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CHANGES IN THE EMPLOYMENT STRUCTURE AND IN JOB QUALITY IN ITALY: A NATIONAL AND REGIONAL ANALYSIS

by Luciana Aimone Gigio*, Silvia Camussi* and Vincenzo Maccarrone**

Abstract

This paper contributes to the literature on changes in the employment structure, focusing on the job quality created and destroyed in Italy and in its regions in the years 2011-17. To do so, we apply a 'jobs-based' approach methodology similar to the one developed by Eurofound re-searchers and we use Labour Force Survey data from the Italian National Institute of Statistics (ISTAT). Our findings suggest that in the period, Italy experienced a polarisation pattern skewed towards lower-paid jobs, whereas we observe an upgrading trend at the average EU level. This pattern is the result of diverging trends across Italy: while the central and northern regions are responsible for the growth not only in the share of workers in low quality occupations but also in higher quality ones, southern Italy contributed exclusively to the increase in low-paid jobs. The latter area is the only one experiencing a clear downgrading trend over the years 2011-17. Sectoral trends are partially responsible for these patterns. Furthermore, we find that in recent years, the economic divide between northern-central and southern regions has widened. Within each macro-area, the contribution of different regions to the total trends was heterogeneous, in particular in the South of Italy, where some regions contributed positively to employment growth in higher paid jobs too, although their role was overshadowed by those that performed worse.

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Contents

* Bank of Italy, Turin Branch; ** University College Dublin, School of Business.

1. Introduction[3]

An influential strand of literature, based on US and UK data, has argued that labour markets have been increasingly polarising, with job growth concentrated at the top and the bottom of the employment distribution and a fall in middle-paid occupations (Autor and Dorn, 2013; Goos et al., 2009). Against this background, Italy is an interesting case, as the country shows very different patterns of structural change before and during the economic crisis. The literature on the topic (Olivieri, 2012; Eurofound, 2014) points out to the fact that before the recession the country experienced a pattern not of polarisation but of upgrading of the employment structure: while the relative importance of highly skilled occupations was growing, the share of unskilled and lower paid occupation remained constant or even decreased. However, this picture changed dramatically since the 2008 crisis, where Italy was among the few European countries which showed a downgrading pattern. In a struggling labour market, employment creation was highly skewed towards low-paid jobs (Basso, 2019; Eurofound, 2017).

While there is now a sizable number of studies on changes in the employment structure at the national level, national trends often mask significant heterogeneity at the regional level (see Kaplanis, 2007; Jones and Green, 2009; Eurofound and JRC, 2019). This is particularly relevant in the case of Italy, where regions have been historically characterised by a different degree of industrialisation and different migration patterns and divergences across northern-central and southern regions are well known (Banca d'Italia, 2010; Svimez, 2015, Bentivogli et al., 2018). While the topic of regional divide in Italy has been a long-standing object of research, this paper is one of the first contributions that addresses the Italian case looking at changes in the regions' employment structure and in the quality of jobs.

In doing so we apply a "jobs-based" approach methodology similar to the one developed by Eurofound researchers (Eurofound, 2008-2019) to the Italian employment data. By shifting the focus from individuals to 'jobs', defined as combination of an occupation in a sector (e.g. a nurse in the health sector), this type of analysis allows to account for a wider set of information compared to the methodology used in other strands of literature. Hence, this approach allows us to describe in a simple but effective way the changes undergone by the Italian employment structure in the last decade. Moreover, it is particularly well suited to be applied also at the regional level.

Our contribution here is two-fold. On the one hand, we study how the four Italian NUTS 1 macro-regional areas (North-West, North-East, Central and Southern Italy) contributed to the trends of the employment structure at the national level. On the other, we consider the four macro-regions separately and we study whether there is convergence or divergence ongoing across different areas. The focus of our study are the years 2011-2017[4].

Analysing results at the national level, we find that Italy has performed worse than the European average: overall in the period 2011-17, while in Europe we observe an upgrading trend, in Italy we

[3] The views expressed in the paper are those of the authors and not necessarily those of the Bank of Italy. We thank for their helpful comments and suggestions and for the data provided the European Foundation for the Improvement of Living and Working Conditions and in particular Enrique Fernandez-Macías, John Hurley and Martina Bisello. Needless to say, all errors are ours.

[4] The choice of the period is conditioned by the changes occurred in the classification of professional qualifications and of sectors on which the job ranking is based.

have a polarisation pattern skewed towards lower paid jobs. However, our within-country analysis shows that each macro-area played a different role in determining the overall pattern. Indeed, central and northern regions are responsible for the growth not only in low quality occupations but also in higher quality ones, while southern Italy contributed exclusively to the increase in low paid jobs.

Analysing employment dynamics separately in each macro-area we find that the gap between Centre-North and South of Italy has widened in recent years. Northern and central regions have performed better in terms of numbers and quality content of jobs created while southern ones have struggled behind. In particular, central regions went through a polarization process, with growth occurring in better paid jobs already in the recession years. Northern regions, where growth in the upper part of the distribution occurred only in the recovery years, also experienced a polarized trend, though skewed towards low-paid jobs, while Southern Italy downgraded, instead. Part of these trends are connected to the differentiated productive structure across the Italian territory and to the diverging sectoral dynamics. In central and northern Italy high value-added services (both private and public in the Centre, mainly private in the North) contributed in determining growth at the top of the employment distribution. In the South, these sectors did not manage to create high skilled positions. Low value-added services played a relevant role in determining growth at the lower end of the employment distribution in all areas. Moreover, the deterioration of the quality of jobs in recent years in the South of Italy is even worse if we consider the type of jobs created: only part-time positions and temporary ones had a positive contribution to jobs creation in the area.

Yet, within each macro-area the contribution of different regions is heterogeneous. In the North-east all regions contributed positively to the growth at the top and at the bottom of the distribution. In the northwestern area trends are driven by Lombardia, whereas in the Centre of Italy Lazio and Toscana are mainly responsible for the polarization pattern. In the South of Italy there are regions that have contributed positively to employment growth (Campania, Molise and Sardegna), though total trends are dominated by less performing ones.

When looking at the total employment trends of each Italian region, we also find a very variegated picture. Piemonte is the only northern region showing a downgrading trend over the 2011-17 period. The other northern and central regions display a polarization pattern, though with different intensity. In the South, the situation is not so negative for all the regions, with Molise and Sardegna that are the only regions displaying a clear polarization trend.

The work is structured as follows. In section 2, we briefly revise the scientific literature on the topic. In section 3, we describe the methodology and the data used in the analysis. In section 4, we briefly present an overview of the patterns emerged in the past decades in Italy in the comparison with the EU average trends. This analysis helps us to introduce the territorial differentials. In section 5 we present our macro-regional analysis, while in section 6 we study the contribution of NUTS 2 regions to the pattern of each area. In the last section, we comment over the most relevant results and conclude.

2. The literature

The literature on changes in employment structure has originally focused on national cases. The US labour market has been one of the first to be analysed. A growing strand of research identified a trend of polarisation at work in the US already in the decade before the recession, with jobs at the top and at the bottom of the occupational structure growing, while mid-qualified jobs stagnated (Wright and Dwyer 2003, 2012; Autor et al., 2006; Autor and Dorn, 2013). The picture for Europe was less crystal clear: whereas some scholars emphasized that also the European countries had experienced a process of polarisation (Goos et al., 2009), other works (Eurofound, 2008; Olivieri, 2012) found a greater heterogeneity of structural patterns among EU countries. Studies of the employment structure throughout the recession noted how for the US the crisis accelerated the process of job polarisation (Jaimovich and Siu, 2012), while for Europe the picture remained heterogeneous (Eurofound, 2016, 2017).

Competing explanations have been advanced to explain these trends. Automatization and information and communication technologies (ICT) and their uneven impact over different occupations are often quoted as the main explanatory factor. The Skill Biased Technical Change (SBTC) hypothesis arguments that new technologies such as ICTs foster an upgrading of the employment structure given their complementary to higher skilled occupations and their substitutability with lower skilled ones (Acemoglu, 2002). According to the Routine Biased Technical Change (RBTC) theory (Acemoglu and Autor, 2011; Autor and Dorn, 2010; Goos and Mannig, 2007; Van Reenen, 2011) the adoption of new technologies which are routine biased leads to polarisation, instead. This theory advocates that ICTs tend to be substitutes for middle skilled jobs (usually composed by routine tasks and hence easily automatized) and complements to highly skilled ones. At the same time, there is limited negative impact on low-skilled occupations which do not entail repetitive tasks and hence are hardly automatized. An alternative explanation is based on globalization and trade (Oldenski, 2014). The offshoring of jobs towards less expensive locations is more likely to affect routine occupations, which can be more easily transferred abroad. As these occupations tend to be in the middle of the employment structure, job polarisation is also the predicted result of such approach.

The heterogeneity of results in terms of employment trends observed in many countries constitutes however a puzzle both for the SBTC, the RBTC and the offshoring-based explanations. More recent strands of the literature point thus towards the importance of structural and institutional factors in explaining trends in the employment structure (Fernández-Macías, 2012; see also Nellas and Oliveri, 2012; Fernández-Macías and Hurley, 2017). Other factors, such as sectoral dynamics (Barany and Siegel, 2018; Basso, 2019; Fernández-Macías, 2012) or migration flows (Fernández-Macías, 2012; Murphy and Oesch, 2018; De Philippis, 2017), might as well be behind the aggregate structural trends, leading to results that might differ from polarisation.

Italy is clearly a good example in this respect. While Goos et al. (2009) insert Italy among the countries which experienced job polarisation between 1993 and 2006, with respect to other countries of the authors' sample Italy appears rather skewed towards upgrading, recording the largest increase in top-paid occupations among the sample. This appears in line with the results of Olivieri (2012), who shows that between 1993 and 2009 the country experienced a pattern of upgrading of the employment structure instead of one of polarisation as observed in other countries in the same

period. Eurofound (2014) also shows that in the period 1995-2007 the Italian case is one of clear structural upgrading.

However, during the recession this pattern interrupted and reversed abruptly. In fact, in the period 2008-10 Italy stands clearly as an example of downgrading and also in the following years employment growth was stronger for lower skilled and lower paid jobs (Eurofound, 2014; 2017). A recent contribution by Basso (2019), who looks at trends in the Italian employment structure from 2007 to 2017, seems to corroborate these findings, showing that the overall picture for Italy is one of downgrading. This trend seems to be driven by the recession, while in the recent recovery years polarisation occurred.

While these trends at the national level are interesting, there is a growing awareness in the literature that the trajectories of employment structure at the national level often hide significantly different trends at the regional and local level (Eurofound and JRC, 2019). Indeed, specific patterns of regional economic specialisation are likely to lead to spatially different trends of the employment structure. For instance, studies on the employment structure of the UK prior to the recession have shown that, while most of the regions showed a tendency towards polarisation, areas such as London and the South East were outperforming the other regions in terms of proportion of highest quality jobs, while Northern Ireland was showing a distinct downgrading pattern (Jones and Green, 2009). Other scholars have instead moved the analytical focus to local labour markets, rather than to regions. Autor and Dorn (2013) analyse patter of spatial differentiation of changes in the employment structure in US local labour markets, showing that areas with an highest initial share of routine jobs experienced a more intense polarisation pattern driven by automation, through reallocation of workers towards low-skilled service jobs and inflows of both low and high skill jobs. Charnoz and Orand (2017) and Consoli and Sanchez-Barrioluengo (2019) find similar results for France and Spain, respectively.

One would expect to find locally differentiated patterns of employment change to be ever more pronounced in Italy, where local and regional differences are well known. In fact, focusing on Italian provinces over the period 2014-2016, and using a similar approach to the one followed by Autor and Dorn (2013), Brunetti et al. (2020) find that provinces with a higher share of routine jobs experienced a higher degree of polarisation, through a higher growth in low-skill occupations. Other studies focused instead on the regional level. Olivieri (2012) showed that, in the context of a general upgrading of the Italian employment structure prior to the 2008 economic and financial crisis, the northern-central regions had a much more significant increase in highest-paid jobs, and a much more significant decrease of middle and low paid positions. A recent study by the Bank of Italy (Banca d'Italia, 2018) found that, while between 2007 and 2017 both northern-central regions and southern ones downgraded their employment structure. Northern regions experienced a polarization trend in the recovery years, with a growth also of higher paid jobs, while the latter stagnated in Southern Italy. Also a more recent research by Eurofound and the European Commission Joint Research Centre (2019) finds that in a general context of downgrading (driven by the recession) of the Italian employment structure between 2002 and 2017, southern regions fared even worse, with a net destruction of high-quality job and employment growth concentrated only in low quality ones.

Despite the growing interest of the literature on locally differentiated changes in the employment structure, the number of studies on the Italian case remain low. Our work complements the studies

by the Bank of Italy (2018) and Eurofound and JRC (2019), by offering an in-depth study of the trends in the employment structure in the Italian regions over the last decade. Our study differs also from the work of Brunetti et al. (2020), in that direct our analysis to the regional rather than the provincial level. Without the claim to be exhaustive, we therefore hope to shed some new light on the topic.

3. Methodology and data

The methodology used in this paper builds on the "jobs based" approach used since 2008 by the European Foundation for the Improvement of Living and Working Conditions (Eurofound) to analyse the changes in the quality of jobs in EU member states (Eurofound, 2008-2017; Fernández-Macías et al., 2012). The "jobs based" approach focuses on the concept of *jobs*, instead of individuals, to understand which kind of employment is being created and destroyed in an economy. A *job* is defined as the combination of an occupation (for instance, a nurse) and a sector (for instance, the health sector). Focusing on jobs to measure changes in the structure of employment has the practical advantage that all the labour force surveys conducted within regular time intervals provide standardized information on the sector and on the occupation of each employed individual. These surveys rely on international classifications such as NACE for the sector and ISCO for the occupation.

While the literature on structural employment change tends to use only the occupational classification (e.g. Goos and Manning, 2009; Olivieri, 2012; Autor and Dorn, 2013; Basso, 2019), using both sectoral and occupational classifications to define a job allows to add important work characteristics (Eurofound and JRC, 2019). In short, "the sector describes what type of economic value is being created and the structure of occupations gives some indication of how this value is being created" (Storrie et al., 2012: 4).

According to the Eurofound methodology, jobs are firstly defined as a combination of occupation and sector by using ISCO and NACE classifications at the two-digit level. Each combination of ISCO and NACE constitutes a cell within the "job matrix" so created. In order to analyse quality content of jobs, once job cells are created, they are ranked by the hourly mean wage of workers within the cell: the higher the average wage of workers within the job cell, the higher the position within the ranking. The wage ranking is widely used in the literature (e.g. Goos et al., 2009; Autor and Dorn, 2013; Murphy and Oesch, 2018; Basso, 2019). While there exist different indicators of job quality, they tend to be well correlated among each other (De Bustillo et al., 2011) and better working conditions are generally associated with higher wages (Fernández-Macías, 2012).

Apart from the wage-ranking approach, jobs have been ranked according to other measures such as their educational requirement (Olivieri, 2012) or their task content (Autor et al., 2006; Basso, 2019). Previous literature has shown that educational and wage rankings are positively correlated (Eurofound, 2013) and the results using both rankings are broadly comparable (Autor et al 2006; Murphy and Oesch, 2018). Wage data are generally more reliable statistics than other composite indicators, such as task indexes that may suffer from potential issues of measurement error (Basso, 2019).

The wage-ranking used in this paper is the one constructed for Italy by Eurofound researchers, which combines information from the Eurostat Labour Force Survey (EU-LFS) and the European Structures of Earnings Survey (ESES) (see Eurofound 2014)[5]. This ranking has been tested and refined across several editions of the European Jobs Monitor[6].

Once they have been ranked, jobs are aggregated into quintiles which contain approximately 20 per cent of the employed population in the starting year of the period of interest. This way to define the initial distribution of jobs is important to correctly evaluate the rate of growth of each quintile and hence the structural trends beneath them. Following Wright and Dwyer (2003) and Eurofound (2008-2017), we assume that the jobs ranking remain fixed over time. The assumption, corroborated by the literature (Oesch and Piccitto, 2019), is that the position of a job within the hierarchy remain stable: jobs at the top (bottom) of the distribution in a decade will likely be at the top (bottom) of the distribution also in another decade[7]. What does change is the relative share of employed within certain jobs, and hence within quintiles.

By keeping fixed the wage ranking over the period of interest and studying the change in the relative size of each quintile, one can offer a picture of the structural trends in terms of the quality of employment. If, for instance, the lower quintiles grow relatively more than the other quintiles we would observe a phenomenon of downgrading. Instead, when there is a relative growth of high-paid jobs, that is those on the top 20 per cent of the wage distribution, we have upgrading. With polarisation, employment growth is weakest in the middle and relatively stronger at both ends of the job-wage distribution. The use of quintiles has therefore the advantage of offering a synthetic representation of changes in the employment structure, while allowing for a more nuanced analysis with respect to the use of other measures such as terciles. The kind of evidence on structural trends offered here remains, in any case, descriptive[8].

Similarly to Nellas and Olivieri (2012) and Basso (2019), we investigate changes in the composition of employment in each period rather than the net employment change in each quintile. To do so we look at the variations not in absolute values but in the shares of workers in each quintile. Given that the sum of the shares equals one in each year, changes in the shares sum up to zero. This implies that what we compute is the relative change in each quintile (i.e. in its associated level of quality) with respect to the total employment trend.

The '*jobs-based*' approach is also well suited to analyse changes in the structure of employment at the regional level. The methodology described above is applied to our territorial analysis, using the initial employment structure of each macro-region as a yardstick to analyse its change. A recent contribution by Eurofound and the European Commission Joint Research Centre (2019) looks at

[5] The combination of both data sources allows to overcome some shortcomings of the Eurostat wage data (see Basso, 2019). The availability of a country-specific ranking is an advantage with respect to previous studies on the topic (for instance the study by Goos et al., 2009 relied on UK wage data to rank the jobs in all EU15 countries, including Italy). To test the correctness of the methodology used we analyse the distribution of employment, obtained by ranking jobs using wages, with the professional content of each job. As expected, we find a higher presence of qualified professions in the top quintiles and a higher presence of elementary professions in the bottom ones (see tab. T1-T2).

[6] See https://www.eurofound.europa.eu/it/observatories/emcc/european-jobs-monitor.

[7] In particular, Fernández-Macías (2012) shows that the result of polarisation for the EU obtained by Goos et al. (2009) is influenced, among other things, by the fact that the sizes of their job-quality segments are not kept equal already in the starting year.

[8] For a more formal test of the polarisation hypothesis in the Italian case see Basso (2019).

the topic of the shifts of the employment structure at the regional level for 9 EU countries, including Italy. Our work differs however from this contribution in several ways. First, the Eurofound and JRC paper relies on job terciles. We prefer to maintain job quintiles as they provide richer information about shifts in the employment structure. Second, in order to ensure comparability between different European regions, the Eurofound and JRC's study uses an average EU-job wage ranking to allocate jobs in the terciles and compares the trends of each region using as a reference point the average structure of employment of the 9 countries. As we provide a more in-depth study on the Italian case, we prefer to use the initial structure of each region as a yardstick to analyse its change, in order to account for the specific employment structure of each area. Third, the Eurofound and JRC (2019) study analyses shifts in the employment structure in the period 2002-2017, while we focus only on more recent years to avoid issues related to changes in the classification of occupations (ISCO) and sectors (NACE)[9].

Data on employment is from the Italian Labour Force Survey (LFS) conducted by the Italian National Institute of Statistics (ISTAT). With respect to other contributions on the topic (e.g. Basso, 2019) we decided to include public sector employees as the public sector is usually a provider of highly skilled jobs (Jones and Green, 2009; Murphy and Oesch, 2018) and agriculture, due to its relevance in Southern Italy. Due to profound changes in the classification of professional qualifications and of sectors, our main analysis focuses on the period 2011-17[10]. As the year 2014 marked the beginning of the recovery period in Italy, we also distinguish two further sub-periods: 2011-2014 and 2014-2017.

4. The case of Italy: a general overview

Italy is an interesting case of analysis for the study of employment trends. In comparison to the average of the EU countries, the number of employed people has grown less in the recent years. In particular, while in Italy during the "douple dip" recession (2011-14) employment continued to fall (-0.5 per cent), in Europe it slightly grew (0.3 per cent). Moreover, also in the recovery years (2014-17) growth in employment was smaller in Italy compared to the average EU trends (respectively, 1.1 and 1.4 per cent).

Applying the methodology described above, we show that also the changes in the structure of employment observed in the two areas over the period are very different. According to our results, Italy experienced a polarization trend both in the "double dip" recession and in the recovery years[11] (fig. 1a). This finding is apparently in contrast with the conclusions of Eurofound's European Job Monitor 2015, which shows a downgrading trend during the period 2011-14. This divergence in

[9] The NACE classification was updated significantly in 2007 from the version rev. 1.1 to NACE rev. 2.0. Similarly, in 2011 there has been the switch from the ISCO-88 to ISCO-08 classification.

[10] Using only the ISCO classification, Basso (2019) instead uses a matching procedure to construct a dataset which contains both pre-2011 and post-2011 data. As we have two deal with two classification breaks (ISCO and NACE) we prefer to present the analysis by breaking down the relevant time periods.

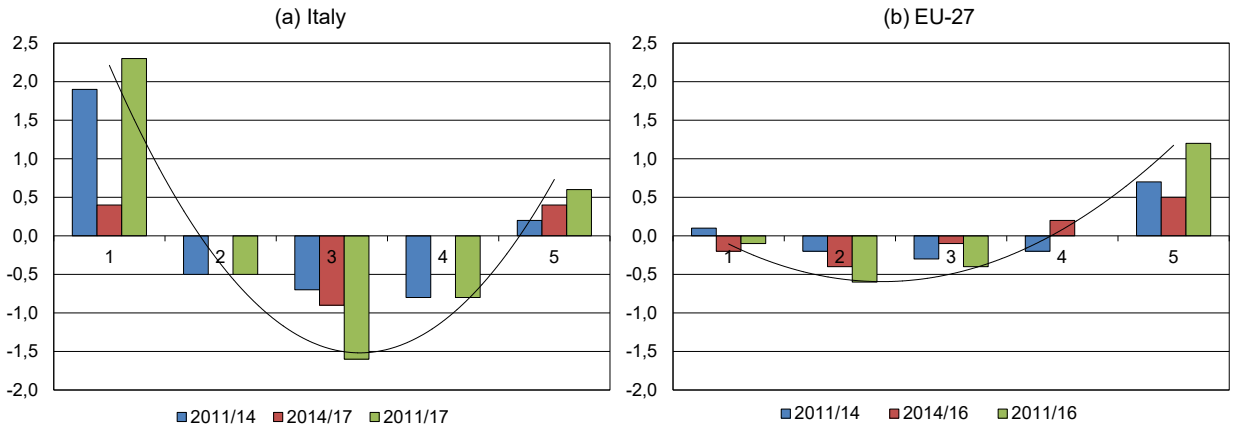
[11] In order to compare our results with those of previous studies we also applied the methodology to the per-crisis years (2000-07) and to the peak crisis period (2008-10). In the first period, consistently with previous analysis (Olivieri, 2012; Eurofound 2014), our findings show an upgrading pattern. In the years 2008-10 in Italy the employment structure changed with a downgrading trend. Results are here similar to those of other studies (Eurofound, 2014 and 2017; Basso 2019).

results is justifiable by the different methodology used[12]. Moreover, coherently with Eurofound's findings, the pattern we observe is strongly skewed towards low paid jobs (we call it a "weak polarization trend").

Figure 1

Changes in the share of total employment by job-wage quintile

(in percentages)



Source: Istat and Eurostat, Labour Force Survey and Eurofound (author's calculations). Ranking 2011.
(1) The interpolation line shown in each panel is done on the period 2011-17 as a whole.

In Europe we find an upgrading of the structure of employment. Only the share of workers in the higher part of the distribution increased and the drop observed in the other quintile was rather small compared to the Italian case (fig. 1b).

Hence, it is striking how Italy struggled in creating qualified occupation in the recent years. What does explain this Italian difficulty in creating quality jobs?

Recent studies (Barany and Siegel, 2018; Basso, 2019) show that trends in sectoral composition can in part explain changes in the employment structure over the years. Therefore, we analyze how different sectors play a role in framing the overall Italian picture. The type of analysis conducted here is descriptive and does not aim to assert how much of the changes observed is due to sectoral re-composition and how much is due to the intensity of usage of the different occupations within each sector.

In Italy, over the 2011-17 period services and domestic work are largely responsible for the growth displayed at the bottom of the distribution (fig. 2a). Among the first group, also considering the technological content of jobs according to the Eurostat classification (see Annex 2), less knowledge-intensive services (LKIS) are mainly interested by this increase (fig. 2b). The small increase in the share of workers at the top of the distribution is mainly due to services (especially private and public knowledge-intensive services, KIS) and to the industrial sector (mainly medium-high technology firms, MHT). These results are consistent with those found by Basso (2019), who

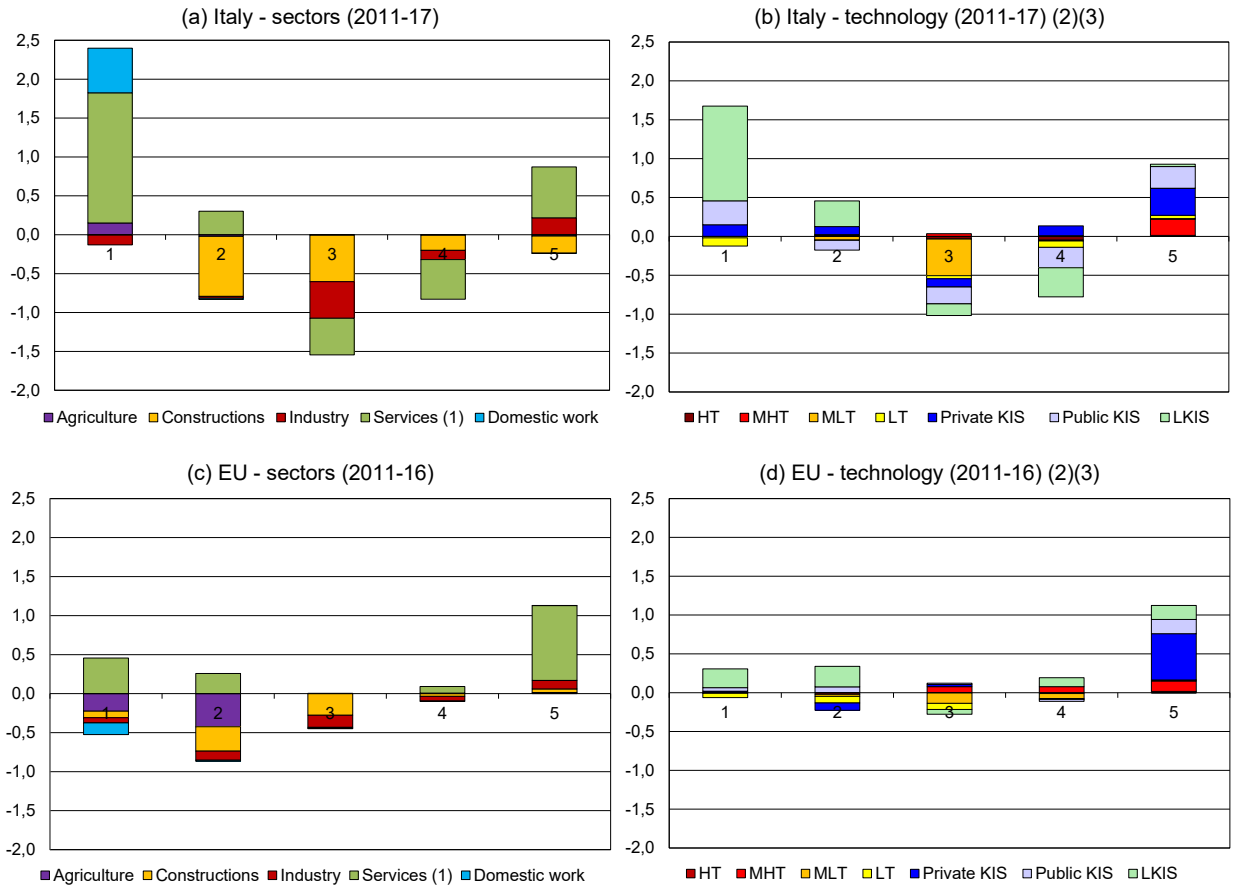
[12] When looking at the net employment change in each quintile (as Eurofound does) we find a growth only in low-paid jobs, while there is a fall in the 5th quintile. However, being this drop weaker than the one occurred in the other quintiles, when considering the changes in the composition of employment the polarisation pattern discussed above emerges, although in any case strongly skewed towards the lowest quintile.

shows that sectoral composition is one of the drivers of the change in the structure of employment; in particular services contribute to the rise in both low and high paid jobs.

Figure 2

Changes in the share of employment by sector and technological content

(in percentages)



Source: Istat and Eurostat, Labour Force Survey and Eurofound (author's calculations). Ranking 2011.
(1) Services for Italy do not include domestic work which is displayed as further category. – (2) The graphs display dynamics for services and industry, only. Other sectors shown in figures a) and c) are not displayed. Sectors are classified according to Eurostat classification of High-tech industry and Knowledge-intensive services by NACE Rev.2: HT=High-technology manufacturing industries; MHT=Medium-high-technology manufacturing firms; MLT= Medium-low-technology manufacturing firms; LT=Low-technology manufacturing firms; KIS=Knowledge-intensive services; LKIS=Less-knowledge intensive services (do not include domestic work). – (3) See *Annex* 2 for further specifications.

Comparing Italian trends with European ones (fig. 2c-2d), low value-added services seem to contribute more to employment growth in Italy. Indeed, services related to tourism (such as accommodation and food service activities), which employ in Italy a larger share of workers, showed in these years a better dynamic than the rest of Europe and partially explain the observed creation of low and medium-low quality occupations. Moreover, in Italy domestic work also contributed positively to the increase in the share of workers at the bottom of the employment distribution. This trend is connected to the higher demand for paid care activities. Higher female labour market participation in fact enhances the request for these services, at times provided by the public sector in

other countries. Yet, to some extent this increase might have been statistically inflated by changes in the legislation[13].

Public services, which mainly created in Europe high quality jobs, in Italy determined an increase in the share of workers not only at the top but also at the bottom of the distribution and a fall in the middle quintiles, not observed at the EU level. This drop may be linked to the hiring restrictions introduced in Italy in the public sector during the recession. High value-added services fostered growth at the top of the distribution with a larger intensity in Europe. This trend can be attributed to private KIS, especially in the ICT, which have been growing to a lesser pace in Italy than the EU average in the period 2011-17. Negative dynamics in the manufacturing and in the construction sectors, leading to a fall in the share of workers in "middle class jobs", are a common feature of both Italy and Europe. However, it should be noted these trends were even worse in Italy (tables T3-T4) while, at the top of the distribution MHT manufacturing firms performed in a similar way in the two areas.

How did these factors play out throughout within the highly heterogeneous Italian territory? The rest of the paper shifts the analysis of changes in the employment structure to the (macro) regional level.

5. The macro-regional analysis

The dichotomy between norther-central and southern regions is a well-known and long studied characteristic of the Italian economy. Therefore, to shed light on the changes in the Italian employment structure it is helpful to delve into a territorial analysis. As a matter of fact, employment trends are profoundly heterogeneous within the country (fig. 3a). In terms of overall employment trends, northwestern and northeastern regions performed quite similarly over the past decades; trends of these areas were in general not far from patterns observed at the national level. In Central Italy, the economic and financial crisis had a relatively weaker impact on employment with a limited fall in jobs during the 2008-10 period and an earlier recovery compared to the rest of the country. Southern regions were hit the worst by the financial turmoil of the recent years, instead: the fall in employment was greater and the effect of the recovery was not strong enough to restore employment pre-crisis levels. How did this play out in terms of employment structure?

The contribution of each macro-area to the overall change in the Italian employment structure was also diverse (fig. 3b). During the 2011-17 period all macro-regions contributed to the growth in the share of workers in the lowest quintile and to the fall of workers in the central part of the distribution. Northern and central regions were responsible for the increase in the share of workers at the top of the distribution. In particular, central regions contributed positively to the growth of the top quintiles both in the period 2011-14 and in the recovery years, whereas the contribution of northern regions was positive only in the second period. Southern regions always contributed negatively to the 5th quintile, instead.

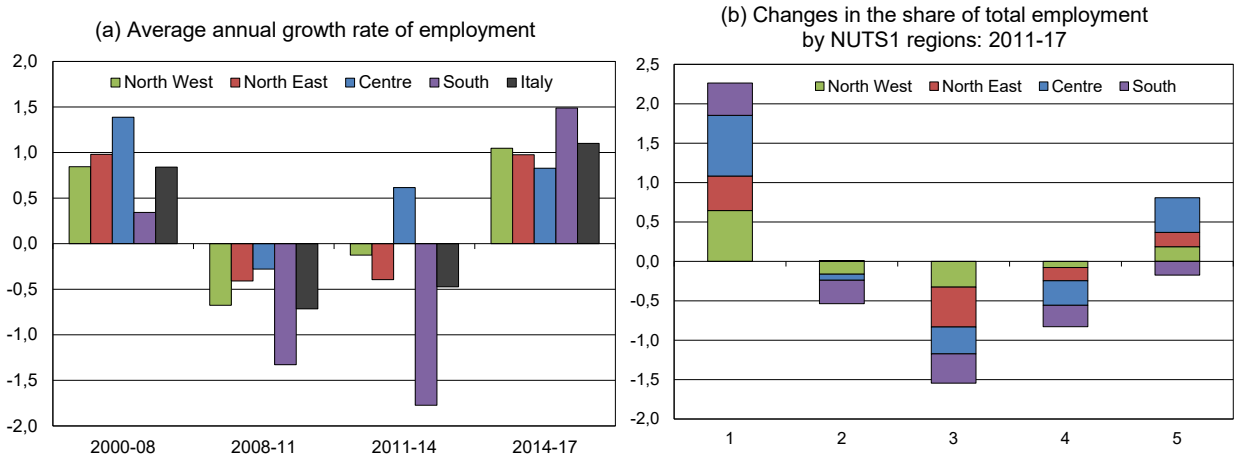
[13] The increase for domestic work may be partly explained by the regularisation of migrant workers occurred in Italy in 2012 (D. Lgs 109/2012) and by the adjustments in administrative data following 2011 Population Census, affecting mainly foreign workers.

Given this heterogenous picture, it is interesting to analyse separately patterns in each macro-region. We apply our methodology to each area using its specific initial ranking.

Figure 3

Employment changes by Italian macro-region (*NUTS 1 level*)

(in percentages)



Source: panel a) Istat, LFS; panel b): Eurofound, LFS Istat (author's calculations). Wage quintiles; ranking 2011.

During the period 2011-17, northwestern and northeastern Italy display an overall pattern of polarisation (fig. 4a-4b). Polarisation was skewed towards low-paid jobs and therefore very weak in the North West[14]. These trends in both areas are the result of a downgrading pattern occurring in 2011-14, followed by an increase in employment mainly at the top and at the bottom of the distribution in the subsequent period. Polarisation occurred also in Central Italy (fig. 4c), where the increase in employment in the top and bottom quintiles was stronger in the years 2011-14. On the contrary, Southern Italy displays a downgrading pattern (fig. 4d), due to a weak polarisation trend in the 2011-14 period and a downgrading trend in the recovery years.

The differences in the productive structure across the Italian territory surely play a fundamental role in explaining these heterogeneous trends and at the same time influence the quality of jobs created and destroyed. As a matter of fact, northern regions are characterized by a greater presence of the industrial sector, while Central and Southern Italy display a greater presence of services (tab. T5-T8). Among these, in particular, Southern Italy shows a greater incidence of LKIS and of public services instead of private KIS. Furthermore, the southern regions are characterized by a greater relevance of agriculture, which is usually characterized by lower paid jobs.

In general, as at the national level, services are mainly responsible for the polarisation pattern observed in northern and central regions over the 2011-17 period (fig. 5). In particular, LKIS mainly contributed to the growth of the share of workers at the bottom of the distribution, while private KIS are responsible for the increase at the top (fig. 6). In the Centre of Italy such pattern was coupled with a relevant role played by public KIS; in this area knowledge intensive services (both private and public) had a positive contribution to the growth in the 5th quintile already in the period 2011-14. In northern regions the positive contribution of private KIS at the top of the distribution

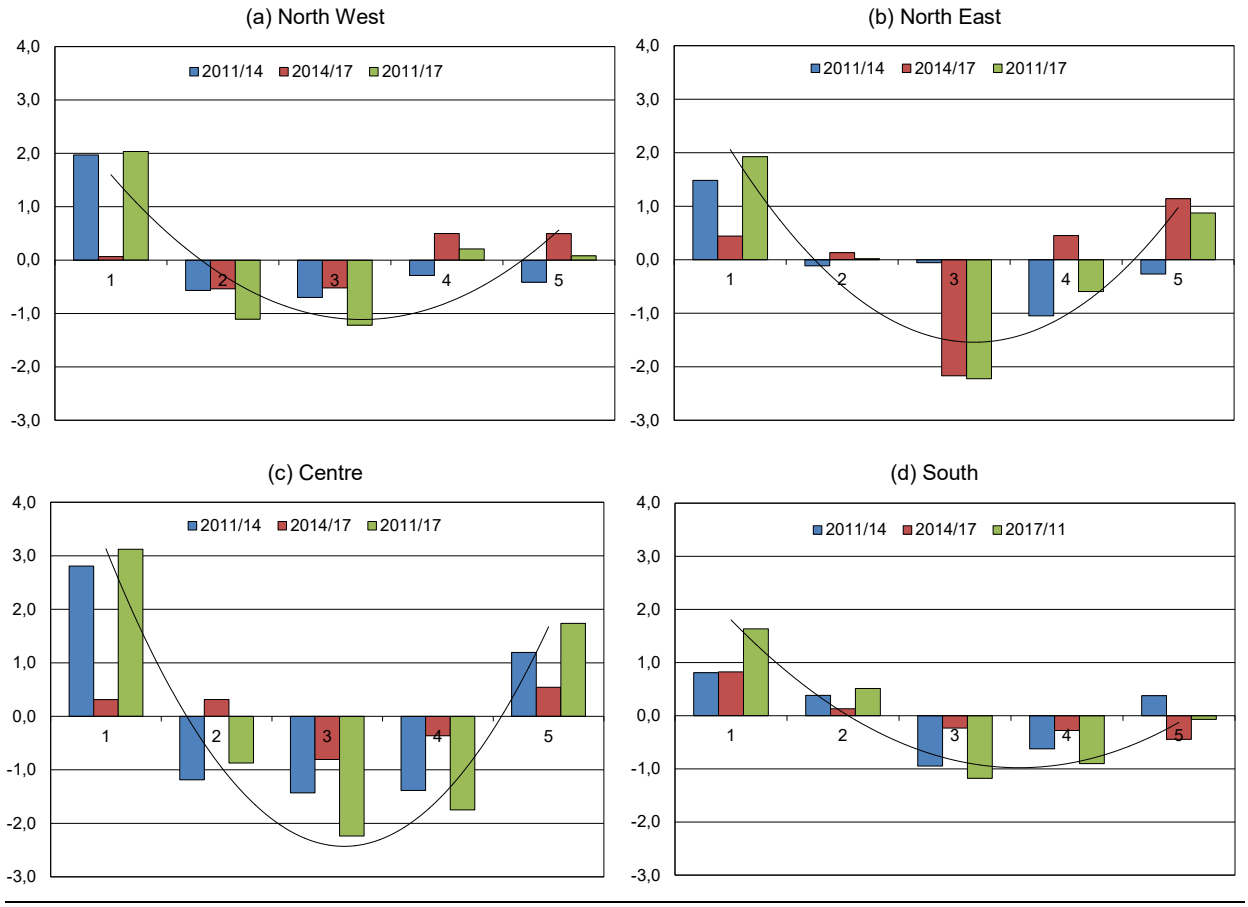
[14] It must be noted that in the North West growth occurred more in the 4th quintile compared to the 5th. This may be due to the fact that when applying the macro-area ranking it is difficult to separate jobs at the boundary of the two quintiles.

occurred only in the recovery period and public KIS played a much smaller role. The industrial sector contributed negatively to the trend observed in the middle and low quintiles in all areas; however MHT manufacturing firms had a positive role in the upper part of the distribution in the North of Italy, where the weight of the sector is higher.

Figure 4

Changes in the share of employment by job-wage quintile in Italian NUTS 1 regions (1)

(in percentages)



Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.
(1) The interpolation line shown in each panel is done on the period 2011-17 as a whole.

Compared to the other Italian macro-areas, in southern regions higher value-added services missed to contribute positively to the growth in the share of workers in highly paid jobs, especially in the recovery years, thus determining the downgrading pattern observed here. LKIS are still responsible for the growth at the bottom of the distribution. Public services, which contributed as well to the growth in the share of workers in the 1st quintile, added negatively to the dynamics in the central part of the distribution with a stronger drop compared to the rest of Italy.

In all the areas domestic work contributed positively to the growth in the share of workers in the lowest quintile over the period, while constructions were responsible for the drop observed in the middle quintiles, reflecting the negative trends of the sector during recent years.

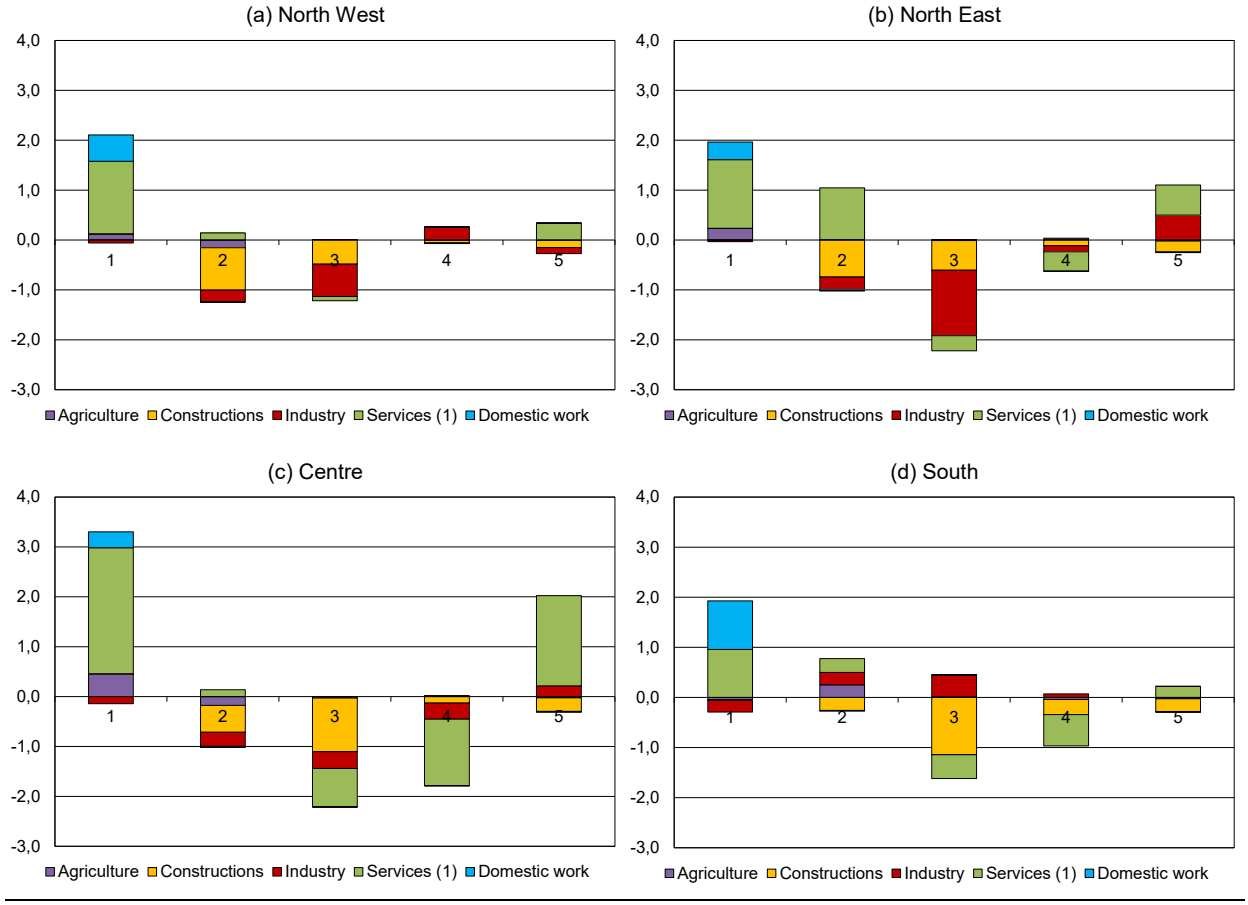
Beside sectoral dynamics, recent studies show that also changes in the labour supply may contribute in determining shifts in the employment structure (Oesch, 2013; Eurofound, 2017; Basso et al.,

2017; Cerina et al. 2018; Basso, 2019). Our analysis suggests that changes in the characteristics of the labour force did not have a differentiated effect over the Italian territory. Looking at the education of workers, in all the NUTS 1 areas tertiary education contributes positively to growth in all quintiles, while lower levels of education contribute only to the rise in the bottom ones. Labour force ageing occurred all over Italy and reforms to the retirement system at the national level determined an increase in the share of older workers in all quintiles, whereas younger workers as well as middle aged ones contribute positively only to the 1st quintile in all areas.

Figure 5

Changes in the share of employment by sector in Italian NUTS 1 regions (1)

(in percentages; 2011-17)



Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.
(1) Services do not include domestic work which is displayed as further category.

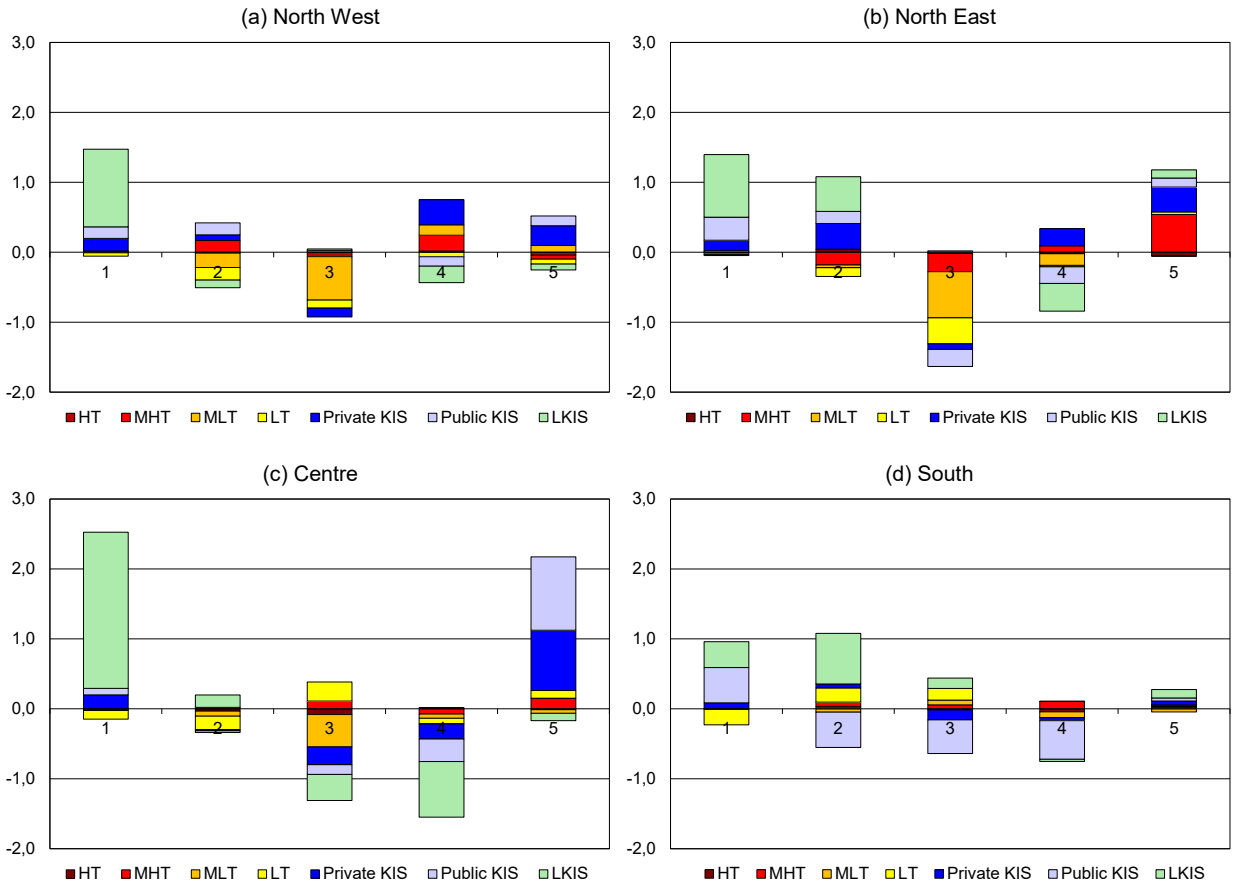
Results by gender and nationality appear to be once more linked to sectoral trends. In all the NUTS 1 areas, men were responsible for the drop in employment in the central part of the distribution; these trends are largely connected to the dynamics in constructions and in the industrial sector. On the contrary, women contributed positively both at the top and at the bottom of the distribution given their higher presence in services. Looking at the nationality of workers, growth in the share of lowest-paid jobs involved both Italian and foreign citizens. Growth in foreigner workers in the 1st quintile is largely connected to agriculture, to services and to domestic work. This last sector, in which over 70 per cent of the workers are of foreign origin, occupies over one fifth of foreign

workers in Italy[15]. In the other quintiles of the distribution trends in jobs for Italians are the main driver of the overall observed patterns. Each macro-area's trend remains confirmed even when focusing exclusively on Italian workers.

Figure 6

Changes in the share of employment by technological content in Italian NUTS 1 regions (1) (2)

(in percentages; 2011-17)



Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.
(1) The graphs display dynamics for services and industry, only. Sectors are classified according to Eurostat classification of High-tech industry and Knowledge-intensive services by NACE Rev.2: HT=High-technology manufacturing firms; MHT=Medium-high-technology manufacturing firms; MLT=Medium-low-technology manufacturing firms; LT=Low-technology manufacturing firms; KIS= Knowledge-intensive services; LKIS=Less-knowledge intensive services. – (2) See *Annex* 2 for further specifications.

Over the recent years, the employment structure in Italy changed also in terms of types of jobs created and destroyed. Indeed, firms re-modulated their use of part time/full time positions as well as permanent/temporary ones, mainly to overcome the difficulties emerged during the economic and financial crisis. Moreover, the changes in the labour market legislation occurred in 2015 also influenced their use in the recovery years. We find that this phenomenon happened in a differentiated way across the Italian territory. Southern regions turn out to be once again disadvantaged

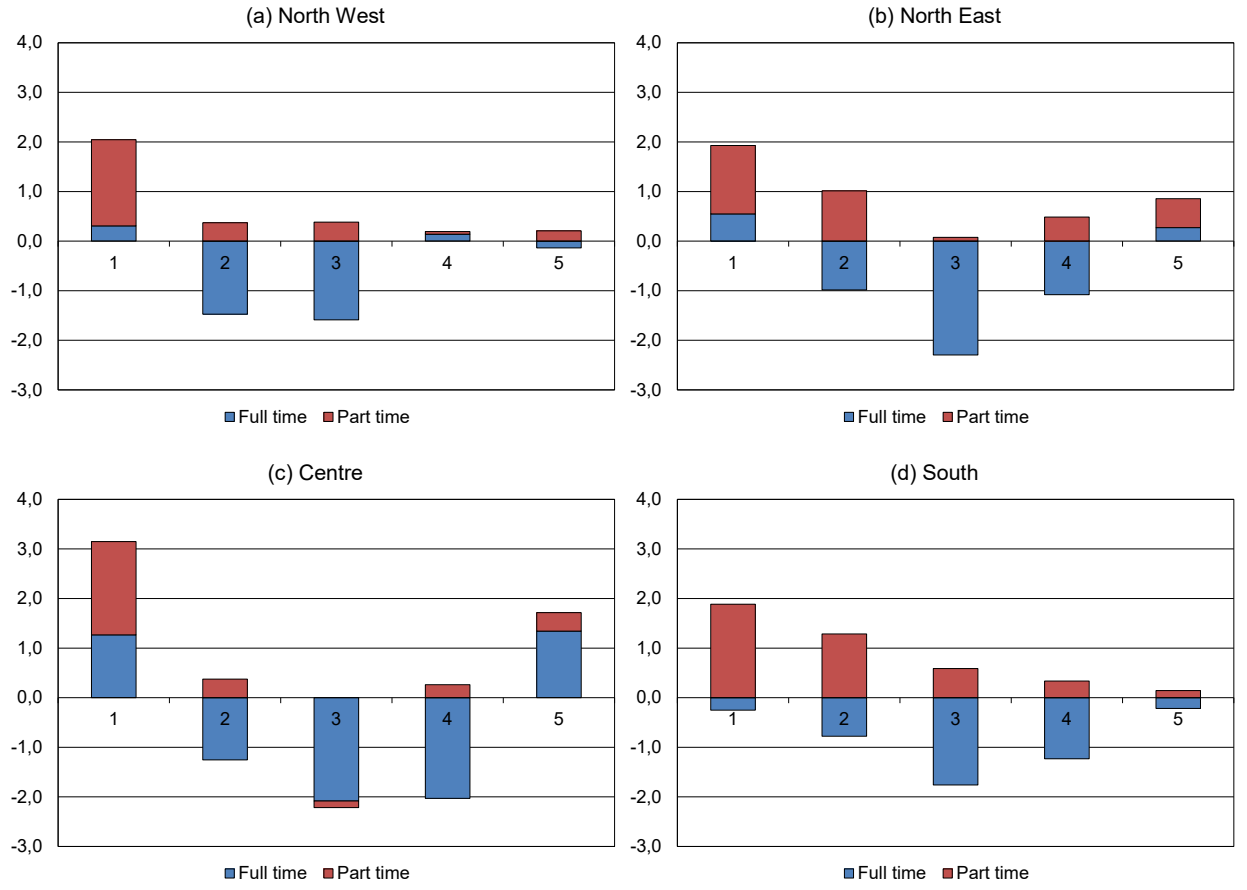
[15] As pointed out above, the registered increase of domestic work might have been partially inflated by legislative measures and adjustment in administrative data.

compared to the other areas. Indeed, looking at the time schedules of workers, in the area, the contribution of part-time positions was positive in all quintiles, while that of full-time jobs was always negative (fig. 7). Further in the South, compared to the other areas, permanent employment had only a very small positive contribution in determining shifts in the weight of workers in the top quintile (fig. 8). This testifies the decline observed in the area over the past years and the deterioration of the quality of jobs created in recent years.

Figure 7

Changes in the share of employment by time schedule in Italian NUTS 1 regions

(in percentages; 2011-17)

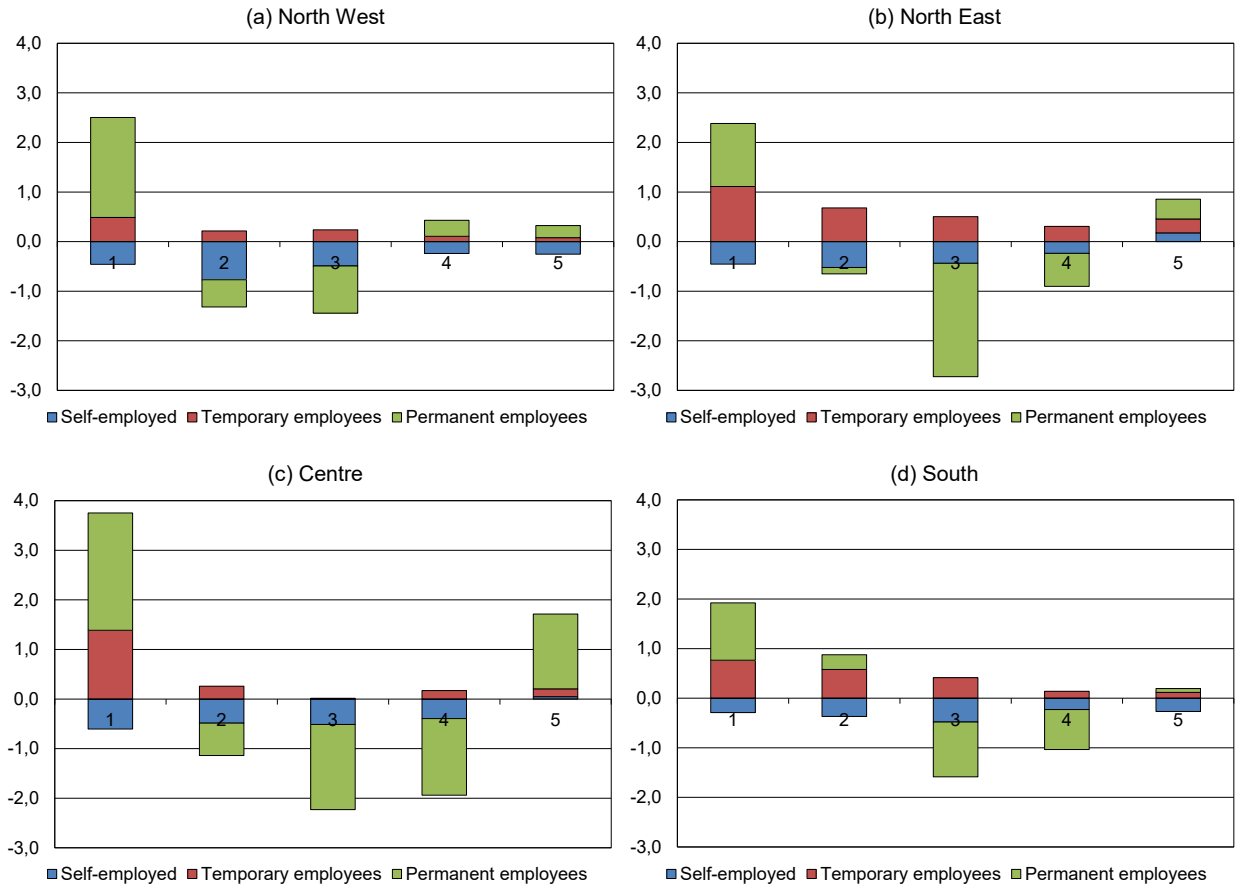


Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

Figure 8

Changes in the share of employment by type in Italian NUTS 1 regions

(in percentages; 2011-17)



Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

Our analysis suggests that in recent years the gap between norther-central and southern regions amplified: the first group of regions are faring much better in terms of quality content as well as number of jobs created compared to the South of Italy especially in the recovery years. This potentially increases inequality across the country. In the next section we account for heterogeneous patterns within each NUTS 1 area.

6. The contribution of NUTS 2 regions to the pattern of each area and their specific trend

Each macro-area is composed by different regions (NUTS 2 level) which may contribute differently to the area's trend. Hence, we further disaggregate the dynamics in order to study the contribution of each region to the pattern of the NUTS 1 area to which it belongs. Figure 9 shows the results of this analysis. In general, it can be seen that also within each macro-area the picture is heterogeneous and not only determined by the patterns occurring in the bigger regions of the area.

The weak polarisation pattern of Northwestern Italy is driven by the trends of Lombardia, which contributes positively to the rise in the share of workers in the 1st, in the 4th and 5th quintile (fig. 9a).

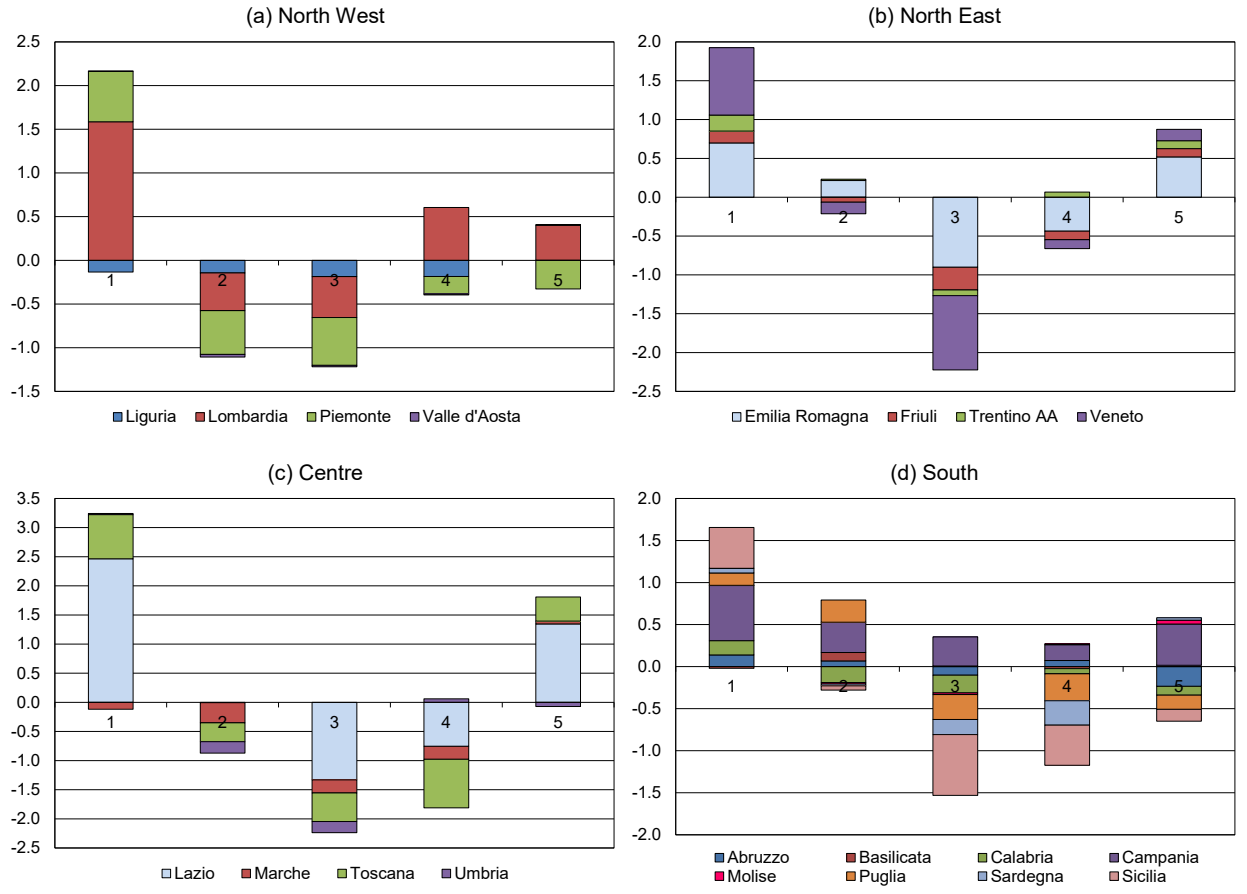
Piemonte contributes positively only to dynamics in the lowest quintile and negatively to the others. While the contribution of Liguria is negative in each quintile, that of Valle d'Aosta is negligible.

Trends within the northeastern area are more homogeneous: all NUTS2 regions contribute positively to the growth in the share of workers in the 1st and in the 5th quintile (fig. 9b). In particular, Emilia Romagna (and Veneto in the bottom of the distribution) is responsible for the biggest part of the changes. While the contribution to the 3rd quintile is always negative, some small differences in regional trends characterize the 2nd and the 4th quintile, where respectively Emilia Romagna and Trentino Alto Adige contribute positively.

Figure 9

Changes in the share of employment by regions in Italian NUTS 1 areas

(in percentages; 2011-17)



Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

In the Centre of Italy Lazio and Toscana are mainly responsible for the polarisation pattern (fig. 9c). In the middle of the distribution all regions contribute negatively to the employment trends (with the exception of a small positive contribution of Umbria in the 4th quintile).

It is interesting to observe regional contribution to the dynamics of Southern Italy, the only macro-area displaying a downgrading pattern over the period. While all regions contribute positively to the growth of lowest-paid jobs (the biggest contribution to the 1st quintile is from Campania and Sicilia; fig. 9d), in the other quintiles regional contributions are very heterogeneous. Campania, for instance, contributes positively to all quintiles, while Sicilia and Calabria contribute negatively to all

quintiles (except from the 1st one). Campania and Molise show growth in the higher paid jobs, however the overall pattern is dominated by the negative trends in the other regions (especially Sicilia, Puglia and Abruzzo).

Furthermore, we consider the specific employment trend of each NUTS 2 region, and not only their contribution to the pattern of the NUTS 1 area. In applying our methodology to each NUTS 2 area, due to a problem of data availability, we cannot use the specific regional rankings, but only that of the macro-area. Results of our analysis (shown in *Annex 1*) confirm the already observed heterogeneity within each macro-area. These data have to be interpreted with caution, taking into account that quintiles do not always represent 20 per cent of the employed population in the region in the starting year[16].

In the North West Piemonte is the only region to show a downgrading pattern over the 2011-17 period. The other northern and central regions display a polarisation trend over the period, though with different intensity.

Within Southern Italy the situation is very heterogeneous. Regions like Molise and Sardegna display a polarising trend. Campania, Basilicata and Sicilia show a weak polarisation pattern (among these Campania contributes with a higher weight in positive to the NUTS 1's trend given its dimension). The other regions of the area display a downgrading trend.

7. Conclusions

Although the employment rate remains a primary signal of the healthiness of an economy, over time the academic literature has argued that the quality of jobs created and destroyed behind the aggregate numbers becomes a crucial element for understanding the potential for growth of a country. In this respect, over the last decade the Italian employment trends appeared to be worse than the EU average both quantitatively and qualitatively. Quantitatively, the increase in employment was minor than the EU average in the recovery period that followed the 2008 economic and financial crisis, while the fall in employment in recessionary periods was higher than the EU average. Qualitatively, in line with recent literature on the topic, our results suggest that since the beginning of the 2008 recession the Italian employment structure has changed, with an increase in the share of workers employed mainly in low quality jobs. Even during the recovery the rise in better jobs remained below the EU-average. This determined a polarised pattern skewed towards lower paid jobs in Italy, vis-à-vis comparatively better trends in other EU countries.

While studies on changes in the employment structure initially focused on the national level, there is a growing awareness in the scientific literature of the importance of regional patterns behind national data. Our paper shows that this is particularly true for the Italian case, where we find a great heterogeneity across the territory. Indeed, between 2011 and 2014 only central regions contributed to a small rise in the upper end of the employment distribution. In the years 2014-17, north-eastern and north-western regions were instead the main drivers of the increase of high qualified jobs, while southern regions contributed only to the employment growth in lower paid ones.

[16] In smaller unit of analysis such as regions, where the number of job 'cells' within the job matrix is reduced, large jobs at the boundary between two quintiles can make the quintiles employment totals uneven.

Considering trends of each macro-area separately, in the period 2011-17 the structure of employment of Southern Italy downgraded, while we observe a polarisation pattern for Northern and central regions, although with different intensity. Growth in high-paid jobs was very small in northern regions while it was comparable to the European trends in Central Italy, where the weight of services (especially public and private KIS) is greater. Southern regions appear to have suffered disproportionately the Eurozone 'double dip' recession: along with a strong drop in total employment, the weight of the lower quintiles has increased, even during the recovery years. The sectoral structure of this area, characterized by a higher dependence on traditional sectors such as agriculture and on the public services, may contribute in explaining the observed divergence with the other macro-regions.

Our analysis suggests that in recent years the gap between norther-central and southern regions widened also in terms of the quality of jobs, with a deterioration of the employment structure in the latter area. This picture appears even worse if we consider the contractual conditions associated to the jobs created in the South: only part-time positions and temporary ones had a positive contribution to jobs creation in the area. However, we observe a heterogeneity of trends within each macro-region. In particular, in the South of Italy there are regions that contribute positively to growth, although their trends are dominated by less performing ones. Thus, it is important when designing policy interventions to consider the specific characteristics of the different macro-areas as well as that of each region within them.

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Tables and Charts

Tab. T1

Distribution of employment by quintiles and ISCO-08 professions
(year 2011; percentages)

ISCO 08	Quintiles				
	1	2	3	4	5
1 - Managers	0.0	3.0	0.4	0.3	15.7
2 - Professionals	0.1	1.3	0.6	10.8	54.3
3- Technicians and Associate Professionals	0.2	3.8	6.4	52.1	24.8
4 – Clerical Support Workers	3.1	7.2	35.2	12.9	4.1
5 – Services and Sales Workers	40.4	29.6	7.1	6.4	0.2
6 – Skilled Agricultural, Forestry and Fishery Workers	1.7	9.3	0.1	0.0	0.0
7 – Craft and Related Trades Workers	6.7	31.0	31.7	3.8	0.6
8 – Plant and Machine Operators Assemblers	3.3	3.7	15.9	13.7	0.3
9- Elementary Workers	44.5	11.1	2.6	0.1	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Istat (author's calculations).

Tab. T2

Distribution of employment by ISCO-08 professions and quintiles
(year 2011; percentages)

ISCO 08	Quintiles					
	1	2	3	4	5	**Total**
1 - Managers	0.1	18.1	2.1	1.6	78.1	**100.0**
2 - Professionals	0.1	2.3	0.9	16.1	80.5	**100.0**
3- Technicians and Associate Professionals	0.1	5.2	7.2	59.4	28.1	**100.0**
4 – Clerical Support Workers	3.8	13.8	55.5	20.5	6.4	**100.0**
5 – Services and Sales Workers	38.9	44.3	8.7	7.9	0.2	**100.0**
6 – Skilled Agricultural, Forestry and Fishery Workers	10.5	88.4	1.0	0.1	0.0	**100.0**
7 – Craft and Related Trades Workers	6.6	47.8	40.0	4.8	0.8	**100.0**
8 – Plant and Machine Operators Assemblers	6.9	12.3	42.7	37.2	0.9	**100.0**
9- Elementary Workers	68.2	26.6	5.0	0.2	0.0	**100.0**

Source: Istat (author's calculations).

Tab. T3

Employment in Italy by NACE and ISCO-08 professions: average annual growth 2011-17

(percentages)

NACE/ISCO08	Managers	Professionals	Technicians and associate professionals	Clerical support workers	Service and sales workers	Skilled agricultural, forestry and fishery workers	Craft and related trades workers	Plant and machine operators and assemblers	Elementary occupations	Total growth	% Total employment
A - Agriculture. forestry and fishing	-10.3	12.8	-3.4	0.6	2.7	-0.4	2.6	2.3	2.8	**0.8**	**3.8**
B - Mining and quarrying		10.2	-0.3	-7.5			-5.6	-3.9	-12.6	**-3.4**	**0.1**
C - Manufacturing	-1.8	4.3	1.7	-0.5	-6.4	-10.7	-1.4	-0.3	2.1	**-0.2**	**18.4**
D - Electricity. gas. steam and air conditioning supply	-0.3	4.0	-0.7	-2.4			-2.8	-12.2	4.2	**-1.0**	**0.5**
E - Water supply; sewerage. waste management and remediation activities	-7.7	10.1	0.3	0.6			3.7	2.0	2.8	**1.7**	**1.0**
F - Construction	-4.9	-3.6	-4.4	-2.7			-3.2	-6.3	-7.9	**-3.8**	**6.2**
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	-2.7	3.1	-1.0	0.6	0.9	-19.6	-2.7	-3.1	4.4	**0.2**	**14.4**
H - Transportation and storage	0.3	4.2	1.6	0.4	-6.7		-0.4	-1.6	9.6	**0.5**	**4.9**
I - Accommodation and food service activities	4.1	11.5	3.0	4.3	3.2	-5.6	0.5	0.6	4.0	**3.4**	**6.4**
J - Information and communication	-2.6	5.6	-0.4	-3.5	5.7		-6.9		-6.8	**0.7**	**2.5**
K - Financial and insurance activities	-8.6	10.5	0.5	-3.6						**-0.3**	**2.8**
L - Real estate activities	-0.5		-0.3	1.8					-3.1	**0.0**	**0.6**
M - Professional. scientific and technical activities	3.1	2.4	-0.9	0.3	-7.7		-6.8	-14.8	1.1	**0.8**	**6.4**
N - Administrative and support service activities	-2.3	1.4	4.0	0.1	4.5	1.8	-12.3	5.8	4.6	**2.1**	**4.2**
O - Public administration and defence; compulsory social security	-4.8	0.4	-2.1	-2.1	-2.1		-11.4	-12.3	-11.5	**-2.6**	**4.5**
P - Education	-0.2	0.8	3.5	1.9	-1.6			3.0	0.0	**0.8**	**7.1**
Q - Human health and social work activities	3.6	0.9	1.3	1.3	4.6		-12.5	3.1	-0.7	**1.7**	**8.2**
R - Arts. entertainment and recreation	6.7	5.1	1.8	2.1	6.2	2.5	0.4		8.5	**4.0**	**1.5**
S - Other service activities	3.9	1.3	2.2	-3.0	0.7	-10.2	-5.3	-0.6	-5.3	**-0.7**	**3.0**
T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use					8.4	7.0	-21.9		1.1	**3.4**	**3.3**
Total growth	**-0.6**	**2.1**	**0.4**	**-0.5**	**1.9**	**-1.2**	**-2.5**	**-1.1**	**2.0**	**0.3**	**-**
% Total employment	**3.8**	**15.0**	**17.7**	**12.1**	**17.8**	**2.3**	**13.3**	**6.8**	**11.2**	**-**	**100.0**

Source: Eurostat and Istat (author's calculations).

Tab. T4

Employment in EU27 by NACE and ISCO-08 professions: average annual growth 2011-17

(percentages)

NACE/ISCO08	Managers	Professionals	Technicians and associate professionals	Clerical support workers	Service and sales workers	Skilled agricultural. forestry and fishery workers	Craft and related trades workers	Plant and machine operators and assemblers	Elementary occupations	Total growth	% Total employment
A - Agriculture. forestry and fishing	2.7	1.9	1.4	3.1	3.6	-3.2	1.0	2.7	-2.0	**-1.9**	**4.2**
B - Mining and quarrying	-0.1	0.7	1.0	-0.6	-2.3		-3.1	-4.2	-4.4	**-1.9**	**0.3**
C - Manufacturing	0.7	3.1	0.8	0.8	1.4	-1.6	-0.1	0.9	0.2	**0.6**	**15.5**
D - Electricity. gas. steam and air conditioning supply	-2.3	2.6	-2.3	-1.0	5.2		-1.7	-6.2	-1.4	**-0.9**	**0.7**
E - Water supply; sewerage. waste management and remediation activities	-0.9	4.8	0.0	1.9	1.0		1.1	0.8	2.9	**1.3**	**0.8**
F - Construction	1.4	1.6	0.4	-0.1	-1.8	7.1	-0.9	-1.7	-4.3	**-0.6**	**6.8**
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	-1.2	7.2	0.1	0.3	0.4	1.8	1.9	2.7	2.3	**0.8**	**14.0**
H - Transportation and storage	-0.1	4.9	1.6	1.3	0.5		0.8	1.5	4.3	**1.4**	**5.3**
I - Accommodation and food service activities	-1.8	3.6	7.0	5.7	2.2	-3.4	4.5	9.6	4.8	**2.2**	**4.8**
J - Information and communication	1.7	4.3	1.5	-2.2	1.7		-0.5	-3.4	-4.0	**2.0**	**3.1**
K - Financial and insurance activities	-3.3	4.6	0.7	-2.2	2.7		5.6	0.9	-2.0	**0.1**	**2.9**
L - Real estate activities	-0.2	6.4	2.8	-1.3	-0.9	15.8	5.9	11.9	0.2	**1.4**	**0.8**
M - Professional. scientific and technical activities	2.6	4.2	1.7	2.3	5.1	-7.0	8.7	5.9	0.9	**2.8**	**5.7**
N - Administrative and support service activities	1.6	5.0	4.1	2.7	2.8	4.8	2.3	1.0	1.5	**2.2**	**4.3**
O - Public administration and defence; compulsory social security	3.6	1.8	0.7	-1.0	-1.7	-1.9	0.8	-3.8	-1.0	**0.2**	**6.3**
P - Education	2.4	0.8	8.0	1.4	1.0	-4.2	-0.1	0.3	1.3	**1.3**	**7.6**
Q - Human health and social work activities	5.9	2.1	2.8	1.2	-0.3	3.4	1.4	3.1	4.3	**1.6**	**11.0**
R - Arts. entertainment and recreation	1.2	3.7	5.3	0.3	2.5	2.7	2.8	-3.6	-0.2	**2.4**	**1.8**
S - Other service activities	1.8	3.3	4.0	0.4	1.4	4.9	-0.5	-0.3	-1.3	**1.3**	**2.5**
T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use		-13.4	-4.4		1.7	-0.2	-12.8		-3.8	**-2.1**	**1.0**
Total growth	**0.5**	**2.8**	**1.8**	**0.5**	**0.8**	**-2.4**	**0.0**	**1.0**	**0.8**	**0.9**	**-**
% Total employment	**6.0**	**19.5**	**16.1**	**9.7**	**16.9**	**3.5**	**11.6**	**7.5**	**9.2**	-	**100.0**

Source: Eurostat (author's calculations).

Tab. T5

Employment in the North West Regions by NACE and ISCO-08 professions: average annual growth 2011-17

(percentages)

NACE/ISCO08	Managers	Professionals	Technicians and associate professionals	Clerical support workers	Service and sales workers	Craft and related trades workers	Plant and machine operators and assemblers	Elementary occupations	Total growth	% Total employment
A - Agriculture. forestry and fishing	0.6	29.3	-2.6	-3.1	-5.1	-1.5	3.4	9.3	**0.2**	**1.9**
B - Mining and quarrying	-16.2	10.7	-16.2	-7.1	6.4	-4.8	-5.6		**-5.7**	**0.1**
C - Manufacturing	-0.3	5.3	0.7	-0.9	-9.0	-2.2	0.5	3.8	**-0.1**	**22.7**
D - Electricity. gas. steam and air conditioning supply	2.2	-0.3	1.9	-0.4	3.2	-2.7	-9.7	22.8	**0.5**	**0.6**
E - Water supply; sewerage. waste management and remediation activities	-4.3	-2.8	-4.8	3.3	-10.8	9.9	1.9	4.8	**2.1**	**0.8**
F - Construction	-4.9	-0.8	-2.3	-4.7	-11.0	-2.7	-7.8	-6.4	**-3.2**	**6.1**
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	-5.4	4.5	0.8	0.4	1.0	-3.9	-7.3	3.1	**0.3**	**13.5**
H - Transportation and storage	3.8	-2.4	3.1	0.8	-8.7	4.3	-1.6	11.1	**1.2**	**4.9**
I - Accommodation and food service activities	-5.2	16.8	12.8	7.7	3.3	-1.5	11.6	-0.5	**3.1**	**5.4**
J - Information and communication	-6.8	5.7	-0.5	-1.5	-3.5	-10.8	2.3	-10.0	**0.7**	**3.1**
K - Financial and insurance activities	-7.9	9.0	0.9	-3.6	-7.5			-17.1	**-0.3**	**3.5**
L - Real estate activities	6.2	12.2	-4.5	0.7	-5.6	-7.6		-9.4	**-4.0**	**0.8**
M - Professional. scientific and technical activities	2.1	2.8	1.3	-0.9	-1.8	-13.6	-22.2	4.7	**1.4**	**7.2**
N - Administrative and support service activities	0.3	3.7	0.2	-1.7	5.1	-7.5	4.9	5.4	**2.0**	**4.4**
O - Public administration and defence; compulsory social security	-3.1	-0.6	-1.3	-2.6	-1.2	-22.8	-19.1	-6.6	**-2.3**	**3.0**
P - Education	5.6	0.7	0.0	4.3	-4.9	-18.3	15.7	-1.2	**0.6**	**6.1**
Q - Human health and social work activities	2.3	1.7	1.5	2.7	4.6	-8.4	7.3	1.4	**2.3**	**8.3**
R - Arts. entertainment and recreation	13.7	3.7	1.1	-0.3	5.9	1.2	33.3	4.2	**2.8**	**1.3**
S - Other service activities	-1.3	1.6	5.5	-5.4	1.9	-3.6	-12.3	3.0	**0.6**	**3.0**
T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use		4.4	6.6	8.6	4.7	-11.1	29.4	2.9	**3.4**	**3.3**
Total growth	**-1.7**	**2.5**	**0.7**	**-0.7**	**1.8**	**-2.8**	**-0.5**	**3.2**	**0.5**	**-**
% Total employment	**2.7**	**14.3**	**20.8**	**11.6**	**17.4**	**13.9**	**9.0**	**10.3**	**-**	**100.0**

Source: Istat (author's calculations).

Tab. T6

Employment in the North East Regions by NACE and ISCO-08 professions: average annual growth 2011-17

(percentages)

NACE/ISCO08	Managers	Professio-nals	Techni-cians and associate professio-nals	Clerical support workers	Service and sales wor-kers	Craft and related trades workers	Plant and machine operators and assem-blers	Elementary occupa-tions	Total growth	% Total em-ployment
A - Agriculture. forestry and fishing	-4.7	-9.8	4.5	-2.1	8.1	0.4	1.2	8.9	**1.4**	**3.8**
B - Mining and quarrying	38.4	9.1	23.2	-18.4		5.3	-10.3	-20.3	**-2.3**	**0.1**
C - Manufacturing	-2.5	5.6	2.3	0.4	-3.5	-3.1	-0.8	1.9	**-0.5**	**24.3**
D - Electricity. gas. steam and air conditioning supply	-11.8	4.9	-6.5	1.2	22.6	-15.4	-7.6	11.9	**-4.8**	**0.4**
E - Water supply; sewerage. waste management and remediation ac-tivities	-14.4	22.7	13.2	-1.5	-8.4	15.3	-1.5	2.5	**4.1**	**0.9**
F - Construction	-1.2	-4.7	-5.0	-1.8	-12.9	-4.0	-4.7	-3.0	**-3.9**	**5.7**
G - Wholesale and retail trade; repair of motor vehicles and motorcy-cles	0.1	0.0	-1.8	0.0	0.2	-2.1	-3.5	4.8	**-0.3**	**13.5**
H - Transportation and storage	4.6	12.7	-0.2	-0.9	-5.9	2.1	-0.4	10.8	**1.4**	**4.9**
I - Accommodation and food service activities	0.8	3.1	2.6	6.8	3.5	-3.1	-3.3	2.6	**3.2**	**6.6**
J - Information and communication	-3.6	8.7	0.8	3.2	2.5	-15.7	4.1	-6.7	**2.2**	**2.1**
K - Financial and insurance activities	-9.4	11.9	0.6	-3.9	6.7			10.6	**-0.2**	**3.0**
L - Real estate activities	1.1	30.0	0.3	5.9	-9.7	11.4		-1.4	**1.8**	**0.5**
M - Professional. scientific and technical activities	3.6	2.5	0.1	2.9	6.8	-5.0	2.4	-3.5	**1.5**	**5.9**
N - Administrative and support service activities	-1.5	4.2	2.8	1.7	-3.0	-1.1	11.3	3.8	**2.2**	**3.6**
O - Public administration and defence; compulsory social security	-9.7	-1.9	-2.3	1.0	-3.7	-20.3	-19.3	-0.9	**-1.9**	**3.5**
P - Education	-1.7	0.6	2.8	3.6	-2.2	-12.7	-19.8	0.2	**0.8**	**6.0**
Q - Human health and social work activities	6.6	1.8	1.1	-2.6	3.4	-0.5	-3.7	-5.6	**1.2**	**8.2**
R - Arts. entertainment and recreation	16.2	2.9	5.5	-5.1	9.7	1.3		8.9	**4.3**	**1.3**
S - Other service activities	14.6	6.4	4.9	3.6	1.2	-6.8	12.7	-13.2	**0.3**	**3.1**
T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use		-21.9	-13.5	15.3	7.4	-18.1		-0.4	**2.7**	**2.4**
Total growth	**-1.1**	**2.3**	**0.7**	**0.3**	**1.6**	**-2.8**	**-0.9**	**2.3**	**0.3**	**-**
% Total employment	**3.0**	**12.6**	**19.9**	**11.7**	**18.1**	**16.3**	**9.4**	**9.1**	**-**	**100.0**

Source: Istat (author's calculations).

Tab. T7

Employment in the Centre Regions by NACE and ISCO-08 professions: average annual growth 2011-17

(percentages)

NACE/ISCO08	Managers	Professio-nals	Techni-cians and associate professio-nals	Clerical support workers	Service and sales wor-kers	Craft and related trades workers	Plant and machine operators and assem-blers	Elementary occupa-tions	Total growth	% Total em-ployment
A - Agriculture. forestry and fishing	4.1	-2.2	-3.2	3.2	5.8	-1.9	-6.5	17.2	**2.3**	**2.7**
B - Mining and quarrying		10.4	-22.9	6.8		-19.2	-13.8		**-8.5**	**0.1**
C - Manufacturing	3.3	3.6	0.8	-1.1	-5.7	-0.8	0.9	-0.7	**0.0**	**14.7**
D - Electricity. gas. steam and air conditioning supply	8.6	3.6	0.5	-8.3		17.3	-20.2	4.5	**1.1**	**0.6**
E - Water supply; sewerage. waste management and remediation ac-tivities	-20.2	-12.8	-6.5	-5.5		-9.2	0.1	-0.1	**-3.9**	**0.8**
F - Construction	-7.8	1.8	-8.9	0.0		-3.0	-6.7	-12.7	**-4.1**	**5.9**
G - Wholesale and retail trade; repair of motor vehicles and motorcy-cles	-2.7	2.3	-1.4	3.3	0.5	-5.0	-2.9	4.0	**-0.1**	**13.9**
H - Transportation and storage	-9.6	5.8	1.6	-1.0	-10.5	-4.4	-2.5	10.9	**-0.6**	**4.8**
I - Accommodation and food service activities	-3.4		-8.8	4.7	6.0	7.1	-1.2	7.8	**5.5**	**7.2**
J - Information and communication	7.5	5.5	-2.0	-6.1	1.1	-2.3	-9.0	18.9	**0.1**	**3.3**
K - Financial and insurance activities	-3.7	13.0	1.1	-1.7	-13.4	23.0	-18.4	-0.1	**1.2**	**3.0**
L - Real estate activities	-14.3	18.0	3.9	-0.5	1.8	-1.6		9.6	**2.9**	**0.8**
M - Professional. scientific and technical activities	7.5	3.0	-1.6	-2.2	-13.7	-3.2	-2.6	-4.9	**0.5**	**6.8**
N - Administrative and support service activities	6.0	7.1	2.8	1.5	8.3	-6.3	9.4	7.9	**4.5**	**4.9**
O - Public administration and defence; compulsory social security	3.0	6.2	-2.0	-2.2	1.5	-1.0	-5.9	-14.0	**-0.3**	**5.6**
P - Education	-2.3	3.2	-5.2	-0.6	-7.3	-8.5	2.1	0.0	**1.7**	**6.9**
Q - Human health and social work activities	5.7	1.6	1.0	3.5	5.1	-25.1	3.0	1.4	**2.0**	**8.1**
R - Arts. entertainment and recreation	-4.0	4.3	3.2	3.2	9.3	0.9	0.0	7.4	**4.6**	**2.0**
S - Other service activities	3.8	0.4	-1.1	-6.3	1.4	-1.2	-1.9	-6.2	**-1.0**	**3.4**
T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use		-10.0	-11.8		8.9	-9.2	-29.2	-0.8	**1.7**	**4.6**
Total growth	**-0.2**	**3.5**	**-0.5**	**-0.7**	**2.8**	**-2.2**	**-1.1**	**2.5**	**0.7**	**-**
% Total employment	**2.7**	**16.4**	**16.9**	**12.6**	**20.4**	**14.4**	**6.3**	**10.4**	**-**	**100.0**

Source: Istat (author's calculations).

Tab. T8

Employment in the South Regions by NACE and ISCO-08 professions: average annual growth 2011-17

(percentages)

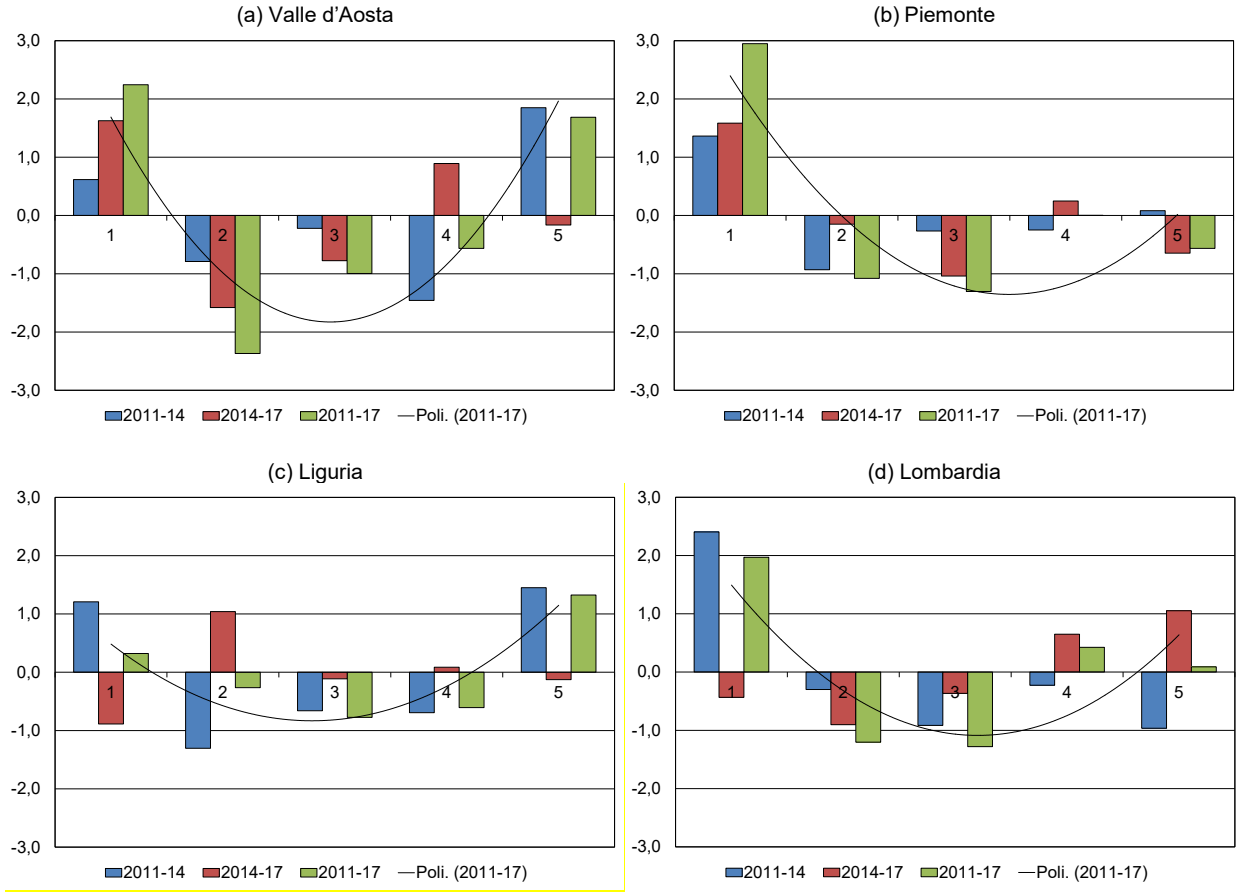
NACE/ISCO08	Managers	Professio-nals	Techni-cians and associate professio-nals	Clerical support workers	Service and sales wor-kers	Craft and related trades workers	Plant and machine operators and assem-blers	Elementary occupa-tions	Total growth	% Total em-ployment
A - Agriculture. forestry and fishing	-1.2	18.4	-12.6	3.2	1.9	0.3	7.4	0.2	**0.2**	**7.0**
B - Mining and quarrying	18.7	-14.0	20.8	-5.4		1.3	7.0	-4.7	**4.0**	**0.2**
C - Manufacturing	-7.6	3.4	0.3	-1.4	-1.0	-0.8	3.2	0.1	**0.3**	**11.5**
D - Electricity. gas. steam and air conditioning supply	-8.8	0.6	1.4	-5.3	2.5	-6.1	-9.4	-7.9	**-2.9**	**0.5**
E - Water supply; sewerage. waste management and remediation ac-tivities	0.8	-0.4	2.8	4.5	4.8	2.2	2.2	3.1	**2.9**	**1.5**
F - Construction	-5.2	-17.4	-1.9	-5.3	-11.2	-3.3	-6.5	-7.7	**-4.2**	**7.0**
G - Wholesale and retail trade; repair of motor vehicles and motorcy-cles	-3.4	5.0	-1.8	-0.8	0.9	-1.8	-0.8	4.9	**0.6**	**16.7**
H - Transportation and storage	-0.8	5.0	2.6	0.8	3.7	-3.3	-2.1	5.5	**0.1**	**4.8**
I - Accommodation and food service activities	-0.4	0.2	2.9	0.7	2.5	-4.6	5.4	2.5	**2.1**	**6.6**
J - Information and communication	-8.9	5.3	0.8	-5.5	-5.2	-1.1	-13.4	-13.2	**-0.3**	**1.4**
K - Financial and insurance activities	-18.5	6.3	-0.6	-5.2	-5.4				**-2.6**	**1.7**
L - Real estate activities	7.8	20.5	4.6	5.6	30.0	5.9		-1.3	**4.3**	**0.5**
M - Professional. scientific and technical activities	-2.9	1.4	-3.4	1.5	6.1	-1.4	-13.2	1.6	**-0.1**	**5.7**
N - Administrative and support service activities	-4.3	-12.8	1.8	0.2	4.3	-12.1	0.8	1.4	**0.2**	**4.0**
O - Public administration and defence; compulsory social security	-9.7	-2.3	-3.2	-2.7	-4.1	-18.7	-11.6	-14.8	**-4.6**	**6.1**
P - Education	-4.0	0.9	-3.9	0.8	-3.9	-27.9	-15.9	1.3	**0.4**	**9.4**
Q - Human health and social work activities	1.4	-0.6	1.3	0.5	5.5	-9.8	2.1	-0.2	**1.2**	**8.1**
R - Arts. entertainment and recreation	-6.8	10.4	-0.9	2.4	5.7	-0.7	-2.8	11.4	**4.5**	**1.3**
S - Other service activities	-2.1	-1.2	-4.4	-0.7	-1.0	-3.5	-8.0	-7.7	**-2.5**	**2.8**
T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use		33.4	6.6	-23.3	13.7	2.9	-14.9	2.2	**6.0**	**3.2**
Total growth	**-3.9**	**0.9**	**-0.7**	**-1.0**	**1.7**	**-2.2**	**0.1**	**0.4**	**-0.1**	**-**
% Total employment	**2.6**	**15.2**	**13.4**	**10.2**	**22.4**	**15.3**	**6.9**	**14.2**	**-**	**100.0**

Source: Istat (author's calculations).

Annex 1 – Regional analysis

Changes in the share of employment by job-wage quintile – North Western regions (1) (2)

(in percentages)

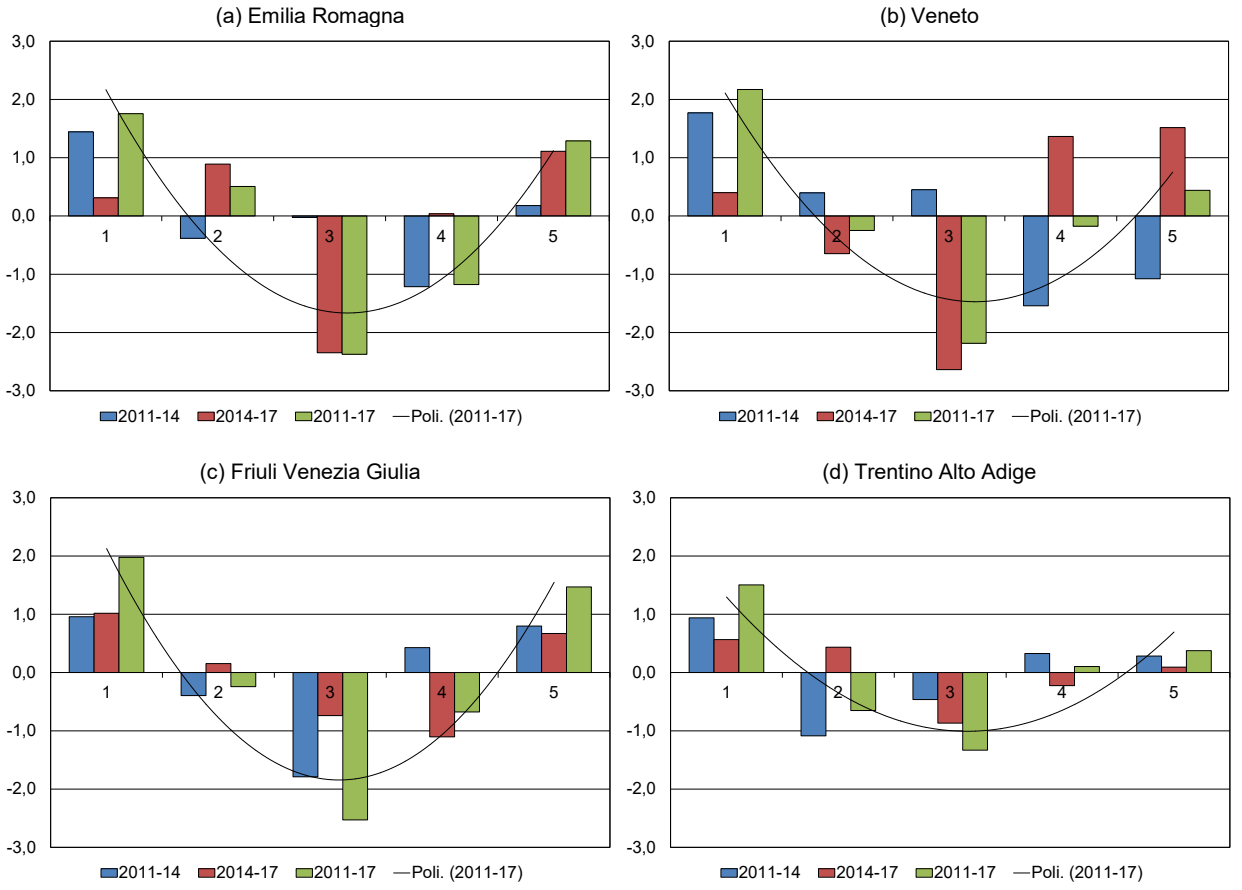


Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

(1) We use the NUTS 1 ranking. – (2) The interpolation line shown in each panel is done on the period 2011-17 as a whole.

Changes in the share of employment by job-wage quintile – North Eastern regions (1) (2)

(in percentages)

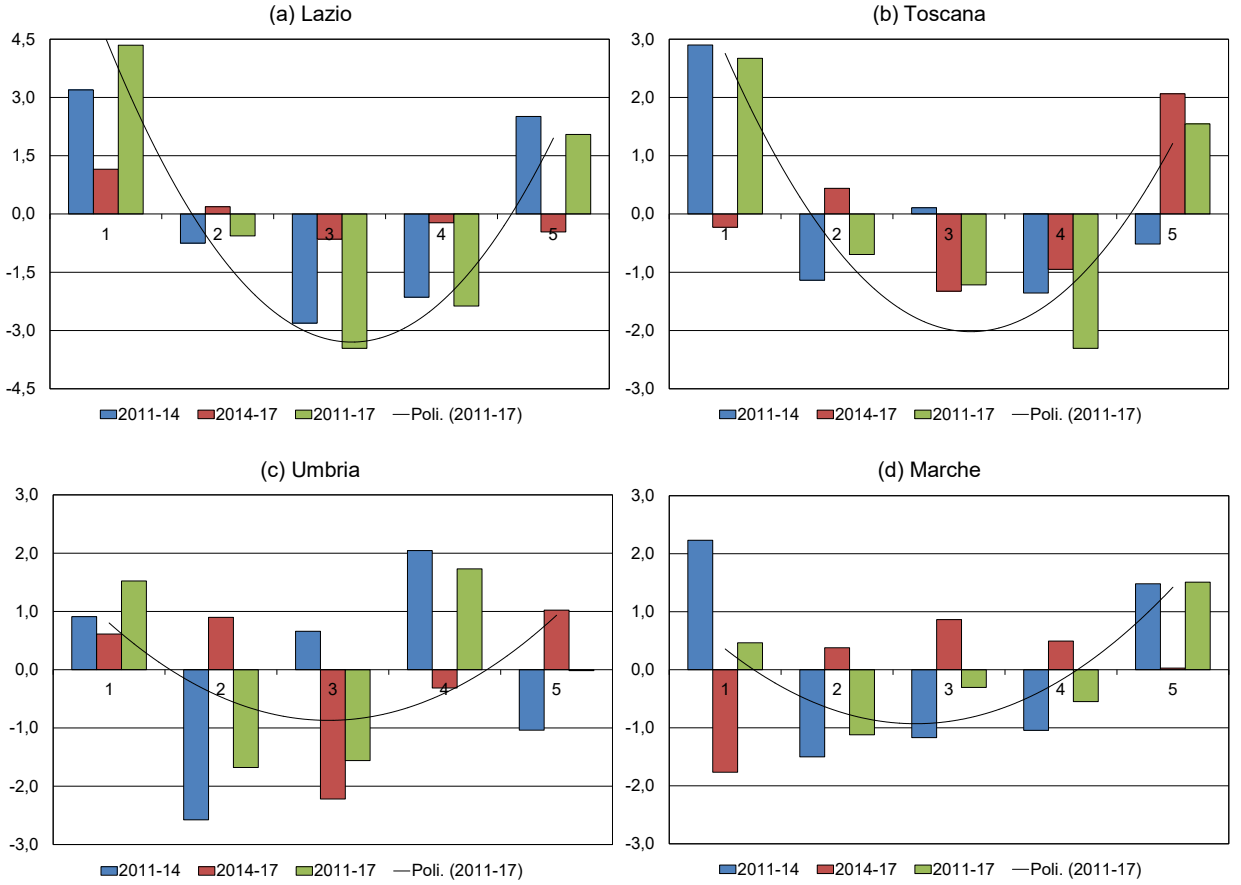


Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

(1) We use the NUTS 1 ranking. – (2) The interpolation line shown in each panel is done on the period 2011-17 as a whole.

Changes in the share of employment by job-wage quintile – Central regions (1) (2)

(in percentages)

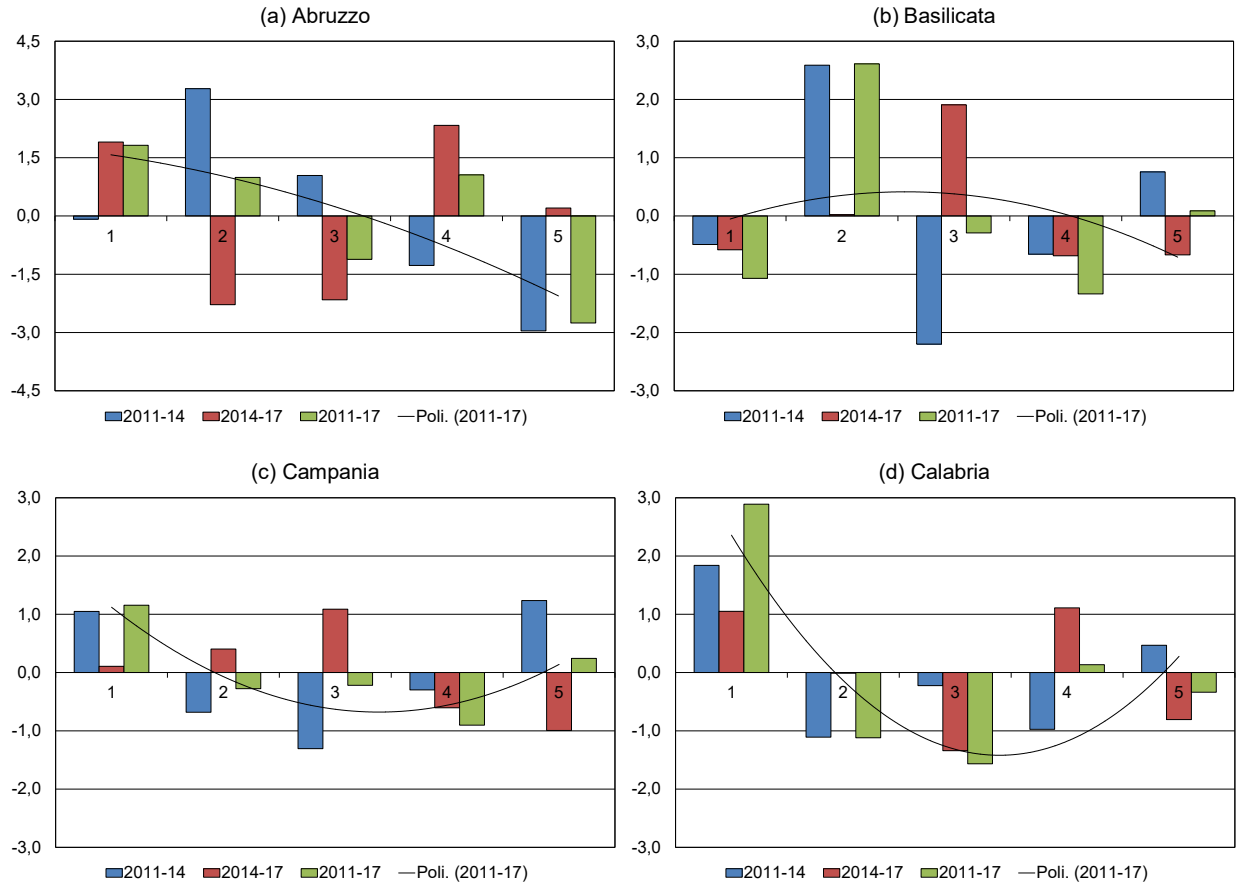


Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

(1) We use the NUTS 1 ranking. – (2) The interpolation line shown in each panel is done on the period 2011-17 as a whole.

Changes in the share of employment by job-wage quintile – Southern regions (1) (2)

(in percentages)

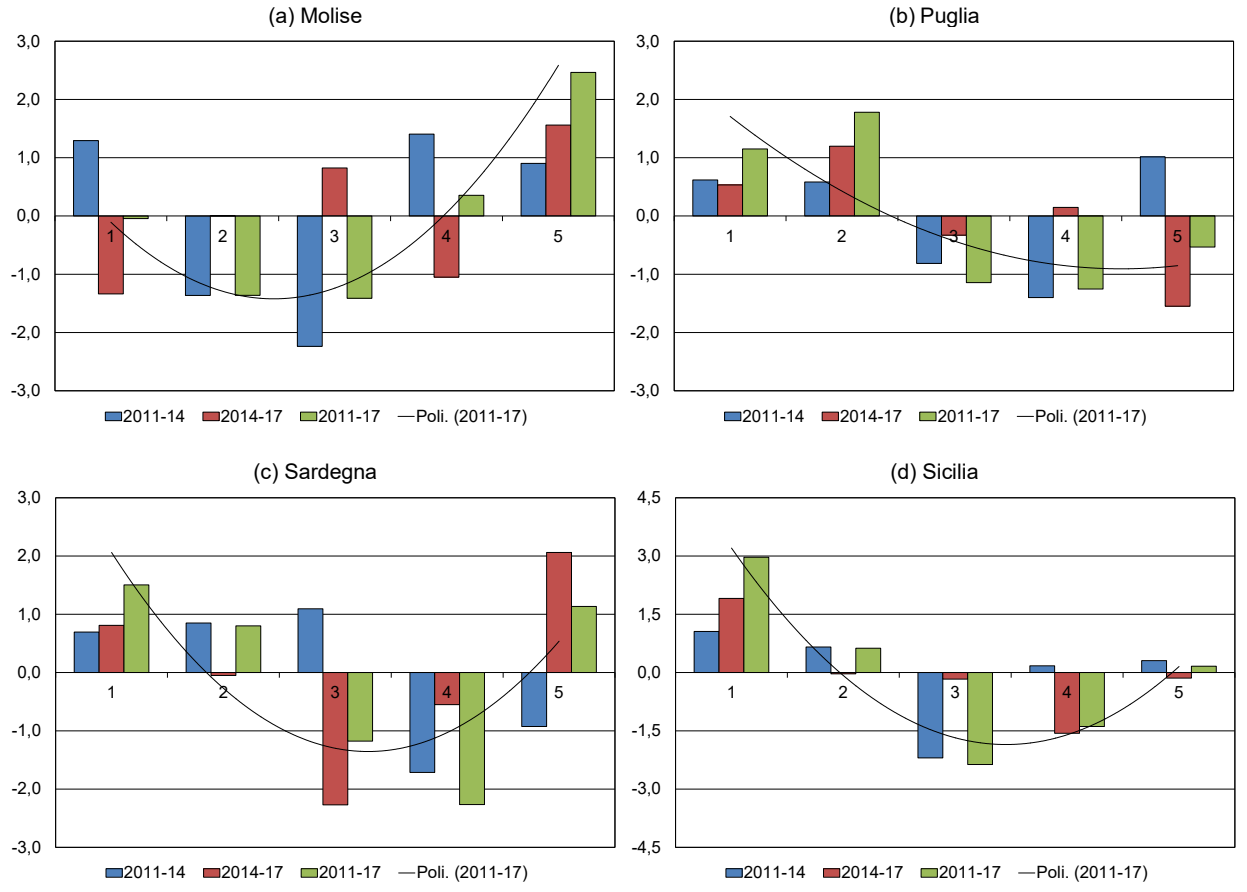


Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

(1) We use the NUTS 1 ranking. – (2) The interpolation line shown in each panel is done on the period 2011-17 as a whole.

Changes in the share of employment by job-wage quintile – Southern regions (1) (2)

(in percentages)



Source: Eurofound, LFS Istat (author's calculations). Ranking 2011.

(1) We use the NUTS 1 ranking. – (2) The interpolation line shown in each panel is done on the period 2011-17 as a whole.

Annex 2 – Categorisation of the service sector

Knowledge-based services aggregation

Service aggregation	NACE Rev. 2	Sector
Private Knowledge Intensive services (Private KIS)	50-51	Water transport. Air transport
	58	Publishing activities
	59-63	Motion picture. video and television programme production. elecommunications. Com-
	64-66	Financial and insurance activities (section K)
	69-71	Legal and accounting activities. Activities of head offices; management consultancy ac-
	72	Scientific research and development
	73-74	Advertising and market research. Other professional. scientific and technical activities
	75	Veterinary activities
	78	Employment activities
	80	Security and investigation activities
	90-93	Arts. entertainment and recreation (section R)
Public Knowledge Intensive services (Public KIS)	84	Public administration and defence. compulsory social security (section O)
	85	Education (section P)
	86-88	Human health and social work activities (section Q)
Less Knowledge Intensive services (LKIS)	45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles (section G)
	49	Land transport and transport via pipelines
	52	Warehousing and support activities for transportation
	53	Postal and courier activities
	55-56	Accommodation and food service activities (Section I)
	68	Real estate activities
	77	Rental and leasing activities
	79	Travel agency. tour operator reservation service and related activities
	81	Services to buildings and landscape activities
	82	Office administrative. office support and other business support activities
	95	Repair of computers and personal and household goods
	94	Activities of membership organisations
	96	Other personal service activities
	97-99	Activities of households as employers of domestic personnel; Undifferentiated goods and services-producing activities of private households for own use (section T).

Source: Eurostat