poiché in un definito arco temporale la componente longitudinale rappresenta solo la popolazione residente in uno stesso comune sia all'inizio sia alla fine del periodo considerato.

specifico tasso di transizione[4] proposto in questa sede consente di valutare gli esiti della ricerca di lavoro attraverso le probabilità di trovare lavoro, secondo le strategie di ricerca messe in atto 12 mesi prima.

In questa seconda parte viene presa in considerazione anche l'informazione sul canale attraverso cui si è trovato il lavoro, che ricalca sostanzialmente gli stessi della ricerca, e il tipo di lavoro trovato. Sfruttando l'ottica longitudinale è dunque possibile confrontare il canale attraverso cui si è cercato lavoro e quello attraverso cui lo si è trovato dopo 12 mesi, oltreché la tipologia di lavoro trovato. L'esito delle differenti strategie di ricerca viene sintetizzato attraverso un indice della qualità del lavoro che considera contemporaneamente la tipologia contrattuale (definita "non atipica" per dipendenti a tempo indeterminato e autonomi e "atipica" per dipendenti a tempo determinato e collaboratori) e la qualifica delle professioni ("qualificate" per intellettuali e tecniche, "non qualificate" per quelle manuali).

Al fine di valutare l'associazione tra le strategie di ricerca utilizzate, il modo in cui si è trovato lavoro e il tipo di lavoro trovato, è stata applicata infine un'analisi delle corrispondenze (cfr. paragrafo 4.3).

4. Risultati

Nel primo paragrafo si descriveranno i canali e le strategie messe in atto dalle persone in cerca di occupazione nel 2017 in base alle loro caratteristiche, nel secondo paragrafo si analizzerà quanto tali strategie si siano rivelate efficaci nell'ottenere il lavoro, nel terzo paragrafo verranno illustrati i risultati dell'analisi multidimensionale.

4.1. Come si cerca lavoro

Come noto, la ricerca di lavoro in Italia si caratterizza per l'elevato grado di informalità: l'87,5 per cento dei disoccupati che hanno svolto almeno un'azione di ricerca nelle ultime quattro settimane lo ha fatto chiedendo ad amici e/o conoscenti. Tuttavia è rilevante anche il ricorso al canale "formale non istituzionale" (85,3 per cento), soprattutto nelle azioni di invio di curriculum e della consultazione di annunci sulla stampa o su internet, mentre meno di quattro disoccupati su dieci dichiarano di aver svolto almeno un'azione di ricerca di tipo "formale istituzionale" (Istat, 2018: 99-101). Il ricorso ai canali formali è più frequente tra i giovani grazie anche alla maggiore dimestichezza con il web che consente di

[4] Il tasso di transizione è ottenuto come rapporto tra il numero di individui che a fine periodo (12 mesi) risultano in una condizione occupazionale diversa da quella in cui erano a inizio periodo e lo stock relativo alla condizione di inizio periodo. Il tasso è assimilabile alla probabilità di passaggio a una diversa condizione, tra l'inizio e la fine di un determinato periodo (cfr. ISTAT(a), 2016).

accedere ai canali di reclutamento online. Differenze significative emergono a livello territoriale, dove peraltro l'attività degli intermediari non può prescindere dalla domanda di lavoro effettivamente presente nei territori. Se il ricorso al canale informale è diffuso in tutte le ripartizioni, al Nord si registra un consistente utilizzo dei canali formali istituzionali (quasi 50 per cento, contro meno del 30 per cento nel Mezzogiorno) soprattutto delle agenzie interinali. Un'ulteriore forte polarizzazione è quella che si registra tra i livelli d'istruzione, con una prevedibile maggiore intraprendenza tra i laureati, che si realizza non solo nella più frequente consultazione di annunci e autocandidature ma anche nell'utilizzo attivo degli strumenti, come la stampa o internet, per mettere inserzioni o rispondere ad annunci (40,1 per cento).

Dal momento che uno stesso individuo può aver svolto contestualmente diversi tipi di azioni per cercare lavoro, è interessante leggere il ricorso ai canali di ricerca all'interno delle strategie più o meno complesse messe in campo dai differenti profili di disoccupati. Dalla combinazione dei diversi canali, il ruolo dell'intermediazione informale ne esce fortemente ridimensionato: solo il 12 per cento dei disoccupati esaurisce la ricerca di lavoro con questo tipo di azione, percentuale più elevata tra gli ultracinquantenni e tra chi ha un più basso titolo di studio, per i quali sfiora il 20 per cento (Tabella 1). Nel Nord e tra i laureati, invece, il canale viene sì attivato ma solo all'interno di strategie più complesse.

Tabella 1 - *Persone in cerca di occupazione per strategia di ricerca di lavoro e principali caratteristiche – Anno 2017 (valori percentuali)*

	Solo informale	Solo formale (istituz. e/o non istituz.)	Formale (istituz. o non istituz.) e Informale	Formale istituz.e formale non istituz.e Informale	Totale
SESSO					
Maschi	11,9	11,0	45,9	31,2	100,0
Femmine	12,1	14,2	44,4	29,2	100,0
RIPARTIZIONE					
Nord	5,9	13,4	39,9	40,8	100,0
Centro	9,9	14,8	43,4	32,0	100,0
Mezzogiorno	16,4	11,1	49,1	23,4	100,0
CLASSE DI ETA'					
15-34	7,3	14,9	46,0	31,8	100,0
35-49	14,2	10,6	45,2	30,0	100,0
50 e più	20,0	9,7	43,3	27,1	100,0
TITOLO DI STUDIO					
Fino licenza media	19,6	8,5	46,5	25,4	100,0
Diploma	6,5	13,1	46,1	34,2	100,0
Laurea	5,6	24,1	36,6	33,8	100,0
TOTALE	12,0	12,5	45,2	30,3	100,0

Fonte: Rilevazione sulle forze di lavoro

Specularmente, una percentuale analoga, 12,5 per cento, utilizza una strategia di ricerca esclusivamente formale, nella maggior parte dei casi affidandosi al solo canale non istituzionale. In particolare, a fare uso esclusivo di canali di ricerca formali sono principalmente i laureati (24,1 per cento). La strategia di ricerca più diffusa (45,2 per cento), e poco differenziata quanto a caratteristiche socio-demografiche, è quella che vede la combinazione della ricerca informale con uno dei due canali di ricerca formali. In particolare, la combinazione più frequente è, tra i giovani, quella che vede il coinvolgimento di parenti e amici insieme alla consultazione di annunci su stampa e web e all'invio di curricula (Pintaldi, Pontecorvo 2018: 37) , mentre i più adulti abbinano in misura maggiore rispetto alla media, l'informale al formale istituzionale. La strategia di ricerca più complessa che vede l'utilizzo congiunto dei tre canali è perseguita da circa 3 disoccupati su 10, i quali combinano con maggior frequenza cinque azioni: oltre ad aver fatto ricorso alla rete informale, hanno inviato curriculum, consultato annunci o sostenuto un colloquio, inserito inserzioni su giornali o internet, e contattato il centro per l'impiego. L'attitudine multicanale alla ricerca è particolarmente frequente al Nord (oltre il 40 per cento dei disoccupati) mentre nel Mezzogiorno riguarda meno di un disoccupato su quattro.

4.2. Gli esiti della ricerca di lavoro: un'analisi longitudinale

Grazie alla dimensione longitudinale della Rilevazione sulle forze di lavoro (Istat, 2015; Boschetto, Lucarelli e Marini, 2016) si può osservare quale esito abbia avuto nel 2018 la ricerca svolta nel 2017. I dati di flusso consentono di valutare l'efficacia delle quattro diverse strategie di ricerca, analizzando il tipo di strategie adottate dai soggetti che nel 2017 risultavano in cerca di occupazione e che nello stesso periodo del 2018 risultano occupati[5]. Per il collettivo dei disoccupati è possibile quindi valutare come varia la probabilità[6] di trovare un'occupazione in base alle strategie di ricerca dichiarate dodici mesi prima, le quali si differenziano per intensità di ricerca e utilizzo dei canali di intermediazione. Degli oltre 2,7 milioni di disoccupati del 2017, poco più di 600 mila, pari al 22,5 per cento, risulta avere un'occupazione a distanza di un anno nel 2018. I disoccupati che attivano solo canali di ricerca del lavoro informali rispetto a quelli che li attivano solo

[5] Per l'analisi dei risultati, in considerazione delle caratteristiche del campione longitudinale, è necessario tener conto che l'osservazione delle strategie adottate al momento dell'intervista 2017 non fornisce informazioni né sulle azioni e le strategie adottate in precedenza, né sulle azioni di ricerca effettuate nel periodo intercorso tra l'intervista 2017 e l'intervista 2018 (quando viene rilevata la condizione di occupazione).

[6] Intesa come rapporto tra il numero di persone che passano dalla disoccupazione a inizio periodo (2017) all'occupazione a fine periodo (2018) sul totale dei disoccupati a inizio periodo (2017) per strategia di ricerca.

formali hanno performances decisamente inferiori a distanza di un anno: trova lavoro il 12,2 per cento dei primi rispetto al 25,5 per cento dei secondi (Tabella 2). La transizione all'occupazione aumenta se alla strategia di ricerca tramite la rete di parenti e amici si aggiungono azioni più formali: con un solo tipo di azione formale (istituzionale o non) il valore sale al 19,6 per cento, con entrambi i tipi trova lavoro a distanza di un anno il 29,9 per cento dei disoccupati. Per tutte le categorie di strategia di ricerca, la probabilità di transitare all'occupazione cresce al crescere del titolo di studio e diminuisce al crescere dell'età, fatta eccezione per la componente più anziana che attiva solo canali informali.

Tabella 2 – *Tasso di transizione all'occupazione dei disoccupati (a) 2017 per strategia di ricerca di lavoro e principali caratteristiche - Anno 2018 (valori percentuali).*

	Solo informale	Solo formale (istituz. e/o non istituz.)	Formale (istituz. o non istituz.) e Informale	Formale istituz e formale non istituz e informale	Totale
SESSO					
Maschi	14,7	31,3	21,1	27,5	24,2
Femmine	9,4	28,1	17,8	23,9	20,6
RIPARTIZIONE					
Nord	12,7	36,1	24,5	31,4	29,6
Centro	14,1	31,4	25,3	26,6	26,2
Mezzogiorno	11,6	22,0	15,5	20,6	16,8
CLASSE DI ETÀ					
15-34	13,7	32,3	22,2	29,2	25,7
35-49	10,7	28,5	17,2	23,9	20,4
50-64	12,7	25,5	17,3	16,2	18,3
TITOLO DI STUDIO					
Fino a licenza media	11,1	25,7	16,8	20,0	18,2
Diploma	14,3	29,9	20,7	24,3	23,8
Laurea e oltre	27,5	42,0	28,5	34,0	34,5
TOTALE	12,2	25,5	19,6	29,9	22,5

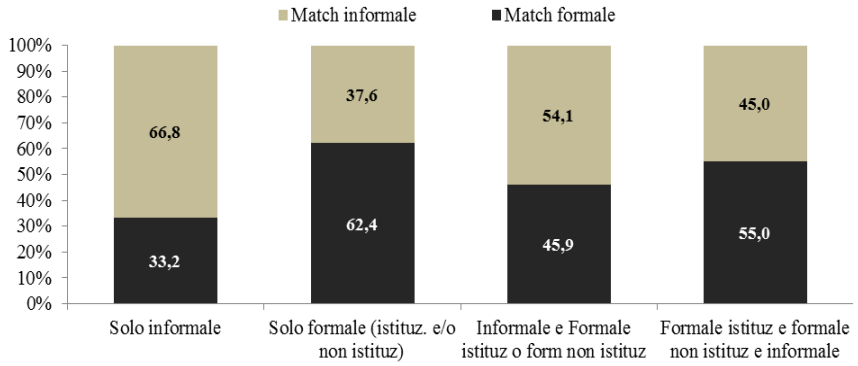
Fonte: Istat, Rilevazione sulle forze di lavoro, dati longitudinali 2017 – 2018, (a) In questo caso si considerano i soli disoccupati che hanno svolto azioni di ricerca, al netto di coloro che inizieranno un lavoro entro tre mesi

Territorialmente, si registra un forte gradiente crescente dal Mezzogiorno al Centro-Nord, soprattutto quando all'azione informale si affiancano una o entrambe le strategie formali. Queste informazioni definiscono un idealtipo polarizzato per istruzione, territorio e rete informale, ovvero identificano soggetti di contesti ricchi, integrati e con capitale umano strutturato rispetto a chi vive meno attivamente la collocazione lavorativa in contesti più sfavorevoli.

Se si confrontano le strategie di ricerca messe in campo dai disoccupati con le modalità con cui hanno trovato lavoro dopo 12 mesi, emerge una associazione buona ma non univoca fra i canali in cui si è cercato lavoro e quelli con cui lo si è

trovato (Figura 1). La proporzione di chi dichiara di aver trovato lavoro attraverso parenti amici e conoscenti nel 2018 è pari a due terzi fra coloro che hanno attivato solo canali informali nel 2017, scende all'aumentare dei canali formali attivati fino ad invertire circa la proporzione fra chi ha fatto ricerca esclusivamente mediante canali formali. La quota di chi trova lavoro attraverso canali differenti rispetto a quelli dichiarati un anno prima potrebbe trovare ragione nelle possibili differenti azioni di ricerca effettuate nel periodo intercorso fra i due momenti di indagine.

Figura 1 – *Disoccupati (a) 2017 occupati a distanza di dodici mesi per strategia di ricerca di lavoro e modo in cui hanno trovato lavoro - Anno 2018 (%)*



Fonte: Istat, Rilevazione sulle forze di lavoro, dati longitudinali 2017 – 2018, (a) In questo caso si considerano i soli disoccupati che hanno svolto azioni di ricerca, al netto di coloro che inizieranno un lavoro entro tre mesi.

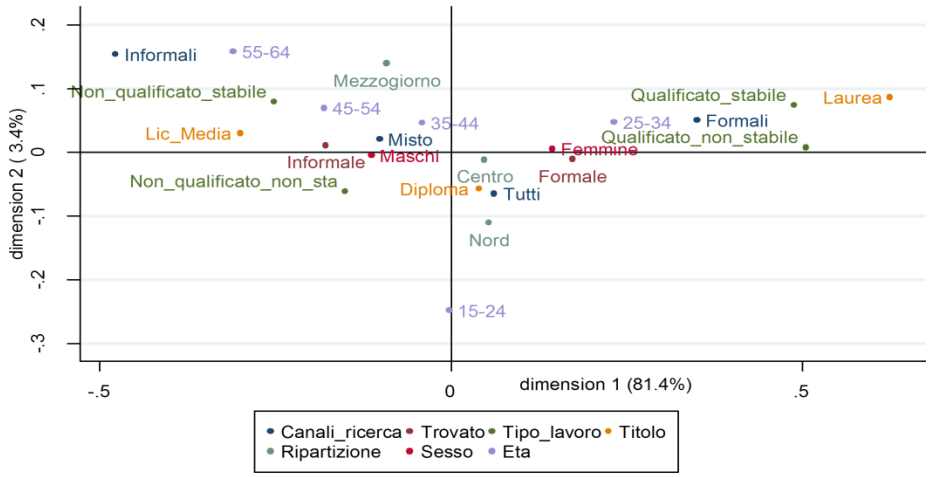
4.3. Analisi multidimensionale

L'analisi trasversale e quella longitudinale viste nei due paragrafi precedenti possono trovare ulteriori conferme attraverso l'utilizzo di tecniche multidimensionali. In particolare trattandosi di dati qualitativi risulta performante l'utilizzo dell'analisi delle corrispondenze multiple per valutare il livello di associazione tra le variabili che hanno maggior influenza nel match tra ricerca e aver trovato un lavoro. Sono stati considerati tutti gli individui appartenenti al campione che a distanza di un anno sono passati dalla condizione di disoccupati a quella di occupati; non avendo la necessità di pesare le osservazioni e ipotizzando che negli ultimi anni non sia cambiato sostanzialmente il modo di cercare e il modo in cui si trova lavoro, per dare maggior robustezza ai dati, sono state unite le transizioni avvenute tra il 2017 e il 2018 con quelle 2016-2017.

La fase più complessa è risultata la scelta delle variabili da inserire nel modello, in particolare come esplicative sono state utilizzate: strategia di ricerca utilizzata,

modo in cui si è trovato lavoro, tipo di lavoro trovato, titolo di studio. A queste sono state aggiunte come illustrative il sesso, l'età e la ripartizione geografica.

Figura 2 – *Rappresentazione grafica delle prime due dimensioni ottenute dall'analisi delle corrispondenze multiple. Variabili attive e illustrative.*



Fonte: Istat, Rilevazione sulle forze di lavoro, dati longitudinali 2016-2017 e 2017-2018

I risultati dell'ACM confermano quanto già osservato nei paragrafi precedenti ma consentono di evidenziare quali siano le variabili che maggiormente spiegano la variabilità del fenomeno, in particolare il titolo di studio e il tipo di lavoro trovato sono quelle che spiegano una percentuale maggiore di inerzia. La figura 2 mostra come la prima dimensione, che spiega l'81,4 per cento dell'inerzia totale, riesca a determinare due gruppi di osservazioni nettamente distinti tra loro.

Nella parte destra del grafico si concentrano individui che hanno trovato un lavoro qualificato, non necessariamente stabile, ricorrendo a canali formali. Altre caratteristiche che uniscono i quadranti positivi dell'asse delle ascisse sono l'aver conseguito almeno la laurea, essere di età giovane e perlopiù di genere femminile.
Di contro, i quadranti negativi dell'asse delle ascisse, mostrano l'associazione tra aver trovato lavoro tramite canali informali e la bassa qualifica del lavoro trovato. In particolare si tratta di individui che hanno anche cercato in modo informale, che hanno titoli di studio bassi, età più avanzata e sono principalmente maschi.

La maggiore vicinanza all'origine delle modalità relative al modo in cui si è trovato lavoro rispetto alle altre variabili conferma quanto già osservato nel paragrafo precedente rispetto alle alte probabilità di trovare un'occupazione in modo diverso da come è stata cercata.

5. Conclusioni

Nel complesso, l'importanza della rete di parenti, amici e conoscenze nel mercato del lavoro italiano emerge con forza sia come modo principale attraverso il quale si trova lavoro (lo indicano quattro disoccupati su dieci del 2017 che transitano nell'occupazione nel 2018) sia come la più diffusa azione di ricerca (coinvolge nove neo-occupati su dieci). Un'analisi per gruppi di strategia di ricerca e per esiti occupazionali, a distanza di un anno, mette in luce alcune differenze importanti: rappresentano poco più di un disoccupato su dieci, sia le persone che cercano lavoro attraverso le sole azioni informali della rete di conoscenze sia coloro che utilizzano invece solo canali formali mirati. I secondi hanno una probabilità più che doppia di trovare lavoro rispetto ai primi; la probabilità per l'individuo di essere occupato a distanza di 12 mesi è massima (circa 1 su 3 trova lavoro) quando la strategia di ricerca si fa più complessa e aggiunge all'informalità entrambe le strategie formali. Tra quelli che trovano lavoro, è fortissima la dicotomia tra chi ha un elevato capitale umano e chi no, soprattutto in termini di maggiori possibilità di ottenere un lavoro qualificato attraverso un canale formale. Tuttavia, quando il canale formale, seppure utilizzato in modo esclusivo dall'individuo, non permette di trovare un'occupazione, ci si deve rivolgere alla propria rete informale: sono oltre cento mila i disoccupati che cercavano lavoro solo formalmente che invece lo hanno trovato tramite la rete di parenti, amici e conoscenze, confermando questa caratteristica peculiare del mercato del lavoro italiano.

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SUMMARY

Job search: strategies and outcomes

The job search is increasingly a seamless activity in people's active lives. Technological displacement and precarious employment market policies often entail the need to relocate with consequent changes in the sector activity, business or territory. This research activity is carried out through formal and/or informal channels, based on the type of possessed human capital, the type of sought employment and the possible influence of own social and parental network.

The Labour Force Survey allows a very detailed reading of the meeting between demand and supply of labour, especially with regard to the research phase (search) that led to finding employment.

This paper aims to shed light on the transitions to employment considering various analysis plans. First of all, in a transversal perspective, the research actions carried out by the unemployed people are examined, classifying them according to the degree of formality and the combination of the different channels. Subsequently, in a longitudinal perspective, the degree of correspondence between the job search strategies and the channels through which the job was found (match) is analyzed. Finally, through a multivariate analysis, this match is put in correspondence with the individual and work found characteristics, identifying the main employment placement strategies.

Barbara BOSCHETTO, ISTAT, boschett@istat.it
Cristiano MARINI, ISTAT, cristiano.marini@istat.it
Maria Elena PONTECORVO, ISTAT, mariaelena.pontecorvo@istat.it
Andrea SPIZZICHINO, ISTAT, spizzich@istat.it

THE IMPACT OF INTERNATIONAL STUDENTS MOBILITY ON WAGES

Valentina Ferri

1. Introduction

The paper investigates the hypothesis that the participation in international student mobility increases wages.

In the literature, few studies assess the impact of international mobility on graduates' employment and wages. The articles that provide causal evidence are based on the method of Instrumental Variables (Oosterbeek and Webbink 2006; Messer and Wolter 2007; Di Pietro 2015) and Propensity Score Matching (Rodrigues 2013, Favero and Fucci, 2017; Iriondo 2019).

The data used in this article come from the Italian National Institute of Statistics. In particular, we use data from the survey on university graduates' vocational integration, a survey conducted by ISTAT that aims to investigate the transition of graduates (3 and 5 years course) from university to employment four years after graduation.

The dependent variable in our empirical analysis is log of monthly wages and our explanatory variable of interest is a dichotomous variable that indicates graduates' participation in an international mobility program during their university studies.

The independent variables in the model concern personal attributes, fields of study, parental education and employment, university location.

First, we estimate the mincerian equation of wages, we distinguish between the full time equivalent monthly wages, including all the workers of the sample, and only the workers full time. Heckman's two-step procedure allows us to take into account the sample selection.

In order to estimate a less biased assessment of international mobility programs on wages, we use the Propensity score matching technique and we estimate the Average Treatment Effect on the Treated.

The paper is organized as follows: the first section is an introduction; the second part includes a brief analysis on International mobility and Erasmus programs to contextualize the research; the third section is a short literature review; the fourth section consists of the description of the data and methodology; the fifth part regards

the empirical results. Finally, the last section draws out some concluding remarks and policy implications.

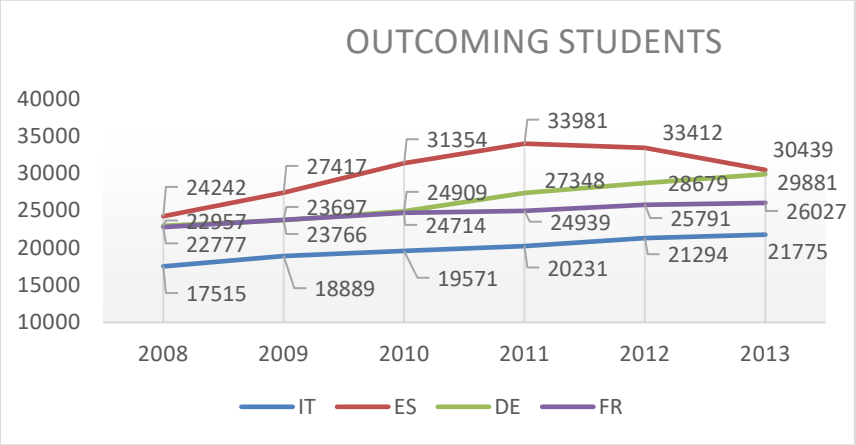
2. International mobility and Erasmus programme

For what regards short-term mobility, the Erasmus programme, financed by the European Commission, has had a decisive role. Italy is ranked fourth for students who participated in an Erasmus mobility program in 2016 (27.095), after Germany (32.138), Spain (31.120) and French (29.851)[1]. Moreover, Spain, France and Germany represent the destinations the most preferred by Italian Erasmus students.

Data from Erasmus statistics reveal that Italy had a steady increase in students leaving for a period abroad; the other countries have similar trends, except for Spain that in the last years (2012-2013) shows a decline of participants in study abroad programs (Fig.1).

Because of the grown of mobility projects and students involvement, in literature there are many studies about the determinants of international mobility experiences, but few studies assess the impact with evidence-based methods.

Figure 1 - *Trends in the number of Erasmus students in Italy, Spain Germany and French.*



Source: Own elaboration based on data from the EC Erasmus Statistics.

The latest available data on Italian students international mobility[2] reveal that the share of women who participated in study abroad programs in 2013/2014 is 58%. The average duration of this period abroad for Italian students is 6.1 months.

[1] Erasmus+ Annual Report 2017 - Statistical Annex, 2017.
[2] Dati su Eu open data portal (https://data.europa.eu/euodp/data/dataset).

Furthermore, it emerges also that Italian students who leave for foreign destinations are enrolled in humanistic, economic, political-social and engineering faculties.

The universities with the highest number of Erasmus students are located mainly in Milan (14.6%), Rome (11.6%), Bologna (7.5%), Turin (6.5%), Padua (5.4%). The languages studied during the Erasmus period are: English (41%), Spanish (26.4%), French (14.9%) and German (10.3%).

3. Previous studies

Various studies based on data survey investigate how the participants in abroad study programs perceive the role of international experience in their post-university outcomes.

Orahood et al. (2004) show that 96% of students participating in international mobility programs suggest that their international experience made a difference in their career plan; 50% of respondents say that the impact has been significant and notable. Teichler and Janson (2007) conduct an analogous study, based on survey data. The survey of 2005 addressed to students who have participated to the Erasmus program in academic year 2000-2001. They show that 54% of them indicate that the international mobility program helped them to find their first job.

Varghese (2008) finds that international mobility programs are prestigious because the participants have better-paid employment opportunities and enhance their professional networks. King et al. (2010) find that participation in international mobility programs improves employability. The analysis is based on interviews of mobility managers of UK universities.

Di Pietro's analysis demonstrates, using a large sample of graduates, how mobility programs impact on employment likelihood. The author uses these methods: OLS estimates, fixed effects and instrumental variables. The estimates based on IV fixed effects method show that the participants in student mobility programs have 24 percentage points more of probability of employment than their peers. The effect is significant only for graduates from disadvantaged backgrounds. Probably this result is related to the opportunity offered to students that otherwise would not have had the same opportunity (Di Pietro, 2015).

Oosterbeek and Webbink (2006) find that a year abroad increases wages of Dutch university students of 3–10 per cent, when they use instrumental variables the effect disappears. Messer and Wolter (2007) demonstrate that when the estimates are not corrected for the selection bias, the salaries of Swiss university students increase, while with correction of bias, the effect is not significant.

Rodrigues (2013) finds that the students who participated in study abroad programs earn 3% more than their peers, but these results vary according to the field of studies. The positive effects regard only Social Sciences and Engineering.

Favero and Fucci (2017) use panel data to study the Erasmus impact on wages, the random effects model yielded a positive and significant increase in salaries of about 7% for Erasmus participants. The estimates based on Propensity score matching technique show that the wage premium of Erasmus students is about 8%. A positive wage differential is found using as instrumental variable: the exposure to international student exchange schemes. Its magnitude, however, is much larger and imprecise.

Iriondo (2019) uses the Propensity Score Matching (PSM) technique in order to obtain a less biased estimation of the impact of mobility on employment and wages.

The conclusions of Iriondo (2019) are that Erasmus mobility programs have a positive impact in the medium term on salaries. Students who spent a period abroad, had no significant short-term effect on either employment or salaries, while 6 years after graduation have a 10.6 per cent higher probability of having a job and salaries 10–12 per cent higher than their peers.

4. Data and methodology

The data used in the article come from ISTAT. The Italian National Institute of Statistics carries out the sample survey on graduates who attained the university degree four years before the survey. It is part of the survey-system on the study-to-work-transition and detects graduates' employment conditions about four years after graduation. The survey collects a large amount of information: educational experience; access to the labor market; job search and family situation.

First, we estimate the mincerian equation of wages (1); we distinguish between the full time equivalent monthly wages, including all the workers of the sample, and only the workers full time.

$$y = \beta_0 + \beta_1 \text{InternMob} + \beta_2 X_i + \beta_3 S_i + \beta_4 G_i + \varepsilon \quad (1)$$

Our explanatory variable of interest is a dichotomous variable taking on the value 1 if the graduate participated in a study abroad program during his/her university studies, and 0 otherwise.

X is a vector of individual traits that are thought to influence wages; S stands for dummy variables related to the fields of studies; G represents the dummy variables related to the geographical area of university attendance and the area of residency before enrolment, ε is the error term.

We drop from the sample graduates who do not have a job, graduates who are studying and graduates who are seeking employment when our y is log monthly wages. If the graduate is actually working, the wage is observed. For people out of the labour market, we cannot observe the wages. In order to solve the problem of the

selection bias, we estimate in the first stage the probability of employment, using the Heckman methods two stages.

Moreover, we estimates Average Treatment Effect on the Treated (ATET) effects by Propensity-score matching (Rosembaum, Rubin, 1983) to solve account bias due to self-selection. Propensity-score matching and in particular Nearest–neighbour matching attributes the missing potential outcome for each graduates by using an average of the outcomes of similar graduates that receive the other treatment level. Similarity between subjects is founded on estimated treatment probabilities (propensity scores).

ATET is identified if:

$$E(Y(0) \mid W = 1) - (E(Y(0) \mid W = 0) = 0 \quad (2)$$

i.e. if the outcomes of graduates from the treatment and comparison groups would not differ in the absence of treatment. Propensity based matching is used to select control graduates who are similar to patient receiving treatment. The treatment in this study is the Participation in an International Mobility Program.
The ATET (δ_1), is defined as:

$$\delta_1 = E[Y_{1i} - Y_{0i} \mid T_i = 1] = E[Y_{1i} \mid T_i = 1] - E[Y_{0i} \mid T_i = 1] \quad (3)$$

ATET measures the treatment effect among those who had participated in the mobility program ($T_i = 1$). Y_{1i} represents result under treatment, the level of wages of graduates who participated in a mobility program (treated), while Y_{0i} represents the result of graduates who did not participate in a mobility program (control).

We have used the method nearest neighbour: the graduate from the control group is chosen as a matching partner for a graduate who participated in mobility program that is closest in terms of propensity score.

The variable included in the regressions analysis are:

- Participation in international mobility: this is our variable of interest and varies between 0 and 1, taking value 0 if the students didn't participate in an International mobility Program, value 1 if participated.
- Gender: varies between 0 and 1, female takes the value 1, male 0.
- Age classes: the first class represents individuals who graduated at age 23-24; the second class includes individuals who graduated from 25 years to 29 years; the third class is constituted by individuals who graduated over 30 years.
- High school mark: these marks are divided in three classes, from the lowest marks to the highest ones.
- Duration of studies: this variable specifies the number of years of studies

- Overeducation: specifies if the individual is more educated than is useful for their role in the labour market (this measure is self-perceived)
- Master's degree: takes the value 1 if the graduate has a master's degree, 0 otherwise.
- Works in the south: takes the value 1 if the graduate works in the south of Italy, 0 if works in another area
- Works abroad: takes the value 1 if the graduate works abroad, 0 if works in another area
- Field of University degree: the fields take into account are the Medical and Healt degree; Engineering, Architecture and Agronomy; Degree in Chemistry, Biology and Pharmacy; Degree in Economics, Political sciences and Law (this is the reference category).

For what concerns the Heckman correction, the variables included to estimate the probability to be employed (0/1) are:

- Not married: takes the value 1 if the individual is not married, 0 otherwise.
- Graduated father: takes the value 1 if the father is graduated, 0 for lower educational levels
- Graduated mother: takes the value 1 if the mother is graduated, 0 for lower educational levels
- Father employed: takes the value 1 if the father is employed, 0 otherwise.
- Mother employed: takes the value 1 if the mother is employed, 0 otherwise.
- Area of residence before university: South takes value 1, 0 otherwise.

In order to identify the common support for ATT based on Propensity Score Matching (1983), the variables included are: gender, the field of graduation at the most disaggregated level possible, the employment situation of the mother and the educational level of the father and mother.

5. Descriptive analysis

The table provides summary statistics for the variables used in the analysis. First, the graduates that participated in study abroad programs are 75.5%; not far from those who have never had the experience of mobility (74.3%). The participants in study abroad programs who work in a foreign country are 19%, the difference amounts to 15 percentage points compared to those who do not participate in study programs abroad.

Graduates who have participated in international mobility, have a permanent contract in 56% of cases, those who have remained in Italy to study instead have in 59% of cases a permanent contract. In 60% of cases the graduates who have had an experience abroad have a masters' degree. Graduation mark is slightly higher for those who participated in an Erasmus or similar program (105.33), compared to non-

participants (102.38). Even the diploma grade is on average higher among the participants by about 3 points. The share of transfer students involved in a study programs abroad is 10 percentage points higher than the share of students that has not participate to program. The percentage of employees is similar. The earnings of those who took part in a study program abroad are on average about 140 euros higher.

Table 1- *Descriptive statistics treatment (International mobility=1) and control group (International mobility=0).*

	International mobility=1			International mobility=0			Total		
	N	Mean	sd	N	mean	sd	N	mean	sd
Workers	5261	.75553	.429809	50653	.743684	.436602	55914	.74478	.435
Work abroad	4634	.18970	.392110	42221	.042947	.202739	46855	.05741	.232
Permanent worker	2715	.55963	.496522	25630	.593257	.491236	28345	.59000	.491
Female	5261	.57786	.493947	50653	.589017	.492017	55914	.58797	.492
Master's degree	5155	.59680	.490587	49555	.431624	.495308	54710	.44705	.497
Graduation mark	5261	105.33	6.492	50653	102.378	7.968	55914	102.65	7.88
High school mark	5187	86.465	12.0027	50101	83.2172	12.5773	55288	83.51	12.5
Offsite students	2225	.67333	.469099	13886	.571330	.494904	16111	.58511	.492
Employee	3829	.71710	.450464	37630	.691847	.461736	41459	.69421	.460
Wage FT Equivalent	3534	1620.08	7377.31	33514	1477.80	6411.03	37048	1491.5	3.783

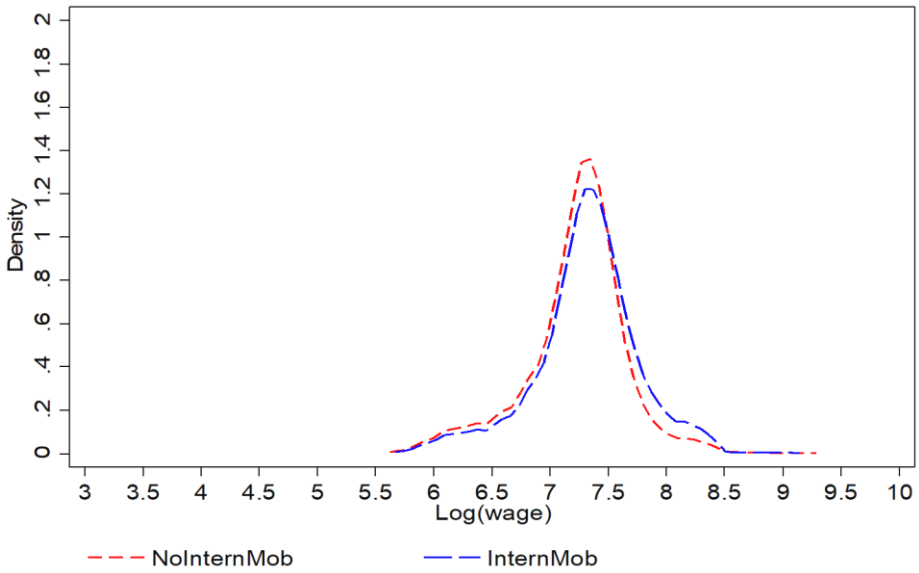
Source: Autor's elaboration on ISTAT data

6. Empirical analysis

A first visual summary of wage distributions is provided in Figures 1 for participants in International Mobility Programs and for people who does not participate. Figure 1 shows a Kernel estimate of density, highlighting differences between graduates who have taken the mobility path and those who have remained in Italy. We observe that the earnings distribution is characterized by a higher density function around the mode. Nevertheless, the graph highlights the high level of concentration of graduates who participated in an International mobility program in the right side of distribution.

In order to control for these differences and to study wage differentials, we estimate wage regressions.

Figure 1 - *Kernel density estimates of the wage distributions for participants to International Mobility Programs*.



Source: Autor's elaboration on ISTAT data

The table 2 reports estimates of the full time equivalent monthly wages (log); the monthly wages for full time employees (log) and the monthly wages with Heckman correction (log). The estimates of the simple ols equation contain all control variables. The international mobility program increases (log)wages of about 6.2%. Even considering only full time workers, the increase does not change.

The wage penalty for graduate female is -9%. The wages increase of 4,1% for students who worked during their studies. The overeducated graduates, graduates more educated than is useful for their role in the labour market, are associated with a significant decrease in wages. Master's degree increases the salary of about 9%.

Workers that live in the South of Italy gain 15.7% less than the other, while workers living abroad earn about 30% more than similar Italian workers.

Depending on the field of the university degree, we observe the following differences in wages: the degree in medical health disciplines seems to be associated with an increase in salary of 16.2 percentage points if we consider full time equivalent wages, of 13.7 percentage points if we consider only full time.

If the university degree is in a humanities field, such as literature, languages, psychology, education sciences, the average wage tends to decrease about 6.8

percentage points (6.7 p.p. with Heckman correction) compared to the salary of graduates in economic, law and political sciences.

Table 2 – *Regression results full time equivalent monthly wages (log), only full time and full time equivalent with Heckman correction*

	Log monthly wages (FTE)	Log monthly wages (full time)	Log monthly wages FTE (Heckman)
International Mobility	0.062***	0.063***	0.064***
	-0.011	-0.012	-0.011
Female	-0.090***	-0.086***	-0.091***
	-0.008	-0.008	-0.008
Age class 23-24	-0.021	0	-0.023*
	-0.013	-0.015	-0.014
Age class 25 - 29	-0.009	-0.006	-0.014
	-0.014	-0.016	-0.014
Age class > = 30	0.036*	0.008	0.031
	-0.02	-0.02	-0.02
High school marks (76-95)	0.030***	0.013	0.029***
	-0.009	-0.01	-0.009
High school marks (96-101)	0.064***	0.045***	0.065***
	-0.011	-0.011	-0.011
Duration of studies	-0.007***	-0.005**	-0.007***
	-0.002	-0.002	-0.002
Overeducated	-0.054***	-0.041***	-0.054***
	-0.009	-0.009	-0.009
Master's degree	0.089***	0.118***	0.091***
	-0.012	-0.012	-0.012
Works in the south	-0.157***	-0.152***	-0.165***
	-0.011	-0.013	-0.011
Works abroad	0.330***	0.293***	0.355***
	-0.019	-0.022	-0.02
Medicine (health) degree	0.162***	0.137***	0.161***
	-0.012	-0.013	-0.012
Degree in engineering, architecture and agriculture	0.004	0.012	0.004
	-0.011	-0.011	-0.011
Degree in chemistry, physics, biology	0.066***	0.020*	0.067***
	-0.011	-0.011	-0.011
Degree in letters, languages, psychology	-0.068***	-0.121***	-0.066***
	-0.012	-0.015	-0.012
Employed (0/1)			
Unmarried			0.090***
			-0.028

	Log monthly wages (FTE)	Log monthly wages (full time)	Log monthly wages FTE (Heckman)
Graduated father			-0.093***
			-0.027
Graduated mather			-0.006
			-0.028
Father employed or retired			0.097
			-0.063
Mather employed or retired			0.109**
			-0.056
First residency area			-0.476***
			-0.019
athrho			0.093***
			-0.031
lnsigma			-0.917***
			-0.008
_cons	7.283***	7.242***	0.309***
	-0.081	-0.087	-0.052
Obs	26553	16612	39806

Note: Standard errors in parentheses
Source: Autor's elaboration on ISTAT data

The variables included to matching the graduated treated and the control are gender, the field of graduation at the most disaggregated level possible, the employment situation of the mother and the educational level of the father and mother. The balancing property is satisfied.

These estimates, based on 3817 treated units and 23420 control units, regard propensity score matching. The ln of wages increases of 9.6% for individuals who have participated in abroad programs. This result is statistically significant and confirms the hypotheses that the participation in an international mobility experience increases wages.

Tabella 5 - *Average Treatment on Treated of International Mobility on (ln)monthly wages.*

n. treat.	n. contr.	ATT	Std. Err.	t
3817	23420	0.096	0.008	11.579

Source: Autor's elaboration on ISTAT data.

7. Conclusions and policy implications

For the 2014-2020 programming period, the Erasmus Plus program has provided a significant increase in funding compared to the previous period with an important focus on employability. One of its main goals is to enhance the level of skills and abilities, in particular, but not only, related to the labour market (Council of European Union, 2012).

Despite the popularity of international mobility programs, little research has been carried out on this topic. Our paper investigates the hypotheses that international students mobility increases wages. We estimates average treatment effects on treated from observational data by propensity-score matching. From the point of view of the implications in terms of policy, the study conducted suggests that participation in international mobility projects makes graduates more competitive: we find that the participation in international mobility programs increases the (ln)wages of 9,6%.

The results represent a first step of research on the relationship between international mobility and wages; so we will continue, in fact, other testing methods that can strengthen the evidence emerged from this analysis. It will be useful, therefore, to use instrumental variables to compare these initial results and to take into account the different exposure to "treatment", in fact there are some characteristics that could affect the participation to an international mobility program. Among the possible further developments it is also considered appropriate to replicate the estimates on data from the same survey relating to previous years to verify whether the same dynamics found can be observed even in different periods.

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SUMMARY

The impact of international students mobility on wages

The paper investigates the hypotheses that the participation in international student mobility increases wages. At this aim, we use the data of the survey on university graduates' vocational integration conducted by ISTAT, that investigates the transition of graduates from university to employment four years after graduation. First, we estimate the mincerian equation of wages, we distinguish between the full time equivalent monthly wages, including all the workers of the sample, and only the workers full time. Heckman's two-step procedure allows us to take into account sample selection.

In order to estimate a less biased assessment of international mobility experience on wages, we use the propensity score matching technique and we estimate the Average Treatment Effect on the Treated.

The OLS regressions show that international mobility experience increases (log)wages and the estimated effect of study abroad program participation confirms this finding.

We estimate average treatment effects on treated from observational data by propensity-score matching. We find that the international mobility experience increases the (ln)wages of 9,6%.

Valentina FERRI, INAPP, v.ferri@inapp.org

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ATTIVITÀ DELLA SOCIETÀ

A) RIUNIONI SCIENTIFICHE

XXXVII	La mobilità dei fattori produttivi nell'area del Mediterraneo (Palermo, 15-17 giugno 2000).
XXXVIII	Qualità dell'informazione statistica e strategie di programmazione a livello locale (Arcavacata di Rende, 10-12 maggio 2001).
XXXIX	L'Europa in trasformazione (Siena, 20-22 maggio 2002).
XL	Implicazioni demografiche, economiche e sociali dello sviluppo sostenibile (Bari, 15-17 maggio 2003).
XLI	Sviluppo economico e sociale e ulteriori ampliamenti dell'Unione Europea (Torino, 20-22 maggio 2004).
XLII	Sistemi urbani e riorganizzazione del territorio (Lucca, 19-21 maggio 2005).
XLIII	Mobilità delle risorse nel bacino del Mediterraneo e globalizzazione (Palermo, 25-27 maggio 2006).
XLIV	Impresa, lavoro e territorio nel quadro dei processi di localizzazione e trasformazione economica (Teramo 24-26 maggio 2007).
XLV	Geopolitica del Mediterraneo (Bari, 29-31 maggio 2008).
XLVI	Povertà ed esclusione sociale (Firenze 28-30 maggio 2009).
XLVII	Un mondo in movimento: approccio multidisciplinare ai fenomeni migratori (Milano 27-29 maggio 2010).
XLVIII	150 anni di Statistica per lo sviluppo del territorio: 1861-2011. (Roma 26-28 maggio 2011).
XLIX	Mobilità e sviluppo: il ruolo del turismo. (San Benedetto del Tronto, 24-26 maggio 2012).
L	Trasformazioni economiche e sociali agli inizi del terzo millennio: analisi e prospettive (Università Europea di Roma, 29-31 maggio 2013).
LI	Popolazione, sviluppo e ambiente: il caso del Mediterraneo (Università Federico II di Napoli, 29-31 maggio 2014).
LII	Le dinamiche economiche e sociali in tempo di crisi (Università Politecnica delle Marche, 28-30 maggio 2015).
LIII	Mutamento economico e tendenze socio-demografiche tra sfide e opportunità (Università degli Studi Internazionali di Roma, 26-28 maggio 2016).
LIV	Mobilità territoriale, sociale ed economica: modelli e metodi di analisi (Università degli Studi Internazionali di Catania, 25-26 maggio 2017).
LV	Coesione sociale, welfare e sviluppo equo e sostenibile (Università degli Studi dell'Insubria, Varese 24-25 maggio 2018).
LVI	Benessere e Territorio: Metodi e Strategie (Università Politecnica delle Marche, Ascoli Piceno 23-24 maggio 2019).