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THE EFFECT OF PARENTAL BACKGROUND ALONG THE SONS' EARNINGS DISTRIBUTION: DOES ONE MODEL FIT FOR ALL?

Michele Raitano

*Department of Economics and Law, Sapienza
University of Rome*

Claudia Vittori

*Department of Social and Policy Sciences
Centre for the Analysis of Social Policy,
University of Bath*

Francesco Vona

OFCE SciencesPo and SKEMA Business School

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***The effect of parental background along the sons' earnings distribution:
does one model fit for all?***

Michele Raitano (Department of Economics and Law, Sapienza University of Rome),

Claudia Vittori (Department of Social and Policy Sciences and Centre for the Analysis of Social Policy, University of Bath) and

Francesco Vona (OFCE SciencesPo and SKEMA Business School)

Abstract

This paper shows that returns to parental background increase along the sons' distribution in four EU countries. Although this indicates a common mechanism, substantial differences in returns' steepness question the one-model-fits-all story.

Keywords: intergenerational inequality, international comparison, unconditional quantile regressions

JEL codes: J31, J62, D31, C21

1. Introduction

It is well known that the association between parents' and children's incomes strongly differs across country: within developed countries, Scandinavian countries are the most mobile ones while the US, the UK and Italy are characterized by the highest levels of the intergenerational income elasticity (e.g., Corak, 2013). Similar rankings are found by Raitano and Vona (2015a), which analyze the size of the association between parental occupation and children earnings in EU countries. However, the association between parental characteristics and children earnings is usually assessed at the mean of the distribution of children's earnings, thus not providing insights on the mechanisms lying behind such association.

This paper sheds light on the differences in the mechanisms generating social immobility in the four largest Euro Area economies (Spain, Italy, Germany and France) looking at the association between parental background and sons' earnings along the sons' distribution. To gauge insights on these patterns, we follow the recent human capital theory and assume complementarity between family background and idiosyncratic son's ability in the skill production function (Cunha and Heckman, 2007). Accordingly, we should expect higher returns to family background in the upper percentiles of the sons' distribution. In addition, we should expect that well-off sons have a significantly higher probability to be in top income percentiles than worse-off ones. We test these predictions separately to identify the extent to which intergenerational inequality is driven by differences in returns to background within sons who achieve similar social positions as opposed to a different degree of mobility across sons' income percentiles.

To address the first issue, after presenting the data, next section discusses the use of Unconditional Quantile Regressions (UQR henceforth; Firpo et al., 2009) to estimate returns to background along the sons' earnings distribution. Secondly, we use ordered probit regressions to retrieve the marginal effect of family background on the son's probability to end up in a certain earnings percentile. Section 3 presents our results: in all countries returns to background are increasing along the sons' distribution and the probability of ending up in high percentiles is significantly correlated with parental background. This lends support to the existence of a common mechanism of intergenerational transmission where background-ability complementarities play a crucial role. However, one model fits all only partially: indeed, the steepness of returns to background along the distribution varies substantially across countries, being lower in Italy and Spain than in France and Germany. Possible explanations of the source of these differences and future research direction are discussed in the concluding section.

2. Data and Empirical Strategy

We use the information provided by the 2011 EU-SILC wave that includes a specific section with information on family characteristics when the interviewed was around 14 years old. Because EU-SILC does not record parents' incomes, we follow Raitano and Vona (2015a) and build a proxy of family background on a surrogate distribution of the parents' social positions. This distribution is built using detailed information on family characteristics in a hierarchical order: first, we rank parents according to the highest parental occupation

achieved by the father or the mother (coded through 1-digit ISCO)¹; second, individuals with the same parental occupation are ranked according to parents' highest educational attainment and then to the occupation and education attained by the parent with the lowest attainments, etc.² This procedure allows us to derive a smooth distribution of social origins. We then use the deciles of this distribution of parental social positions as the proxy of family background.

Our sample is restricted to those individuals (excluding immigrants) aged 30-54, in order to avoid biased estimates of individuals long-run earnings (Haider and Solon, 2006). Moreover, we focus on males only because the correlation between parental background and females incomes could be affected by selection bias, due to the different female labour market participation (Raitano and Vona, 2015b). To reduce selection effects driven by family background through employability, we only include males who worked full-time over the whole year. Our dependent variable is the log of the yearly gross labour income, from employment or self-employment.³

The association between family background and sons' earnings is usually assessed at the mean of the sons' distribution. However, linear estimation methods are unsuitable to grasp the interdependence between son's abilities and the influence of parental background. UQR are useful to this scope because they allow us to explore the presence of nonlinearities in the intergenerational transmission along the different percentiles of the sons' earnings distribution. UQR regression is similar to a standard linear regression where the dependent variable is replaced by the RIF (recentered influence function) of a distributional parameter of interest, i.e. a given percentile. Differently from the standard Conditional Quantile Regression, UQR enables to retrieve the marginal impact of any explanatory variable and the percentiles of the unconditional distribution of the dependent variable while controlling for other covariates (Firpo et al., 2009).⁴

We estimate the extent to which the association between parental background and children earnings varies along the sons' earnings distribution using the deciles of the distribution of parents' social conditions as proxy of background. We linearize the deciles in a continuous variable in order to estimate a single coefficient, thus making the cross-country comparison easier.⁵ More precisely the estimated model is:

$$(1) \quad \log(y_i) = \alpha + \beta back_i + \mathbf{X}\delta + \varepsilon_i$$

¹ According to the literature (e.g., Granovetter, 2005), parental occupation is a good proxy for the influence of the family on son's outcomes as it encompasses unobservable aspects of human capital, socio-economic status and family networks.

² The other characteristics included to build the rank are: dummies for fathers born in the country, for mothers born in the country and for households where both parents were present, the number of siblings (sorted in descending order), the number of income recipients in the household, the year of birth of the father and the mother (sorted in descending order).

³ The influence of outliers is reduced by dropping the bottom 1% and the top 0.5% of the country distribution of annual gross labour incomes.

⁴ To the best of our knowledge, only two studies have investigated intergenerational mobility using UQR: Schnitzlein (2014), who compares Germany and the US, and Gregg et al. (2015), which focuses on the UK. Both studies find an increasing pattern of the intergenerational income elasticity along the children income distribution.

⁵ The estimated patterns do not change if we use dummies for the various deciles.

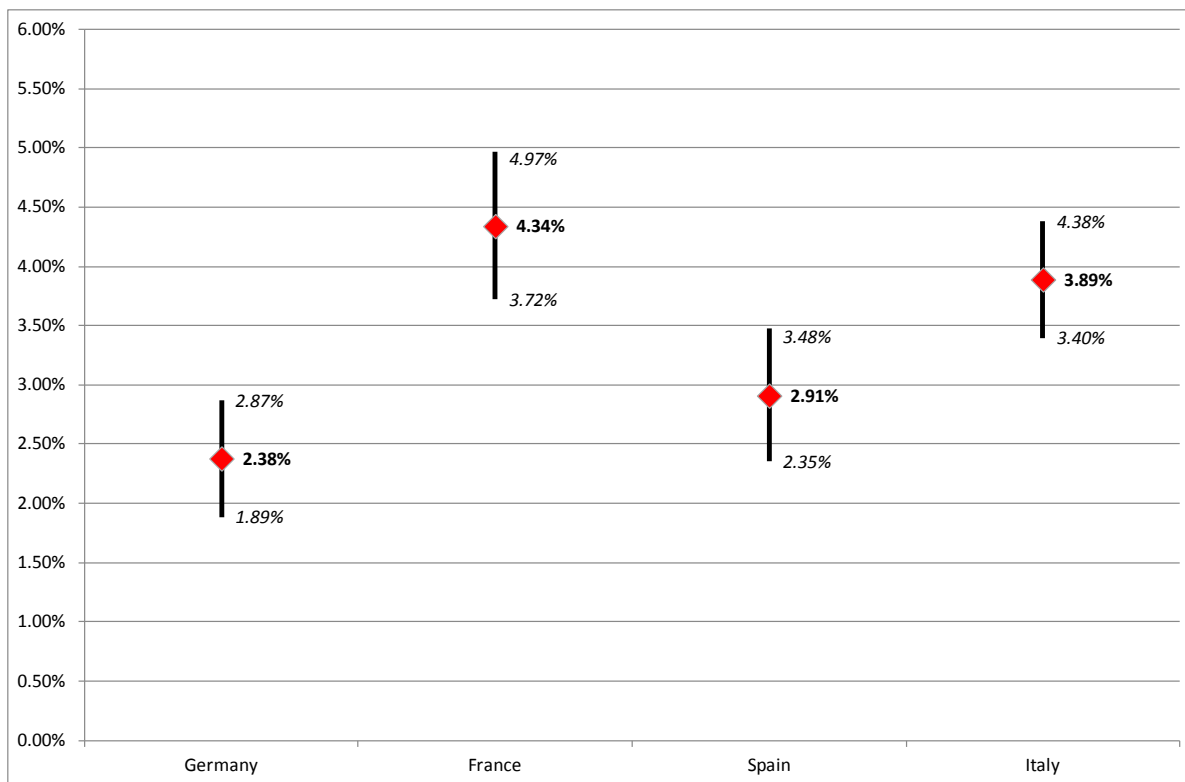
Where y is annual gross income, ε_i is a standard error term, $back$ is our variable of interest and \mathbf{X} is a parsimonious set of control variables, i.e., age, age squared and a dummy for individuals whose main labour income comes from self-employment.

We estimate both OLS and UQR at the various deciles of the son's income distribution. UQR provides price effects of parental background for those who achieve certain percentiles, but it is not informative on the influence of parental background on the sons' probability to end up in each percentile (i.e. compositional effect). To this end, we complement UQR with ordered probit regressions where the deciles of the sons' earnings distribution are the categories of the dependent variable and the same covariates of model (1) are included. We summarize the results of these regressions showing the average marginal effect of a one-decile increase in parental position on the probability of ending up in each decile of the sons' earnings distribution.

3. Results

Figure 1 presents basic OLS estimates to compare the magnitude of parental background coefficients across countries. As expected, the influence of parental background is positive and statistically significant in all countries. The size of the coefficients is instead quite different across countries: the reward associated with a one-decile increase in the parental position is 2.4% in Germany, 2.9% in Spain, 3.9% in Italy and 4.3% in France. The unexpected result is represented by the large coefficient for France, which is usually considered a country with a higher social mobility than Italy (Corak, 2013). However, this finding resonates with recent research showing a decreasing intergenerational educational mobility in France (e.g., Ben-Halima et al., 2014).

Fig. 1: OLS estimates of the association between sons' earnings and parental background.
90% Intervals of confidence

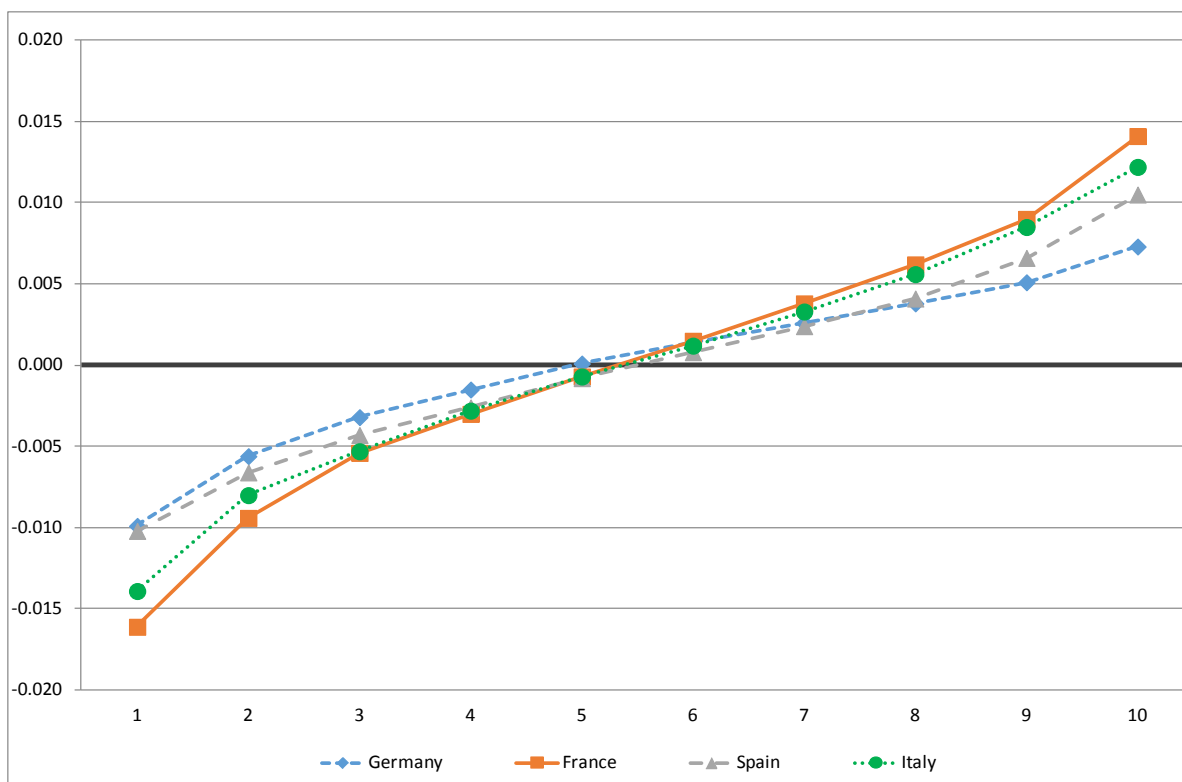


Source: elaborations on EU-SILC 2011

The country ranking is left unchanged when we estimate the effect of family background on the probability of ending up in a given income decile (Figure 2). A visual inspection of Figure 2 suggests that differences across countries are negligible, especially in the central part of the distribution. Conversely, as well known (e.g., Bratsberg et al. 2007), both social immobility and cross-country differences are more evident in the tails. Improving parental position from the bottom (first decile) to the top (tenth decile) increases the probability of being among the top income earners by only 7 percentage points in Germany, which is half of the corresponding effect for France. In the bottom part of the distribution, Italy and France appear significantly less equal than Spain and Germany, but these differences are slightly smaller than at the top.

This evidence indicates that one model fits all when the probability of being in a certain income decile is concerned. If any, cross-country differences in the effect of parental background along the sons' distribution should depend on differences in returns to background within each income decile. Our hypothesis that the influence of parental background is increasing along the sons' distribution is more likely to hold for Germany and France, where transmission through educational quality is particularly important because of, respectively, the early tracking and the *grandes écoles system*, than for Spain and Italy, where family background often affects children career prospects through social networks (Raitano and Vona, 2015b).

Fig. 2: Average marginal effect of lying in the deciles of sons' earnings distribution according to the parental background. Ordered probit estimates.



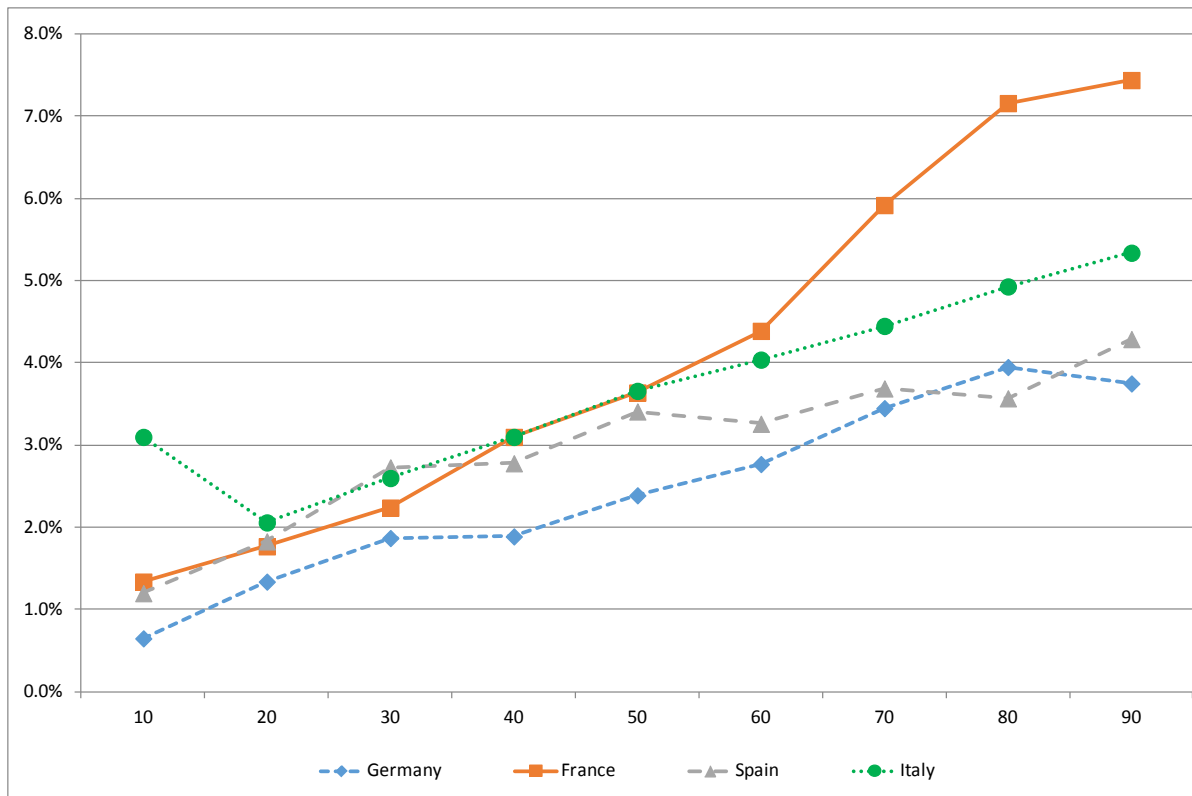
Source: elaborations on EU-SILC 2011

Figure 3 shows the results of the UQR that lend to support to the hypothesis of a widespread background-ability complementarity. Returns to background are higher at the top of the distribution not only in the two central European countries, but also in the two Mediterranean countries, where usually non-meritocratic mechanisms are stronger. The parental background coefficient is always significant, apart from in the first decile in Germany and Spain (see Table A1). The large effect at the top for France is broadly consistent with the parental influence on the probability of entering top schools.

However, one model does not fully fit all when returns to background are concerned. The curve of returns to background is significantly steeper in the two central European countries than in the two Mediterranean countries.⁶ By way of example, the ratio between the differences of the values at the 8th and the 2th deciles and the OLS mean estimate is 0.60 in Spain, 0.73 in Italy, 1.1 in Germany and 1.24 in France. This is evident from a visual inspection of the French and Italian curves that cross at the 4th decile. A rough comparison of the confidence intervals by decile also highlights strong differences in the steepness of the estimated coefficients (see Table A2).

Fig. 3: UQR estimates of the association between sons' earnings and parental background.

⁶ Note that the *J* shaped pattern in Italy (due to the high value of the estimated coefficient in the first decile) disappears when we exclude from the analysis the self-employed.



Source: elaborations on EU-SILC 2011

4. Concluding remarks

This paper points to the existence of a common mechanism through which parents affect sons' earnings, namely the complementarity between son's ability and parental inputs. This general mechanism may in turn depend on institutional factors, i.e. financial constraints on investment in human capital, or on the intrinsic features of the skill production, i.e. non-financial inputs such as parental time spent with kids and school quality. While previous research discards the liquidity constraint explanation (Grawe, 2004), further analyses are required to better understand the foundations of these complementarities. Likewise, further research is needed to assess the role played by non-meritocratic mechanisms that make the influence of family background independent of sons' abilities and particularly strong in the labour market (Hudson and Sessions, 2011).

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Appendix

Tab. A1: Estimated coefficients of the association between sons' logs of yearly gross earnings and parental background. OLS and UQR estimates.¹

UQR	Germany		France		Spain		Italy	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
10	0.0065	0.0063	0.0134***	0.0040	0.0120	0.0077	0.0310***	0.0069
20	0.0134***	0.0047	0.0177***	0.0036	0.0183***	0.0040	0.0206***	0.0032
30	0.0187***	0.0037	0.0224***	0.0035	0.0273***	0.0037	0.0260***	0.0030
40	0.0189***	0.0032	0.0310***	0.0037	0.0278***	0.0038	0.0310***	0.0031
50	0.0239***	0.0033	0.0364***	0.0038	0.0341***	0.0040	0.0366***	0.0031
60	0.0277***	0.0035	0.0439***	0.0042	0.0326***	0.0043	0.0404***	0.0033
70	0.0345***	0.0037	0.0592***	0.0051	0.0369***	0.0048	0.0445***	0.0034
80	0.0395***	0.0044	0.0716***	0.0054	0.0357***	0.0054	0.0493***	0.0042
90	0.0375***	0.0057	0.0744***	0.0071	0.0429***	0.0061	0.0534***	0.0055
OLS	0.0238***	0.0030	0.0434***	0.0038	0.0291***	0.0034	0.0389***	0.0030
Obs.	3,362		3,054		3,537		5,689	

¹ Control variables of model "A" are age, age squared and a dummy for self-employed. Observations are weighted using sample weights provided by EU-SILC. Standard errors are robust to heteroskedasticity. * p<0.10; ** p<0.05; *** p<0.01. Source: elaborations on EU-SILC 2011 data

Tab. A2: 90% Intervals of confidence of UQR estimates of the association between sons' logs of yearly gross earnings and parental background.

	Germany		France		Spain		Italy	
10	-0.0059	0.0065	0.0056	0.0134	-0.0032	0.0120	0.0175	0.0310
20	0.0043	0.0134	0.0106	0.0177	0.0103	0.0183	0.0142	0.0206
30	0.0114	0.0187	0.0155	0.0224	0.0201	0.0273	0.0201	0.0260
40	0.0125	0.0189	0.0239	0.0310	0.0204	0.0278	0.0250	0.0310
50	0.0174	0.0239	0.0289	0.0364	0.0263	0.0341	0.0304	0.0366
60	0.0208	0.0277	0.0357	0.0439	0.0243	0.0326	0.0340	0.0404
70	0.0274	0.0345	0.0492	0.0592	0.0275	0.0369	0.0378	0.0446
80	0.0308	0.0395	0.0611	0.0716	0.0251	0.0357	0.0411	0.0493
90	0.0263	0.0375	0.0604	0.0744	0.0310	0.0429	0.0427	0.0534

Source: elaborations on EU-SILC 2011 data