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Cohort size and youth labour-market outcomes in Europe

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Abstract

Using data from 49 European regions covering 2005-2012, this paper estimates the effect of cohort size on youth employment and unemployment outcomes. The effects are found to be very sensitive to the age range of the sample used for estimation. In particular, the results show a negative (positive) effect of cohort size on employment (unemployment) among individuals aged 18-22 but the opposite effects among older individuals. This heterogeneity is driven by Eastern and Western European countries. For Southern European countries, belonging to a larger cohort is found to be beneficial across all age groups.

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1. Introduction

The question of how cohort size affects the labour-market prospects of its members has generated a substantial body of research. While there exists ample evidence that, ceteris paribus, wages are lower in larger cohorts (see Moffat and Roth, 2016, for a survey), the effect on (un-)employment outcomes is less well understood. The cohort-crowding hypothesis is based on the assumption that differently aged workers are only imperfectly substitutable due to differences in human capital (Welch, 1979). If wages are not fully flexible, an increase in the size of an age group will lead to an increase in the unemployment rate of that group. Korenman and Neumark (2000) provide evidence from cross-country longitudinal data in support of the cohort-crowding hypothesis by showing that increases in the size of youth cohorts lead to higher youth unemployment rates. Opposing results are obtained by Shimer (2001). Using data on a panel of US states, he finds that the size of the youth cohort reduces the unemployment rate of youths (as well as other age groups). These findings are motivated through a search-and-matching model in which young individuals are more often without a job or less well matched to their employers than older individuals and are therefore more willing to take up or switch jobs. This makes it easier for firms to make a productive match with workers in areas with a large number of young individuals. They therefore react to an expected increase in the youth cohort by creating vacancies, to the benefit of all age groups.

The small number of studies that have since looked at the relationship between age structures and unemployment outcomes have yielded mixed results. Using data on Swedish labour markets, Skans (2005) finds that the youth unemployment rate falls when the size of young age groups increases. Contradicting evidence is provided by Biagi and Lucifora (2008): their analysis of European countries suggests that larger youth cohorts lead to higher unemployment rates among the young. A common feature of this literature is the use of the share of individuals aged either 15-24 or 16-24 as the definition of the youth cohort.

This paper contributes new results based on the longitudinal European Union Statistics on Income and Living Conditions (EU-SILC) which provides greater cross-regional variation than has so far been used to address this question. More importantly, this paper adopts a flexible approach towards the definition of the youth population and shows that the effects on (un-)employment are highly sensitive to the age range of the sample used for estimation. We also find evidence that the effect of cohort size on employment and unemployment differs between Eastern, Southern and Western Europe which casts doubt on the appropriateness of pooling data across disparate economies in a single estimation sample. While Eastern and Western Europe display heterogeneous age-specific cohort-size effects, belonging to a large cohort is beneficial across all age groups in Southern Europe.

The next section discusses the dataset and empirical model. The results are presented in Section 3 and Section 4 concludes.

2. Data and Methodology

The major part of the dataset is constructed by combining nine longitudinal EU-SILC releases (see Moffat and Roth, 2016, for details on the process of appending the different datasets). This not only allows extension of the time dimension of the dataset beyond the four years provided by a single longitudinal release, but also increases the number of observations within a given year. The resulting dataset contains 2.76 million observations on over 1 million individuals, covering 2004-2013. For purposes of estimation, the dataset is aggregated to the level of

region-year cells. Because individuals in EU-SILC are not randomly sampled, this requires the use of weights. These are constructed by adjusting the weights provided in each release of EU-SILC to take account of the number of rotational groups within a country-year combination. The dataset is supplemented by the size of relevant age groups between 1990 and 1999 (which is used to construct instrumental variables) from Eurostat's publicly available database. After the removal of countries for which the full range of required information is not available[1], the final dataset is a balanced panel of 49 Nomenclature of Territorial Units for Statistics (NUTS) 1 regions from the following countries covering 2005-2012 (number of regions per country in parentheses): Austria (3), Belgium (3), Czech Republic (1), Denmark (1), Estonia (1), Greece (4), Spain (7), France (8), Hungary (3), Italy (5), Lithuania (1), Luxemburg (1), Latvia (1), Poland (6), Sweden (3), Slovakia (1).

The analysis estimates the effect of youth cohort size on the share of young individuals in region *r* and year *t* that are unemployed and employed. Since females are excluded to reduce problems from selected labour-market participation, these fractions are calculated from the individual-level data as the weighted sum of male youths who report to be (un-)employed in a given region-year group divided by the total male youth population in that cell. In order to assess the extent to which the effect varies with the age range of the sample, the model is estimated separately for the following age groups: 18-22, 19-23, 20-24, 21-25, 22-26, 23-27, 24-28 and 25-29.

The model's central explanatory variable is the share of young individuals in the working-age population. This ensures comparability with the previous literature. The youth population is defined as a 5-year age group, which leads to the following measure of cohort size:

$$CS_{jrt} = \frac{N_{jrt}+N_{j+1,rt}+N_{j+2,rt}+N_{j+3,rt}+N_{j+4,rt}}{N_{16-65,r,t}} \quad (1)$$

N_{jrt} is the weighted number of individuals aged *j* (where *j* ranges from 18 to 25 in accordance with the lower age range of the sample) in region *r* in year *t*. Since the model is estimated separately for each of the above mentioned age ranges, the cohort-size variable is age-invariant within the samples used for estimation. As they are not available to the labour market, individuals reporting to be in the military or disabled or unfit to work are omitted from the sample and from computation of the cohort-size variable. However, since it is not possible to definitively categorise other individuals reporting themselves to be neither employed nor unemployed as either available or unavailable to the labour market (Jones and Riddell, 2006; Moffat and Yoo, 2015), we follow the approach of the extant literature and include them in our measure of cohort size.

The effect of cohort size on the outcome variables is therefore modelled as follows:

$$share_{jrt} = \alpha + \beta CS_{jrt} + \eta_{\boldsymbol{r}} + \pi_t + \varepsilon_{rt} \quad (2)$$

The variable $share_{jrt}$ represents either the unemployment or employment share, CS_{jrt} represents cohort size, $\eta_{\boldsymbol{r}}$ is a set of region dummies and π_t is a set of time dummies. The size of an age group in a given region and year is not necessarily exogenous because individuals might react to economic shocks by migrating into regions that offer better economic prospects. If such self-selection takes place, cohort-size would be endogenous to the share of individuals that are (un-)employed and estimation by ordinary least squares (OLS) would yield an inconsistent estimate

[1] These are Germany, the Netherlands, Portugal, Croatia, Finland, Iceland, Slovenia, Ireland, the United Kingdom, Bulgaria, Cyprus, Malta, Norway and Romania.

of the cohort-size effect. In order to address this issue, we employ an instrumental variable (IV) strategy. Specifically, we use the relative size of the age group that is fourteen years younger than the reference group as observed fourteen years earlier as an instrument. Instruments of this type have been regularly used in this literature[2] and are appealing because, in the absence of large net migration rates or natural population changes, a cohort that was relatively large (small) in the past will remain large (small) in the present.

$$CS\_Ins_{jrt} = \frac{N_{j-14,r,t-14}+N_{j-13,r,t-13}+N_{j-12,r,t-12}+N_{j-11,r,t-11}+N_{j-10,r,t-10}}{N_{2-51,r,t-14}} \quad (3)$$

3. Results

Figure 1 shows the estimated coefficients and associated confidence intervals for the cohort-size variable from IV estimation using overlapping samples of differently aged individuals. For both outcome variables, the effect of cohort size varies substantially across age groups. When the dependent variable is the unemployment share, the effects are positive and statistically significant for individuals aged 18-22 but negative and statistically significant for older groups. The effect appears to converge to between -5 and -6 for the older groups implying that an increase in cohort size of 1 percentage point would lead to a reduction of the age-specific employment share of between 5 and 6 percentage points.[3] In the employment model, cohort-size effects are negative and significant for individuals aged 18-22 but positive and significant for older age groups, converging to a value of between 6 and 8.[4]

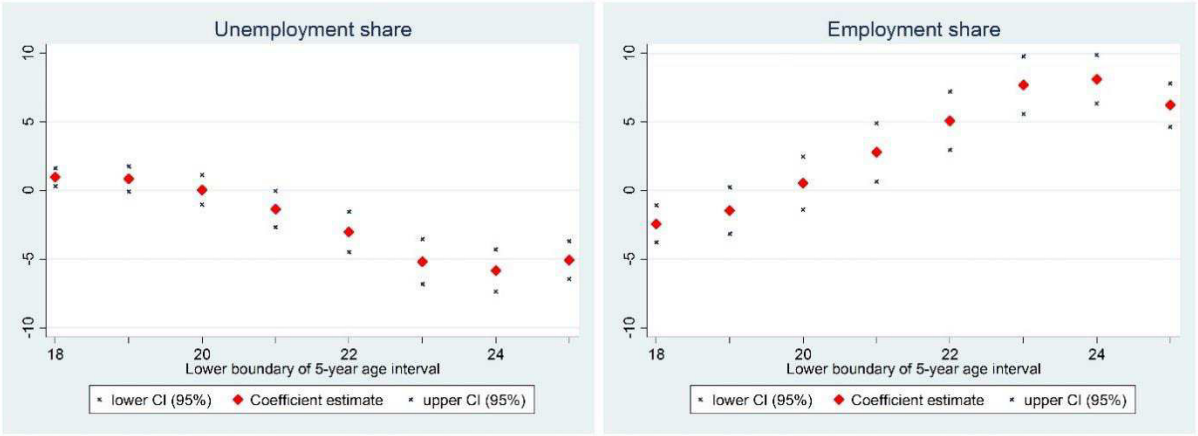
Since the unemployment (employment) share is the unemployment (employment) rate multiplied by the labour force participation rate, it is straightforward to show the source of the effect heterogeneity shown in Figure 1. Estimation of Equation (2) using the unemployment/employment rate and the labour force participation rate as the dependent variable reveals that the variation in the estimated coefficients is largely due to effects on the unemployment/employment rate. With the exception of the age groups 23-27, 24-28 and 25-29, for which the effects are positive but small, the effects on the participation rate are not statistically significant. Estimation of the model using the education share as the dependent variable shows, unsurprisingly, that these latter results coincide with negative effects on the education share. These results are presented in Figures S10 and S11 in the Supplementary Material.

[2] Further information on the instrument can be found in Moffat and Roth (2016), while the validity of time- and age-lagged instruments is discussed in Garloff and Roth (2016).

[3] To allow for direct comparison with Shimer (2001), a double-log specification is also estimated. In the case of the unemployment share the estimated coefficients at the upper end of the age range are about 50% larger than the corresponding effects in Shimer (2001). However, for older age groups his analysis produces results that are comparable in magnitude to those reported in Table 1. The estimated coefficients are shown in Table S1 in the Supplementary Material.

[4] Similar results are obtained when using Ordinary Least Squares estimation (see Figure S2 in the Supplementary Material), additional covariates are added to the model (Figure S3), all available regions available between 2004-2013 are included (Figure S4); an age-varying cohort-size measure (Wright, 1991; Brunello, 2010; Moffat and Roth, 2016) is used (Figure S5); individuals years are removed from the sample (Figure S6); individual regions are removed from the sample (Figure S7); no weights are used (Figure S8) and the population aged 16-65 is used as the weight (Figure S9).

Figure 1: Estimated cohort-size coefficients across age groups

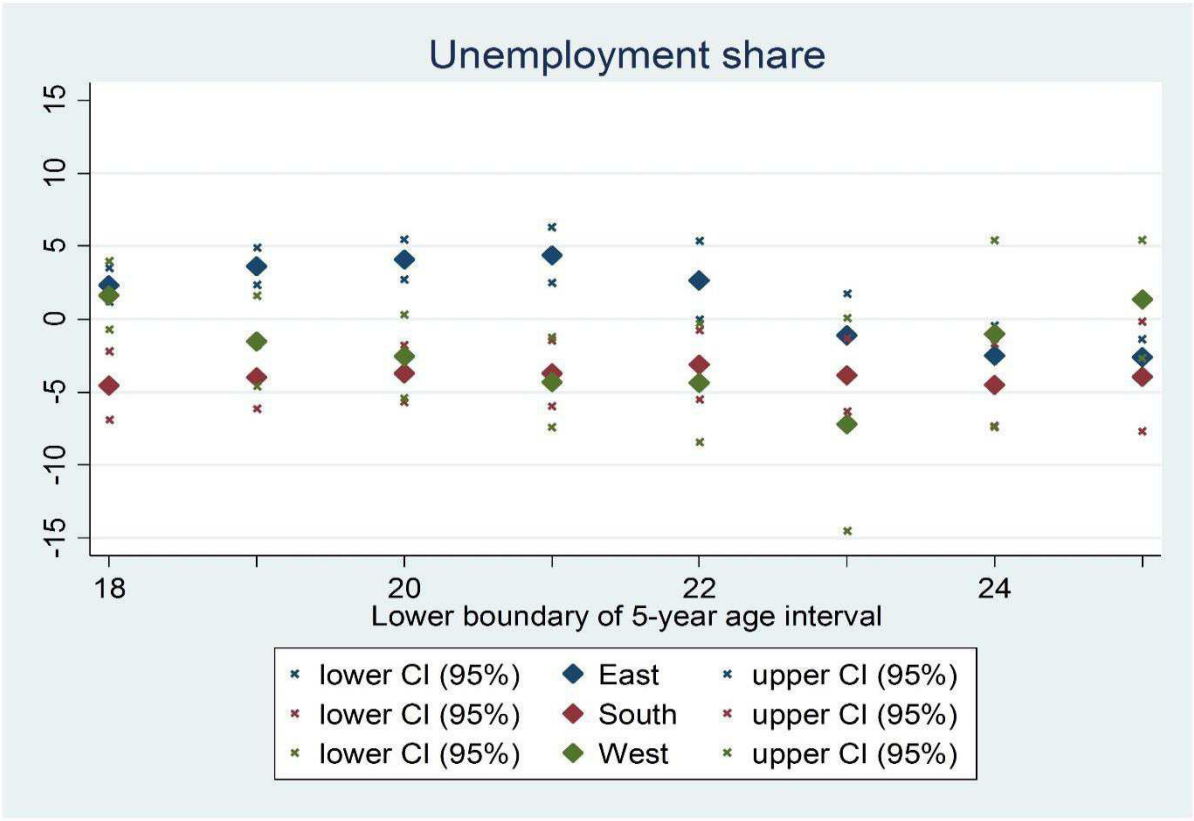


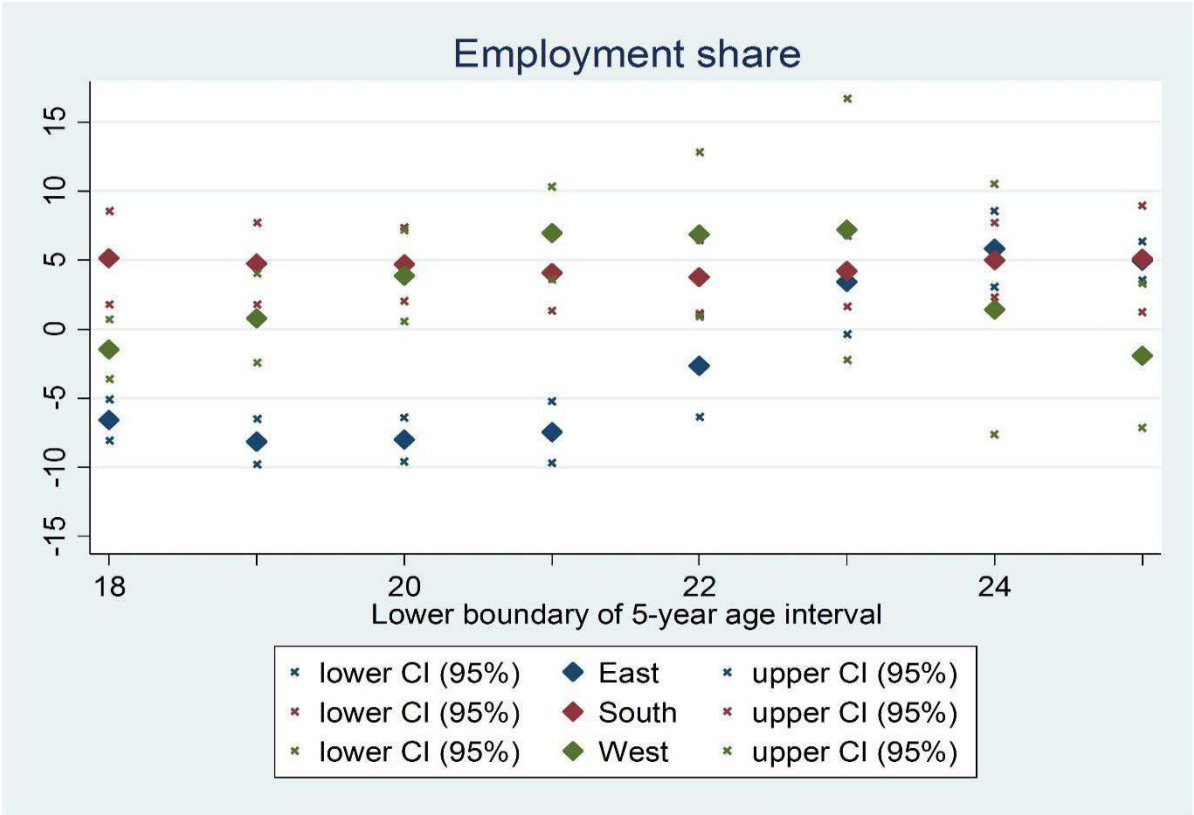
Estimated coefficients are obtained from weighted 2SLS estimation of a model containing dummy variables for regions and years. The weights are the estimated number of male observations in the relevant age group in a region-year cell. Robust standard errors are used.

In order to assess whether the pattern observed in Figure 1 is also obtained for different parts of Europe, Equation (1) is re-estimated for regions in Eastern Europe (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Slovakia), Southern Europe (Greece, Italy and Spain) and Western Europe (Austria, Belgium, Denmark, France, Luxembourg and Sweden). Figure 2 shows that Eastern Europe shows the greatest heterogeneity across age. The estimated effects on the unemployment (employment) share are positive (negative) and statistically significant for younger age groups but become negative (positive) for age groups 23-27 and above. There is also considerable heterogeneity in Western Europe: the effects are positive (negative) on unemployment (employment) but statistically insignificant for age groups 18-22 and 25-29 but of the opposite sign for all other age groups. Membership of a large cohort therefore has a mostly positive effect on youth labour market outcomes in Western Europe although the magnitude of the effect is variable. By contrast, the estimated coefficients for Southern Europe show very little heterogeneity across age. Although they are relatively modest (between -3 and -5 for unemployment and 4 and 5 for employment), they suggest that belonging to a larger cohort is beneficial for all of the age groups considered. This is therefore consistent with the argument of Shimer (2001) that firms disproportionately create jobs in regions with large youth populations.

While the results for Western Europe and, particularly, Southern Europe tend to support the hypothesis that young individuals gain (to different extents) from membership of larger cohorts, the story is more complex for Eastern Europe. One explanation is that the change in the coefficient estimates seen in Eastern Europe is the result of differences in the relative strengths of the (harmful) effects of cohort crowding and the (beneficial) effects arising from firms creating more jobs in areas with larger youth populations (Shimer, 2001). In relation to the former, if young cohorts become more substitutable with older cohorts as they age, the detrimental effects of belonging to a large cohort will diminish. In relation to the latter, because mobility decreases with age (Antolin and Bover, 1997; Nivalainen, 2004) and large groups at the lower end of the age range therefore do not necessarily predict future large groups, firms may not respond to large groups at the lower end of the age range by creating employment. If this is the case, the mechanism discussed by Shimer (2001) would be more applicable to older age groups and may dominate the cohort crowding effect. Given high rates of emigration from Eastern to Western Europe over the sampling period, particularly of young individuals (Atoyan et al. 2016), this is likely to be particularly true of Eastern Europe and may therefore explain the effects observed for older age groups.

Figure 2: Estimated cohort-size coefficients across age groups for Eastern, Southern and Western Europe (unemployment share)





Estimated coefficients are obtained from weighted 2SLS estimation of a model containing dummy variables for regions and years. The weights are the estimated number of male observations in the relevant age group in a region-year cell. Robust standard errors are used.

4. Conclusion

This paper has estimated the effect of cohort size on youth employment and unemployment outcomes using data on 49 regions covering the period 2005-2012. The results show that the estimated effects are highly sensitive to the chosen age range. In particular, we find that the sign of the estimated coefficient changes as successively older age groups are used. Further analysis shows that this heterogeneity is driven by Eastern and Western European countries. The effects of belonging to a larger cohort are found to be advantageous for all age groups in Southern Europe. Since the previous literature has tended to define the youth population as that aged either 15-24 or 16-24 and has, in some cases, pooled data from disparate economies, our results indicate that this may conceal considerable effect heterogeneity. Our results for older age groups and for Southern and Western Europe generally suggest that youth (un)employment outcomes are positively affected by the size of the youth age group, in line with previous findings by Shimer (2001) and Skans (2005).

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