Questioni di Economia e Finanza

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by Alfonso Rosolia and Roberto Torrini

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THE GENERATION GAP:
A COHORT ANALYSIS OF EARNINGS LEVELS, DISPERSION AND
INITIAL LABOR MARKET CONDITIONS IN ITALY, 1974-2014

by Alfonso Rosolia* and Roberto Torrini*

Abstract

We discuss entry wages, career patterns and inequality developments of successive cohorts who have entered the Italian labour market between 1974 and 2014. We find that entry wages started to decline around the mid-1990s; the drop continued at least until the onset of the global financial crisis, seemingly slowing down thereafter. This pattern cannot be explained by changes in observable job characteristics. Falling entry wages have not been accompanied by faster subsequent career paths; rather, subsequent career paths have increasingly featured rising earnings dispersion due to both increased workers heterogeneity and greater temporary earnings instability. We relate such developments to the changes in labour market institutions that took place between the early 1990s and the mid-2000s.

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1 Introduction

Over the decade prior to the 2008-09 global financial crisis the employment opportunities of Italian youths improved considerably. Figure (1) displays the employment rate of young males no longer in education with a high-school or college degree 2-3 years after completion. Since 1995, along with the introduction of more flexible working arrangements and the recovery after the lira devaluation, their employment rate increased sizeably; at the onset of the Great recession it was 70 percent for high-school graduates and almost 80 percent for college graduates, more than twice the levels in the mid 90s (Giorgi, Rosolia, Torrini and Trivellato (2011)). This happened despite a marked slowdown of the Italian economy since 2000. Not surprisingly, since the eruption of the global financial crisis the persistent weakening of overall labour demand and the major slowdown in hirings have mostly fallen on new entrants thus eroding most of the prior improvements (Rosolia (2014)).

The steady improvement, until 2008-09, of youth occupational opportunities at the beginning of their careers had shifted the attention on the quality of such opportunities in terms of earnings and job stability and of career development. Several studies have concluded that the sequence of partial labor market reforms implemented after the 1992-93 recession to modernize the economic environment, while supporting the creation of new employment opportunities, also contributed to generate a dual labor market along the age dimension, opening a gap between the earnings of old incumbent workers and those of new labor market entrants, more exposed to the new working arrangements.

The attention to the evolution of youth conditions in the labor market has primarily focussed on the consequences of entering the labor market during a recession (for example, Oreopoulos,

Heisz and von Wachter (2012)). However, recently a concern has emerged that youth may be suffering from a more structural deterioration of their opportunities in the labor market, above and beyond the cyclical stance at entry (OECD (2010)). For example, Beaudry, Green and Sand (2014) show that US college graduates entry wages have fallen since the early 2000s because they are more likely to be matched to non-cognitive lower paying jobs than their comparable predecessors.

This paper compares the evolution of a number of labor market outcomes of subsequent cohorts of entrants exploiting administrative records for a sample of private sector non agricultural employees covering 40 years (1974-2014). In a previous paper (Rosolia and Torrini 2007) we documented the evolution of entry wages of subsequent cohorts of entrants over the 3 decades between 1974 and 2004. This is the starting point of the present paper: we expand the analysis to 2014 using a different identification strategy and confirm our previous findings documenting how the declining pattern we unveiled in the previous paper has steadily continued. We then offer a more systematic study of the evolution and nature of earnings dispersion over the lifecycle of subsequent cohorts, analysing the role played by unobserved heterogeneity and (permanent and transitory) earnings instability. While most of the anglo-saxon literature has traced developments in youth labor market performance and opportunities to the technological development and the routinization of middle skill tasks, we conclude that in Italy institutional developments and their interplay with structural weaknesses of the economy are what matters, given the substantial absence of these technological trends.

2 Data

We exploit two longitudinal random samples drawn from administrative records mantained by the Italian Social security administration (Inps) and covering the universe of Italian private non agricultural employees. The samples collect all information available on records concerning individuals born in specific dates of the year. Both samples have an individual identifier which may be inconsistent across versions so that the two overlapping samples cannot be linked. Along with basic demographics, the data provide information on yearly earnings and weeks worked at the employer level and some information on the employer. Earnings measures are deflated with the consumer price index (2010=1).

The first sample spans the 30 years between 1974 and 2004 and is drawn by selecting 2 birthdates (March and October 1st) for a total of about 80.000 observations per year; the second sample spans the period 1985-2014 and is based on 4 birthdates (March and October 1st and June and December 9th). We only focus on males because female labor market participation and employment have undergone profound structural changes over the past decades, reflecting a number of factors of which rising education is perhaps the most relevant (Giorgi et al. (2011)). However, female entry wages and career paths recorded substantially similar developments as the ones unveiled in this paper and in our previous work.

For our purposes, the data has two major limitations. First, we do not observe the actual entry age. We thus infer it from the observed employment history and define a new entrant in the labor market as someone who has no observed prior employment relationships. Because both datasets are left-truncated and no information prior to the first year is available, we start our analysis of entrants from the third year of each sample so that a new entrant in 1976 is

someone who has not been employed in the two previous years, in 1977 in the 3 previous years and so on (similarly, for the newer dataset we start from 1987).

Second, the data lack information on educational attainment. Education is a major determinant of earnings levels and wage profiles; the major changes in educational achievements recorded over the past 40 years, if unaccounted for, would thus boost average earnings of younger cohorts. We deal with this shortcoming by studying separately 4 groups of entrants defined by their (observed) entry ages (19-21, 22-24,25-27, 28-30) so as to approximately account for different education achievements. Evidence based on the Bank of Italy's Survey of household income and wealth suggests that 50 to 60 percent of males' labor market entries occur between the ages of 19 and 30, with larger shares among younger cohorts; only a negligible fraction of entrys occurs after age 30. Reassuringly, Naticchioni, Raitano and Vittori (2016) find qualitatively similar results to our earlier and current analysis by adding to the analysis information on education obtained by merging a cross-section of survey data (the 2005 Survey of income and living conditions) with longitudinal administrative information on labor incomes over the period 1980-2009.

3 Preliminary evidence on entry wage developments and subsequent careers

Figure (2) summarizes the main evidence of the paper. It displays the wage progression since entry of subsequent cohorts with different (proxied) education levels. Two main features clearly stand out. First, weekly entry wages began to drop in the first half of the 90s and the downward trend has rather steadily continued at least until the burst of the global financial crisis. Second,

subsequent wage careers do not appear to have compensated the decline in entry wages thus leading to a long-lasting, if not permanent, loss in life-earnings. Interestingly, Oreopoulos et al. (2012) unveil a similar timing and pattern of entry annual earnings among male college graduates in Canada: annual earnings appear to have increased until the late 80s and then have fallen by roughly 30 percent in the first half of the 90s and remained stable thereafter; however, they find evidence that this drop is associated to somewhat faster wage progressions in subsequet years. Beaudry and Green (2000) and Beaudry et al. (2014) in a different empirical setting also find similar evidence.

Figure (3) plots only average weekly wages at entry along with average weekly wage per full-time equivalent measured by the National accounts[1]. While average compensations have broadly stagnated throughout the 90s, entry wages have actually fallen: between the early 90s and 2014 the drop has been, in all four groups around or above 15 percent. These developments have generated a generation gap in earnings. This gap in entry wage rates is further amplified by other developments. First, falling entry wage rates have gone along with increasingly fragmented work experiences of youths. Figure (4) plots the average number of weeks worked in the first full calendar year after entry and shows that they have fallen roughly by one third since the early 90s (Rosolia (2010)). Second, falling entry wages have coincided with a reversion of the declining trend in entry wage dispersion. Figure (5) displays the standard deviation of (log) real weekly earnings and shows it has increased one fourth to one fifth since the early 90s. Third, falling entry wages have not been followed by faster (or even equal) subsequent wage growth. Figure (6) displays the average wage growth experienced 5 years from entry; even amidst the high cyclicality of initial wage growth, with stronger dynamics for those entering at

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[1]National accounts report annual compensations per full-time equivalent; we convert such figures into weekly rates by dividing by 52.

times of expansion, the slowdown experienced by labor market entrants since the 90s is quite evident, especially among the younger ones.

4   A cohort-level econometric investigation

The comparison of outcomes of subsequent cohorts at the same point of the lifecycle necessarily implies comparing outcomes at different points in time and thus in different cyclical conditions. A more appropriate analyisis of developments in entry wages and their consequences on lifetime earnings should account for these potentially confounding factors.

In this section, we look at the preliminary evidence discussed above through the lenses of an empirical model. Specifically, we postulate that (log) real weekly earnings of employee i at time t born in b and of age a can be written as:

$$w^i_{b,a,t} = \mu_b + \mu_a + \mu_t + \epsilon^i_{b,a,t}$$

where $\epsilon^i_{b,a,t}$ is an i.i.d. error. Earnings are assumed to reflect a cohort effect (μ_b), an age profile (μ_a) common to all cohorts and a time effect (μ_t) also common to all cohorts. The model can be estimated projecting individual weekly earnings of subsequent cohorts of entrants on a set of cohort, year and age dummies. Since age, time and cohort dummies are perfectly collinear ($t = a + b$) we follow what is customary in the literature (e.g. Deaton and Paxson (1994), Attanansio (1998)) and impose, as identification assumptions, that time effects (i) sum up to zero, and (ii) are orthogonal to a linear trend.

These assumptions amount to assigning all observed wage growth to the changing demografic structure, which over time modifies the relative weights of the common age profile, and to the change in the permanent component of each subsequent cohort's average earnings, captured

by the cohort dummies. Time effects capture only zero-mean cyclical effects, assumed to affect all groups equally.

Cohort effects thus measure the permanent difference across cohorts once a common age profile is accounted for. Under the identification assumption, any difference in the age profile would appear into the estimated cohort effect. Therefore, if the decline in entry wages observed in the previous section was actually accompanied by a faster wage growth the resulting cohort effect would signal a weaker deterioration (or none at all). By the same token, if the slow down of entry wages described above was the result of a temporary deterioration in economic activity that also affected older workers or previous cohorts of entrants, the estimated cohort effect would not signal any relative deterioration.

We estimate the model both for weekly wage rates and for average annual earnings, the difference lying in the developments of career fragmentation across cohorts. The gap between the two cohort effect yields a measure of the employment gap, that is (permanent) differences across cohorts due to changes in the patterns of attachment to the labor market.

Figures (7) and (8) diplays the two cohort effects. The model is estimated separately for the 4 entry age groups. The dependent variable is the (log) average weekly wage or annual earnings in the year-cohort cell. In each group the reference category is a worker aged 40 and born in 1970. The permanent component of the wage rate had dropped remarkably, 10 to 20 percent, for cohorts who entered the labor market just prior to the global financial crisis in comparison to those beginning their careers in the late 80s. Factoring in the growing fragmentation of careers, the gap becomes even larger. Figure (8) shows the permanent component of annual earnings, thus a combination of average weekly wage rate and time spent in employment. By this metric, the gap between recent and earlier comparable cohorts of entrants more than doubles, reflecting

the deep fall in average weeks spent in employment. Interestingly, the generation gap turns to be wider for older, presumably more educated, entrants suggesting a drop in returns to education. This result confirms our previous findings described in Rosolia and Torrini (2007), in which we used a different identification strategy for cohort effects.

Overall, the drop in our estimated measure of permanent earnings potential has coincided with the increase in employment rates of youths at exit from school discussed above. The decline may reflect a number of factors, of which the changing composition of available jobs is one. It is often claimed that labor market reforms have relaxed constraints on more labour intensive and less productive sectors thus leading to their development, a classical example being the expansion of the service sector, especially in its low skilled segment. In addition, the new legislation has made new entrants into the the labour market gradually more likely to be hired on temporary contracts, typically associated to lower wage rates. To quantify the role of such developments we replicate the above analysis including controls for firm and job characteristics in the empirical model. While the above exercise was performed on year-cohort cell averages because, beyond birth year and age, there were no individual specific characteristics to be accounted for, now we estimate cohort effects on worker-level data augmenting the above empirical model with controls for job (qualification, open-end vs temporary contract, full-time vs part-time contract) and firm (size, sector, location) characteristics. Unfortunately, this specific analysis can be conducted only for the subperiod 1990-2014 due to data limitations. Figure (9) compares the cohort dummies estimated in models for the (log) weekly real wage rate with and without controls for job and firm characteristics; the reference category is again a worker born in 1970 at age 40. The results suggest that the changing composition of working arrangements has small to nil effects on the fall in the permanent component of weekly entry

wages; for younger groups there are nearly no differences, while for olders groups such specific characteristics appear to account for only a minor portion of the drop of the cohort-specific component of weekly wages. The result implies that the increasing incidence of flexible work arrangements among new entrants and the sectoral recomposition of jobs has had no direct impact on the wage differential between younger and older cohorts. However, this does not imply that the expansion of flexible contracts is irrelevant for the drop in entry wages across cohorts: the introduction and diffusion of flexible contractual arrangements may have put competitive pressures on the newly hired on open-end contracts thus compressing their entry wage relative to those of open-end workers in previous cohorts.

5   A look into the nature of earnings dispersion

As shown above, the decline in entry wages has roughly coincided with a pick up in earnings dispersion at entry. This pattern may reflect various developments. First, the progressive deregulation of the labour market may have increased (transitory or permanent) earnings instability; second, by bringing into the labour market a larger fraction of youths, the higher dispersion may reflect the higher heterogeneity of entrants; third, new labor market rules may have helped create jobs in less productive sectors so that increased earnings dispersion may reflect job quality dispersion[2]. While it is not straightforward to disentangle the different components, below we attempt to look at this issue by imposing more structure on the stochastic process of individual wages. Specifically, we assume that for each cohort/entry-age (b, e) individual weekly

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[2]Note, however, that as shown in the previous section job heterogeneity has not significantly contributed to shaping average wage differentials across cohorts.

earnings at age a result from:

$$w_{ia} = \mu_a + \alpha_i + u_{ia} \qquad (1)$$

where μ_a are cohort/entry-age age-specific effects, accounted for by a set of group specific age-dummies, α_i an individual unobserved effect such that $E\alpha_i = 0 \quad \forall(b,e)$ and $u_{ia} = \eta_{ia} + \epsilon_{ia}$ a residual such that $\eta_{ia} = eta_{ia-1} + \nu_{ia}$ represent permanent innovations and ϵ_{ia} temporary shocks to wage rates such that $E(\epsilon_{ia}, \nu_{ie}) = 0 \quad \forall(a,e)$. All variances are assumed to be cohort/entry-age specific.

Figure (10) shows, for each cohort, the cross-sectional variance of the estimated individual fixed effects obtained separately for each cohort/entry-age/sample cell. The evidence supports the view that, since the early 2000s, permanent heterogeneity has gradually increased. This may in turn reflect both the greater heterogeneity of workers' traits and the combination of increased heterogeneity of available jobs and stronger lock-in effects. We thus re-estimate model (1) allowing, once again, for job and firm characteristics so as to obtain alternative estimates of α_i. Such exercise, because of data availability, can be conducted only for the period 1990-2014. Results, also reported in figure (10), show that controlling for job features does not alter the main finding of gradually increasing workers heterogeneity since the early 2000s.

The variances of permanent and transitory shocks $(\sigma_\nu^2, \sigma_\epsilon^2)$ to wage rates can be estimated by noticing that for all ages a:

$$V(\hat{u}_{ia}) = a\sigma_\nu + \sigma_\epsilon \qquad (2)$$

$$V(\Delta \hat{u}_{ia}) = \sigma_\nu + \sigma_\epsilon \qquad (3)$$

$$cov(\hat{u}_{ia}, \hat{u}_{ia-1}) = (a-1)\sigma_\nu \qquad (4)$$

These equations imply an estimate for σ_ϵ through:

$$V(\Delta \hat{u}_{ia}) - V(\hat{u}_{ia}) + cov(\hat{u}_{ia}, \hat{u}_{ia-1}) = \sigma_\epsilon^2 \tag{5}$$

and of σ_ν through:

$$2(V(\hat{u}_{ia}) - cov(\hat{u}_{ia}, \hat{u}_{ia-1})) - V(\Delta \hat{u}_{ia}) = \sigma_\nu^2 \tag{6}$$

The cohort/entry-age specific variances of temporary and permanent shocks are displayed, respectively, in figures (11) and (12). Results suggest that, in addition to the increased worker heterogeneity shown above in figure (10), higher earnings dispersion has also reflected more volatile wage rates as the variance of transitory innovations appears to have started increasing already in the early 90s (fig. 11). On the contrary, the variances of permanent shocks do not show clear trends and appear to have remained rather stable.

6 Conclusions

Since the beginning of the 90s the Italian labor market has undergone major transformations (Brandolini, Casadio, Cipollone, Magnani, Rosolia and Torrini (2007), Sestito (2002)). First, in 1993 the income policy agreements among the social partners introduced a reform of the wage setting system that led to significant wage moderation; also, they definitely abolished the indexation mechanism then in place, the so-called *scala mobile*, thus removing a strong source of wage compression (Manacorda (2004)). Around the same time, some major collective agreements took the initiative to relax limitations to the use of temporary contracts. In 1997 a set of laws, the so-called *Pacchetto Treu*, introduce a number of new and more flexible working arrangements and further expanded the possibility of hiring workers on temporary contracts. In 2003, the so-called *Legge Biagi* weakened further the limitations to using such flexible working

arrangements. All these interventions have greatly enhanced labor flexibility but only at the margin; only in 2012 and, then again in 2014, labor market legislation has begun rebalancing the burden of flexibility across all workers by modifying also employment protection of open-end contracts. Until then, incumbents had been nearly spared the direct consequences of these developments while new entrants have borne the brunt of the innovation. By affecting mostly new entrants, those developments shaped the fortunes of subsequent cohorts of youths who entered the labor market since the '90s. Until the burst of the global financial crisis youths' employment rates have quickly increased, in spite of subdued economic growth. However, their wage rates have fallen relative to those of comparable earlier cohorts of entrants throughout their careers: we decompose wage profiles into cohort, age and (cyclical) time effects and find that cohort effects have declined substantially since the mid-90s for all age groups we investigate; the drop appears to have come to a halt during the years since the burst of the global financial crisis. The size of the relative decline is barely affected by the introduction of controls to account for the varying composition of available jobs over time. Importantly, the drop is not limited to new employees hired on more flexible terms, suggesting it rather reflects the increased competitive pressures among workers ensuing from broader room for flexibility, even if only at the margin, granted to employers by those reforms; increased participation of educated females may have further strengthened these competitive pressures. Those cohorts, along with the relative decline in wage rates, have recorded more fragmented careers: their average number of weeks worked in a year has gradually fallen, thus adding to the worse economic outlook they face. Beyond recording a drop in average wages, cohorts entering since the late 90s have also experienced an increase in wage dispersion. By assuming that, beyond observables, individual earnings reflect also an unobserved fixed effect and permanent and transitory earnings

shocks, we show the increased dispersion is mostly traceable to both the larger heterogeneity of workers' unobserved fixed characteristics, presumably a reflection of more individuals entering the labor market, and of the increased variance of temporary earnings shocks. Again, the increased dispersion is a likely result of the combined effect of higher flexibility in labor usage and of the elimination of the indexation mechanism whose details implied stronger real wage growth at the bottom of the earnings distribution. Also in this case, the trends in dispersion appear to have been somewhat interrupted by the global financial crisis. Overall, the evidence collected is supportive of concerns about a structural deterioration of the employment and earnings opportunities of Italian youths. This is the likely outcome of the combined effects of earlier changes in the institutional arrangements that mainly affected younger cohorts and of a disappointing performance of the Italian economy, whose slowdown before the global financial crisis and contraction thereafter had an asymmetric impact on younger cohorts of entrants and older cohorts of incumbents.

References

Attanansio, Orazio P., "Cohort Analysis of Saving Behavior by U.S. Households," *Journal of Human Resources*, 1998, *33* (3).

Beaudry, Paul and David Green, "Cohort Patterns in Canadian Earnings: Assessing the Role of Skill Premia and Inequality Trends," *Canadian Journal of Economics*, 2000.

— , **David A. Green, and Benjamin M. Sand**, "The Declining Fortunes of the Young since 2000," *American Economic Review*, May 2014, *104* (5).

Brandolini, Andrea, Piero Casadio, Piero Cipollone, Marco Magnani, Alfonso Rosolia, and Roberto Torrini, "Employment Growth in Italy in the 1990s: Institutional Arrangements and Market Forces," in Nicola Acocella and Riccardo Leoni, eds., *Social Pacts, Employment and Growth*, Physica-Verlag, 2007, chapter 3.

Deaton, Angus and Christina Paxson, "Saving, Growth and Ageing in Taiwan," in David Wise, ed., *Studies in the Economics of Ageing*, Chicago, Ill.: The University of Chicago Press, 1994, pp. 331–357.

Giorgi, Federico, Alfonso Rosolia, Roberto Torrini, and Ugo Trivellato, "Mutamenti tra Generazioni delle Condizioni Lavorative Giovanili," in N. Sartor A. Schizzerotto, U. Trivellato, ed., *Generazioni disuguali*, Bologna, Italia: il Mulino, 2011.

Manacorda, Marco, "Can the Scala Mobile Explain the Fall and Rise of Earnings Inequality in Italy? A Semiparametric Analysis," *Journal of Labour Economics*, 2004.

Naticchioni, Paolo, Michele Raitano, and Claudia Vittori, "La Meglio Gioventú: Earnings Gaps across Generations and Skills in Italy," *Economia Politica*, 2016, *33*, 233–264.

OECD, *Off to a Good Start? Jobs for Youth*, OECD Publishing, 2010.

Oreopoulos, Philip, Andrew Heisz, and Till von Wachter, "The Short- and Long-Term Career Effects of Graduating in a Recession: Hysteresis and Heterogeneity in the Market for College Graduates," *American Economic Journal: Applied Economics*, 2012.

Rosolia, Alfonso, "L'evoluzione delle retribuzioni in Italia tra il 1986 e il 2004," *Politica Economica*, 2010, *2*.

— , "The Italian Labor Market after the Great Crisis," in "Gli Effetti della Crisi sul Potenziale Produttivo," Vol. 18, Bank of Italy, Workshops and Conferences, 2014.

— **and Roberto Torrini**, "The Generation Gap: Relative Earnings of Young and Old Workers in Italy," 2007. Bank of Italy, Discussion paper n. 639.

**Sestito, Paolo**, *Il Mercato del Lavoro in Italia*, Bari: Laterza, 2002.

Figure 1: Youth employment rates at entry in the labor market
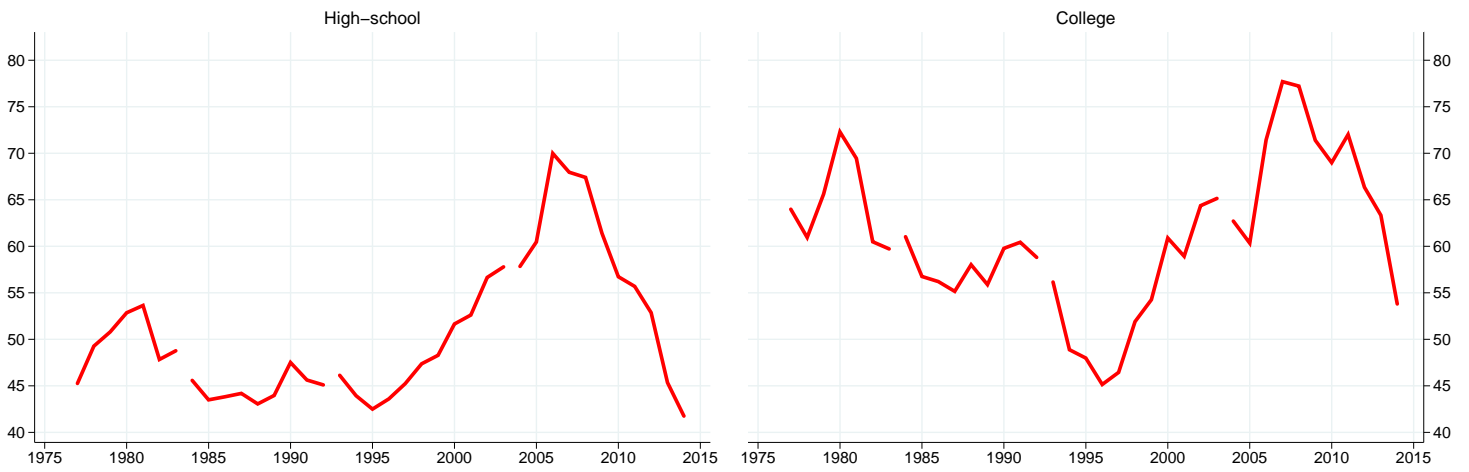
Source: Labor force surveys.
Note: The chart displays the employment rate of young males no longer in education 2-3 years after the completion of the high-school or college degree.
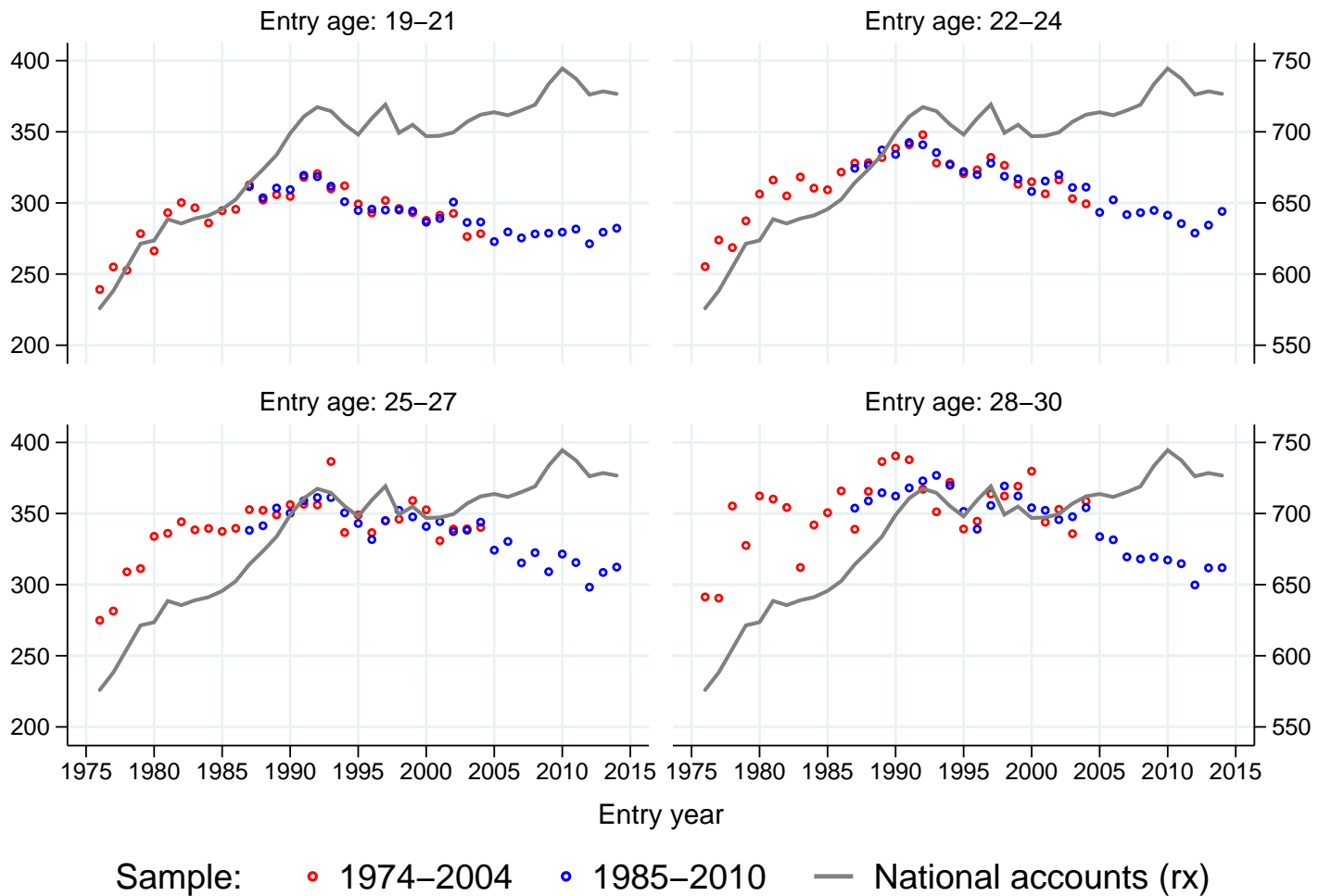
Figure 2: Weekly wage profile of subsequent cohorts

Figure 2: Weekly wage profile of subsequent cohorts
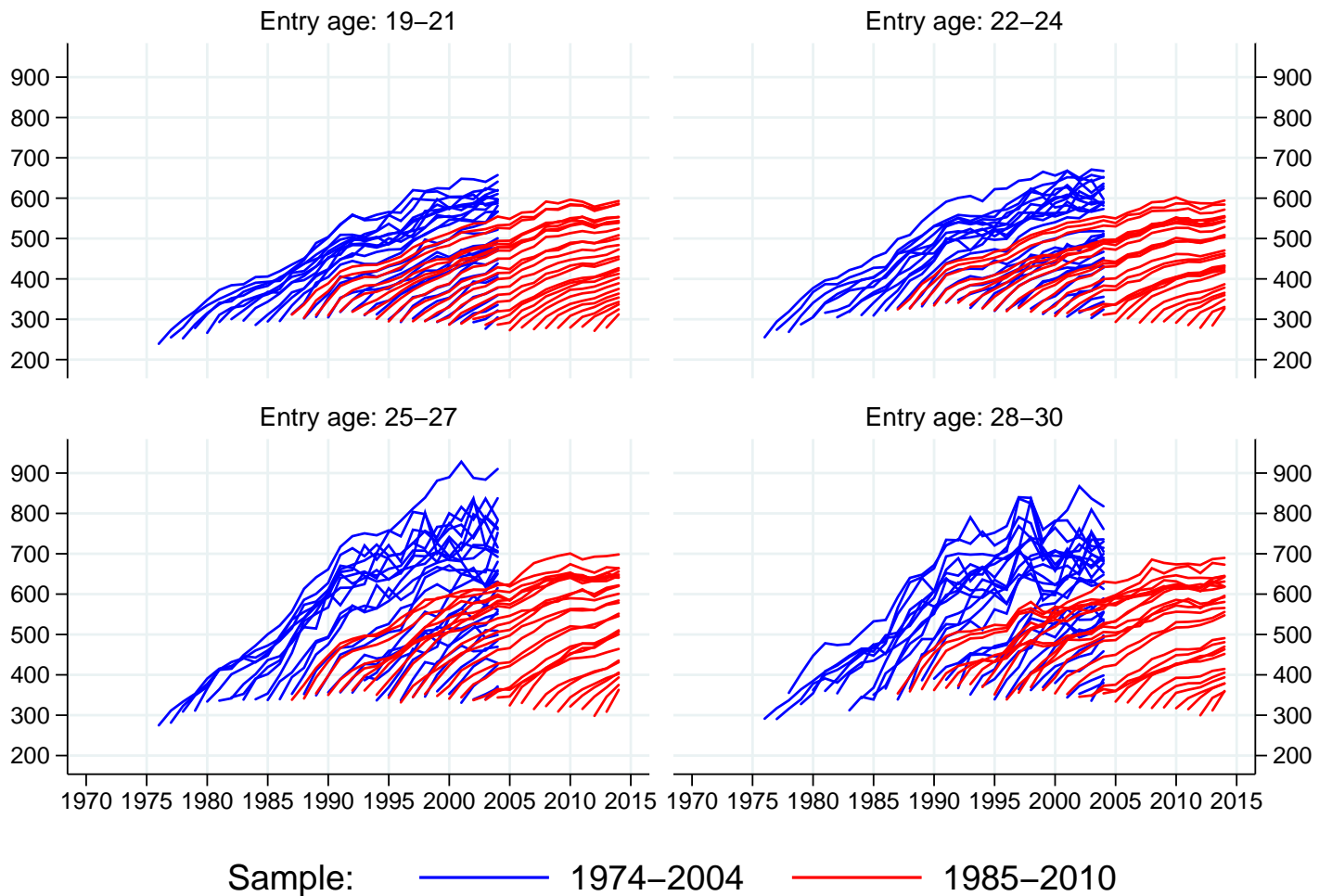
Source: Social security records.
Note: The chart displays the real weekly wage profile of cohorts of males entered in the labor market at specific ages.

Figure 3: Entry weekly wages and average weekly compensations

Figure 4: Weeks worked at entry
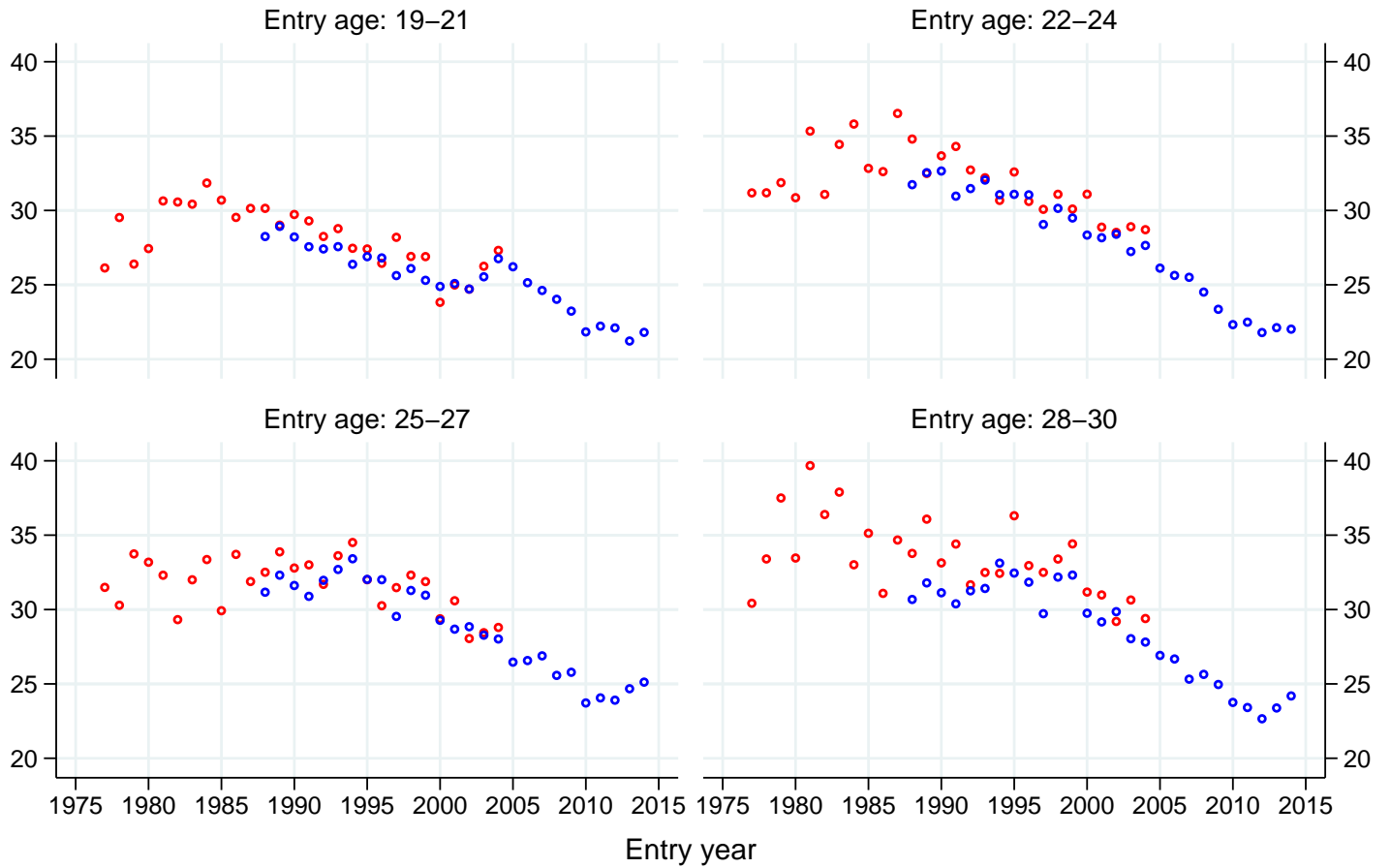
Source: Social security records.
Note: The chart displays the average number of weeks worked in the first full calendar year after
entry for cohorts of males entered in the labor market at specific ages.

Figure 5: Standard deviation of (log) weekly entry wages
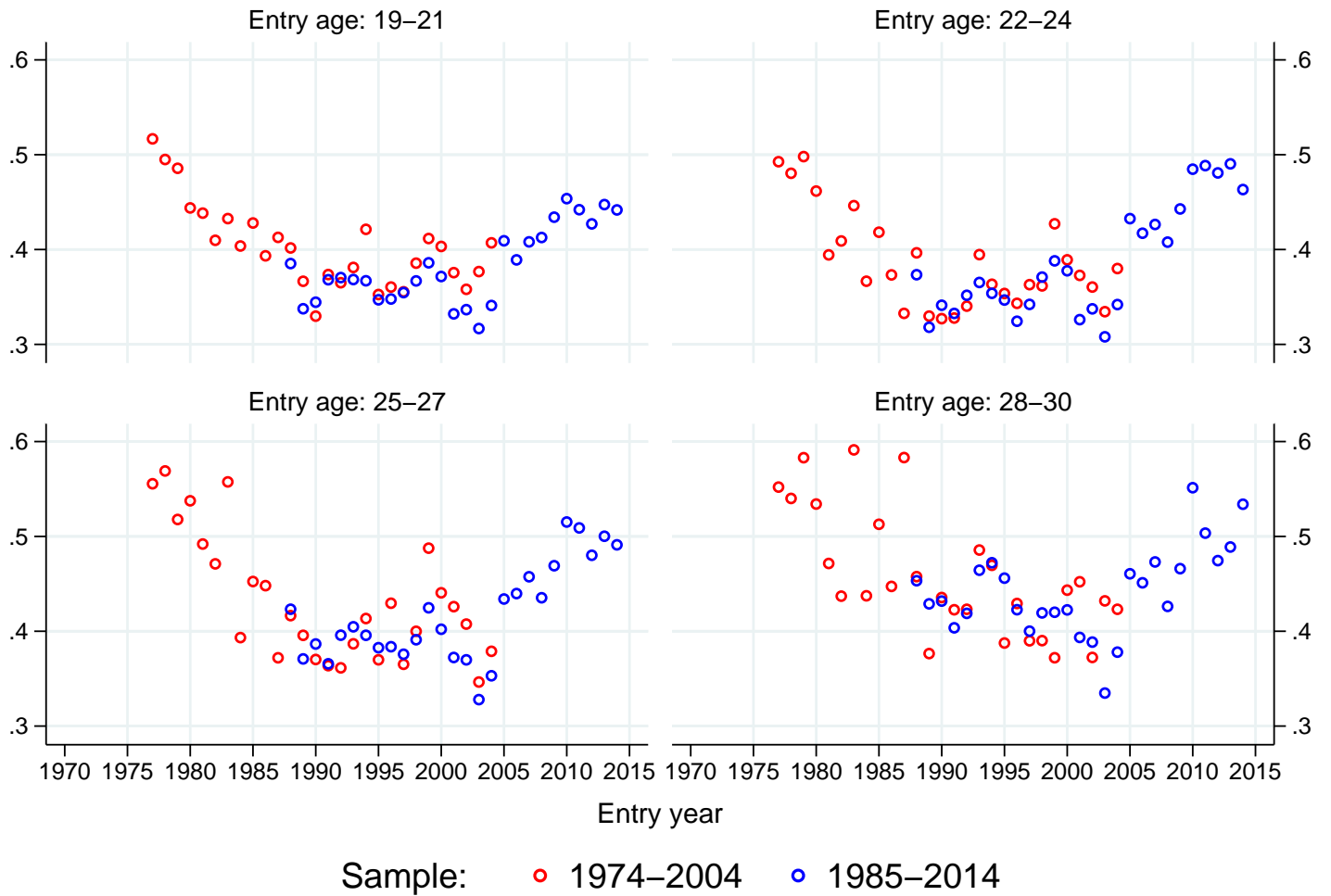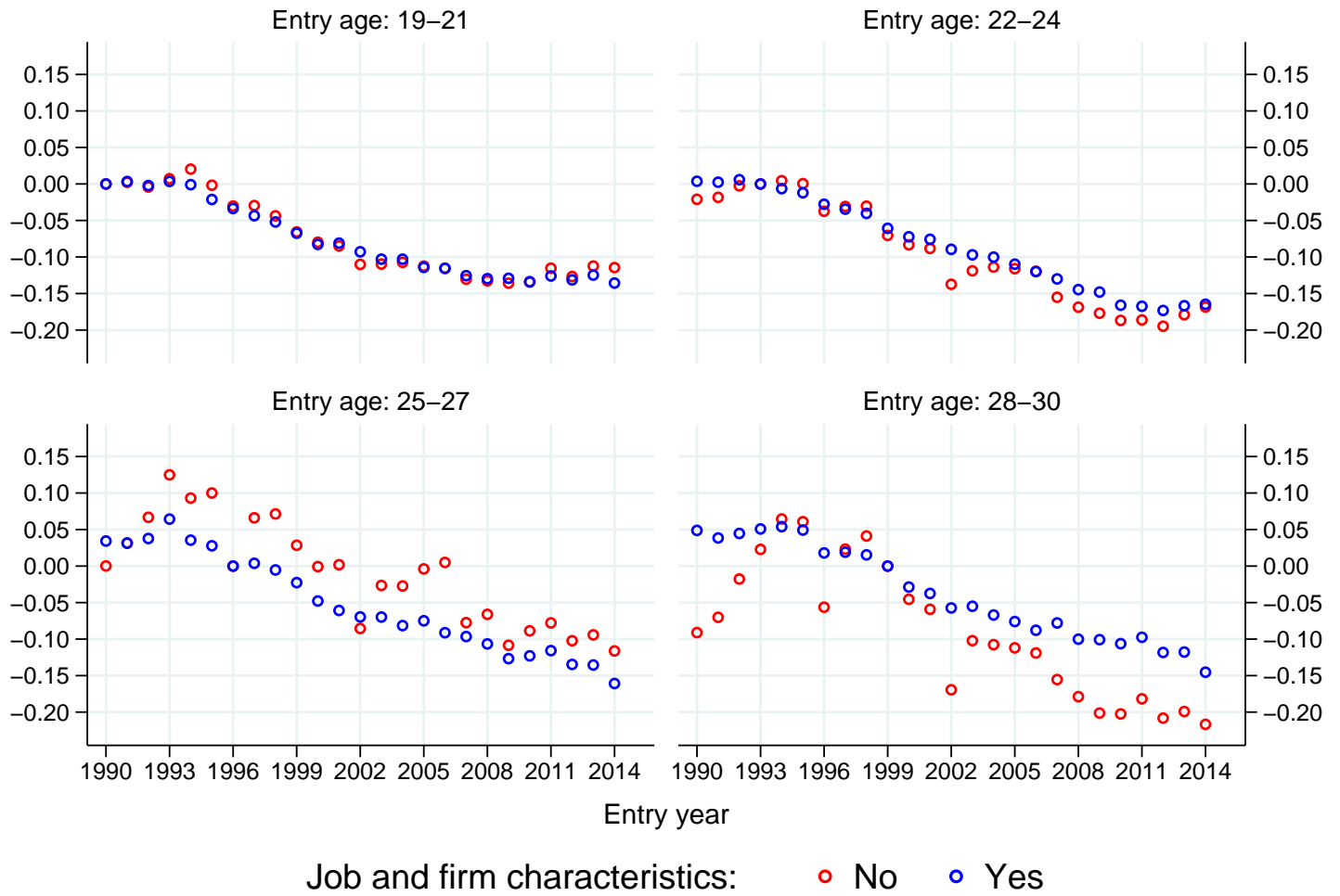

Source: Social security records.
Note: The chart displays the standard deviation of log real weekly wages in the first full calendar
year after entry for cohorts of males entered in the labor market at specific ages.

Figure 6: Average yearly wage growth 5 years from entry

Figure 7: Cohort effects of (log) weekly wage
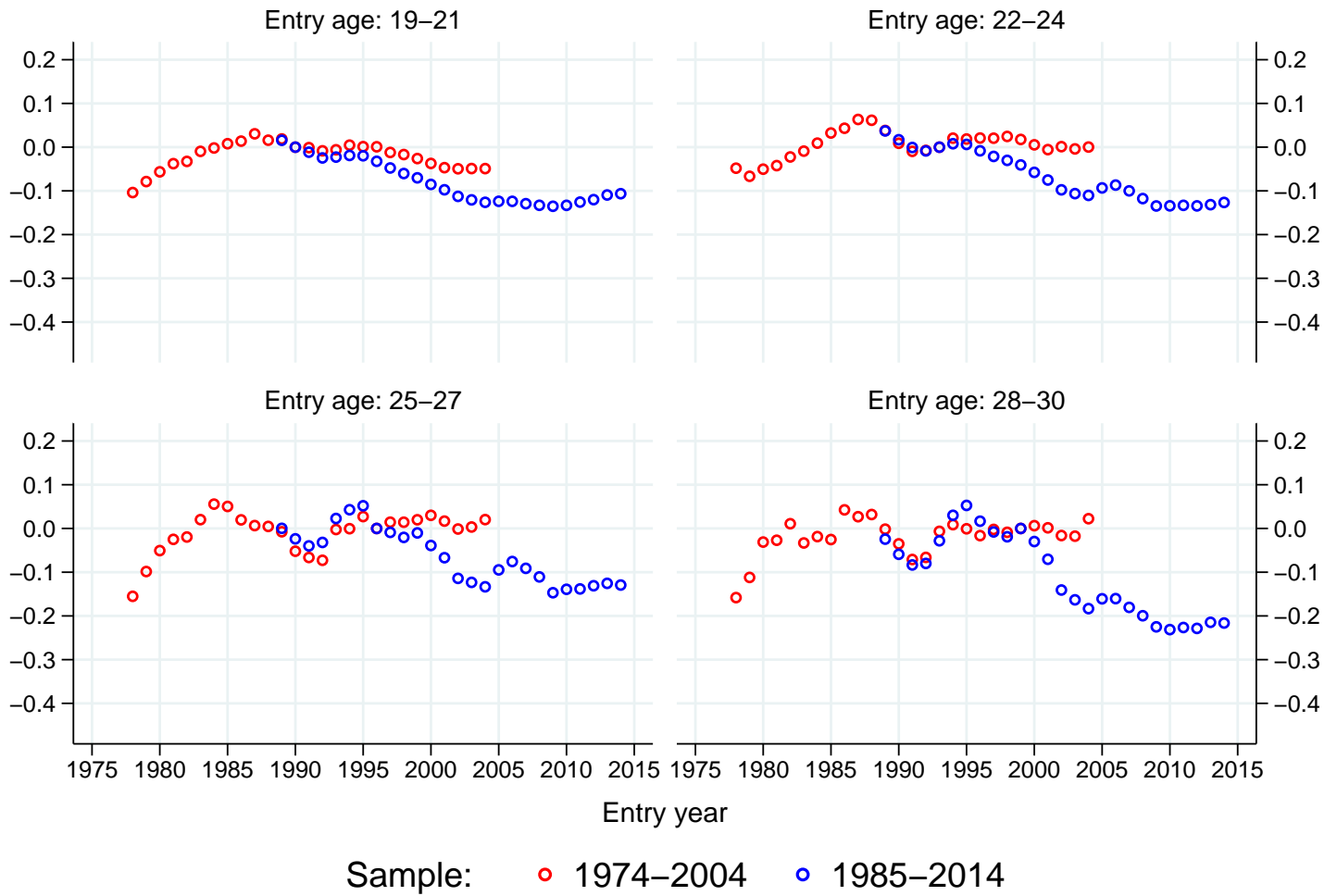
Source: Authors' elaborations on Social security records.
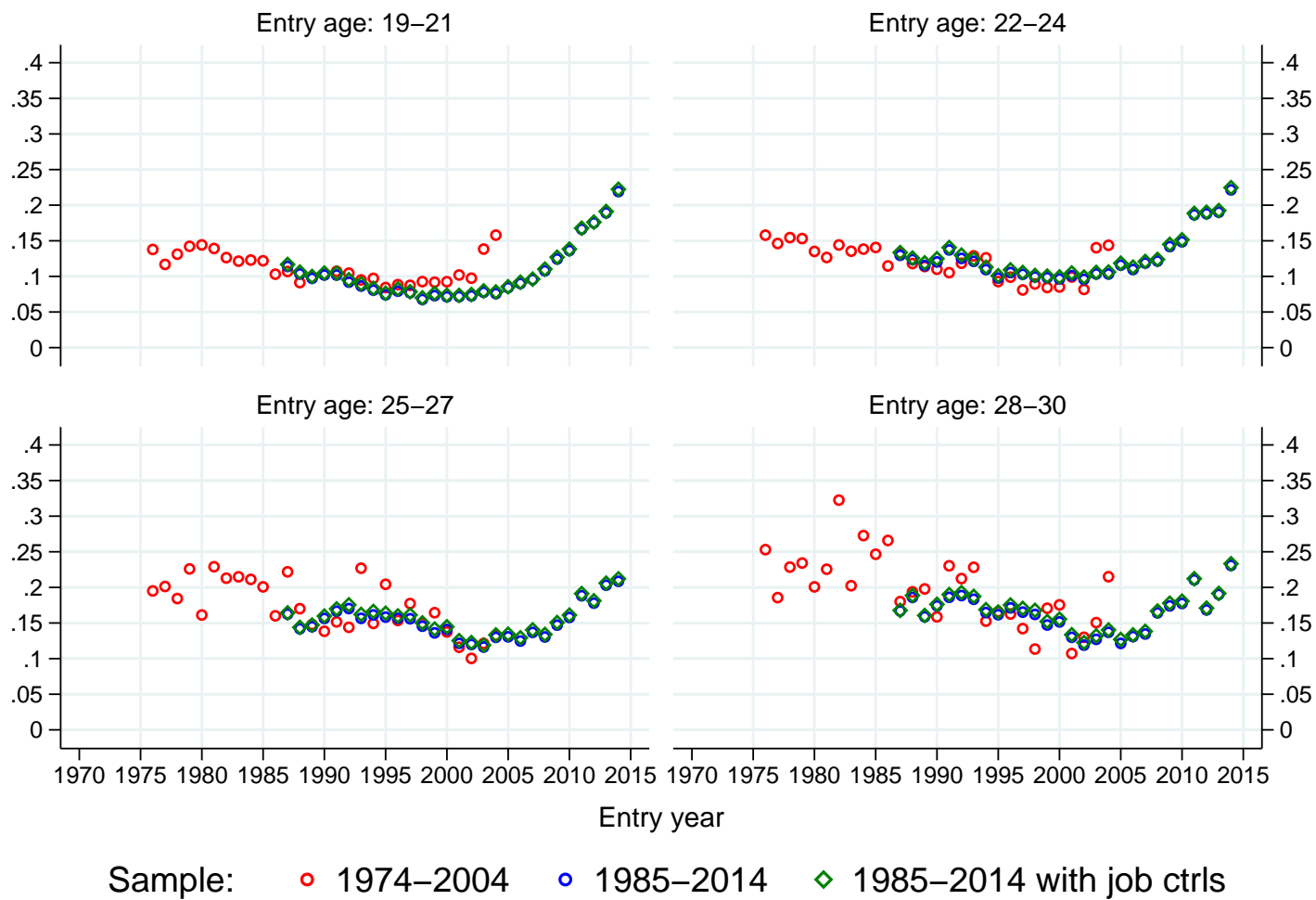
Figure 8: Cohort effects of (log) annual wage
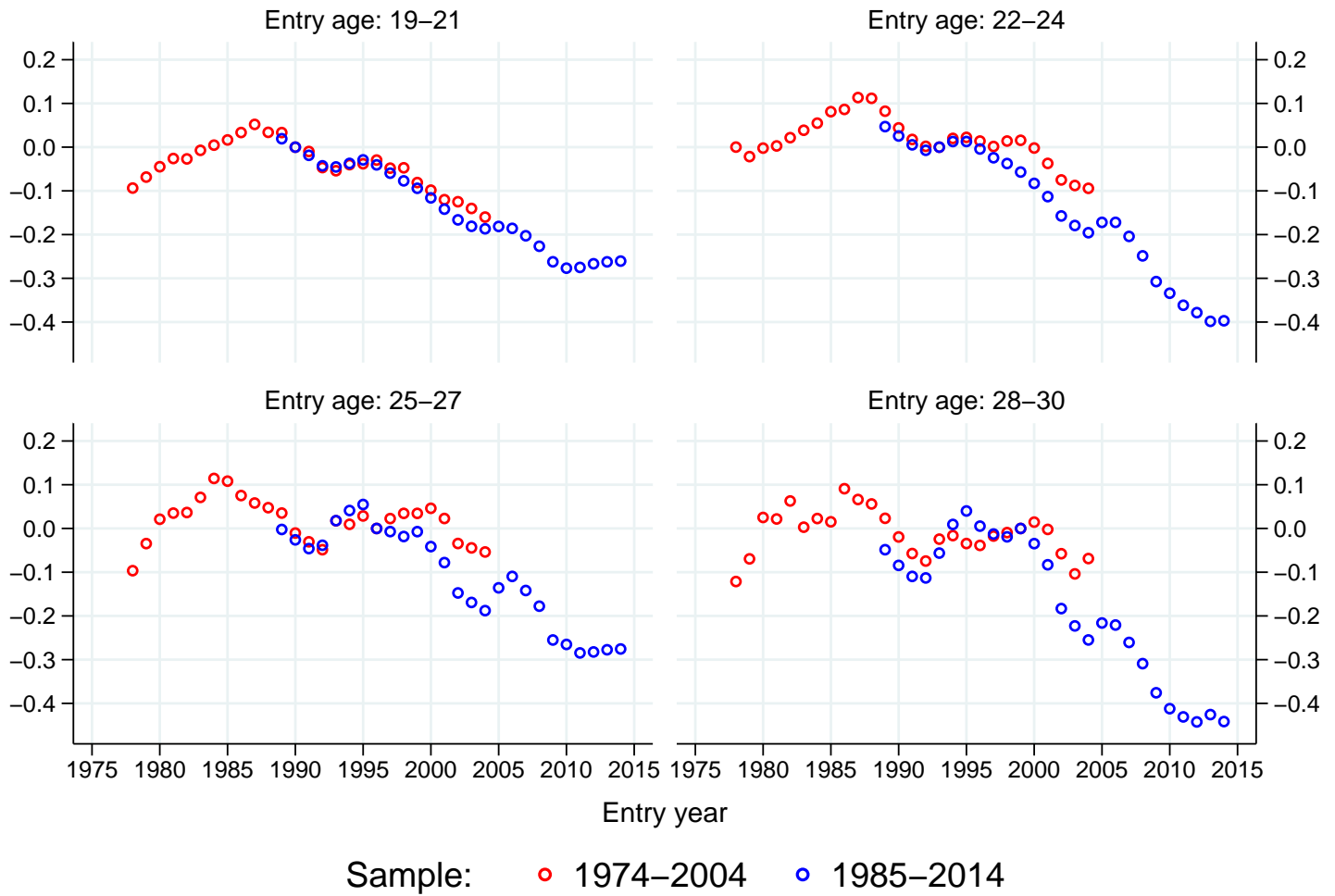
Source: Authors' elaborations on Social security records.

Figure 9: The effects of job characteristics on cohort effects - (log) weekly wage
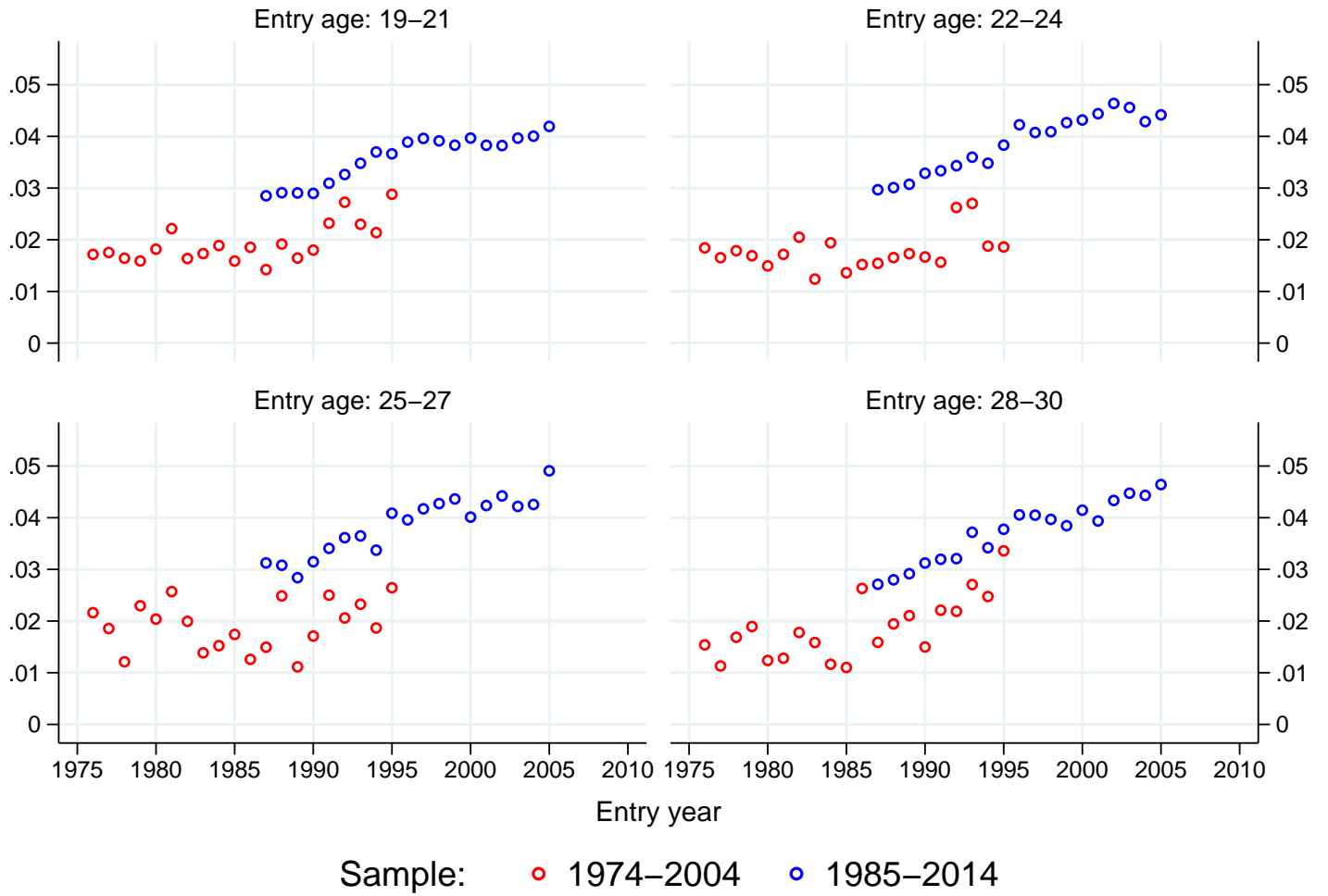
Source: Authors' elaborations on Social security records.

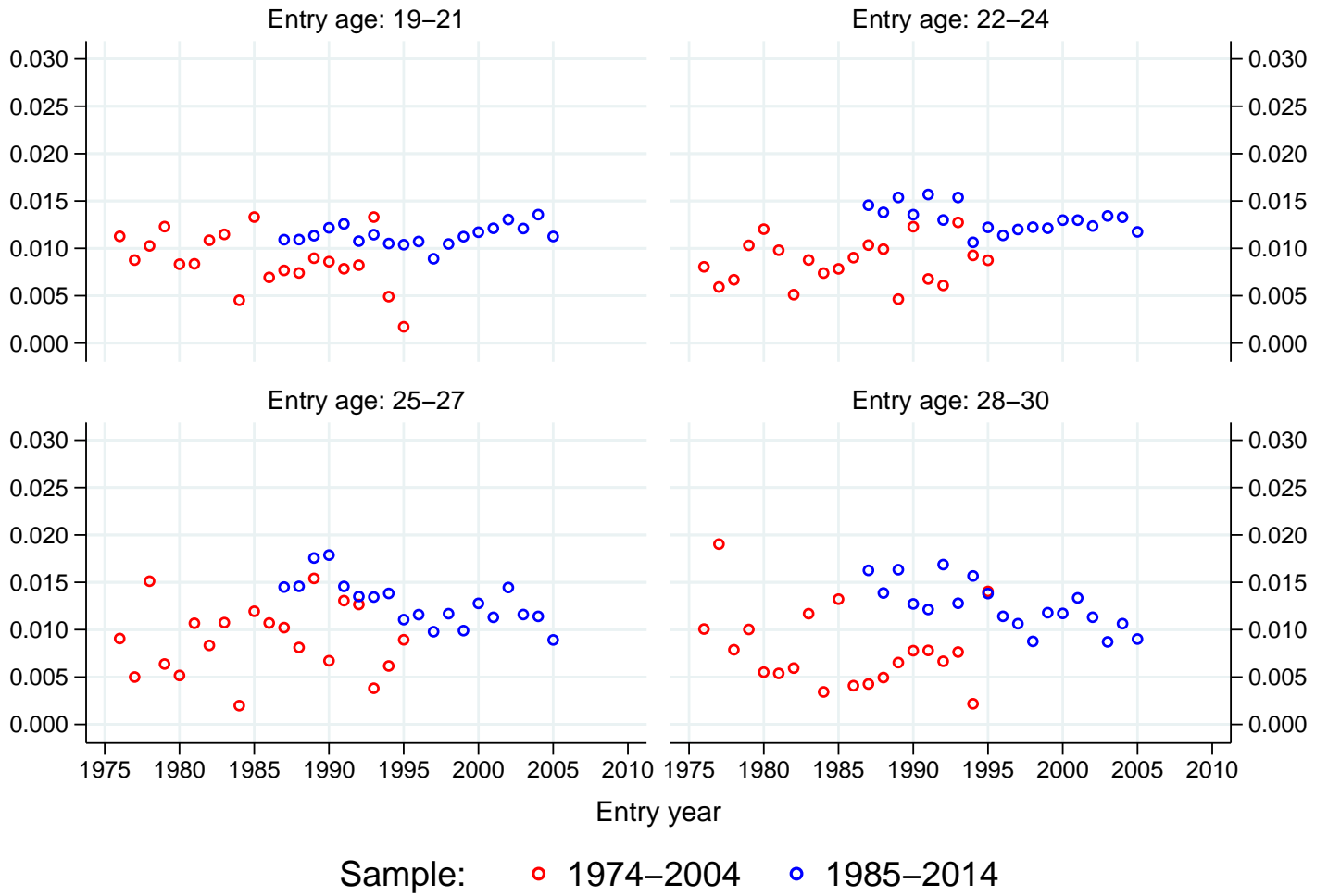Figure 10: Variance of unobserved individual fixed effects

Source: Authors' elaborations on Social security records.

Figure 11: Variance of temporary wage shocks

Source: Authors' elaborations on Social security records.

Figure 12: Variance of permanent wage shocks

Source: Authors' elaborations on Social security records.