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A note on the effects of human capital policies in Italy during the Great Recession

Paolo Di Caro
Italian Ministry of Economy and Finance

Roberta Arbolino
University of Naples l'Orientale

Ugo Marani
University of Naples l`Orientale

Abstract

Human capital policies can make labor supply more resilient to adverse shocks. This note investigates the role of regional human capital policies funded by the EU cohesion policy on the Italian regional labor markets during the Great Recession. By using different panel models, we find that the EU funds financing education and training contributed to smooth the negative employment consequences of the recent crisis. We detect limited effects in terms of hours allocated to job-insurance mechanism. We also document that the role of human capital policies is high in the regions with low educational attainment levels, in line with theoretical predictions on catching-up processes. Our findings are fairly robust to alternative specifications and endogeneity issues.

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Contact: Paolo Di Caro - paolo.dicaro@mef.gov.it, Roberta Arbolino - rarbolino@unior.it, Ugo Marani - marani@unina.it.
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Paolo Di caro
Italian Ministry of Economy and Finance

Roberta Arbolino
University of Naples l'Orientale

Ugo Marani
University of Naples l''Orientale

Benedetto Torrisi
University of Catania

Abstract

Human capital policies can make labor supply more resilient to adverse shocks. This note provides evidence on the labor market effects of the progress of the EU cohesion policy funding projects on education and training in the Italian regions during the Great Recession. We find that where the EU funds were effectively transferred to the beneficiaries, the negative consequences of the recent crisis on employment were smoothed. No significant effects are registered when looking at the intensive margin, in line with theoretical predictions. We also document that the buffering action of human capital policies for regional labor markets is high in the regions with low educational attainment levels, by confirming the role of human capital policies for catching-up processes. The results control for cross-sectional dependence and endogeneity issues.

The views expressed are those of the authors and do not reflect those of the institutions they are affiliated with. The usual disclaimers apply.

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1. Introduction

Human capital policies can play a crucial role for sustaining economies both in the long- and the short-run, if used for the enhancement of current and prospect workforce. Indeed, policies aimed at fostering the accumulation of human capital may contribute to improve productivity and the skill level of labor supply, and favor the matching between workers and firms (Gennaioli *et al.*, 2012). Human capital, moreover, is commonly considered as a key factor for understanding long-term growth divergences across and within regions (Vogel, 2015). In Italy, regional differences in human capital are used to explain the rooted divide between the North and the South (Gagliardi and Percoco, 2012). Specific human capital policies such as on- and off-job training activities can support labor markets during recessions: the workforce can positively react to economic shocks, by acquiring and updating skills (Heckman and Carneiro, 2003). Using data on the US, Belfield (2015) found that more educated and trained workers displaced less educated and trained workers during the recent crisis. In the European Union (EU), the Junker Plan pointed out to strengthen human capital through investments in education, given that, during the recent crisis, low-educated workers were less resilient (EU Commission, 2016). During the years 2007-2013, EU cohesion funds addressed to human capital increased by about 30%, by contributing, according to the EU Commission, to moderating the effects of the Great Recession in the European regions (EU Commission, 2017). Yet, evidence is needed for supporting the view that cohesion policies sustained regional labor markets over the crisis (Camagni and Capello, 2015).

This note provides evidence on the short-term labor market consequences of regional human capital policies undertaken in Italy over the years 2007-2013, by using novel data on the EU funds in the twenty Italian regions (NUTS-2 level). Specifically, we study if and to which extent the EU funds used by regional policymakers for financing human capital policies produced effects on regional labor markets during the recent crisis, as measured by variations in employment and hours allocated to the main Italian job insurance mechanism, the *'Cassa Integrazione Guadagni Ordinaria'* or CIGO. Differently from previous works, we construct a region-specific indicator – presented in the next section – that is able to describe the absorption of the cohesion policy managed by regional policymakers (Tosun, 2014). We contribute to the existing literature along several dimensions. Our analysis studies the economic effects of the cohesion policy over the years 2007-2013, by covering all the Italian regions and not only some geographical areas (Ciani and De Blasio, 2015). We apply different panel data models to regional observations, by integrating the findings of Cerqua and Pellegrini (2018). Regional data are preferred for two main reasons: regional authorities manage a large fraction of the EU funds in comparison to municipalities/provinces; most of the cohesion policy changes undertaken during the Great Recession were activated by regional governments.[1] Therefore, this work is directly related to the regional science literature and cohesion studies (Pinho *et al.*, 2015); it can be also considered complimentary to the papers using more disaggregate data on local labour systems or individuals (Andini *et al.*, 2013; Matano and Naticchioni, 2015). The results of this note are part of a research project undertaken by the authors on the estimation of the effects of the EU cohesion policy in the Italian regions during the Great Recession (Arbolino *et al.*, 2018).

Our findings, which are robust to different econometric models (OLS, GMM and IV), suggest that in the regions where the EU funds for human capital projects where timely transferred to beneficiaries, the negative effects of the Great Recession were smoothed. This is in line with theoretical predictions that suggested the buffering role of human capital policies during recessions (Capello and Lenzi, 2014), and with the evidence of recent studies

[1] Some Italian regions (Emilia-Romagna, Liguria, and Lombardy) recalibrated the cohesion funds during the years 2007-2013 by supporting anti-crisis packages financing job-oriented training activities.

focusing on the labor market effects of the cohesion policy in the Lombardy region (Porro and Salis, 2017). We find that the effects of human capital policies on the job-insurance mechanism are significant only in the IV models, by suggesting further investigation on this direction. Indeed, human capital policies are less likely to influence labor demand than labor supply, particularly during economic crises (Keen and Nada, 2016). Moreover, we focus here only on the EU funds managed by regions, a limited share of cohesion funds for human capital policies in Italy: possibly, the policies activated by the central government are more suitable for explaining changes in worked hours than regional policies. We also provide supporting evidence on the fact that the returns of human capital policies are conditional to human capital levels, by confirming that such policies can contribute to the activation of catching-up processes in lagging regions (Heckman and Jacobs, 2010). Two are the main limitations of our analysis. We only consider the quantitative aspects of regional human capital policies, without looking at the quality of such policies that can produce different effects on labor markets. We are not able to distinguish the effects of specific policies – active labor market policies, on- and off-the job training policies, policies for skill formation – that can play a different role during crises (Heckman, 2000).

The remaining of the paper is organized as follows. Section 2 describes the data and the methodology. Section 3 presents the results. Section 4 discusses some policy conclusions. Additional results are provided in the Appendix.

2. Data and Methods

2.1 Labor market indicators and human capital in the Italian regions

We describe regional labor markets by combining information on total employment and hours allocated to the CIGO. Workers benefiting from the CIGO are excluded from employment figures, and a decrease (an increase) of the CIGO can be read as the presence of better (worse) economic conditions following a rise (a drop) in labor demand (Tronti, 1991). The graphs in fig. 1 report the average growth of total employment (fig. 1a) and CIGO (fig. 1b) registered in the Italian regions during the years of the Great Recession. Spatial differences emerge when looking at the distribution of the two variables on a regional level: the ANOVA Tests on the equality of the mean level reject the null hypothesis at 5% level of significance. High employment losses are registered in most of the Southern regions, where the effects of the recent crisis on occupation were more marked. The highest changes in the CIGO were observed in the Northern regions; this is a direct consequence of the concentration of the manufacturing sector in this area. The Italian regional labor markets experienced uneven reactions during the Great Recession. In the next sections, we explore if the different absorption of the EU resources for human capital policies are able to explain such differences.

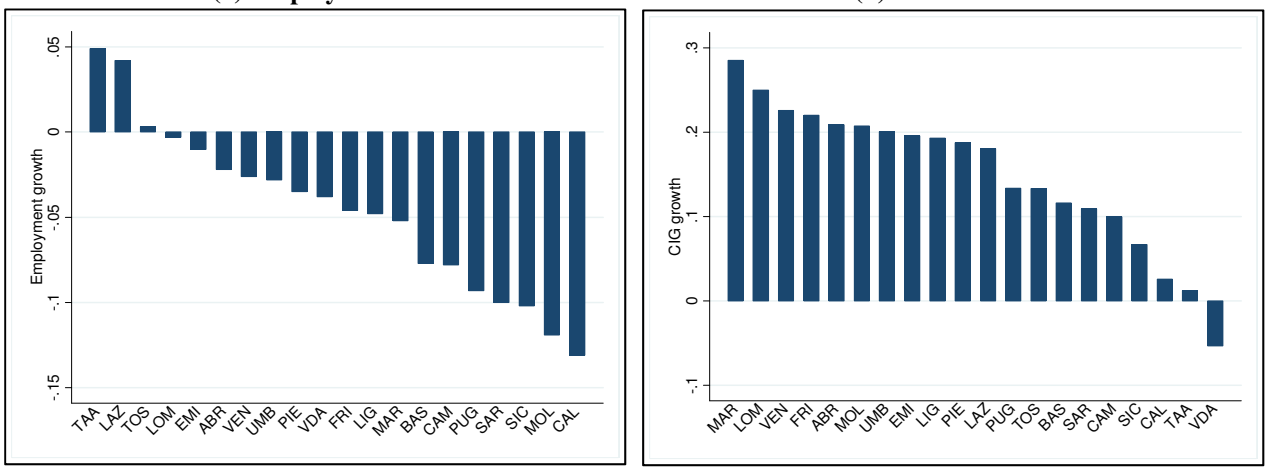
To measure the absorption of the EU funds financing human capital policies in a given region *i*, for each individual year, we have constructed an indicator obtained as the share of annual payments made by regional authorities divided by the funds committed to the region at the beginning of the programming period 2007-2013. More formally:

$$0 \leq EU\ funds\ absorption_{it} = \left(\frac{EU\ payments}{EU\ committed\ funds}\right)_{it} \leq 1. \qquad (1)$$

This indicator ranges from zero (low absorption) to one (high absorption). Data on payments refer to the EU expenditures (ERDF and ESF) within each Regional Operational Program (ROP). The attention is limited to resources allocated trough ROPs that are autonomously managed by regional policymakers. The EU funds allocated to human capital policies were the second highest (after transportation) in terms of total commitments over the years 2007-2013, counting for about 24% of the total allocation of the EU cohesion policy in Italy.

Figures 1a-b. Regional growth in employment and CIGO, years 2007-13

(a) Employment **(b) CIGO**

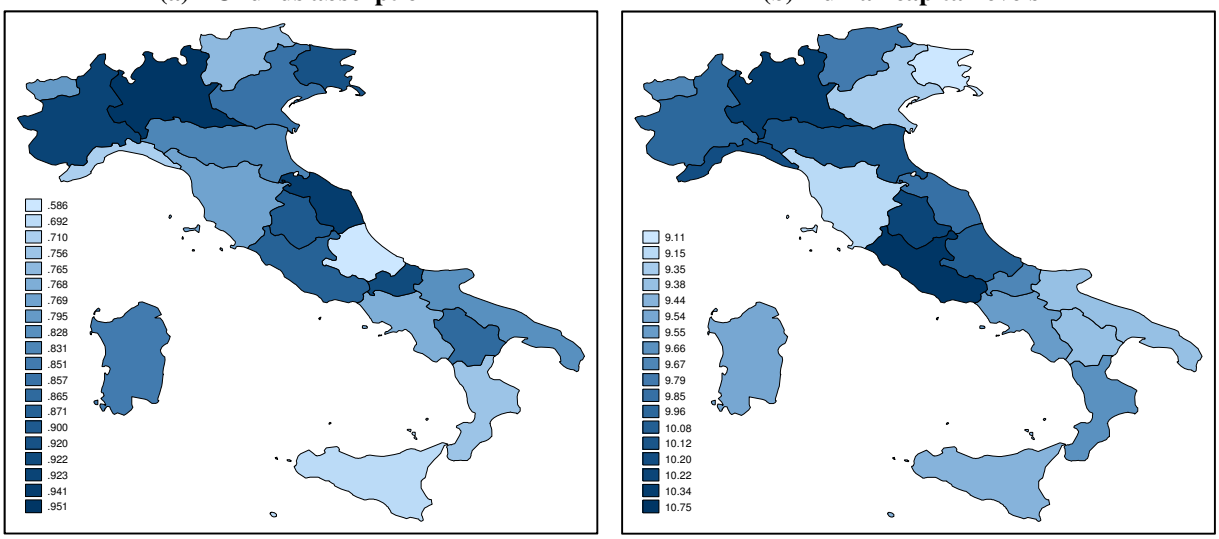


Note: Growth rates are calculated as average over the years 2007-13. ABR: Abruzzo, BAS: Basilicata, CAL: Calabria, CAM: Campania, EMI: Emilia-Romagna, FRI: Friuli VG, LAZ: Lazio, LIG: Liguria, LOM: Lombardia, MAR: Marche, MOL: Molise, PIE: Piemonte, PUG: Puglia, SAR: Sardegna, SIC: Sicilia, TAA: Trentino AA, TOS: Toscana, UMB: Umbria, VDA: Valle d'Aosta; VEN: Veneto.

Fig. 2a shows the regional distribution of the indicator in (1). In the Centre-North of Italy, the indicator is equal (on average) to 0.85, that is, for 1 euro of EU funds committed to human capital policies, about 0.85 euro are transferred to beneficiaries by means of payments. In the Southern regions, where the absorption of the EU funds is relatively low, for each euro of EU resources funding human capital policies, about 0.78 euro are effectively paid to the beneficiaries. In every region, however, the EU funds have been used for different projects. In Lombardy, most of the funds were used for individual supporting measures like training voucher and scholarships; in Emilia-Romagna, most of the resources were used for financing educational infrastructures. In Calabria and Campania (South), a relevant share of the EU funds was used for purchasing of goods and services. Fig. 2b maps the stock of human capital in the Italian regions, as measured by the average number of years of educational attainment of the regional population. This variable, which is calculated by weighing the educational attainment achieved by a fraction of the total population in school years with the corresponding duration in years of the specific educational level, is a measure commonly used in the literature (Barro and Lee, 2013).

Figures 2a-b. EU funds absorption and human capital levels, Italian regions

(a) EU funds absorption **(b) Human capital levels**



Note: EU funds absorption (figure a) and human capital (figure b), calculated as average over the years 2007-13.

2.2 Econometric methodology

We have estimated the following panel relationship:

$$y_{it} = \alpha_i + \beta_1 EUabs_{it-1} + \beta_2 Humcap_{it-1} + \beta_3 (EUabs * Humcap)_{it-1} + X_{it-1} + \lambda_t + \varepsilon_{it} \quad (2)$$

where the dependent variable y_{it} is the growth rate of employment/CIGO in region $i = 1, \dots, 20$ at time $t = 2007, \dots, 2013$. The main covariates of interest are introduced with a lag of one year: the cohesion policy can produce effects on regional labor markets after some time lag (Mohl and Hagen, 2010). This choice also limits the occurrence of reverse causality bias in the estimates (Pinho *et al.*, 2015).[2] The (overall) labor market effects of regional human capital policies are equal to $\Delta y / \Delta EUabs = \beta_1 + \beta_3 * Humcap$. The (partial) effects captured by the coefficient β_1 have to be integrated with the effects of the interaction term that allows for the consideration of human capital policies conditional on the endowments of human capital observed in the different regions. We expect that the labor market consequences of human capital policies financed by the EU cohesion policy will be high in the regions where the existing stock of human capital is relatively low, given the role of human capital policies for supporting catching-up processes across regions (Barro, 2001). Human capital policies mostly sustain lagging regions (OECD, 2009).

The relation (2) is enriched as follows. Regional fixed-effects (α_i) are used for taking into account time-invariant differences across units (Hsiao, 2014);[3] time dummies are included for considering effects that are common across all regions like the advancement of the EU budget during the programming period (Elhorst, 2014). The choice of regional- and time-fixed effects has been supported after applying Likelihood Ratio tests. The set of covariates X_{it-1} always includes lagged values of the regional population, as a standard control variable used in labor market models (Chodorow-Reich *et al.*, 2012). We have also added the growth of employment/CIGO registered in the previous EU programming period (2000-2006) in order to account for pre-existing regional economic trends that can affect through persistence or regression to the mean current changes in the variables (Bondonio and Greenbaum, 2007). The total allocation of the EU funds granted to a region at the beginning of the programming is included for considering the different amount of EU funds among regions, in line with the existing studies (Crescenzi et *al.*, 2016). Tab. A1 (Appendix) shows correlation between main variables. Preliminary tests confirm the presence in the error (ε_{it}) of: heteroskedasticity (modified Wald test); serial correlation (Wooldridge test); cross-sectional independence (Pesaran's test). Consequently, our baseline estimates are obtained by using the Prais-Winsten estimator with heteroskedasticity-robust and panel-corrected standard errors (Beck and Katz, 1995).

3. Results

3.1 Main estimates

Tab. 1 shows panel estimates when the dependent variable is the employment growth rate. The Prais-Winsten estimates are reported in models a-c. In models d-f, we report the results obtained by applying the Generalized Method of Moments (GMM). Although GMM results have to be read carefully given the small dimension of our panel, they are still useful for

[2] The selection of one year lag derives from the comparisons of models augmented with current and lagged covariates (Mohl and Hagen, 2010). The Hausman test robust to heteroskedasticity for the covariate *EUabs* fails to reject the null hypothesis of exogeneity at 1% level of statistical significance. The next sections contain more information on endogeneity.

[3] Adding dummies for regional macro-areas does not substantially affect our results. In model (c), for instance, the introduction of a dummy for Southern regions produces the following total effect of EU funds: 0.0173 (std. error=0.009) and -0.1172 (std. error=0.1212) for employment and CIGO, respectively.

taking into consideration additional sources of endogeneity, apart from those discussed in the next section, and to limit the occurrence of dynamic panel bias in our small T and large N panel (Roodman, 2009; Crescenzi *et al.*, 2016). We find that the role of human capital policies has contributed to smoothing the labor market consequences of the recent crisis in Italy. From model (c), in a region showing an average level of human capital, the effect of the absorption of the EU funds for human capital policies on employment growth was equal to 0.034=0.614+(-0.059*9.77), with 9.77 denoting the average years of educational attainment in Italy. During the Great Recession, a 10 percentage-point increase in the EU payments for regional human capital policies produced a positive variation of employment of 0.340 standard deviation from the mean employment growth. The F-test rejected the null hypothesis of joint not significance of the coefficients β_1 and β_3, with p-value=0.004. Following Wooldridge (2009), we have calculated the standard error of the estimated coefficient $\widehat{\beta_1} + \widehat{\beta_3} * \overline{Humcap}$ that is equal to 0.0109. The results of the controls are generally in line with the existing literature (Becker *et al.*, 2010). The goodness of the Prais-Winsten estimates is confirmed by the Wald statistics and the R-squared; autocorrelation tests results and the value of the Hansen test overall support the GMM results.

Table 1. EU funds for human capital policies, employment estimates

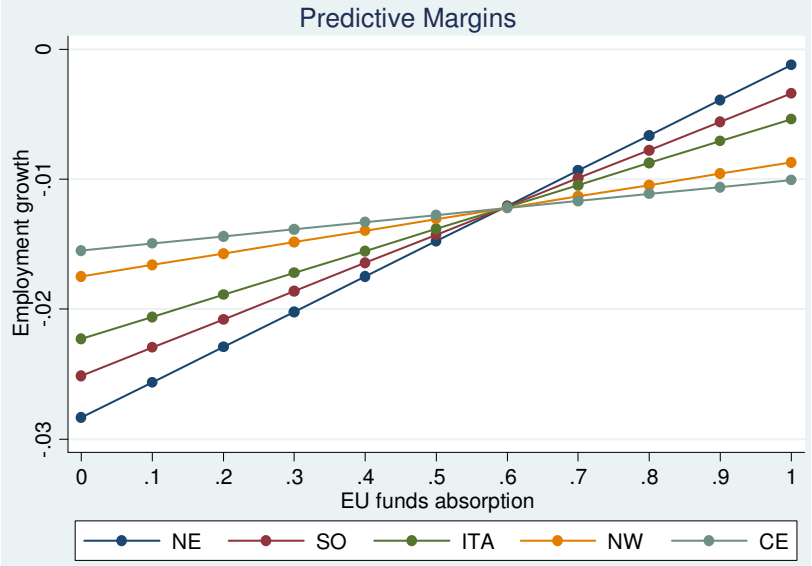
Model:	***Prais-Winsten***			***GMM***		
Explanatory variables	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**
EUabs (β_1)	0.0315***	0.0305***	0.6141**	0.0203	0.0089	0.6032
	(0.0108)	(0.0108)	(0.2788)	(0.0220)	(0.0180)	(0.6133)
Human capital (β_2)	-	-0.0345**	0.0234	-	-0.0033	0.0516
		(0.0166)	(0.0335)		(0.0091)	(0.0563)
*EUabs.*HumCap* (β_3)	-	-	-0.0594**	-	-	-0.0601
			(0.0282)			(0.0618)
Prev. emp. growth	-0.3014***	-0.3962***	-0.3994***	-0.0210	-0.0183	-0.0172
	(0.0969)	(0.1073)	(0.1064)	(0.0257)	(0.0341)	(0.0356)
Population (log)	0.2214	0.5017**	0.4201*	0.0276	0.0254	0.0238
	(0.1746)	(0.2217)	(0.2242)	(0.0277)	(0.0352)	(0.0369)
Tot. EU funds (log)	-0.0071***	-0.0062***	-0.0058***	-0.0067***	-0.0067***	-0.0061**
	(0.0015)	(0.0015)	(0.0015)	(0.0022)	(0.0023)	(0.0024)
Observations	120	120	120	120	120	120
R^2	0.38	0.39	0.41	-	-	-
Wald statistics	175.43	165.27	153.73	6.40^	5.85^	4.72^
($\chi^2_{(k)}$)	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]	[0.002]
AR(1) Test (p-value)	-	-	-	[0.244]	[0.118]	[0.170]
AR(2) Test (p-value)	-	-	-	[0.298]	[0.179]	[0.277]
AR(3) Test (p-value)	-	-	-	[0.716]	[0.940]	[0.783]
p-value of Hansen test	-	-	-	[0.320]	[0.425]	[0.132]

Note: Prais-Winsten estimates include regional and time effects, and a constant term. Errors are robust to heteroskedasticity, autocorrelation and cross-section dependence. GMM-system estimates include a constant term. The n. of instruments is equal to 11 (d), 15 (e), 19 (f). GMM-difference results are fairly similar. The set of instruments is limited following serial correlation tests on residuals and collapsed instruments (Roodman, 2009). ^GMM-system estimates report the F-statistics. *, **, *** denote significance at 10%, 5%, 1%. Figures in brackets are p-values.

Fig. 3 shows the effects of the absorption of EU funds financing human capital policies on the predicted employment growth rates, conditional to the different levels of human capital endowments registered in Italy. We find that regional human capital policies produced positive effects in all the Italian macro-regions. But, in some parts of Italy like in the South, were educational attainment levels are relatively low, labor markets would have benefited more from the absorption of the EU funds for human capital than in other regions if effective payments had been higher than they actually were. When adequately used, the effects of the cohesion policy are more market in the regions that need and receive a large amount of resources that show low levels of human capital (Rodríguez-Pose and Garcilazo, 2015). Tab. 2 reports the estimates when the dependent variable is the CIGO growth rate. Despite the

coefficients of the main variables of interest show the expected signs, they are not statistically significant by suggesting that regional human capital policies do not play a relevant role for explaining variations in hours allocated to the job-insurance mechanism over the years 2007-2013. This seems in line with the discussion developed in the Introduction.

Figure 3. EU funds and human capital, interaction effects



Note: Estimates refer to model (c) for employment (table 1). ITA (Italy); NW (North-West); CE (Centre); NE (North-East); SO: South.

Table 2. EU funds for human capital policies, CIGO estimates

Model:	***Prais-Winsten***			***GMM***		
Explanatory variables	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**
EUabs (β_1)	-0.0669	-0.1312	-0.7093	-0.0674	-0.1521	11.3125
	(0.1815)	(0.1869)	(7.3987)	(0.2416)	(0.1647)	(9.0588)
Human capital (β_2)	-	-0.5060	-0.5624	-	-0.9701	-0.0270
		(0.3630)	(0.8088)		(0.6861)	(1.3776)
*EUabs.*HumCap* (β_3)	-	-	0.0588	-	-	-1.1649
			(0.7576)			(0.9206)
Prev. CIGO growth	-0.9464***	-0.9272***	-0.9283***	-1.0436***	-0.9895***	-0.9844***
	(0.0763)	(0.0771)	(0.0772)	(0.8003)	(0.0782)	(0.0731)
Population (log)	6.3305	8.5672*	8.7478	-3.3765	0.9569	1.1015
	(5.3737)	(5.1740)	(5.4368)	(3.0499)	(3.3252)	(3.3377)
Tot. EU funds (log)	0.2163***	0.2321***	0.2326***	0.3410***	0.3497***	0.3540***
	(0.0425)	(0.0461)	(0.0468)	(0.0450)	(0.0480)	(0.0474)
Observations	120	120	120	120	120	120
R^2	0.77	0.67	0.67	0.77	0.73	0.73
Wald statistics	191.66	204.53	203.82	52.88^	46.78^	40.79^
($\chi^2_{(k)}$)	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]
AR(1) Test (p-value)	-	-	-	[0.310]	[0.160]	[0.110]
AR(2) Test (p-value)	-	-	-	[0.110]	[0.130]	[0.112]
AR(3) Test (p-value)	-	-	-	[0.590]	[0.720]	[0.520]
p-value of Hansen test	-	-	-	[0.572]	[0.259]	[0.226]

Note: Prais-Winsten estimates include regional and time effects, and a constant term. Errors are robust to heteroskedasticity, autocorrelation and cross-section dependence. GMM-difference estimates include a constant term. The n. of instruments is equal to 8 (d), 11 (e), 14 (f). The set of instruments is limited following serial correlation tests on residuals and collapsed instruments (Roodman, 2009). ^GMM estimates report the F-statistics. *, **, *** denote significance at 10%, 5%, 1%. Figures in brackets are p-values.

3.2 Robustness checks

This section provides a discussion on the sensitivity checks we have performed for supporting our findings. When introducing human capital variables in regressions like (2), Acemoglu *et*

al. (2014) pointed out to check for the presence of omitted variables bias. Current human capital endowments can be the by-product of past events influencing institutions that, if properly included in growth regressions, can improve the validity of the effects of human capital levels for explaining the growth of regional economies. In our case, endogeneity can be also due to reverse causality: fast-growing regional labor markets can attract more educated workers (Faggian and McCann, 2008). The results of the Hausman test robust to heteroskedasticity for the covariate *Human capital* reject the null hypothesis of exogeneity at 1% level of statistical significance. The interaction term can be also affected by endogeneity (Angrist and Pischke, 2010). To rule out inconsistency, we have adopted a two-stage instrumental variable (IV) strategy where historical variables available for Italy are used as instruments.[4] We have constructed regional values of the provincial instruments of Di Liberto and Sideri (2015), which capture the duration (in years) of the dominations present in the Italian regions between 1100 and 1800. These instruments rely upon the idea that past events produce consequences on the Italian regional labor markets through their permanent influence on regional institutions and human capital (D'Adda and De Blasio, 2017).

The IV estimation has proceeded as follows. In the first-stage, the variable *Human capital* is regressed in nine out of ten historical covariates representing the instruments; the covariate describing the independent states has been excluded for avoiding collinearity problems. In the second-stage, the predicted values of the first-stage regression are used for the level of regional human capital and for constructing the interaction term. In tab. 3, we report second-stage coefficients for the models (b-c), and the main IV post estimation diagnostics. Two main comments derive from the IV results. First, the positive, significant effect of human capital policies on employment growth is confirmed. Second, from the IV estimates, we also find negative, significant consequences of the absorption of the EU funds on CIGO growth over the years 2007-2013: in model (c), the total effect is equal to -0.6401 (std. error = 0.2011). The F-statistic of the first-stage is higher than ten, by suggesting that set of instruments is appropriate. The results of the Sargan-Hansen's J statistic on the validity of instruments and those of the Kleibergen-Paap rk LM statistics on the null hypothesis of under-identification overall support IV estimates.

Our results are fairly robust to alternative specifications: additional results are reported in the Appendix. To limit the attention to human capital expenditures, we have opted for the total regional EU expenditures in human capital projects, both in logs and divided by the number of unemployed, instead of the indicator of EU funds absorption. Both indicators are significantly (at 1% level) correlated with our EU funds absorption variable: 0.39 (payments) and 0.30 (payments/unemployed). Results are in tab. A2. Tab. A3 shows estimates with the inclusion of regional gross domestic product per-capita (in logs) among the controls for capturing additional sources of variations in regional employment growth rates (Crescenzi *et al.*, 2016). Tab. A4 reports Prais-Winsten estimates obtained by using annual changes in regional population rather than levels for checking for the influence of regional migration flows, which were relevant during the recent crisis in Italy (Bonifazi and Heins, 2017). We have also replicated our results by introducing a variable describing the quality of regional institutions (tab. A5); a research objective we have developed in a different paper (Arbolino *et al.*, 2018). Furthermore, we have added (tab. A6) the share of regional employment in specific sectors of production (agriculture, building, manufacturing, and public administration) in order to account for other sources of variations in our specification (Rodríguez-Pose and

[4] More information on the instruments can be found in Di Liberto and Sideri (2015). This set of instruments introduces some spatial variability among Southern regions, and shows correlation with the covariate *Humcap* (0.50) and limited correlation with the other main covariates. The set of instruments is cross-sectional and fits with our interest in explaining primarily changes in human capital levels among regions than over time: the std. dev. of the variable human capital is 0.11 (within regions) and 0.42 (between regions).

Fratesi, 2004; Jofre-Monseny *et al.*, 2016). Lastly, we have repeated our estimates after pooling our data for ruling out additional endogeneity issues due to changes of the controls over time. Results are reported in tab. A7 and they confirm the main findings of the paper.

Table 3. IV-TSLS estimates

II stage results				
Dep. Variable:	***Employment***		***CIGO***	
Explanatory variables	**(b)**	**(c)**	**(b)**	**(c)**
EUabs (β_1) *TSLS*	0.0781***	0.4702*	-0.4391**	16.1661**
	(0.0143)	(0.2793)	(0.1935)	(6.6574)
Human capital (β_2) *TSLS*	0.0607	0.0903*	-4.8183***	-3.3309***
	(0.0494)	(0.0526)	(0.7387)	(0.8935)
*EUabs.*HumCap* (β_3) *TSLS*	-	-0.0405	-	-1.7196**
		(0.0287)		(0.6959)
Prev. Emp/CIGO Growth	-0.3556**	-0.3846**	-1.1214***	-1.1135***
	(0.1625)	(0.1668)	(0.0503)	(0.0498)
Population (log)	0.2096	0.1844	19.2111***	16.0201**
	(0.4038)	(0.4029)	(6.5685)	(6.2270)
Tot. EU funds (log)	0.0035	0.0028	0.0541	0.0322
	(0.0034)	(0.0035)	(0.0460)	(0.0450)
I stage diagnostics				
F-Statistics I Stage	64.92	64.92	46.28	46.28
	[0.000]	[0.000]	[0.000]	[0.000]
Kleibergen-Paap rk LM stat.	53.75	53.75	51.16	51.16
	[0.000]	[0.000]	[0.000]	[0.000]
Hansen J statistics	10.21	10.21	12.01	12.01
	[0.256]	[0.256]	[0.150]	[0.150]
II stage diagnostics				
Observations	120	120	120	120
R^2	0.46	0.47	0.90	0.91
F-Statistics II stage	161.19	189.57	1061.75	1070.30
	[0.000]	[0.000]	[0.000]	[0.000]
Total effects EU funds	-	0.0743***	-	-0.6401**
F-test β_1, β_3 *(p-value)*	-	[0.000]	-	[0.010]

Note: Total effects of EU funds obtained as $\widehat{\beta_1} + \widehat{\beta_3} * \overline{Humcap}$, with $\overline{Humcap} = 9.77$. The F-test refers to the hypothesis on the joint not significance of coefficients β_1, β_3 (p-value). Estimates include regional and time effects. Errors are robust to heteroskedasticity, autocorrelation and cross-section dependence. *, **, *** denote significance at 10%, 5%, 1%. Figures in brackets are p-values.

4. Concluding remarks

Despite our results are not enough for support causality relations between the variables of interest, being based on different panel data models that can be affected by some limitations, from the findings provided in this note, two main policy conclusions can be drawn. First, human capital policies *lato sensu* can work for smoothing the negative consequences of economic shocks on labor markets. In the case of Italy, we have documented that the EU funds timely transferred to beneficiaries over the years 2007-2013 sustained regional labor supply. In short, our findings indirectly support the actions of policymakers in some regions (Lombardy and Emilia-Romagna), which decided to recalibrate the EU cohesion policy towards human capital and knowledge-based innovation policies during the Great Recession. Apart from other factors, this can motivate why labor markets in those regions registered a better reaction to the recent crisis than in the rest of Italy. Interestingly, both Lombardy and Emilia-Romagna have recently requested to the central government to obtain more autonomy regarding the organization of human capital policies.

Second, the current discussion on the reform of the EU cohesion policy for the period 2021-2027 has to take into account the possible usage of the cohesion funds for achieving countercyclical objectives (Kline and Moretti, 2014). This means that budget flexibility and

administrative simplification are crucial for making the cohesion policy effectively work. The cohesion policy is the main source of financial support for place-specific interventions in the EU, and its future design has to be necessarily projected by remembering that the EU funds can contribute to enhancing the resistance and recoverability of regions. We will try to improve our knowledge on the labor market effects of human capital policies when: the qualitative aspects of policies are also considered, and regional policies are interacted with national ones. We have also planned to collect more disaggregate data on a firm- and individual-level, which can help establishing causality relations and disentangling the labor market effects of specific human capital policies. These objectives are left for future research.

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