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## Early-career complexity before and after labour-market deregulation in Italy: Heterogeneity by gender and socio-economic status across cohorts

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## **Early-career complexity before and after labour-market deregulation in Italy:**

### **Heterogeneity by gender and socio-economic status across cohorts**

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## **Abstract**

Labour-market deregulation may have generated more unstable and complex employment life courses. As exposure to highly volatile early-career trajectories has long-lasting consequences for the working lives of individuals, it is especially important to consider how these processes have affected younger workers in countries like Italy. Here, deregulation ‘at the margins’ of the labour market has been characterized by a strong age divide and has exacerbated the separation between insiders and outsiders. We contrast the *individualization of risk* perspective with the *persistent inequality* hypothesis by looking at differentials by gender and socio-economic status in the degree of early-career complexity of workers who entered the labour market before and after deregulation. The use of an innovative longitudinal dataset (AD-SILC) which combines administrative records on employment episodes and survey data on individuals’ socio-economic characteristics allows this study to apply advanced methods in sequence analysis to calculate the complexity of seven-year-long early career trajectories. Complexity is measured by considering the number of transitions between employment states and the length of each episode. We find that early-career complexity increased across cohorts, especially for those more exposed to deregulation. Against the scenario of a generalized increase in labour market dualization, this non-linear dynamic especially affected medium and low-educated individuals and was particularly pronounced for women. Although our analytical strategy does not allow for a causal interpretation of mechanisms engendering the observed trends, this empirical evidence is highly relevant for the implication of changes in early career patterns across cohorts for stratification research.

**Keywords:** labour market, youth, gender, education, flexibility, sequence analysis

## **Introduction**

In recent decades, many European countries have sought to increase labour market flexibilization by removing labour market rigidities (e.g. centralized bargaining and hiring and firing costs [OECD, 1994]). The ultimate aim was to reduce unemployment and foster smoother transitions into employment for young people and workers with weak labour market attachment, typically women and low-skilled individuals. However, in most cases, the reform process strongly emphasized flexibilization at the margins – i.e. a deregulation of hiring through temporary and atypical arrangements – thus creating two-tier labour markets in which flexible and permanent contracts coexist (Boeri 2011).

Although the newly introduced non-standard arrangements were expected to facilitate labour market entry for workers who would subsequently follow linear upward trajectories towards stable standard contracts, some authors have argued that deregulation might have generated more unstable, complex, and ultimately more uncertain employment life courses (e.g. Hofmeister et al., 2006; Mills et al., 2006).

The literature in economics and sociology investigates the short-term effects of labour market deregulation by exploring the ‘trap versus stepping stone effect’ of non-standard labour market arrangements (e.g. Barbieri et al. 2016; Booth, Francesconi, and Frank 2002; Gagliarducci 2005; Polavieja 2005). It proceeds primarily by considering the occurrence and timing of transitions between single events, i.e. from temporary to permanent contracts. The political science literature on labour market dualization emphasizes the process of workforce segmentation between insiders and outsiders, which leads to increasing institutional dualism when policies (e.g. employment protection and unemployment benefits) allocate different rights and entitlements to different categories of recipients (Davidsson & Naczyk, 2009; Emmenegger, Häusermann, Palier, & Seeleib-Kaiser, 2012;

Rueda, 2014). Dualization is measured by adopting either a categorical or a continuous indicator of ‘outsiderness’ (i.e. risk of being in atypical employment or unemployment; Schwander & Häusermann, 2013) but always refers to ‘point-in-time outcomes’ using cross-sectional analytical designs. Both streams of literature have demonstrated that the ‘trap effect’ of non-standard employment arrangements and insider-outsider cleavages exist and extend to generational inequalities depending on the welfare state. This is especially the case in conservative welfare states and in their Mediterranean variety (Chauvel and Schröder 2014; Palier and Thelen 2010).

We extend previous literatures in two respects. First, we describe a trend we observed across cohorts, namely of longitudinal variability for early-career trajectories. We use an indicator that accounts for their temporal dynamics to explore – even if not in a causal fashion – the association between changes in the institutional setting and the *entire* early-career trajectory conceptualized as a ‘process outcome’ (Abbott, 2016). This means that working trajectories are the global result of multiple single events (e.g. the complete succession of different jobs within a career). We utilize sequence analysis to calculate the complexity of early-stage careers by using a synthetic indicator to account for the length of episodes in employment as well as for the mobility between spells in and out of employment. It therefore adequately reflects the life course concept of working-life differentiation: the greater the number of states and episodes experienced over time, the higher the differentiation (Brückner and Mayer 2005). Stability is usually defined in opposition to frequent mobility between different jobs, contracts, and arrangements, whereas mobility often refers to frequent transitions, both from employment to unemployment and vice versa, as well as between different contractual arrangements. When workers move from permanent to temporary contracts, they experience downward transitions. Hence mobility patterns might generate employment trajectories that are not linear or upwardly sloped, i.e. that do not imply a progression toward more desirable

positions. Stability and linearity are especially relevant for workers in the early stages of their careers: different levels of exposure to highly volatile trajectories at this point might have long-lasting consequences for (and over) an individual's working life (Kohli 2007). Ultimately, early-career differentiation in a highly deregulated context may expose outsiders to high precariousness, conceptualized as 'employment that is uncertain, unpredictable, and risky from the point of view of the worker' (Kalleberg, 2009:2).

Second, we consider if trends across cohorts in early-career complexity differ by worker's gender and socio-economic status (education and parental background). Against the background of increasing deregulation, the *individualization of risk* perspective suggests that this increase in employment uncertainty should affect all individuals equally (Beck 1992; Sennett 1999) and lead to a generalization of unpredictable and precarious careers. By contrast, the *persistent inequality* perspective argues that inequality patterns based on traditional stratification factors should continue to shape individuals' exposure to labour market risks (Breen 1997; Goldthorpe 2002). Specifically, it assumes that the ongoing process of recommodification of risk linked to labour market deregulation affects workers who are more exposed to market fluctuations and who have fewer background resources to rely on. These workers are typically new entrants into the labour market, especially women and/or those from low socio-economic status groups.

We focus on Italy, where the flexibilization reforms of the mid-1990s/mid-2000s only deregulated non-standard arrangements. Although employment rates increased, this was caused by a massive growth in temporary and atypical contracts, for which employment protection was very limited (Boeri 2011). The Italian economic model had traditionally been characterized by high rates of youth unemployment, low rates of female participation, and a sizable proportion of (low-skilled) individuals working in the informal economy. Because the reforms 'at the margins' (more or less

directly) targeted new entrants, they engendered age and cohort gaps in access to the protected labour market segment. As a result, in contexts characterized by a Mediterranean welfare state, differences between protected/unprotected and older/younger workers overlapped with the traditional distinction between outsiders and insiders (Barbieri & Scherer, 2009; Chauvel & Schröder, 2014; Palier & Thelen, 2010; Rueda, 2014). Against this backdrop, considering the longitudinal variability in the differentiation of early career trajectories of young workers entering the labour market across cohorts by gender and education offers insights into the actual consequences of the insiders/outsiders cleavage in terms of precariousness. In fact, Italy represents an important case study for comparative social policy worth studying in depth *per se* for at least two reasons. First, the process of reforms towards progressive flexibilization lead to a peculiar two-tier segmentation with several implications for inequality of opportunity and inequality of outcomes (Boeri 2011; Esping-Andersen and Regini 2000; Henrichs and Jessoula 2012). Second, the international economic literature has focused prominently on wage profiles in the entry phase (that is, only episodes with non-zero-wages) of careers, showing that Italy is an outlier in international comparisons as wage experience patterns across cohorts have mostly declined in recent decades for high-skilled workers (Beaudry and Green 2000; Fitzenberger et al. 2001; Mishel 2012; Naticchioni, Raitano, and Vittori 2016; Rosolia and Torrini 2016). However, a thorough account of cohort dynamics in early-career patterns that incorporate (multiple) transitions in and out of unemployment and between employment states to better characterize the Italian case is still missing in existing scholarship.

We use an innovative longitudinal dataset built by combining survey data with administrative information about working histories. We analyse seven-year-long early careers, starting from the first employment episode across six cohorts of young Italian workers who entered the labour market between 1974 and 2001. This means that we compare the complexity of early-career trajectories



across cohorts of workers who were exposed to increasing degrees of labour market deregulation. By looking at a single country, we adopt a ‘differential’ life course sociology perspective that studies country cases over time to highlight linkages between institutional configurations and life course outcomes instead of comparing broad categories of welfare state regimes (Mayer 2005).

### **The Italian institutional background**

From the mid-1980s to the early 2000s, the Italian government approved several labour market reforms to ease constraints on temporary hiring and to introduce new contractual arrangements. In Italy, as in other Mediterranean countries, deregulation was promoted as a way of (ideally) boosting the participation of more vulnerable workers, such as women, workers over the age of 50, low-skilled individuals, young people, and immigrants (Vesan 2009). The reforms fostered a deregulation process that was ‘partial and selective’ (Esping-Andersen and Regini 2000) as it only targeted the ‘margins’ of the labour market system, that is, non-standard employment. Unlike other European countries, where access to protected labour market segments was uneven and based on skills differentials (Giesecke and Groß 2003), in Italy the most severe cleavage existed between the older and younger cohorts of workers (Barbieri, 2009). Older workers remained in the core segment, while new entrants found it difficult to move from the periphery (e.g. Barbieri et al., 2016).<sup>1</sup>

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<sup>1</sup> A reduction in the unfair dismissal protection offered by standard contracts was introduced only much later, in 2012 and 2015, whereas a further deregulation of fixed-term contracts occurred in 2014.

Table 1 shows the timeline of the reforms and connects it to the cohorts of workers whose early careers were affected. In this article, we focus on individuals who entered the labour market in the period from 1974 to 2001 and follow them over a seven-year-long observational window starting with their first work episode. Therefore, our empirical analyses concern workers whose early careers unfolded before the 2008 economic crisis.

[Table 1 here]

In the mid-1980s, a number of regulations were introduced to increase part-time employment, raise the maximum age for apprenticeships, and facilitate job training (e.g. internships), as well as to allow for the reintegration of long-term unemployed workers. The first set of reforms affected the early careers of individuals who had entered the labour market during the late 1970s or after. Subsequent reforms to extend apprenticeship and training contracts to a broader range of sectors, which took place in the early 1990s, affected workers who entered in the late 1980s. Following this, a specific public pension fund was introduced in 1995 (the *Gestione Separata*, implemented in 1996) for para-subordinate workers – also termed dependent self-employed workers. These individuals are self-employed in legal terms, as they work at their own risk and are not formally subordinate to an employer, but they are often ‘economically dependent’ on an employer because in most cases, their activity relies upon one or an extremely small number of clients (Raitano, 2018). In this phase, deregulation reached a crucial turning point: the creation of this fund institutionalized para-subordinate collaboration contracts (with no hiring and firing costs, very low social security guarantees, and reduced pension contribution rates that had applied until more recent reforms). In consequence, firms started using these contracts on a large scale instead of standard employment

arrangements. Before the reform, only a few workers (mostly freelance researchers) had been hired on para-subordinate contracts. According to INPS (Italian National Social Security Institute) figures, the number of individuals who exclusively performed a para-subordinate activity more than doubled from 1996 to 2003 (from around 840,000 in 1996 to over 1.8 million workers in 2003). The more recent decline in updates of such contracts after 2008 was due to gradual increases in the contribution rates and welfare guarantees, both of which aimed to reduce incentives for employers using para-subordinate arrangements. Another factor in the recent decline was the introduction of stricter regulations aimed at detecting ‘false’ para-subordinate work (Raitano, 2018).

The *Treu package* (Law n.186/1997) introduced temporary employment agencies and internship contracts. It also reformed the rules concerning fixed-term employment (dating back to 1962), weakening regulations regarding the hiring of temporary employees and reducing sanctions for violations of the obligation to transform temporary contracts into open-ended arrangements. Constraints on the use of fixed-term arrangements were largely removed by Legislative Decree 368/2001. While the previous regulation had outlined specific conditions under which temporary hiring could occur (peaks in production or replacement of workers on sickness or maternity leave), the new Decree contained a more general and non-specific rule permitting hiring on a fixed-term basis for ‘technical, productive, organizational or substitution’ reasons. The flexibilization of the Italian labour market was finally completed by Law 30/2003 (the *Biagi law*), which introduced further para-subordinate arrangements (e.g. ‘project collaborations’, ‘job on call’, ‘staff leasing’, and ‘job sharing’). It is also notable that, since the mid-1990s, severe limitations on permanent public-sector hiring have been introduced to limit public spending, thus strongly reducing young workers’ chances of attaining an open-ended contract in the public sector (Dell’Aringa et al., 2007).

Although these measures changed the opportunity structure for cohorts of workers who were in their early careers in the early 1990s, they are likely to have more directly affected the careers of those who experienced the very first employment spell after the mid-1990s.

The implications of these last measures for the early career trajectories of more recent cohorts of young workers are evident in some Eurostat figures for Italy. The increase in non-standard arrangements from the mid-1990s to 2000s is reflected in the share of employees hired on temporary contracts (6.2% in 1998, 7.2% in 2002, and 10.0% in 2008) and on part-time contracts (7.2% in 1998, 8.5% in 2002, and 14.1% in 2008). The picture changes dramatically when we consider workers between the ages of 15 and 29: the share of employees on fixed-term contracts rose from 9.7% in 1983 to 11.4% in 1993, and to 32.0% in 2008. The share of part-time employees rose from 4.7% in 1983 to 6.0% in 1993, and to 17.2% in 2008. Women were over-represented both in part-time jobs and in any other non-standard arrangements (and still are in the most recent statistics).

At the same time, during the period ranging from the mid-1990s (when its employment protection legislation was amongst the most rigid of the EU15 countries) to 2008 (when it was amongst the most lax), Italy's employment protection legislation (EPL) index underwent the greatest decline of all OECD countries. The EPL index for temporary workers decreased from 5.25 in the late 1980s to 3.25 in 2001 and to 2.00 in 2003, while the EPL index for permanent workers has remained constant at 2.76 since the 1980s because, as mentioned above, the legislation pertaining to permanent contracts was not liberalized until the early 2010s. Finally, the share of workers with trade union

membership fell dramatically over time. Union density rose steadily – from 24.7% of the labour force in 1960 up to 50.4% in 1978 – and then constantly fell to 33.4% in 2008.<sup>2</sup>

## **Labour market deregulation and the complexity of early career trajectories**

### *Early-career complexity across cohorts*

The literature on individual-level outcomes of labour market flexibilization mostly examines changes in job and employment security. Job insecurity refers to unstable contractual arrangements: in dual labour markets, non-standard workers experience high job turnover and face high barriers to accessing the core segments of the labour force (Barbieri & Cutuli, 2015; Gebel & Giesecke, 2016). If such conditions persist over time, individuals experience long-lasting employment insecurity (Wilthagen and Tros 2004), and temporary arrangements become a trap rather than being a stepping stone into stable contracts. Employment insecurity is therefore an inherently longitudinal characteristic of individuals' working trajectories (Berton et al., 2009).

The life course literature has conceptualized the increasing longitudinal variation in careers, which is driven by increases in non-standard employment relations, as differentiation (Brückner and Mayer 2005). Differentiation refers to the increasing number of distinct events experienced over a working lifetime (both within and outside of the labour market), taking into consideration their order, timing, and duration. Hence, high differentiation implies unpredictable and non-linear employment trajectories. In a highly deregulated context, where the social security system does not compensate

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<sup>2</sup> OECD figures based on the Jelle Visser database available at <https://stats.oecd.org/Index.aspx?DataSetCode=TUD>

for such employment insecurity, differentiation may translate into precariousness (Berton, Richiardi, and Sacchi 2009; Kalleberg 2009).

Recent research by Van Winkle and Fasang (2017) looks at the differentiation in employment trajectories and shows relative stability in career complexity between the ages of 15 and 45 in Europe. However, the individuals in their sample were at an early stage in their careers before the mid-1970s. This period was certainly characterized by dramatic changes due to economic tertiarization, globalization, and technological change, but several European countries only implemented labour market reforms that actively promoted de-standardization from the mid-1980s. Moreover, the increasing differentiation that usually occurs during the first years of labour market participation is likely to be moderated by the stability typical of later stages when considering a longer portion of the employment life course.

### ***Early-career complexity, gender, and socio-economic status across cohorts***

In the context of economic globalization (Blossfeld et al., 2005), the restructuring of companies after economic crises (Kalleberg, 2009), and job losses due to technological change (Oesch and Rodríguez Menés 2010), labour market participation and employment in general have become less stable and secure. More frequent unemployment episodes and increasing employment instability should generate less predictable employment life courses. Two main theoretical perspectives refer to the ways in which changes in labour market regulation have shaped career configurations over time: the individualization of risk and persistent inequality perspectives. According to the individualization of risk perspective, these processes should have resulted in unstable and extremely fragmented careers for a large part of the labour force, independent of ‘traditional’ social stratification dimensions, such as gender and socio-economic status (Beck 1992; Sennett 1999).

By contrast, the persistent-inequality perspective argues that traditional stratification factors should still strongly shape individuals' exposure to labour market risks. Within this framework, the concept of recommodification of risks (Breen, 1997) suggests that the organizational restructuring processes triggered by labour market deregulation should transfer market risks to employees. These risks would likely be allocated to groups depending on pre-existing power structures and stratification dimensions, so that the negative outcomes of employment flexibility and the risk of unemployment would not be spread across the whole population but would affect specific groups (Breen 1997; Goldthorpe 2002). This study mostly focuses on gender and education. However, it also takes into account that individual educational opportunities are affected by parental background characteristics (see Hertz et al. [2007] for a comparative study, and Raitano & Vona [2018] for a focus on Italy).<sup>3</sup>

The rise in women's education and labour-market participation was expected to bring about a transition from more traditional to more egalitarian gender ideologies (Goldscheider et al., 2015). However, gender stereotypes persist in cultural beliefs and women are likely to be confronted with gender-specific expectations regarding work-family commitment – even in countries with generous reconciliation policies (Grunow et al., 2018). These findings may be relevant in a context of persistent traditional gendered work-family roles, high levels of labour market deregulation, and little provision of childcare services (Crompton 2002; Krüger and Levy 2001). We might expect women in their

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<sup>3</sup> There are two reasons for focusing on gender and education. First, as mentioned, Italy's labour market deregulation 'at the margins' was strongly intended to promote the labour market participation and employability of disadvantaged workers, mostly women and low-skilled individuals. Second, the economic policy debate has emphasized the role of education as the most important means of reducing labour market risks.

early careers to be more likely to work in flexible jobs than men because they anticipate and seek to fulfil the requirements of their *master status* by demonstrating a stronger commitment to their (current/future) family than to their career. Opting for a flexible job might be reinforced by discriminatory hiring and firing practices of employers, because they anticipate (stereotypical) lengthy and/or frequent breaks in women's active participation over and above the compositional effects in observable characteristics associated with rising female participation.

Against the backdrop of educational expansion, skill-biased technological change, and increasing labour market segmentation, and given the reduction in relative demand for low-skilled workers, we might expect less educated individuals to undergo multiple and long-lasting unemployment episodes (DiPrete et al., 2006; Katz & Murphy, 1992). Further, we might also expect them to be less likely to access the primary segment (Gebel & Giesecke, 2011, 2016) and to encounter obstacles to stabilization in the short term (Hollister, 2011; Solga, 2002). This extends to those from less advantaged family backgrounds, who might experience higher degrees of early-career complexity because the educational opportunities of children are generally constrained by parental background (Hertz et al., 2007; Holmlund et al., 2011).

In recent decades, women have caught up with men in terms of educational attainment, even overtaking them in several countries. Therefore, women entering the labour market are increasingly well educated. Due to possible (self-)selection or discrimination, lower-educated women persistently suffer from a type of double disadvantage (OECD 2017). As a result, gender employment gaps tend to be widest amongst lower-educated men and women. We expect this to be reflected in the complexity of early careers as well.

## **Research questions and hypotheses**



We first consider trends in early-career complexity across entry cohorts extending from before to after the deregulation phase in Italy. We expect an increase in early-career complexity for workers who entered the labour market in the early 1980s. We expect that this increase was even more acute for those who entered during or after the mid-1990s, that is, during or after the period when deregulation reached its climax (*hypothesis 1*).

We then explore possible heterogeneities in trends of early-career complexity by gender and education. On the one hand, we might expect early career trajectories to be more complex for all workers who entered the labour market during the deregulation phase as well as after it, that is, irrespective of their individual (observable) ascriptive or attained characteristics (*hypothesis 2*). On the other hand, we could also expect: early-career differentiation to increase more for women than for men across cohorts (*hypothesis 3a*); lower-educated workers to experience higher degrees of early-career complexity when the potential for employment insecurity increases (*hypothesis 3b*); and the early careers of lower-educated women to have increased in complexity more than (i) those of men with the same education as well as (ii) those of highly educated women (*hypothesis 3c*).

## **Data and methods**

### ***Data and sample***

We used the AD-SILC longitudinal dataset, which is constructed by linking information on individuals interviewed in the 2005 cross-sectional wave of the IT-SILC (i.e. the Italian component of the European Union Statistics on Income and Living Conditions–EU-SILC) to administrative longitudinal records on all job relationships an individual had experienced up to 2009 provided by INPS (Italian National Social Security Institute). AD-SILC is a retrospective unbalanced panel

because individuals enter and exit the labour market in different years, and it includes almost 1.2 million observations nested in 43,388 individuals who appeared at least once in the INPS archives between 1940 and 2009 and who were in the 2005 sample of the IT-SILC module. Appendix B contains a detailed description of the AD-SILC dataset that also highlights advantages compared to alternative data sources for Italy as well as its limitations.

For this article, we selected individuals who, after having completed their education,<sup>4</sup> experienced their first working episode lasting at least 13 weeks<sup>5</sup> between 1974 and 2001 between the ages of 15 and 34 (men=8,398; women=7,147). We observed individuals in the sample for seven years, as this is the longest period for which we were able to follow those who entered into the labour market between 1998 and 2001 (i.e. after the last deregulation reforms) in order to conclude the observational window before the 2009 economic crisis.

Table 2 displays the distribution of the independent and control variables by gender, while Table A1 in the Appendix presents the sample distribution by gender, education, and cohort. It confirms the educational expansion over the last decades in Italy, especially for women.

[Table 2 here]

### *Sequence construction*

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<sup>4</sup> The year in which own highest qualification was attained is recorded in the EU-SILC.

<sup>5</sup> In Italy, 13 weeks is the threshold for eligibility for unemployment benefits.

By adopting the sequence analysis framework,<sup>6</sup> we conceptualized early career trajectories as sequences of categorical states to be analysed as they unfold over time rather than as a set of isolated elements (Abbott, 1995). The objects of study were therefore entire trajectories instead of single transitions between or durations in specific states: we understood early careers as individual realizations of a ‘process outcome’ which entailed aggregate-level patterns and regularities (Abbott, 2016; Aisenbrey & Fasang, 2010).

We constructed 84-month-long sequences by coding each month according to labour-market status at each time point:<sup>7</sup> apprenticeship, full-time employment in the private sector, part-time employment in the private sector, employment in the public sector (we did not distinguish between part-time and full-time arrangements in the public sector), self-employment (merchants, craftsmen, and farmers), professionals (e.g. lawyers, architects, physicians), and joblessness (due to unemployment or inactivity).

This approach did not take into account transitions between different jobs/employers if the contractual arrangement did not change (e.g. transitions between full-time contracts in the private sector). Therefore, we intended to emphasize the employment insecurity dimension rather than the job insecurity connected to the duration of contracts in the transitions between states in individual trajectories. In fact, direct job-to-job transitions between employers do not necessarily translate into

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<sup>6</sup> We performed sequence analysis using the R packages TraMineR and TraMineRextras (Gabadinho et al., 2011) and Weighted-Cluster (Studer 2013), version R.3.6.2 (R Core Team 2019).

<sup>7</sup> In the event of overlap of two different episodes, we prioritized the more ‘beneficial’ episode in terms of stability and related benefits: e.g. we prioritized working episodes over non-employment.

differentiation and possible precariousness as long as the individual in question remained employed in the same occupation (Biemann et al., 2011; Hollister, 2012).<sup>8</sup>

Unfortunately, AD-SILC only began distinguishing between fixed-term and permanent contracts in the private sector from 1998 onwards, and this distinction was never made for public-sector employees. Moreover, as mentioned, para-subordinate arrangements were only identified as such from 1996 onwards. In fact, before 1996, para-subordinate arrangements were not recorded in administrative social security records as they were exempt from social contributions. However, a massive increase in the use of para-subordinate arrangements occurred after the introduction of the *Gestione Separata* fund in 1995. We thus chose to code episodes in para-subordinate and temporary jobs as employment in the private sector.

### *Complexity index of early careers*

We used the complexity index (Gabadinho et al. 2011) to operationalize the differentiation of individual sequences representing trajectories of early career trajectories. The complexity index of sequence (x) was calculated as:

$$0 \leq C(x) = \sqrt{\frac{h(x)}{x_{max}} * \frac{q(x)}{q_{max}}} \leq 1$$

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<sup>8</sup> We accounted for job-to-job transitions and for a more detailed definition of states used to construct the sequences in a series of robustness checks. As the results were highly consistent with those presented here, we prioritized sequences that more accurately reflected employment versus job security.

$h(x)$  is the longitudinal entropy, or time spent in different states, and  $q(x)$  refers to the number of transitions between different states in the sequence. Both  $q(x)$  and  $h(x)$  are divided by the respective maxima,  $q_{max}$  and  $x_{max}$ . The complexity index is therefore the mean of the two components normalized. For example, the sequences *AABB* and *ABAB* have the same entropy, as the time spent in the two possible states – A and B – is equal. However, the second is more complex (as it implies three transitions between states), while the first only has one transition between states. The minimum value of  $C=0$  corresponds to sequences composed of one single state (i.e. no transitions) and entropy equal to 0. The maximum value of  $C=1$  corresponds to sequences in which (i) all possible states appear, (ii) the same time is spent in each state, and (iii) all possible transitions between states occur.

Since we coded episodes in para-subordinate and temporary jobs as employment in the private sector, the complexity index is the lower bound of actual complexity because it ignores transitions between permanent and temporary employment and between employment and para-subordinate jobs. Moreover, the value of the complexity index is underestimated for younger cohorts because transitions between employment and para-subordinate arrangements and temporary and permanent employment clearly increased in recent decades – at least in the case of Italy. Therefore, growing complexity for the younger entry cohorts should be interpreted as an actual increase across cohorts.

Finally, note that we used an individual's seven-year trajectory to compute a synthetic indicator of this trajectory, i.e. the complexity index. Therefore, we use the longitudinal information available in the dataset to compute the index and then proceed to run the empirical analyses using a single observation for all individuals.

### ***Regression analysis***

We estimated the complexity of early career trajectories by using ordinary least squares (OLS) regression. Stepwise models were estimated for men and women separately. The first model includes cohorts of entry into the labour market (entry years were grouped into five-year classes: 1974–1978, 1979–1983, 1984–1988, 1989–1993, 1994–1997, 1998–2001 – this is the main independent variable) and is adjusted for area of residence (North-West, North-East, Centre, or South and Islands), age at the time of the first employment episode (15–19, 20–24, 25–29, 30–34), and a dummy for those who started to work at least one year after completing their highest level of education.<sup>9</sup> The second and third models include two indicators of socio-economic status separately, namely the individual’s highest educational attainment (at most lower secondary, upper secondary, or tertiary) and parental background (operationalized by the highest educational attainment amongst parents: at most lower secondary education, or at least upper secondary education).<sup>10</sup> Finally, the fourth model includes both individual educational attainment and parental background. Formally:

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<sup>9</sup> We ran the regression models using cross-sectional weights for 2005 as provided by IT-SILC. Therefore, the analytical sample is representative of the population living in Italy in 2005 (excluding migrants) and of the labour market entry cohort as defined by the AD-SILC retrospective panel.

<sup>10</sup> We acknowledge that parental education is not a perfect proxy for parental background, as the latter encompasses several additional dimensions (e.g. cultural capital, economic resources, prestige, and power). AD-SILC does not include information on parental incomes and the available occupational classification does not allow us to precisely define social class. Therefore, we opted to use parents’ education instead of occupation. Further, education captures both the parents’ earning potential and their capacity to transfer human capital to their children (Chevalier et al., 2013).

$$(1) y_{complexity} = \beta_0 + \beta_1 entrycohort + \beta_2 area + \beta_3 age1st\_empl + \beta_4 lateentry$$

$$(2) y_{complexity} = \beta_0 + \beta_1 entrycohort + \beta_2 area + \beta_3 age1st\_empl + \beta_4 lateentry + \beta_5 education$$

$$(3) y_{complexity} = \beta_0 + \beta_1 entrycohort + \beta_2 area + \beta_3 age1st\_empl + \beta_4 lateentry + \beta_6 parentalbackground$$

$$(4) y_{complexity} = \beta_0 + \beta_1 entrycohort + \beta_2 area + \beta_3 age1st\_empl + \beta_4 lateentry + \beta_5 education + \beta_6 parentalbackground$$

### ***Caveat and robustness check***

First, because youth unemployment has increased across cohorts, the complexity's trends might be driven by multiple transitions between employment and unemployment as well as exposure to unemployment at the beginning of a career – which is the case for younger cohorts in Mediterranean welfare states. Therefore, in robustness checks, we also estimated all models adjusting for number of months spent in unemployment across the seven-year individual sequences. However, as a matter of fact, the number of months spent in unemployment is endogenous to the sequences. Due to the fact that results of this robustness check are highly consistent with those of the unadjusted model, we focus on the latter in the results section.

Second, the regression analyses presented below are descriptive in the sense that we consider whether the complexity of early career trajectories changed for cohorts of workers who were exposed to the different phases of the labour market deregulation process. The adopted analytical strategy does not allow us to identify a *causal* effect of deregulation on career complexity. Other macro-level dynamics might have acted as potential confounders of the association of interest against the scenario of the increasing of employers' demand for flexibilization due to globalization, the widening of the

divide between high-skilled and low-skilled workers driven by technological progress, and the expansion of the spectrum of employment arrangements because of structural changes in the productive system associated with the growth of the service sector (tertiarization) – see Blossfeld et al. (2005) and Esping-Andersen and Regini (2000).

Because we do not consider individual outcomes at one specific point in time (e.g. the year) but instead survey early career trajectories as a whole (as summarized by the complexity index built on the seven-year trajectories), the only indicator we could use to partially account for such macro-level dynamics is the unemployment rate. Specifically, in further robustness checks we adjusted the model for: (1) the average unemployment rates between the first and the seventh year in the labour market in the working-age population and (2) in the population of 15-24-year-olds; and (3) the average unemployment rates between the first and the seventh year in the labour market in the female and male working-age population and (4) in the female and male population of 15-24-year-olds.<sup>11</sup> The effect of these average indicators over a specific time-span that differs depending on the calendar year the early career starts is likely to be captured by the cohort-effect already. In fact, as expected, even after controlling for the different unemployment rates, the trend across cohorts persists in very similar sizes and in comparable significance to the main results presented below. We opted for parsimonious models unadjusted for unemployment rates as the averaged unemployment rates over the seven-year observational window is an attempted and rough approximation of unemployment (or any other macro indicator one might use) dynamics. Results are available upon request.

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<sup>11</sup> For the cohort 1974-1978, the unemployment rates are averaged starting from 1977 because the ISTAT-Italian National Statistical Institute provide historical series that date back to 1977.



A further caveat regards the comparison of cohorts over time, as their composition may have changed. This is of special concern with respect to women, as female employment rates in Italy steeply increased in the period studied here.<sup>12</sup> Although we adjust our estimates for observable individual characteristics (i.e. education, geographical macro-area of work, age at time of entry into the labour market, and late entrance), we cannot empirically address the fact that our results might be affected by changes over time in unobservable individual characteristics (e.g. their preferences for leisure time or for specific employment arrangements, as well as their need to balance family and job activities) due to data limitations, as AD-SILC does not include this information. In particular, compositional effects in terms of unobservable characteristics might lead to a strong increase in career complexity amongst women and low-educated individuals. Despite these limitations, our dataset can provide detailed descriptive evidence about trends over time in early-career complexity and its heterogeneity according to workers' gender and socio-economic features.

Finally, it is important to point out that since our aim is to compare early career complexity across several workers' cohorts over a 35-year time span, any empirical quasi-experimental strategy to infer causal links between labour market reforms (or other macro-level trends) and individual outcomes in the labour market would, first, force us to abandon the complexity index as a synthetic indicator of longitudinal dynamics of early career trajectories and, second, compel us to compare only

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<sup>12</sup> According to the National Institute of Statistics (ISTAT) data, the 15–64 female employment rates increased from 33.5% in 1977 to 49.6% in 2018.

a small number of cohorts over a shorter period of time.<sup>13</sup> However, as we have already highlighted, the complexity index applied to employment trajectories responds to the empirical fact that our raw data show that workers' longitudinal experiences are largely heterogeneous and do not describe linear upward trajectories. These would hardly be impossible to capture by focusing on specific (traditionally studied) 'point-in-time' outcomes (e.g. unemployment spells or transitions across contractual arrangements).

## **Results**

### *Complexity of early careers across cohorts*

Figure 1 displays the mean of the complexity index by gender and entry cohort. The complexity value can theoretically vary between 0 and 1: the empirical maximum in our data is 0.391 and 0.436 for men and women, respectively. The mean complexity increased across entry cohorts in a non-linear fashion for both genders: it first rose for those who entered in the early 1980s and underwent a sharp increase from the mid-1990s onwards, which is when the labour market deregulation process began (see Table 1). These findings suggest gender heterogeneities in how the pace at which exposure to labour-market deregulation is associated with longitudinal early-career differentiation across cohorts.

[Figure 1 here]

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<sup>13</sup> Studies that try to infer – through DID or RDD techniques – the causal effect of labour market reforms on workers' outcomes necessarily compare few and very close in time workers cohorts (see e.g. Raitano and Fana [2019] for Italy).

To better illustrate the meaning of changes in complexity across cohorts, Figure 2 shows the distribution of the complexity index amongst workers according to intervals computed with respect to the value of one or more standard deviations of such an index over the total sample (s.d.=0.074). We found that the share of women whose early careers were characterized by complexity increased by more than two standard deviations, from 12.2% to 26.7% across entry cohorts, while the share of early career trajectories with complexity equal to 0 decreased from 27.8% to 17.7%. In both cases, the differential was more pronounced for the two youngest cohorts. This general trend also applied to men, but since men's early careers were already relatively more complex amongst older entry cohorts, the increase in complexity was less pronounced: 25.6% of the sample of the youngest cohorts displayed very high complexity versus 19.4% for the oldest, while 23.3% and 27.4% of the youngest and the oldest workers, respectively, experienced complexity equal to 0.

[Figure 2 here]

These descriptive results might be confounded by changes in the observable characteristics of individuals across cohorts due to educational expansion and increasing women's labour market participation. Therefore, although our analysis cannot provide causal evidence of the link between labour market deregulation and early-career complexity, we ran a set of OLS regression models to estimate the association between the complexity index and entry cohort, adjusting for observable individual characteristics. Table 3 displays the results of separate models for men and women. Support for *hypothesis 1* is provided by the non-linear increase in the size of the complexity index across entry cohorts, as shown by the estimated coefficients: the baseline models M1 (i.e. not adjusted

for workers' and parents' education) show that the most recent cohorts of both men and women experienced a non-linear rise in complexity. Substantiating *hypothesis 3a* rather than *hypothesis 2*, our findings show that for men, early-career complexity significantly increased only for the two youngest cohorts (1994–1997 and 1998–2001) compared to the 1974–1978 reference cohort. By contrast, amongst women, early-career complexity started to increase significantly for those who entered the labour market in the early 1980s.

Changes in complexity across cohorts remained significant after adjusting for workers' education (models M2 in Table 2). As expected, higher educational attainment was associated with lower complexity. Moreover, because younger cohorts were, on average, more educated than the older ones, the size of the effects for the different cohorts increased when adjusting for education. When adjusting for socio-economic status proxied by parental education instead of workers' own educational attainment (models M3 in Table 2), we found further support for the persistent inequality hypothesis – a more advantageous family background was associated with lower early-career complexity for both men and women.<sup>14</sup> However, the effect of parental characteristics on workers' early-career complexity was almost fully explained by the better educational opportunities of those from a more advantageous background. In fact, when adjusting for workers' own education, the coefficient for parental education was no longer statistically significant (models 4 in Table 4).

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<sup>14</sup> Note, however, that 75% of all missing values on parental education concerned the youngest cohort (which had 22% of missing values on this variable). In fact, the ad-hoc IT-SILC 2005 module on 'Intergenerational transmission of poverty' that collects this information only applied to those who were at least 25 years old in 2005. Thus, those in the youngest cohort who entered at a very young age were excluded from the models adjusted for parental education.

[Table 2 here]

Figure 3 displays the predicted values of the complexity index for entry cohorts divided by gender and education. Overall, striking differences between genders emerged when considering not just the comparison across cohorts within each gender but also the levels of complexity (panels (a)). On average, the older cohort of men, i.e. the 1974–1978 cohort, exhibited higher complexity values than the same cohort of women (0.079 versus 0.062, respectively). A crossover of complexity was observed for men and women across cohorts, as women’s early-career complexity increased at a much quicker rate across cohorts. The 1984–1988 entry cohort for women eventually reached the same complexity level as men (0.081 and 0.082, respectively), meaning that the early careers of younger cohorts of women displayed higher differentiation than those of men, reaching the highest value of 0.121 for the cohort 1998-2001. These findings further substantiate *hypothesis 3a*, namely that there was higher early-career differentiation for women across cohorts of workers exposed to increasing labour market deregulation.

[Figure 3 here]

Figure 3 also shows the predicted complexity by education. Consistent with *hypothesis 3b*, lower educated workers experienced higher degrees of early-career complexity as the deregulation process proceeded compared to those with upper secondary education or more. In fact, for men and women with tertiary education (panels (c)), the early-career complexity remained relatively low across cohorts, while more recent cohorts of workers with lower and upper secondary education

displayed a much higher complexity than the older cohorts. Yet, for men, the increase in early-career variability was non-linear, as it only concerned the two more recent cohorts (1994–1997 and 1998–2001), that is, those more exposed to the late-1990s deregulation phase. Instead, the dynamic across cohorts for women followed a (non-linear) inverse S-shape: complexity increased from the 1974–1978 cohort to the 1979–1983 cohort and then stagnated, only to increase again for the two youngest cohorts – the 1994–1997 and 1998–2001 cohorts. These findings therefore support *hypothesis 3c* in that, first, the early-career complexity of lower-educated women grew more rapidly compared to the complexity for both low-educated men and high-educated women, and, second, the complexity value was highest for the 1998–2001 cohort of low-educated women.

Note that we do not present the predicted probabilities by gender, cohort, and parental education because none of the cohorts exhibited statistically significant differences in the complexity index between workers with high and low parental education for both genders. Results are available upon request.

Additional evidence regarding the number of transitions between states and the number of months spent in each state during the seven-year-long observational window substantiates this interpretation. Figure 4 shows that the increase in complexity for the subsample of women could be partially explained by the decrease across cohorts in the share of individuals who never changed states. This mainly affected women with a tertiary degree, whose early career trajectories were characterized by steady complexity values across cohorts. By contrast, the share of men who never changed states decreased only for those with an upper secondary education. Therefore, the complexity experienced by the newest entry cohort of workers was likely driven by increasing transitions between different states within the labour market. The most recent cohorts of highly educated men and women experienced an increase in working time versus joblessness, so that their early-career complexity was

less influenced by the number of episodes of joblessness or their length. In fact, the number of transitions increased across cohorts for less educated individuals. Finally, the increase in early-career differentiation for (mostly low-educated) women was associated with an increase in the average number of transitions and different states they had experienced.

It has been proposed that highly educated individuals may benefit from the increased availability of temporary arrangements (especially if these are in prestigious occupations). These individuals may opt for them more consciously than lower-educated workers because they believe temporary arrangements will offer different work experience and will improve their chances of upward career mobility (De Jong et al., 2009). Although we cannot assess whether the higher complexity of early career trajectories is a result of individual preferences, our results indicate lower complexity for individuals with tertiary education and no changes across cohorts. If some sort of strategic behaviour was relevant, it does not seem to have changed during the deregulation process, when the institutional structure began to offer more options for flexible arrangements. These considerations underpin our interpretation of high early-career complexity as an indicator of uncertainty, unpredictability, and, ultimately, precariousness.

## **Discussion and concluding remarks**

Labour market deregulation might have generated less stable and more complex employment life courses. Exposure to highly volatile early career trajectories has long-lasting consequences over the course of a working life, especially in contexts where the insurance-based welfare states make lifetime earnings dependent on a favourable entry into the labour market (Chauvel and Schröder 2014). It is therefore especially important to consider how these processes affect younger workers in

countries like Italy, where deregulation ‘at the margins’ of the labour market has been characterized by a notable age divide. This article has contrasted two approaches – individualization of risk versus the persistent inequality hypothesis – by looking at heterogeneity in early-career complexity by gender and socio-economic status. It considered workers who entered the labour market before and after the deregulation phase.

By adopting a ‘differential’ life course sociology perspective, the analyses looked at one country case over time to highlight linkages between institutional configurations and employment outcomes. Instead of relying on cross-sectional indicators of working statuses, we compared seven-year-long early career trajectories of six cohorts of young workers who experienced their first employment episode between 1974 and 2001. We used an innovative longitudinal dataset built by merging survey data with administrative data about working histories and applied sequence analysis techniques to calculate longitudinal employment life course variability as operationalized by a complexity index that captures stability and mobility between different spells in employment and out of the labour market, accounting for their length and recurrence. Even though our analyses could not test causal relations, they allowed us to display the pace at which exposure to the labour market deregulation process was associated with longitudinal early-career differentiation.

Our results support *hypothesis 1* in the sense that early-career complexity increased across cohorts as the deregulation process advanced. However, there are differences across gender and socio-economic status. Specifically, in line with the persistent inequality hypothesis, we found gender differences in the pace of the increase in complexity but also in its levels (*hypothesis 3a*): women’s early-career differentiation grew faster and to a greater extent than men’s. However, this dynamic was driven by low- and medium-educated individuals (*hypothesis 3b*) amongst whom the youngest cohorts of women displayed the highest values of early-career complexity (*hypothesis 3c*). We



additionally show that the effect of parental background on the differentiation of young people's labour market trajectories was almost fully explained by the educational opportunities associated with such backgrounds.

Drawing on these findings, we argue that the inadequate employment conditions for younger cohorts were not due to fewer occupational opportunities – which were supposed to increase in number due to labour market deregulation – but resulted from the decline in opportunities for employment stability (or continuity) in the long run. All in all, the increasing career complexity for entry cohorts is a feature of middle- and low-educated workers rather than of high-educated ones, which indicates a rising skill divide amongst young people. This is likely to result in an age cleavage of differential exposure to precariousness, as this is a context where deregulation has occurred 'at the margins'. The Italian case is telling in this respect because flexibilization targeted young workers who, as a result, became highly vulnerable to unprotected employment. These results speak to the insiders/outsiders literature, as we used an indicator of early-career complexity based on individuals' longitudinal career trajectories that hints at their exposure to precariousness. It therefore offers evidence of labour market dualization in terms of a sharp cohort divide resulting in long-lasting cleavages in labour market participation.

In addition to the limitations highlighted above, which hint at prospects for future work, we were not able to account for one crucial dimension because of the lack of data. Specifically, we could not trace the geographical mobility of workers for the first job for all cohorts in the sample. This might be more relevant given the persistent North-South divide in Italy, which is largely based on differentials in labour market opportunities that still trigger massive migration from the South to the North. Moreover, a specific focus on sectors of activity might suggest complementary explanations to increasing early-career complexity. In fact, the trend towards a service economy – characterized

by a wider spectrum of jobs and, usually, higher worker flexibility with respect to manufacturing – may have favoured more complex careers. Finally, future research should address the direct role of other life course events (e.g. childbirth) in the context of underdeveloped care services (Pacelli, Pasqua, and Villosio 2013) and to the role of the persistence of traditional gender roles for labour-market participation (Grunow, Begall, and Buchler 2018).

Notwithstanding these limitations, our results represent an important point of departure for extending the analysis to countries that have experienced similar patterns of institutional change. Moreover, the findings are relevant for future analyses of the aftermath of the economic crisis after 2008 on early career trajectories: more frequent layoffs of temporary workers and more frequent joblessness generated higher complexity, which will have severely negative consequences for future incomes and pensions. It will also erode career opportunities due to weakening human capital and increasing skill mismatches.

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## Tables and Figures

Tab.1 Summary of labour market reforms and identification of the entry cohorts affected by the new regulations

Year of the reform	Reforms	Entry cohort interested from the first year	Entry cohort interested along the first 7 years in the LM
1983-1984	Regulation and extension of part-time, apprenticeship, and training contracts	1983-2001	1977-2001
1994	Extension of apprenticeship and training contracts	1994-2001	1988-2001
1995	Introduction from 1996 of the public pension fund <i>Gestione Separata</i> for para-subordinate workers, thus institutionalizing collaboration contracts (no hiring-firing costs)	1996-2001	1990-2001
1997	<i>Pacchetto Treu</i> Law 186/1997: introduction of temporary worker agencies and relaxation of the constraints on hiring fixed-term employees	1997-2001	1991-2001
2001	Law 368/2001: removal of constraints on hiring fixed-term employees	2001	1995-2001
2003	<i>Legge Biagi</i> Law 30/2003: extension of temporary worker agencies and introduction of new types of atypical contracts ('project collaborations', 'job on call', 'staff leasing', 'job sharing').		1997-2001

Tab. 2: Sample characteristics

	Men	Women
<i>Gender</i>	54.0	46.0
<i>Cohort of entry</i>		
1974-1978	13.9	14.5
1979-1983	19.2	17.4
1984-1988	19.7	18.8
1989-1993	17.5	18.7
1994-1997	13.7	13.2
1998-2001	16.1	17.4
<i>Education</i>		
At most lower secondary	42.4	36.4
Upper secondary	47.8	51.4
Tertiary	9.8	12.2
<i>Highest parental education</i>		
At most lower secondary	56.4	54.6
At least upper secondary	38.2	41.4
Missing values	5.4	4.0
<i>Geographical area of work</i>		
North-West	23.4	25.9
North-East	24.8	26.5
Centre	23.2	23.8
South and Islands	28.6	23.8
<i>Late entry: yes</i>	71.2	70.2
<i>Age at first working episode</i>		
15-19	38.2	32.9
20-24	36.9	39.5
25-29	16.7	18.0
30-34	8.2	9.6
Obs.	8,398	7,147

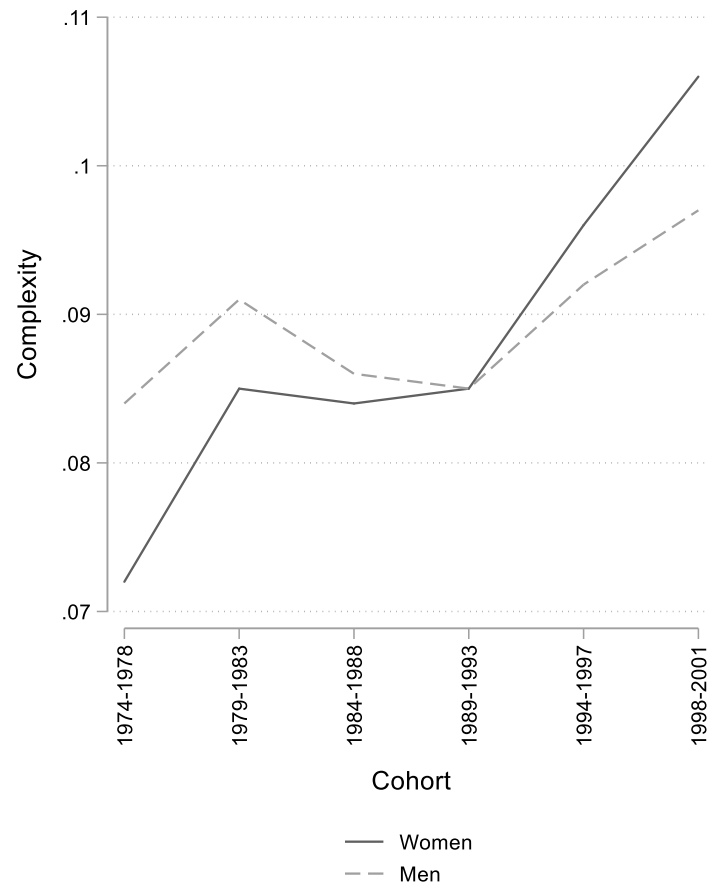
Source: elaborations on AD-SILC dataset.

Tab. 3: Association between early-career complexity index and individual characteristics. OLS regression estimates<sup>a</sup>

	Men				Women			
	M1	M2	M3	M4	M1	M2	M3	M4
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
1979-1983	0.002 [0.003]	0.002 [0.003]	0.001 [0.003]	0.001 [0.003]	0.012*** [0.003]	0.013*** [0.003]	0.014*** [0.004]	0.014*** [0.004]
1984-1988	0.002 [0.003]	0.004 [0.003]	0.000 [0.003]	0.001 [0.003]	0.017*** [0.003]	0.019*** [0.003]	0.016*** [0.003]	0.017*** [0.003]
1989-1993	0.006** [0.003]	0.008*** [0.003]	0.005 [0.004]	0.006* [0.004]	0.023*** [0.003]	0.025*** [0.003]	0.021*** [0.004]	0.022*** [0.004]
1994-1997	0.018*** [0.003]	0.022*** [0.003]	0.018*** [0.004]	0.019*** [0.004]	0.038*** [0.003]	0.041*** [0.003]	0.036*** [0.004]	0.037*** [0.004]
1998-2001	0.027*** [0.003]	0.030*** [0.003]	0.026*** [0.004]	0.029*** [0.004]	0.050*** [0.003]	0.054*** [0.003]	0.051*** [0.004]	0.053*** [0.004]
Upper secondary		-0.018*** [0.002]		-0.016*** [0.002]		-0.019*** [0.002]		-0.017*** [0.003]
Tertiary		-0.025*** [0.003]		-0.024*** [0.004]		-0.025*** [0.003]		-0.023*** [0.004]
High parental education			-0.006*** [0.002]	-0.002 [0.002]			-0.006*** [0.002]	-0.002 [0.002]
<i>R</i> <sup>2</sup>	<i>0.18</i>	<i>0.20</i>	<i>0.18</i>	<i>0.20</i>	<i>0.10</i>	<i>0.11</i>	<i>0.10</i>	<i>0.10</i>
<i>N.</i>	<i>8,398</i>	<i>8,398</i>	<i>7,946</i>	<i>7,946</i>	<i>7,143</i>	<i>7,143</i>	<i>6,860</i>	<i>6,860</i>

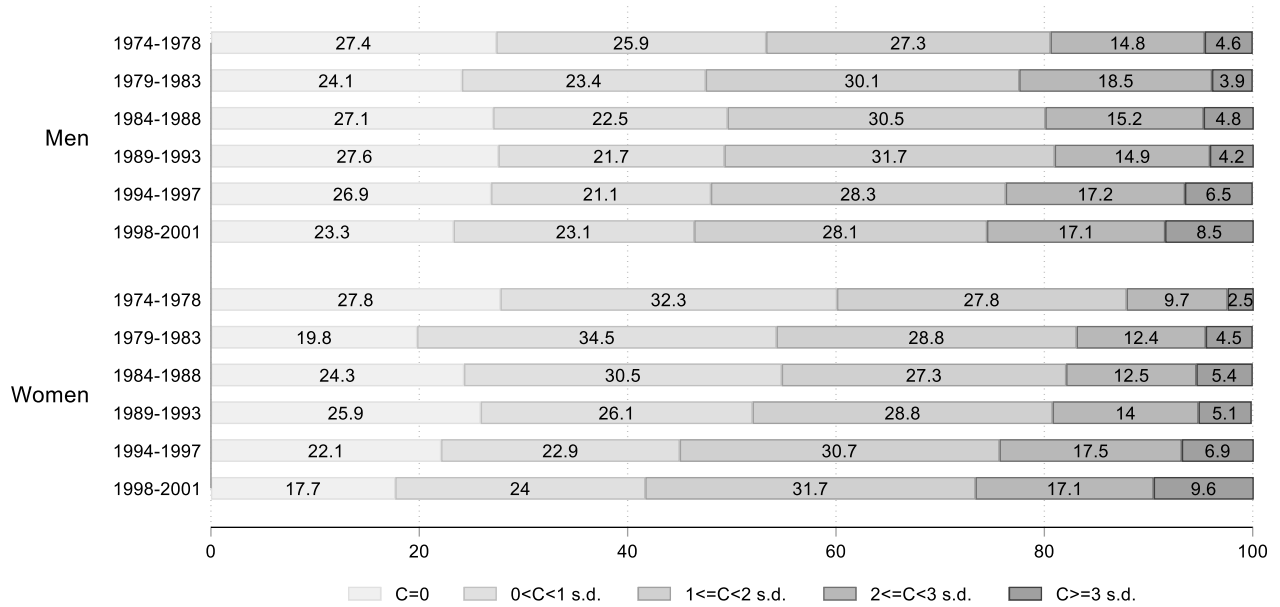
Notes: <sup>a</sup> Control variables included in all models: dummies for age category at the beginning of the first working episode, dummies for geographical macro areas of work, and a dummy for late entry into the labour market. 1974-1978 is the reference category for entry cohort; at most lower secondary is the reference category for own education and parental education. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Source: elaborations on AD-SILC dataset.

Fig.1: Complexity across cohorts by gender (average)



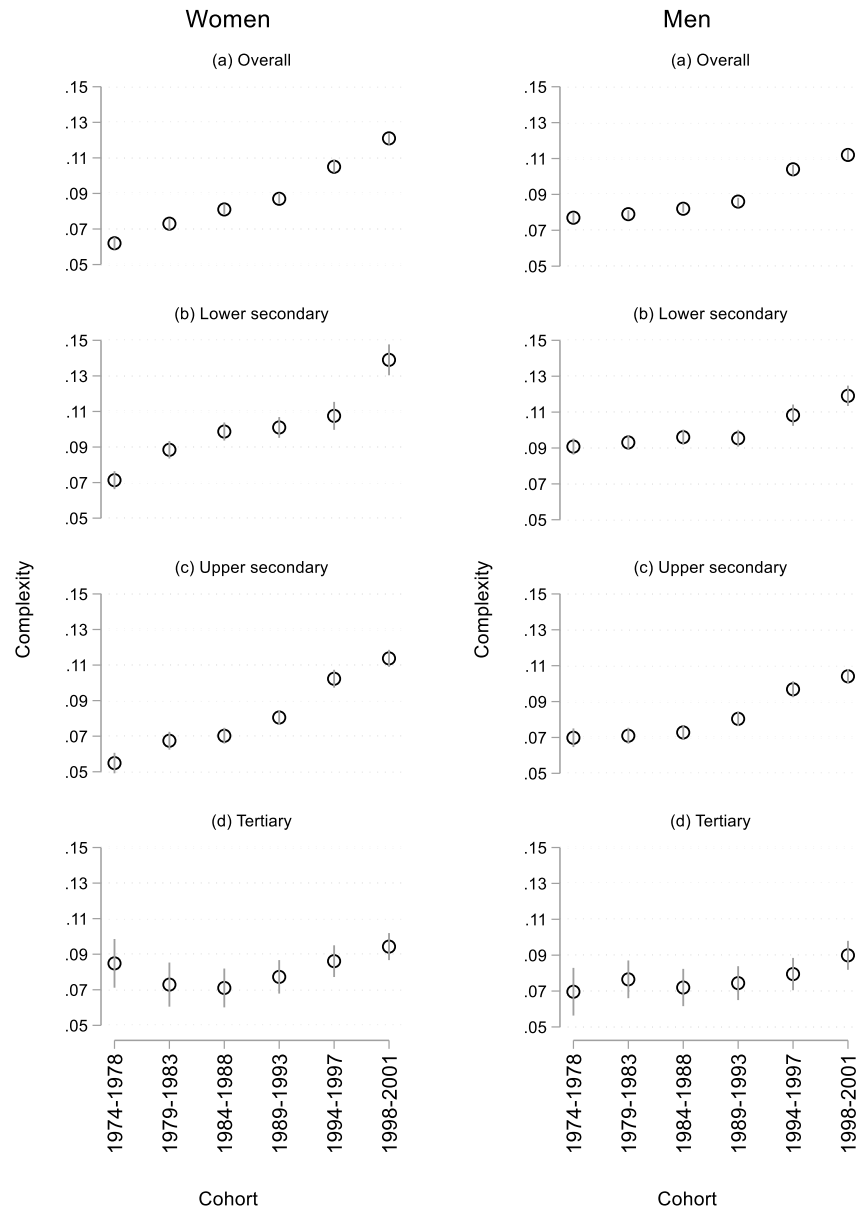
Source: elaborations on AD-SILC dataset.

Fig. 2: Distribution of early-career complexity index across cohorts by gender.



Notes: C=complexity; s.d.=standard deviation. Distributions are calculated relative to the overall sample. Source: elaborations on AD-SILC dataset.

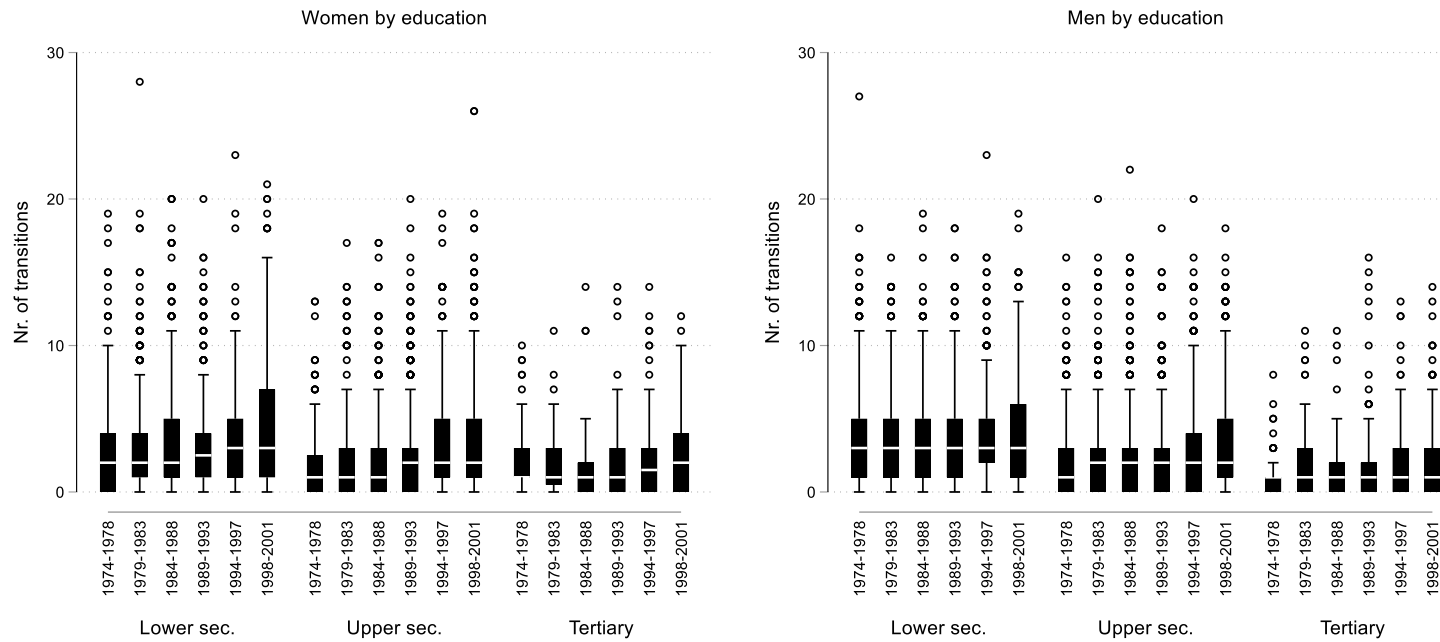
Fig. 3: Predicted values of the complexity index for early career trajectories by gender, cohort of entry, and education, OLS regression models.



Notes: Estimates from models M2 in Table 3. 90% confidence intervals. Source: elaborations on AD-SILC dataset.



Fig. 4: Number of transitions between labour market states by gender, education, and cohort of entry.



Source: elaborations on AD-SILC dataset.

## Appendix A: Tables and figures

Tab. A1: Sample distribution by gender, cohort, and educational attainment

	Men				Women			
	Education			N.	Education			N.
	At most lower sec.	Upper sec.	Tertiary		At most lower sec.	Upper sec.	Tertiary	
1974-1978	54.8	39.1	6.1	1,155	54.7	38.4	6.9	1,024
1979-1983	54.4	38.6	7.1	1,616	50.2	42.7	7.1	1,248
1984-1988	44.6	48.2	7.2	1,655	40.9	50.6	8.5	1,348
1989-1993	39.2	50.9	9.9	1,469	29.8	58.2	12.1	1,336
1994-1997	30.5	55.5	14.0	1,148	23.9	57.3	18.8	945
1998-2001	28.3	56.5	15.1	1,355	19.2	60.6	20.2	1,246
Total	42.4	47.9	9.7	8,398	36.4	51.5	12.1	7,147

Source: elaborations on AD-SILC dataset.

## Appendix B: The AD-SILC dataset

The AD-SILC dataset was created in the framework of a collaboration between the Ministry of Economy and Finance and the Fondazione Giacomo Brodolini (see [http://www.dt.tesoro.it/it/attivita\\_istituzionali/analisi\\_programmazione\\_economico\\_finanziaria/modelli\\_stica/t\\_dyymm.html](http://www.dt.tesoro.it/it/attivita_istituzionali/analisi_programmazione_economico_finanziaria/modelli_stica/t_dyymm.html)). The link between the IT-SILC and the administrative data from INPS-Italian National Institute of Social Security registers was performed by INPS in accordance with ISTAT (which manages the Italian component of the EU-SILC) using fiscal codes as the matching key. They were subsequently delivered in a way which protected anonymity. Eurostat policies for privacy were therefore respected. All individuals older than 15 who were interviewed in IT-SILC 2005 were matched with the administrative archives if they had an employment spell registered by social security records (i.e. non-matched individuals are those who have neither worked nor ever received a social security benefit in their lives). All working episodes are tracked by social security records apart from the few types of contractual arrangements that are free from paying social contributions (e.g. internships and, of course, informal jobs).

Since it is based on the IT-SILC 2005 sample, the AD-SILC panel relies on a sample representative of the Italian population in 2005 and is therefore also representative of the entry cohorts. However, this representativeness is weaker for certain groups of mobile workers (mostly migrants) in particular years. For instance, foreigners who were working in Italy in 1980 but who moved abroad in 1990 were not interviewed in IT-SILC 2005. Therefore, workers without Italian citizenship are not considered in the analyses.

AD-SILC has several advantages over other longitudinal datasets available for Italy. First, compared to a survey panel, it covers a much longer time span (the entire period from the entry into the labour market up to 2009, while survey panels follow individuals for at most few years, e.g. four years

in the EU-SILC). Second, it contains information from all available INPS archives, which means that it was possible to distinguish between all employment types, including self-employment and dependent self-employment. Third, INPS archives are attrition free (i.e. individuals exit the panel because of retirement, involuntary unemployment, or inactivity, but not because they drop out from a survey). Fourth, AD-SILC records workers' educational attainment as well as that of their parents. These variables are of crucial importance for our research questions and are absent from other Italian administrative datasets (e.g. WHIP - Work Histories Italian Panel). Finally, since they are based on an administrative source, AD-SILC data are not affected by measurement errors regarding the type of contractual arrangement or by memory bias. This is particularly important when studying employment trajectories because short episodes might not be reported or might be located on a timeline several years after they occurred (Manzoni et al., 2010).

We need to highlight two limitations. First, in AD-SILC it is not possible to distinguish between inactivity and involuntary unemployment. Second, AD-SILC does not include a precise number of months spent searching for a job at the end of education. Indeed, the information on the year in which the highest educational level was attained is a poor proxy for the job search time because: i) it is measured in years rather than in months; ii) it is unclear whether a lag between the year of highest educational attainment and the entry into the labour market was due to time spent searching for a job or to periods in education without attaining a qualification (in Italy, there is a very high drop-out rate for both upper secondary and tertiary students, e.g. around 15% in 2011; [Borgna and Struffolino, 2017]); iii) many individuals – especially those in the oldest cohort – attained the highest educational qualification while working (around 20% of tertiary graduates in our dataset). However, in the multivariate OLS regressions, we also controlled for a dummy variable identifying late entrants into the labour market (i.e. those who started to work at least one year after the attainment of their highest qualification).